



Propulsion Environmental Working Group

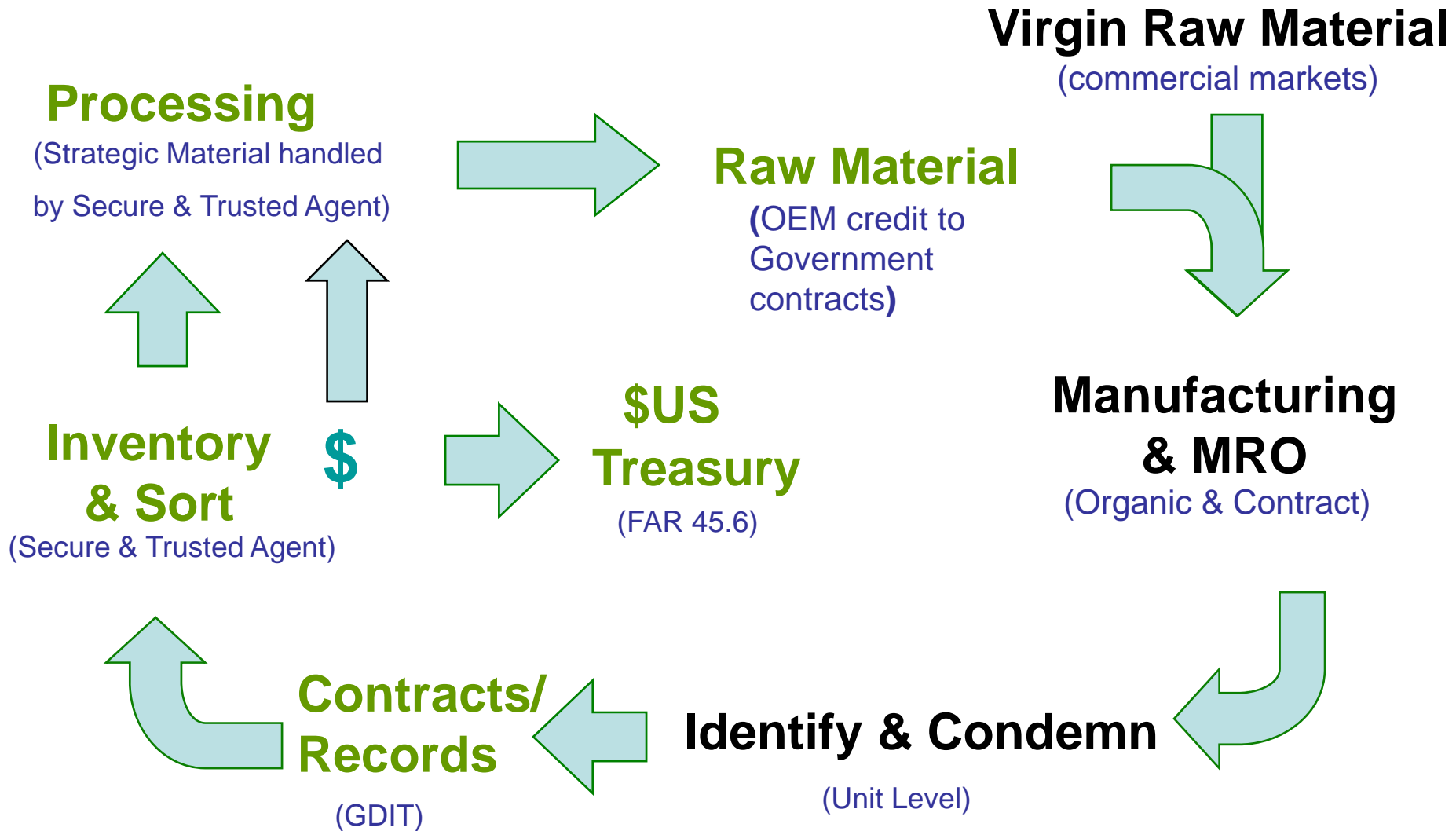
A Collaboration for Advanced
Sustainment Technology Insertion

Mickey Conklin, 448 CSW/YP

PEWEG 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



PEWG PROJECTS

Number

PEWG HQ AFMC/A5S

LP700 AA1004
 LP701 AA1045
 LP702 AA1015
 LP703 AA1038
 LP704 AA1051
 LP705
 LP706 AA1033
 LP707 AA1048
 LP708 AA1028
 LP709 AA1055
 LP710 AA1050
 LP711 AA1032

Title

PSTWG (Tinker)

Powder Coating Phase IV
Supersonic Particle Deposition (SPD) Phase IV
Coating Removal Process (CRP) – CrC plus
Low Radioactivity Thermal Barrier Coating (TBC)
 Non-solvent Cleaning Process
 Advancements in Plating Shop Efficiencies
 Laser Inspection of Coated GTE parts
 Plasma Resource Recovery System (PRRS)
 Laser Peening to Preserve GTE part life
 Slurry Feed Nano Plasma Repair Process
 Optical Fusion Component Repair
Advanced Coating Application Module (ACAM)

P2
 P2
 Ohio/NASA

PEWG HQ AFMC/A5S

LP750 AA1014
 LP751 AA1040
 LP752 AA1037
 LP753 AA1036
 LP754 AA1043
 LP755 AA1029
 LP756 AA1057
 LP757 AA1046
 LP15
 LP16

MRO&PTWG (Hill)

Stripping Solution - WCCoCr
 Parent Material Restoration – “Recast”
 Low Density Coatings for Component Repair
 High Velocity Oxy Fuel (HVOF) ID Gun
Laser Cladding/Additive Manufacturing (LAM)
 No-strip/Touch-up Repair
 Camouflage Tire and Wheel Coating
 Single Part Wheel Paint (Low VOC)
Qualify CERAL 3450 & produce in US
Qualify portable hand Held Laser Welding

FCT
 TAFB
 FCT
 FCT

Coating Removal Process OC-ALC – Propulsion PEWG LP 702



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

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.

Deliverables

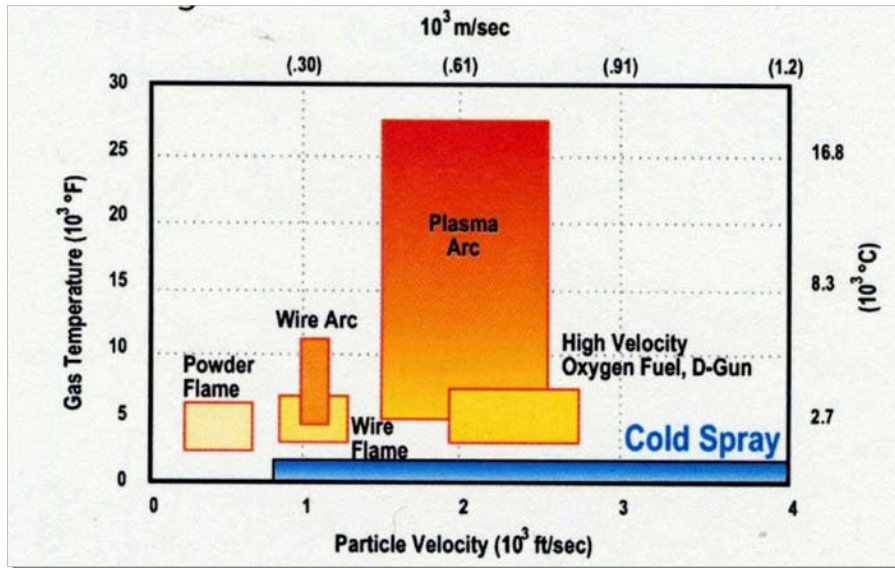
- Formula to remove duplex coatings
- Test Report
- License to use
- Final Report
- First Article

Funding Sought

FY 08 Funded	FY09 \$450	FY10 \$200K
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OC-ALC/YP POC
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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

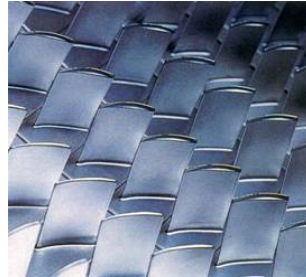
- Technology Report - Final
- New Process for 76 PMXG
- Identify new equipment
- Update TO pages

Funding Sought

FY 08	FY09	FY10
Funded	\$200K	\$200K

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Ceral 3450 - Chrome Free Corrosion Protection



Keeping Assets In The Field And Out Of The Depot

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

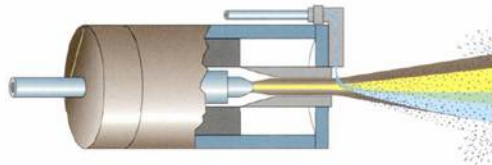
Funding (\$M)

	<u>FY07</u>	<u>FY08</u>	<u>Total</u>
FCT	Funded	Funded	0.95M
AF (F100 AMT)	1.0M	1.0M	2.0M

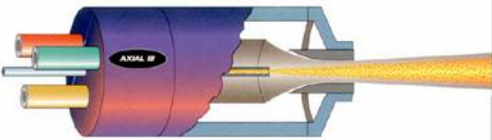
Benefits

- 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



Traditional Radial Plasma Gun



Axial III Plasma Gun

Phenomenal Deposition Efficiencies and Rates of Deposit

Reactive Metal Spraying (Ti, Zr, Al.....)

Blended and Graded Coatings

Allows for higher particle velocities & temperatures

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

Description

- Advanced coating application module (ACAM) with axial powder injection providing high deposition efficiency, high spray rates
- Opportunity for micro and nanopowder coating application development incorporating metallics, ceramics, Thermal Barrier Coatings, Carbides and plastics
- Faster, cheaper, and produces better quality coatings than conventional Plasma Spray systems - utilizes nitrogen: others use expensive helium.
- Last longer, wear less, and be more reliable = MTBR increase

OC-ALC/YP POC

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- 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

<u>FY08</u>	<u>FY09</u>	<u>Total</u>
Funded	Funded	\$1100K

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