

System engineering approach was utilized to align DoD needs to roadmap

# AM Technology Roadmap updated to align more closely with supplier and customer needs



Approach for roadmap refresh

## PROBLEM

Additive manufacturing (AM) technology offers benefits across a range of applications. The potential opportunity includes an ever-increasing number of manufacturing processes, materials, and advanced manufacturing methodologies. As the number of potential solutions continues to increase exponentially, long-range success and industrialization of technology rely on the right-sized solutions due to limited time and resources. Rapidly identifying high-priority opportunities requires alignment of both customer and supplier to facilitate successful technology maturation. The data informing the decision-making process should be up to date and relevant to the current state to position future investment for optimal benefit and reduced risk of duplicated efforts. Two vital sources of information that fulfill this function for America Makes are the AM Technology and DoD Roadmaps. At present, the technology roadmap does not include current and future applications and capability needs of the DoD, which are vital to future Institute success and research and development (R&D) investment prioritization. Engagement with subject matter experts is necessary to identify and document immediate and future capability needs for updating these strategic documents.

## OBJECTIVE

The objective of this funded effort through the Office of the Secretary of Defense (OSD) was to capture Service-specific visions for AM and its application and then put them into a standard framework. The goal of the standardization was to enhance cross-Service collaboration and connect Department of Defense (DoD) AM Roadmaps to industry and academia via the broader America Makes AM Technology Roadmap. Additionally, the project was to assess the capability needs of government partners as well as their current approach to tracking technology maturation.



**AMERICA MAKES  
TECHNOLOGY  
DEVELOPMENT  
ROADMAP**

This project aligns to:



PROCESS

**ASTM PROCESS  
CATEGORY:**  
N/A

**EQUIPMENT:**  
N/A

**MATERIAL:**  
N/A

## TECHNICAL APPROACH

The project involved three main approaches: 1.) Design-Vantage Systems Engineering (SE) Approach, 2.) Deloitte effort description aligning Service and Agency needs to America Makes Technology Roadmap, and 3.) American National Standards Institute (ANSI) alignment to standardization. America Makes teamed with Design Vantage to perform an extensive Systems Engineering (SE)-based analysis of the current DoD AM Roadmap. Design Vantage was instrumental in the development of the current DoD AM Roadmap and was able to provide an analysis of the current structure of Critical Technology Elements (CTEs) and requirements and build upon it. The project team reviewed existing AM strategy documentation (e.g., AM Campaign / Implementation Plans) and conducted primary research with each of the Services / Agencies. The project team finalized and prioritized the future Capability Needs incorporated into the refreshed roadmaps, ensuring congruence with the America Makes DSF. This process helped ensure the next iteration of the DoD AM Roadmaps was sufficiently detailed, prioritized, and aligned with ongoing services/agencies efforts.

## ACCOMPLISHMENTS

The Design Vantage analysis accomplished under this project provided the foundation for the DoD AM Roadmap Capabilities Enhancement and was instrumental to the development of future revisions to the technology roadmap. Through detailed analysis of the Military Services and DLA's additive manufacturing plans, the project team developed updated roadmap views for each, supported by additional analysis. These roadmaps will support coordination both within government and industry/academia and guide strategic choices by stakeholders. All Services and Agencies that participated showed considerable depth of vision and identified several commonalities and opportunities for collaboration, many of which are already being explored through joint organizations and research projects. Coordination and collaboration will grow in importance as the Services and DLA approach their respective integration points. Although DLA's vision and outcomes are unique, they reflect that agency's role in the defense AM ecosystem. By understanding the relationships between these visions, the Services can expect to benefit from DLA's efforts.

## PROJECT END DATE

December 2021

## DELIVERABLES

- Four updated roadmaps and summary reports
- Updated and refined technical requirements in the America Makes Technology Development Roadmap
- Final report

## FUNDING

**\$1,511,933 total project budget**

## PROJECT PARTICIPANTS

### Project Principal:

NCDMM/America Makes

### Other Project Participants:

Deloitte

Design Vantage

American National Standards Institute (ANSI)

### Public Participants:

U.S. Department of Defense