



DoD Additive Manufacturing Update and Hypersonics Launch

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America Makes TRX

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Overview



- **Why Additive Manufacturing?**
 - Modernize National Defense Systems
 - Increase Material Readiness
 - Enhance Warfighter Innovation and Capability
- **Department of Defense Strategy Approach to Additive Manufacturing**
- **Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) Role and Approaches**
 - Lead and Facilitate Collaboration
 - Partner with External Stakeholders
 - Invest in R&D to Address Foundational AM Challenges
- **Hypersonics Challenge Launch**





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)

Strategic



Operational



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.





AM Workshop Outcomes & Next Steps



Workshop topics are informed by the Annual Joint Additive Manufacturing Working Group (JAMWG) Priority List and the outputs feedback into the prioritization and next steps required.

Outcomes:

- Initial set of metrics identified
- Initial mapping of over 100 job roles to workforce development needs using the AM Body of Knowledge
- Draft outline of the DoD AM Guidebook underway
- Refinement of the AM Common Data Dictionary
- Completion of a data federation and data mining test case
- Advancement toward a common AM technical data package and AM risk part assessment
- Further definition of cybersecurity requirements for AM machines and networking

Next Steps:

- Complete refinement of the metrics and identify resources to support definition for more complex ones (like cost)
- Complete job role mapping and map to existing training resources, identify gaps and propose way forward
- Writing the AM Guidebook
- Publication of American Society for Testing and Materials (ASTM) document for the Common Data Dictionary
- Completion of the data mining test case and a potential data management workshop
- Continuation of the JAMA project
 - Common DoD AM TDP and Risk Categorization
- White paper on cybersecurity to be drafted for review by OSD

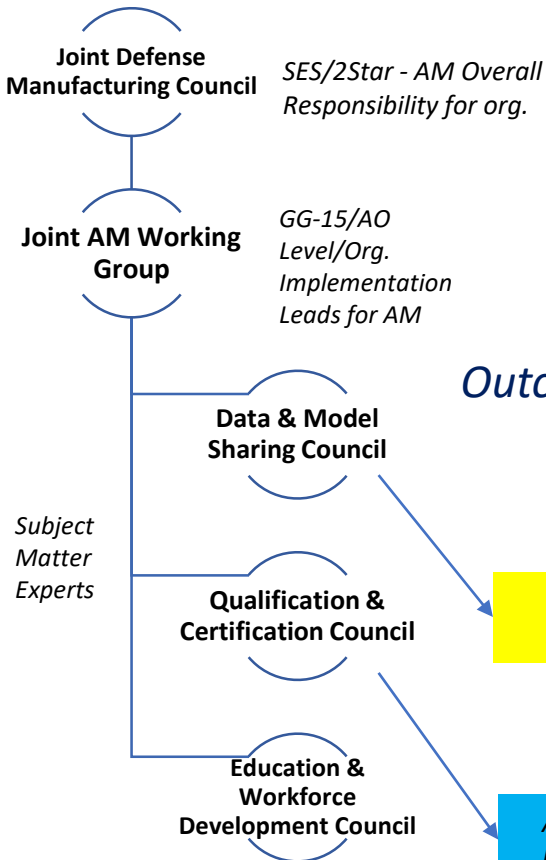
278 AM COI Registrants Participated 23-25 June 2020



Joint Additive Manufacturing Working Group (JAMWG)

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

Organization:



Objectives:



Outcomes:



Opportunities:





JAMWG FY20-21 Priorities



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.

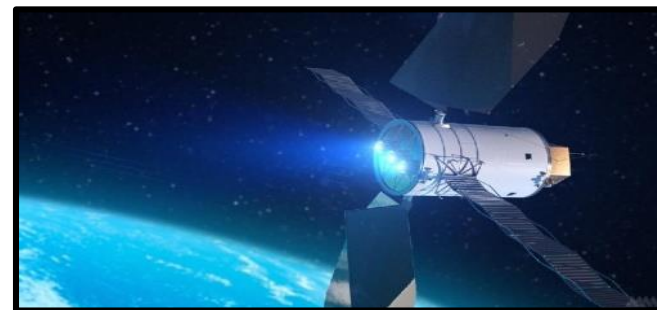
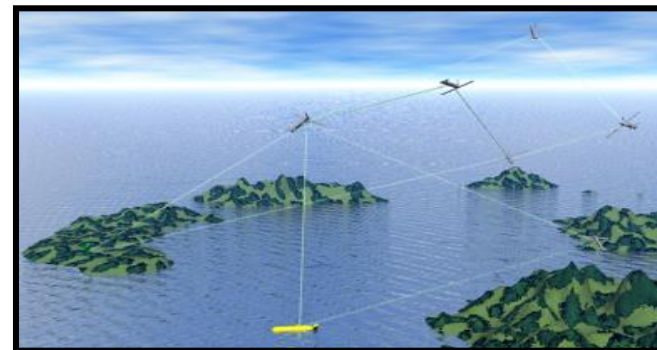
- Publish DoD AM Strategy.
- Develop AM communication plan and utilize AM collaboration tools.
- Share information on metrics to capture value of AM and agree on common metrics.



Office of the Under Secretary of Defense for Research and Engineering Mission



- **Ensure Technological Superiority for the U.S. Military**
 - Set the technical direction for DoD
 - Champion and pursue new capabilities, concepts, and prototyping activities throughout DoD research and development enterprise
- **Bolster Modernization**
 - Pilot new acquisition pathways and concepts of operation
 - Accelerate capabilities to the Warfighter





OUSD(R&E) Role



- **Lead and Facilitate Collaboration Across DoD to Address Barriers**
- **Partner with External Stakeholders to Accelerate AM Adoption**
- **Invest in Solutions to Foundational AM Challenges**
 - Validated and controlled materials and manufacturing processes
 - Secure data access and exchange
 - Design for AM
 - Qualified and trained personnel
 - Rapid parts qualification and certification





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



***Maintain Leadership in Critical
Technology Modernization Areas***

D, Resilient Systems
Ms. Melinda Reed



***Foster Assured Resilient Missions,
Systems and Components***

D, Technology and
Manufacturing Industrial Base
Mr. Robert Gold



***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.***



Defense Manufacturing for the Modernization Priorities



USD(R&E) and USD(A&S) are working together with the Services to align defense manufacturing with the Defense Modernization Priorities.



OSD ManTech

<https://www.dodmantech.com/>



Small Business Innovative Research

<https://sbir.defensebusiness.org/>

Small Business Technology Transfer

<https://rt.cto.mil/rtl-small-business-resources/>



Industrial Base Analysis & Sustainment (IBAS)

<https://www.businessdefense.gov/IBAS/Overview/>



Defense Production Act (DPA) Title III

<https://www.businessdefense.gov/Programs/DPA-Title-III/>

OSD is establishing a DoD Manufacturing Council to provide holistic governance across DoD budget authorities, and to improve our engagement strategy and process with our industry partners.



Joint Defense Manufacturing Council



Strengthen
Cross-Cutting
Initiatives in
Advanced
Manufacturing

Address
Department of
Defense
Modernization
Priorities

Provide
Strategic
Management
for
Manufacturing
Innovation
Institutes



**Build a More Lethal
Force**

**Strengthen Alliances
& Attract New
Partners**

**Greater
Performance &
Affordability**





JDMC Timeline

- **January-March 2020:** ManTech developed a plan for turning the Joint Additive Manufacturing Steering Group into the Joint Defense Manufacturing Council (JDMC). Work began on drafting a new charter for the JDMC.
- **March 2020:** ManTech hosted the first JDMC meeting and the draft charter was shared for review and edits.
- **May 2020:** Full-time staff hired to support the establishment and work of the JDMC.
- **June 2020:** Confirmation of JDMC membership across DoD Agencies and the Services – 17 principal members across OUSD R&E, OUSD A&S, Army, Navy, Marine Corps, Air Force, DLA, DCMA, MDA, and Joint Chiefs of Staff.
- **June 2020:** Formal review and coordination of JDMC Charter across principal members completed.
- **Expected July 2020:** JDMC officially chartered and the Council's establishment shared across DoD.
- **Expected September 2020:** Second meeting of the JDMC.



JDMC Principal Members



Role	Organization	Principal Name
Acting Deputy Director for Strategic Technology Protection and Exploitation	OUSD – Research and Engineering	Dr. Robert Irie
Director, Technology Manufacturing and Industrial Base	OUSD – Research and Engineering	Mr. Rob Gold
Deputy Director for Engineering	OUSD – Research and Engineering	Dr. Sandra Magnus
Acting Deputy Assistant Secretary of Defense for Industrial Policy	OUSD – Acquisition and Sustainment	Mr. Scott Baum
Deputy Assistant Secretary of Defense for Materiel Readiness	OUSD – Acquisition and Sustainment	Mr. Steve Morani
Deputy Assistant Secretary of Defense for Logistics	OUSD – Acquisition and Sustainment	Ms. Leigh Method
Assistant Deputy Chief of Staff HQDA G4	Army	Mr. Bill Moore
Executive Deputy to Commanding General, Army Materiel Command	Army	Ms. Lisha Adams
Commanding General, US Army Combat Capabilities Development Command	Army	Major General John George
Deputy Assistant Secretary of the Navy Research, Development, Test and Evaluation	Navy	Mr. Bill Bray
Deputy Commandant, Installations and Logistics	United States Marine Corps	Lt. General Charles Chiarotti
Deputy Assistant Secretary of the Air Force for Logistics and Product Support	Air Force	Ms. Angela Tymofichuk
Deputy Assistant Secretary of the Air Force for Science, Technology, and Engineering	Air Force	Ms. Kristen Baldwin
Executive Director, Logistics, Policy, and Strategic Programs	Defense Logistics Agency	Mr. George Atwood III
Executive Director Technical Directorate	Defense Contract Management Agency	Mr. Matthew Lupone
Chief Engineer	Missile Defense Agency	Mr. David McNeill
Principal Deputy Director for Logistics	Joint Chiefs of Staff	Ms. Kristina O'Brien

