Propulsion Environmental Working Group

A Collaboration for Advanced Sustainment Technology Insertion

Mickey Conklin, 448 CSW/YP
**Propulsion Environmental Working Group. A Collaboration for Advanced Sustainment Technology Insertion**

**Advanced Surfaces and Processes, Inc, 448 CSW/YP, 85 N. 26th Ave, Cornelius, OR, 97113**

**Surface Finishing and Repair Issues for Sustaining New Military Aircraft Workshop, February 26-28, 2008, Tempe, AZ. Sponsored by SERDP/ESTCP.**

**Approved for public release; distribution unlimited**

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**Security Classification of:**

- a. Report: unclassified
- b. Abstract: unclassified
- c. This Page: unclassified

**Limitation of Abstract:**

Same as Report (SAR)

**Number of Pages:**

9
PEWG Mission

- Work within the AF propulsion community to discover and insert safe, clean, and effective manufacturing, maintenance, repair and overhaul (MRO) technologies to improve process & product
  - Performance
  - Affordability
  - Competitiveness
Strategic Materiel
Recovery and Re-use Program

Processing
(Strategic Material handled by Secure & Trusted Agent)

Inventory & Sort
(Secure & Trusted Agent)

Raw Material
(OEM credit to Government contracts)

$US Treasury
(FAR 45.6)

Identify & Condemn
(Unit Level)

Contracts/Records
(GDIT)

Virgin Raw Material
(commercial markets)

Manufacturing & MRO
(Organic & Contract)

Treasury
<table>
<thead>
<tr>
<th>Number</th>
<th>PEWG</th>
<th>Title</th>
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</thead>
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<tr>
<td><strong>LP700</strong></td>
<td>AA1004</td>
<td>Powder Coating Phase IV</td>
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<tr>
<td><strong>LP701</strong></td>
<td>AA1045</td>
<td>Supersonic Particle Deposition (SPD) Phase IV</td>
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<td><strong>LP702</strong></td>
<td>AA1015</td>
<td>Coating Removal Process (CRP) – CrC plus</td>
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<tr>
<td><strong>LP703</strong></td>
<td>AA1038</td>
<td>Low Radioactivity Thermal Barrier Coating (TBC)</td>
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<td><strong>LP704</strong></td>
<td>AA1051</td>
<td>Non-solvent Cleaning Process</td>
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<tr>
<td><strong>LP705</strong></td>
<td>AA1033</td>
<td>Advancements in Plating Shop Efficiencies</td>
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<td><strong>LP706</strong></td>
<td>AA1048</td>
<td>Laser Inspection of Coated GTE parts</td>
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<td><strong>LP707</strong></td>
<td>AA1028</td>
<td>Plasma Resource Recovery System (PRRS)</td>
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<td><strong>LP708</strong></td>
<td>AA1037</td>
<td>Laser Peening to Preserve GTE part life</td>
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<td>AA1036</td>
<td>Slurry Feed Nano Plasma Repair Process</td>
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<td><strong>LP710</strong></td>
<td>AA1050</td>
<td>Optical Fusion Component Repair</td>
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<td><strong>LP711</strong></td>
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<td>Advanced Coating Application Module (ACAM)</td>
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<td>AA1014</td>
<td>Stripping Solution - WCCoCr</td>
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<td>AA1040</td>
<td>Parent Material Restoration – “Recast”</td>
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<td>AA1037</td>
<td>Low Density Coatings for Component Repair</td>
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<td>AA1036</td>
<td>High Velocity Oxy Fuel (HVOF) ID Gun</td>
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<td>Laser Cladding/Additive Manufacturing (LAM)</td>
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<td>AA1029</td>
<td>No-strip/Touch-up Repair</td>
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<td>AA1057</td>
<td>Camouflage Tire and Wheel Coating</td>
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<td><strong>LP757</strong></td>
<td>AA1046</td>
<td>Single Part Wheel Paint (Low VOC)</td>
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<tr>
<td><strong>LP15</strong></td>
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<td>Qualify CERAL 3450 &amp; produce in US</td>
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<tr>
<td><strong>LP16</strong></td>
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<td>Qualify portable hand Held Laser Welding</td>
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Coating Removal Process OC-ALC = Propulsion
PEWG LP 702

Problem Statement

• Duplex coatings, such as Thermal Barrier Coatings (TBCs) used on augmentor components, are difficult to remove without damaging the part.

• Current methodology, grit blasting, damages substrates contributing to increased scrap rate.

• Blasting with material creates HAZWASTE that needs to be removed at increased cost.

Description

• An “intelligent” coating removal process (technology) that attacks a duplex coating’s bond coat without causing damage to the substrate.

• “Green” - clean, safe, environmental and worker friendly

• May be utilized in Lean cell manufacturing

• Support Tinker AFB Transformation

Deliverables

• Formula to remove duplex coatings
• Test Report
• License to use
• Final Report
• First Article

Funding Sought

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OC-ALC/YP POC
James “Mickey” Conklin
405.739.7816
**Supersonic Particle Deposition – Propulsion**  
**PEWG LP701**

**Description**
- Supersonic Particle Deposition, or Cold Spray, Technology is emerging as a viable repair alternative.
- The ability to produce coatings without inducing heat results in coatings with very low residual stress.
- Low residual stress contributes to the ability to produce thick coatings without the effects of spallation.

**Problem Statement**
- Thermal Spray Coating Technology employed at the depot has a limitation on the thickness of the coatings that it can produce. This is due to the residual stresses in the coating that are inherent with high-temperature processes.
- Often times the thin coatings produced by the traditional Thermal Spray Process represent the limiting factor when attempting to salvage an MRB component.

**Deliverables**
- Technology Report - Final
- New Process for 76 PMXG
- Identify new equipment
- Update TO pages

**Funding Sought**
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OC-ALC/YP POC  
James “Mickey” Conklin  
405.739.7816
Ceral 3450 - Chrome Free Corrosion Protection

Technology
• An environmentally friendly coating that will extend the service life of strategic components; aircraft, engines, ground vehicles.
• Aluminum-Ceramic retards corrosion / erosion
• Drop-in replacement for existing hazardous coating used throughout DoD.

Benefits To The Warfighter
• Increase time-on-wing, time on station, reduce shop visits, lower overall cost, fuel savings
• Presently being used throughout NATO and EU.

Participants
• Sponsors: USAF, USN
• Gov’t Contributors: AFRL, OC-ALC/LR, 76th PMXG/CC
• Industry: Gebr.M und M.Morant, Grassau, Germany

Schedule
• Test Plan 1QFY07
• Functional Testing 2QFY07
• Engine Testing 3QFY07
• Test Review 1QFY08
• Procurement 2QFY08

Funding ($M)
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Benefits
• RDTE Cost Avoidance: $1.5 - $3.0M
• O&S Cost Avoidance: $10M
• Procurement Cost Avoidance: $300K/yr
• Procurement Potential: >$1M/yr
• Other: Results of previous (non-US) testing are available and can be used to offset US testing costs.
**Qualify Advanced Coating Application Module**

**PEWG LP 711**

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**Phenomenal Deposition Efficiencies and Rates of Deposit**

- Reactive Metal Spraying (Ti, Zr, Al…)
- Blended and Graded Coatings

**High quality advanced coatings for life of part wear, corrosion resistance, and thermal barrier protection**

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**OC-ALC/YP POC**

James “Mickey” Conklin

405.739.7816

- Government Contributors: OC-ALC, PEWG
- Industry: Northwest Mettech Corp, Vancouver, BC

**Schedule**

- Contract for Test System: 1QFY08
- Prepare Test Protocol: 2QFY08
- Perform Testing: 4QFY08
- Procurement: 2QFY09

**Funding**

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**Benefits**

- TRL9 = RDTE Cost Avoidance: $11M
- O&S Cost Avoidance: $5M
- Procurement Cost Avoidance: $1.2M/unit
- Fielding Reduction: 4+ years (COTS System)
2008 Summer PEWG

HOLIDAY INN
6200 NORTH ROBINSON DRIVE
OKLAHOMA CITY, OK 73118

June 16th – 19th

www.pewg.com