

America Makes Overview

COVID-19 Advanced Manufacturing Crisis Production Response

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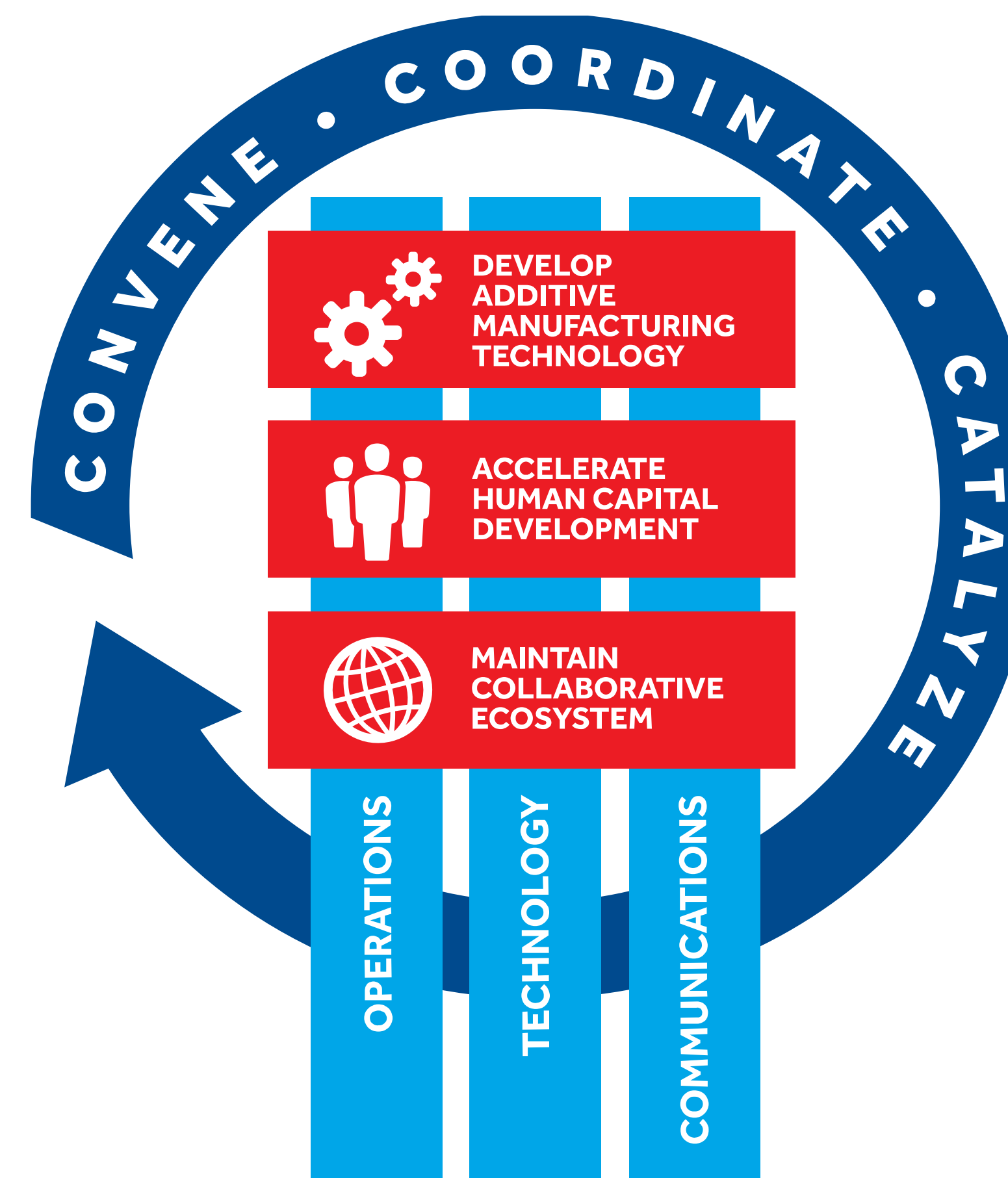
Overview

The three core activities of the Institute are:

- **Develop Additive Manufacturing Technology:**
Projects, Innovation, Technology Transfer, Implementation
- **Accelerate Human Capital Development:**
Workforce, Education, Training, Outreach
- **Maintain Collaborative Ecosystem:**
Government, Membership, Community

These focus areas are enabled by:

- **Operations:** Run by a not-for-profit organization with a lean and collaborative structure
- **Technology:** A dynamic advanced manufacturing technology including the core AM technologies as well as supporting technologies like the digital thread, standards, etc.
- **Communications:** Spreading the word to government, members, stakeholders, community



Who We Are



Public / Private Partnership

America Makes has substantial federal investment, private industry and academic investment.

Multi-Agency Collaboration

Partnership between industry, government and universities, led by the Defense-wide Manufacturing S&T team.

Membership

Innovation facility in Youngstown, Ohio with more than 225 members. We continue to grow.

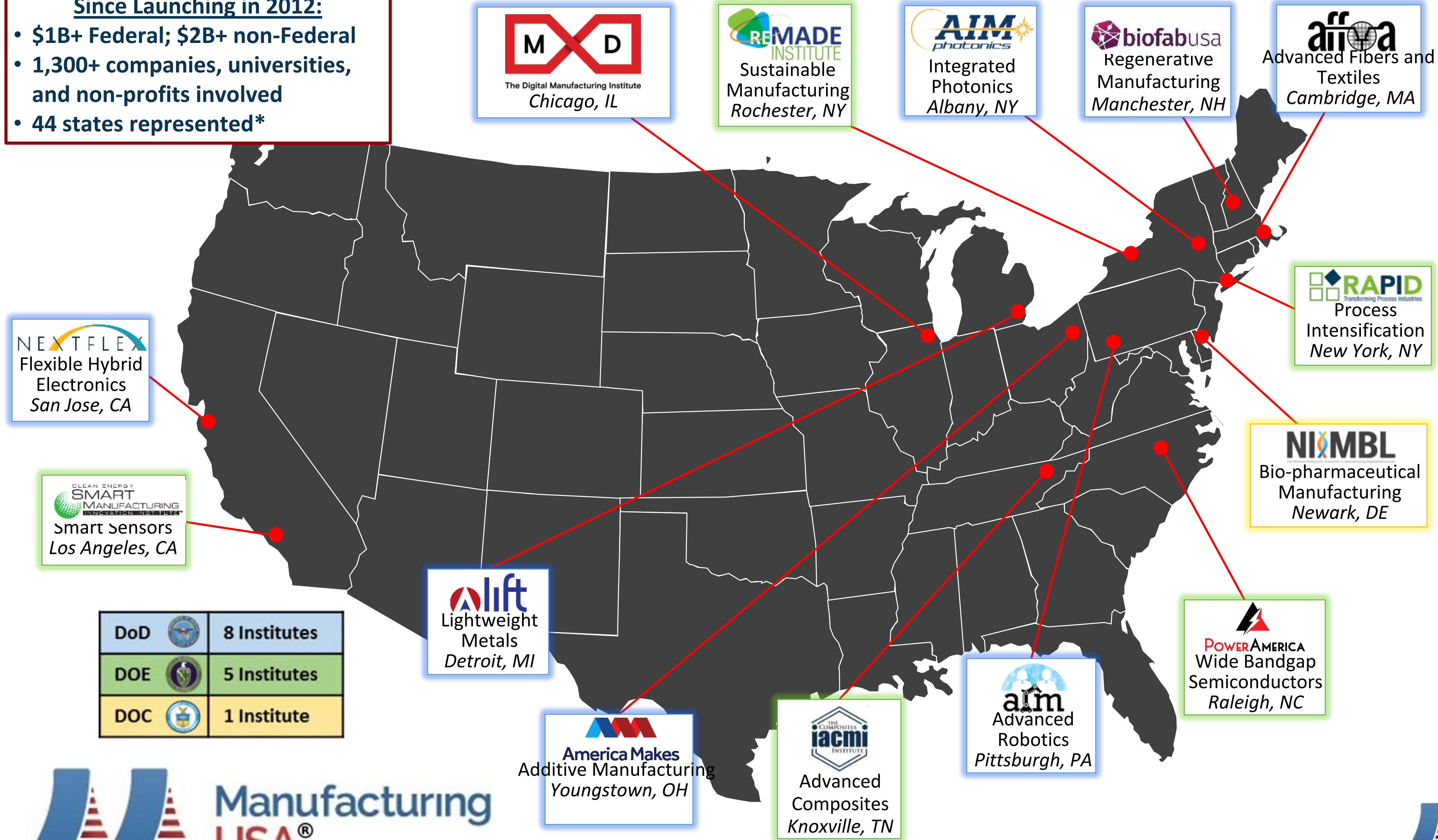
Operations

We are operated by the National Center for Defense Manufacturing & Machining (NCDMM)

AFRL Manufacturing USA Network

Since Launching in 2012:

- \$1B+ Federal; \$2B+ non-Federal
- 1,300+ companies, universities, and non-profits involved
- 44 states represented*



DoD		8 Institutes
DOE		5 Institutes
DOC		1 Institute



What We Have Heard – Stakeholder Needs

R&D Projects

Participation from broad, diverse teams and shared risk through cost share

Community Networking

Introduction to new and emerging partners in the supply chain

State of the AM Industry

Keeping pace with a fast moving and innovative technology

Member Resources

Access to knowledge; data; know-how

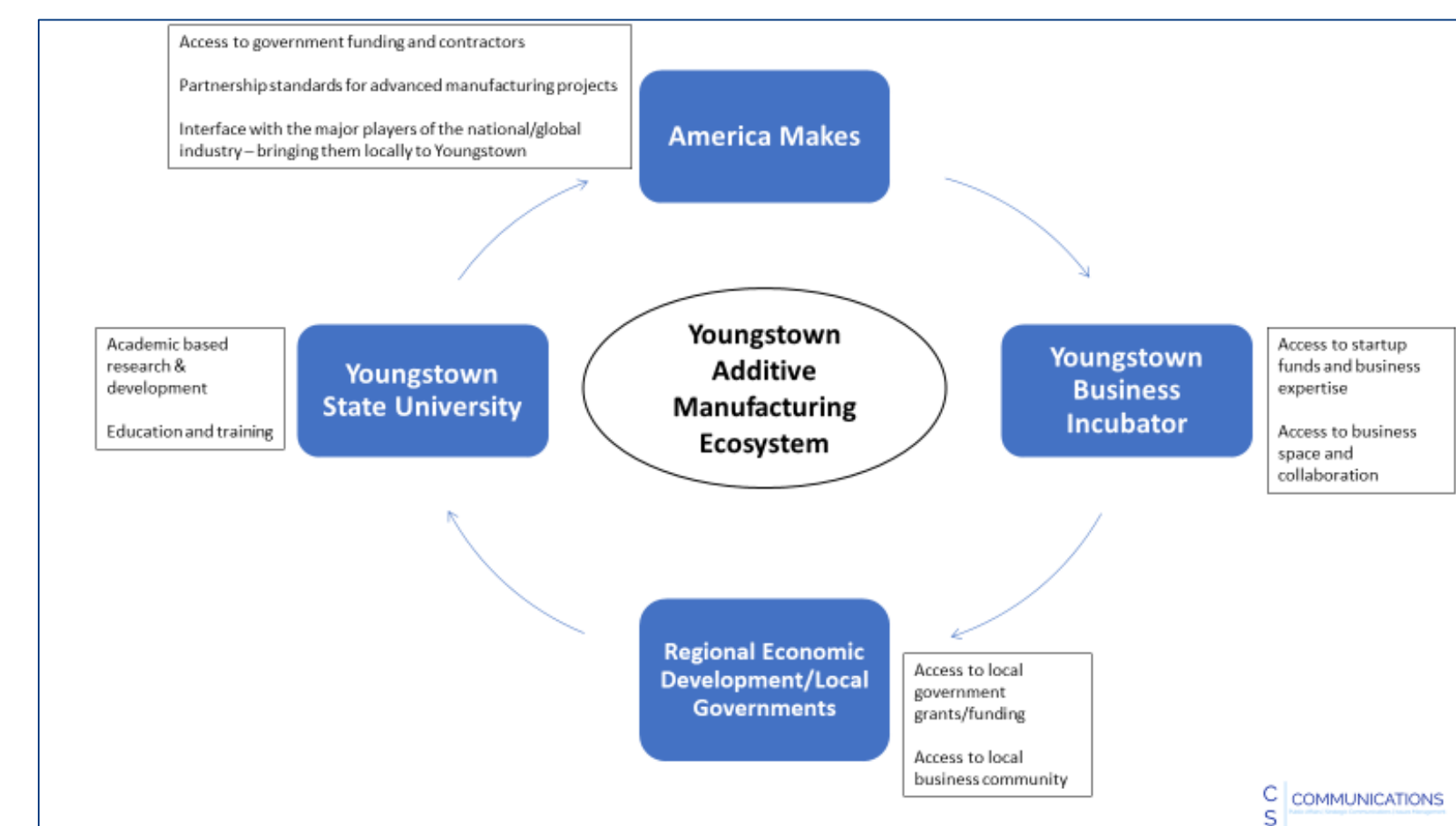
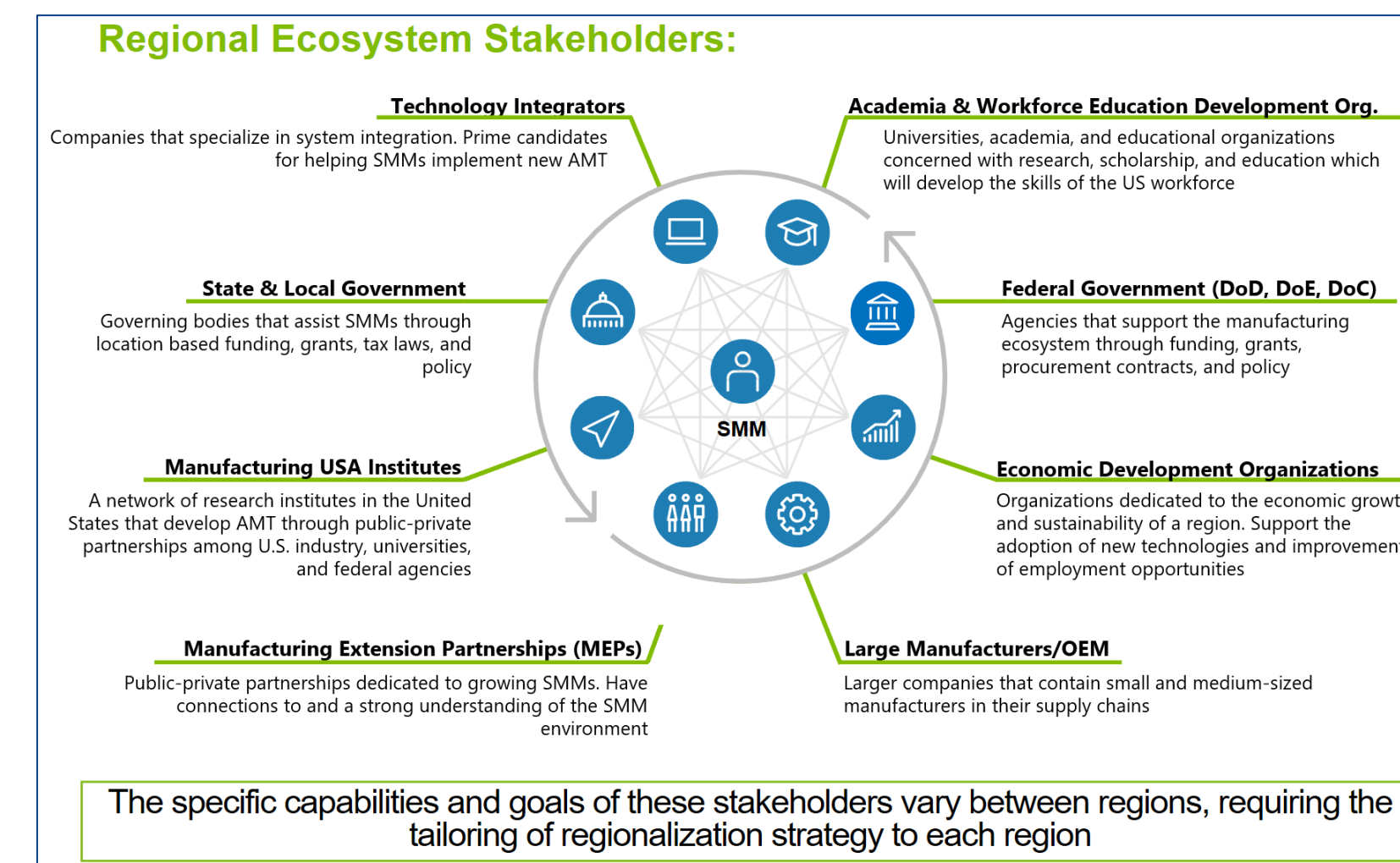
Business Opportunities

Engaging with new players; complicated “partners”

Value Proposition to Industrial Base

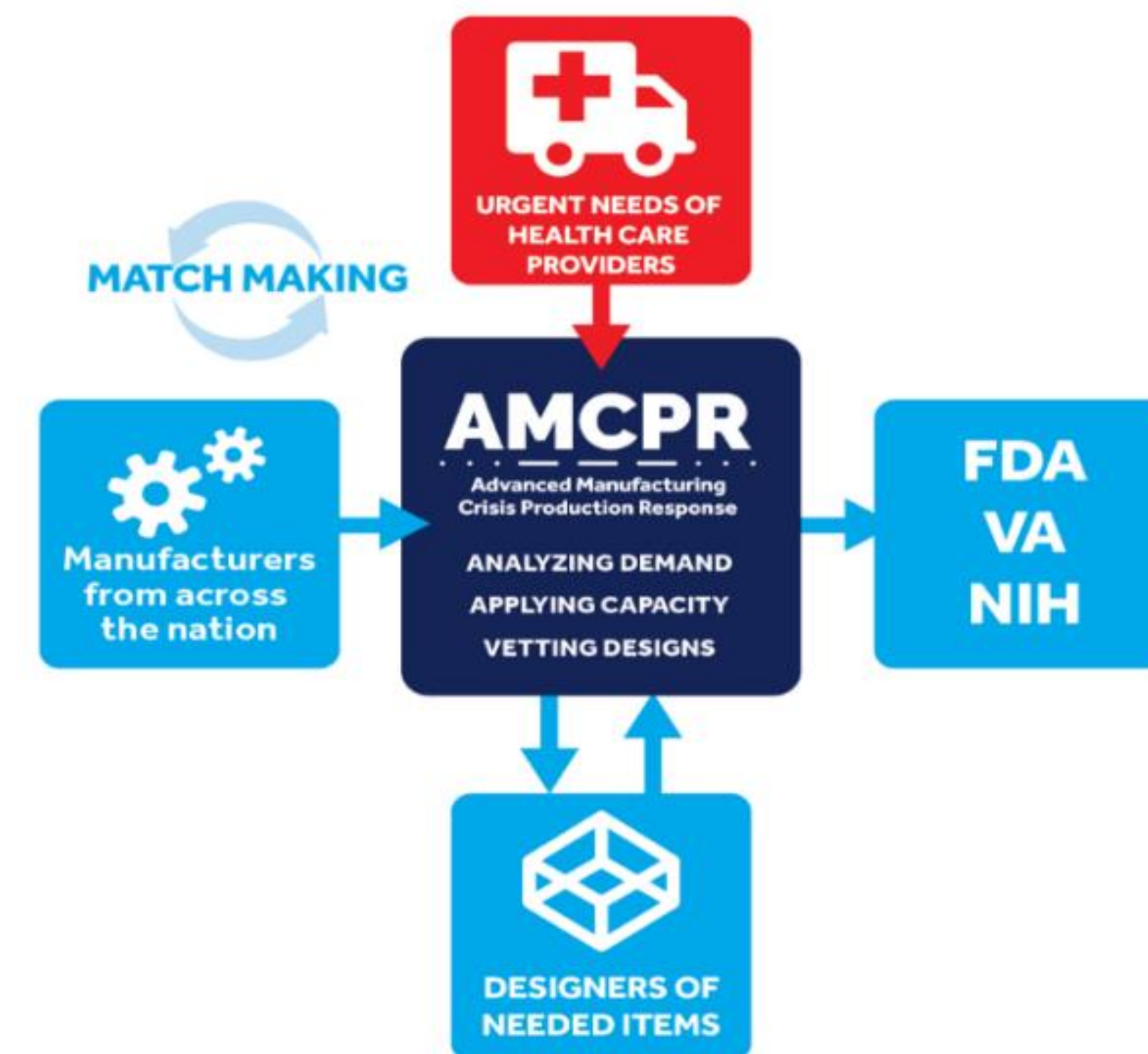
Small to Medium Manufacturers (SMMs) Regionalization Strategy – America Makes has supported many diverse initiatives focused on advancing the current state of additive and advanced manufacturing technology. The advancement of manufacturing technology and the ecosystem is dependent upon understanding regional strengths within small to medium size manufacturers (SMMs). Manufacturing technology adoption will be enhanced through the SMMs having the ability to capitalize on the national network of institutes, and the depth of knowledge and training resources that can be accessed through them. Through OSD support, America Makes executed a project focused on developing a regionalization strategy to connect SMMs to America Makes and other institutes through the development of a “regionalization playbook” which can be replicated nationally.

AM Ecosystem – America Makes is engrained into an ecosystem in Youngstown, Ohio which is connected to a larger national network to provide members access to additive manufacturing capabilities and expertise. America Makes continued to develop and expand its AM ecosystem in 2019 by adding two additional Satellite Centers at Texas A&M Engineering Experiment Station at Texas A&M University and the National Institute for Aviation Research at Wichita State University. Each Satellite Center is focused on mirroring and enhancing the efforts of America Makes to foster a collaborative infrastructure for the open exchange of additive manufacturing information and research, engaging with local companies and educational institutions to supply education and training in additive manufacturing technologies, and focusing on the transition of additive technology from the research lab to commercialization.



AMCPR – Advanced Manufacturing Crisis Production Response Overview

- America Makes, as the *leading organization* to *communicate, convene and coordinate* the additive manufacturing ecosystem responding to critical manufacturing needs. has developed the **AMCPR** – Advance Manufacturing Crisis Production Response initiative, to respond to critical manufacturing needs, enabling **delivery of safe, effective products**
- Department of Defense’s Manufacturing Innovation Institute (DoD MII) for additive manufacturing, part of the Manufacturing USA network. Initial funding from OSD to establish the AMCPR initiative
- Our mission is to **drive collaboration within our industry to meet the needs of the U.S. government and manufacturing base** – a mission more critical in the fight against the COVID-19 pandemic



AMCPR – Current State

The Advanced Manufacturing Crisis Production Response (AMCPR) initiative has already embarked on the **design**, partial **deployment**, and intended **delivery** of this capability. To date, the AMCPR team has accomplished the following key objectives:

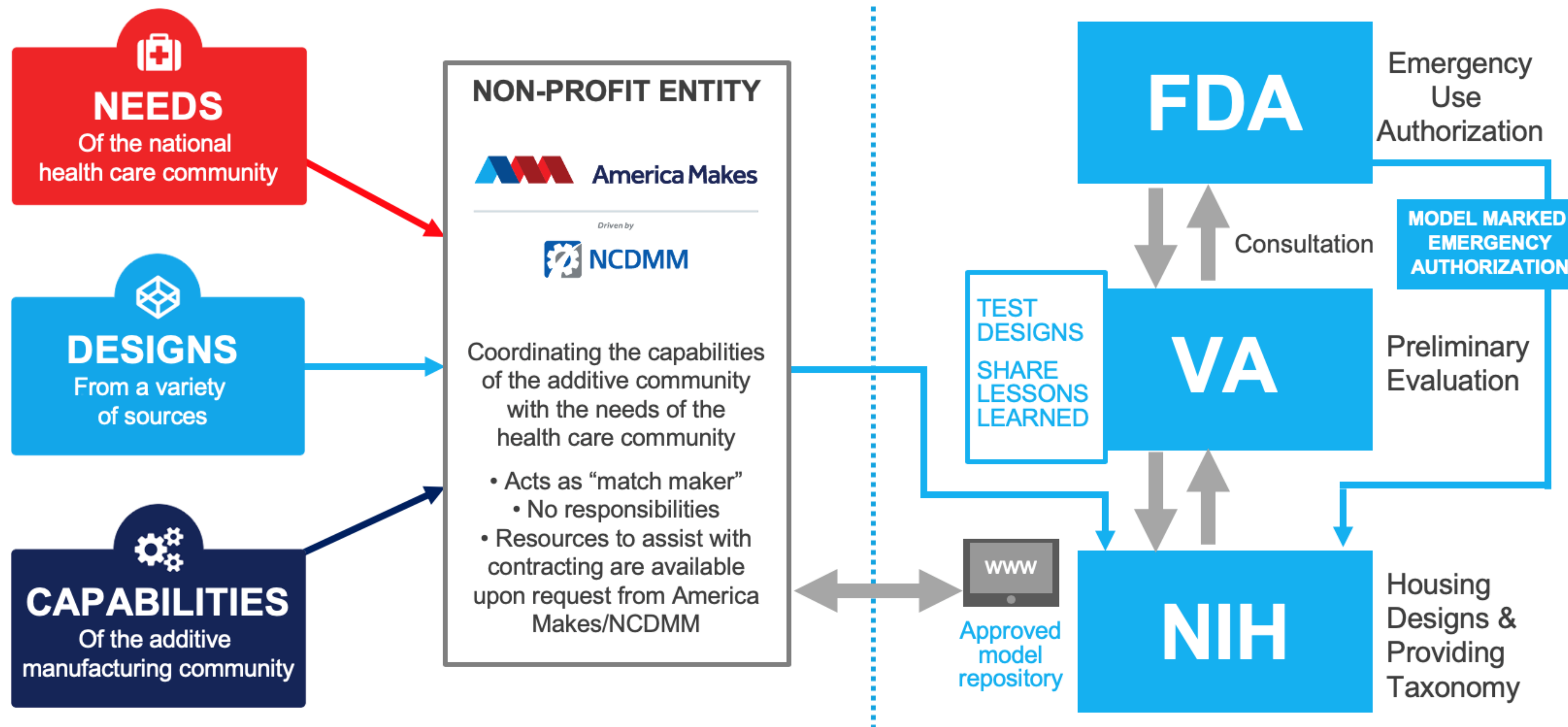
- *Initiated the AMCPR portal*
- *Joined forces with the FDA, VA, and NIH*
- *Created “tiger teams” to address supply chain issues*

America Makes COVID-19 Response by the Numbers

Within the first ten days of standing up the AMCPR:

- **America Makes registered more than 400 manufacturers from 43 states with capacity to deliver 100,000 clinically reviewed PPE items weekly.**
- **More than 13 product designs received and reviewed** for medical and non-medical products.
- **Facilitated matches between local manufacturers and those with medical supply needs; a single supplier in the network delivered between 10,000 and 20,000 face shields.**

How it works



3D PRINTING: COVID-19 Regulatory and Performance Considerations

The information below is provided to give manufacturers regulatory and product performance considerations related to producing clinically reviewed designs.

RELEASE DATE: May 8, 2020

For up-to-date information and resources, visit:
www.AmericaMakes.us/covid-19

Manufacturing Regulatory Considerations		Product Type				
		Face Shield	Community Use Face Mask	Surgical / Clinical Use Face Mask ¹	Mask Tension Release Bands	Personal Assistance Device
IFU – Instructions for Use	Manufacturers are responsible for telling the user the intended use, how to wear/use the device, storage, assembly, cleansing, and disposal information. Moreover, information on materials, warnings, performance testing, adverse reactions, and a disclaimer should be included. General Device Labeling Requirements	✓	✓	✓	✓	✓
Labeling	Medical devices sold in the US, from manufacturing through distribution to a patient, must be labeled. Device Labeling UDI System Link	✓		✓		
Product Tracking	Device manufacturers must track how many devices are distributed to each customer and offer a method for receiving, recording, and tracking potential issues with devices. Medical device tracking	✓		✓		
GMP – Good Manufacturing Practice	Manufacturers must establish and follow quality systems to help ensure that their products consistently meet applicable requirements and specifications. QS Regulation and GMP Overview of Device Regulation			✓		

Value Proposition to the U.S. Workforce

America Makes Education and Workforce Development (EWD) is centered around a roadmap built by industry, academic, and defense stakeholders.

America Makes is a dynamic partner building scale and scope to a variety of projects and programs with a rich portfolio of over 75 EWD projects since inception all of which are mapped to the America Makes EWD Roadmap. Part of this great work is the building on the additive manufacturing body of knowledge first established in 2013, then refreshed in 2016 and undergoing another refresh currently in 2019. This is great work done through their membership, partners, and DoD stakeholders.



When America Makes America Works



AmericaMakes.us



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Backup

IMPACT TO THE INDUSTRIAL BASE

America Makes project 3003

Development of a complete materials property database for ULTEM™ 9085 that can be used across industry and within the DoD

- *Improve material understanding and reliability*
- *Reduce variance in applications*
- *Increase uses of this high-performance thermoplastic used in aerospace, automotive and other industries*

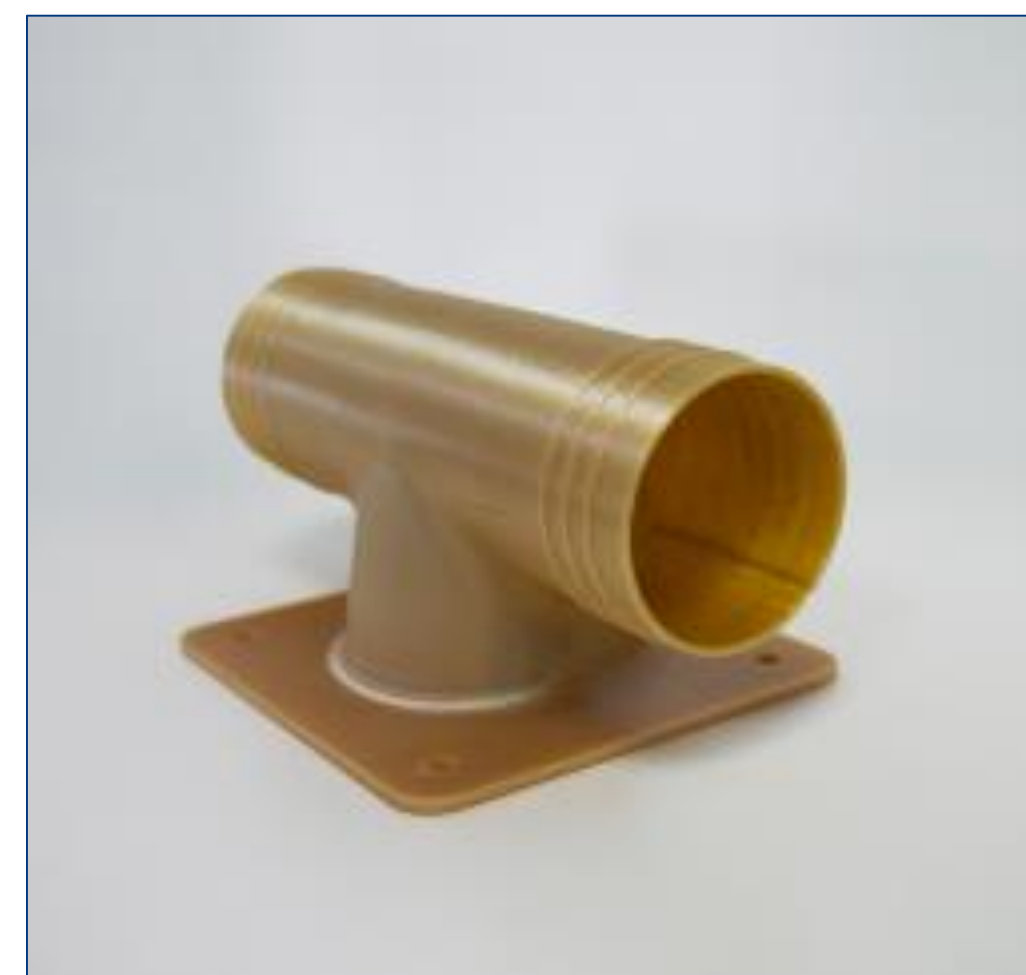
ACCOMPLISHMENTS

- Developed parameters and process specifications
- Confirmed reproducible material properties across recognized methods for aerospace grade manufacturing
- Followed NIAR/NCAMP guidelines to generate baseline data



(Above) Brackets 3D printed on the Fortus 900mc Production 3D Printer.
(Photo: Stratasyss)

[LINK](#)



(Left) Final, flight-approved, 3D printed ducting for air conditioners. 3D printed in ULTEM™ 9085 resin on the Fortus 450mc
(Photo: Business Wire)

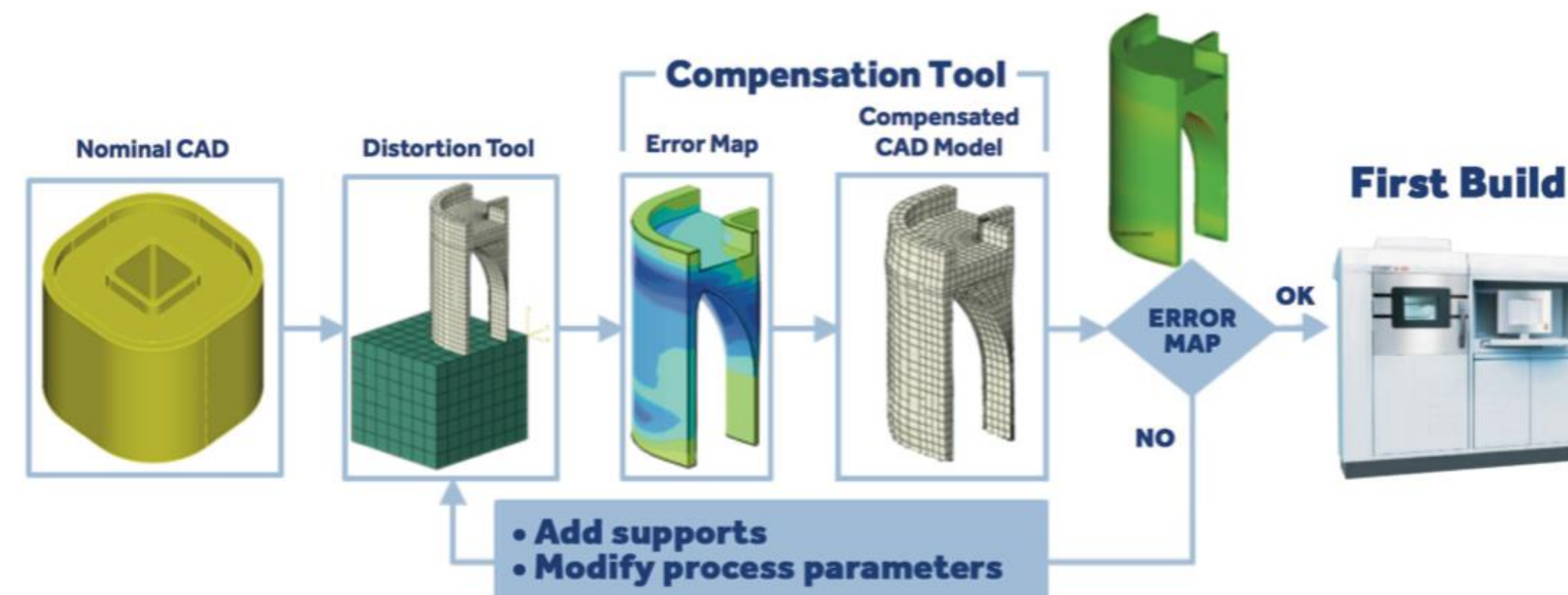
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IMPACT TO THE INDUSTRIAL BASE

America Makes project 4026

Development of distortion prediction and compensation methods for metal powder bed AM

- A collaborative team of three, highly technical, and competitive aerospace OEMs—GE, Honeywell and United Technologies Research Center (UTRC)—worked together with software developers 3DSIM, Pan Computing, and CDI Corporation to execute this project.



Using accurate and reliable software to predict distortion caused by thermal additive processes allows drastically reduced product development times and shortened time to production. (image: America Makes)

[LINK](#)

ACCOMPLISHMENTS

- Reduced product development time by 75% - reducing the number of iterative builds from 15 to 3.
- Commercially available software incorporating project findings.
- Compensation tool available for free to America Makes members.



The simulated distortion compensation ability of NETFABB from Autodesk incorporates many of the discoveries of this project (Image: Autodesk)

[LINK](#)

IMPACT TO THE INDUSTRIAL BASE

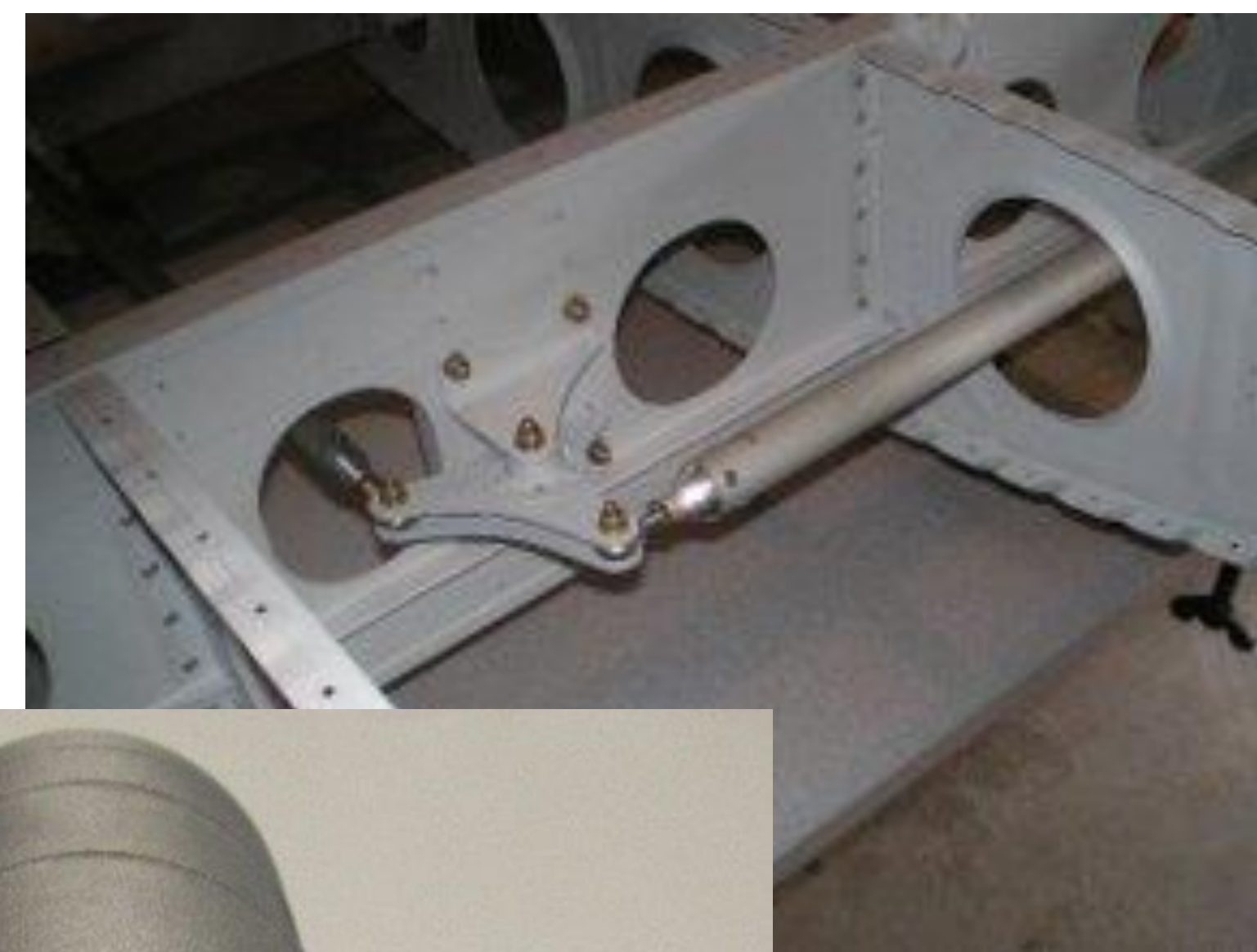
America Makes – MAMLS (3006 and 3007)

Developing Additive Manufacturing (AM) for metal part production

- *The Maturation of Advanced Manufacturing for Low-cost Sustainment (MAMLS) Phase 2 projects led by YSU and UDRI, developed and demonstrated key build parameters for successfully manufacturing aluminum alloy bell cranks and oil coolers for aerospace platforms.*
- *All aspects of the build from part design to post-processing were characterized.*

ACCOMPLISHMENTS

- Produced complete, full scale, very complex parts that included thin to thick wall transitions and thin-walled tubing over long lengths.
- Using EOS, 3D Systems, and Concept Laser AM machines to check repeatability, transferability, and reproducibility factors.



Oil coolers (left) and bell cranks (above) are the applications used for this effort.

IMPACT TO THE DoD

America Makes – Education and Workforce Development

Investment Casting Course for Tinker AFB Personnel

A two-day advanced manufacturing class for Air Force personnel, including civilian and military technicians and engineers on July 30-31, 2019.

Fifty-two personnel attended the training held at a community college near Tinker AFB. Industry professionals affiliated with the Investment Casting Institute (ICI) presented the material.

ACCOMPLISHMENTS

- Improved organic additive manufacturing capability
- knowledge of the advanced domestic supply chain
- On-line access to presentations and best practices
- Government attendees eligible for 16 hours of continuous learning credits.



(Photos: Tinker AFB)