Developing Disruptive and Transformational Solutions

Department of Defense Manufacturing Technology Program

December 2022

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OFFICE OF THE UNDER SECRETARY OF DEFENSE
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WASHINGTON, DC 20301-3030

RESEARCH
AND ENGINEERING

December 5, 2022

SUBJECT: Advanced Manufacturing for Disruptive and Transformational Solutions

The U.S. military's technological edge provides an enduring advantage for the Joint Force. However, our strategic competitors enjoy increased access to commercial-state-of-the-art, disruptive technologies that endanger America's interests and national security. Increasingly sophisticated cyber-attacks, new supply chain risks, hypersonic weapons, and biological threats make the consequences of technological stagnation more severe than ever. The Department of Defense (DoD) must innovate to ensure future military dominance.

For over 66 years, the DoD Manufacturing Technology (ManTech) Program has developed a responsive, world-class manufacturing capability to affordably and rapidly meet Joint Force needs throughout the defense system life cycle. This brochure highlights manufacturing success stories of DoD ManTech Programs managed by the Army, Navy, Air Force, Defense Logistics Agency (DLA), Missile Defense Agency (MDA), and the Office of the Secretary of Defense (OSD). Although DoD ManTech has a singular mission and shared strategic vision, the military services and DoD agencies select and execute their own mission-driven projects and initiatives. Collectively, these DoD Components comprise the Congressionally codified Joint Defense Manufacturing Technology Panel (JDMTP).

In the JDMTP's role of identifying and integrating joint requirements, it continues to transition defense manufacturing technologies through partnerships across the DoD, other federal agencies, industry, and academia. The success stories in this brochure illustrate the ongoing benefits of the DoD ManTech Program to strengthen U.S. manufacturing technology and the industrial base.

This year's center article highlights the 2022 DoD ManTech Program Strategic Plan that complies with Section 4842 of Title 10, United States Code. Prepared by the Office of the Secretary of Defense in coordination with the JDMTP, the strategic plan articulates the vision and steps needed to ensure that DoD best leverages the latest innovations in advanced manufacturing. It introduces three thrust areas: our nation's ability to produce the needed parts and systems for the military, the need for healthy and secure supply chains, and the skills needed by the U.S. manufacturing workforce.

Finally, this brochure contains a special insert that recognizes 10 years of the DoD's public-private partnership with its nine Manufacturing Innovation Institutes (MIIs). The DoD MIIs are game-changing catalysts intended to build enduring advantages for the future Joint Force by connecting innovative industrial ecosystems with emerging technology and domestic market sectors. The DoD ManTech Program invests significantly in the DoD MIIs to ensure that the U.S. defense industrial base can produce needed parts and systems, maintain healthy and secure supply chains, and train the skilled U.S. workforce.

Today's DoD ManTech Program continues to play a crucial role in fostering innovation to meet the challenges of our changing world and to maintain our nation's competitive edge. We are pleased to present you with this year's DoD ManTech Program brochure, which represents the JDMTP's collaborations to enhance our military's strength and technological advantage.

Tracy Frost
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The Department of Defense Manufacturing Technology Program

WHAT? The Department of Defense Manufacturing Technology (DoD ManTech) Program was originally created in 1956, and falls under Section 4842 of Title 10, United States Code (USC), to further national security objectives through the development and application of advanced manufacturing technologies and processes. The Program is composed of the Military Service and DoD Agency (or "Component") ManTech investment programs executed by the Army, Navy, Air Force, Defense Logistics Agency (DLA), Missile Defense Agency (MDA), and the Office of the Secretary of Defense (OSD).

WHY? The U.S. Military capability depends on our ability to ensure technological advantage over our adversaries. We must constantly respond to world military challenges in a manner that is innovative, agile, robust, resilient, and affordable. The DoD Manufacturing Technology (ManTech) Program meets these challenges with a focus on cost-effective, risk-mitigated manufacturing development, and sustainment of defense systems.

***VISION:** A responsive world-class manufacturing capability to affordably and rapidly meet warfighter needs throughout the defense system life cycle.*

HOW? Although DoD ManTech has a singular mission and shared strategic vision across the military services, Defense Agencies, and OSD, each Component uses its own organization-specific processes, mandates, and procedures to select programs and execute its investments and initiatives.

***MISSION:** The DoD ManTech Program anticipates and closes gaps in manufacturing capabilities for affordable, timely, and low-risk development, production, and sustainment of defense systems.*

The directors and senior managers of these programs coordinate through the auspices of the Joint Defense Manufacturing Technology Panel (JDMTP). The JDMTP is chartered to identify and integrate requirements, conduct joint program planning, and develop joint strategies. The OSD ManTech Office administers the DoD ManTech Program by providing central guidance, direction, and support to the Components ManTech Programs.

The OSD ManTech Program also manages Manufacturing Education and Workforce Development (M-EWD), the Manufacturing Science & Technology Program (MSTP), and the DoD Manufacturing Innovation Institutes (DoD MIIs). The brochure includes a special insert to provide updates and recognize 10 years of the DoD's public-private partnership with its nine DoD MIIs: America Makes (the national additive manufacturing institute), Manufacturing Times Digital (or MxD, digital manufacturing and cybersecurity institute), LIFT (lightweight materials institute), the American Institute for Manufacturing Integrated Photonics (AIM Photonics), NextFlex (the flexible hybrid electronics institute), Advanced Functional Fabrics of America (AFFOA), BioFabUSA (advanced regenerative manufacturing institute), Advanced Robotics Manufacturing (ARM institute), and BioMADE (bioindustrial manufacturing institute).

This brochure highlights twenty manufacturing successes of the DoD Services and Agency ManTech Programs, provides a center article to announce the 2022 DoD ManTech Strategic Plan, lists the 2022 nominations for the Defense Manufacturing Technology Achievement Awards, and announces the 2020-2021 Defense ManTech Champion and JDMTP Service Recognition Awards.

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Army Manufacturing Technology Program Overview

The U.S. Army Manufacturing Technology (ManTech) program's mission is to support Army readiness and modernization priorities by improving and maturing manufacturing technologies to ensure overmatch and fulfill national security objectives. The Army ManTech Program addresses manufacturing solutions that enable and improve the efficiency and affordability of manufacturing processes to advance the Army's technological capabilities while reducing life-cycle costs for current and future Army acquisition programs. The goal of the program is to improve end-item affordability by addressing manufacturing and producibility risks and facilitating the maturation and transition of critical technologies to weapon system platforms. There are three primary objectives of the program:

- Material development to meet performance requirements
- Improve manufacturability and reduce the cost to programs of record (PoRs)
- Advance the Organic Industrial Base

Critical technology maturation and transition is accomplished by coordinating efforts between the Army Science and Technology (S&T) community, the Program Executive Offices and their supporting program managers, and the defense industrial base through effective, efficient, affordable, and adaptable manufacturing processes. Additionally, the Army, through Army ManTech, actively participates in the Office of the Secretary of Defense's (OSD) DoD Manufacturing Science & Technology Program for efforts with Defense-wide impacts.

Organization

The Army ManTech program supports Army-wide manufacturing requirements with current coordinated efforts across the Assistant Secretary of the Army for Acquisition, Logistics and Technology Program Executive Offices. Participation in the program competitive selection process includes leaders from the U.S. Army Materiel Command; the U.S. Army Futures Command, the U.S. Army Space and Missile Defense Command; U.S. Army Medical Research and Development Command; and the Army Rapid Capabilities and Critical Technologies Office. The Deputy Assistant Secretary of the Army for Research and Technology (DASA(R&T)) provides oversight and management of the Army ManTech program.

Investment Strategy

The Army ManTech process provides a balanced portfolio aligned with S&T, PEO/PM and Department of the Army priorities. Additionally, it enables the Army to maximize technology transition by leveraging both technical and acquisition subject matter expertise for specific weapon systems.

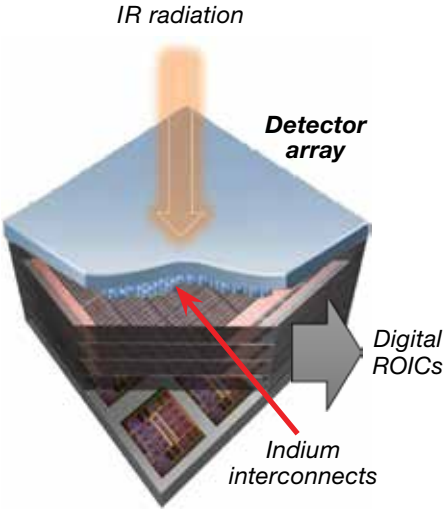
The Army ManTech program focuses investments on specific Army related weapons systems in the following portfolio areas:

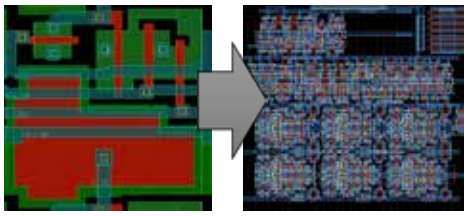
- Networks/Command, Control, Communications, and Intelligence (Network/C3I) Platforms
- Weapon Systems, including long-range precision fire air missile defense
- Ground Systems, including next generation combat vehicles
- Aviation Systems, including future vertical lift
- Soldier Systems, including Soldier lethality

Army Improves Advanced Manufacturing for Digital Sensors and Enables 3rd Generation Infrared Ground Vehicle Capability

Manufacturing Challenge:

Existing sensors cannot reliably see, target, and engage in poor environmental conditions or in extreme dynamic range conditions. The challenge is producing high dynamic range Read-Out Integrated Circuits (ROICs) at on-shore silicon foundries with acceptable yields in order to realize affordable 3rd generation infrared system capability.





Analog ROIC pixel *Digital ROIC pixel*

The increased manufacturing capability provided by this effort enables multiple solutions of high dynamic range digital ROICs for a variety of Army applications.

ManTech Response:

- Developed manufacturing processes for the production of high dynamic range (HDR) & digital HDR Read-Out Integrated Circuits (DROICs), improving yields on high density DROICs at on-shore silicon foundries
- Implemented in a variety of Army Programs
- Represents a leap ahead in capability that will enable an integrated, digital imaging battlespace, enabling and enhancing aided target recognition (AiTR), which can be leveraged for future DROICs

Enables an integrated digital imaging battlespace for enhanced target detection through microelectronics component manufacturing capability

ManTech Impact and Benefits:

- Optimized image processing capability to view low and high contrast targets simultaneously
- Increased thermal performance to acquire targets in the presence of battlefield obscurants

PARTICIPANTS

Army ManTech; Army Combat Capabilities Development Command (DEVCOM) C5ISR Center; Program Executive Officer (PEO) for Intelligence, Electronic Warfare and Sensors (IEW&S); Raytheon Vision Systems; DRS; L3Harris, SenSeeker; Skywater; Tower Semiconductor

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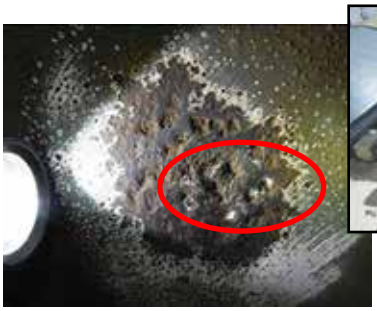
US Army C5ISR Center OPSEC. #A1370 (16 November 2022)

Army ManTech Enables Cold Spray Repair Process Implementation For Weapon System Industrial Base Sustainment

Manufacturing Challenge:

High-hard armor plate on military vehicles is prone to corrosion pitting, which results from prolonged environmental exposure. Repair involves cutting out the armor plate then replacing with a new identical piece which is welded into place is expensive and subject to supply chain delays awaiting the replacement panel. The manufacturing challenge is to mature a cold spray process and material system to fill in the corrosion and meet performance requirements to enable transition to depots for repair and reclamation.



Pitting and corrosion of armor components resulting from environmental exposure

Repairs show using cold spray

HIMARS system

ManTech Response:

- Developed manufacturing processes and replacement material for Rapid Innovation of Structural Repairs using Cold Spray
- Successful application of the Cold Spray repair methodology that was developed under this Cold Spray Army ManTech program was applied more broadly across the Defense Organic Industrial Base (OIB)
- **Army ManTech investment of $3.6M**

ManTech Impact and Benefits:

- Implementation on the Army HIMARS (High Mobility Artillery Rocket System)
- Collaborative relationship with LEAD (Letterkenny Army Depot) to ensure transition of cold spray repairs to the warfighter, and LEAD can also gain from this relationship by increased throughput of vehicle repairs, as well as helping to increase the operational readiness for the warfighter
- Process and test data developed at ARL to repair corroded regions of the Stryker armored vehicle was used to gain approval of a similar repair of corroded steel underneath the grab bar on the cab roof of a HIMARS vehicle used by the Army and Marine Corps
- Documented repair benefits per system ($10K and 6-week lead time) versus replacing ($750K and 12-month lead time)

Approved repair procedures for depots and OEMs for key DoD weapon systems in support of Joint Defense Manufacturing Council (JDMC) Priority for Cold Spray Implementation

PARTICIPANTS

Army ManTech; Army Combat Capabilities Development Command (DEVCOM), Army Research Laboratory; Letterkenny Army Depot

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ARL OPSEC Approved (21 September 2022)

Navy Manufacturing Technology Program Overview

The U.S. Navy Manufacturing Technology (ManTech) is an industrial preparedness program focused on affordability improvements for key naval platforms as well as capability acceleration to get capabilities to the Fleet faster. Navy ManTech works closely with the Program Executive Offices (PEOs), Program Offices, key industry partners, and the Navy ManTech Centers of Excellence (COEs) to identify manufacturing affordability challenges, develop affordable manufacturing technology, and transition that technology to the industry partners for implementation. Once implemented, the developed technology results in substantial affordability improvements – measured as either cost savings or cost avoidance – and strengthens the industrial base.

Organization

Navy ManTech executes through seven COEs, which provide a focal point for the development and transfer of new manufacturing processes and equipment in a cooperative environment with industry, academia, and the Naval Research Enterprise.

- Center for Naval Metalworking (CNM)
- Composites Manufacturing Technology Center (CMTC)
- Electronics Manufacturing Center (EMC)
- Electro-Optics Center (EOC)
- Energetics Manufacturing Technology Center (EMTC)
- Institute for Manufacturing and Sustainment Technologies (iMAST)
- Naval Shipbuilding and Advanced Manufacturing (NSAM) Center

Investment Strategy

Navy ManTech will execute an investment strategy in FY23 – FY27 based on the direction of Office of Naval Research (ONR) leadership and determined by total acquisition funding, stage in acquisition cycle, platform cost-reduction goals, cost-reduction potential for manufacturing, and other factors primarily associated with the ability of ManTech to deliver the technology when needed. Over the next five years, Navy ManTech will continue to improve the affordability of Navy platforms critical to the future force, focusing resources on the VIRGINIA Class Submarine (VCS), COLUMBIA Class Submarine (CLB), DDG 51 Class destroyer, CVN 78 Class aircraft carrier, FFG 62 Class frigate, and F-35 Lightning II aircraft, as well as select manufacturing technology projects that accelerate the delivery of capabilities to the Navy. The seven capability acceleration thrust areas include swarm / unmanned / autonomous vehicle production, HEL weapon systems, advanced submarine fabrication technology, fleet sustainment technology, energetics production improvement, hypersonics fabrication, and manufacturing acceleration of other ONR activities.

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Office of Naval Research PAO Document Control Number: 43-9442-22

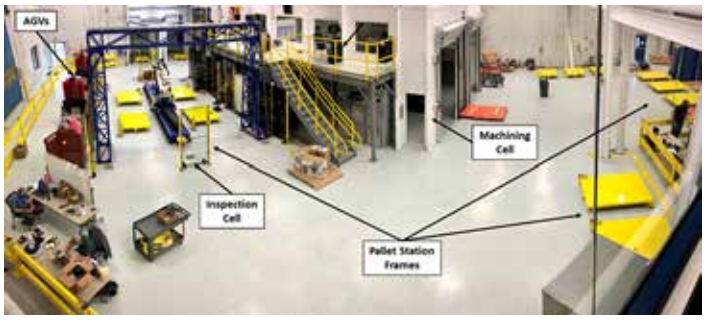
Navy ManTech Develops Flexible Robotic Composites Manufacturing Cell, Saves CH-53K $22.7M

Manufacturing Challenge:

Ramping up production for CH-53K Main Rotor Pylon and Engine Nacelle composite components while maintaining strict production quality standards at an affordable price requires an innovative manufacturing solution. Navy ManTech developed a unique solution to machine and inspect composite components that enabled the Program Office to achieve this goal.

ManTech Response:

- Navy ManTech worked closely with Aurora Flight Sciences, Electroimpact, Naval Air Systems Command, and PMA-261 to bring an innovative approach conceptualized by Aurora Flight Sciences to reality
- Produced and demonstrated a fully functioning FRCMC capable of affordably machining and inspecting CH-53K composite components
- Demonstrated the ability to adhere to strict aerospace tolerances
- **ManTech investment of $3.5M** for development and demonstration of FRCMC, $4.5M investment from PMA-261 for equipment, and significant cost share from Aurora Flight Sciences for facility expansion and upgrades to support FRCMC and development of Production Utilization Planning software



Aurora Flight Sciences implemented the Flexible Robotic Composites Manufacturing Cell (FRCMC) into its production facility beginning in FY22 for the production of CH-53K composite components.

ManTech Impact and Benefits:

- Reduced cost by $22.7M for the CH-53K program alone through reduced touch labor
- Significantly reduced the overall equipment investment required over traditional CNC machining and manual inspection cell configuration
- Offered an additional 50% machine capacity for other program use when CH-53K is at full rate production
- Enabled the inspection of hole diameters via laser tracker scanning – a significant process improvement not possible to perform manually
- Increased available capacity by automating transportation between machining and inspection resources and by not requiring a human to retrieve and load parts/tools, which would require the FRCMC robots to stop work during this process

Navy ManTech's FRCMC project will save $22.7M over the life of the CH-53K program and offers capacity to provide additional costs savings to other DoD programs.

PARTICIPANTS

Office of Naval Research Navy ManTech; Composites Manufacturing Technology Center (CMTC); Naval Air Systems Command, PMA-261; Aurora Flight Sciences; Electroimpact

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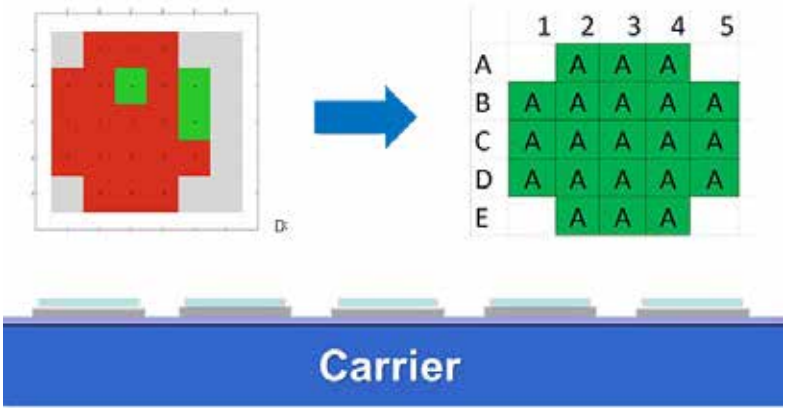
Office of Naval Research PAO Document Control Number: 43-9040-22 (14 September 2022)

Navy ManTech Implements Manufacturing Improvements for F-35 Electro-Optical Targeting System (EOTS) That Will Save $19.2M

Manufacturing Challenge:

F-35 focal plane array (FPA) production involves many processes performed at the individual die level rather than the wafer-processing level. Additionally, final testing of the integrated dewar cooler (IDC) is a manual process with many steps. Navy ManTech introduced die carrier processing and testing automation that will significantly reduce manufacturing costs and enable the F-35 Program to more easily achieve its build rates.



Die carriers facilitate batch processing of detector die. Both the die-to-carrier (DTC) process and the lower vacuum assembly (LVA) test automation developed by Navy ManTech are targeted for implementation at Lockheed Martin Santa Barbara Focalplane in 2023.

ManTech Response:

- Navy ManTech developed and implemented a batch manufacturing process (die-to-carrier) at the FPA level to significantly lower manufacturing costs
- Automated and validated the LVA test station within the IDC assembly manufacturing line
- **Navy ManTech investment of $1.1M**; also leveraged a $600K capital equipment investment from industry

Navy ManTech's streamlined manufacturing process for EOTS production lines provides estimated savings of $19.2M for the F-35 Lightning II Program

ManTech Impact and Benefits:

- DTC process reduces technician training, decreases the potential for human error, and significantly improves throughput
- DTC process reduces FPA touch hours per unit by 33% and significantly lowers manufacturing costs by $9K per unit
- Finding defects at the image test process step – versus at the IDC assembly test process step – saves three weeks of manufacturing time and reduces the cost of rework by 80%
- Automation of the LVA test station increases capacity, throughput, and test detail/analysis capacity and lowers manufacturing costs by $1K per unit

PARTICIPANTS

Office of Naval Research Navy ManTech; the Pennsylvania State University Electro-Optics Center (EOC); Lockheed Martin Santa Barbara Focalplane

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Office of Naval Research PAO Document Control Number: 43-9052-22 (14 September 2022)

Navy ManTech Extends Digital Thread to Shipbuilding to Reduce Costs by Nearly $13M

Manufacturing Challenge:

Recent studies indicate that location identification can account for up to 10% of touch labor costs in shipbuilding. Past R&D efforts that addressed location identification were focused on limited use cases where items were attached to the hull during the short interval when the hull cylinder is empty and in the axis vertical position. Navy ManTech integrated product model data with projection technologies to improve the processes used to locate and install paint masking and hanger stud positions.

ManTech Response:

- Navy ManTech demonstrated the potential of utilizing existing platform product model information in complex ship construction activities
- Developed a software application that automatically queries the CAD model and planning databases for the location and work sequencing data needed to drive projectors
- Developed a mobile optical projection device and software to receive, process, and project CAD and associated product data to optimize key location identification activities
- Integrated paint masking data and mobile optical projection and stud location data with the Total Station system to demonstrate and validate the accuracy and repeatability of the improved process
- **Navy ManTech investment of $1.5M**

Navy ManTech applied digital thread to ship and submarine manufacturing processes used to locate and install paint masking and hanger stud positions. The new process has been implemented at both General Dynamics Electric Boat and General Dynamics Bath Iron Works.

ManTech Impact and Benefits:

- Reduced VIRGINIA (VCS) and COLUMBIA (CLB) Class submarine non-recurring labor requirements to extract submarine stud and paint masking positions from legacy databases by 82% from 21,750 hours to 3,975 hours
- Reduced VCS, CLB, and DDG recurring labor requirements to locate no-paint markup and stud locations by 6.5% from 130,750 hours to 122,322 hours
- Facilitated future efforts to consume existing platform product model data to reduce time and resource requirements of complex shipbuilding activities
- Total five-year savings of $12.9M; reduced hull construction costs by:
  - CLB - $1.7M (non-recurring) and $809K (recurring)
  - VCS - $1.1M (non-recurring) and $501K (recurring)
  - DDG - $510K (recurring)

Navy ManTech applied digital thread to integrate platform product model data with projection technologies for ship and submarine construction and optimized a historically manual process.

PARTICIPANTS

Office of Naval Research Navy ManTech; Naval Shipbuilding and Advanced Manufacturing (NSAM) Center; General Dynamics Bath Iron Works; General Dynamics Electric Boat; Delta Sigma Company

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Air Force Manufacturing Technology Program Overview

Overview

Throughout its 60+ year history, the Department of the Air Force (DAF) ManTech program has played a foundational role in maturing critical technologies and modern business practices for the defense industrial base, including numerically controlled machining, organic matrix composites, and manufacturing readiness levels. DAF ManTech has also worked closely with Programs of Record such as F-16, B-1, F-22, B-2, and F-35 to deliver billions of dollars in acquisition and sustainment cost savings and avoidance. Over the last twenty years, the cost of computing power, data storage, and internet bandwidth have all fallen exponentially, dramatically reshaping the manufacturing sector, and currently, DAF ManTech is at the forefront of the 4th Industrial Revolution (or Industry 4.0), characterized by an infrastructure built on digital manufacturing tools, such as robotics, Industrial Internet of Things (IIoT), and additive manufacturing.

Organization

The DAF ManTech program is managed by the Air Force Research Laboratory's Manufacturing and Industrial Technologies Division within the Materials and Manufacturing Directorate. Sources used to build the program include strategic policy documents, DAF Programs of Record, AFRL's technical directorates and the AFRL Transformational Capabilities Office (TCO), industry roadmaps, the Joint Defense Manufacturing Technology Panel (JDMTP), and Technical Interchange Meetings (TIMs) with government/industry stakeholders. All AF ManTech projects are captured in technology roadmaps that are reviewed throughout the year to ensure alignment with the Warfighter. The program is funded with core 6.3 funds and by leveraging resources of other partners, such as the OSD Manufacturing Science & Technology Program, Manufacturing Innovation Institutes (MIIs), and the Industrial Base Assessment program that is executed on behalf of the Secretary of the Air Force for Acquisition. Finally, the Division also acts as the Defense Production Act Title III Executive Agent Program Office.

Investment Strategy:

Based on both the DoD demand signals and the technology trends driving rapid manufacturing innovations of Industry 4.0, DAF ManTech uses five technology pillars in its investment strategy. Advanced Concepts includes programs that address procurement and sustainment needs of Programs of Record. These programs provide a new capability to the weapons platform or substantial return-on-investment (ROI) in the form of reduced cost and/or increased platform availability. Hypersonic Strike, Attritable & Low-Cost Systems, and Networked C3 Systems generally include enabling technologies that are more pervasive in nature and therefore impact multiple weapons platforms and are often directed at emerging operational capabilities for which there isn't currently a baseline technology. The final pillar, Emerging Technology, includes Biomanufacturing, Quantum Technology, and Directed Energy. ManTech anticipates that each of these areas will provide transformational capabilities to the DAF in the future.

The DAF ManTech investment portfolio also includes two crosscutting emphasis areas, Advanced Manufacturing Technologies (AMT) (TRL/MRL 4-7) and Digital Manufacturing Research (TRL/MRL 2-4). These represent pervasive opportunity areas that deliver capabilities across all the technology pillars at reduced cost and timelines in the high mix, low volume aerospace manufacturing environment. DAF ManTech efforts in AMT and Digital Manufacturing Research heavily leverage the MIIs as well as partnerships with academia and industry to meet Warfighter needs.

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AFRL-2022-5363 (8 November 2022)

AF ManTech Invents CLASP Processing Technology to Save Millions of Dollars in Manual Sanding Labor

Manufacturing Challenge:

Proper surface preparation is critical to achieve a strong bond for structural capacity of composite aircraft parts. Current surface preparation methods use manual sanding that is extremely time consuming and has variability issues, leading to structural integrity uncertainties. Composite Laser Ablation Surface Preparation (CLASP) is a key enabling process that utilizes femtosecond laser and advanced fiber technologies to bring the precision and control of athermal laser ablation to solve rate and variability issues with current "sand to black" methods. The Air Force in collaboration with Northrop Grumman Corporation and UDRI needed to mature the technology and manufacturing readiness of CLASP.

Jared Speltz (UDRI) is demonstrating the transitioned CLASP unit on site in its transitioned state.

CLASP is an athermal ablation process which allows fine control of carbon fiber exposure on Polymer Matrix Composite surfaces.

This ruggedized CLASP cart will act as a precurser to commercial variants, expected to be offered by Albers Aerospace in the next few years.

ManTech Response:

- The DAF ManTech Government/industry team developed and aided in the transition of CLASP technology using constant open communication and a focus on commercialization, transition, and production readiness
- Produced ruggedized Beta production system representative of a commercial product
- Demonstrated 3X rate increase with a roadmap to 100X rate increase
- **DAF ManTech investment of $1.7M** with $3.5M cost share from industry

ManTech Impact and Benefits:

- Achieved 100X increase in surface preparation processing rates (that translates into ~tens of millions of dollars saved per aircraft)
- Automated process results in reduction of technician variability and rework
- In-situ sensing data provides digital thread to processed components

CLASP makes light work of composite preparation with a faster, more reliable athermal laser ablation process

PARTICIPANTS

Air Force Research Lab; University of Dayton Research Institute; Northrop Grumman Corporation; Albers Aerospace

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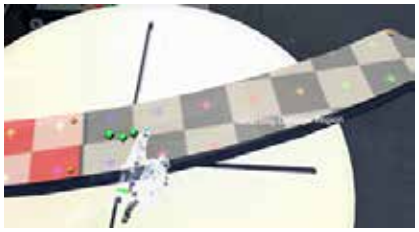
AFRL Case Number: AFRL-2022-4400 (14 September 2022)

Augmented Reality Robot Interface (ARRI) Provides Ten-Fold Cycle Time Improvement for Cold Spray Operations in USAF Depot

Manufacturing Challenge:

Cold spray is a vital manufacturing process for refurbishing worn aircraft components that are no longer commercially available. The cycle time is currently four weeks because each part requires custom robot programming and fixturing. The process requires highly skilled technicians who are difficult to retain and hard to replace.

Cold spray robot installed at Warner-Robins ALC



User "showing" the robot where to apply cold spray

ManTech Response:

- AF ManTech developed an augmented reality robotic interface (ARRI) that allows operators to indicate workpiece location and surface areas of interest through intuitive hand gestures
- Applied ARRI to a cold spray robotic work cell, eliminating the need to write a custom program for each workpiece and create part-specific fixturing
- Demonstrated the cold spray application at Warner-Robins Air Logistics Center, where the first system is in pilot production
- Created ARRI as a general solution that may be applied to any surface processing application
- **DAF ManTech Investment of $1.4M**

ManTech investment created a technology that cuts weeks from cold spray cycle time, eliminates a depot production bottleneck, dramatically increases workforce agility, and reduces sustainment costs

ManTech Impact and Benefits:

- Decreased cold spray cycle time by 90% (from 4 weeks down to 2 days)
- Eliminated a production bottleneck; cuts days from time required to get assets out of the depot and into the warfighter's hands
- Improved workforce agility by reducing cold spray operator training by 90% (from 2 weeks to 1 day)
- Saved $600K per year in depot operating costs
- Warner-Robins Air Logistics Center has ordered 2 additional systems for delivery in 2023

PARTICIPANTS

Air Force Research Lab; Advanced Robotics for Manufacturing Institute; University of Connecticut; Titan Robotics; Warner-Robins Air Logistics Center

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AFRL Case Number: AFRL-2022-4398 (14 September 2022)

DAF ManTech Implements Mid Wave Infrared (MWIR) for Attritable Missions at Lower SWaP and Cost

Manufacturing Challenge:

Current MWIR devices on attritable airborne platforms are unaffordable. Department of the Air Force ManTech partnered with Attollo Engineering to reduce the size, weight, and power (SWaP) and cost of MWIR in order to fit onto Class 2 Unmanned Aircraft Systems (UAS) for attritable airborne platforms at an affordable cost. Attollo used its infrared (IR) sensor manufacturing with integrated dewar cooler assembly (IDCA) packaging expertise to develop video graphics array (VGA) and high definition (HD) MWIR cameras that are the lowest SWaP and cost in the cryocooled IR imaging market.

ManTech Response:

- Through this AF ManTech effort, Attollo introduced a 220-gram MWIR VGA and HD imager including cryocooled packaging for a rugged environment – it is 120 grams lighter than any other competing device
- Introduced the first 5µm pixel MWIR VGA and HD MWIR imagers that have more pixels on target and are contained in the most “SWaPtimized” package in the industry
- In the Griffin VGA5 and HD arena, demonstrated TRL 8/9 products in gimbals that are lighter by 120 grams, have added broadband (1 - 5.2µm) responsivity, and are cost competitive with U.S and foreign sources
- **DAF ManTech investment of $4.2M** with $4M cost share from industry including capital facilitization

ManTech Impact and Benefits:

- By going to the smallest pixel in the industry (5µm) Attollo enabled low-cost focal plane array (FPA) production while maintaining yield throughout the semiconductor fabrication process
- Small pixels enabled shorter focal length, lighter, weight, and smaller optics
- Reduced cost by over 50% from $50K to <$20K in quantities of 50 and above
- Established an in-house packaging IDCA capability while also developing a U.S.-based cryogenic cooler (1 of only 5 vendors in the world)

Enabled enhanced mission capability by reducing cost and SWaP of MWIR for fit into small UAS platforms for attritable and multi-mission airborne and handheld systems

PARTICIPANTS

Air Force Research Lab (AFRL/RX and RY); Naval Research Lab; AFLCMC/WI; Attollo Engineering

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AFRL Case Number: AFRL-2022-4399 (14 September 2022)

DLA Manufacturing Technology Program Overview

The **Defense Logistics Agency (DLA) ManTech program** mission is to develop and deliver new capabilities through applied technologies and innovative solutions to enhance warfighter sustainment. Working with its diverse supply chain, the DLA ManTech Program funds the advanced technology development needed to improve manufacturing capability throughout a product's life cycle. As illustrated, DLA's R&D programs deliver responsive, innovative solutions that improve DoD readiness, support current strategies and operations, and anticipate future logistics and manufacturing needs at lower cost and risk.

MISSION

Develop and deliver new capabilities through applied technologies and innovative solutions to enhance Warfighter sustainment

VISION

Premier Innovators for Global Warfighter Mission Readiness

Logistics Research and Development

Pioneers advance logistics concepts and business processes that use commerical best practices; develops and demonstrates high payoff technologies that can provide improved performance at lower costs

PROGRAMS:

Logistics Technology Research (LTR) formerly known as Weapon System Sustainment (WSS)

Strategic Distribution and Disposition (SDD)

Supply Chain Management (SCM)

Energy Readiness Program (ERP) Acquistion Modernization Technology Research (AMTR)

Manufacturing Technology

Supports technical innovation in the DLA industrial base to improve the operational performance of key supply chains

PROGRAMS:

Advance Microcircuit Emulation (AME)

Battery Network (BATTNET)

Casting PRO-ACT (CASTING)

Forging PRO-FAST (FORGING)

Military Unique Sustainment Technology (MUST)

Subsistence Network (SUBNET)

Defense Logistics Information Research (DLIR)

Additive Manufacturing (AM)

Small Business Innovation Program

Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR)

Through competitive awards-based programs, SBIP funds small business to develop state-of-the-art, innovative solutions to mission critical:

Nuclear Modernization

Supply Chain Innovation

Force Readiness and Lethality

Supply Chain Risk Reduction

Technology Accelerator Team

Rapidly delivers prototype capabilities with design and discovery techniques rather than requirements-based concepts

Strategic Technology Team

Explores and leverages technologies to provide new capabilities to enhance the user computing experience across the agency

Applied Reserach & Testing Emerging Technologies

Provide the technological infrastructure to propel early-stage adoption for emerging and disruptive technologies

DLA ManTech developments provide the crucial link between invention and application by maturing, scaling up, and validating advanced manufacturing technology in "real-world" environments. The program goal is to provide a path to low-risk technology implementation by small businesses, defense unique suppliers, and to the military depots and shipyards. By anticipating and addressing production and sustainment problems before they occur, readiness levels increase, and sustainment costs are decreased.

ORGANIZATION

The DLA ManTech Program is aligned under the Office of the Under Secretary of Defense (OUSD) Acquisition and Sustainment, Assistant Secretary for Sustainment, as the nation's combat logistics support agency. Within DLA's Information Operations (J6), DLA R&D (J68) improves Warfighter support by addressing military needs, internal business processes, and industrial base manufacturing challenges. DLA ManTech works with the Military Engineering Support Activities to conduct annual strategic assessments to identify, and fund needed efforts to meet Warfighter needs.

INVESTMENT STRATEGY

The DLA ManTech program uses two lines of effort (LOE) to guide its investments and research. The first DLA R&D LOE 1, Industrial Base and Aging Weapon System Support, ensures a viable and responsive defense industrial base; addresses obsolescence using trusted manufacturing sources of qualified microcircuits to sustain legacy DoD weapon systems; and introduces advanced manufacturing concepts into the DoD supply chain, for example, by using additive manufactured replacement parts.

The 2nd DLA R&D LOE 2, 3D Technical Data Modernization/Model Based Enterprise Technologies, transforms data into 3D machine usable formats to support DoD's digital modernization efforts for significantly improved readiness. It creates a digital model-based system in which DLA, the military services and industry can streamline the specification of accurate requirements and delivery of high-quality material/end-items throughout the supply chain.

The DLA ManTech program focuses its investments in the following portfolio areas:

(1) Advanced Microcircuit Emulation
(2) Battery Network
(3) Castings/Forgings
(4) Military Unique Sustainment Technology (MUST)
(5) Subsistence Network
(6) Defense Logistics Information Research, and
(7) Additive Manufacturing

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DLA OPSEC # 0199-22 (26 October 2022)

DLA ManTech Improves Quality of Combat Rations for the Warfighter

Manufacturing Challenge:

The DLA Subsistence Network (SUBNET) Program challenge was to improve the quality of combat rations and to provide products that have both a fresh flavor and a home-like appearance. The current combat rations program utilized conventional retort processing, that had a deleterious effect on most food products, rendering them unacceptable upon an organoleptic evaluation. Radio Frequency (RF) sterilization technology was implemented to demonstrate processing of two shelf stable food products (apple dessert and pasta with alfredo sauce) with improved quality.

RF pilot unit at Microwave Materials Technology facility

ManTech Response:

- DLA SUBNET program demonstrated RF-processed products are superior to traditional retorted items
- Performed heat penetration studies to determine cold spots on a 420-gram rectangular tray
- Validated RF technology meets regulatory requirements for two food items with the FDA
- Produced 280 samples for field trial through RF technology and 280 samples of conventional retort for comparative analysis to quantify the benefits and prove the quality of the RF is best for the Warfighter
- Shipped and distributed field trial samples to U.S. Army Natick Combat Feeding for testing
- **ManTech investment of $249,000** and $175,000 cost share from industry

Comparison of processing methods for apple dessert and pasta with alfredo sauce

ManTech Impact and Benefits:

- Developed shelf stable products not currently available with industrial food processing technologies
- Reduced duration of food products' exposure to high processing temperatures by 50%
- Reduced processing time for combat rations by an estimated 20%
- Vastly improved food products appearance, texture, and flavor due to reduced process time
- Led to the development of a commercial RF sterilization unit to integrate these products into the DoD supply chain

Improved combat ration quality through reduced processing time and reduced exposure to high heat

PARTICIPANTS

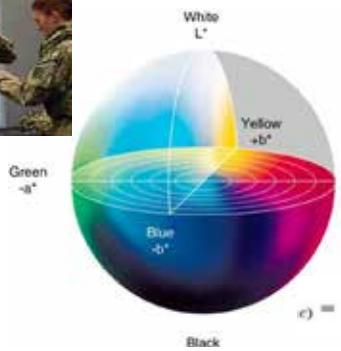
DLA ManTech; AmeriQual Foods; US Army Combat Capabilities Development Command – Soldier Center; Combat Feeding, Microwave Materials Technology

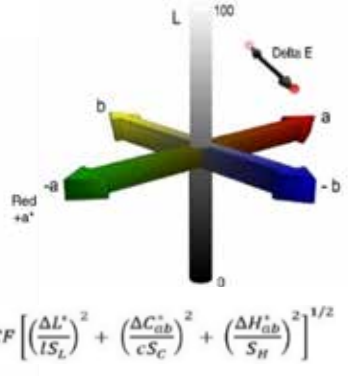
DISTRIBUTION STATEMENT A. Approved for public release.
DLA OPSEC #0200-22 (2 November 2022)

DLA ManTech Improves Joint Process Coordination of Technical Requirements for Military Uniforms and Combat Equipment

Manufacturing Challenge:

The DLA Military Unique Sustainment Technology (MUST) Program is responsible for communicating and managing the military uniform and combat equipment technical requirements among the military services and the defense industrial base. Currently, there is no common environment for collaborating on new requirements among joint stakeholders. The existing platform uses Microsoft Word documents published as Adobe PDFs that are not conducive to the collaborative processes. MUST needs to modernize its technical data using knowledge-based technologies to reengineer the joint processes for: (1) clothing and textiles (C&T); and (2) the DLA Product Testing Center (PTC).





$$c) = CF\left[\left(\frac{\Delta L^*}{lS_L}\right)^2 + \left(\frac{\Delta C^*_{ab}}{cS_C}\right)^2 + \left(\frac{\Delta H^*_{ab}}{S_H}\right)^2\right]^{1/2}$$

Supply Request Package (SRP) Tool

ManTech Response:

DLA MUST developed, tested, and deployed a tool that provided the DLA C&T program and the military services with a single point of communication for new military uniform and combat equipment introduction into DLA sustainment with:

- Secure access via single sign-on user authentication
- Tailored workflows to automate the transfer of information to coordinate review and approval
- Management reports for accessibility, visibility and traceability from industry

ManTech Impact and Benefits:

- Improved productivity
- Enabled joint transparency in SRP progress
- Easily identified process delays or bottlenecks

Science-based Shade Measurement and Quality Test Reports

ManTech Response:

DLA MUST leveraged and adopted commercial manufacturing digital data tools and practices for DLA's PTC – an analytical lab to automate documentation, reporting, and review of shade measurement test data.

ManTech Impact and Benefits:

- Automated review and analysis of test results
- Streamlined the test reporting and review process for increased supply chain production efficiency
- Greatly reduced the amount of non-conforming test lots submitted to PTC for evaluation

MUST supports the Warfighter by strengthening the DLA clothing & textile and individual equipment supply chain

PARTICIPANTS

DLA ManTech; DLA Troop Support Clothing & Textiles (C&T); LMI

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DLA OPSEC # 0206-22 (2 November 2022)

DLA ManTech Demonstrates Ceramic Coatings in Forging Furnaces to Reduce Cost and Lead Time

Manufacturing Challenge:

Fuel and operating costs are a large portion of the price for forged parts manufactured in a forge shop. This includes the cost of energy to pre-heat the billets of material prior to forging and the heat treatment after forging. Furnace efficiencies play a big role in these costs. New reflective ceramic coatings installed on the inside of a forging furnace may provide potential cost savings and need to be evaluated and compared to an uncoated furnace.

Forging furnace with old and badly devitrified ceramic fiber lining

Fully coated forge furnace with ITC 100HT ceramic lining

ManTech Response:

- Installed reflective ceramic coatings on the interior of several sizes of forging furnaces
- Determined and measured key metrics on effectiveness of a ceramic coated furnace compared to an uncoated or devitrified furnace. Metrics included:
  – Energy cost
  – Heat recovery times (from open to closed door – back up to temp)
  – Lead times
  – Quality of forged parts
- **DLA R&D investment: $717,000** with a cost share of $50,000

ManTech Impact and Benefits:

- Obtained fuel savings of 25% – 60%
- Decreased heat recovery time by 40% – 65%, (e.g. 25 vs. 9 mins.)
- Reduced manufacturing lead time due to shorter reheating times or heat recovery times
- Obtained higher quality forgings due to uniform heating of the unforged billets
- Prolonged furnace life
- Reduced part cost by lower operating costs

Decreased fuel costs by 25% and reduced furnace recovery time by 40%

PARTICIPANTS

DLA ManTech Forging Program; ITC Coatings; Advanced Technology International

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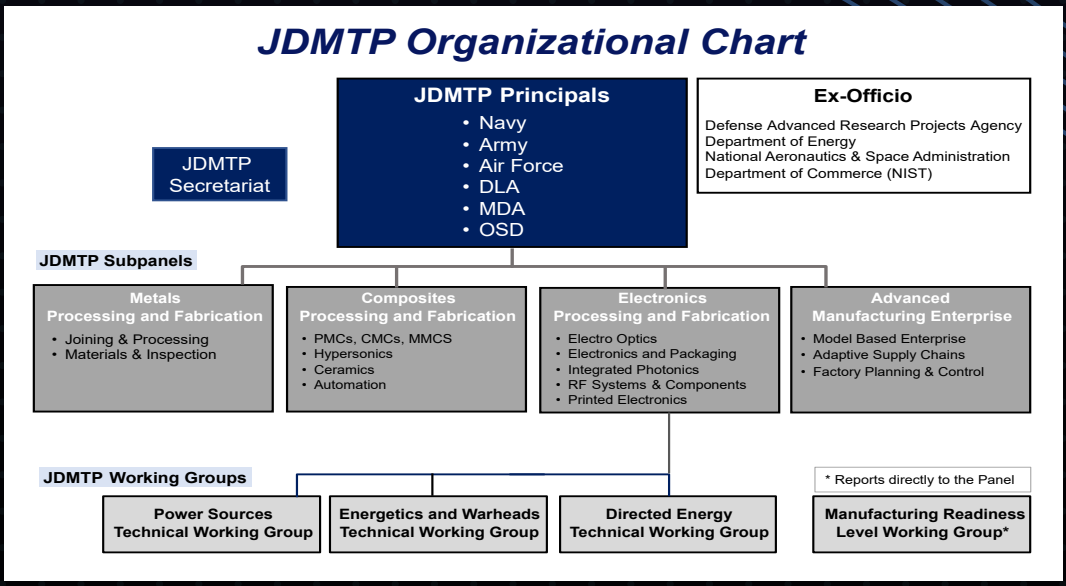
DLA OPSEC # 0201-22 (2 November 2022)

2022 DoD Manufacturing Technology Strategic Plan

To ensure technological superiority of our Armed Forces and to maximize readiness, the Department of Defense relies on the DoD Manufacturing Technology (ManTech) program to provide an innovative, agile, resilient, responsive, and affordable industrial base. Every 5 years, as Chief Technology Office for the Department, the Office of the Under Secretary of Defense for Research and Engineering (OUSDR&E), is required by Congress to develop a five-year Manufacturing Technology (ManTech) Strategic Plan in response to Section 238 of the National Defense Authorization Act (NDAA).



The OUSDR&E prepared the strategic plan in close collaboration with the Joint Defense Manufacturing Technology Panel, which is comprised of ManTech Program leadership from each Military Department and participating Defense Agency that executes the ManTech program.

The current JDMTP Principals provided input to the strategic plan on their manufacturing programs within the Army, Navy, Air Force, Defense Logistics Agency, Missile Defense Agency, and the OSD Manufacturing Science & Technology Program (MSTP). In addition, the four JDMTP subpanels (illustrated above) also provided input on their activities and thrust areas: metals, composites, electronics, and advanced manufacturing enterprise.

This year's plan establishes a distinct strategy, vision, and mission for the ManTech Program. The strategy addresses our Nation's ability to produce the needed parts and systems for the Military, the need for healthy and secure supply chains, and the skills needed by the U.S. manufacturing workforce. The Strategic Plan focuses the ManTech Program efforts on four thrust areas for the next five years that support the joint ManTech enterprise. These thrust areas, which are outlined on the next page, focus on responsive and effective delivery of high-priority solutions across the portfolio of manufacturing technology investments to meet broader defense manufacturing needs.

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DOPSR #22-S-0352 (7 November 2022)

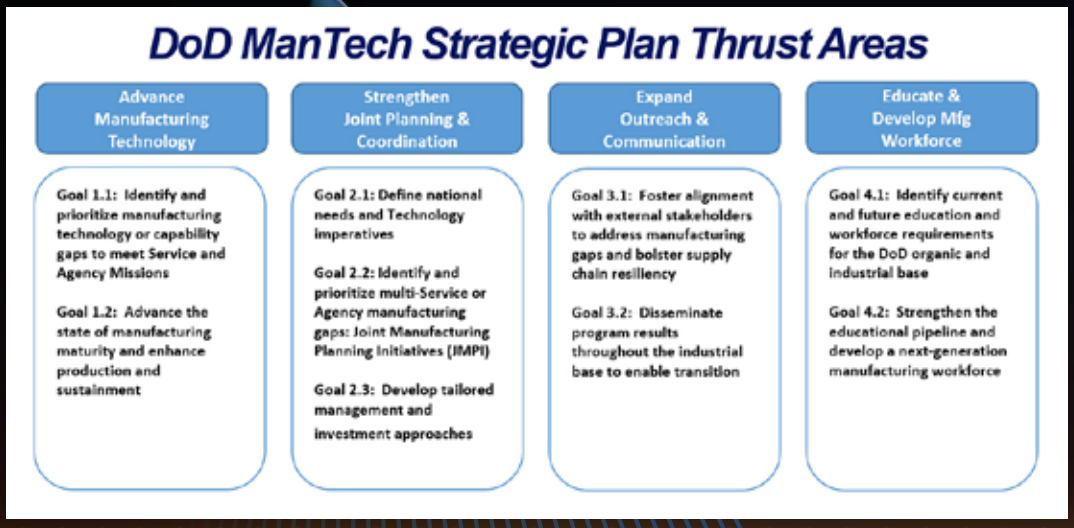
2022 DoD Manufacturing Technology Strategic Plan Thrust Areas

Thrust 1: Advance Manufacturing Technology – ManTech Programs identify manufacturing gaps associated with either transitioning novel technology into developmental systems or improving the existing production and sustainment capabilities.

Thrust 2: Strengthen Joint Planning & Coordination – Strategic coordination combines individual Service requirements into joint manufacturing technology roadmaps that highlight overlaps and gaps, ultimately defining joint investment initiatives.

Thrust 3: Expand Outreach & Communication – ManTech will collaborate with external partners to close manufacturing gaps, improve supply chain resiliency, and increase program effectiveness.

Thrust 4: Educate & Develop the Manufacturing Workforce – ManTech will both directly invest in manufacturing education and workforce development and engage with universities, community colleges, and vocational technical schools to deliver advanced skills.



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DOPSR #22-S-0352 (7 November 2022)

MDA Manufacturing Technology Program Overview

Overview

The mission of the Missile Defense Agency's (MDA) Manufacturing Technology (ManTech) Office is to address manufacturing challenges to reduce cost, improve manufacture cycle time, increase performance, and accelerate development of MDA weapons systems and support future production requirements emerging from science and technology programs. The MDA ManTech Program matures advanced technologies and evolves missile defense capabilities through research and development testing and demonstrations, and enhances manufacturing technologies for insertion into missile defense systems. MDA's ManTech Program partners with the Office of the Secretary of Defense (OSD) and other DoD Services and Agencies on projects whenever possible to reduce cost and risk. Additionally, MDA's ManTech Council executes its mission by collaborating with MDA program executive offices, directorates, and its Science and Technology Council, which is chartered to identify and develop technologies that enable future capabilities.

Organization

The Missile Defense Agency ManTech program is managed by the Industrial Manufacturing Technology office which is aligned under the Innovation, Science and Technology Directorate. It supports manufacturing requirements across the MDA portfolio through the ManTech Council which is made up of representatives from the program offices, the MDA S&T Council, the Technology Maturation department, the Chief Engineer's office, and the Quality Safety and Mission Assurance Office. The ManTech program works closely with the Technology Maturation department to advance the MRL of new technologies being developed by MDA.

Investment Strategy:

MDA invests in manufacturing technologies that will directly benefit the Integrated Missile Defense System. This includes ManTech projects which: advance the MRL of new technologies to the point where they can be incorporated into programs of record, reduce cost or production time for critical system components, and reduce the environmental impact of producing, fielding and disposing of equipment.

MDA ManTech is currently investing in the following areas:

- High Temperature Materials
- Thermal Protection Systems
- Directed Energy Enabling Technologies
- Hypersonics
- Increased Toughness of Composite Materials
- Flexible Hybrid Electronics
- Nondestructive Evaluation Methods
- Additive Manufacturing

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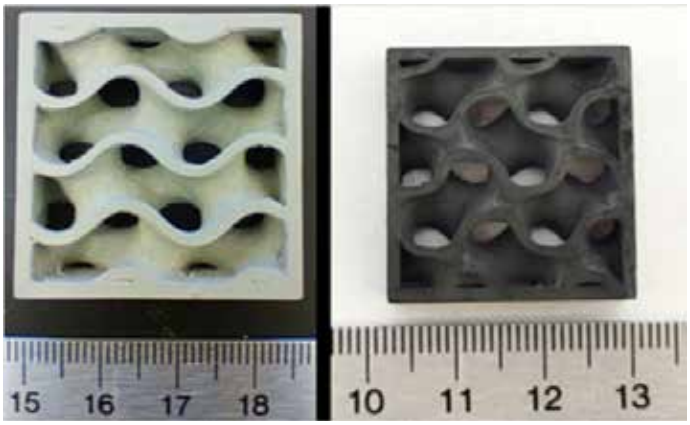
22-MDA-11309 (7 Nov 22)

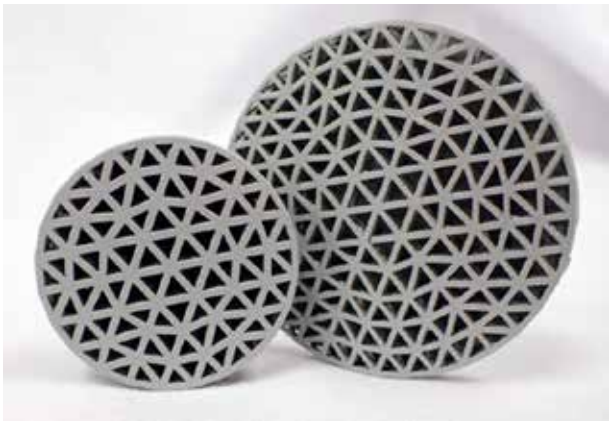
ManTech Supports Additive Manufacturing of SiC Composite Structures for Hypersonics

Manufacturing Challenge:

Previous versions of SiC precursor resin for 3D printing retained too much oxygen after curing, resulting in amorphous SiC with a low melting point. The performer needed to refine the formula to produce a UV curable resin for 3D printing SiC and incorporate reinforcing particles to provide high strength at elevated temperatures. The resin needed to balance high UV curability with low residual oxygen.



Representative green printed and pyrolyzed part



Lattice reinforced disk

ManTech Response:

- MDA Technology Maturation facilitated development of a new resin and print process for producing reinforced crystalline SiC structures
- Performer produced SiC precursor resin with whisker reinforcements
- Resin improvements increased the operational temperature by 8% above previous formulations

ManTech Impact and Benefits:

- New capability to 3D print complex, crystalline SiC parts with high strength at elevated temperatures
- Maximum operational temperature increased by 8% vs previous resin formula
- Rapid production of complex SiC structures for high temperature applications with lattices, internal plumbing and/or printed near net shape parts
- Greatly reduced production time and cost vs. Chemical Vapor Deposition and milled SiC components

Developed and demonstrated whisker reinforced resin for printing high temperature SiC parts

PARTICIPANTS

MDA Industrial Manufacturing Technology; HRL, Inc.

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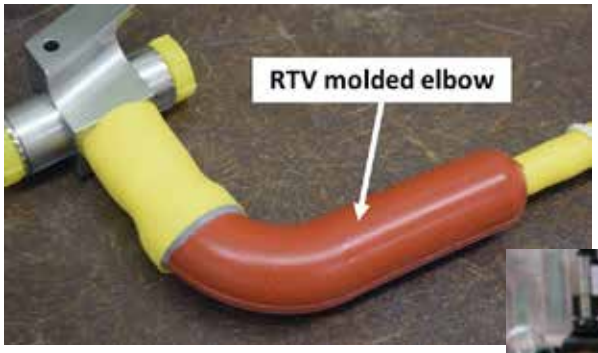
22-MDA-11259 (9 Sep 22)

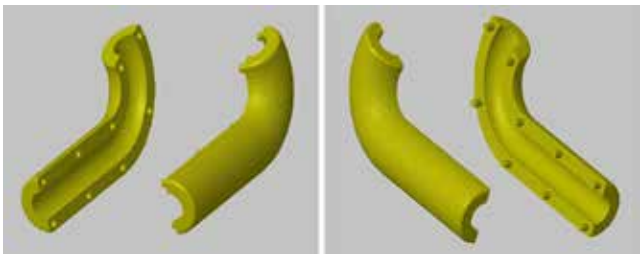
MDA SUCCESS STORY

Successful Insertion of Additive Manufacturing Yields Benefit to MDA Systems

Manufacturing Challenge:

Additive Manufacturing (AM) offers potential benefits to the industrial supply chain by increasing system flexibility, capacity, and efficiency. Insertion of Additive Manufacturing (AM) into MDA hardware systems is a challenging task, requiring high rigor to ensure system reliability for the Warfighter. MDA and Lockheed Martin successfully identified an appropriate use-case, developed the AM solution, and, pending successful Manufacturing Process Verification and First Article Inspections, will be the first use of AM on flight hardware for the Agency. The effort included manufacturing and materials assessments, material property validation, rapid prototyping, and Design Verification Testing. This is a significant accomplishment for the Lockheed Martin team and the MDA Terminal High Altitude Area Defense (THAAD) program office.





ABOVE: Representative transfer line assembly produced without using AM

RIGHT: Materials validation testing

UPPER RIGHT: Final design models

FAR RIGHT: Fused Deposition Modeling AM rapid prototype components

Inserted the MDA's first use of AM on flight hardware, overcoming a significant hurdle through manufacturing verification and component qualification

ManTech Response:

- Lockheed Martin conducted trade studies to identify initial AM solution candidates, assess replacement options, weigh manufacturing methods, and identify suitable materials
- Performed material properties validation testing
- Utilized AM for rapid prototyping
- Performed Design Verification Testing to demonstrate design performance

ManTech Impact and Benefits:

- Removal of extensive curing time associated with Room-Temperature Vulcanizing Silicone
- Increased production rate (no longer tooling-set dependent)
- Up to 30% reduction in rework based on initial data

PARTICIPANTS

MDA Industrial Manufacturing Technology

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22-MDA-11265 (14 Sep 22)

Manufacturing Science & Technology Program Overview

Overview

The OSD Manufacturing Science and technology (MSTP) Program focuses on cross-cutting defense manufacturing needs – those that are beyond the ability of a single service to address – and stimulates the early development of manufacturing processes and enterprise business practices concurrent with science and technology (S&T) development to achieve the largest cost-effective impact and to facilitate the developments enabling capabilities to our warfighters. The program focuses heavily on satisfying the manufacturing technology needs for the DoD's critical technology areas including: trusted artificial intelligence and autonomy, biotechnology, integrated network systems-of-systems, directed energy, microelectronics, quantum science, hypersonics, space technology, renewable energy generation and storage, advanced computing and software, human-machine interfaces, future generation wireless technology (FutureG), advanced materials, and integrated sensing and cyber.

Organization

The OSD MSTP Office is located within the Technology and Manufacturing Industrial Base (TMIB) directorate of Strategic Technology Protection and Exploitation (STP&E) in the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)). The program office has three main organizational components: the Manufacturing Science and Technology Program (MSTP), the Manufacturing Innovation Institutes (MIIs), and Manufacturing Education and Workforce Development (M-EWD) in which the M-EWD team is collaborating across the DoD, the MIIs, and other Federal agencies to develop a National Manufacturing Workforce Strategic Framework for manufacturing education and workforce development.

Investment Strategy

The OSD MSTP focuses its research and development investment portfolio on cross-cutting defense manufacturing needs using a set of identified joint, defense-critical, and sometimes high-risk manufacturing technology areas. JDMTP helps identify the defense manufacturing technology gaps and assists OSD MSTP in determining potential joint investment opportunities. OSD MSTP then assesses these opportunities against R&E critical technology areas and then issues a call for project proposals that must feature a Governmental office lead. Project tenets must include:

- DoD Enterprise-wide issues
- Joint service applicability
- Enhances manufacturability and producibility of a process or component
- Beyond reasonable and normal industry and program office risk
- Requirement is defense-essential or defense-unique

Technology transition and joint-service or multi-system application are key factors in selecting OSD MSTP projects. All potential OSD MSTP projects are required to have a clear technology transition plan and target along with endorsement from the potential project team's program office. Funding is typically a combination of OSD MSTP investment, component ManTech program investments, program office or transition office investments, and industry investment cost share. Additionally, technical experts are recruited from the DoD Services or Agencies to serve as government program managers and are responsible to support technical execution, conduct financial management, and ultimately transition the technology to fielded systems.

The MSTP investment portfolio is broken down into 4 categories: Advanced Electronics and Optics, Advanced Materials and Manufacturing, Enterprise and Emerging Processes, and Advanced Energetics Manufacturing.

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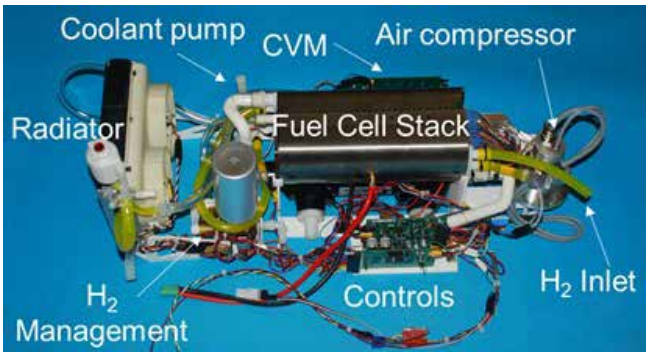
DOPSR #22-S-0352 (7 November 2022)

ManTech Supports Domestic Production of Lightweight Hydrogen Fuel Cells for UASs

Manufacturing Challenge:

The DoD has a critical need for increased power and endurance for persistent Intelligence, Surveillance, and Reconnaissance (ISR) and transmission of radio frequency (RF) sources for communications and targeting. Commercially available hydrogen fuel cells for unmanned aerial vehicles (UAVs) have inadequate performance for military use. There is presently no U.S. vendor that makes a lightweight fuel cell on the order of 1-3 kilowatts, leaving a key manufacturing technology gap that prevents RF surveillance by fuel-cell powered unmanned aerial systems (UAS).

Completed fuel cell design



Initial prototype design

ManTech Response:

- OSD ManTech leveraged the Office of Naval Research (ONR) investment in a Navy-owned prototype fuel cell system
- Teamed with Northwest UAV, the industry leader in tactical UAS propulsion systems to turn the Navy's prototype into a product
- Built 5x beta test systems in production relevant environments
- Validated cost models in terms of systems trades and component lifetimes
- **MSTP investment of $3.8M**, plus ONR funding of $1.8M, and industry cost share of $1.5M

Domestic source of lightweight hydrogen fuel cells provide long endurance, quiet electric power solution at a decreased cost for Group 2 UASs

ManTech Impact and Benefits:

- Provided 4-8x endurance over batteries
- Demonstrated 10x operating cost advantage over heavy fuel engines
- Decreased 10x decreased audible signature by 10x over combustion engines
- Enabled quick start capability of <1 second
- Offers possibility for energy harvesting and persistent logistics
- Leveraged automotive approach and supply chain ($3B+ investment)

Transition/Implementation Program:

- Design work for H2 Stalker integration is underway
- Flight with MSTP fuel cell was held in April 2022
- Other transition targets include Group 3 UAS and Multi-Day UAS

PARTICIPANTS

OSD MSTP Program; United States Naval Research Laboratory; Northwest UAV

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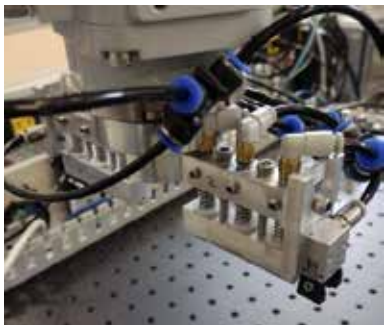
DOPSR #22-S-0352 (7 November 2022)

OSD MSTP and Navy Successfully Automate Assembly of Laser-Welded Fiber-Optic Assemblies at Reduced Cost

Manufacturing Challenge:

High Energy Laser (HEL) Directed Energy Weapons are the U.S.'s leading technology against the rising threats of drone and boat. Current HEL technology has high size, weight and power (SWaP) requirements that are not compatible with mid-to-small scale aircraft or mobile ground platforms. HEL construction time is currently greater than 9 months per unit because the photonic phased arrays in the HEL laser system have an ultra-high number of optical fibers (at least 1,000 per device) that are currently aligned by hand in a lab environment by subject matter experts (SMEs). This demands significant time and cost, and an automated manufacturing process was needed.

Finished manufacturing cell



Close up view of fiber placement tooling

ManTech Response:

- OSD MSTP worked with the Navy to develop an automated manufacturing approach that completely removes SMEs from the assembly process
- Fibers are were robotically aligned and permanently laser welded to a glass substrate using a CO2 laser
- Reduced size and complexity of spectral beam combiner design for alternate fielding capabilities
- **MSTP Investment of $5.4M**, NAVAIR SBIR funding of $2.6M, Directed Energy Joint Transition Office funding of $2.1M and industry cost share of $1.6M

ManTech Impact and Benefits:

- Offers automated and reduced cost to any platform that benefits from a phased array:
  - F35, MALD, LCAAT, tankers, electronic warfare (EW) platforms, JIDO standoff improvised explosive device (IED) detection and Army stand-alone systems for sensing in DVEs
- Benefits included:
  - Reduction in system manufacturing costs, less labor, and faster mmW imager production
  - Enabling technology for HEL Weapons Systems and improved reliability
  - ROI is $10M for 50 sensors per year with an investment of $5.6M

Newly-established automated assembly process for manufacture of laser-welded fiber optic assemblies provides enabling technology for HEL at lower cost

PARTICIPANTS

OSD MSTP Program; NAVAIR PEO (U&W) and PMA(242); NAVAIR Chief Technology Officer; Naval Air Warfare Center (China Lake); RAM Photonics

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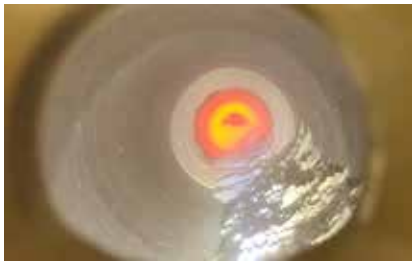
DOPSR #22-S-0352 (7 November 2022)

MSTP Ensures Domestic Source of Critical Magnesium Oxide (MgO) Binder Replacement for Thermal Batteries

Manufacturing Challenge:

Thermal batteries provide power to missiles and munitions, and they need Magnesium-Oxide (MgO) as a critical binder in the battery separators. Only some types of MgO can be used in batteries, and the manufacturing of high quality MgO (Maglite S) halted in the 1980s. Current MgO sources of supply are primarily obtained from offshore sources and are either unsuitable for thermal battery use or provide a material with lower performance and manufacturing yield.



MgO calciner tube

Filled and packaged MgO material

ManTech Response:

- The OSD MSTP funded Qynergy to develop a MgO binder material ("GoMax") that outperforms currently available binder materials used by the thermal battery industry
- Qynergy acquired and installed necessary equipment to scale-up the manufacturing process of GoMax MgO material
- U.S. Army conducted material characterization, testing, assessment of the of the scaled manufactured GoMax MgO to confirm scaled consistency and performance
- By scaling up production, a steady, uninterrupted domestic supply of this critical thermal battery material was established
- **MSTP Investment of $1.5M**, Army DEVCOM Armaments Center funding of $0.170M, Navy NSWC Crane funding of$0.150M and industry cost share of $0.100M

ManTech Impact and Benefits:

- Overcame a serious manufacturing challenge that has proven historically difficult for the thermal battery industry to overcome
- Ensured a steady supply of a critical, U.S.-manufactured, qualified MgO material needed to fabricate thermal batteries
- Improved MgO material "GoMax" directly translates to enhanced thermal battery performance, enabling longer mission life and higher weapon power levels needed for next generation munitions and missiles
- Without this success, the DoD would have continued to suffer effects from an uncertain supply chain for this critical material, and be forced to use other inferior MgO binders

GoMax will prevent "mass requalification" costs going forward, and its cost is projected to be even more competitive with other current sources of MgO on a cost/ performance basis

Transition/Implementation Program:

- Goal is to incorporate GoMax for its performance capabilities at battery design verification stage
- ONR AMPS project remains viable pathway to near-term advanced thermal battery technology transition
- Other transition targets include unmanned aircraft systems (UAS)

PARTICIPANTS

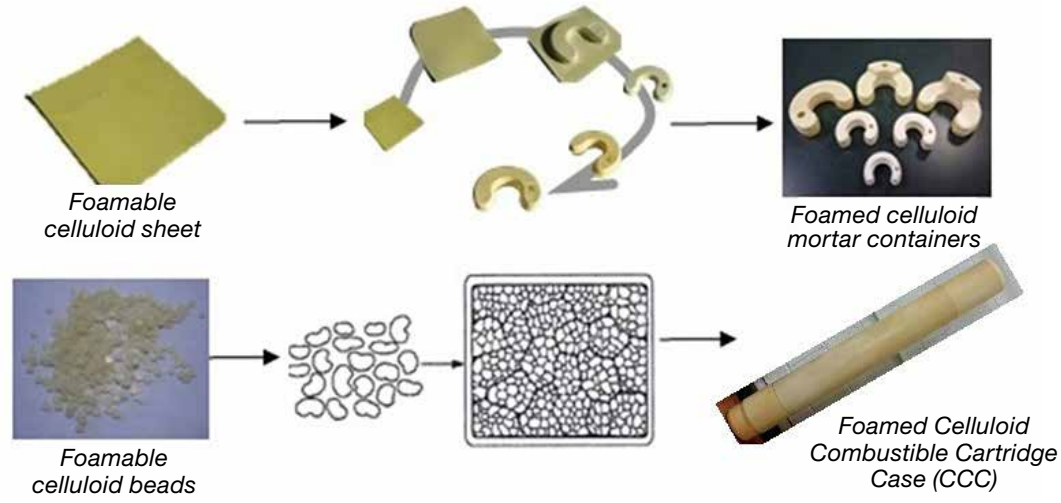
OSD MSTP Program; Army Combat Capabilities Development Command (DEVCOM) Armaments Center; Naval Surface Warfare Center Crane Division; Qynergy

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
DOPSR #22-S-0352 (7 November 2022)

MSTP and Army Establishes Domestic Source of Precursor Foamable Celluloid Materials to Enable Combustible Components for DoD Munitions

Manufacturing Challenge:

Current foamable celluloid combustible materials are not manufactured within the National Technology Industrial Base (NTIB), and instead are manufactured in non-qualified countries.



ManTech Response:

- The Army DEVCOM Armaments Center (AC) collaborated with its industry and academia partners to develop a safe, environmentally friendly and semi-continuous processes to manufacture precursor, foamable celluloid materials at lower manufacturing cost
- NTIB source established for foamable celluloid sheets using an optimized blocking method
- NTIB source established for foamable celluloid beads using an optimized traditional propellant manufacturing processes

ManTech Impact and Benefits:

- Reduced weight of the combustible casings by 50-70%
- Eliminated field recovery requirements of metal cartridge cases
- Improved insensitive munition (IM) properties in both tactical and logistic configuration
- Potential reduction in hazard classification to mitigate environmental risk for transportation and handling
- Potential annual savings of $3.16M for 120mm mortar increment containers with a payback period of 3 years

Transition/Implementation Program:

- Mortars, Tank, Artillery (e.g. ERCA, MACS, 105mm and 120mm tank rounds, and US Navy 5 inch rounds)

Established an NTIB source of foamable celluloid materials (sheets and beads) at reduced cost for mortar increment containers and other large caliber cartridge cases

PARTICIPANTS

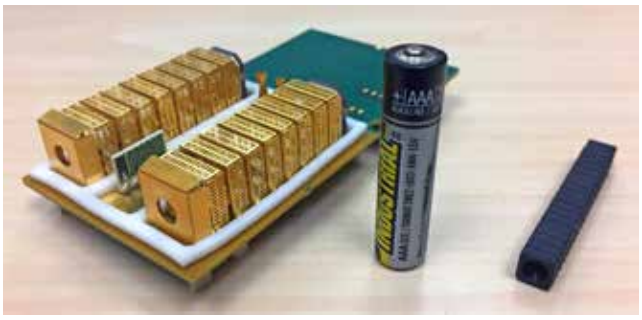
OSD MSTP Program; Army Combat Capabilities Development Command (DEVCOM) Armaments Center; General Dynamics – Valleyfield, Canada; Polymer Processing Institute

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
DOPSR #22-S-0352 (7 November 2022)

DLA and Army Prototype "On-Demand" Additive-Manufactured Replacement Parts for Next Generation Chemical Vapor Detectors

Manufacturing Challenge:

Chemical vapor detectors (CVDs) based on ion mobility spectrometry (IMS) are widely deployed to detect and identify chemical warfare agents, explosives, and pharmaceutical based compounds. The critical component within IMS-based devices is the ion drift tube, consisting of multiple materials and subcomponents including conductive electrodes, ion gates, and a Faraday plate, all separated by insulators. Deployment and replacement of CVDs is heavily dependent on supply chain logistics that currently have vulnerabilities. Additive Manufacturing (AM) of replacement parts enables the next generation of CVDs to be generated on-demand at the time and place of need and needed to be demonstrated.



Drift tubes of current IMS-based CVD

Completed large print-in-place drift tube

ManTech Response:

- DLA and the Army DEVCOM Chem-Bio Center 3D printed an IMS drift tube in a single process (termed "print in place") using multi-material fused deposition modeling (FDM)
- The print in place drift tube doesn't require the assembly of subcomponents and is functional upon dissolution of internal support structures
- Demonstrated suitability of AM to produce key components for CVDs
- Electrical signal and spectra successfully acquired from print-in-place drift tube
- Performance of larger prototype currently matches smaller handheld detectors
- **DLA ManTech investment of $500K**

Demonstrated AM capability to develop next generation CVDs, reduce costs, and fabricate detection capabilities on-site and on-demand

ManTech Impact and Benefits:

- Demonstrated AM fabrication process to be accurate
- Enabled rapid prototyping and miniaturization of CVDs by using AM
- Simplified detector assembly (with minimal training) with the use of print-in-place capability
- Reduced cost to pennies for 3D-printed parts
- On-demand CVD can be "mix-and-matched" with multiple separation and identification capabilities in a single CVD

PARTICIPANTS

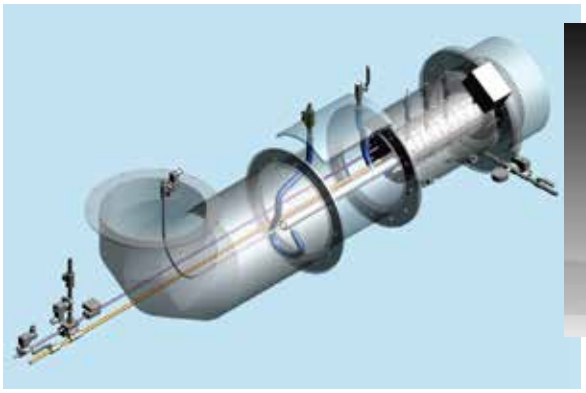
DLA ManTech; Army DEVCOM Chemical Biological Center

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
DLA OPSEC # 0204-22 (2 November 2022)

DLA and Army Improve Domestic Production of Low Cost CFx for Non-Rechargeable Lithium Batteries

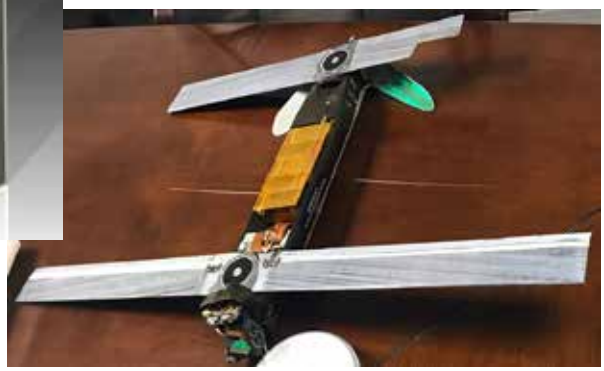
Manufacturing Challenge:

Carbon Monofluoride (CFx) is an improved active material for hybrid Lithium primary batteries, like the BA-5790. CFx is produced with a limited supply base, using outdated, inefficient batch processes that depend on a foreign-sourced specialized coke. This results in high material costs. Due to the high cost of CFx, the unit cost of the BA-5790 is 1.5x the cost of BA-5390 and 2.5x the cost of BA-5590.



Schematic of the reactor developed to synthesize CFx powder

Slice image of D-size battery cell used in BA-5790



U.S. Army's UAV which uses high-power form-factored Li/CFx battery

ManTech Response:

- DLA SBIR and BATTNET programs and the Army C5ISR (Power Division) collaborated to develop and optimize domestic production of low cost CFx
- Significantly improved the supply and decreased the cost of CFx, essential to a variety of military and commercial applications
- Engaged industry to characterize, test, and process cheaper, more stable sources of domestic coke, to process higher quality, non-aggregated CFx, and to develop process efficiencies that significantly lowers CFx cost

ManTech Impact and Benefits:

- Improved manufacturing efficiency and product quality while providing higher performing, domestically produced material
- Expanded the use of Lithium CFx batteries that are 8% lighter, last 30% longer, maintain a 15-year shelf-life, and operate efficiently in a wider temperature range under robust discharging
- Reduced material cost
- The CFx manufacturing process has expanded domestic graphite processing capabilities
- New battery initiatives with Army DEVCOM Aviation and Missile Center (AvMC), a DOD Battery Prime

Lower cost, high performance CFx for military batteries

PARTICIPANTS

DLA Small Business Innovation Research (SBIR); DLA BATTNET; American Energy Technology Company; Army C5ISR Center

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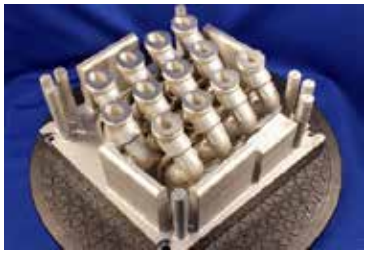
DLA OPSEC # 0203-22 (2 November 2022)

DLA and Army ManTech Demonstrate Additive Manufacturing (AM) Capability to Respond to Supply Shortages

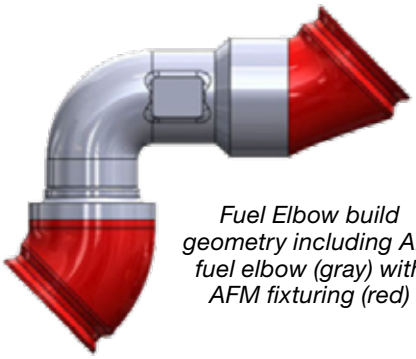
The Challenge:

Quality escapes due to manufacturing issues are a serious problem for defense systems with limited sources of supply. Supply shortages driven by these manufacturing issues can seriously limit mission capability. Additive manufacturing provides the capability to rapidly manufacture parts to mitigate these supply issues. DLA and the US Army Program Management Office Utility Helicopters recently encountered such an issue with a 90 degree fuel elbow used on the UH-60 Black Hawk Helicopter.

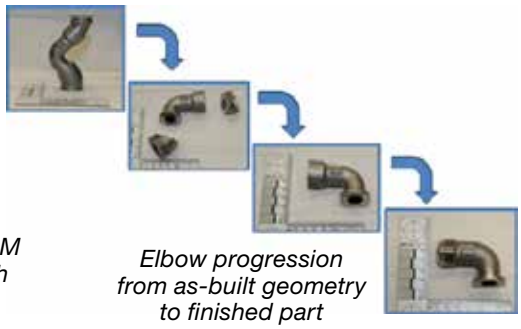
- Over-drilling of the internal passageway by the original equipment manufacturer (OEM) led to a shortage of the elbows across the industry.
- The resolution requires a manufacturing process change: To prevent similar manufacturing issues to the OEM, drilling operations for internal diameter/surface finish should be avoided.



Additive manufacturing build plate including 12 AM fuel elbows with abrasive flow machining (AFM) fixturing as well as tensile/fatigue/microstructure coupon preforms



Fuel Elbow build geometry including AM fuel elbow (gray) with AFM fixturing (red)



Elbow progression from as-built geometry to finished part

ManTech Response:

- DLA and Army designed, built, and tested AM fuel elbows via laser powder bed fusion using 316L feedstock in order to exercise the Airworthiness Qualification Process for AM parts with the end goal of a limited airworthiness release and flight test of AM fuel elbows on the UH-60 planned in FY22
- Produced AM fuel elbows with the intent of meeting requirements of MS20762-12
- Demonstrated the design flexibility of additive manufacturing to rapidly mitigate supply chain issues
- **ManTech Investment: $400K**

Demonstrated AM capability to supplement the traditional supply chain while mitigating quality issues associated with AM parts

Impact:

- Demonstrated the capability to use AM to rapidly design and fabricate parts to supplement the traditional supply chain
- Exercised the Airworthiness Qualification Process for AM parts in order to streamline the process for future parts
- Authored Society of Automotive Engineers Aerospace Material Specifications (SAE AMS) for 316L laser powder bed fusion feedstock and parts – these specifications will be available across the Department of Defense upon program completion
- Weapon systems affected: UH-60 Black Hawk

PARTICIPANTS

DLA; Army DEVCOM Aviation & Missile Center Systems Readiness Directorate; US Army Program Management Office Utility Helicopters; National Center for Defense Manufacturing and Machining (NCDMM); Pennsylvania State University Applied Research Lab (PSU ARL); Redstone Test Center (RTC)

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DLA OPSEC #0137-21 (3 September 2021) and Army Aviation & Missile Center #PR20210238 (1 July 2021)

AWARDS

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DOPSR #22-S-0352 (7 November 2022)

2021 DEFENSE MANUFACTURING CHAMPION AWARD

The ManTech Champion Award recognizes and honors an individual in government or the private sector who has made significant and enduring contributions to the DoD Manufacturing Technology program. The Award is presented by the Joint Defense ManTech Panel (JDMTP) on behalf of all of the ManTech Programs of the Army, Navy, Air Force, DLA, and OSD and is awarded at the discretion of the JDMTP. Any individual who is a "champion" of manufacturing technology is eligible to receive this award – most notably, someone who has consistently supported the powerful impact of manufacturing technology on increasing warfighter capability, reducing cost, and improving performance. These individuals have been ardent supporters and defenders of the need to stay at the forefront of defense essential manufacturing capability, strive to ensure that our Nation's warfighters are the beneficiaries of the best technology that industry can provide, and that we, as a Department, provide those technologies quickly and affordably.

Mr. John U. Carney supported the Navy ManTech Program in various capacities for the entirety of his 30-year Navy career. He retired in July 2020 after his long distinguished career in which he began his government service in 1990 in the Shipbuilding Technologies Division of the David Taylor Research Center, now the Naval Surface Warfare Center, Carderock Division. He joined the Office of Naval Research (ONR) in 1998 and served as program manager for several ManTech Centers of Excellence and as ONR's liaison to the National Shipbuilding Research Program prior to becoming the ManTech Director.

The VCS affordability initiative is an exemplary example of Mr. Carney's leadership and a major success for Navy ManTech and the VCS Program Office. In 2021, 59 affordability projects executed for General Dynamics Electric Boat (GDEB) were completed and either implemented or were in some phase of implementation. The projects totaled $41.7M per hull of recognized cost savings by the Program Office and GDEB. With two submarines procured every year, the annual recognized VCS cost savings are greater than the annual ManTech budget.

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DOPSR #22-S-0352 (7 November 2022)

Always humble, Mr. Carney was quick to point out that Navy ManTech's accomplishments and successes were the result of team effort, not the director.

Mr. Carney has been recognized by many organizations as an advocate for manufacturing technology and its ability to increase warfighter capability, reduce cost, and improve performance, including recognition from the Joint Defense Manufacturing Technology Panel for his leadership as chairman in 2008 - 2010. He was the recipient of the 2008 ONR Cheapskate Prize for Affordability "for providing a manufacturing portfolio to the VCS Program that realized cost reductions of $30M per hull, the May 2010 DoD Value Engineering award from USD (AT&L) Ashton Carter in recognition of the DDG 1000 Surface Ship Affordability Initiative Leadership Integrated Project Team, and the June 2014 DoD Value Engineering award from USD(AT&L) Frank Kendall for "recognized cost reduction of $26.5M per VCS hull or $440M in total program acquisition costs for the VCS Program."

Mr. Carney was the recipient of two Meritorious Civilian Service Awards – the first in 2011 for reducing Center of Excellence (COE) operating costs by removing overlap from COE capabilities and achieving internal COE efficiencies, and the second in July 2020 for meritorious service and contributions to the Department of the Navy and the Office of Navy Research. Mr. Carney has a Bachelor of Science degree in Industrial Engineering and Operations Research and a Master of Engineering Administration degree, both from Virginia Polytechnic Institute and State University.

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DOPSR #22-S-0352 (7 November 2022)

2022 DEFENSE MANUFACTURING CHAMPION AWARD

Dr. David Walker was nominated posthumously for the JDMTP ManTech Champion award. At the time of his death in January 2020, Dr. Walker was Executive Director of the Wright Brothers Institute. Prior to that, Dr. Walker entered the Senior Executive Service in July 2006 and was assigned as the Research and Development Portfolio Director, Office of Naval Research, in July 2017. In this capacity, Dr. Walker was responsible for policy, planning, resourcing and execution management of the Department of the Navy (DoN) S&T budget, including basic and applied research, the Future Naval Capabilities (FNCs), Innovative Naval Prototypes (INPs), DoN Small Business Innovation Research (SBIR), and Navy Manufacturing Technology programs.

Before joining ONR, Dr. Walker was the deputy assistant secretary of the Air Force for Science, Technology and Engineering, Office of the Assistant Secretary of the Air Force for Acquisition, Washington, D.C. He was responsible for preparing policy, guidance, and advocacy for the Air Force's annual $2 billion science and technology program. He provided annual testimony to Congress, technical advice and counsel to the Air Force Acquisition Executive, and the Air Force's science and technology recommendations to the Office of the Secretary of Defense. In addition, Dr. Walker oversaw a broad range of engineering and technical management policy and served as the functional manager for more than 20,000 military and civilian scientists and engineers.

Prior to this, Dr. Walker served as associate deputy assistant secretary of the Air Force for Acquisition Integration, Washington, D.C. He directed planning and analysis of $268 billion in Air Force research, development, and modernization programs, including budget formulation and execution and managing the acquisition performance reporting system. Dr. Walker developed acquisition policies, including program direction, contractor support, and transformation initiatives. He hired a corrosion expert to meet statutory requirements and implemented a new quick-reaction capabilities process, tracking 19 joint urgent operational needs to provide rapid capability to address warfighter needs.

Dr. Walker also served as associate director, Air Force Programs, deputy chief of staff of the Air Force for Plans and Programs. In this position, he integrated, evaluated, and analyzed the $630 billion, five-year Air Force Program across the Future Years Defense Program. He was responsible for maintaining the integrity and discipline of the Air Force corporate structure process. Dr Walker developed, evaluated, and recommended funding options related to force structure, readiness, sustainability, and modernization for decisions by the chief of staff and secretary of the Air Force. Finally, he interpreted and integrated national, DoD, and service-focused policies and objectives into Air Force programs spanning fiscal years 2010 through 2018.

Dr. Walker had extensive experience leading science and technology development in the Air Force having served in the Air Force Research Laboratory as the director of air vehicles, the director of materials and manufacturing, and the vice commander. He retired from an active-duty Air Force career as a colonel in 2006. As a master navigator, he had more than 2,700 hours in 65 different types of aircraft, including the RF-4C and the F-15E. He served in a variety of assignments in operations, developmental test and evaluation, science and technology, and the air staff.

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2022 DEFENSE MANUFACTURING TECHNOLOGY ACHIEVEMENT AWARD NOMINATIONS

The Defense Manufacturing Technology Achievement Award (DMTAA) is awarded to ManTech teams who demonstrate outstanding performance in executing and delivering ManTech solutions for DoD. The Joint Defense Manufacturing Technology Panel would like to recognize these teams for their hard work and congratulates the winners of the 2022 DMTAA, to be announced at the 2022 Defense Manufacturing Conference.

* ***DMTAA Winner***

Technology Enabler

The primary advancement is in software, hardware, firmware, data management, and related activities

Project Title	Service / Agency	Subpanel
3D-Printed Components Throwable/Disposable Chemical Vapor	DLA	Metals
* Digital Data – Next Gen Measurement/Location Tools	Navy	Advanced Manufacturing Enterprise (AME)
Automated Assembly of Ultra High Count, Max Density, Laser-Welded Fiber-Optic Assemblies	OSD	Electronics

Cost Reduction / Rate or Safety Improvement

Projects where the primary objective is to reduce cost, increase rate or provide significant safety methodology for manufacturing production, or sustainment

Project Title	Service / Agency	Subpanel
* Composite Laser Ablation Surface Preparation (CLASP)	AF	Composites
Diagnostic Monitoring of Equipment and Capacity Planning	Navy	AME
Flexible Robotic Composites Manufacturing Cell (FRCMC)	Navy	Composites

Enhancing Military Capability

ManTech projects which enhance systems and sub-systems to improve military performance

Project Title	Service / Agency	Subpanel
* Title III GaN MMIC Production Initiative	AF	Electronics
Manufacturing of Lightweight Hydrogen Fuel Cells	OSD	Electronics
Advanced Manufacturing for Digital Sensors (Digital Pilotage)	Army	Electronics

Readiness Improvement

Manufacturing technologies where the primary benefit is readiness

Project Title	Service / Agency	Subpanel
* Virtual Part Repair Programming for Robotic Thermal Spray Applications	Air Force	AME

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Cont. next page

Supply Chain Improvement

Develop manufacturing technologies, processes, or workforce improvements that enhance efficiency (cost) and effectiveness (quality) of the supply chain

Project Title	Service / Agency	Subpanel
Pacer Edge Capability Deployment	AF	Metals
Additive Manufacturing for the UH-60 Black Hawk Helicopter Fuel Elbow	DLA	Metals
Augmenting the Supply Chain Using Additive Manufacturing for Electromagnetic Waveguides for RADAR and Communication Systems	DLA	AME
Additively Manufactured Parts for the Joint Biological Point Detection System (JBPDS) – Biological Agent Warning Sensor (BAWS) Intake and Exhaust Plugs	DLA	AME
* Scalability and Production of Magnesium Oxide (MgO) Binder Replacement for Thermal Batteries	OSD	Electronics
* Manufacturing of Precursor Foamable Celluloid Materials	OSD	Electronics
Efficiency Gains in Forging and Steel Manufacturing Using Ceramic Coatings	DLA	Metals

2021–2022 JDMTP Service Recognition Awards

DoD ManTech and the JDMTP Principals recognize and thank the following Government members of JDMTP for their past contributions to JDMTP. These individuals have personally dedicated their time and manufacturing technology expertise and have shared critical information on their respective DoD Component's manufacturing projects in order to exchange knowledge, identify mutual objectives, and jointly collaborate to improve the overall DoD ManTech program.

2021 Service Recognition Awards

Julie Locker, Deputy Assistant Secretary of the Army for Research & Technology, JDMTP Chair

Barry Birdsong, Missile Defense Agency, JDMTP MDA ManTech Principal

Jamie White, Army DEVCOM Aviation & Missiles Center, Composites Subpanel Chair

Carrie Davis, Naval Surface Warfare Center (NSWC Carderock), Metals Subpanel Chair

Paul Huang, Office of Naval Research, Advanced Manufacturing Enterprise Subpanel Chair

James Zunino, Army DEVCOM Armaments Center, Electronics Subpanel Chair

Michael Brundage, Army C5ISR Power Division, Power Sources Technical Working Group (TWG) Chair

Angie Babian, Air Force Research Lab, Manufacturing Readiness Levels TWG Chair

Tracy Tapia, DMC Senior Conference Manager

2022 Service Recognition Awards

Dr. Charles Ward, Air Force Research Lab, JDMTP AF Principals

Robert J. Wittman, Jr., Air Force Research Lab, Metals Subpanel

Dr. Senthil Arul, Defense Logistics Agency, Advanced Manufacturing Enterprise Subpanel Chair

K. Bryan Mitsdarffer, NSWC Crane, Electronics Subpanel Chair

Jenny Niles, Army Space and Missile Defense Command, Directed Energy TWG Co-Chair

Philip Samuels, Army DEVCOM Armaments Center, Energetics & Warheads TWG Co-Chair

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DOPSR #22-S-0352 (7 November 2022)

PAST DEFENSE MANTECH ACHIEVEMENT AWARD WINNERS

The Joint Defense Manufacturing Technology Panel (JDMTP) seeks to recognize and honor those most responsible for outstanding technical accomplishments in achieving the vision of the Department of Defense (DoD) ManTech Program. That vision is to realize:

"A responsive world-class manufacturing capability to affordably and rapidly meet Warfighter needs throughout the defense system life cycle."

To this end, the Defense Manufacturing Technology Achievement Award was established in late 1999.

AWARDEES

2021 – Production BOM QA Using Artificial Intelliegnce
2021 – VIRGINIA Class Submarine Alternative Coating and Surface Preparation Solutions for Air-System Ball Valves
2021 – Polymer Gradient Index Lenses for Military Optics
2021 – Advanced Radome Diagnostic System (ARDS)
2021 – Advanced Laser Diode Supply Chain Improvement During COVID
2020 – Development of Large Diameter Silicon Carbide Substrates
2020 – Agile Manufacturing Cell with High Energy Buried Arc Welding for Vehicle Structures
2020 – Novel Ultra-Strong Low Cost Film Manufacturing Technology for Superior Warfighter Protection
2020 – Hatchable Cold Spray Technology for Naval Shipyards and Marine Corps Depots
2020 – Integrated Casting Ordering Network (ICON) Portal Enhancement and Supply Chain Development
2019 – 12 µm Pixel High Definition Uncooled LWIR2019
2019 – Maturation of Adv. Mfg. of Low Cost Sustainment
2019 – High Performance, Low Variability AM Parts
2019 – III-V Dual Band Infrared FPAs
2019 – DLA Nuclear Enterprise Support Office NSNs
2018 – Automated Aircraft Inlet Coating
2018 – Organic Light Emitting Diode (OLED) Microdisplays
2018 – F-35 High Fidelity Fastener Measurement
2018 – Lithium-Ion Replacement for TOW MGS Nickel Cadmium Battery
2017 – Tungsten Carbide Penetrator and Assembly Cost Reduction
2017 – Affordable Protection from Objective Threats
2017 – Virginia Class Submarine Retractable Bow Plane System
2017 – 128 Kilobit RAM ROM Microcircuit Emulation
2016 – High Operating Temperature Multi-Band FPA
2016 – Digital Thread for Material Review Board
2016 – Optical Windows – ALON
2015 – F-35 Electro-Optical Targeting System (EOTS) Producibility
2015 – Welding of High Strength Steels
2015 – Manufacturing Technology for High Power Vertical Cavity Surface Emitting Lasers (VCSELS)
2014 – Chip Scale Atomic Clock (CSAC)
2014 – F-35 Canopy Thermoforming Automation
2014 – Low Light Level Sensor
2014 – Large Affordable CdZnTe Substrates (LAS)
2014 – Establishing the Production Capability for Lighter, Higher Energy Soldier Batteries
2013 – Advanced Body Armor
2013 – Plate Edge Preparation Improvements (PEPI)
2013 – Restoration of Aerospace Parts by Cold Spray
2012 – Fastener Insertion Live Link System (FILLS)
2012 – Customer/Supplier Interoperability During Collaborative Design
2012 – 3-D Technical Data Package and Certification
2011 – Use of Digital Radiography for Final Part Acceptance of Aerospace Casting
2011 – Prosthetics & Orthotics Manufacturing Initiative (POMI)
2011 – Automated Fiber Placement of Carbon Fiber Bismaleimide Materials
2010 – High Power, High Energy Density Lithium-Ion Batteries
2010 – Seal Extrusion Development and Demonstration (SEDD)
2010 – Weld Seam Facing and Back Gouging
2009 – F-35 Inlet Duct Robotic Drilling
2009 – Low Cost Manufacturing of Materials for Improved Warfighter Protection
2008 – Laser-Welded Corrugated-Core (LASCOR) Panel Evaluation
2008 – Low Observable Paints for Aircraft
2007 – Lean Battery Initiative
2007 – Low Cost SiC-N Ceramic Tile
2007 – Translational Friction Stir Welding
2006 – Uncooled Focal Plane Array Producibility
2006 – Engine Rotor Life Extension
2005 – Large Aircraft Infrared Countermeasures
2005 – Large Marine Composite-to-Steel Adhesive Joints
2004 – Lean Depot Repair
2004 – Uniform Cannon Tube Reshaping

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