NEWSLETTER October - December 2023

DEPARTMENT OF DEFENSE MANUFACTURING TECHNOLOGY PROGRAM

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

We extend a warm welcome to readers of the final DOD ManTech newsletter of 2023! This edition is dedicated to an essential tenet of our program: pursuing solutions to reach DOD's transition goals. Throughout the past year, initiatives across the enterprise — from the Manufacturing Science and Technology Program (MSTP) to the Manufacturing Innovation Institutes (MIIs) and Manufacturing Education and Workforce Development (M-EWD) — have played an important role in delivering groundbreaking advancements to the warfighter and closing funding gaps for technologies that align with DOD priorities. This issue spotlights some of the ways ManTech helps accelerate technology transition, shedding light on the movement of innovative technological advancements from research and development into practical application within defense manufacturing. These transformative efforts are benefitting defense-related systems by enhancing efficiency, quality, and capability.

Notable Events:

- **Organic Industrial Base Challenge**, Chicago, IL: February 7
- **Pacific Operational Science and Technology Conference**, Honolulu, HI: March 4-8
- **NextFlex Innovation Days**, San Jose, CA: March 26-28
- **America Makes Technology Review and Exchange**, Golden, CO: April 9-11
- **DOD MII Spring Program Management Review**, Washington, DC: May 20-22
- **DOD ManTech Pentagon Day and Network Meeting**, Washington, DC: June 4-6

Inside This Issue:

ManTech Technology Transition Solutions Demonstrated at the Defense Manufacturing Conference

At December's Defense Manufacturing Conference, the DOD ManTech Program showcased the pivotal role it plays in orchestrating technology transition solutions across the defense industrial landscape. DOD ManTech hosted Under Secretary of Defense for Research and Engineering (USD(R&E)) Heidi Shyu and Deputy Assistant Secretary of Defense for Science and Technology Futures Dr. Kevin Geiss for an exclusive exhibit hall tour. OSD ManTech Program Director Tracy Frost guided the leaders through displays of cutting-edge collaborations and advancements, reinforcing how our commitment to accelerating critical technology areas is bolstering U.S. manufacturing ecosystems through partnership with industry. This visit provided a platform for conversations with the MIIs, MSTP, M-EWD, and other DOD components and agencies. USD(R&E) Shyu was particularly keen to interact with our partner companies, who demonstrated how DOD investment is helping to bridge the valley of death. Some of the companies visited included:

- **RAM Photonics**, which works on OSD MSTP's Laser Welded Fiber Optic project
- **SPEE3D**, ManTech Point-of-Need Manufacturing Challenge awardee and member of LIFT – the lightweight materials MII – which showed its "Expeditionary Manufacturing Unit for Battlefield Repair and Readiness," a cold spray metal additive manufacturing project
- **Corsha**, ManTech Point-of-Need Manufacturing Challenge awardee and Advanced Robotics for Manufacturing (ARM) Institute member for the project "Securing the Digital Backbone with Zero-Trust Platform for Machines"
- **Craitor**, ManTech Point-of-Need Manufacturing Challenge awardee and member of America Makes, the additive manufacturing MII, showed its "Intrepid Expeditionary 3D Printer"
- **Safi Biotherapeutics**, ManTech Point-of-Need Manufacturing Challenge awardee and member of BioFab USA – part of the Advanced Regenerative Manufacturing Institute – which demonstrated its "Sciperio Austere Bioreactor to Produce Blood in a Forward Environment from CONUS Cryopreserved Starting Material"

Under Secretary of Defense for Research and Engineering Heidi Shyu learns about innovations from SPEE3D (left), Safi Biotherapeutics (center), and Corsha (right), DOD ManTech Point-of-Need Challenge winners, during a tour of the Defense Manufacturing Conference exhibit hall in Nashville, Tennessee, December 12, 2023.

OSD ManTech Tools to Aid Transition

DOD ManTech Launches Point-of-Need Manufacturing Challenge for Technologies That Enhance Cold Weather Combat Effectiveness

In March 2023, MII member companies presented pitches for technologies that would help warfighters who are forward deployed in austere environments, facing contested logistics, to circumvent potential supply chain delays. After just eight months, the six winners demonstrated advanced capabilities in extreme temperatures during a December 4-8 event at the Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire. Read More: Here

Acting Assistant Secretary of Defense for Science and Technology Dr. Steven Wax (right) and DOD ManTech Director Tracy Frost review technology being demonstrated during OSD ManTech's Point-of-Need Challenge at the U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory in Hanover, Per AP, December 7, 2023.

A representative from nScrypt demonstrates its Austere nField Repair, a rugged "factory in a box" that employs additive electronics and mechanical part manufacturing to replace and repair damaged hardware, during the OSD ManTech Program's Point of Need Challenge held at the U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire, December 7, 2023

Bridging the Gaps - Manufacturing Collaboration Engine

USD(R&E) Heidi Shyu established the new Sustainment Technology Office in late 2023 to work with the entirety of R&E to ensure that technology is being transitioned to the sustainment communities. The ManTech program has been closely engaged with the new team, supporting efforts to take manufacturing technology matured under ManTech funds to programs and organizations that need it to improve warfighter readiness.

Representatives of the defense sustainment community and DOD Manufacturing Innovation Institutes tour the MxD factory floor during the DOD-sponsored modernization workshop in Chicago, October 25-26, 2023.

DOD Mobilizes Manufacturing Innovation Institutes to Support Military Industrial Base

The DOD MIIs met with stakeholders of the Organic Industrial Base on October 25-26 to discuss how the manufacturing innovation ecosystem can support the Services' modernization efforts.

Representatives from the MIIs attended the OSD ManTech-hosted OIB Modernization Workshop in Chicago to get a better understanding of the current critical needs for modernizing the OIB. Subsequently, MII member companies submitted 104 technology project proposals. Following a thorough review and down-selection, companies will present the (top-ten) ranked proposals to a panel of judges on February 7. OSD ManTech is set to offer up to $2.5 million in funding to five winners, chosen based on their projected positive impact across the 47 DOD-owned OIB sites. Read more about the workshop: Here

Manufacturing Science and Technology Program: Addressing R&E Critical Technology Areas

During this past fiscal year, MSTP took the lead in defining where DOD investments in directed energy are needed and how to relay this information in support of the OUSD(R&E) principal director for directed energy. Working closely with the Joint Defense Manufacturing Technology Panel community and partnering with subject matter experts from across DOD, MSTP continues to provide direction on high-energy laser and high-power microwave manufacturability. MSTP is currently funding multiple projects focused on directed energy, including Carbon Nanotubes for High-Power Microwave Directed Energy, Advanced Pulse Power Solutions for Directed Energy Integrated Air and Missile Defense Platforms, the High-Power Magnetron Maturation Program, and Deformable Mirrors for High-Energy Lasers.

2024 Leadership Outlook

Dear Friends and Colleagues,

As we reflect on another year of achievements across the DOD Manufacturing Technology Program enterprise, let me express my heartfelt gratitude to each of you who has been instrumental in driving success in 2023.

Our collective efforts have propelled us forward, fostering innovation and groundbreaking advancements in defense manufacturing technology. From the significant strides made within the Manufacturing Science and Technology Program (see page 6) to the endeavors championed by the Manufacturing Innovation Institutes (see page 4), our shared commitment to create affordable, efficient, and scalable technologies has been the engine of our accomplishments.

In 2024, we will continue our efforts to bridge the gap between innovative technology and its practical implementation within defense systems. Our leading FY 2024 goals focus on accelerating technology transition by building on assets in the R&E toolkit, drafting a technology transition playbook, positioning the program to address manufacturing prototyping, scale-up, and transition challenges, implementing our new strategy for the Manufacturing-Education and Workforce Development team, and expanding support of the organic industrial base through the MIIs.

These goals are designed to fortify our collaborative efforts, accelerate the transition of critical technologies, and focus on solutions that enhance our nation's defense capabilities.

Thank you to our partners and supporters for continuing to innovate and equip our forces with the best tools possible, made by Americans. Here's to a year of success as we set new benchmarks in defense manufacturing technology.

Warm regards,

Tracy Frost
Director, DOD ManTech

DEPARTMENT OF DEFENSE
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Annual Manufacturing Day

The first Friday in October is National Manufacturing Day, bringing awareness of manufacturing job opportunities to diverse audiences. It is a chance to engage and inspire young people to take an interest in the field and to shape the future of defense manufacturing. The DOD MIIs hosted Manufacturing Day events throughout the month of October, fostering participants' ingenuity and enthusiasm while demonstrating the career possibilities within advanced manufacturing.

M-EWD HIGHLIGHTS

Empowering Tomorrow's Workforce: M-EWD Network Collaboration at DMC 2023

On December 11-14 at the Defense Manufacturing Conference in Nashville, Tennessee, the M-EWD Program hosted several technical sessions with industry leaders, academic representatives, DOD SMEs, and engineering experts to discuss challenges in manufacturing professional development, educational best practices, and workforce development.
These sessions sparked valuable conversations between M-EWD program leaders and panelists from Northwest UAV, Spirit AeroSystems, U.S. Army Combat Capabilities Development Command Armaments Center, and Lockheed Martin, among others, engaging them on tough questions about how to enact nationwide efforts to build the industry future state and realize workforce goals.
In one outcome, M-EWD identified its next actions for future engagement and for generating interest across the industry through:

- Fortifying supply chain partnerships
- Encouraging corporate internships, apprenticeships, and on-site trainings
- Hiring applicants with or without technical degrees and/or STEM backgrounds

These actions will support the effort to bridge any workforce and knowledge gaps and pave the way for an inclusive, innovative, and future generation-ready workforce.

LIFT's Operation Next Program Receives $2 Million in Funding

LIFT, the advanced materials Manufacturing Innovation Institute, has prepared over 600 departing Servicemembers to transition into civilian careers in in-demand, high-paying manufacturing jobs. Operation Next is a self-paced and skills-based curriculum that enables active-duty and veteran Servicemembers to learn on their own time and receive credit for knowledge they already possess.

Read more: Here

NextFlex and FlexFactor Visit Students Across the Country

NextFlex® and its FlexFactor® regional program leaders recently held a series of events around the country with top industry experts and engineers, aimed at promoting hands-on learning and career exploration for students interested in STEM fields and advanced manufacturing.

At several in-person networking events at Evergreen Valley High School in San Jose, California, and separately at Sinclair Community College's Manufacturing Day in Dayton, Ohio, NextFlex engineers provided students with hands-on demos for flexible and hybrid electronic devices, inviting them to solve real-world problems and pitch their own solutions to a panel of industry experts, while providing feedback on their results and advice on how to enter the manufacturing workforce. Read more: Here and Here

Using a similar format, Trenholm State Community College in Montgomery, Alabama, hosted a FlexFactor Final Pitch event, which exposed students to current STEM-based education options and STEM-based post-college career paths. The event connected students interested in STEM fields to degree programs at Trenholm State and Auburn University, through dual-enrollment partnerships and credit-transferring options.
Read more: Here

Together, these NextFlex events offered students unique opportunities to explore the exciting and rewarding worlds of advanced manufacturing and STEM, pointing them toward education pathways that lead to rewarding careers.

Carnegie Mellon Begins Construction for New Robotics Innovation Center for FY25

Carnegie Mellon University is building a new Robotics Innovation Center (RIC) with 150,000 square feet of research space for robots and similar high-tech products in Pittsburgh, Pennsylvania, next to the ARM Institute, the MII focused on increasing the use of robotics and artificial intelligence to grow U.S. manufacturing. The RIC will include an indoor robot test facility, wet lab, reconfigurable high bays, and an outdoor lab with a drone cage. Construction is expected to begin in 2025. CMU aims to educate the next generation of students in STEM fields, specifically future roboticists, to help solve the world's most challenging problems, and often partners with the ARM Institute on both technology and workforce projects.

Read More: Here

M-EWD Events Across the Enterprise

DEPARTMENT OF DEFENSE MANUFACTURING TECHNOLOGY PROGRAM INNOVATING MANUFACTURING

MANUFACTURING INNOVATION INSTITUTES HIGHLIGHTS

Assistant Secretary of Defense for Science and Technology Visits DOD Manufacturing Innovation Institutes

Dr. Steven Wax, assistant secretary of defense for science and technology, recently concluded a visit to two of DOD's nine Manufacturing Innovation Institutes: the Advanced Regenerative Manufacturing Institute/BioFabUSA and Advanced Functional Fabrics of America.

Read about the visits: Here

First Lady of the United States Dr. Jill Biden and Acting Secretary of Labor Julie Su Discuss Manufacturing Workforce Initiatives at ARM Institute

The ARM Institute welcomed Dr. Jill Biden, First Lady of the United States, and U.S. Acting Secretary of Labor Julie Su to the Mill 19 facility in Pittsburgh, Pennsylvania. The visit amplified Pittsburgh's Workforce Hub designation by the White House. Pittsburgh is one of five national Workforce Hubs where President Biden's Investing in America agenda—including the American Rescue Plan, Bipartisan Infrastructure Law, CHIPS and Science Act, and Inflation Reduction Act—is catalyzing private and public investments and creating good-paying jobs.

Read More: Here

MxD Launches Cyber Playbook for Additive Manufacturing

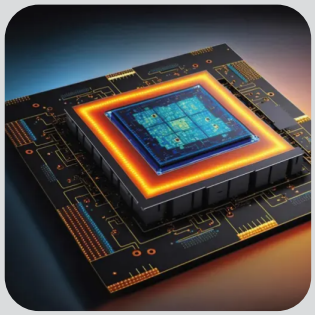
The MxD Manufacturing Innovation Institute launched the "Cyber Playbook: Ensuring Cybersecurity in Additive Manufacturing," the second playbook in the cyber series. This playbook addresses unique considerations for DOD Risk Management Framework compliance in the deployment of additive manufacturing devices, commonly referred to as 3D printers.

Read More: Here

Photonic Integrated Circuit Testing: Accelerating R&D From Lab to Fab

AIM Photonics, the American Institute for Manufacturing Integrated Photonics, is accelerating the work of researchers in the Air Force Research Laboratory's Information and Sensors Directorates by almost five years. By developing novel integrated photonic circuits and new integrated photonic platforms, AIM Photonics is reducing waveguide losses, supporting work with light in the visible wavelength regime, and increasing material thicknesses. These developments are being applied to innovative devices and systems for quantum photonics, sensors, and atomic physics.

Read how AIM Photonics is leading manufacturability testing for the industry to advance technologies from R&D to high-volume production: Here



The Fast Get Faster: Hypersonics and 3D Printing

The LIFT institute has teamed with its members Velo3D, Lockheed Martin, and Vibrant on a data-driven approach to certifying materials and methods for additively manufactured aerospace systems.

"Understanding materials characteristics is at the core of everything as we look to manufacture the components of the future, particularly those which need to travel in excess of 4,000 miles per hour," said Nigel Francis, LIFT's CEO and executive director.

"The goal is to identify which materials and/or manufacturing processes can provide the most efficient, productive pathways to vehicles and/or missiles capable of hypersonic flight," said Dr. John Keogh, LIFT's engineering director. "At LIFT we're perfectly situated between industry, laboratories, and government to be an extended workbench where people can come to buy-down risk with us," he added.

This project supports the Hypersonics Challenge, funded by DOD ManTech and overseen by OUSD(R&E). Team stakeholders are hoping to move soon to a next phase of the research that would consider the fatigue behavior of AM components and make progress toward "born-certified" parts. Read More: Here

MSTP/JDMTP HIGHLIGHTS

MSTP's Unique Path to Tech Transition

Traditional ManTech investment portfolios tend to have clear and defined transition paths. An opportunity is identified, a project is funded to address the opportunity, and after the project reaches maturity, it is transitioned to the warfighter. But what happens when a project/prototype needs additional funding or more time to reach maturity? What happens when a need is apparent across multiple Services or agencies? Or when an emerging technology shows promise, but carries more risk? This is where MSTP steps in.

The MSTP investment portfolio operates in defense-critical, and sometimes high-risk, manufacturing technology areas, focusing on cross-cutting defense manufacturing needs that are beyond the ability of a single military service to address. This investment plan allows MSTP to bridge the gap in the transition lifecycle of a defense manufacturing need or project and define transition in two unique ways. The first is transition to the warfighter, like the Lightweight Hydrogen Fuel Cell, which reached maturity through MSTP funding on the traditional path. The second is transition to another service or agency. For example, with Thermoplastic Welded Assemblies, MSTP took on the higher risk in the early prototype phase to prove production feasibility and mitigate risk to the point where other services and agencies could gain entry. After the execution of funds, the project will transition from MSTP to the Air Force and Navy ManTech offices, which will continue advancing the technology, ultimately to transition to the warfighter.

The following MSTP projects were funded in their entirety for FY 2023. With the ability to execute funds until September 2024, these projects have transitioned or will be transitioning to the warfighter or to another service/agency this upcoming calendar year.

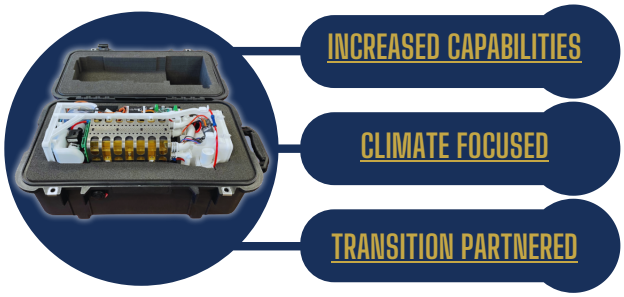
- Lightweight Hydrogen Fuel Cell for UAS (Transition Complete, NAWCAD)
- LCCSAC – Low-Cost Chip Scale Atomic Clock (Transitioned to Army ManTech)
- Automated Assembly of Laser-Welded Fiber Optics/Multi Spectral Beam Combiner
- MOC3HA - Manufacturing of Carbon-Carbon Composites for Hypersonic Applications
- Advanced Mixing for Infrared Countermeasures
- Deformable Mirrors
- Thermoplastic Composite Welded Assemblies
- Scale-up Optimization and Qualification of Green Primary Explosive –DBX-1

Joint Funded Hydrogen Fuel Cell Display Contributes to Navy's Climate Week NYC Event

DOD officials showcased the Hydrogen – Small Unit Power Ruggedized Expeditionary Power Source (H-SUP), which expands operational capabilities for ground-based troops while reducing the Department's carbon footprint, during Climate Week in New York City.

The H-SUP is a portable device that uses hydrogen to provide small unit power to charge and operate mission-critical devices covertly in the field. Part of the Department's drive to address climate threats, the device itself boasts no carbon emissions since its only waste products are heat and water. The fuel cell within the H-SUP matured from an NRL prototype to commercial product through MSTP's Lightweight Hydrogen Fuel Cells for UAVs project (FY 2020-2022).

Click the image below to read the full Climate Week article and to learn more about the H-SUP.



Hypersonic Technology GAMMA-H Prototype Awarded Through S²MARTS, OSD ManTech

DOD announced an award decision on the Growing Additive Manufacturing Maturity for Airbreathing Hypersonics prototype opportunity.

The project was awarded through the Naval Surface Warfare Center Crane Strategic and Spectrum Missions Advanced Resilient Trusted Systems Other Transaction Agreement vehicle, managed by the National Security Technology Accelerator office, with funding and support from the OSD ManTech program.

A total of $96.3 million has been awarded across nine performers, who are responding to the call for rapid development of manufacturing technologies and processes for hypersonic sub-subsystems, resulting in more efficient development of hypersonic capabilities.

Click the image below to read how OSD ManTech is leading the way in the advancement of hypersonic technology.

S²MARTS

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

CONTACT US

Strategic Communications Team

Office of the Secretary of Defense

Manufacturing Technology Program

Lynn.b.mcconaughey.ctr@mail.mil

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https://www.CTO.mil
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JDMTP Recognizes Excellence at DMC 2023

At the Defense Manufacturing Conference in Nashville, Tennessee, the Joint Defense Manufacturing Technology Panel presented five Defense Manufacturing Technology Achievement Awards to project teams that demonstrated outstanding performance in executing and delivering ManTech solutions to DOD.

Established in 1999, the DMTAAs are sponsored by the JDMTP and conferred on teams from government, industry, and/or academia that are most responsible for remarkable technical accomplishments in projects that advance the vision of the DOD ManTech Program.

The transition of these projects provides invaluable advantages to the warfighter and leads to great strides in the advancements of defense manufacturing.

Click here for more information about the winning projects, the complete list of project team members, and photos of the award winners.

Biden-Harris Administration Announces 31 Regional Tech Hubs:

ReGen Valley Tech Hub, led by the Advanced Regenerative Manufacturing Institute (ARMI) Receives Designation

President Biden and Secretary of Commerce Gina Raimondo announced the designation of 31 communities across the country as Regional Innovation and Technology Hubs through the Department of Commerce Economic Development Administration.

The ReGen Valley Tech Hub, led by ARMI, aims to make New Hampshire a global leader in biofabrication to produce cost-effective regenerative therapies that address chronic disease and organ failure. BioFabUSA, one of the nine DOD MIIs, is an ARMI program that supports this mission by working to develop a highly diverse, competitive, capable, and innovative domestic cell, tissue, and organ manufacturing ecosystem.

These tech hubs will catalyze investment in technologies critical to economic growth, national security, and job creation, and will help communities across the country become centers of innovation driving American competitiveness.

Read More: Here

Taking on the Wearables Challenges: AFFOA at the Emerging Technologies Conference

The Emerging Technologies Conference, part of the Advanced Textiles Association's annual expo, revealed the diversity in advanced textiles markets and applications and tackled big questions that need answers to move this segment into the envisioned future. As much as it is apparent that exciting, new functionalities are nearing breakthroughs, speakers at the expo adopted a measured perspective and did not shy away from pointing out challenges, while urging attendees and industry participants to work together for solutions.

In his presentation, Dr. Sasha Stolyarov, CEO of Advanced Functional Fabrics of America, described the vision AFFOA has for "textiles 2.0," which brings fibers/textiles together with semi-conductors and advanced materials to create fibers that are devices and fabrics that function as systems.

Read more: Here

About the DOD 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, Missile Defense Agency, and Office of the Secretary of Defense. 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 and Technology Program and DOD Manufacturing Innovation Institutes.

The nine DOD MIIs are proud members of Manufacturing USA, the network of 17 institutes sponsored by the Departments of Commerce, Defense, and Energy.