METALS PROCESSING AND FABRICATION SUBPANEL
Overview for SAMPE Conference
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Metals Processing and Fabrication Taxonomy

Metals Processing and Fabrication Thrusts

Special Materials Processing
- Armor
- Multi-Functional Materials
- Advanced Materials
  - Titanium
  - Al MMC
  - Al Alloys
  - Ceramics
  - Tri-Modal Aluminum
- Nanomaterials

Processing Methods
- Forming & Consolidation
- Casting
- Powder Metallurgy
- Forging
- Additive Manufacturing
  (Direct Digital Manufacturing)
- Surface Treatments
- Materials Characterization
- Future Integrated Technologies for Machine Tools (FIT-MAT)
  - Conventional/Enabling Modeling
  - MT Connect
- Process / Machine Intel
  - Process Models
  - Expert Systems

Joining
- Welding
- Laser
- Adhesives
- Friction Stir

Inspection & Compliance
- Test & Inspection
- NDE
- Sensors

Munitions
- Machining
- Forming
- Assembly

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2014 Metals Portfolio

Project Distribution by Technology Area

- Processing Methods comprises over 70% of the portfolio:
  - 10 Additive Manufacturing related projects
  - 11 Casting projects
  - Remaining projects include repair/refurbishment, manufacturing affordability/cost-reduction/weight-reduction, and coatings/cladding
- Joining projects cover efforts to reduce welding costs and distortion issues
- Inspection/Compliance projects cover efforts in casting modeling/NDE and corrosion, debond, and crack detection

Notable Trend – Increase in additive manufacturing related projects.
2014 Metals Portfolio

Project Distribution by Technology Area Trend 2011-2014

Total # of Projects: 69 88 75 81

Significant growth in processing projects.

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Navy represents over half of the Metals portfolio due in large part to ship affordability efforts through cost reduction projects in collaboration with the shipyards.

Army programs contain munition, ground vehicle, and helicopters manufacturing improvements primarily in the Processing Methods area.

DLA projects represent the portfolio of their Metal Casting Program.

$71.7M Total Investment in Metals Projects Reviewed in 2014.
National Network of Manufacturing Institutes Interactions

• Lightweight Innovations for Tomorrow (LIFT): the Lightweight & Modern Metals Manufacturing Institute (LM3II)
  LIFT ensures that the U.S. is the world leader in the application of innovative lightweight metal production and component/subsystem manufacturing technologies.

• America Makes: National Additive Manufacturing Innovation Institute (NAMII)
  Accelerate the adoption of additive manufacturing technologies in the U.S. manufacturing sector and to increase domestic manufacturing competitiveness.

• Digital Manufacturing & Design Innovation Institute (DMDII)
  The DMDII is the nation’s flagship research institute for applying cutting-edge digital technologies to reduce the time and cost of manufacturing, strengthen the capabilities of the U.S. supply chain, and reduce acquisition costs for DoD.
Metals Portfolio Highlights
2013 Metals Subpanel
Achievement Award Winners

Restoration of Aerospace Parts by Cold Spray - IMAST

Plate Edge Preparation Improvements - NMC
2014 Metals Subpanel
Achievement Award Nominations

1. Improved Welder Productivity - CNST

- Interactive Computer Application that Controls Every Step of the Welding Sequence

2. Lead Installation Process Improvement - CNST

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3. SHT Debond Detector - NMC

4. Casting Forging Assist Team - SCRA
Other Noteworthy Projects

- National Forging Tooling Database – DLA Forging
- Cast-IT Solutions – DLA AMC
- Defense Casting Resources – DLA AMC
- Alternative Brazing for Shipboard Use – Navy NMC
- Improved Shaft Cladding Materials and Processing – Navy NMC
- Sliding Door Mfg Improvements – Navy NMC
- Weapons Cradle Manufacturing Cost Reduction – Navy NMC
- Additive Manufacturing of Airfoil Investment Casting Cores by Ceramic Stereolithography – DLA / Air Force
- Portable Cold Spray – Army/Navy IMAST
- Advanced Surface Ship Watertight Closures – Navy IMAST