Air Force Corrosion Prevention and Control Office (AFCPCO)

2006 International Workshop on Pollution Prevention and Sustainable Development

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AFRL
THE AIR FORCE RESEARCH LABORATORY
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Overview

- Mission
- Organization
- Program Efforts
  - Technical Orders
  - Cost of Corrosion
  - Command Surveys
  - Information Management, Dissemination, Feedback
  - USAF Corrosion Managers' Conference
  - Corrosion Prevention Advisory Boards
- Corrosion Management/Prediction Efforts
- Contractual Efforts

Air Force Corrosion Prevention and Control Office

Mission

Ensure the Air Force has an effective program to prevent, detect, and control corrosion and minimize the impact of corrosion on Air Force combat capability.

Directed by HQ USAF: Manage AF Corrosion Maintenance Program

(AFI 21-105, Air and Space Equipment Structural Maintenance, Apr 03)

- Engineering and Technical Assistance
- Engineering Responsibility for 6 Technical Orders
- Corrosion Surveys of Major Commands and Weapon Systems
- Weapon System Corrosion Prevention Advisory Boards
- Host Annual USAF Corrosion Conference
- Support Corrosion Training
- Facility Requirements for Corrosion Maintenance
- Cost of Corrosion Studies
- Transition Corrosion Technologies to Users

Customers:

- **Field Units**
- **Major Commands**
- **System Managers**
- **Air Logistics Centers**
- **AF Research Laboratory**

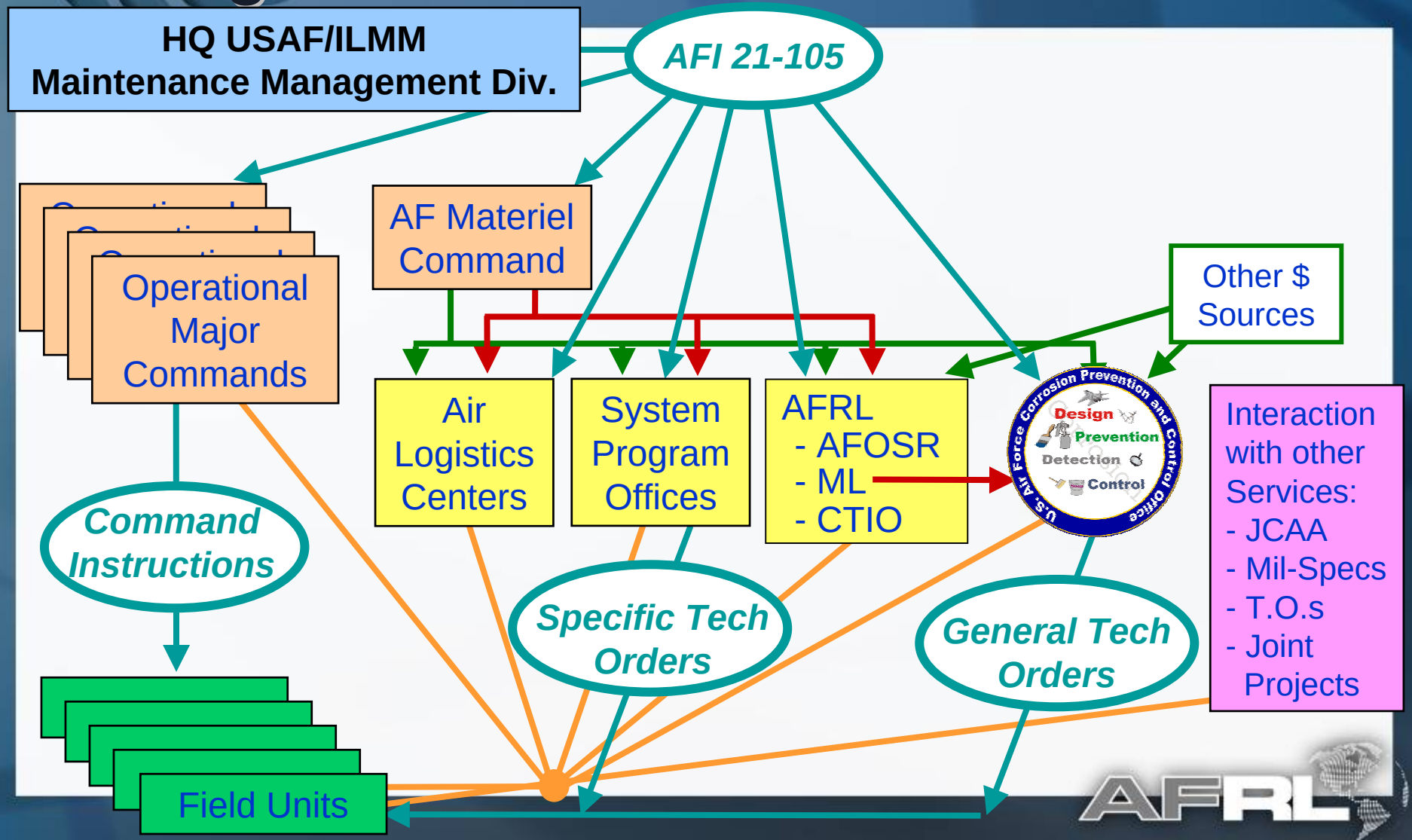
AFCPCO Personnel

- Government
  - Major Robert Reed — Office Chief
  - Dave Ellicks — Materials Engineer
  - Kim Andrews — Materials Engineer
  - CMSgt Ronald Allison — AF Corrosion Program Manager
  - SMSgt Donald Ward — AF Corrosion Program Manager
  - Issie Kennedy — Management Assistant

- Engineering and Technical Support Contractors (S&K Technologies)
  - Owen Jett (CMSgt Ret) — Project Lead
  - Wes Barfield — Senior Materials Engineer
  - Charles McKenna (CMSgt Ret) — Senior Maintenance Analyst
  - Mark Foley (SMSgt Ret) — Senior Maintenance Analyst
  - Kevin Wilson (MSgt Ret) — Senior Maintenance Analyst
  - Ruth Jett — Senior Corrosion Technician
  - Jeff Hatfield — Senior IT Systems Engineer
  - Beverly Dillard — Administrative Assistant

- Liaison contractors
  - Jerry Powell (SMSgt Ret) — Air National Guard Liaison
  - Larry Cornwell (Cmdr Ret, USCG) — US Coast Guard Liaison

AF Corrosion Organizational Structure



Technical Orders

- We manage six AF general series corrosion-related technical orders
  - Pervasive -- apply to all systems
  - Referenced by all other corrosion T.O.s
- Primary means to transition technology to AF-wide use
- Continual effort to update as needed
  - Ensure maintainers use best materials and processes--increase combat capability, reduce maintenance time & cost, protect people & assets, comply with environmental restrictions

Technical Orders

- **T.O. 1-1-8**, Application and Removal of Organic Coatings, Aerospace and Non-Aerospace Equipment
- **T.O. 1-1-686**, Desert Storage Preservation and Process Manual For Aircraft
- **T.O. 1-1-689**, Avionics Cleaning and Corrosion Prevention/Control
- **T.O. 1-1-691**, Aircraft Weapon Systems Cleaning and Corrosion Control
- **T.O. 35-1-3**, Corrosion Prevention & Control, Cleaning, Painting, and Marking of USAF Support Equipment (SE)
  - All updates available at https://afcpco.robins.af.mil/
- **T.O. 2-1-11**, General Corrosion Control of Engine Parts During Overhaul & Field Level Maintenance

- T.O.s for vehicles
  - WR-ALC/LE is engineering authority; AFCPCO provides technical support
  - Full rewrite in work

Cost of Corrosion Study

- AFCPCO conducted Air Force-wide collection/analysis of corrosion cost
  - Aircraft, vehicles, equipment, munitions, space systems
  - Not real property (AF OPR is Civil Engineering)
- Cost of documented, direct corrosion control maintenance
  - Repair, treatment, washing, painting, depainting, sealing (conservative--only costs that could be captured)
  - Not intangibles (availability, readiness, training, safety)

Command Corrosion Surveys

- Surveyed ANG & PACAF & AFMC
- Assess <u>overall health of programs</u> -- NOT inspection
- Provided on-site assistance
- Briefed base and MAJCOM maintenance leadership, published final report
- General Findings:
  - Comprehensive command instruction
  - Corrosion shops: proper materials & processes
  - Excellent condition of aircraft
  - Some unauthorized paints, cleaners, sealants
  - Good Quality Assurance and training programs, but need Wing Corrosion Mgrs appointed
  - Improvement needed: support equipment

Information Management, Dissemination, Feedback

- Biggest hurdle is communication
  - Many corrosion needs have some known answers
  - Many unauthorized or damaging processes being used
- Customer feedback and needs identification via:
  - Surveys, Corrosion Prevention Advisory Boards (CPABs), conferences, and phone/e-mail
  - Quarterly corrosion telecon with MAJCOM managers
  - Best dissemination tool is Web site: https://afcpco.robins.af.mil
- Publicly releasable info on www.dodcorrosionexchange.org

- **Survey & project reports**
- **Cost of Corrosion Studies**
- **Qualified Product Lists**
- **Technical Orders**
- **Message traffic**
- **Material selection Info**
- **Event schedules**
- **Specifications**
- **Points of contact**
- **Links to partner organizations**
- **Meeting minutes**
- **Training & technical info**

Air Force Corrosion Managers' Conference

- Purpose: crossflow & resolve issues across entire Air Force corrosion prevention and control community
- Over 500 participants: all MAJCOMs, ALCs, SPOs, over 120 field units, all sister services, HQ USAF, AFRL, industry
- Mar 6-8, 2007

Corrosion Prevention Advisory Boards

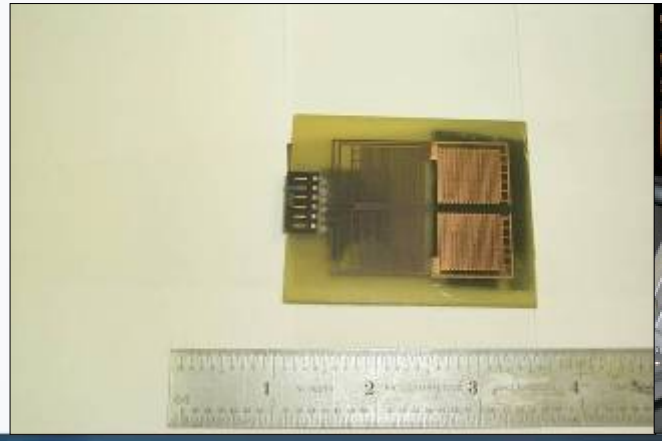
- Each aerospace system required to establish CPAB, hold annual meetings
- Purpose: bring system designer, program office, MAJCOM corrosion managers, field corrosion representatives together to discuss and resolve corrosion issues unique to their weapon system.
- SPO chairs CPAB and directs corrosion program for its system (SPO is engineering authority)
- AFCPCO is technical support, advising on most effective methods, materials, and processes for that specific system.
  - We participate in approximately 15 CPABs/year

Corrosion Prediction / Management

- Definition of Basing Environments
  - New Algorithm for ESI (Environmental Severity Index)
  - Ability to Predict ESI Values from Available Weather Data and Atmospheric Chlorides
    - Calculate Interim ESI (Useful For New Deployments)
  - Unique exposure racks measuring corrosion rates of 5 alloys in different configurations in > 150 USAF sites from Antarctica to SW Asia deserts
    - Cl Values Not Typically Available
    - Measure Cl (3-6 months)
    - Recalculate New ESI
  - Used to determine frequency of preventive maintenance actions

Corrosion Prediction / Management

- On Aircraft Cumulative Environmental Exposure Sensors
- >1000 sensors flying on 7 platforms
- Basis for Corrosion Inspections and Preventive Maintenance tailored to individual aircraft exposure
- Provides verification of corrosion prediction models
- Allows detection of spills and anomolous corrosion exposures
  - Other Maintenance Actions or Projects



Corrosion Mitigation

Aircraft Sheltering Studies

- Quantified Reductions in corrosion rates
- Reductions in corrosion maintenance based on measured severities
- Provides basis and support for aircraft shelters for corrosion mitigation

Aircraft Wash/Rinse Optimization Studies

- Unique observed affects of washing on outdoor exposure panels
- On aircraft wash cycle study (C-130's at Mansfield Ohio)
- Affects of aircraft rinse cycles (H-60's at Patrick AFB FL)
- Potential of extended wash cycles at no cost to corrosion in specific environments

Other AFCPCO Contractual Efforts

- AFCPCO Engineering and Technical Support
- Packaging, VCI, Dehumidification Evaluation
- Southwest Asia Corrosion Assessment
- Evaluate Low/No VOC/HAP Coatings for Touch-up
- Field Evaluation & Implementation of Corrosion Prevention Compounds
- Develop General Series T.O. for Comm/Nav Equipment

What to remember…

Visit our web site!

https://afcpco.robins.af.mil

(We also post PA-reviewed info on www.dodcorrosionexchange.org)

Call us!

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U.S. Air Force Corrosion Prevention and Control Office
Design
Prevention
Detection
Control
Soap