ManTech

PROMOTING A RESILIENT DEFENSE INDUSTRIAL BASE

NOVEMBER 2012
As our military seeks to maintain technological superiority across an increasingly competitive global landscape, the ability to deliver advanced, affordable manufacturing for the Warfighter remains paramount. The Defense Manufacturing Technology (ManTech) Program continues its over fifty-year journey of innovation and exploration in manufacturing processes to promote a highly capable and resilient defense industrial base to deliver affordable, technologically advanced capabilities to our Warfighters.

This brochure highlights many of the recent initiatives and successes of the DoD ManTech Program. Executed through the individual ManTech programs of the Military Departments, DLA and OSD, the DoD ManTech Program is comprised of a diverse portfolio of projects within the metals, electronics, composites, and advanced manufacturing enterprise technology sectors. This portfolio represents a careful balance of the individual mission-driven needs of the program Components with ManTech’s joint requirements identified through the collaborative efforts of the Joint Defense Manufacturing Technology Panel (JDMTP) and the Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy (ODASD(MIBP)).

The center section of this brochure highlights ManTech’s expanding efforts in national initiatives to foster engagement across multiple government organizations and Industry on high priority national needs. We have established the National Additive Manufacturing Innovation Institute (NAMI), a private-public partnership of industry, academia, government, and workforce development resources – all collaborating with a shared vision of transitioning additive manufacturing technology to mainstream U.S. manufacturing. We have also launched the Connecting American Manufacturing, or CAM, initiative to enhance DoD ability to broadly engage U.S. manufacturers – many of whom are small businesses – while addressing a diminishing DoD supply-base, long lead times and high lifecycle costs.

In our current period of uncertainty, ManTech continues to maintain focus on our Warfighters. We see ManTech as crucial to fostering innovation to meet the challenges of our changing world and ensure our nation maintains its competitive edge on the battlefield. We are pleased to represent the ManTech team, which continues to enhance our defense industrial base for the protection of this nation’s future.

Sincerely,

Adele Ratcliff  
Director, Manufacturing Technology, MIBP

Andy Davis  
Chairman, Joint Defense ManTech Panel
DEFENSE MANUFACTURING VISION

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

FOCUS

An important focus of ManTech is on the manufacturing technologies, processes, and enabling production capabilities that reduce the acquisition and sustainment cost of weapon systems, and provide direct benefit to the Warfighter. Measures of effectiveness include improved mission capability, improved readiness, and reduced total ownership costs. Timely transition of the technology consistent with acquisition and operational requirements is essential.

STRATEGY

The new 2012 DoD Strategic Plan prepared by the Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy (MIBP) in close collaboration with the Joint Defense Manufacturing Technology Panel (JDMTP) contains four strategic thrusts:

• Thrust 1: A Responsive and Balanced Manufacturing Technology Investment Portfolio to Meet DoD Requirements.
• Thrust 2: Active Support for a Highly Connected and Collaborative Defense Manufacturing Enterprise.
• Thrust 3: Active Support for a Strong Institutional Focus on Manufacturability and Manufacturing Process Maturity.
• Thrust 4: Active Support for a Healthy, Sufficient, and Effective Defense Manufacturing Infrastructure and Workforce

The ManTech Program Strategy is to support the broader defense industrial base to deliver maximum value to the warfighter and the nation. The strategy is executed by the Component ManTech programs within the Army, Navy, Air Force, DLA, and OSD (e.g., Defense-Wide Manufacturing Science and Technology (DMS&T)) and includes projects of the Industrial Base Innovation Fund (IBIF), Congressionally-directed funding executed by DLA in 2008-2010 and by DMS&T in 2011 and beyond.

The ManTech successes documented herein are categorized by the sponsoring Service/Agency Component. The center two pages of this document focus on JDMTP linkages to national manufacturing technology efforts such as NAMII and CAM.

MANTECH MISSION

The DoD Manufacturing Technology (ManTech) Program anticipates and closes gaps in manufacturing capabilities for affordable, timely, and low-risk development, production and sustainment of defense systems.
ManTech Provides Affordable Multi-Purpose Warheads

The Challenge:
Multi-purpose warheads enable future tactical missile systems with the capability of defeating explosive reactive armor protected tanks, soft targets, urban terrain targets and personnel. However, the current process of making warheads has many manufacturing steps that are labor intensive and must utilize more material to produce, making the warhead expensive.

ManTech Response:
• Army ManTech established new processes to improve multi-purpose warhead manufacturing on current and future missile systems.
• Addressed processing times, and increased throughput of shape charge manufacturing by reducing forging steps, machining time, labor costs, and tool wear
• Army ManTech investment was $4.3M

Impact:
• Reduces warhead costs by 15% to enable affordable warheads for tactical missions
• Uses 40% less material by weight than the current method
• Permits affordable current and future tactical missile system upgrades such as Javelin, TOW, other Army systems
• Transitioned manufacturing improvements to Close Combat Weapon Systems (CCWS)

Projected ROI of 3.8 to 1 with a cost benefit of $16.3M
ManTech Enables Advanced Armor Implementation for Ground Combat Vehicles

The Challenge:
Army combat vehicles could not utilize advanced structure and armor solutions because assembly procedures were too complex and advanced armor materials were too expensive with long lead-times.

ManTech Response:
• Army ManTech developed agile, flexible production technologies critical to meeting cost and schedule demands for rapid transition of advanced armor designs to future vehicle production and legacy vehicle upgrades
• Demonstrated Model Based Engineering (MBE) collaborative tools to develop and share the manufacturing and design data between two OEMs for the fabrication and assembly of a ballistic hull and turret
• Advanced friction stir welding (FSW) technology to join thick aluminum alloy plates
• Army ManTech investment was $92M

Impact:
• Enabled Composite Armor Implementation for all Army Ground Combat Vehicles (GCV) Contractors
• Reduced Silicon Carbide (SiC) production cost from $135/lb to $50/lb using new semi-continuous hot press
• MBE advances established the tech data requirements for current and future acquisition programs
• Created process technology for single pass FSW of aluminum alloys up to 3 inches thick
• Manufacturing data package transitioned to ceramic armor program of record

Projected ROI of 17 to 1 (over $1.4B) for all legacy and future armored vehicle systems
ManTech Implements Model Based Enterprise (MBE) Tools to Reduce Life Cycle Costs of Weapon Systems

The Challenge:
The Model Based Enterprise (MBE) is a revolutionary new collaborative environment in which 3-dimensional (3D) detailed product definitions are shared across the manufacturing enterprise to enable rapid, seamless, and affordable deployment of products from concept to disposal. The Army’s challenge is to implement MBE to reduce the manufacturing costs, the lead times for acquisition and sustainment, and the materiel lifecycle costs of weapons systems.

ManTech Response:
- U.S. Army Research, Development & Engineering Command (RDECOM) is working with PM Improved Explosive Device Disposal and Ground Combat Vehicle and Joint Program Office for Mine Resistant Ambush Protected Vehicles to demonstrate new MBE capabilities:
  - 3D product data tools such as fully-annotated CAD models, digital work instructions to support manufacturing operations, 3D model validation, 3D-based technical publications and 3D-based engineering analysis tools
  - Product Data Management system to support lifecycle operations between engineering service agencies, product managers, depots and the defense manufacturing base
  - Standards-based MBE technologies to promote free dissemination and reuse of product data elements
  - Access to relevant product data to support operations
- Army ManTech investment of $8.9M

Impact:
- Improvements in overall parts availability for weapons systems
- 25% decrease in lead times for manufactured parts and assemblies
- 30% reduction in new operator training time for field level installation instructions
- 20% reduction in repair time using 3D technical data and digital work instructions

25% Reduction in Cycle Time for Processing Engineering Changes
**The Challenge:**
The AN/SLQ-32 Electronic Warfare (EW) system performs the mission of early detection, analysis, threat warning and protection from anti-ship missiles. Upgrades to pace the threat, improve detection capabilities and lower the cost were needed.

**ManTech Response:**
- The Surface Electronic Warfare Improvement Program (SEWIP) Block 2 project upgraded the Navy’s AN/SLQ-32 (V) electronic support measures system, including the system’s receiver, antenna and combat system interface
- Worked with PEO IWS customer for initial implementation on CVN 78 Class carriers
- Design for manufacturing (DFM) and design for test (DFT) techniques used to improve manufacturing, tuning, and test of three subassemblies:
  - Precision Direction Finding (PDF) switch module: Consolidated discrete components with multiple connectors into a single Integrated Microwave Assembly (IMA) enabling reduction in number of manual tuning elements
  - Fiber Optic Transmitter and Receiver: Replaced existing single fiber optic transmitter with dual fiber optic transmitter enabling mounting all 26 on a single rack and replaced 52 connectors with a single interface
  - Wideband RF Tuner: Combined discrete components into single surface mount subassemblies enabling manufacture using an automated pick and place machine
- Navy ManTech investment of $2.7M

**Impact:**
- Reduced PDF switch manual tuning labor from 81.5 hours to 4.5 hours per assembly for $400K savings per CVN hull
- New Fiber Optic Transmitter single rack subassembly with one interface connection resulted in labor and material savings of $253K per CVN hull and improved reliability
- RF Tuner optimization resulted in $204K savings per CVN hull due to a reduction in labor and material costs with improved reliability and performance
- Additional CVN savings from reduced maintenance and shipboard repair time and decreased spare part costs
- Modified subassemblies transitioned to the SEWIP Block 2 Engineering Development Model (EDM) and are currently undergoing Integration and Test (I&T) prior to implementation into the CVN 78 Block 2 upgrade
- Future implementation on all classes of U.S. Navy ships is anticipated

**Estimated cost savings of $1M per CVN 78 Hull**
**ManTech Significantly Improves the Affordability of the AIM-9X Active Optical Target Detector**

**The Challenge:**
The AIM-9X “Sidewinder” air-to-air missile uses an optical proximity fuse, the DSU-41B Active Optical Target Detector (AOTD), to detonate the missile's charge near its target. The AOTD is a complex optical and electronics system that requires numerous labor-intensive manual assembly and test steps. Performance and costs are negatively impacted by poor laser diode yield, brittle electrical connections, and suboptimal spreader lens design.

**ManTech Response:**
- A Navy ManTech project targeted improvements in the manufacturing process and automated in-line test procedures for the AOTD micro laser, the transceiver unit, and the primary AOTD unit
- Improved the solder process for the pump laser diode and added in-line tests to eliminate failing diodes resulting in increased yield and improved reliability
- The AOTD transceiver manufacturing process now uses less expensive spreader lenses that improve the optical performance
- Connectors, wire harnesses, and desiccant packages inside the complex AOTD unit were redesigned to enable easier, less labor-intensive unit assembly and testing and increased manufacturing yield, leading to increased unit performance and reliability
- Navy ManTech investment of $2.2M

**Impact:**
- Changes to AOTD manufacturing processes were immediately transitioned to main-line production at Raytheon Missile Systems (RMS)
- Reduction of laser diode failures increased AOTD yield from 87.5% to 98% at RMS
- RMS lens process increased yield from 60% to >90%
- Improved AIM-9X Block II system performance for Pilot-Friendly JHCMS Fire-And-Forget Air-To-Air Engagement Capability
- The latest version, AIM-9X Block II air-to-air missile, is on track for implementation on the F-35 Joint Strike Fighter and the F/A-18 variants

**Estimated cost savings of $40M**
The Challenge:
Contractor-furnished components make up nearly 30% of the overall cost for a VIRGINIA-Class Submarine (VCS); about $146M of that is attributable to 40 very costly components. Optimizing the material acquisition process for these components, from initial design through procurement, receipt and inspection and delivery to and installation in the ship significantly reduces overall construction cost.

ManTech Response:
• Using the ISSR (inherent, structural, systemic, and realized) analysis process, General Dynamics Electric Boat (GDEB) and Huntington Ingalls Industries - Newport News Shipbuilding (NNS) conducted a structured review of these 40 most costly contractor furnished components
• Design engineers evaluated and optimized component designs to reduce cost and schedule
• Dimensional accuracy requirements driving costs were challenged, and design-for-assembly techniques were considered where practical
• Vendor infrastructures were evaluated to determine their ability to provide components for the two ships per year build rate and to identify opportunities for optimizing productivity
• Ideas demonstrating the most cost savings potential were fast tracked, where possible, to realize initial cost savings
• Navy ManTech investment of $2.26M

Impact:
• Nearly 60 cost savings opportunities were identified between the VCS co-build shipyards
• Implementation began in January 2011 using a phased approach, and initial savings of $1.04M/VCS hull were accomplished with no implementation costs
• Once fully implemented, shipyards and vendors expect cost savings to increase by an additional $7.4M per hull and will support the Block IV reduction of total ownership cost initiative

Estimated cost savings of $8.5M per VCS Hull
**ManTech Reduces Cost of High Temperature Composite Engine Components**

**The Challenge:**
Engine components made from polyimides versus titanium or steel offer aircraft reduced weight and fuel consumption, greater durability in high temperature environments, and provide enhanced environmental benefits. However, the manufacturing cost of composite engine components is the number one cost driver in military aircraft engine upgrades.

**ManTech Response:**
- AF ManTech funded a Small Business Innovative Research (SBIR) project to reduce the cost of manufacturing composite materials that replace titanium and steel parts in aircraft engines
- Maverick Corporation in Blue Ash, Ohio identified, tested and demonstrated multiple alternate sources for critical monomers used to manufacture their AFR-PE-4 polyimide composite material
- Renegade Materials in Springboro, Ohio, combined resin with carbon fiber and fabrics using high-rate prepreg manufacturing equipment and processes
- Maverick and Renegade Materials used internal funding for qualification of their materials that have been approved for use in several F135 engine components
- AF ManTech invested $1M in SBIR funding

**Impact:**
- Alternate monomer sources were identified and validated
- Pre-impregnated AFR PE-4 polyimide composite material was approved for use on F135 engine components

**Cost of AFR-PE-4 Composite Material Reduced from $500/lb to $200/lb**

_Air Force_
**ManTech Automates Fastener Installation on F-35 to Improve Accuracy and Reduce Labor Costs**

**The Challenge:**
Approximately 30,000 fasteners are installed on every F-35 center fuselage. Operators manually measure and record grip length for each drilled hole. This labor intensive process is highly susceptible to measurement and data recording errors.

**ManTech Response:**
- Joint Strike Fighter Program invested $1.5M Congressionally directed Small Business funding with Air Force ManTech contracting a Phase III Small Business Innovative Research (SBIR) task and industry participants invested an additional $1M
- The Air Force Fastener Insertion Live Link System (FILLS) automated the installation of aircraft fasteners on the F-35 using a “digital thread architecture”
- The FILLS Team developed an improved “digital thread process” to automate fastener hole measurements, auto-create a Bill of Materials from which fastener kits are prepared, and automate fastener installation by using optical projection illumination and fastener call-out to direct the operator in fastener installation
- Matured and demonstrated system to MRL 7 (production representative environment)
- Automated process has transitioned to F-35 nacelle assembly at Lockheed Martin Aerospace, Marietta (LMA) and is planned for F-35 Center Fuselage Integrated Assembly Line, Northrop Grumman Aerospace Systems, Palmdale (NGAS)

**Impact:**
- LMA has realized 80 hours of savings for the wing forward and aft nacelle subassemblies
- NGC projects a potential savings of 150 hours for the center fuselage skins installation
- Transition potential to other assembly lines: P-3 wing assembly, C-5 Troop door doubler program, and C-130 outer wing assembly at LMA; also the F-35 aft fuselage at BAE in the UK, F-35 OML control (in development), F-35 fastener installation at ATK, and various commercial aircraft programs

$2.7M investment resulted in $20M transitioned savings with a total potential savings of $111M over the life of the F-35 Program
Enhancing National Manufacturing

JDMTP Linkages to National Efforts
The DoD ManTech Program continues to jointly coordinate component program activities through the Joint Defense Manufacturing Technology Panel (JDMTP) that derives its responsibilities from Title 10 (USC) and represents the interests of the Office of the Secretary of Defense and the S&T Executives of the Army, Navy, Air Force, and DLA. On a national level, the DoD ManTech program is not statutorily structured to address the entirety of defense industrial base challenges, however, it shares an expansive vision with the broader defense industrial base – *that is, to maintain a responsive, world-class manufacturing capability* – JDMTP serves as a key focal point to link into some of the following national manufacturing efforts.

The New World of Additive Manufacturing
Additive manufacturing is one of the new and exciting growth areas in our nation's industrial base today. The proliferation of a number of commercial machines with the capability to direct print parts in metals, polymers and electronics has led to a sharp increase in the application of this technology. Additive technology shows great promise for DoD applications where the tailoring of material properties and flexibility of the direct print processes can provide cost and performance benefits over current manufacturing technologies.

NAMII
The National Additive Manufacturing Innovation Institute (NAMII) is a public-private partnership of industry, academia, government, and workforce development resources – all collaborating with a shared vision of transitioning additive manufacturing technology to mainstream U.S. manufacturing, creating an adaptive workforce capable of meeting industry needs and further increasing domestic manufacturing competitiveness. DoD ManTech is integrally involved in the creation of NAMII that is organized and managed by the National Center for Defense Manufacturing and Machining (NCDMM). DMS&T and Army ManTech contribute funds to this new partnership that is led by the Department of Defense with participation from other federal agencies (including NIST, NASA, DoE, DARPA), manufacturing firms, universities, and non-profit organizations. For more information, go to [http://www.namii.org](http://www.namii.org) or contact the DoD Lead, Jennifer Fielding, jennifer.fielding@wpafb.af.mil.
Manufacturing Priorities

JDMTP Metals Subpanel Additive Manufacturing Technical Working Group
This JDMTP technical working group, chartered by the JDMTP Metals Subpanel, is comprised of members from DoD, NAMII, NASA, NIST, and DoE. It addresses needs in materials and process standards for additive manufacturing, and its goal is to develop and publish government standards documents. For more information, contact the Metals Subpanel Chairman, Stephen Luckowski at stephen.l.luckowski.civ@mail.mil.

Connecting American Manufacturing (CAM)
The CAM initiative was established at the national level to address a critical need within the Department to better connect DoD needs for manufactured parts with U.S. manufacturer capabilities. The initial phase of CAM employs internet-based marketplace utilities to make it easier for the DoD to find U.S. manufacturers — many of whom are small businesses — with the right capability and capacity at the right time. The initiative also will make it easier for U.S. manufacturers to find and secure DoD opportunities that match their capabilities. Increased competition due to the expansion of DoD's industrial reach should result in lower acquisition costs and shorter lead times, especially for parts that historically have been difficult to source. This program is sponsored by the Office of the Deputy Assistant Secretary of Defense, Manufacturing and Industrial Base Policy, addressing the direct interests of the White House Office of Science and Technology Policy. For more information, go to http://www.connectingmfg.com/twiki/CAM or contact the CAM Lead, Brench Boden at brench.boden@wpafb.af.mil.

Executing the JDMTP Strategy
For the future, the JDMTP has identified joint pursuit areas and the actions required to address these areas in order to execute its strategic plan. As part of this process, these joint pursuit areas are evaluated based upon the Department's priorities and the ability to leverage other programs, capabilities and resources. The areas identified and supported by the JDMTP can be either technical or non-technical (e.g., policy-based). These joint pursuit areas represent a real power of the JDMTP and its execution of the strategic plan.
The Challenge:
Over the years more food items have been added to the MRE to improve variety, acceptability, and nutritional quality. Meanwhile the size and shape of the MRE shipping box has remained constant, resulting in an increased difficulty in fitting 12 MREs into a box and causing delays and cost overruns.

ManTech Response:
• Improved efficiency of manufacturing process and packaging product for MRE main meals into smaller MRE cardboard cartons – estimated cost savings of $250K/year
• Analyzed packaging and determined best fit for packaging automation to: (1) minimize entrapped air; (2) eliminate redundant packaging; and (3) develop an algorithm for the most efficient use of packaging space
• Menu bags based on the new films, and the new cardboard design sent to U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) for quality analysis and feedback.
• Improved productivity in manufacturing by developing modeling software for the manufacturers to use in packing and packaging of primary MRE packages, boxes and palletized shipping containers
• DLA ManTech investment of $600K

Impact:
• Eliminated unnecessary manufacturing lines and excessive packaging for the MRE main meals into smaller MRE cardboard cartons – estimated cost savings of $250K/year.
• Reduced the quantity of packaging and packing material required for the MRE menu bag, the MRE case, and the palleting for a conservative combined estimated cost savings of $750K/year
• Reduced the volume and weight of the primary packaging by 35% to reduce the cost to ship more than 30 million MRE’s procured annually

Combined efficiencies total $1 million in annual savings
ManTech Standardizes Components to Reduce Manufacturing Cost and Assembly Time for Military Lithium-Ion Batteries

The Challenge:
Newer military smart electronics require higher energy batteries. The available lithium-ion technologies are cost prohibitive when considered for these applications due to a lack of standard components.

ManTech Response:
• DLA’s Battery Network (BATTNET) program developed and tested prototype Li-ion modules that are configured for 12 different military battery types using existing specifications
• To maximize standardization across the Services, the project brought together experts from US Army TARDEC, US Army CERDEC, NAVAIR, NSWC Crane, AFRL, and Industry, including Quallion LLC who developed and tested the module prototypes
• DLA ManTech investment of $257K

Impact:
• Optimizes assembly of multiple battery configurations from the same cell production lines
• Lowers procurement costs of Li-ion batteries by increasing competition among lower volume suppliers
• Lowers the cost of Li-ion battery production
• Expands DoD usage of state-of-the-art large format battery technology
• Establishes technology roadmap that standardizes Li-ion battery production for military aviation, ground vehicle, and communications applications

Lowers Li-Ion Battery Production Cost and Assembly Time
**The Challenge:**
Defense systems must be maintained to extend their useful life, however, applicable reference data to sustain these products is often unavailable due to unclear DoD standards, directives, and procedures that do not support uniform procurement of valuable technical data. In contrast to older documentation based on drawings, the emerging digital data world now has the ability to make all necessary data available in digital form.

**ManTech Response:**
- DMS&T funded the 3D Technical Data Packages (TDP) project to develop a standardized format for contractual flow-down of necessary technical data in 3D digital format for improved lifecycle maintenance of defense systems
- DoD agencies and defense industry participated in the group known as the DoD Engineering Drawing and Modeling Working Group (DEDMWG)
- Formed in 2009, a diverse group of members from interested services collaborated to provide technical data solutions for legacy systems
- The solution provides a 3D model organization schema and validation guidebook that benefits all services
- The DEDMWG rewrote MIL-DTL-31000 that was converted to MIL-STD-31000, a document that defines contractual requirements for 3D TDP
- DMS&T Investment of $1070K

**Impact:**
- Contractual flow down requirements for 3D formats are transitioning to a Defense Logistics Agency procurement contract on the A-10 wing retrofit effort
- The 3D model organization schema has been implemented at several OEMs for internal usage
- Less costly methods to reuse data for spares and digital work instructions

**3D TDP enables easier and less costly maintenance of the A-10 retrofit wing**

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**PARTICIPANTS**

**DMS&T, U.S. Army Research Laboratory, U.S. Army ARDEC - Picatinny Arsenal, Defense Logistics Agency, NIST**
**ManTech Increases Reliability of Defense Systems by Establishing Methods to Certify 3D Models**

**The Challenge:**
The DoD is inherently a 2D drawing-based enterprise for master data of its defense systems. Presently, there is no official method of verifying and validating the quality of any 3D digital data the DoD delivers or receives from industry. As a result, the prevailing view is that 3D data is not reliable for use throughout the supply chain. If 3D data is used, it is often remodeled into ‘local’ formats or translated into a new format with a host of quality errors that are repeated. All of this has fostered an inherent distrust of the data that could have been reused throughout the entire product lifecycle, thereby driving up cost and time to mission of a product.

**ManTech Response:**
- A DMS&T-funded effort was conducted to provide an official method to verify and validate the quality of 3D digital data the DoD delivers or receives from industry
- Beginning in 2009, a NIST-led group from industry and the services worked with the DoD Engineering Drawing and Modeling Working Group (DEDMWG) to address three areas:
  - 3D Model Creation
  - Product Lifecycle Management Check-in
  - Derivative Creation
- A guidebook with Model Based Definition (MBD) requirements for master data was created to coincide with MIL-STD-31000 that defines contractual flow-down requirements for 3D Technical Data Package (TDP)
- The Guidebook details the 3D MBD criteria to ensure that the data contained is accurate and validated for use in weapon systems sustainment
- DMS&T investment of $1750K

**Impact:**
- MBD as Product Master Guidebook document will be issued as an appendix within MIL-STD-31000 that is expected to be released by end of 2012
- To be implemented with the Army’s Armament Research Development and Engineering Center (ARDEC) where local 3D data policies, procedures and tools are being re-engineered

**First of its kind-validated 3D model technical data package**
Increased Productivity of Military Thermal Batteries

The Challenge:
Thermal battery production is hampered by inefficient battery press electronics and controls and inconsistent pellet material resulting in a large amount of pellet and battery die scrap. This limits the production of military thermal batteries and the ability of the industrial base to meet surge production requirements.

ManTech Response:
• This DLA IBIF project reduced scrap and increased productivity and capacity of thermal battery production
• Upgraded electronics and controls on the thermal battery presses to eliminate the need to qualify batteries produced with refurbished presses that improves the overall production efficiency and lead time
• All DoD weapon systems are impacted by the upgraded electronics and controls to include: Javelin, TOW, Hellfire, JDAM, Patriot, THAAD, AMRAAM
• Project results to be verified using batteries produced by the improved and refurbished presses
• DLA ManTech/IBIF investment of $600K.

Impact:
• Improved product consistency and reduced press cycle times resulting in increased productivity of 20%
• Reduced pellet scrap rates by 18% resulting in reduced material costs

IBIF investment of $600K for increased thermal battery production by 850 per month
DoD ManTech developed the original numerically controlled machine tool and the associated programming language (APT) to advance military aircraft manufacturing – now used globally in countless manufacturing applications.

The DoD ManTech program developed the technology that became the foundation for the current microelectronics industry.

DoD ManTech developed processes for the production of the forerunners of precision laser guided missiles and munitions.

DoD ManTech developed a process for reverse engineering thousands of obsolete microcircuits that support weapon systems still in service – use and mission benefits continue to expand today.

DoD ManTech program developed magneto-rheological finishing for advanced military optics. The process is now also used by all manufacturers of photolithographic optics.

In the 21st century, DoD ManTech:

– Provided revolutionary electronics such as Micro Electro-Mechanical Systems (MEMS) for field artillery systems and Focal Plane Arrays (FPAs) for sensor systems

– Enabled manufacturing of interceptor body armor currently used by our forces

– Manufactured next generation of enhanced combat helmets to replace 30-year old technology

– Developed automated processes for lighter, durable and more comfortable composite prosthetics

– Provided improved combat rations with high quality, safer, and surge-capable production

– Implemented higher power, longer duration batteries across weapon systems

– Applied model-based manufacturing and CAD in aeronautical and maritime construction for greater affordability
## 2012 Defense ManTech Achievement Award Nominations

There were 10 nominations submitted through JDMTP Subpanels for the 2012 Defense ManTech Achievement Award. The awardees are announced at the Defense Manufacturing Conference.

The JDMTP Principals would like to recognize these nominees for their efforts.

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<th>Project Title</th>
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<td>* Alternative Brazing for Shipboard Use</td>
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<td>* Customer/Supplier Interoperability during Collaborative Design (CSI)</td>
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<td>* 3D Technical Data Package &amp; Certification of 3D Models as the Product Master</td>
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<td>Manufacturing Technology for Vertical Cavity Surface Emitting Lasers (VCSELs)</td>
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* Finalist
The Joint Defense Manufacturing Technology Panel (JDMTP) seeks to recognize and honor those individuals 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 the Fall of 1999.

**AWARDEES**

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
2003 – Laser Additive Manufacturing
2003 – Laser Shock Peening
2002 – Composites Affordability Initiative
2002 – Apparel Research Network
2001 – Enhanced Manufacturing Processes for Body Armor
2000 – Advanced Optics Manufacturing
2000 – Flexible Manufacturing of Microwave Vacuum Devices
1999 – Advanced Fiber Placement