DoD Additive Manufacturing Update

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Defense Standardization Program Conference
October, 14
Overview

• Why Additive Manufacturing?
  - Modernize National Defense Systems
  - Increase Material Readiness
  - Enhance Warfighter Innovation and Capability

• Department of Defense Strategic Approach to Additive Manufacturing

• Joint Additive Manufacturing Working Group and Standardization
Why Additive Manufacturing?

• Modernize Defense Systems
  - New geometries enabled by AM
  - Part reduction
  - Faster prototype and build cycles
  - *Faster, lighter, stronger, more impactful systems*

• Increase Material Readiness and Efficiency
  - Address part obsolescence
  - Reduced logistics footprint
  - Rapid tooling and job aids
  - *Increased system availability and lower cost*

• Enhanced Warfighter Innovation & Capability
  - Training and job aids
  - Innovative solutions in theater
  - *More responsive and capable units*

*SOURCE: Defense.gov*
DoD’s Strategic Approach to Additive Manufacturing

National Defense Strategy

DoD Additive Manufacturing Strategy
- Provides a Department-wide vision and identifies strategic goals. (~FY20Q4)

AM Policy DoDI & AM Guidebook
- Policy expands across W/S lifecycle & defines responsibilities. (~FY21Q1)
- Guidebook to provide more information and best practices. (~Draft FY21Q2)

Implementation or Campaign Plans
- The plan for each Service or Agency identifying requirements, supporting activities and milestones in operationalizing AM. (FY21-22)

Annual Joint Priority List
- Identification of common issues requiring, or that could benefit from, joint solutions by the JAMWG. (Annually in Q1)

Budgets & Resource Allocation
- Sufficient resources are required to achieve the strategic goals and realize the vision. (Annual cycle)

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DoD AM Strategic Goals

1. Integrate AM into DoD and defense industrial base.
2. Align AM activities across DoD and with external partners.
3. Advance and promote agile use of AM.
4. Expand proficiency in AM: learn, practice, and share knowledge.
5. Secure the AM Workflow.
Joint Additive Manufacturing Working Group (JAMWG)

Across the DoD Enterprise: Research & Engineering, Acquisition, Sustainment and Logistics

Organization:
- Joint Defense Manufacturing Council
  - SES/2Star - AM Overall Responsibility for org.
- Joint AM Working Group
  - GG-15/AO Level/Org. Implementation Leads for AM
- Data & Model Sharing Council
- Qualification & Certification Council
- Education & Workforce Development Council
- Subject Matter Experts

Objectives:
- Disseminate Information
- Joint AM Investment Strategy
- Share Best Practices

Outcomes:
- JAMMEX - DoD 3D file exchange
- Advanced Tools for Rapid Qualification

Opportunities:
- Qualification Tools
  - Digital Thread
  - Workforce
  - Communication
  - Business Practices
  - Cybersecurity
  - Supply Chain Integration

SES/2Star - AM Overall Responsibility for org.
GG-15/AO Level/Org. Implementation Leads for AM

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1. **Accelerate qualification and certification of AM materials, machines and parts.**
   - Scope a joint AM Qualification data generation pathfinder project for metals.
   - Execute pilot materials data federation project and scope a joint AM materials database approach if appropriate.
   - Increase engagement with standards development organizations.
   - Promote and transition R&D to mature AM technologies that will increase reliability and accelerate qualification.

2. **Enhance a secure common digital thread across DoD and industry.**
   - Complete demonstration of Joint Additive Manufacturing Model Exchange (JAMMEX) system, roll out to users and define future requirements.
   - Common Technical Data Package standard developed, accepted by all Services and published.
   - Identify challenges and scope possible solutions to key cyber-physical security needs for AM across DoD.

3. **Expand proficiency in AM: learn, practice and share knowledge.**
   - Identify common requirements, complete asset mapping and a path to fill in gaps with joint Education and Workforce (EWD) Development programs to support Service Implementation plans.
   - Develop an artisan/technician certification program and share outcomes across DoD.

4. **Develop DoD and supply chain integration policies and guidance.**
   - Publish DoD Instruction (Policy) on AM.
   - Share and issue best practices for AM acquisition and cataloging.
   - Provide policy and guidance to integrate the supply chain.

5. **Improve internal and external communication effectiveness on AM.**
   - Publish DoD AM Strategy.
   - Develop AM communication plan and utilize AM collaboration tools.
   - Share information on metrics to capture value of AM and agree on common metrics.
OUSD(R&E) Approaches

Lead and Facilitate

- Joint AM coordination and collaboration
- Funding to support joint priority AM projects
- Sponsor the Additive Manufacturing Innovation Institute
- Develop DoD AM Strategy
- Develop DoD AM Policy

Partner

- Manufacturing Innovation Institutes:
  - America Makes
  - Manufacturing times Digital (MxD)
  - Lightweight Innovations for Tomorrow (LIFT)
  - NextFlex
- Other Partnerships:
  - NDIA Manufacturing Division
  - Additive Manufacturing for Maintenance Operations

Invest in R&D

- Manufacturing of Gradient Index (GRIN) Polymer Lenses for Military Optics
- Cold Spray Additive Manufacturing (AM) & Structural Repair (SR)
- Enhanced Energetics
- Conformal Antennas
Strategic Technology Protection & Exploitation
Mission and Focused Lines of Effort

Acting Deputy Director
Strategic Technology Protection & Exploitation (STP&E)
Dr. Robert Irie

D, Maintaining Technology Advantage
Dr. Robert Irie

D, Resilient Systems
Ms. Melinda Reed

D, Technology and Manufacturing Industrial Base
Mr. Robert Gold

Maintain Leadership in Critical Technology Modernization Areas
Foster Assured Resilient Missions, Systems and Components
Advance Domestic Innovation Base to Deliver Modernization Goals

STP&E MISSION:
Promote and protect technology advantage and counter unwanted technology transfer to ensure Warfighter dominance through superior, assured, and resilient systems, and a healthy, viable national security innovation base.