



# *DoD Corrosion Prevention and Control*

## Current Program Status

*Presented to the Army Corrosion  
Summit*

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3 February 2009



# Report Documentation Page

Form Approved  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>03 FEB 2009</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2009 to 00-00-2009</b>	
4. TITLE AND SUBTITLE <b>DoD Corrosion Prevention and Control Current Program Status</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>DOD Corrosion Policy and Oversight, 3000 Defense Pentagon, Washington, DC, 20301</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>2009 U.S. Army Corrosion Summit, 3-5 Feb, Clearwater Beach, FL</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>18</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

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# Headlines

- Revised law and organization in place
- Strategies unchanged
- DODI 5000.67 updated
- Corrosion Executive assignment
- Additional projects funded for 2009
- University Consortium underway
- New National Academies study started
- 1<sup>st</sup> DoD Corrosion Conference in August

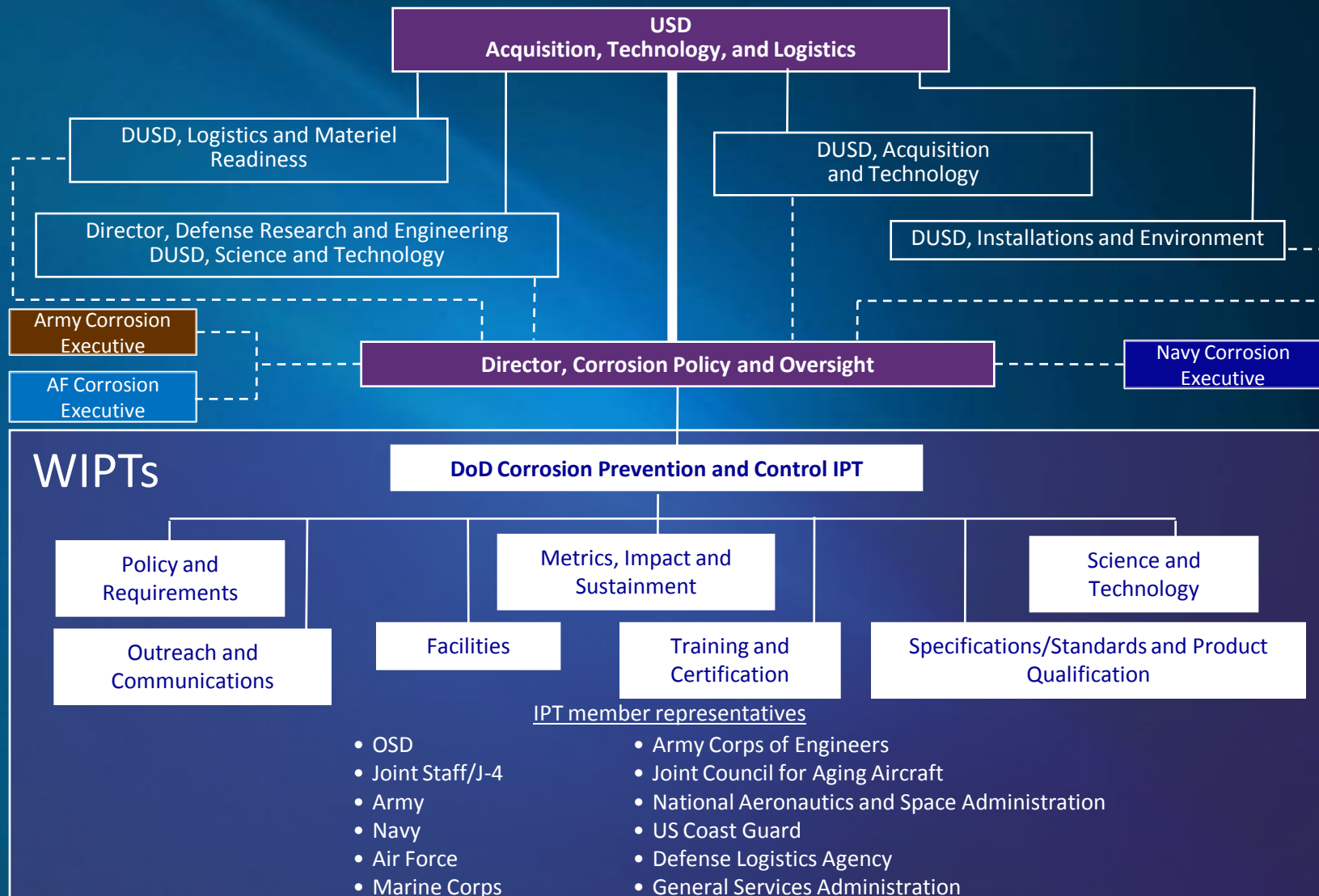


# Recently Revised Law and Organization

- Retains the basic requirements of original public law
- FY08 National Defense Authorization Act
  - Eliminates DoD Corrosion Executive
  - Adds Director of Corrosion Policy and Oversight (DCPO) with Corrosion Executive duties
  - Streamlines organization
  - Codifies Corrosion Policy and Oversight activities
- FY09 National Defense Authorization Act
  - Requires assignment of Service Corrosion Prevention and Control Executives
  - Requires report to Congress on inserting corrosion planning into the acquisition process



# DoD Corrosion Organization



# Strategies and Directions

- **Overarching strategy:** transcend traditional control methods, organizations, management and funding
- **Attack corrosion early** in construction or acquisition  
**Focus life-cycle efforts on four primary areas**
  - **Materials and processes that prevent or reduce corrosion**
  - **Detection** and prognosis of corrosion
  - **Prediction** of corrosion occurrences
  - **Management tools** facilitating maintenance and materials decisions to assure acceptable levels of integrity and functionality
- **Publish policy and strategy direction and guidance**
- **Promote international cooperative efforts**



# DOD Instruction 5000.67

## *“Prevention and Mitigation of Corrosion on DoD Military Equipment and Infrastructure”*

- Implements policy – assigns responsibilities – prescribes procedures
- Establishes DoD policy requiring:
  - Acquisition strategies for corrosion prevention & control
  - CPC programs to be implemented throughout life cycle
  - CPC reporting for data collection, archiving, and feedback.
- Requires Army, Navy and Air Force to:
  - Designate a POC for oversight of corrosion matters
  - Establish corrosion planning review & evaluation
- **Updated to reflect FY08 and FY09 National Defense Authorization Act**





# Military Corrosion Executives

- Army

- Wimpy D. Pybus

- Navy

- E. Dail Thomas II

- Air Force

- Col. Gary C. Blaszkiewicz



# Cost of Corrosion Study: Maintenance Cost Estimates

Year	Study area	Annual Corr. Costs	% of Maint. Costs
2004/05	Air Force (USAF funded, USAF methodology)	\$1.5B	UNK
2005/06	Army ground vehicles	\$2.0B	14.8%
2005/06	Navy ships	\$2.4B	19.8%
2006/07	DoD facilities	\$1.8B	15.1%
2006/07	Army aviation and missiles	\$1.6B	18.6%
2006/07	USMC ground vehicles	\$0.7B	20.8%
2007/08	Navy aviation, USMC aviation,	\$2.9B	31.5%
2007/08	USCG aviation and USCG ships	\$0.3B*	27.6%*
2008/09	Air Force aviation, Navy ships & Army ground	TBD	TBD



# History of Projects and Activities

- 342 project plans submitted in 5 year period
- 140 projects selected
- \$138 million spent on projects and activities
  - Service project funding - \$53.6 million
  - OSD project funding - \$54.5 million
  - Activities funding ~ \$30 million
- Combined savings & return on investment
  - Life cycle cost avoidance - \$5.75 billion
  - ROI: >50:1



# FY09 Army Projects

Army FY09 Projects Selected	Joint Project	\$K OSD Funds	\$K Match Funds	\$K Total Funds	ROI	\$M Savings
Corrosion Resistant Fences and Railings	joint	\$230	\$230	\$460	28.2	\$13.0
Robust HDS Manhole Sensors	joint	\$240	\$240	\$480	10.4	\$5.0
Corrosion Resistant Roofs with Integrated Sustainable Photovoltaic Power	joint	\$325	\$325	\$650	19.5	\$12.7
Structural Health and Degradation Indices for Bridges	joint	\$435	\$435	\$870	17.2	\$15.0
High-Voltage Capacitor Based Water Treatment for Corrosion Growth	joint	\$362	\$362	\$724	16.6	\$12.0
Improved Zinc Dust Primer and Coating System for Steel Structures	joint	\$310	\$310	\$620	12.6	\$7.8
New Generation of Corrosion Resistant Fire Hydrant Retrofits	joint	\$215	\$215	\$430	19.7	\$8.5
State of the Art Reinforcing Bar for Concrete Structures	joint	\$355	\$355	\$710	24.6	\$17.4
Innovative Corrosion Resistant Coatings and Materials for Pumps	joint	\$285	\$285	\$570	16.9	\$9.7
Lightweight Fiber Reinforced (Thermoset) Polymer Composite Bridge Decks	joint	\$425	\$425	\$850	9.9	\$8.4
Dilute Flowable Backfill Validation for Corrosion Mitigation of Buried Piping	joint	\$175	\$175	\$350	12.3	\$4.3
Development of Advanced CPCs for Use on Ground Equipment	joint	\$350	\$350	\$700	639.0	\$447.3
Corrosion Mitigation for MRAP Thru Improved Coatings	joint	\$250	\$1,103	\$1,353	400.8	\$542.3
Phased Array Ultrasonic (PA-UT) "In Situ" NDTE	joint	\$350	\$75	\$425	120.0	\$51.0
CPC Technology Implementation for Missile Weapon Systems		\$125	\$100	\$225	31.2	\$7.0
<b>FY09 Totals</b>		<b>\$4,432</b>	<b>\$4,985</b>	<b>\$9,417</b>	<b>123.3</b>	<b>\$1,161.4</b>



# Army 5-Year Project Summary

Year	\$K OSD Funds	\$K Match Funds	\$K Total Funds	ROI	\$M Savings
FY05	\$7,300	\$8,587	\$15,887	10.1	\$160.9
FY06	\$5,395	\$6,030	\$11,425	19.7	\$225.2
FY07	\$4,263	\$4,983	\$9,246	72.5	\$670.4
FY08	\$5,443	\$5,262	\$10,705	35.3	\$378.1
FY09	\$4,432	\$4,985	\$9,417	123.3	\$1,161.4
<b>Total</b>	<b>\$26,833</b>	<b>\$29,847</b>	<b>\$56,680</b>	<b>45.8</b>	<b>\$2,596.0</b>



# University Consortium Research Initiative - *Background*

- Many fundamental aspects of corrosion science and engineering are not fully understood
- Susceptibility and course of corrosion in engineering materials are not reliably predictable.
- Advances are needed in fundamental research and basic understanding of corrosion
- Five universities with overlapping and complementary capabilities participating
- Addresses an array of basic and applied research needs



# Boundaries of Research

- Realistic, Accelerated, Atmospheric Corrosion Tests
- Corrosion Prediction
- Improved Corrosion Algorithms
- Improved resin systems
- Corrosion Mitigation By Sheltering
- Corrosion Sensor Verification
- Effects of Washing and Clear Water Rinsing
- Corrosion Mechanisms For Coated Systems
- CPC Durability Prediction
- Environmental Degradation of Composite Structures
- Degradation Effects of and Design Solutions for Composite Structures Joined to Metallic Structures
- Corrosion Impacts of Friction Stir Welding



# FY 09 National Academy of Science Study

- Focus - Identification of Gaps in Scientific Knowledge limiting ability to more effectively address materials degradation
- Scope – National needs for both equipment and infrastructure (NIH, DOT, NRC, etc.) and not specifically DoD
- Timing – Kickoff in Jan 09 with completion in 18 months
- Status – Money on contract and panel selection in progress





# Education and Training Activities

- Education and training
  - Corrosion Engineering Degree at University of Akron
  - Virtual corrosion simulation and gaming video
- Education productions
  - 4+ training videos: public information and continuous learning
  - 4 podcasts
  - 1 webcast
  - 1 Corrosion Prevention Advisory Team (CPAT) video
- National Academies - National Research Council: corrosion education in the 21<sup>st</sup> century
  - assessed undergraduate corrosion education in engineering programs
  - developed recommendations for curricula that could enhance the corrosion-based skill and knowledge base of graduating engineers



# Communication and Outreach Activities

- CorrDefense tri-annual epublication
- Specs & Standards assessment/qualification process
- Acquisition workforce corrosion training video
- [www.CorrDefense.gov](http://www.CorrDefense.gov) website
- International cooperative efforts
- DoD Corrosion Conference – August 2009 featuring Congresswoman Kay Granger as keynote speaker and Congressional Staff panel



# Sharing Problems and Solutions

