DEPARTMENT OF DEFENSE MANUFACTURING TECHNOLOGY PROGRAM

Welcome to the latest edition of the DOD ManTech newsletter! In this issue, we bring you a compelling lineup of stories that highlight groundbreaking achievements across the entire enterprise. The Manufacturing Science and Technology Program, the Manufacturing Education and Workforce Development team, the Manufacturing Innovation Institutes, and the Joint Defense Manufacturing Technology Program, made significant strides in closing gaps in innovation pipelines, raising awareness of our cross-cutting solutions, and informing stakeholders throughout the defense industrial base on how and where to connect to solutions. Dive into the success stories that have defined this quarter in defense manufacturing technology.

DOD ManTech Engages with Industry at NDIA Tech Expo to Advance Growth, Development of Emerging Defense Technologies

The Department of Defense Manufacturing Technology Program showcased its groundbreaking programs and partnerships at the National Defense Industrial Association's inaugural Emerging Technologies for Defense Conference and Exhibition, held August 28-30, 2023, in Washington, D.C. DOD ManTech teams spent the three-day conference engaging with representatives from government, industry, and academia to promote entrepreneurial initiatives for advancing the transition and adoption of new, defense-relevant technologies, which will help secure supply chains that support the warfighter.

Participating in both the breakout sessions and the exhibit hall, ManTech highlighted activities across the enterprise, including completed and ongoing initiatives from the Manufacturing Innovation Institutes, Manufacturing Science and Technology Program, and Joint Defense Manufacturing Panel.

"The DOD ManTech programs enable manufacturing ecosystems to develop and field emerging technologies at speed and scale, addressing points of need such as contested logistics environments," said Tracy Frost, the DOD ManTech Program director. "We continue to foster innovation through our proven investment and partnership model, connecting industry, academia, and government stakeholders to enable advanced manufacturing technologies and processes – and the workforce needed to support them."

Under Secretary of Defense for Research and Engineering Heidi Shyu emphasized the importance of comprehending the evolving threat landscape and leveraging tools and advancements in the industrial base to meet warfighters' needs rapidly and extensively. "There's multiple ways to close the gap," she said. "I'm looking for lower cost, asymmetric ways to close the gap. That's exactly what I'm focusing on."

While visiting the ManTech booth, Shyu said that she was, "absolutely thrilled to be able to attend and talk about the importance of the MIIs as well as ManTech programs. I can tell you they are absolute treasures within the DOD...they are incredible at what they do, they are innovative, they help industry, in terms of solving the most challenging problems, and on top of that they educate the workforce, growing our manufacturing talent, which we absolutely need to build our workforce of the future."

Frost co-hosted a panel with OSD Basic Research Office Director Dr. Bindu Nair on "Accelerating Transition Across Manufacturing Readiness Levels: From Basic Research to ManTech." Frost outlined the ManTech program, highlighted resources and opportunities for industry and government engagement, and discussed different pathways available to small companies during the Q&A.

"The joint seminar with Dr. Nair highlights how our programs collectively can deploy critical technologies and transition them from basic research to operational application," said Frost.

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

Notable Events:

- **ARM Institute Members Meeting**, Pittsburgh, PA: November 13-15
- **Point of Need Challenge Demonstration,** U.S. Army's Cold Regions Research and Engineering Laboratory, Hanover, NH: December 4-8
- **Defense Manufacturing Conference**, Nashville, TN: December 11-14

Inside This Issue:

Assistant Secretary of Defense for Science & Technology Visits DOD MIIs

Dr. Steven G. Wax, performing the duties of the Assistant Secretary of Defense for Science and Technology in the Office of the Under Secretary of Defense for Research and Engineering, visited the Advanced Functional Fabrics of America and the BioFabUSA Manufacturing Innovation Institutes, Sept. 27 and 28, 2023. Wax engaged each MII in a discussion on how it focuses on a unique technology and is strategically coordinating efforts and forming partnerships to ensure the United States maintains its technological leadership in a rapidly evolving landscape.

AFFOA, located in Cambridge, Massachusetts, transforms traditional fibers, yarns, and textiles into integrated and networked systems that will allow fabrics to become tech-enabled products. The AFFOA leadership team demonstrated active textile capabilities that can utilize light-based communications and aid in warfighter rehabilitation.

"The active textiles being developed at AFFOA will provide a strategic advantage to the warfighter," said Wax. "Military uniform fabrics that can store power and sense potential hazards are truly a game-changing technology."

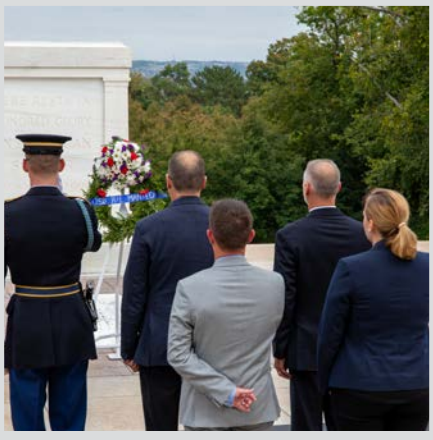
BioFabUSA, located in Manchester, New Hampshire, brings together the manufacturing process for science of regenerative medicine to create regenerative manufacturing. This new industry will be responsible for manufacturing lifesaving, restorative therapies for injured warfighters and veterans, and will transform treatments for traumatic injuries and chronic illness for all Americans. "Regenerative medicine will no doubt become an important asset at the DOD," said Wax. "These innovative capabilities are just one of many reasons successful technology transitions are needed."

Wax reiterated the commitment to fostering collaboration between department organizations to drive innovation and technological progress, saying, "DOD is committed to an accelerated technology transition for the prototypes that have the best long-term operational value for the department…The DOD is actively collaborating with our interagency partners to develop the best processes to field capabilities at speed and scale."

Read More: HERE

ManTech Honors Fallen Heroes

ManTech recently honored the sacrifices of American servicemembers at a wreath-laying ceremony at the Tomb of the Unknown Soldier. Participants included Director of Science and Technology Futures in the Office of the Under Secretary of Defense for Research and Engineering Dr. Kevin Geiss, DOD Manufacturing Innovation Institutes program manager Steve Luckowski, Manufacturing Science and Technology program manager Justin McRoberts, and OSD ManTech analyst MicKenzie Frith.



America Makes, ANSI Publish Standardization Roadmap

America Makes and the American National Standards Institute (ANSI) have jointly released the Additive Manufacturing Standardization Roadmap, Version 3.0. Developed by the America Makes and ANSI Additive Manufacturing Standardization Collaborative (AMSC), this roadmap delves into current and future standardization needs for additive manufacturing, particularly within industrial sectors. It identifies 141 standardization gaps, including 60 new ones, with associated recommendations.

AMSC, established in 2016, expedites comprehensive AM standards' development, ensuring consistency within the industry. While it doesn't create standards, it coordinates these efforts. The roadmap's creation involved approximately 300 contributors from various sectors, addressing safety, performance, and quality concerns. It categorizes the 141 identified gaps into priority levels, with 54 high, 64 medium, and 23 low priority, along with recommendations for pre-standardization research and development. AMSC will monitor progress in addressing these gaps, prompted by industry needs and aligned with current practices.

Read more: HERE

MxD Hosts White House Round Table

MxD, the Digital Manufacturing and Cybersecurity Institute, recently convened a roundtable discussion in collaboration with the White House Office of the National Cyber Director, Access Living, The College of Lake County, CyberSkills2Work, and Task Force Movement. The discussion focused on addressing the critical needs of the U.S. cybersecurity workforce. Each participating organization pledged its commitment to developing robust cybersecurity skills and programs, with a specific emphasis on the manufacturing sector.

Read more about the participants' commitments to address cybersecurity workforce needs: HERE

AIM Photonics Releases Unique Capability for the Domestic Manufacture of Electronic Interposers

AIM Photonics has introduced a unique capability with the release of an electronic interposer process design kit (PDK). This innovation empowers designers to explore advanced packaging designs for photonic integrated circuits, opening up new horizons for manufacturing and packaging at AIM Photonics' Albany and Rochester, NY, facilities.

"This new offering is in response to the demand from our members and customers for a more accessible source for electronic interposers," said Colin McDonough, AIM Photonics' 3D and heterogeneous integration manager.

While not a completely new technology, domestic manufacturing of electronic interposers has been largely limited to high-volume producers. AIM Photonics' PDK streamlines the electronic photonic design automation from chip to package, equipping designers with essential elements and tools for photonic integrated circuits prototypes.

Read more: HERE

Pittsburgh Inno Recognizes ARM Institute CEO with 2023 Ecosystem Advocate Award

Ira Moskowitz, ARM Institute CEO, was honored with an Ecosystem Advocate Award from the Pittsburgh Inno, a media and events company that is part of the American City Business Journal family. The Pittsburgh Inno Fire Awards honor individuals who are setting the local innovation economy ablaze.

"What inspires me and every member of the ARM Institute staff is the ability to make a difference when it comes to growing U.S. manufacturing," said Moskowitz. "We all experienced the challenge of not making enough products to meet the needs of our citizens during the pandemic. Our mission is to avoid or lessen these challenges in the future."

Precision Optical Wind Sensor Captures the Attention of Under Secretary Shyu

Ms. Heidi Shyu, Under Secretary of Defense for Research and Engineering, interacted with numerous Office of the Secretary of Defense Manufacturing Science and Technology Program (MSTP) projects while attending the National Defense Industrial Association's Emerging Technologies for Defense Conference, August 29, 2023. This included a hands-on demonstration of one of the newest projects within the MSTP investment portfolio: The Precision Optical Wind Sensor.

The Precision Optical Wind Sensor is a laser-based, cross-wind-measuring technology designed to aid the warfighter in long-range shooting applications. Initially developed and delivered by technicians at Sandia National Labs, the Government-owned wind sensor design improves accuracy for long-range target acquisition, improving both operational effectiveness and training capabilities. The project is funded through MSTP in collaboration with Naval Surface Warfare Center, Crane Division, United States Special Operations Command, Irregular Warfare Support Directorate, and U.S. Army Combat Capabilities Development Command. During his brief, McRoberts elaborated on the goals of the project, stating, "this joint effort is focused on increasing manufacturability of the technology while working towards reducing material costs by 50 percent and labor by 65 percent, in addition to a 10x reduction in cycle time."

Ms. Shyu is pictured looking through the optical viewfinder of the device as
Justin McRoberts, MSTP Program Manager, provides a capability brief of the technology.

MSTP Thermoplastics Program Review

DOD's Manufacturing Science and Technology Program, in conjunction with the Office of Naval Research Manufacturing Technology Program, highlighted advancements in the manufacturing capabilities of thermoplastic composites within airframe designs during a Boeing program technical review. The review included a tour of the Boeing production floor and an open discussion session of the project schedule in support of Boeing's MQ-25 unmanned refueling tanker platform.

Advancements in thermoplastic composite technology give it numerous advantages over traditional thermoset composites. The improvements offer a lower cost approach, a significant reduction in part counts, and increased production capabilities by drastically reducing manufacturing time. This technology also provides improved damage tolerance and durability compared to its thermoset composite alternatives.

By focusing efforts and investments into advanced materials, one of DOD's 14 critical technology areas, MSTP is accelerating the transition of key capabilities to the military services and combatant commands.

Boeing's MQ-25 performing an unmanned refueling demonstration

DLA: Industry Collider Day Sparks Collaboration

Industry Collider Day (ICD) is Defense Logistics Agency Research and Development's annual opportunity to bring together the range of government, industry, and academia partners to tackle DLA's most challenging problems and think critically to solve supply chain challenges. This year's theme was "forging tech-forward connections to enable proactive global logistics." This year's event was the first in-person ICD in four years, a welcome step toward increased collaboration and ideation. DLA's director, VADM Michelle Skubic, opened the day with remarks emphasizing the importance of R&D's partnerships, after which keynote speaker BG Stephanie Howard, gave remarks on the critical role logistics plays in the nation's military preparedness.

To read more about ICD 2023 please click HERE.

AF: Leveraging Ceramic Additive Manufacturing for Low-Cost Turbine Castings

Casting is a critical manufacturing process for producing engine components, which often have long lead times and high associated costs. Air Force ManTech is actively working to utilize additive manufacturing technology to develop low-cost tooling for the casting process, specifically through a Small Business Innovation Research Phase II project performed in collaboration with the Air Force Research Lab, Renaissance Services, and Bescast in Ohio. The additively manufactured ceramic mold and injection dies developed under the project demonstrated the successful production of integrally bladed rotor components for turbine engines, leading to its award in the Most Innovative Casting in the Defense category at the Investment Casting Institute Conference in Pittsburgh, PA in August 2023, and the project was published in INCAST Magazine.

To read the full-length article please click HERE.

The Future of Defense Manufacturing Education and Workforce Development

Keith DeVries, the acting Manufacturing Education and Workforce Development (M-EWD) Program lead at the Office of the Secretary of Defense Manufacturing Technology Program, works to ensure the United States' defense manufacturing sector remains at the forefront of technology innovation. Aligned with OSD ManTech's mission and partnered with stakeholders, practitioners, and policymakers, the M-EWD program aims to cultivate an educated and skilled advanced manufacturing workforce that can meet the changing demands of defense manufacturing.

DeVries acknowledges that defense manufacturing technology education faces challenges. The industry's rapid evolution demands a workforce with up-to-date skills and knowledge. However, the current pace of training and upskilling workers is insufficient to provide a steady supply of qualified professionals.

"As defense manufacturing leans into next-generation advanced manufacturing capabilities, we can lead workforce training efforts for the broader manufacturing sector to follow," DeVries said. "As we train, we will be learning many lessons ourselves in optimizing our approach for the next generation(s) of learners."

To address these challenges, the DOD ManTech EWD program is pursuing strategies that focus on fostering collaboration among educational institutions, industry partners, and government agencies. This collaboration aims to create a robust defense manufacturing technology workforce pipeline.

"While our emphasis is on post-secondary, non-degree learning opportunities for manufacturing skills, the pipeline begins with and relies on our emerging K-12 students having a renewed understanding of manufacturing opportunities and skillsets."

The M-EWD Program collaborates closely with the DOD Manufacturing Innovation Institutes. These institutes have a history of designing and implementing educational programs that address the workforce challenge. With more than 339 academic member organizations across 45 states and over 212,200 students, teachers, and incumbent workers trained since 2020, the DOD-MIIs play a pivotal role in preparing the workforce for the future.

"The DOD MIIs are the M-EWD laboratory for high-value experimentation and validation of workforce development techniques," said DeVries. "They allow us to put theory into practice in a focused environment, and then scale highly successful programs for nation-wide impact."

In a dynamic field like defense manufacturing, continuous innovation and emerging technologies are paramount. DeVries places great emphasis on leveraging these advancements to shape the future workforce. By staying at the leading edge of technology and growing the needed workforce, the defense manufacturing sector can maintain its competitive edge.

"Our advanced manufacturing technique development is enabling ever greater technical capability to be delivered to our warfighters," said DeVries. "From carbon-carbon composites for hypersonics to advanced packaging of semiconductors into stacked-die modules, defense manufacturing is deploying the next generation of capability for our troops."

Diversity, equity, inclusion and accessibility are integral to the program's approach to workforce development. DEIA efforts aim to ensure that opportunities in the defense manufacturing sector are available to all, regardless of background or demographic. This commitment to diversity strengthens the sector's innovation and adaptability.

"In our pursuit of innovation and excellence, we must recognize that diversity is not just a goal; it's an imperative," said DeVries. "Embracing individuals from all walks of life brings fresh perspectives, creativity, and resilience to our workforce, ultimately making us more adaptable and capable in the ever-evolving landscape of defense manufacturing."

For those aspiring to join the defense manufacturing technology or workforce development field, DeVries emphasizes the importance of having a thirst for knowledge, adaptability, and a commitment to lifelong learning. The defense manufacturing industry, he asserts, is dynamic and filled with opportunities for those who are industrious and driven.

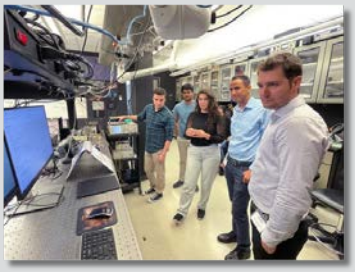
"With a spirit of curiosity and humility to work across disciplines and skillsets, a career in manufacturing can be extremely rewarding and provide a pathway for gainful employment for all incoming workers," said DeVries. "From entry-level technician to engineer to shop-manager to executive, the dynamic environment of defense manufacturing will make every day a new opportunity to innovate, collaborate, and solve real challenges that make a difference."

ManTech Participates in Inaugural Manufacturing Momentum Summit

The DOD ManTech Manufacturing Education and Workforce Development team participated in the inaugural Manufacturing Momentum Summit in Arlington, Virginia, on Sept. 12, 2023. The event brought together various networks focused on manufacturing workforce development made up of industry, state, and regional government, academia, and non-profit agencies, who shared lessons learned, tools, and resources to address the manufacturing skills gap and adapt to the changing economy. Attendees engaged with federal decision-makers, gained insights into key workforce and education issues in defense manufacturing, and acquired practical solutions for implementation.

The summit facilitated networking among communities tackling similar challenges and featured speakers from DOD, the Department of Commerce, the Department of Education, the Department of Energy, and other influential organizations. Participants represented a diverse range of defense manufacturing initiatives, including Manufacturing Innovation Institutes, American Manufacturing Communities Collaborative, Defense Manufacturing Community Support Program communities, and Manufacturing Extension Partnership organizations.

Rochester Hosts Industry-leading Integrated Photonics Test and Packaging Workshop



Students, educators, and early career professionals in the integrated photonics field convened in Rochester, NY, at AIM Photonics' bi-annual Photonic Integrated Circuit (PIC) Testing and Packaging Workshop for deep, hands-on learning focused on the daunting challenge of packaging PICs. The four-day workshop, which takes place at three different locations in Rochester, has been hailed by academics and industry insiders as one of the most effective hands-on learning opportunities for students and working professionals in the integrated photonics industry.

"As the nation's only accessible 300 mm state-of-the-art facility for integrated silicon photonics test, assembly, and packaging, AIM Photonics is clearly a choice venue to host this workshop, but Rochester's status as a national optics and photonics hub means that the region also has a wealth of additional, complementary resources to offer," said Wade Cook, AIM Photonics' executive director.
Read more: HERE

FlexFactor Collaboration Between Trenholm State and Auburn University Inspires Students

On July 27, 2023, Trenholm State Community College in Montgomery, Alabama, hosted its FlexFactor Final Pitch event at the end of a summer camp that took place on the Trenholm campus. Twenty high school students participated in this pitch event, which represented the culmination of the FlexFactor program. FlexFactor is a project-based learning program that introduces students to Flexible Hybrid Electronics (FHE). Students work in teams to research a real-world problem, conceptualize an FHE-enabled advanced hardware solution, create a business model to market their product, and then present their product and business plan in a final pitch to a panel of judges.

Students learned about advanced technology, built skills essential to future employment, including teamwork and problem-solving, and gained exposure to the most current education and career paths. And, because of the partnership between Trenholm State Community College and Auburn University during this FlexFactor iteration, the student participants also gained exposure to the amazing opportunities, such as the state-of-the-art LASE-END research lab, that are available for their future education in their own community.
Read More: HERE

BioFabUSA Manufacturing Innovation Institute Launches Registered Apprenticeship Program

biofabusa

In September, BioFabUSA launched a Biofabrication Technician Registered Apprenticeship Program, which is officially recognized through the U.S. Department of Labor. This program offers two-months of dynamic instruction followed by a full year of paid and benefitted on-the-job training, after which employers may choose to offer apprentices permanent employment. Instruction is focused on hands-on laboratory training, biology, chemistry, and vital soft skills, all underscored by Good Manufacturing Practice principles. The program is also designed with embedded industry-recognized credentials, ensuring a standard of skills achievement that will benefit both apprentices and employers as the industry grows.
Read More: HERE

DEPARTMENT OF DEFENSE MANUFACTURING TECHNOLOGY PROGRAM INNOVATING MANUFACTURING

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

Annual Collaborative Workshop Enhances Advanced Manufacturing Crisis Response Playbook

The annual Additive Manufacturing (AM) Workshop, a collaborative effort involving the Joint Additive Manufacturing Working Group, the AM Maintenance Operations working group, and the America Makes Manufacturing Innovation Institute, featured a highly anticipated contested logistics wargame. The event, held on July 18-19, was a pivotal step in refining the Advanced Manufacturing Crisis Response Playbook introduced in September 2022. Participants engaged in scenario-based exercises, focusing on refining the playbook's initial plays. The workshop's outcomes include reports, briefings, and presentations, which will help the AM community hone the playbook to address realistically anticipated crises. ManTech remains committed to furthering advanced manufacturing capabilities in response to evolving challenges.

BioFabUSA Member Epibone Achieves Investigational New Drug Clearance for Osteochondral Graft

Epibone, a member of the BioFabUSA Manufacturing Innovation Institute, has achieved a significant milestone by obtaining Investigational New Drug (IND) clearance from the Food and Drug Administration for its innovative osteochondral graft technology. The IND clearance paves the way for initiation of clinical trials in 2024 on the grafts, which are designed to replace damaged cartilage in joints, particularly in the knee.

This notable accomplishment stems from Epibone's successful crafting of a closed, automated, and scalable manufacturing process, an important advantage in advancing osteochondral graft technology. This technology holds promise as a therapeutic solution for post-traumatic osteoarthritis, a condition responsible for numerous lost workdays, as well as a treatment option for the age-related onset of arthritis.

While several companies are actively developing therapies, many grapple with the challenges of scaling up production – Epibone's collaboration with the BioFabUSA ecosystem will help enable a more swift and efficient path to large scale manufacturing.

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 16 institutes sponsored by the Departments of Commerce, Defense and Energy.

Manufacturing USA

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