

Overview of Options, Issues, etc.

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Aug 30, 2011

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 30 AUG 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE Overview of Options, Issues, etc.				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) Rowan Technology Group,1590 S. Milwaukee Ave., Suite 205,Libertyville,IL,60048				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 Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Focused Workshop on Cadmium Plating Alternatives, August 30-31, 2011, Baltimore, MD. Sponsored by SERDP/ESTCP.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 8	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Specified and qualified Cd alternative technologies

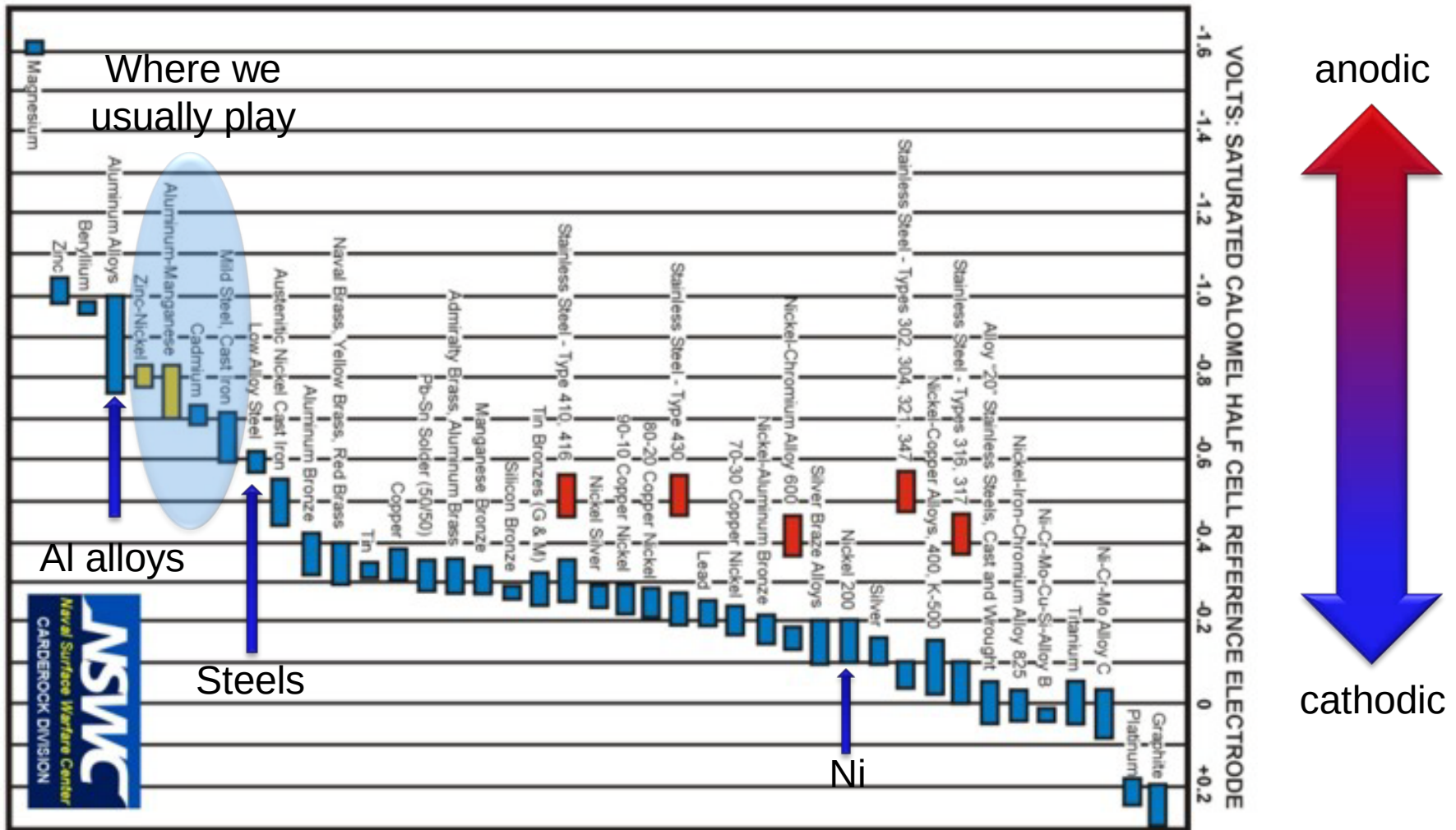
	Connectors	Fasteners	Components
CRES alloys	✓ Wide use	✓ esp GTEs, composites	✓ PH steels, S53
Al: AlumiPlate, IVD, spray	Spec, AP Qual	✓ IVD avail, AP In test	✓ Wide use
ZnNi (old acid, new LHE alk)	Spec	✓ Boeing Qual	✓ USAF validated
Metallic-ceramics			✓ Abrasion/corr
Dip-spin Al/Zn filled polymers		✓ All commercial vehicles, some mil	
Electroless Ni-PTFE	✓ In-house coating		

● Alternatives

- ❑ Cr^{3+} sealers (Zr and other inhibitors)
- ❑ Non-Cr sealers (Zr, Mn, Mo, rare earth)
- ❑ Adhesion promoters (AC-131, Prekote)
- ❑ Electrolytic “mineralization”

- **AlumiPlate**
 - ❑ Better performance than Cd; sole source, toluene bath
- **LHE ZnNi**
 - ❑ Looks as good as Cd; below spec conductivity on connectors
- **Dip-spin – fasteners only**
 - ❑ Excellent for vehicles, what about aircraft, vessels?
- **Electroless Ni-PTFE – connectors only**
 - ❑ Excellent corrosion, conductivity; galvanic mismatch, not sacrificial

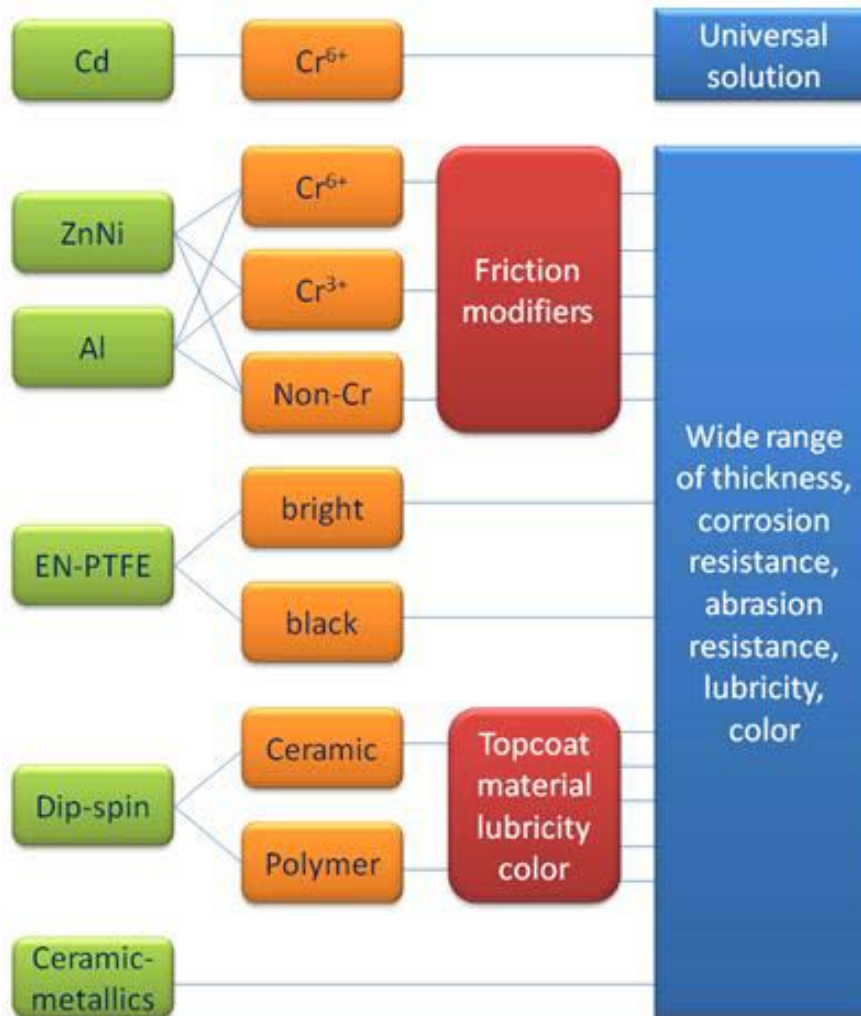
Galvanic issues



- We will need to modify specs to accommodate new coatings
- Say goodbye to olive drab!



- Galvanic compatibility (esp. EN-PTFE)
 - ❑ Primarily Ni to Al or any anodic coating
 - ❑ Smaller differences between anodic coatings
- Torque-tension (esp. Al)
 - ❑ Differences between different coating systems
 - ❑ Largely alleviated by friction modifiers (DFLs)
- Tolerance, paintability, etc. (esp. dip-spin)
 - ❑ Different thicknesses, different prep, adhesion



Capabilities and ease of use
VS
standards and logistics