

Booth	Technology	Description	Performers
AFFOA	Pison Vulcan Control Ban - Gesture Controlled Wearable	The Vulcan Control Ban is a wearable device with a sensor that uses patented electroneurography sensing technology to acquire biopotential and motion signals created by the neuromuscular system. Primary applications include gesture control of technology as an assistive device for ALS patients or to aid military situational awareness. The watch-like wearable can also be used as a controller for drones and robots, eliminating the need to carry additional equipment on missions.	Pison, AFFOA
AFFOA	Dexmat + Hexoskin shirt	These soft electronics and CNT electrodes (non-powered/non-functional) can be used for directed energy applications, like physiological reading/reporting. This new technology eliminates the disadvantage of traditional technologies that require metal contacts, making system integration use much more available and effective.	Dexmat, Hexoskin, AFFOA
AFFOA	Heated Arm Sleeve and Glove	<p>With competition from near-peer adversaries venturing into colder climates, there is a renewed arctic focus for the US Army. This shift increases the risk of cold weather injuries, particularly frostbite, immersion injury, and hypothermia. An additional related issue is the loss of dexterity, particularly in the thumb and trigger fingers, which is critical to operating cold weather missions.</p> <p>After conducting a thorough review of available state-of-the-art technologies and a deep dive into the latest research on cold weather biology, AFFOA developed a powered forearm sleeve that helps maintain finger dexterity and reduces cold weather injuries. The Institute leveraged its knowledge of the domestic ecosystem to identify necessary technologies, designed and prototyped forearm sleeves and gloves, integrating an arctic-ready closed-loop heating system and specialized high-performance insulation stack.</p>	AFFOA, Loomia, Factory 404
AFFOA	Physiological Status Monitoring Headband	<p>Military free-fall jumps pose special health risks above and beyond typical military static-line parachuting or civilian skydiving due to the extreme altitudes at which operations occur. To prevent hypoxemic and hypercapnic events (which can cause the jumper to lose consciousness in free fall), a system is needed to continuously monitor the SpO2 and respiration rate of each jumper waiting to exit the aircraft.</p> <p>The prototype physiological monitoring headband can be worn by squads of jumpers and which reports SpO2 and respiration rate</p>	AFFOA, MIT Lincoln Lab

		information to the medic or jump master responsible for monitoring the status of the jumpers.	
AFFOA	LiFi Communications Hat	The “Fabric LiFi” (Light Fidelity refers to the transmission of data via light) product platform is an advanced fabric-based hat that receives data from an overhead light source for long-distance, directional, and high-bandwidth communications. This system can be used to provide precise indoor position, locate and communicate in radio-frequency and GPS-denied environments, and transfer highly secure information. A spectrally unique platform was used to create a fabric turret cover for the identification of friendly forces from above.	AFFOA
AFFOA	Advanced Fiber Preforms	Roughly 12” x 2” thermoplastic pieces with various inactive and unpowered electronic materials inside.	
AFFOA	Preform Puck	Small battery	
AFFOA	Lit Advanced Fiber on spool/preform	Spool(s) of yarn/string-like materials (fiber) with small LED lights embedded and a small battery	
AFFOA	Fabric swatches	advanced fibers embedded, no metal wiring.	
AFFOA	Nufabrx samples	– Knee, arm, and/or calf sleeves that deliver medication via skin contact with a retail box.	
AFFOA	AFFOA designed Surgical Mask	A disposable surgical mask.	
AIM Photonics	DEVCOM CBC/NRL chemical sensing system	The chemical sensing system we are demonstrating is based on a technique called waveguide-enhanced Raman spectroscopy (WERS) for detecting the presence of hazardous vapors such as chemical warfare agents. These vapors can be hazardous at very low concentrations, which makes them difficult to detect. In the system, polymer coatings concentrate hazardous vapors on the surface of an optical waveguide on a photonic integrated circuit. Laser light in the waveguide is scattered and changes its wavelength (color) in a specific pattern that gives a fingerprint of the hazardous chemical that is absorbed. Combining the polymer concentration and long waveguides allows for detection of low concentrations of hazardous vapors. We will demonstrate the function of the spectrometer in combination with a photonic	US Army DEVCOM Chemical Biological Center, Naval Research Laboratory, AIM Photonics

		integrated circuit sensor chip. No hazardous chemicals will be used. The system uses a low-power laser, which is contained within the sensor chip and does not pose a hazard. The system runs on standard 110 V power and uses about as much power as a laptop computer.	
AIM Photonics	SiPhox Home	SiPhox Home is a portable blood diagnostic platform for lab-quality measurements of biomarkers linked with inflammation, hormones, and metabolic/cardiovascular health at 100x smaller size and cost. It was developed and initially manufactured using sensor technology developed at AIM Photonics. This device highlights how AIM Photonics can provide both technical expertise and fabrication capabilities to small and medium businesses to enable them to advance the state of the art with respect to photonic integrated circuits (PICs) and novel systems that can be created with these components.	SiPhox, AIM Photonics
AIM Photonics	Hands-on Photonic Education (HOPE) Kit	The HOPE Kits are made with integrated photonic chips manufactured and packaged at AIM Photonics in Albany and Rochester, NY. Each chip is attached to a lexan (clear polycarbonate) base plate, which includes a printed circuit board with 8 RF (SMP) connectors and 16 DC header pins, as well as a 12-fiber polarization maintaining fiber array at each end.	AIM Photonics, RIT
AIM Photonics	300 mm Silicon Integrated Photonics Wafer	AIM Photonics provides services that enable the design and manufacture of photonic integrated circuits (or PICs) through our design enablement and multi-project wafer manufacturing programs.	AIM Photonics
AIM Photonics	RapidPlex Photonic Diagnostic	A low-cost, disposable medical diagnostic integrating an AIM Photonics ring resonator sensor photonic integrated circuit (PIC) with a passive microfluidic sample card for handling human samples.	University of Rochester, University at Albany, AIM Photonics
Air Force	Part Localization, Registration, and Defect Detection using Spatial AI and XR	GridRaster will showcase its Dynamic Spatial AI and Extended Reality (XR) technology that enables operators to perform manufacturing and sustainment tasks faster and more accurately, with significantly fewer errors ensuring high readiness levels for the warfighters. They will demonstrate real time 3D spatial	GridRaster Inc., AFRL, ARM Institute

		mapping, localization of 3D objects, errors and defect detection, and visualization of complex workflows, such as paint masking on a C-130 aircraft - all using the Microsoft HoloLens Headset and a server laptop.	
Air Force	Composite Laser Ablation for Surface Preparation (CLASP) Polymer Composite Matrix	This composite matrix sample is a test specimen to show the quality of the CLASP process as powers scale. All 5 sections are processed at different power scales and sizes. Even as power increases, CLASP is able to maintain a controlled, clean, and cool surface	AFRL, University of Dayton Research Institute, AFLCMC
Air Force	Surface Master	Utilizing the same laser as used in CLASP, many other materials can be athermally manipulated. This demonstrations shows the ability to do different levels of removal of a material called surface master. The four sections are as follows: 1. As manufactured surface master on Polymer Matrix Composite 2. Laser refresh of the surface for paint re-application 3. removal of the surface master to reveal copper mesh 4. Removal of all material surrounding the copper mesh without disbond.	AFRL, University of Dayton Research Institute, AFLCMC
Air Force	Composite Laser Ablation for Surface Preparation (CLASP) Sand to Black	Controlled fiber exposure for composite bond prep of unidirectional composite plys. Utilizing the high level of contol with laser processing, patterns can be used in bond preparation to selectively impart the desired properties. This panel demonstrates a side-by-side example of a manually sanded surface vs a possible CLASP surface. The remaining resin cap as a “bag” side finish from manufacturing.	AFRL, University of Dayton Research Institute, AFLCMC
Air Force	Composite Laser Ablation for Surface Preparation (CLASP) Polymer Composite Matrix	This composite matrix sample is a test specimen to show the difference in scale for a low power and a high-power femtosecond laser operating at CLASP parameters. The original CLASP system with 20W femtosecond laser power, processed the small area. The new state of the art 300W femtosecond processed the large area, in half of the time as the small area.	AFRL, University of Dayton Research Institute, AFLCMC
America Makes	Inconel 718 Scaled Down Rocket Engine	An integrated geometry compensation workflow combining physics-based simulations to shorten development time and cost when printing complex hypersonic assemblies using metal laser powder bed fusion (L-PBF) technology. When this workflow was applied, starting with process simulation and compensation, the following results were realized: <ul style="list-style-type: none"> <li>• 50% increase in dimensional accuracy for 90% of datums and</li> </ul>	Principal: The Ohio State University Participants: Hexagon; 3Degrees; Northrop Grumman; Lockheed Martin; Collins Aerospace Public Participants: U.S. Department of Defense

		<p>features;</p> <ul style="list-style-type: none"> <li>• improvement to the accuracy of 100% of datums and features; and</li> <li>• conformity for individual parts and assemblies.</li> </ul>	
America Makes	Army Forward Enclosure for Tank Powerplant	<p>This project sought to understand if wire-fed, electron beam DED could be developed into a viable alternative source for engine hardware and other low-volume legacy parts. The part chosen for study was from the Honeywell AGT1500 gas-turbine engine used on the M1 Abrams family of tanks. The program team was provided insight into the material science, technical capabilities, processing requirements, and human systems supporting EBAM. At the same time, the EBAM supplier was provided insight into the processing, quality, and documentation requirements for military part production.</p>	<p>Principal: Honeywell Aerospace  Participants: U.S. Army Ground Vehicle Systems Center; FAMAero, Inc.  Public Participants: U.S. Department of Defense</p>
America Makes	Raytheon Heat Exchanger	<p>The overarching accomplishment of the project was the design and development of a performance-driven, feature-based, full-scale, air-to-air HEX in IN625. Design features of the HEX include reliable (~95% first build success) thin section printing of heat exchange surfaces of less than 0.010 inch thick, accomplished through geometry characterization and machine parameters, as opposed to the typical method utilizing modeling parameters.</p>	<p>Principal: United Technologies Research Center (Now known as RTX)  Participants: United Technologies Aerospace Systems; Pratt &amp; Whitney; Stratonic; 3DSIM; 3rd Dimension; University of Connecticut  Public Participants: U.S. Department of Defense</p>
America Makes	Valve Bonnet for Navy 8” Gate Valve	<p>This project was an early-stage evaluation of how wire-fed electron beam DED might be used to produce large replacement parts that had traditionally been cast. Four valve bonnets were produced from commercially pure titanium, and an artillery muzzle brake was produced from 4130 steel. The completed parts were provided to Benet Labs and GVSC for additional material testing and evaluation. This work provided the DoD insight into the capabilities of both the EBAM process and the vendor.</p>	<p>Principal: FAMAero, Inc.  Public Participants: U.S. Army Ground Vehicle Systems Center (GVSC); U.S. Navy; Army Benét Labs; U.S. Department of Defense</p>

ARM	Autonomous Robotic Iterative Forging	The Ohio State University, in collaboration with CapSen Robotics and Yaskawa Robotics, developed an autonomous robotic system to address challenges in producing complex metallic components for various industries. The system demonstrated flexible manufacturing capabilities through iterative open-die forging with heat treatment, controlled by AI, to fabricate high-quality components without explicit CNC programming. Efforts were focused on accelerating system productivity (50x-100x) by improving workflow iterations and reducing processing time. The team successfully implemented improvements in component positioning, deformation capacity, and imaging frequency to streamline the manufacturing process.	ARM Institute; The Ohio State University (OSU)
ARM	Safe Robotic Handling of Energetic Materials	The team demonstrated the feasibility of safely handling an energetic material in a manufacturing operation using industrial robotics. The energetic material in this project was in the form of a fine powder which is dispensed from a hopper during the manufacturing of a final product. The size of the hopper must be minimized for safety and regulatory reasons, and consequently must be refilled frequently during production. Refilling the hopper manually exposes the production staff to risk, so in this project, we demonstrated the feasibility of installing an industrial robot to reduce this risk.	ARM Institute; Renselaer Polytechnic Institution; Interface Technologies; FANUC Robotics; Picatinny Arsenal; Ensign-Bickford Aerospace & Defense
ARM	Mack Truck transmission bracket	Penna Flame is a medium sized manufacturer in Butler County, PA recently came to ARM to automate an oil coating and packaging process at their facility. This manufacturer does flame hardening of casted metal parts, with parts typically weighing 30-50 lbs. Ergonomically, the process of lifting and maneuvering a 40 lb cast part repeatedly has an increased risk of injury. This manufacturer already had a Fanuc robot on site that is currently under-utilized. ARM took on the task to redefine the oiling process from a spraying process to an oil dip process that makes it a better fit for robotic automation. ARM also did a trade study on potential end effectors that could accomplish this task using modeling and simulation and tested a selected end effector in our lab prior to conducting testing at the manufacturer's site. ARM successfully demonstrated the end effector performance and new oiling process at the manufacturer's site. This manufacturer is planning to acquire a pick and place vision software package through one of ARM's partners, Capsen Robotics and the identified end effector hardware.	ARM Institute; Penna Flame Industries Inc.

Army	Advanced Transceiver Optical Module (ATOM) Laser Range-Finder (LRF)	<p>The ATOM LRF is a high-performance, compact range-finding module. The laser transmitter is capable of penetrating obscurants found in battlefield conditions, and its range performance exceeds that of current similar fielded systems. In addition to range-finding, the ATOM LRF can perform other marking and pointing missions. Because it was designed to be a common module, it can be integrated into various soldier, airborne, and mounted platforms. When produced in higher volumes for multiple efforts, the unit cost is significantly lower than traditional customized rangefinders for military use. The ATOM LRF combines high performance and a small footprint in a package previously not available for Army applications.</p>	L3-Harris, Safran Optics1
Army	Advancing Vacuum Microwave Drying (VMD) Technology	<p>The VMD technology applies vacuum and microwave to rapidly and economically dry ration components using low temperatures (&lt; 50o C) to reduce the weight of rations and to retain quality, nutrition, and ensure safety. The technology can partially dry the food components to render them pliable such that they could be subsequently compressed to further reduce weight and volume (minimum of 50%) for individual and squad-sized/group-sized military ration components. VMD semi-dried food components will have a more uniform final moisture distribution in the finished products due to a volumetric heating of microwave to flush out the moisture simultaneously throughout the food components. The uniform moisture distribution in the semi-moist food components is critical to its quality and microbial safety.</p>	Bridgford Foods, EnWave Corp.
Army	6T Li-ion Battery	<p>Li-ion batteries have greater energy density, longer cycle life and significantly lighter weight when compared to the currently fielded lead-acid ground vehicle (6T) batteries. Army ManTech demonstrated high-volume manufacturing capability for batteries that are safety and military performance specification compliant.</p>	<p>U.S. Army Combat Capabilities Development Command (DEVCOM) Ground Vehicle Systems Center (GVSC), Program Executive Office for Combat Support and Combat Service Support (PEO CS&amp;CSS), Joint Light Tactical Vehicle (JLTV) Program Office, Saft America Inc., U.S. Navy (Naval Surface Warfare Center Carderock), Defense Logistics Agency (DLA)</p>

Army	Cold Spray Additive Manufacturing for Leading Edges	Leading edges for helicopter blades manufactured using additive cold spray technology. Helicopter blades require metallic leading edges to protect them from sand erosion. The cold spray niobium (Nb) leading edges have increased erosion resistance and bond-line compatibility with underlying blade materials, as compared to conventional options. The project will manufacture strips for erosion testing and provide a full-scale manufacturing process demonstration.	Boeing, Bell, Dynetics, VRC Metal Systems, Solvus Global, Siemens Energy
BioFabU SA	3D Printed Lung	BioFabUSA Members United Therapeutics and 3D Systems are developing 3D printed regenerative lung scaffolds. <b>Visitors would be able to hold a 3D printed lung.</b>	
BioFabU SA	Decellularized Porcine Heart	Transplantation is the only definitive cure for end-stage organ failure. However organ donation cannot keep pace with demand and requires immunosuppression of the recipient. Building a complex solid organ such as liver, kidney, lung, or heart with a patient's own cells that could eliminate the organ donor shortage and obviate the need for immunosuppression is a goal of the tissue engineering field. Organamet developed a method to decellularize a porcine heart, leaving a bare heart scaffold. Human heart cells are cultured and then injected into the scaffold. Once cells are present, they require further culture so that they integrate fully into the scaffold. BioFabUSA led the optimization and automation of heart cell culture in a single vessel, eliminating the manual processing of nearly 400 individual tissue culture plates by multiple operators. The decellularization process was closed and automated, increasing throughput and consistency of scaffold production. Institute members with expertise in AI-driven robotics automated the injection of cells into the heart scaffold, eliminating a significant risk of contamination of the final product. <b>Visitors would be able to see observe the activity of a BioBot and would be able to hold a decellularized heart scaffold.</b>	
BioFabU SA	Self-assembled ligament for ACL and rotator cuff reconstruction; skeletal muscle unit (SMU) for the treatment of volumetric muscle loss.	Regenerative ligament and skeletal muscle products are expected to provide restorative treatments and rehabilitative care to maximize function for return to duty (RTD) or civilian life following ligament injury or volumetric muscle loss for Warfighters who have suffered blast injuries, burns, or other injuries. <b>Visitors will be able to hold prototype ligament and skeletal muscle products made on a Tissue Foundry line.</b>	



BioFabU SA	Engineered red blood cells for the treatment of trauma and chronic conditions	The affordable manufacture of Red Blood Cells will reinforce the supply of RBCs for transfusion, especially for Warfighters, during times of high demand like the recent pandemic, and in environments with a limited population of eligible donors. Visitors will be able to hold a vial of manufactured blood.	
BioFabU SA	Novel Intradermal Therapeutic Applicator	<p>As pandemics, epidemics, allergy incidents and CBRN threats are on the rise, the U.S. needs to rethink its mass therapeutics administration strategy. The right solution requires: (i) rapid development, (ii) expanded availability (iii) quick and easy administration, (iv) dose sparing (as needed). Multiple studies have demonstrated improved vaccine immunogenicity from intradermal delivery, dramatically reduced dose required for vaccination (dose-sparing), and improved durability (persistence) and breadth (ability to neutralize variants) of multiple vaccines including COVID-19, pandemic and seasonal influenza, zoster, polio, when compared to intramuscular/subcutaneous delivery. These attributes make Intradermal delivery (ID) an attractive option for mass administration. However, the current method has not gained widespread clinical adoption because mastering the technique with standard syringes and needles is difficult and prone to leakage or deeper delivery – both of which have shown to reduce vaccination effect – not to mention a more painful experience for patients. BioFabUSA and its Members have developed a novel intradermal therapeutic applicator that leverages proven hollow microneedle technology, is self-administrable, painless, enables dose sparing, and is capable of using any liquid therapeutic agent without reformulation. It eliminates the need for a trained medical professional for administration of therapeutic agents. It avoids the use of medical sharps and their special disposal requirements. These critical features make this the perfect platform for mass, rapid administration. <b>Visitors would be able to see the device applied on site and witness painless, self-administered delivery (device filled with sterile saline).</b></p>	
BioMAD E	Ketone-IQ drink	<p>Made from plant sugars using BioMADE member Geno’s sustainable, proprietary fermentation process, Avela™ (R)-1,3-Butanediol is a source of natural energy and can provide the benefits of ketosis on demand, supporting a variety of lifestyles. Formulated with Avela™, this novel, sugar-free ingredient offers a fast, easy, and accessible way to raise beta-hydroxybutyrate (BHB)</p>	Geno (BioMADE member)

		ketone levels, the primary energy source made in the body during ketosis.	
BioMAD E	Bionylon shirt	Plant-based nylon-6, made by BioMADE member Geno, is made by converting renewable carbon (sugar made from plants) into the precursor to nylon, resulting in a 100% renewable carbon-based nylon-6. Specifically, Geno's technology is used to produce the precursor to plant-based nylon-6 (caprolactam) and plant-based nylon-6,6 (HMD).	Geno (BioMADE member)
BioMAD E	Performance apparel	The Phase Series is a newly launched line of performance apparel from BioMADE member Checkerspot. The pieces feature miDori® bioWick, a 100% petroleum-free wicking finish derived from microalgae instead of fossil fuels.	Checkerspot (BioMADE member)
BioMAD E	Performance apparel – Adidas	BioMADE member LanzaTech is partnering with national brands like H&M and Adidas to create clothing and shoes partially made from captured carbon emissions. LanzaTech captures carbon emissions from steel mills, traps them in bioreactors and converts them into the same building blocks that conventional polyester is made of. This revolutionary solution helps reduce pollution and limits the use of virgin fossil resources needed to make new products.	LanzaTech (BioMADE member)
BioMAD E	Spider silk	Spider silk is one of the strongest natural materials known to humankind. With a greater strength to weight ratio than steel, spider silk fiber fabrication has been a scientific pursuit for many years.	Technology Holding (BioMADE member)
BioMAD E	Algae wheels	Checkerspot's AlgalCast is a thermoset cast polyurethane that can be fine-tuned to meet the hardness, flexural strength and impact resistance needs of the end-use application. The longboard wheels are 10-20% biobased, but AlgalCast can be formulated up to ~67% biobased.	Checkerspot (BioMADE member)
BioMAD E	Foamboard	The high biocontent foam (up to 42%) is easily tunable for cure profile and density, and rigid foam boards are easily cut or carved for final applications. The foam system uses water as a blowing agent (no cyclopentane, n-pentane, methyl formate or hydrofluorocarbons), and there is no added mercury, tin, MOCA or TDI. Checkerspot offers a two-component foam system that is	Checkerspot (BioMADE member)

		ideal for both open and closed mold production, as well as rigid foam planks.	
BioMAD E	Biocement	Biocement tiles exceed the physical properties of standard materials for compressive strength, absorption, freeze-thaw, adhesion, and dimensional tolerance, are safer for humans and the planet than comparable materials, and actively sequester environmental carbon.	Biomason (BioMADE member)
BioMAD E	Dandelion rubber	Kultevat is creating a domestic, natural rubber from dandelions. This annual crop can be grown sustainably in the U.S. to provide a consistent and high-quality source of natural rubber.	Kultevat (BioMADE member)
BioMAD E	Bio-based thermal protection systems (drone wing)	Bio-based thermal protection systems from member Cambium, which utilize materials such as resveratrol, represent a promising class of protective biomaterials that possess a unique combination of high-thermal stability and mechanical strength to ablative and structural materials.	Cambium (BioMADE member)
BioMAD E	Laser-Protective Eyewear	Cambium is developing military-grade laser-protective eyewear for pilots, first responders, and other professionals. Bio-based additives to the eyewear enable improved dye infusion, reduce haze, quench secondary dye fluorescence, and impart UV protection. The peel-and-stick films can be applied to virtually any surface quickly and can conform to relatively complex shapes.	Cambium (BioMADE member)
BioMAD E	Squitex Masks	This technology takes revolutionary manufacturing processes to make a face mask. The fibers used in this novel mask enhance the triboelectric properties for enhanced air filtering that surpass those of other natural and synthetic materials by several orders of magnitude. This technology will be tested for Warfighter use in air filtration. When fielded, this technology has the potential to save lives and Federal funding. There is also potential commercial interest in making this technology available to everyone.	Tandem Repeat Technologies, Inc
DLA	Additive Manufactured Waveguide I	The US Army has radar and communication systems that use microwave radio signals, which are transmitted through a part called a “waveguide”. Waveguides are used to direct microwave energy much like a cable, however the item itself is shaped like a hollow metal pipe of special dimensions. All communication systems in the microwave frequency use this type of part. This part becomes a supply issue at the depot level	DEVCOM C5ISR Center, Army Rock Island, DLA J68 R&D

		because these are usually not stocked, and when ordered, take several months to build and supply. Some of these legacy systems will continue to be in service for another decade. This will demonstrate an alternate or on-demand supply source, using Additive Manufacturing.	
DLA	Reduced Size, Volume, and Weight of the Meal, Ready-to-Eat (MRE)	The Subsistence Network ManTech project supports an effort to replace the current pre-formed meal bag with a new package utilizing Horizontal Form Fill and Seal (HFFS) films. The effort provides multiple benefits to the Warfighter, including reduced package size, weight, and packaging waste. The focus of the initiative is to demonstrate that the HFFS package is economical, easy-to-open and can survive military distribution.	DLA ManTech; AmeriQual Foods; Wornick Foods; Sopakco Packaging; US Army Combat Capabilities Development Command – Soldier Center, Combat Feeding; US Department of Agriculture Center for Grain and Animal Health Research; Cadillac Products Packaging Company; Phenix Specialty Films & Packaging
LIFT	Hypersonic Sting Mount specimen	Robocast Additively Manufactured Hexoloy SA, a sintered alpha silicon carbide material intended for hypersonic wind tunnel testing as a part of LIFT's Hypersonics Materials Acceleration program.	LIFT
LIFT	155m Projectile Rotating Bands Section	Intended for prove our Plasma Arc Welding Directed Energy Deposition to replace WAAM as a higher build rate and better quality manufacturing process, this sample was an initial proof of concept for feasibility of this application to be used in fabrication of rotating bands for 155mm howitzer shells.	LIFT
LIFT	Laser Beam Powder Bed Fusion Manufactured Tungsten Tensile Bars	A bar of tungsten which was manufactured via Laser Beam Powder Fusion. Tungsten is a challenging material to additively manufacture (temperature, oxygen control, distortion)	LIFT
LIFT	Hypersonic Ramjet (plastic model) Cross Section	An additively manufactured (plastic) small scale hypersonic ramjet, part of the DoD Hypersonic Challenge Project call.	LIFT, Lockheed Martin, Velo 3D, Vibrant

MSTP	Joint Clothing Textile Modernization Initiative (JCTMI)	<p>JCTMI introduces a data centric modular network platform and integrated digital tools to accommodate a spectrum of manufacturing capabilities and automation. JCTMI provides the foundation required to position the DoD with the capability to ensure our current and future warfighters receive the right uniform with the right fit to meet the mission required.</p> <p>JCTMI is a transformation of culture, workforce and tools to create a real-time digital ecosystem with decision support capabilities that enable cost effective development and sustainment of uniforms with the agility and adaptability to meet the changing global environment. The JCTMI suite of digital tools capitalizes on commercial industry best practices to automate and create a digital thread from inception through production and sustainment optimizing impact to the Services, Coast Guard, DLA, and industry.</p>	Air Force, Army, Navy, Marine Corps, Coast Guard, Space Force, Defense Logistics Agency, & Advanced Functional Fabrics of America (AFFOA)
MSTP	Micro-Electromechanical Systems (MEMS) Mirror-Based LiDAR Sensor	<p>4D Tech Solutions (4D) has developed a modular, ultra-high resolution, small-scale Light Detection and Ranging (LiDAR) sensor for Department of Defense and government customers. Based upon micro-electromechanical system (MEMS) technology licensed from the Army Research Lab and optimized through design and manufacturing studies, 4D's high-definition (HD) MEMS mirror-based LiDAR enables users to rapidly collect high-quality three-dimensional (3D) data about an area of interest, such as a runway, field, facility, or a vehicle approaching a checkpoint. The system can collect up to 1 million 3D points per second across a distance of more than 120 meters as it is flown by drone, carried by hand, or driven across terrain. The quantity, quality, and pace of 3D data collection supports a broad spectrum of advanced data analytics applications at the tactical edge. Its modular design enables the same physical LiDAR sensor to be easily and quickly reconfigured on-the-fly as a user changes mode of operation in the field.</p>	Army Research Laboratory
MSTP	Lightweight Hydrogen Fuel Cell and Low Cost, Domestic Separator Plates	<p>The Navy owned lightweight hydrogen fuel cell addresses a critical DoD capability gap for small, electric powered Unmanned Aerial Vehicles (UAVs) with insufficient endurance for persistent Intelligence, Surveillance and Reconnaissance (ISR). OSD ManTech invested \$3.8M from FY20 to FY22 to improve the manufacturability of this fuel cell, with great success.</p>	US Naval Research Laboratory, LIFT, Northwest UAV

MxD	MxD Sensor Kit	MxD has identified digitization as one of the greatest challenges facing small and medium-sized Manufacturers (SMMs) in the U.S. The MxD Sensor Kit was created to respond to this need and show manufacturers that going digital does not have to be expensive or complicated. In addition to installation and use at SMMs, the Sensor Kits also have applications within the Organic Industrial Base (OIB) for data collection on legacy equipment that is prohibitively expensive to replace. The device is designed to be a simple, no-code solution that interfaces with most commercially available sensors to allow manufacturers to monitor their processes more closely, shortening downtimes or reducing failures. Each Sensor Kit has four digital inputs, four analog inputs, four digital outputs, and a stack light driver.	MxD
Navy	High Energy Laser (HEL) Weapons System Gold Coating	Navy ManTech developed a Navy-owned, optimized, and qualified gold coating process for aluminum, titanium, and carbon fiber composite components on the HEL Beam Expander Telescope and transitioned the process to industry.	ONR Navy ManTech, Penn State Applied Research Laboratory / Institute for Manufacturing and Sustainment Technologies (iMAST), PMS 400D, U.S. Army, U.S. Marine Corps, U.S. Air Force, L3Harris Technologies, Northrup Grumman Innovation Systems
Navy	Powder Blown Laser Directed Energy Deposition (L-DED) Repair	Navy ManTech developed a qualified in-situ repair process that monitors a family of parts, includes knife-edge seal teeth features on rotating engine components, and utilizes power blown L-DED additive manufacturing with Inconel 718®.	ONR Navy ManTech, Penn State Applied Research Laboratory / Institute for Manufacturing and Sustainment Technologies (iMAST), Naval Air Warfare Center Aircraft Division Lakehurst, Naval Air Station Patuxent River, Fleet Readiness Center East
Navy	Thermoplastic Composite Welded Assemblies	Thermoplastic composite components can be adhesively bonded or mechanically fastened to form structural assemblies, but the chemical nature of the thermoplastic matrix also enables local re-melting and opportunities to “weld” these components as a means of joining. Navy ManTech leveraged previous thermoplastic induction welding efforts, developed an induction welding process for structures with significant curvatures representative of aircraft fuselage chines and leading and trailing edges, and demonstrated the process on MQ-25A representative geometries.	ONR Navy ManTech, Advanced Technology International / Composites Manufacturing Technology Center (CMTC), Boeing, University of South Carolina

Navy	Carbon Fiber PEKK Additive Manufacturing	Navy ManTech developed an alternative method to fabricate non-flight-critical parts by building upon previous data to validate HexPEKK® material and demonstrated performance against F-35 Lightning II specifications. New designs for candidate non-flight-critical parts, such as ducts and equipment trays, were developed, printed, and demonstrated through full-scale testing.	ONR Navy ManTech, Advanced Technology International / Composites Manufacturing Technology Center (CMTC), F-35 Lightning II Joint Program Office, Lockheed Martin Aeronautics, Northrop Grumman, Hexcel Corporation, National Institute for Aviation Research
Navy	High Energy Laser Optical Coating Reliability Improvement	Navy ManTech improved the reliability of optical components for High Energy Laser (HEL) weapon systems by understanding how coating defects impact coating performance and developing coating process improvements to minimize defects while maintaining or improving optical properties. The results are lower life-cycle costs and improved system availability. While this project functions as a risk-reduction effort, it also supports the requirement for higher laser power of future systems.	ONR Navy ManTech, Penn State Applied Research Laboratory / Electro-Optics Center, PEO IWS 2.0
Navy	Dewar Cooler	Navy ManTech has been working to help understand the challenges in building and manufacturing cryocoolers. These small cooling devices are used for high end camera systems in the Electro-Optic and Infrared imaging systems. These detectors are very sensitive and operate at high temperatures, to maintain them they require these devices. The Navy ManTech team is focused on extending the life and reliability of the devices.	ONR Navy ManTech, Penn State Applied Research Laboratory / Electro-Optics Center, PEO IWS 2.0
NextFlex	Tissue Oxygenation Patch for Casualty Monitoring and Tracking	Wearable oxygenation monitor for casualty triage and aeromedical evacuation.	NIRSense, AFRL
NextFlex	Wearable Patient Monitor	Multimodal clinical-quality patient monitor for long-term wear outside hospital environments.	GE Healthcare, Binghamton University, Infinite Corridor Technology
NextFlex	Wearable Confined Space Monitor for Worker Safety	Chemical sensor device to be worn by workers in hazardous confined spaces such as aircraft fuel tanks, to improve safety and reduce attendant labor for the OIB and industrial sites.	Vigilife, Aptima, NextFlex, AFRL
NextFlex	Integrated Head Protection System (IHPS) RAILINK Infrastructure	Project developed modular add-ons for the FAST helmet system including a step-in visor with integrated heads-up display, waveguide devices, and active anti-fog goggles.	Gentex Corp, DEVCOM Soldier Center

NextFlex	Wearable Sensors for Multi-Domain Platoon Operations	This project has integrated hybrid electronics and functional fabrics in 10 separate devices as part of an integrated soldier kit with sensors, communication, power, and data distribution.	NextFlex, AFFOA, Drexel University, DEVCOM Soldier Center
NextFlex	Hybrid Electronics Enabled Smart Munition	Electronic rounds in a 40mm munition format with wireless communication, GPS location and GPS jamming, and acoustic beacon capability, for integration into an AR/VR system	IS4S , DEVCOM Armaments Center
NextFlex	Conformal Additive Electronic Circuit Demonstrator AND Point of Need Manufacturing Challenge Austere nField Repair	Samples include conformally printed and assembled electronic circuits with wireless communication and a sensor suite (motion, gas, acoustics, etc.). The manufacturing platform was also used to fabricate circuits at -40°C in the OSD Point of Need Manufacturing Challenge.	nScript, Sciperio, NextFlex, DEVCOM Armaments Center
NextFlex	Flexible X-Ray Detectors for Explosive Ordinance Disposal	Project has enabled a domestic source for rugged flexible x-ray imagers for EOD.	InnovaFlex Foundry, DTRA, OSD ManTech
NextFlex	Additive RF Multichip Module	RF multichip module fabricated using ceramic additive manufacturing, embedded die, and printed interconnects and antenna arrays.	GE Aerospace, Binghamton University
NextFlex	Nonplanar 3D Packaging Approaches for Compact Microwave Systems	Two demonstrators: (1) Printed vertical interposer solution that eliminates multi-level wire bonds, reducing PCB cost & complexity; prototype represents a portion of an X-Band T/R channel assembly. (2) Non-planar structure for a high-efficiency RF performance in a compact volume the structure is fully printed around a thermal spreader for high power applications.	UMass Lowell, RTX
NextFlex	Sustainable Additively Printed Electronics	Hybrid electronics samples fabricated and using environmentally sustainable material sets including functional inks with water-based solvents and repair processes.	Auburn University, Jabil, MacDermid Alpha
NextFlex	Embedded Sensors for Composite Material Process & Structural Health Monitoring	Composite material panel with embedded passive electrical circuit to measure both cure process and strain; improves manufacturing consistency/cure cycle time and enables inspection.	GE Aerospace, Lockheed Martin, Binghamton University, Georgia Tech
NextFlex	Human Machine Interface Touch Surfaces using In-Mold Electronics Interconnection	Samples of in-mold electronics, which embed electronic functionality directly into molded plastic parts for improved SWAP for application such as touch controls for automotive interiors or wire harness replacements.	Auburn University, Jabil, Molex



NextFlex	Scalable Manufacturing for ELMNT Liquid Metal Inks	Stretchable data cables fabricated using a new liquid metal ink developed in-part at AFRL and commercialized by UES; project has supported this technology transition.	UES Inc. (a BlueHalo Company), Tapecon
NextFlex	Asset & Facility Monitoring for the OIB	Monitoring device for real-time equipment status to improve preventive maintenance. Device monitors changes in acoustic signature, vibrations, and temperature using machine learning.	Aptima, NextFlex
NextFlex	Flexible Microcontroller	This mechanically flexible microcontroller device was developed initially as a demonstration that such devices could be fabricated using hybrid electronic methods, in later iterations to be the basis for developing more advanced application specific circuits by NextFlex and members. The device can read sensors, perform logic, and drive actuators and communications.	NextFlex
NextFlex	High Temperature CMOS Signal Electronics	This project is developing SiC CMOS electronics by improving PMOS device performance through material optimization and improved gate dielectrics. Exhibited samples are pieces of SiC wafers.	GE Aerospace