



Department of Defense Manufacturing Technology Program

May 12, 2023

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

Promoting domestic advanced manufacturing growth to support the national defense and economic prosperity

Notable Events:

- Indiana University Kelley School of Business Appreciation Ceremony at the Pentagon: April 28
- [Manufacturing@MIT](#) in Cambridge, MA: May 23
- Manufacturing USA Network Meeting in Washington, DC: May 25
- Manufacturing Innovation Institutes Technology Demonstration Day at the Pentagon: June 21

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Six Technology Solutions Win Point of Need Manufacturing Challenge

The Office of the Secretary of Defense (OSD) Manufacturing Technology (ManTech) Program's "Point of Need Challenge Pitch Event," held March 8-9, 2023, at the ARM Institute in Pittsburgh, PA, was a first-of-its-kind event showcasing technology solutions generated by member companies of Department of Defense (DoD) Manufacturing Innovation Institutes (MIIs) to support forward-deployed forces in austere environments.



The event featured 11 pitch presentations that had been selected from 63 concept papers submitted by the MIIs and reviewed by 72 DoD Subject Matter Experts (SMEs). The pitches, presented over a day and a half, were reviewed by a panel of 13 judges from all Military Services, Defense Logistics Agency, Defense Innovation Unit, OSD ManTech, and the Joint Staff.

The panel recommended funding of six projects from five MIIs, covering three challenge areas (Warfighter Medical, Health, and Nutrition Challenge; Staying in the Fight Challenge; and Cyber Challenge). OSD ManTech will invest nearly \$2.5 million while industry partners will contribute nearly \$700,000 in cost share.

Follow-on demonstration of the projects is planned for December 2023 in a simulated cold weather environment, supported by Army Combat Capabilities Development Command.



"If we can't make it, the war fighter can't have it!"

OSD ManTech Connects on INDOPACOM Collaboration at POST

OSD ManTech was pleased to have personnel at the Pacific Operational Science and Technology (POST) Conference 2023, which focused on DoD opportunities for joint research, development, and experimentation. OSD [Manufacturing Science and Technology Program \(MSTP\)](#) connected with the Office of the Under Secretary of Defense for Research and Engineering (OUSD(RE)) Principal Directors for Directed Energy, Space Technology, Trusted Artificial Intelligence/Autonomy, and Integrated Sensing and Cyber to discuss manufacturing challenges and set future engagement between the MSTP team and the Critical Technology Area Principal Directors to help frame future MSTP-focused investment areas.

Representatives from the BioMADE MII appreciated assistance from F. Michael von Fahnstock of U.S. Indo-Pacific Command (INDOPACOM) Science and Technology Office (J85), who helped set a breakout session hosted by DoD's Tri-Service Biotechnology for a Resilient Supply Chain program. The session introduced attendees to the MII, current projects in the works, and outreach efforts. BioMADE held a separate meeting with Hawaii's state government to discuss a possible future project with BioMADE, which will coordinate future visits, demonstrations, and discussions of INDOPACOM's bio-based needs.

In addition to the networking opportunities, POST 2023 featured inputs from representatives of the United Kingdom, Australia, New Zealand, and Canada that helped illustrate the close collaboration between the United States and its allies in INDOPACOM.

MII Education and Workforce Development Teams Highlight Achievements and Plans in Annual Review

The OSD Manufacturing-Education and Workforce Development (M-EWD) team hosted their annual Program Review series for the DoD MIIs in March. The details shared in the reviews will contribute to how M-EWD plans its support and collaboration with the MIIs as they work with public and private sector educators and trainers in the advanced manufacturing industry.

Achievements included effective use of online curriculum and job matching platforms, expansion of existing programs to new student demographics, the establishment of regional collaborations, participation in DoD-sponsored transition programs, and planned inclusion of DEIA-focused EWD.



Highlights from MIIs

- ◆ [AIM Institute for Learning and Research](#), AIM Photonics' EWD offering, is continuing to grow using the [BuildYourFuture.us platform](#). Courses are designed to move students into the U.S. PIC workforce, retain incumbent workers, and expand AIM's user base.
- ◆ [ARM Institute](#) continues to evolve its [RoboticsCareer.org platform](#). Since its launch two years ago:
 - ◆ 42k+ individuals across 50 states accessed the platform
 - ◆ ARM facilitated 370+ connections with programs or institutions listed on the site
 - ◆ There are 16,000+ training programs for manufacturing technology
- ◆ [Advanced Functional Fabrics of America \(AFFOA\)](#) became an official SkillBridge program provider, expanding access to SkillBridge interns for the AFFOA Fabric Innovation Network. SkillBridge helps provide retiring military personnel with professional growth and career opportunities through internships.
- ◆ [NextFlex, the Flexible Hybrid Electronics MII](#), continues to grow its existing programs, FlexFactor, Flex2Future, and FlexPro, and is launching FlexAhead for graduate students in engineering programs.
- ◆ [BioMADE](#) supports ALAKA'I (Applied Life-Science Academy: Knowledge Advancing Industry), representing the Hawaiian concept of leadership or mentorship. The program, drawing on traditional Hawaiian and Pacific Island cultural perspectives, trains high-impact professionals in the bioeconomy. The current project phase includes national training in Hawaii, with planned expansion into credit-degree programs and to remote and rural areas.
- ◆ [BioFabUSA's BioTrek](#), a project-based learning program for high school students in advanced biomanufacturing and entrepreneurship, will reach 1,000 students this year – preparing them to pursue certificate, apprenticeship, and degree programs. Among notable statistics from BioTrek graduates:
 - ◆ 49% of students are more likely to attend a college or university after attending BioTrek
 - ◆ 89% of students have a better understanding of the educational steps that lead to careers in STEM, business/entrepreneurship and advanced manufacturing.
- ◆ [America Makes](#) is in the early stages of developing the Additive Manufacturing Portal for Education (AMPED) platform. This platform provides access to training that is necessary to upskill and reskill for specific jobs within advanced manufacturing. America Makes is collaborating with SMEs and project teams to complete four new micro-learning modules for DOD/Industry leadership
- ◆ [LIFT](#) reported that in FY 2021 167 people completed their certifications in the Operation Next pilot program in Kentucky. Operation Next is an innovative training and credentialing program for Active Duty soldiers, National Guard members, Reserve members, veterans, and their spouses and dependents.
- ◆ [MxD](#) shared information on its Cybersecurity for Manufacturing Operational Technology (CyMOT) professional training curriculum, which is customized for the fast-paced demands of cybersecurity in manufacturing. Existing courses and certifications are offered by University of Maryland-Baltimore County training centers with manufacturing-specific content integrated from the MxD Hiring Guide and input from industry SMEs.

MSTP Hosts Hydrogen Demonstration Event at MCB Quantico

On March 22, 2023, the OSD MSTP hosted a demonstration at Marine Corps Base Quantico in Virginia to increase Warfighter awareness of hydrogen-enabled technologies that are ready for transition to DoD applications. A team effort between MSTP, which is overseen by the Office of the Under Secretary of Defense for Research and Engineering (OUSD(RE)), and the U.S. Marine Corps, the Army Ground Vehicle Systems Center, the Naval Research Laboratory, and the Department of Energy, the Hydrogen Demonstration Event showcased multiple DoD-sponsored projects that use hydrogen as a logistics fuel.

One of the projects featured was MSTP's Lightweight Hydrogen Fuel Cell technology, which was integrated with two platforms performing mission-specific operations. The Lockheed Martin H2 Stalker unmanned aircraft system used the fuel cell during a flight demonstration simulating reconnaissance of the local terrain, performing vertical takeoff and landing maneuvers while supplying a direct thermal imaging feed from overhead. The demonstration proved the significant audible signature reduction that hydrogen technology provides over typical heavy-fuel engines. The Hydrogen Small Unit Power generator proved its capabilities by powering a network-on-the-move system atop a Joint Light Tactical Vehicle, while simultaneously charging eight communications-type lithium-ion batteries using an Advanced Battery Charger and providing DC ports that could be used to power portable electronic devices in the field.

Warfighter Benefits of Hydrogen

- Increased available power
- Increased endurance/range, 4-8x endurance over batteries
- Decreased thermal signature
- Reduced audible signature, 10x reduction over heavy fuel engines
- Increased cost savings, 10x operating cost advantage over heavy fuel engines

The event brought together DoD participants, other Federal agencies, and private-sector partners to demonstrate hydrogen-powered and hydrogen-capable technologies in a simulated field environment.

To read more about MSTP, click [here](#).



MSTP Leads Annual Program Management Training at Johnson Space Center

On February 22nd the Office of the Secretary of Defense (OSD) Manufacturing Science and Technology Program (MSTP) hosted their annual Program Management (PM) training at Johnson Space Center in Houston, TX. The training provided critical updates to the team leads of MSTP funded projects and established the reporting requirements of their project advancements for FY 2023/FY 2024. Sessions encompassed technical reporting, financials, timeline management, contracting, communications engagement, and included a Q&A forum.



The training additionally gave attendees opportunities to build relationships that will support their collective drive to manufacture world-class equipment for America's Warfighters.

The location of the meeting played an integral role in promoting collaboration, said Dr. Phillip Peters, MSTP Navy Program Support, noting that "The OSD MSTP Program met with and toured facilities at the Johnson Space Center in order to facilitate collaboration between the DoD and NASA on manufacturing issues of mutual interest. NASA is a potential transition partner for existing MSTP programs and, to the extent that NASA manufacturing issues are also of interest to DoD entities, future MSTP investments could be made in these areas."

For a recap of the meeting please click [here](#).

Manufacturing Technology Will Underpin Innovation in the Department of Defense Biomanufacturing Strategy

The recently released U.S. Department of Defense Biomanufacturing Strategy will guide defense research efforts, industry partnerships, and relationships with allies in a rapidly developing technology field with significant implications for national security and economic competitiveness.

"The National Defense Strategy directs us to seed opportunities in biotechnology as part of our broader responsibility to ensure our enduring technological advantage, and the Department of Defense Biomanufacturing Strategy will help guide our efforts in this critical technology field," said Heidi Shyu, Under Secretary of Defense for Research and Engineering.

The scaling and adoption of biotechnology capabilities will be supported by the MSTP and the DoD MIIIs, nine public-private partnerships whose network spans the nation. Two MIIIs – [BioMADE](#) and [BioFabUSA](#) – focus directly on biotechnology, while others offer potential support in the areas of automation, digital manufacturing, and cybersecurity.

Tracy Frost, Director of OSD ManTech, hailed the DoD Biomanufacturing Strategy as a catalyst for laying a new building block of the industrial base, noting that the biomanufacturing sector is made up largely of small, innovative businesses.

The MIIIs connect small businesses to large businesses, research institutions, and Federal, state, and local governments. They also link training and education organizations together to accelerate critical manufacturing technologies and build skilled workforces.

The DoD Biomanufacturing Strategy will provide important focus and an infusion of support to the MII communities, said Ms. Frost, especially in building the infrastructure necessary to grow and sustain this sector.



< Photo: Courtesy of BioMADE



Photo: Courtesy of BioFabUSA

Separately, MSTP is working to support the Biomanufacturing Strategy by coordinating with the OUSD R&E on manufacturing constraints that biomanufacturing can solve.

In FY 2024, MSTP will begin an effort with US Army Soldier Center to utilize biomanufacturing in developing a point-of-need solution for food nutrition. The goal for this effort is to enable the manufacturability of food sources without the need of a logistics trail for Meals-Ready-to-Eat (MREs). In addition to helping the supply channels, this effort will focus on ensuring the prepared food sources will have a higher nutritional content to meet specific requirements. For FY 2025 and beyond, MSTP is currently evaluating potential use of biomanufacturing to address unique composite manufacturing and energetics precursor materials.

Read more on the [White House's plan to advance American Biotechnology and Biomanufacturing](#)



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Mentor Protégé Summit 2023

The OSD Manufacturing Technology Program Office, in conjunction with three OSD-sponsored Manufacturing Innovation Institutes – [NextFlex](#), [America Makes](#), and [LIFT](#) – participated in a panel discussion at the Mentor Protégé Summit on March 30.

During the event, OSD announced the initiation of the Mentor Protégé Pilot Program, a collaboration between the OSD Manufacturing Technology Program and the OSD Office of Small Business Programs.

The goal of the pilot is to promote diversity, equity, and inclusion in the DoD supply chain by leveraging OSD MIIs as resources to provide technical assistance to small, disadvantaged businesses. The pilot, expected to run for a year, builds upon the existing authorities of the Mentor Protégé Program in business assistance and seeks to broaden technical support for companies in areas like vendor qualification and certification for advanced manufacturing processes.



Stephen Luckowski, OSD MII Program Manager, introduced and moderated a panel discussion with MII representatives (L-R) Nigel Francis (CEO, LIFT), Kimberly Gibson (Ecosystem Director, America Makes) and Ed Hendricks (Director of Business Development, NextFlex). Photo courtesy of OSD

Manufacturing Innovation Institutes Collaborate on E-Textiles Workshop

On March 22, as part of the Cross-MII Digital Framework program, three MIIs, AFFOA, Nextflex and the ARM Institute, collaborated on a first-of-its-kind workshop addressing the challenges in designing e-textile products. Focused on functional fabrics, flexible hybrid electronics, and robotics, respectively, the institutes and member companies performed customer discovery, which informed the development of a draft digital framework for e-textiles. Participants went through the design process for four case study products, identified key gaps in the digital software tools and defined infrastructure needs to effectively design the product. The feedback and findings will be used to guide future investment in multidisciplinary digital tools, methodologies, and supporting infrastructure.

Advanced manufacturing is increasingly a multidisciplinary endeavor where novel materials, process technologies, and design approaches meet. DoD MIIs recognize the need for an integrated approach to address the design, simulation, process definition, and qualification of complex, integrated parts, which may include features such as dynamic flexible form factors and structural, electronic, optical, thermal, and fluidic functionalities. Data sharing between the design and manufacturing experts representing these disciplines and the aggregation of expertise from across the membership ecosystems of AFFOA, ARM, and Nextflex provide a unique way to accomplish this.

About the ManTech Program

The DoD ManTech Program, created in 1956, is composed of the Military Service and DoD Agency (or "Component") investment programs operated out of the Army, Navy, Air Force, Defense Logistics Agency (DLA), Missile Defense Agency (MDA), and Office of the Secretary of Defense (OSD).

The OSD ManTech Office is responsible for administering the DoD ManTech Program by providing central guidance and direction to the Component ManTech Programs. Along with providing oversight to DoD ManTech, the OSD ManTech Office also manages two investment portfolios: the Manufacturing Science & Technology Program (OSD MSTP) and DoD Manufacturing Innovation Institutes (DoD MIIs).

The nine DoD MIIs are proud members of Manufacturing USA, the network of 16 institutes sponsored by the Departments of Commerce, Defense and Energy.

