Cold Spray - Portable System and Internal Diameter Applications (TMR 16-03)

**Project Description**
- ARL/ARDEC will demonstrate and transition Cold Spray (CS) to eliminate Cr+6 in numerous current hard chrome applications and HAZMAT in Ni electroplating at LEAD, ANAD & CCAD
- CS facilities will be established at ANAD, LEAD, and CCAD for production and field repair.
- CS processes will be scaled up and qualified for candidate parts from Patriot Missile, UH-60, AH-64, M1A1, AGT 1500, T-55 & T-700 Engine

**Requirement/Impact**
- CS will enable the DoD to comply with environmental regulations (i.e., AERTA PP-2-02-04) and Executive Orders (i.e., 13693) to eliminate Chromic Acid currently in use.
- Performance of CS is equal to or better than chromium and nickel electroplated coatings.
- Eliminate 3,000 lbs/year of HAZMAT at CCAD
- 71,100 lbs/year for Cr

**Progress Report**
- **Key dates**
  - Endorsement signed by PM UH-60 3Q-FY14
  - TTA signed-Chief of Staff PEO Aviation, 4Q-FY15,
  - CCAD, LEAD, ANAD TTA – 4Q-FY16
  - Army RIF
  - Apache Mast Support qualification, 4Q-FY16
  - End/transition point: 4Q-FY20
- **Recent accomplishments/issues**
  - Qualified AH-64 Mast Support Base (Ni) electroplate replacement with Boeing, PM Apache, MOOG and CCAD
  - Worked with ANAD/Honeywell to identify 36 parts, establish JTP, initiate CS capability in AR
Project Description

- ARL/ARDEC will develop a Cold Spray (CS) coating process for ID of large cal. gun barrels & CS additive manufacturing process for medium cal. donor tubes adaptable to full-scale production
- ID gun barrel coating for large caliber and near-net donor tubes for medium caliber
- CS replace conventional Cr plating for ID coatings and extrusion for donor tubes
- CS will be developed, tested & compared to Cr

Requirement/Impact

- Potential to eliminate Cr(VI) in numerous gun systems, including 120 and 155 mm large caliber barrels at Watervliet Arsenal
- Toxic material disposal of several tons of HAZMATS per year (source: HartChrom)
- Performance equal or better than chrome coatings that allows the use of advanced higher energy propellants such as M919 propellants for the 25mm and M829A2 and M29A3 propellants for 120mm

Progress Report

Key dates

- Endorsements signed by PM Bradley & Striker, PM Abrams & Extended Range Cannon Artillery FY13-FY14
- TPA between ARL and Benet Labs: 2Q-FY15
- VES test of Ta by Benet Labs 4Q-FY16
- End/transition date: 4Q-FY18

Recent accomplishments/issues

- Ta-10W 50 caliber donor tube produced for ARDEC
- Graded 50 caliber donor tube produced (Nb-10W-Ta)
- Laser Pulse Heating capability established at UTRC and samples tested for calibration and testing at Benet Labs
- Vented Erosion Simulator Test sample of Ta completed
- 25 July 2016 meeting at Benet (brief mgmt. & S&E’s)
- Target acquisition for the 62 Cal XM350 155mm system