SUCCESS STORY 5502

Advancing U.S. manufacturing supply chain resiliency and preparing for future crises

Response infrastructure using advanced manufacturing bridges supply chain gaps and supports warfighter readiness

Parts additively manufactured by ecosystem suppliers during Scenario Execution

PROBLEM

The COVID-19 pandemic and subsequent supply chain disruptions exposed an ongoing need for domestic crisis preparedness and supply chain resiliency. The ability of the United States to maintain readiness, and to surge and sustain in response to an emergency, directly relates to the capacity, capabilities, and resiliency of our manufacturing and defense industrial base. Disruptions in supply and demand occur with surprising frequency – leading to significant challenges for the United States and its citizens. For this reason, the U.S. must pursue efforts to increase the resiliency and agility of supply chains, and develop talent pipelines.

OBJECTIVE

Create and demonstrate an enduring, strategic infrastructure that provides a means to rapidly respond to national, regional, and local supply chain shortages in times of crisis, ultimately enhancing overall national economic competitiveness and security.

TECHNICAL APPROACH

The National Center for Defense Manufacturing and Machining (NCDMM)/America Makes, with key support from Deloitte Consulting, LLP (Deloitte) and Quotient, Inc., executed this effort through two major focus areas: (1) Leadership and National Coordination - Identify supply chain and technical gaps and disseminate needs to solution providers to address known risks impeding rapid response to supply chain shortages in times of crisis. This was addressed through the sustainment and extension of the work that NCDMM/America Makes initiated with the Food and Drug Administration (FDA), Veterans Affairs (VA), and National Institutes of Health (NIH), and at the direction of the Office of the Secretary of Defense (OSD). (2) Resiliency and enduring Infrastructure to improve the U.S. response capability to future crises - In line with the Department of Defense (DoD) and United States Air Force (USAF) goals through enhancements of the existing AMCPR portal, developing a Strategic Roadmap and Playbook, and culminating with an Impacts Report. Three teams were created to execute these focus areas and deliver the products for this effort.

- Product Identification, Guidance, and Matchmaking
- Ecosystem and Communication
- Process and Technology Platform Development

AMERICA MAKES TECHNOLOGY DEVELOPMENT ROADMAP

This project aligns to:

PROCESS

ASTM PROCESS CATEGORY: N/A

EQUIPMENT: N/A

MATERIAL: N/A

ACCOMPLISHMENTS

During the COVID-19 pandemic, NCDMM/America Makes led the AMCPR as a trusted entity to demonstrate impact across three key dimensions: convene, coordinate, and catalyze -- to bolster supply chain resiliency and accelerate the adoption of advanced manufacturing (AM) technologies to meet critical demands during any crisis. Throughout the AMCPR, impact was delivered in the following ways:

- **Convened** an ecosystem of diverse players who helped to provide strategic guidance, define system requirements, and participate in scenario wargaming. Significant activities included assessing the supply chain landscape to identify gaps across the ecosystem, engaging ecosystem stakeholders to accelerate the production response, and amplifying the AMCPR mission, objectives, and success stories through strategic communications.
- **Coordinated** an emergency response using the AMCPR Exchange (online 3D model repository and platform) to provide suppliers a demand signal they can address. Steps taken to drive the coordination included defining the requirements for the AMCPR Exchange, developing the back-end code and front-end user interfaces, and deploying the platform for ecosystem use.
- **Catalyzed** the ecosystem to action through situational wargaming. The approach to catalyzing action included conceptualizing scenarios, engaging scenario participants, and executing scenarios to comprehensively test the AMCPR Exchange. Over the course of five months, **42 participants** across **23 organizations** were engaged, and **seven scenarios** were fully executed. Results included highlighting the need for an increased number of validated designs and access to AM capability.

Additional deliverables included: Sensing reports; scenario summary and success slides; University of Texas El Paso Drive AM Training AMCPR content; and demonstration of 2D to 3D file conversion capabilities.

The AMCPR program identified, developed, and demonstrated processes, policy, ecosystem, and tools to rapidly respond to national, regional, and local supply chain shortages during times of crises or normalcy. These efforts are recommended to continue and expand to address the needs of organic and inorganic industrial base; capture knowledge of additive manufacturing; execute wargaming exercises to ensure preparedness; expand the number of users and function of the AMCPR exchange to help address supply chain gaps; inform and drive policy and law needed around crises response and supply chain shortages.

PROJECT END DATE

May 2022

DELIVERABLES

- Development and demonstration of the AMCPR Exchange
- Stakeholder and Supply Chain Capabilities Mapping
- OSD AMCPR Long-term Roadmap
- AMCPR Playbook
- OSD AMCPR Impacts Report

FUNDING

$5.2 total project budget

PROJECT PARTICIPANTS

Project Principal:
NCDMM/America Makes

Other Project Participants:
Deloitte Consulting, LLP
Quotient, Inc.

Public Participants:
Office of the Secretary of Defense (OSD)
Air Force Research Laboratory (AFRL)