



# Army Corrosion Program Update

9 February 2010



LTG Mitchell H. Stevenson  
Deputy Chief of Staff, G-4

Headquarters, Department of the Army

# Report Documentation Page

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# Agenda

- ❑ Department of the Army G-4 Vision and Mission
- ❑ Roles and Responsibilities of DA G-4 Related to Corrosion
- ❑ Army Corrosion Structure
- ❑ Army Corrosion Partners
- ❑ Army Initiatives to Combat Corrosion
- ❑ Challenges
- ❑ Way Ahead



# Department of the Army G-4

## Vision

Enable a ready Army by providing and overseeing integrated logistics policies, programs, and plans in support of Army Force Generation.

## Mission

Recognized as the preeminent source on the Army Staff for relevant, value-added logistics expertise. Actively engaged in sustaining, preparing, resetting, and transforming the Nation's Army in support of full spectrum operations.



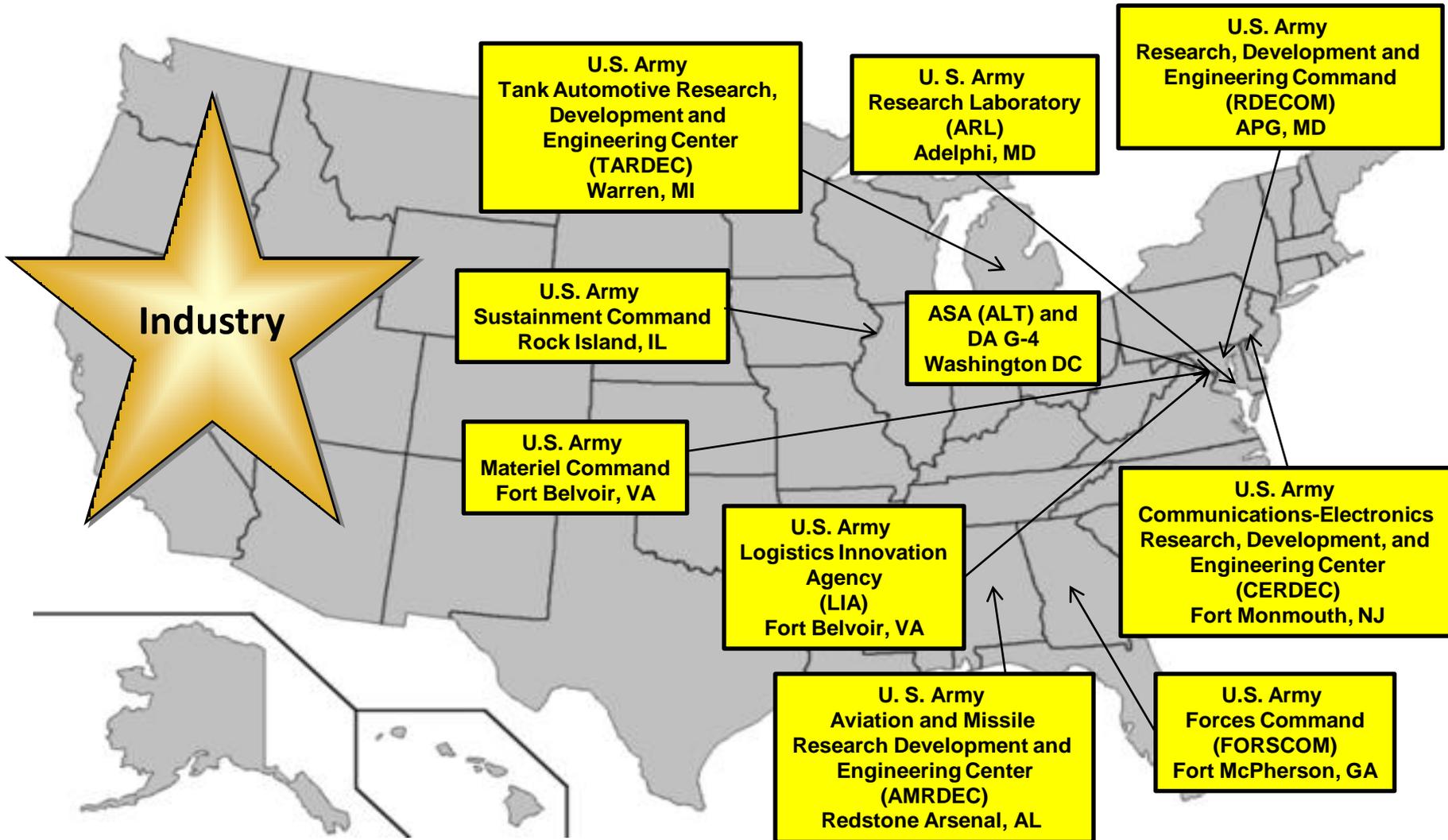
# Roles and Responsibilities of DA G-4 Related to Corrosion

- ❑ Army proponent for AR 750-59
  - Establish equipment maintenance corrosion policy
  
- ❑ Advises the Army Corrosion Control and Prevention Executive (CCPE) on maintenance and supply policy and procedures
  
- ❑ Co-chair of the Sustaining PEG
  - Validate and provide resources to sustain Army corrosion efforts
  
- ❑ Develop, support and defend resources to initiate and sustain an effective corrosion program





# Army Corrosion Partners





# Army Initiatives to Combat Corrosion

## Focus:

Identification and rapid transfer of new technology and maintenance processes that can be applied throughout a systems lifecycle to inhibit corrosion.

- ❑ Anti-Corrosion Nanotechnology Solutions for Logistics (ACNS-L) Project – LIA
- ❑ Chromate-Based Coating Products – RDECOM
- ❑ Integrated Teflon Like Coatings – RDECOM



# Anti-Corrosion Nanotechnology Solutions for Logistics (ACNS-L) Project

- ❑ Nanotechnology - Measure, manipulate and manufacture materials and devices at the scale of atoms and molecules (1 to 100 nanometers).
- ❑ Structured Approach Toward Applying Existing/Emerging “Nanotech” Solutions.
- ❑ Potential Applications for Ground and Aviation Vehicles

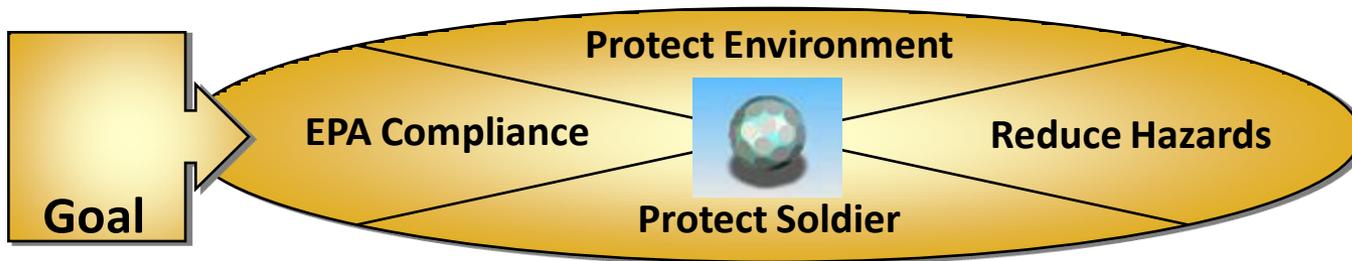
OH-58D  
Torquemeter Support  
Testing  
FY11





# Chromate-Based Coating Products

- ❑ Chromate-based pretreatments have provided outstanding corrosion inhibition in the past, but new EPA and OSHA requirements are drastically reducing the use of  $Cr^{6+}$ .
- ❑ Develop chromate free pretreatments to enhance corrosion protection and adhesion promotion on light weight alloys.





# Integrated Teflon Like Coatings

- ❑ Develop coatings for the protection of metal surfaces against thermal, chemical and biological damage.
  
- ❑ Warfighter Payoff
  - Self-cleaning for reduced contamination
  - Decrease life-cycle costs
  - Reduce weapon system corrosion, maintenance, operational & liability costs
  - Reduce potential bio & chem hazards



# Challenges

- ❑ Increase visibility of corrosion costs
- ❑ Standardize corrosion infrastructure
- ❑ Lab to field transfer velocity

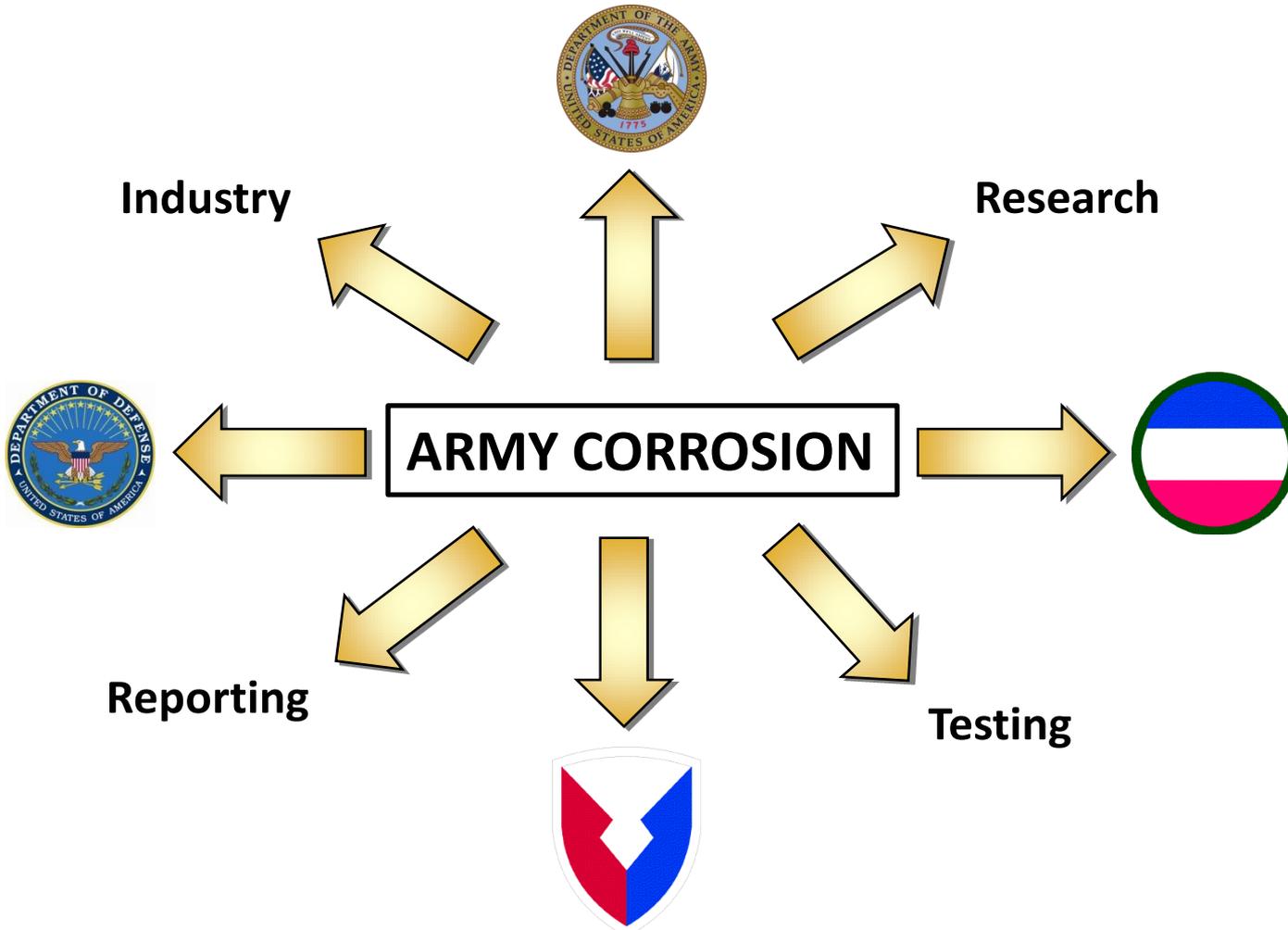


# Tracking of Corrosion Related Maintenance

- ❑ In the 2009 Annual Cost of Corrosion for Army Ground Vehicles Report, LMI used a list of 433 keywords to search for corrosion related repairs. IE: Check, eval, test, crack, leak, weld, clean
  - DA G4 published guidance directing the use of one failure code
    - Failure Code 170 – when corrosion is the root-cause for failure or required maintenance.
  - Mapping corrosion related maintenance actions to Global Combat Support System-Army and Logistics Modernization Program to ensure visibility is enhanced.



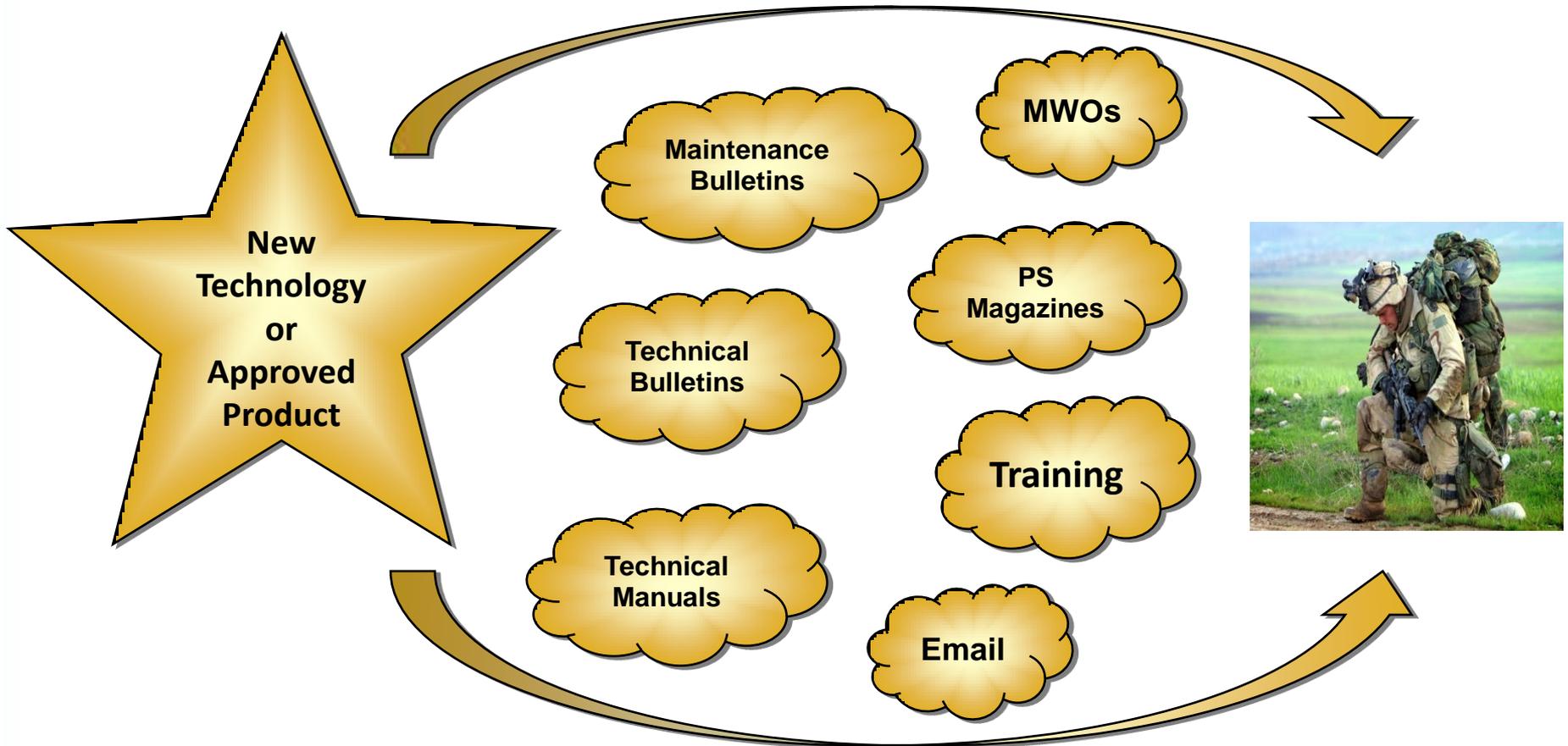
# Current Strategy



**Bottom Line: Current efforts to develop a corrosion strategy enables unity of effort.**



# Lab to Field Transfer



**Bottom Line: Increasing velocity of information transfer is critical to effectively combat corrosion!**



# Thoughts on Way Ahead

- ❑ IAW guidance from the CCPE, establish an Army Corrosion Board (ACB)
  - The ACB will be responsible for the coordinated development of an Army-wide strategy for corrosion control and prevention.
  
- ❑ Develop and publish Army corrosion strategy
  
- ❑ Establish resource requirements within POM 12-17
  
- ❑ Revise and publish AR 750-59 to better define:
  - Roles and responsibilities
  - Tactical equipment policy
  - Guidance to increase velocity for the adoption of new technology



# Questions?



# Back-up Slides



# ACNS-L Project Objectives

- ❑ Increasing U.S. Army awareness about the potential of nanotechnology for corrosive resistant materials.
- ❑ Facilitating enhanced communication and collaboration through organized information exchange within the U.S. Army.
- ❑ Assessing the technical, business, and risk elements of implementing an anti-corrosion nanotechnology solution for the OH-58D Kiowa Warrior.
- ❑ Developing a comprehensive OH-58D KW ACNS-L Nano-tech Corrosion Mitigation Plan (NCMP) with actionable recommendations for implementing an anti-corrosion nanotech solution.
- ❑ Developing a High-level sub-topic matrix report that provides potential nanotechnology solutions for ten (10) additional U.S. Army "Platforms of Interest" as a foundation for future U.S. Army CPC activities.



# Nanotechnology-Enabled Self Healing Anti-Corrosion Coating Products

## □ Milestones/Schedule:

- Formulate pretreatment for Mg and Ti 3QFY10
- Deposit optimized pretreatment on substrates 3QFY10
- Demonstrate compatibility with conventional organic coating processes (powder, liquid, and e-coat) 4QFY10
- Define process parameters for scale-up 4QFY10
- Conduct adhesion tests 4QFY10
- Conduct corrosion resistance tests to determine self-healing capabilities 1QFY11
- Demonstrate application techniques to facilitate scale-up and manufacturability 1QFY11



# Annual Cost of Corrosion for Army Ground Vehicles

- ❑ It is estimated that Army ground vehicle corrosion costs the Army \$2.44\* billion per year.
  - This equates to roughly 14 percent of our annual maintenance budget.
  
- ❑ The highest corrosion-related costs are incurred during depot maintenance, which is more than 40 percent of the total corrosion cost for Army ground vehicles.
  - Corrosion costs incurred as part of ground vehicle depot maintenance are nearly triple those of field-level maintenance.

\* Report MEC8T1T1 – The Annual Cost of Corrosion for Army Ground Vehicles - LMI



# Annual Cost of Corrosion for Army Aviation and Missile Equipment

- ❑ It is estimated that Army aviation and missile equipment corrosion costs the Army \$1.6\* billion per year.
  - This equates to roughly 15.8 percent of the total Field level maintenance costs for aviation and missile equipment.
  
- ❑ The Army spent more than twice as much on corrective corrosion maintenance for aviation and missile equipment (\$1.017 billion) as it did on preventive corrosion maintenance (\$503 million) for the same equipment.

\*Report SKT50T3 – The Annual Cost of Corrosion for Army Aviation and Missile Equipment Vehicles – LMI