

Overview of Options, Issues, etc.

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Specified and qualified Cd alternative technologies

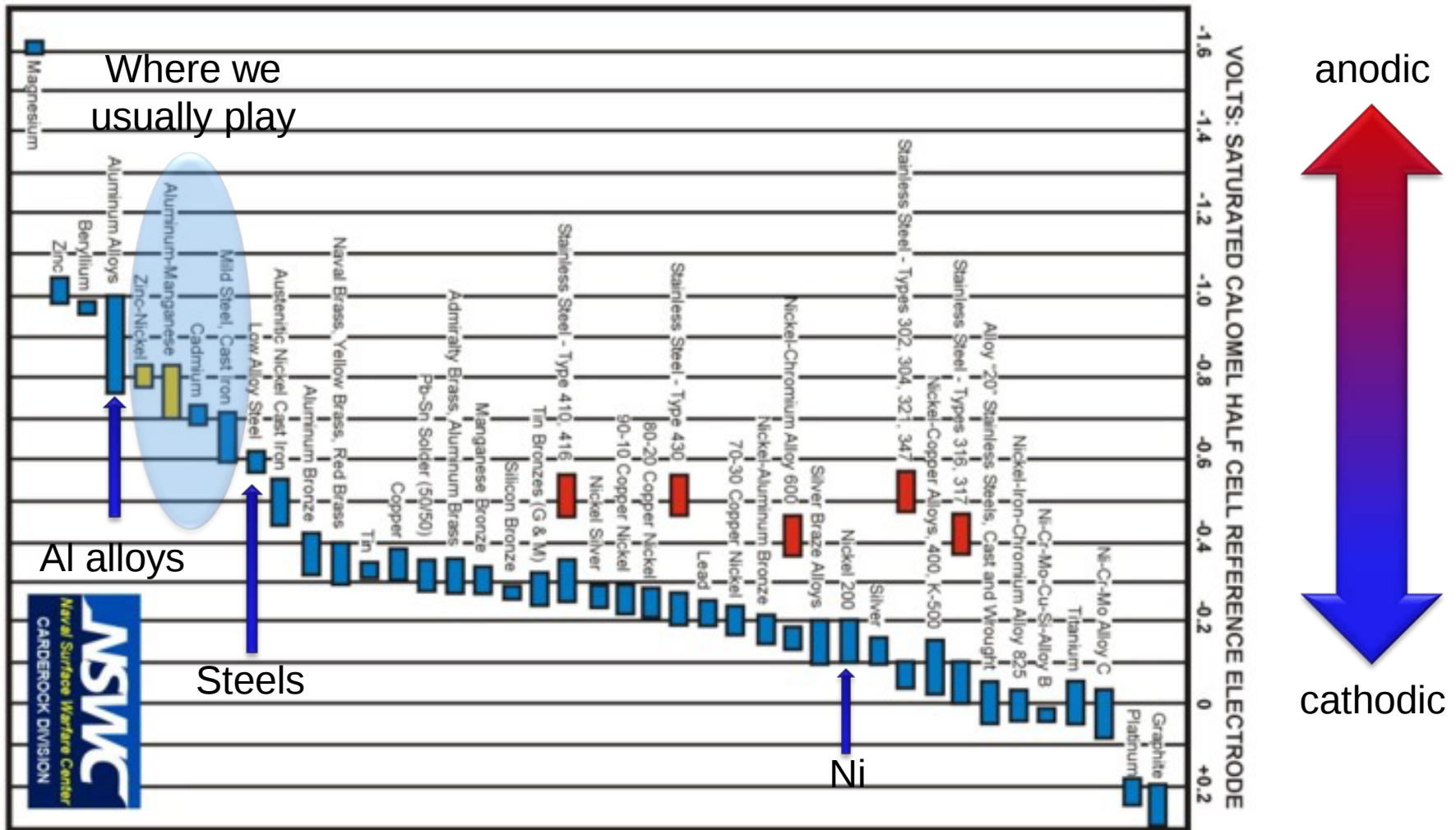
	Connectors	Fasteners	Components
CRES alloys	✓ Wide use	✓ esp GTEs, composites	✓ PH steels, S53
Al: AlumiPlate, IVD, spray	Spec, AP Qual	✓ IVD avail, AP In test	✓ Wide use
ZnNi (old acid, new LHE alk)	Spec	✓ Boeing Qual	✓ USAF validated
Metallic-ceramics			✓ Abrasion/corr
Dip-spin Al/Zn filled polymers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

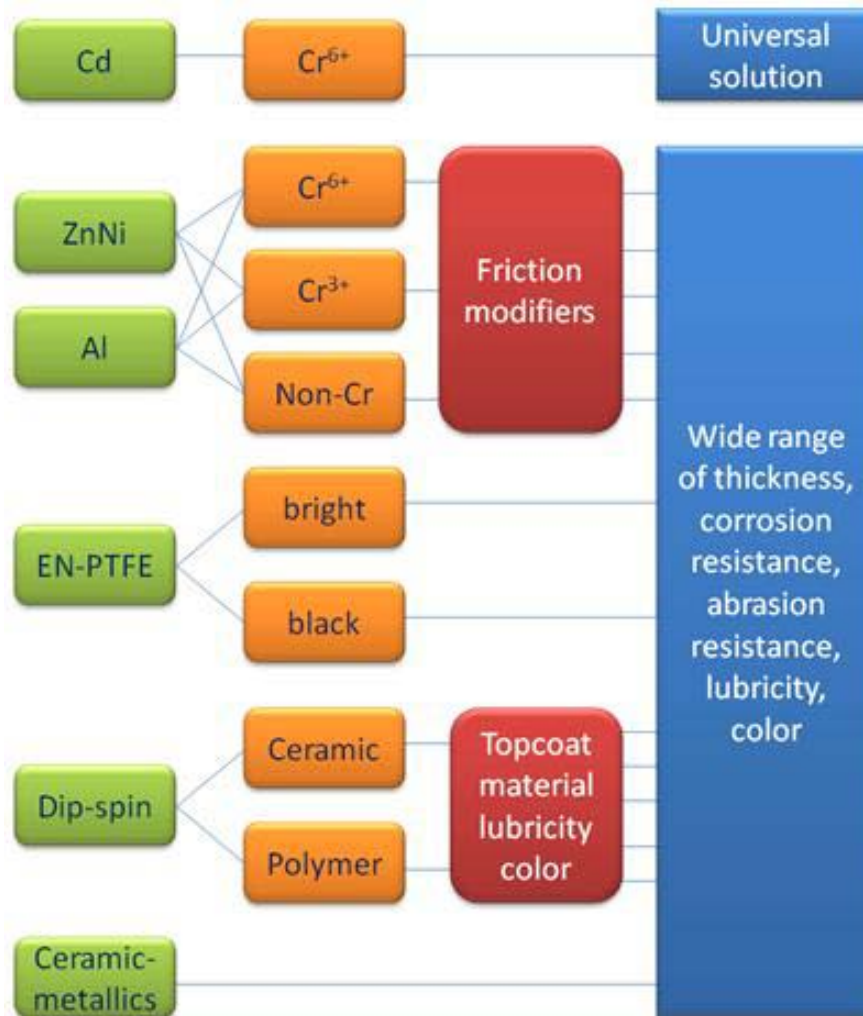
Galvanic issues



- 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