Technology Transition: The Dynamic Role of the US Army Research Laboratory Coatings and Corrosion Offices.

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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# Technology Transition: The Dynamic Role of the US Army Research Laboratory Coatings and Corrosion Offices

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<table>
<thead>
<tr>
<th>a. REPORT</th>
<th>b. ABSTRACT</th>
<th>c. THIS PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>unclassified</td>
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</table>

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**19a. NAME OF RESPONSIBLE PERSON**
• Technology Transition
• Key Drivers to Support New Technology
• Major Gaps in Pretreatments
• Coatings and Corrosion Updates
• Transition of New Pretreatment Technology

Courtesy of U.S. Army

Courtesy of U.S. DoD
Critical Coating Performance Requirements

Affordable
Multifunctional
Military
Coatings

VOC/HAP Reduction
Cr(VI) and heavy metal elimination

UV Resistance
Flexibility
Corrosion resistance

Chemical agent protection
Camouflage

Environmental
Survivability
Durability
Affordability
Key Drivers to Support New Technologies

• Transitioning New and Enhanced Technology
  - Reduction of Hazardous Air Pollutants
  - Elimination of Heavy Toxic Metals
  - Reduction of Volatile Organic Compounds
  - Enhanced Performance-Corrosion and Weathering
• Specifications
  - Powder Coating-MIL-PRF-32348
  - E-Coat-MIL-DTL-53084
  - Enhanced Corrosion-MIL-DTL-53022/MIL-DTL-53030
  - HAP-free Solvent-Memorandum and NSN’s, future MIL-T-81772 type
  - Crystalline Silica Elimination-CARC Topcoats
Major Gaps in Pretreatments

• Pretreatment for Ferrous Substrates-TT-C-490 CHEMICAL CONVERSION COATINGS AND PRETREATMENTS FOR FERROUS SURFACES (BASE FOR ORGANIC COATINGS)
  ❖ Type I-Zinc Phosphate
  ❖ Type III-Wash Primer conforming to DoD-P-15328
    ➢ Contains hexavalent chromium-7% Zinc Chromate
    ➢ Contains HAPS
    ➢ Contains high levels of VOC-6.7 lbs/gal
    ➢ Only pretreatment for spray application not requiring contained and regulated spray booth
    ➢ Only pretreatment for multi-metal application
• Defense Federal Acquisition Regulation Supplement; Minimizing Use of Hexavalent Chromium (DFARS Case 2009-D004).
• Proposed-52.211-4017 (TACOM) PREPARATION, APPLICATION, AND QUALITY ASSURANCE OF CARC PAINT SYSTEMS
• TACOM- Products containing hexavalent chromium shall not be used
• No available replacement for wash primer for spray application in existing spray booths.
• Direct to metal is not recommended or approved.
• **Planned action to resolve this gap in technology is revision to TT-C-490.**
• Evaluation and demonstration of Zr pretreatments as alternatives to both Zinc phosphate and chromate conversion coatings-SERDP and ESTCP

• Evaluation of Mg-Rich and Mg-Oxide primers for application to Army aircraft-ESTCP/NAVAIR&AMCOM

• ARL pursuing non-isocyanate topcoat technologies-SERDP
• Cadmium elimination on fasteners-ESTCP

• Evaluation and demonstration of spray in place hexavalent chromium free pretreatments to replace wash primer for multi-metal application-TMR and OSD

• Development of rapid cure CARC Coatings-OSD

• Non-chromate ZVOC pretreatments-ESTCP/Kelley*
• Major Questions to be Asked:

- What is the transition method to implement new pretreatment technologies.

- Transition to Chemical Agent Resistant Coating System.

• *Planned action to resolve this gap in technology is revision to TT-C-490.*
• Revision to TT-C-490-CHEMICAL CONVERSION COATINGS AND PRETREATMENTS FOR METALLIC SUBSTRATES (BASE FOR ORGANIC COATINGS)
  - Multi-metal application
  - Immersion and spray technologies
  - Organic and inorganic pretreatments
    - Silanes
    - Nano-Technology
    - Zirconium Technology
  - Qualification of new technologies, cancellation of DoD-P-15328
  - Legacy systems, as zinc phosphate, will not be affected
  - Legacy systems—**Does Not Require Qualification**
  - Referenced in MIL-DTL-53072, CARC application specification
QUESTIONS?