

UNCLASSIFIED

FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: February 2007

BUDGET ACTIVITY: 07
PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total PE	57,745	60,941	56,445	56,705	58,929	59,823	60,326	60,833
1050 MANUFACTURING TECHNOLOGY	55,445	54,963	56,445	56,705	58,929	59,823	60,326	60,833
9999 CONGRESSIONAL PLUS-UPS	2,300	5,978	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Manufacturing Technology (ManTech) program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development and transition of leading edge manufacturing technologies. The ManTech program is executed through a Center of Excellence (COE) strategy. A majority of the COEs are consortium based with only a small group of technical and management personnel at the center. ManTech projects are primarily performed by industry participants that bill the COE which, in turn, bills the Navy which causes a non-traditional financial execution profile for the program. The program therefore does not meet traditional execution benchmarks. The ManTech program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs.

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2007 President's Budget Submission	59,286	55,048	57,328	58,764
Congressional Action	0	6,000	0	0
Congressional Adjustments	9	-107	0	0
Non-Pay Inflation Adjustments	0	0	-35	33
Program Adjustments	0	0	-195	-105
Program Realignment	0	0	-653	-1,989
Rate Adjustments	0	0	0	2
SBIR Assessment	-1,550	0	0	0
FY 2008/FY 2009 President's Budget Submission	57,745	60,941	56,445	56,705

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical:

Schedule:

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Efforts have been focused on the Integrated Systems Investment Strategy platforms: DDG 1000 (formerly DD(X)), CVN 21, Littoral Combat Ship (LCS), and the Virginia Class Submarine as well as aircraft/other programs. Due to a recent change in strategy, FY07 and out will increasingly focus on affordability efforts for DDG 1000 (formerly DD(X)), CVN 21, LCS, and Virginia Class Sub with some concentration on improvements for non-ship systems.

E. PERFORMANCE METRICS:

The ManTech program's overall goal is to transition leading edge technology for the production of Navy weapons systems. Individual project metrics are tailored to the needs of specific acquisition programs. Example

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metrics include: enabling a 400 ton weight reduction for CVN 21 as a result of the High Strength and Toughness Naval Steels for Ballistic Protection Project; and a 60% cost reduction from the original baseline, for the Large Marine Composite to Steel Adhesives Joint Project, bolted joint effort.

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PROJECT NUMBER: 1050 PROJECT TITLE: MANUFACTURING TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
1050 MANUFACTURING TECHNOLOGY	55,445	54,963	56,445	56,705	58,929	59,823	60,326	60,833

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The ManTech project is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. Major areas of endeavor both underway and planned include: advanced manufacturing technology for electronics assembly, laser metalworking, flexible computer manufacturing, composites, metal working, and welding technology. The ManTech project is being integrated into the Seapower 21 and Joint Warfare Operational Capability process and will utilize the results of these initiatives as appropriate in the program planning process. The ManTech project is aimed at assisting acquisition programs in meeting performance and affordability goals by inserting manufacturing process solutions early into the design phase.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
METALS PROCESSING AND FABRICATION	18,988	19,725	21,570	21,620

The objective of the Metals Processing and Fabrication activity is to develop affordable, robust manufacturing processes and capabilities for metals and special materials critical to defense weapon system applications. Major areas that support this objective include: processing methods, special materials, joining, and inspection and compliance. These efforts directly impact the cost and performance of future aircraft, rotorcraft, land combat vehicles, surface and subsurface naval platforms, space systems, artillery and ammunition, and defense industry manufacturing equipment.

Funding in this area is increasing from FY 2007 to FY 2008 to better support the shipbuilding affordability focus and corresponding increase in metals fabrication and processing technical work.

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PROJECT TITLE: MANUFACTURING TECHNOLOGY

FY 2006 Accomplishments:

- Continued process improvements to DDG-1000 (formerly DD(X)) Program for surface hull treatment application processes to support critical design review schedule. (DDG-1000 Advanced Bonding Methods for Steel Structures)
- Continued testing and validation of adhesive bonded joints to support critical design review and technical insertion to reduce radar cross section, weight, and life-cycle costs for DDG-1000 (formerly DD(X)) program. (Large Marine Composite-to-Steel Adhesive Joints)
- Continued transition of high-productivity, cost-effective welding processes for large, thick-section, high-strength steel structures to shipyard production to enhance the survivability of DDG-1000 (formerly DD(X)). (Manufacturing Large Marine Structures)
- Continued evaluation of material properties of small-scale production heat of 10% Nickel (Ni) material for CVN 21. (High Strength and Toughness Naval Steels for Ballistic Protection) (Ballistic 10% Ni Steel)
- Continued Laser Welded Lightweight Panel Structure Fabrication and Application for CVN 21, developed inter-panel joint concepts and preliminary design concept to improve productivity. (Laser Welded Lightweight Panel Structure Fabrication - NMC)
- Continued rapid response and teaching factory activities.
- Continued Hybrid Laser Beam Welding effort for pipe welding for submarine applications (Hybrid Laser Beam Welding).
- Continued Erosion Resistant Coatings for Stage I Compressor Blisks effort. (Erosion Resistant Coatings for Stage 1 Compressor Components)
- Continued Manufacturing Process Development for Elimination of Weld Distortion of CVN 21 Heavy Plate Erection Units. (Elimination of Weld Distortion of CVN 21 Heavy Plate Erection Units)
- Continued Navy Unmanned Combat Air System (N-UCAS) Metallic Manufacturing Technology Transition effort to integrate with the Composites-Joint Unmanned Combat Air System (J-UCAS) Systems Design and Manufacturing Development (SDMD), Boeing St. Louis. (N-UCAS Structural Design and Manufacturing Development)
- Continued Turbine Inspection Techniques effort.
- Continued development of preliminary designs and manufacturing concepts, identifying material changes and specific processes to be improved. (Advanced Surface Ship Watertight Closures)
- Completed manufacturing process improvements supporting CVN 21 and J-UCAS.
- Completed analysis with Naval Surface Warfare Center (NSWC) and Northrop Grumman Ship Systems (NGSS) of key components and substructures that can be converted to low-cost titanium for center of gravity and structural weight savings on CVN 21. (Issues associated with Fabrication of Titanium Components for CVN 21)
- Completed Laser Welded Corrugated Core (LASCOR) Fabrication for CVN 21, Application Development of

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LASCOR effort: Designed, fabricated, tested, and performed final application demonstration for various repair, stud attachment, and joining technologies (Phase I).

- Completed Automated Thermal Plate effort by demonstrating a system for automated thermal plate forming of complex steel shapes to reduce fabrication cost and signature of the DDG-1000 (formerly DD(X)). (Automated Thermal Plate Forming)
- Completed Hot Section Corrosion Protection for 501-K34 Gas Turbine effort. (Hot Section Corrosion for 501-K34 Gas Turbine)
- Completed Modeling and Simulation for Carrier Construction Planning and Sequencing effort for CVN 21.
- Completed DDG-1000 (formerly DD(X)) Collarless Construction effort to develop and test methods for selecting most viable collarless construction techniques for DDG-1000 (formerly DD(X)) fabrication. (Collarless Construction)
- Completed Development of Cost-Effective, Low-Manganese Flux Core Welding Electrode for Joining High-Strength Steels effort with shipyard verification of trial production advanced weld wire. (Cost-Effective, Low-Manganese Flux Core Welding Electrode)
- Completed Improved Affordability of Titanium Parts for Marine Corps M777 Lightweight 155MM Howitzer effort by implementing flow formed titanium tubes into full rate production. (Titanium Parts for Lightweight 155M Howitzer)
- Completed J-UCAS Structural Welding effort.
- Completed Weld Quality Improvement/Distortion Reduction effort for CVN 21 carriers.
- Initiated Friction Stir Welding (FSW) effort for LCS. (Low Cost FSW of Aluminum for LCS Applications)
- Initiated corrosion mitigation efforts for the SH-60 helicopter. (Corrosion Resistant Coatings for Magnesium Transmission Gearboxes)
- Initiated facility simulation /optimization effort for Blast & Paint Facility at Marinette Marine. (LCS Paint Facility Design)
- Initiated facility simulation effort at Austal USA to assess benefits of alternatives to shipyard production flow. (Austal USA - Facility Design and Simulation)
- Initiated development of methods to improve the control of accuracy for structure fabrication. (Improved Dimensional Accuracy for LCS)
- Initiated effort to join composite structures for CVN 21. (CVN 21 Composites Joining)
- Initiated development of tandem arc welding process of high strength steels for CVN 21 fabrication. (Tandem Gas Metal Arc Welding (GMAW) for High Strength Steel Structures)
- Initiated development of hybrid-laser beam welding for use in fabrication of complex ship panels. (Hybrid Laser Welding of Ship Structures)
- Initiated development of translational friction welding for replacement of individual airfoils for

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aircraft engine blisks. (Translational Friction Weld Repair of Blisks)

- Initiated development of technology to join armor sub-panels for the Expeditionary Fighting Vehicle (EFV) armor skirt. (EFV Armor Skirt Manufacturing Development)
- Initiated effort to improve manufacturability and performance of pallets for AGS on DDG-1000 (formerly DD(X)). (Low-Cost Pallet Systems for DDG-1000 AGS)
- Initiated effort to develop, optimize, and demonstrate forming process for CVN components and determine material properties. (Alloy 625 Formability for Future Carriers)
- Initiated effort to evaluate castings as forming process for DDG-1000 (formerly DD(X)) applications. (DDG-1000 Improved Tee Sections for High-Strength Steel Structures)
- Initiated effort to evaluate sources of contaminants, controls, and remediation processes for removal of contaminants to support coating tanks. (CVN Preparation Methods for Coating Tanks)
- Initiated effort to address current production issues in weld defects in large diameter Alloy 625 pipes with new or modified procedures and equipment. (SSN Alloy 625 Pipe Welding)

FY 2007 Plans:

- Continue all FY 2006 efforts less those noted as completed above.
- Complete transition of high-productivity, cost-effective welding processes for large, thick-section, high-strength steel structures to shipyard production to enhance the survivability of DDG-1000 (formerly DD(X)). (Manufacturing Large Marine Structures)
- Complete Hybrid Laser Beam Welding effort for pipe welding for submarine applications. (Hybrid Laser Beam Welding)
- Complete testing and validation of adhesive bonded joints to support critical design review and technical insertion to reduce radar cross section, weight, and life-cycle costs for the DDG-1000 (formerly DD(X)) program. (Large Marine Composite-to-Steel Adhesive Joints)
- Complete effort to join composite structures for CVN 21. (CVN 21 Composites Joining)
- Complete development of tandem arc welding process of high strength steels for CVN 21 fabrication. (Tandem Gas Metal Arc Welding (GMAW) for High Strength Steel Structures)
- Complete development of hybrid-laser beam welding for use in fabrication of complex ship panels. (Hybrid Laser Welding of Ship Structures)
- Complete development of technology to join armor sub-panels for the EFV armor skirt. (EFV Armor Skirt Manufacturing Development)
- Complete Manufacturing Process Development for Elimination of Weld Distortion of CVN 21 Heavy Plate Erection Units. (Elimination of Weld Distortion of CVN 21 Heavy Plate Erection Units)

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- Complete Turbine Inspection Techniques effort.
- Initiate identification of requirements, candidate materials, and application techniques for an improved interior treatment on SSN-774 class subs and initiate testing. (SSN-774 Damping Material Application)
- Initiate applications and develop application techniques and equipment for High Solids coatings on DDG-1000 (formerly DD(X)) and other platforms. (Coating Application Improvement - formerly High Solids Coatings)
- Initiate project to explore commercially available mechanically attached fittings and belled-end pipe joining techniques for SSN-774 applications. (SSN Alternative Pipe Joining and Fittings)
- Initiate new effort for welding processes for large, thick-section, high-strength steel structures. (Large Marine Structure Hull Integration)
- Initiate VCS material management effort to develop a material management system to reduce acquisition costs for Virginia Class Submarines. (VCS Material Management)
- Initiate Design for Production Process Improvement effort to develop an enhanced design build process to support design decision trade-offs. (Design for Production Process Improvement)
- Initiate outfitting process improvement effort to support design decisions and trade-offs in VCS outfitting. (Outfitting Process Improvement)
- Initiate CVN 21 Power Unit Assembly Facility and Carrier Visual Build effort to optimize carrier build. (Optimization of CVN 21 Power Unit Assembly Facility and Carrier Visual Build)
- Initiate laser cladding effort to develop laser cladding technologies for use in sub construction. (Laser Cladding for Submarines)
- Initiate metalworking and joining efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN 21, Virginia Class Submarine, and LCS.

FY 2008 Plans:

- Continue all FY 2007 efforts less those noted as completed above.
- Complete N-UCAS Metallic Manufacturing Technology Transition effort to integrate with the Composites-J-UCAS SDMD, Boeing St. Louis. (N-UCAS Structural Design and Manufacturing Development)
- Complete facility simulation/optimization effort for Blast & Paint Facility at Marinette Marine. (LCS Paint Facility Design)
- Complete facility simulation effort at Austal USA to assess benefits of alternatives to shipyard production flow. (Austal USA - Facility Design and Simulation)
- Complete FSW effort for the LCS. (Low Cost FSW of Aluminum for LCS Applications)
- Complete development of translational friction welding for replacement of individual airfoils for aircraft engine blisks. (Translational Friction Weld Repair of Blisks)

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- Complete effort to develop, optimize, and demonstrate forming process for CVN components and determine material properties. (Alloy 625 Formability for Future Carriers)
- Complete effort to evaluate castings as forming process for DDG-1000 (formerly DD(X)) applications. (DDG-1000 Improved Tee Sections for High-Strength Steel Structures)
- Complete effort to evaluate sources of contaminants, controls, and remediation processes for removal of contaminants to support coating tanks. (CVN Preparation Methods for Coating Tanks)
- Complete applications and develop application techniques and equipment for High Solids coatings on DDG-1000 (formerly DD(X)) and other platforms. (Coating Application Improvement - formerly High Solids Coatings)
- Complete effort for welding processes for large, thick-section, high-strength steel structures. (Large Marine Structure Hull Integration)
- Complete development of preliminary designs and manufacturing concepts, identifying material changes and specific processes to be improved. (Advanced Surface Ship Watertight Closures)
- Complete Erosion Resistant Coatings for Stage I Compressor Blisks effort. (Erosion Resistant Coatings for Stage 1 Compressor Components)
- Complete corrosion mitigation efforts for the SH-60 helicopter. (Corrosion Resistant Coatings for Magnesium Transmission Gearboxes)
- Complete development of methods to improve the control of accuracy for structure fabrication. (Improved Dimensional Accuracy for LCS)
- Initiate metalworking and joining efforts to address improvements/affordability for DD(X), CVN 21, Virginia Class Submarine, and LCS.

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Complete process improvements to DDG-1000 (formerly DD(X)) Program for surface hull treatment application processes to support critical design review schedule. (DDG-1000 Advanced Bonding Methods for Steel Structures)
- Complete High Strength and Toughness Naval Steels for Ballistic Protection (Ballistic 10Ni Steel) effort.
- Complete Laser Welded Lightweight Panel Structure Fabrication and Application for CVN 21, develop inter-panel joint concepts and preliminary design concept to improve productivity. (Laser Welded Lightweight Panel Structure Fabrication - NMC)
- Complete identification of requirements, candidate materials, and application techniques for an improved interior treatment on SSN-774 class subs and initiate testing. (SSN-774 Damping Material Application)

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- Complete effort to improve manufacturability and performance of pallets for AGS on DDG-1000 (formerly DD(X)). (Low-Cost Pallet Systems for DDG-1000 AGS)
- Complete project to explore commercially available mechanically attached fittings and belled-end pipe joining techniques for SSN-774 applications. (SSN Alternative Pipe Joining and Fittings)
- Complete project to address current production issue in weld defects in large diameter Alloy 625 pipes with new or modified procedures and equipment for SSN-774 applications. (SSN Alloy 625 Pipe Welding)
- Complete VCS material management effort to develop a material management system to reduce acquisition costs for Virginia Class Submarine. (VCS Material Management)
- Complete Design for Production Process Improvement effort to develop an enhanced design build process to support design decision trade-offs. (Design for Production Process Improvement)
- Complete outfitting process improvement effort to support design decisions and trade-offs in VCS outfitting. (Outfitting Process Improvement)
- Complete CVN 21 Power Unit Assembly Facility and Carrier Visual Build effort to optimize carrier build. (Optimization of CVN 21 Power Unit Assembly Facility and Carrier Visual Build)
- Complete laser cladding effort to develop laser cladding technologies for use in sub construction. (Laser Cladding for Submarines)
- Initiate metalworking and joining efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN 21, Virginia Class Submarine, and LCS.

	FY 2006	FY 2007	FY 2008	FY 2009
OTHER (REPAIR TECH, ENERGETICS, GULF COAST, AND TECHNICAL ENGINEERING SUPPORT)	10,400	10,945	12,322	12,382

The "Other" activity includes repair technology, energetics, and technical engineering support. Repair technology addresses repair, overhaul, and sustainment functions that emphasize remanufacturing processes and advancing technology. Energetics efforts concentrate on developing energetics solutions to ensure the availability of safe, affordable, and quality energetics products largely in support of Program Executive Office (PEO) Integrated Warfare Systems (IWS).

Funding in this area is increasing from FY 2007 to FY 2008 to better support the shipbuilding affordability focus and corresponding technical work.

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FY 2006 Accomplishments:

- Continued to provide technical engineering support for the ManTech Program.
- Continued project to provide PEO (Carriers) with a portable device for aircraft carrier propulsion system health monitoring. (CVN Propulsion Health Monitoring)
- Continued effort for submarine Vertical Launch System (VLS) tube repair tools. (VLS Tube Repair)
- Continued effort on an automated rotor blade stripping system and workcell designs associated with rotor blade repair. (Helicopter Blade Refurbishment)
- Continued work with ATK Thiokol Propulsion to scale-up and implement the alternative manufacturing process. (Alternative Manufacture of Energetic Material 1,3,5-triamino-2,4,6-trinitrobenzene (TATB))
- Continued effort to demonstrate a continuous process to manufacture high volume, low cost, nitrogen based gun propellants, including a co-extrusion process for manufacture of co-layered propellants. (Flexible Manufacturing of Nitrogen Based Gun Propellants)
- Continued development of a pre-production laser/GMA hybrid pipe welding system. (Hybrid Pipe Welding System)
- Continued development of a comprehensive technical training and data collection program for structural welders and fitters, applying elements of Best Practices Lean technologies. (Technical Training and Data Collection (NGSS))
- Continued re-engineering internal supply chain/material delivery process. (Re-engineer Internal Supply Chain (NGSS))
- Completed Virginia-Class structural fabrication facility design effort to incorporate product centric manufacturing principles and robotic processes into self-sufficient and self-governing product lines. (Product Centric Facility Design)
- Completed development of a man-portable Gas Metal Arc (GMA) welder for shipyard applications. (Ultra-light Welding System)
- Completed wireless automated diagnostics/prognostics project and implemented on mobile diesel engines in shipyards.
- Completed evaluation of feasibility of welding High-Strength Low-Alloy (HSLA)-100 steel with reduced preheat, specifically for submerged arc welding of plates more than 1 5/8 inch thick and GMA welding of plates more than one inch thick. (High Heat Input Welding of Thick HSLA-100 with Reduced Pre-Heat)
- Completed development of "Super Finishing Process" to salvage helicopter gears and reduce procurement and maintenance costs. (CH-46 Gear Repair)
- Completed project to identify technologies to reduce the time and costs of alignment and inspection procedures associated with the maintenance of submarines. (Alignments and Inspections)

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- Completed development of a safer, repeatable, cost effective and environmentally sound alternative to live fire testing of M198, M777 and M1A1 recoil assemblies. (M198 Howitzer Mechanism Recoil Testing)
- Completed effort to evaluate finite element analysis methods to determine if they apply to thick Navy structures of CVN 21 ships. (Predictive Weld Distortion in Thick Navy Structures, Northrop Grumman Newport News (NGNN))
- Completed program to develop standards and processes for digital radiography of piping and plate welds supporting CVN 21 and Virginia-Class construction non-destructive testing. (Digital Radiography)
- Completed effort to minimize distortion and resulting re-work and costs in Virginia-Class hull ring manufacturing. (Weld Distortion Prediction Initiative)
- Completed building and evaluation of hand-held analyzer that can provide test results for determining presence of PCB contamination. (HAZMAT Analyzers)
- Completed development of a manufacturing process to reduce the cost and lead-time associated with polycan fabrication. (Polycan Fabrication)
- Completed development of new weld size and inspection criteria based on fitness for service. (Portable Weld Inspection Management System)
- Completed project to develop Waterborne Tank and Void Preservation process using new long-life high-solids coatings and Ultrahigh Pressure Water Jet (UHPWJ) surface preparation for tanks and voids on CVN 21 carriers. (Carrier Tank Coatings)
- Initiated evaluation of remanufacturing/repair operations at blast and paint facilities at USMC Depot at Albany, GA and identified process optimization/improvement options. (USMC Depot Blast & Paint Lean Production Optimization)
- Initiated Repair Technology projects based on high priority depot needs.
- Initiated energetics efforts to support PEO (IWS) and other acquisition programs.
- Initiated shipbuilding efforts for DD(X), LCS, CVN 21, and Virginia Class submarines.

FY 2007 Plans:

- Continue all FY 2006 efforts less those noted as completed above.
- Complete development of a pre-production laser/GMA hybrid pipe welding system. (Hybrid Pipe Welding System)
- Complete development of a comprehensive technical training and data collection program for structural welders and fitters, applying elements of Best Practices Lean technologies. (Technical Training and Data Collection (NGSS))
- Complete re-engineering internal supply chain/material delivery process. (Re-engineer Internal Supply

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Chain (NGSS))

- Complete work with ATK Thiokol Propulsion to scale-up and implement the alternative manufacturing process. (Alternative Manufacture of TATB)
- Complete effort for submarine VLS tube repair tools. (VLS Tube Repair)
- Complete effort on an automated rotor blade stripping system and workcell designs associated with rotor blade repair. (Helicopter Blade Refurbishment)
- Initiate and complete computed radiography effort as replacement for conventional film radiography for submarine applications. (Computed Radiography, an Alternative to Conventional Film Radiography)
- Initiate and complete nested material effort to develop a pipe nesting process to enable an efficient pipe spool fabrication process that supports a flexible manufacturing environment. (Nested Material Manufacturing Technology Improvement)
- Initiate internal supply chain effort at Marinette Marine that will result in process improvement activities focused on the methods used for tracking material in the yard. (Internal Supply Chain - Marinette Marine)
- Initiate Repair Technology projects based on high priority depot needs.
- Initiate energetics efforts to support PEO IWS and other acquisition programs.
- Initiate shipbuilding efforts for DDG-1000 (formerly DD(X)), LCS, CVN 21, and Virginia Class submarines.

FY 2008 Plans:

- Continue all FY 2007 efforts less those noted as completed above.
- Complete effort to demonstrate a continuous process to manufacture high volume, low cost, nitrogen based gun propellants, including a co-extrusion process for manufacture of co-layered propellants. (Flexible Manufacturing of Nitrogen Based Gun Propellants)
- Initiate Repair Technology projects based on high priority depot needs.
- Initiate energetics efforts to support PEO IWS and other acquisition programs.
- Initiate advanced shipbuilding efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN 21, Virginia Class submarines, and LCS.

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Initiate Repair Technology projects based on high priority depot needs.
- Initiate energetics efforts to support PEO IWS and other acquisition programs.

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- Initiate advanced shipbuilding efforts to address improvements/affordability for DD(X), CVN 21, Virginia Class submarines, and LCS.

	FY 2006	FY 2007	FY 2008	FY 2009
ELECTRONICS PROCESSING AND FABRICATION	10,000	10,690	10,900	10,900

Electronics Processing and Fabrication efforts develop and deploy affordable, robust manufacturing processes and capabilities for electronics critical to defense applications over their full life cycle. Efforts create new and improved manufacturing processes on the shop floor, as well as repair and maintain facilities such as depots and logistics centers, with a strong emphasis on process maturation.

FY 2006 Accomplishments:

- Continued Light Activated Semiconductor Switch (LASS) for CVN 21.
- Continued Electro-Optics Rapid Response efforts such as fiber optic training and troubleshooting efforts to support integration of fiber into new and legacy aircraft and ships.
- Continued Helmet Mounted Displays effort to reduce cost and improve durability of F/A-18 and Joint Strike Fighter (JSF) helmet mounted visor. (Helmet Mounted Display Visor)
- Completed F-18/DDG-1000 (formerly DD(X)) Microwave Monolithic Integrated Circuit (MMIC) Flip Chip Second Source validation and transfer effort.
- Completed ALQ-99 Band 4 Jammer effort (Phase 1) to increase production yields.
- Completed Hermetic Sealing of T/R Modules to provide significant improvement in affordability of T/R Modules for SPY-3 radar through use of more commercial packaging and manufacturing methods.
- Completed Manufacturing & Packaging of Power Systems for PEO Carriers and PEO Ships: Developed packaging methodologies for transmission and storage of switching devices and subsystems for pulsed power systems.
- Completed MicroElectroMechanical Systems (MEMS) Affordability Program.
- Completed effort to bring current and voltage sensors designed for high power applications from Technical Readiness Level 4 up to Technical Readiness Level 6 through a series of development phases for the manufacture of the sensor systems and developed a test bed for qualification of the system.
- Completed Lead-Free & Environmentally Safe Manufacturing project to reduce the risk of implementing current environmentally safe components and materials.
- Initiated effort on small Ku-band phased arrays suitable for high data-rate airborne relays and communications networks. (SiGE-Based System-on-Chip for Low-Cost Weight Phased Array Antennas)

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DATE: February 2007

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0708011N

PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT NUMBER: 1050

PROJECT TITLE: MANUFACTURING TECHNOLOGY

- Initiated Phase 2 effort to improve the manufacturability of the AN/ALQ-99 Band 4 Transmitter-Antenna Output Traveling Wave Tube (OTWT). (Manufacturability of OTWT for Jammer Applications)
- Initiated project to replace CRT based units on F/A-18 to significantly improve aircraft availability while reducing maintenance and logistics costs. (Digital Heads-Up Display)
- Initiated effort to address manufacturing issues of future high-power silicon carbide based components for solid state power substations for future Navy ships such as CVN 21. (High-Power Silicon Carbide PiN Diode Manufacturing)
- Initiated effort to determine applicability and performance capability of fiber optic acoustic sensors to reliably detect underwater swimmers approaching ships in port locations. (Underwater Swimmer Detection System)
- Initiated effort to further improve fiber light acceptance and transmission capabilities for DDG-1000 (formerly DD(X)). (DDG-1000 Remote Source Lighting)
- Initiated effort to develop the manufacturing technology to enable the Directional Infrared Countermeasures (DIRCM) mid-infrared laser subsystem technology to be ready for insertion in 2007-8 timeframe. (Multispectral Mid-IR Lasers for DIRCM)
- Initiated advanced electronics and electro-optics efforts to address improvement and affordability issues for DDG-1000 (formerly DD(X)), CVN-21, Virginia Class submarines, LCS, F/A-18, EA-18G, and others.

FY 2007 Plans:

- Continue all FY 2006 efforts less those noted as completed above.
- Complete LASS for CVN 21.
- Complete Phase 2 effort to improve the manufacturability of the AN/ALQ-99 Band 4 Transmitter-Antenna OTWT. (Manufacturability of OTWT for Jammer Applications)
- Initiate effort to reduce the cost and improve the reliability of fiber optic wound sensors for Virginia Class submarines. (Conformal Acoustic Velocity Sensor CAVES for Virginia Class Sub)
- Initiate high-G packaging and miniaturization effort for deeply integrated inertial guidance units (High-G Packaging and Miniaturization for Deeply Integrated Inertial Guidance Units)
- Initiate LCS Antenna Affordability Phase II effort. (LCS Reconfigurable Antenna)
- Initiate sonar and navigation effort for Virginia Class submarine. (Sonar and Navigation for Virginia Class)
- Initiate advanced electronics and electro-optics efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN-21, Virginia Class submarines, LCS, F/A-18, EA-18G, and others.

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PROGRAM ELEMENT: 0708011N

PROJECT NUMBER: 1050

PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT TITLE: MANUFACTURING TECHNOLOGY

FY 2008 Plans:

- Continue all FY 2007 efforts less those noted as completed above.
- Complete Helmet Mounted Displays effort to reduce cost and improve durability of F/A-18 and JSF helmet mounted visor. (Helmet Mounted Display Visor)
- Complete project to replace CRT based units on F/A-18 to significantly improve aircraft availability while reducing maintenance and logistics costs. (Digital Heads-Up Display)
- Complete effort to determine applicability and performance capability of fiber optic acoustic sensors to reliably detect underwater swimmers approaching ships in port locations. (Underwater Swimmer Detection System)
- Complete effort to further improve fiber light acceptance and transmission capabilities for DDG-1000 (formerly DD(X)). (DDG-1000 Remote Source Lighting)
- Complete effort on small Ku-band phased arrays suitable for high data-rate airborne relays and communications networks. (SiGE-Based System-on-Chip for Low-Cost Weight Phased Array Antennas)
- Complete LCS Antenna Affordability Phase II effort. (LCS Reconfigurable Antenna)
- Initiate advanced electronics and electro-optics efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN-21, Virginia Class Submarine, LCS, F/A-18, EA-18G, and others.

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Complete effort to address manufacturing issues of future high-power silicon carbide based components for solid state power substations for future Navy ships such as CVN 21. (High-Power Silicon Carbide PiN Diode Manufacturing)
- Complete effort to reduce the cost and improve the reliability of fiber optic wound sensors for Virginia Class submarines. (Conformal Acoustic Velocity Sensor CAVES for Virginia Class Sub)
- Complete sonar and navigation effort for Virginia Class submarine. (Sonar and Navigation for Virginia Class)
- Initiate advanced electronics and electro-optics efforts to address improvements/affordability for DDG-1000 (formerly DD(X)), CVN-21, Virginia Class Submarine, LCS, F/A-18, EA-18G, and others.

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PROJECT TITLE: MANUFACTURING TECHNOLOGY

	FY 2006	FY 2007	FY 2008	FY 2009
COMPOSITES PROCESSING AND FABRICATION	6,000	6,863	6,900	6,900

The primary technical goal of the Composites Processing and Fabrication activity is improving weapon systems affordability, enhancing weapon system effectiveness and improving reliability/war-fighter readiness through the increased utilization of composite materials and structures. This is being achieved through the development and maturation of affordable, robust manufacturing and assembly processes that fully exploit the benefits of composite materials.

The increase in funding between FY 2006 and FY 2007 reflects realignment from other activities to more closely align funding with planned program requirements.

FY 2006 Accomplishments:

- Continued project to develop advanced manufacturing techniques for alternate JSF Weapons Bay Door (WBD) design that employs integrated structure concepts to reduce both weight and cost. (Weapons Bay Door)
- Continued effort to develop methods for CVN 21 Weight Reduction. (CVN 21 Weight Reduction)
- Continued effort to develop and implement bonded steel-to-composite joint technology that is producible and cost effective while meeting the functional requirements of structures, signatures and longevity for the DDG-1000 (formerly DD(X)). (Large Marine Composite to Steel Bonded Joint)
- Continued development and refinement of low-cost composites manufacturing approaches for key vehicle areas. (N-UCAS System Design and Manufacturing Demonstration)
- Completed project to develop low cost manufacturing and joining processes for skin panels that can be incorporated into a deckhouse design for the Advanced Electric Ship Demonstrator (AESD) that would allow the testing of future topside concepts. (AESD Deckhouse)
- Completed development efforts on Advanced Hawkeye satellite communications antenna and initiated application of technology to advanced antennas being developed by PEO IWS for CVN 21 application. (Affordable Integrated Structural Apertures)
- Completed development of manufacturing processes to produce high temperature organic polymer radomes for the Phase III and IV Advanced Medium Range Air-to-Air Missile (AMRAAM). (Development of Manufacturing Processes to Produce High Temperature Capable Composite Radomes)
- Completed project to develop a robust cost-effective composites manufacturing process that incorporates current hardware interfaces so that Lock-In Lock-Out Composite (LIOC) hatches can be fabricated from lightweight materials for the ASDS. (Manufacturing Technology for ASDS LIOC Hatch)

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PROJECT NUMBER: 1050

PROJECT TITLE: MANUFACTURING TECHNOLOGY

- Initiated project for the insertion of titanium graphite reinforcement for engine bay doors on the F-18. (Titanium-Graphite for F/A-18 Engine Bay Doors)

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete full scale WBD manufacturing demonstration and testing. (Weapons Bay Door)
- Complete effort to develop methods for CVN 21 Weight Reduction. (CVN 21 Weight Reduction)
- Complete effort to develop and implement bonded steel-to-composite joint technology that is producible and cost effective while meeting the functional requirements of structures, signatures and longevity for the DDG-1000 (formerly DD(X)). (Large Marine Composite to Steel Bonded Joint)
- Complete development and refinement of low-cost composites manufacturing approaches for key vehicle areas. (N-UCAS System Design and Manufacturing Demonstration)
- Initiate affordability effort for DDG-1000 (formerly DD(X)) Helodeck stiffeners. (DDG-1000 Helodeck Stiffeners Affordability)
- Initiate affordability effort for DDG-1000 (formerly DD(X)) Radomes. (DDG-1000 Radomes Affordability)
- Initiate Virginia Class Sail Cusp effort to replace current steel and syntactic foam design with a lower cost composite cusp for the VA Class (Composite Sail Cusp).
- Initiate Virginia Class Impeller effort to replace current titanium forging that requires complex machining with a more affordable composite design (VCS Impeller).
- Initiate V-22 and H53 frames effort to replace current aluminum frames with more affordable composite frames made with enhanced automated weaving processes (Composite Frame Manufacturing Technology - V-22 and H-53).
- Initiate other projects to address improvements/affordability of DDG-1000 (formerly DD(X)), CVN 21, Virginia Class submarines, and others.

FY 2008 Plans:

- Continue all FY 2007 efforts less those noted as completed above.
- Complete project for the insertion of titanium graphite reinforcement for engine bay doors on the F-18. (Titanium-Graphite for F-18 Engine Bay Doors)
- Complete Virginia Class Sail Cusp effort to replace current steel and syntactic foam design with a lower cost composite cusp for the VA Class (Composite Sail Cusp).
- Complete V-22 and H53 frames effort to replace current aluminum frames with more affordable composite

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PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT NUMBER: 1050

PROJECT TITLE: MANUFACTURING TECHNOLOGY

frames made with enhanced automated weaving processes (Composite Frame Manufacturing Technology - V-22 and H-53).

- Initiate other projects to address improvements/affordability of DDG-1000 (formerly DD(X)), CVN 21, Virginia Class submarines, and others.

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Complete affordability effort for DDG-1000 (formerly DD(X)) Helodeck stiffeners. (DDG-1000 Helodeck Stiffeners Affordability)
- Complete affordability effort for DDG-1000 (formerly DD(X)) Radomes. (DDG-1000 Radomes Affordability)
- Initiate Virginia Class Impeller effort to replace current titanium forging that requires complex machining with a more affordable composite design (VCS Impeller).
- Initiate other projects to address improvements/affordability of DDG-1000 (formerly DD(X)), CVN 21, Virginia Class submarines, and others.

	FY 2006	FY 2007	FY 2008	FY 2009
CORPORATE INVESTMENTS	10,057	6,740	4,753	4,903

The Corporate Investments area is focused on accelerating defense industrial enterprise progress toward implementation of world-class industrial practices as well as advanced design and information systems that support weapon system development, production, and sustainment. Key emphasis areas include: 1) Benchmarking and accelerating the implementation of world-class industrial practices throughout the contractor base; 2) Demonstrating and validating advanced business practices and information technologies capable of streamlining management functions in all industrial base tiers; and 3) Leveraging information technologies in pursuit of tighter coupling of all defense industrial enterprise elements. Corporate Investment efforts create improvements to cost and cycle time for weapon system development, production, and repair.

The funding decreases in FY 2007 and FY 2008 reflect realignments to other activities to more closely align funding with planned program requirements in support of the shipbuilding affordability efforts.

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PROGRAM ELEMENT: 0708011N

PROJECT NUMBER: 1050

PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT TITLE: MANUFACTURING TECHNOLOGY

FY 2006 Accomplishments:

- Continued Best Manufacturing Practices efforts in surveys, the Program Manager's WorkStation, and Collaborative Work Environment.
- Continued Packaging Reconfigurable Antenna Solutions for Improved Mission Adaptability for the Littoral Combat Ship effort.
- Completed LASCOR/10% Ni Steel CVN Tails effort.
- Completed development of decision support system. (Gulf Coast Region Maritime Technology Center, NGSS LPD-17, potentially DDG-1000 (formerly DD(X))
- Completed the development of a low cost Vacuum Assisted Resin Transfer Mold (VARTM) process to produce Virginia-Class "Special Feature" parts that do not require significant post processing/machining and meet drawing and performance specifications. (Composite Manufacturing Technology for "Special Feature")
- Initiated efforts to continue to improve the Navy industrial base through above-the-factory-floor enhancements and supply chain processes/technology improvements for Navy weapon system acquisition programs such as the Littoral Combat Ship (LCS), CVN 21 carrier program, and others.

FY 2007 Plans:

- Continue all FY 2006 efforts less those noted as completed above.
- Complete the Packaging Reconfigurable Antenna Solutions for Improved Mission Adaptability for the LCS effort.
- Initiate efforts to continue to improve the Navy industrial base through above-the-factory-floor enhancements and supply chain processes/technologies improvements for Navy weapon system acquisition programs such as DD(X), CVN 21, LCS, Virginia Class submarines, and others.

FY 2008 Plans:

- Continue all FY 2007 efforts less those noted as completed above.
- Initiate efforts to continue to improve the Navy industrial base through above-the-factory-floor enhancements and supply chain processes/technology improvements for Navy weapon system acquisition programs such as the DDG-1000 (formerly DD(X)), CVN 21, LCS, Virginia Class submarines, and others.

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PROJECT NUMBER: 1050

PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT TITLE: MANUFACTURING TECHNOLOGY

FY 2009 Plans:

- Continue all FY 2008 efforts less those noted as completed above.
- Initiate efforts to continue to improve the Navy industrial base through above-the-factory-floor enhancements and supply chain processes/technology improvements for Navy weapon system acquisition programs such as the DDG-1000 (formerly DD(X)), CVN 21, LCS, Virginia Class submarines, and others.

C. OTHER PROGRAM FUNDING SUMMARY:

Major Acquisition programs, such as: DDG 1000 (formerly DD(X)), CVN-21, LCS, LPD-17, LCS, EFV, F/A-18, and VIRGINIA Class Submarines.

NON-NAVY RELATED RDT&E:

PE 0708011F Industrial Preparedness (USAF)

PE 0708011S Industrial Preparedness (DLA)

PE 0708045A End Item Industrial Preparedness Activities (ARMY)

D. ACQUISITION STRATEGY:

Not applicable.

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DATE: February 2007

BUDGET ACTIVITY: 07
PROGRAM ELEMENT: 0708011N PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS
PROJECT NUMBER: 9999 PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

	FY 2006	FY 2007
FORMABLE ALIGNED CARBON THERMOSETS (FACTS)/STRETCH BROKEN CARON FIBER	0	2,192

Currently, carbon fibers used in composites for structural applications are in continuous tows. These continuous tows of fiber provide high strength and stiffness but are unable to conform to complex contours, which prevents them from being used in certain applications. Previous efforts in the FACTS/Stretch Broken Carbon Fiber projects have developed methodologies to manufacture tows where the fibers are randomly discontinuous, allowing the fiber tow to maintain its mechanical properties but conform to complex shapes. This effort will be to scale up the process to make preimpregnated tape with these tows, and using this tape to make contoured demonstration articles for naval aircraft applications.

	FY 2006	FY 2007
POLYETHERIMIDE RESIN FOAM DOMESTIC MANUFACTURING CAPABILITY	0	996

Currently, "Airex" polyetherimide (PEI) foam is used as a structural core material in a variety of radome applications for platforms such as DDG-1000 (formerly DD(X)) and F/A-18 due to its unique combination of mechanical and RF properties. There is only one worldwide manufacturer of this foam (Alcan), a Swiss company that has announced it will stop manufacturing the foam for environmental reasons. There is no alternate supplier of this foam, and switching to other foam cores would result in costly part redesigns and/or reduction in radome performance. This project is intended to develop a domestic manufacturing capability for an environmentally friendly version of PEI foam for use as a drop-in replacement for these naval applications.

	FY 2006	FY 2007
US NAVY NUCLEAR POWER PLANT AND SHIP PROPULSION SHAFT MANUFACTURING IMPROVEMENT	0	1,345

This effort concentrates on improving the manufacturing and lowering the cost of production for nuclear power plant components and shafts for Navy submarines/aircraft carriers and for shafts for Navy surface combatants.

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DATE: February 2007

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0708011N

PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: INDUSTRIAL PREPAREDNESS

PROJECT TITLE: Congressional Plus-Ups

	FY 2006	FY 2007
NANO-IMPRINT AT MANUFACTURING SCALE (NIMS)	1,341	1,445

FY 2006 - This effort concentrated on the module level development for subsystems needed for direct manufacturing of micro-electronic integrated circuits. Emphasis was placed on evolving year - 1 alpha concept designs into beta prototypes for testing and processing data collection.

FY 2007 - This effort supports NIMS research.

	FY 2006	FY 2007
NAVAL APPLICATION OF LASER PEENING TECHNOLOGY	959	0

This effort supported evaluation of the implementation potential for Navy aircraft of the laser peening process to enhance fatigue life, fatigue strength, resistance to stress corrosion cracking on aircraft and rotorcraft components, reduce aircraft maintenance costs and improve damage tolerance.