Navy ManTech Program
Impacting Key Platform Affordability

John Carney
Affordability Initiatives Division
4 Feb 2015
Overview

• Navy Manufacturing Portfolio (6.1-7.8)
• Navy ManTech Investment Strategy
• New CH-53K Affordability Initiative
• Centers of Excellence – Execution Agents
• FY16 Planning Cycle
• Affordability Initiative Highlights
  • VIRGINIA Class Submarine (VCS)
  • Joint Strike Fighter (JSF)
ONR Affordability Initiatives

- **Manufacturing Technology (ManTech) Program** - *Develops affordable, enabling manufacturing technology for use in DoN weapon system acquisition or repair.*

- **Technology Insertion Program for Savings (TIPS)** - *Transitions commercial off-the-shelf solutions and late-stage development technologies into DoN acquisition programs to reduce operations and maintenance support costs.*

- **Technology Transfer (T2)** – *Aids DoN to benefit from the innovations developed by its own network of R&D labs.*

- **Domestic Preparedness Support Initiative (DPSI)** - *Leverages DoD’s technology and logistics capabilities to assist first responders.*

- **Foreign Comparative Test (FCT)** - *Evaluates foreign technology or COTS equipment and funds operational testing of improved, mature technology to improve warfighter capability, accelerate fielding, and save money.*
ONR ManTech Organization

John Carney
ONR 03T
Director, Affordability Initiatives and Navy ManTech

Program Director
ManTech Portfolio Manager:
- PEO (Carriers)
- PEO (Ships)
- PEO (LCS)
- PEO (Subs)
JDMTP Principal

Dr. Richard Fonda
NRL

6.1 ManScience Program

Angela Gray (On-site)
ADS (SA)
Financial / Budgetary Support

Sarah Mitchell
Bill Palko
Lorie Lee
(Off-site)
ADS
ManTech Contractor Support

Paul Huang
Program Officer
Coordination with S&T
AME Subject Matter Expert
JDMTP AME Subpanel

Neil Graf
Program Officer
Program Officer / COR:
- CMTC
- CNST
ManTech Portfolio Manager:
- PEO (JSF) - JSF
- PEO (A) - CH-53K
JDMTP Composites Subpanel

Rich Henson
Program Officer
Program Officer / COR:
- EMPF
- EOC
JDMTP Electronics Subpanel

Greg Woods
Program Officer
Program Officer / COR:
- iMAST
- NMC
JDMTP Metals Subpanel

Legend
- ONR
- Detallees
- Contractor

Distribution Statement A: Approved for public release
**Vision**: Integrated approach from S&T basic research through industrial base preparedness (6.1 through 7.8) to address manufacturing and affordability in manufacturing for DoN systems

<table>
<thead>
<tr>
<th>6.1 – Manufacturing Science</th>
<th>6.2 – Mfg Applied Research</th>
<th>6.3 - Mfg Technology S&amp;T</th>
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</thead>
<tbody>
<tr>
<td>Novel manufacturing technologies and control methods to produce critical new and replacement parts on-demand</td>
<td>Scale-up and development of emerging manufacturing process innovations for product-related S&amp;T programs (FNCs) to reduce cost of fielding new capabilities</td>
<td>Acceleration of manufacturing technologies to reduce total ownership costs for DoN systems (higher risk than ManTech)</td>
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<tr>
<td>– Cyber-Enabled Manufacturing Systems for Direct Digital Manufacturing (CeMS-DDM)</td>
<td>– Azimuth and Inertial MEMS Disk Resonator Gyros</td>
<td>– Integrated Manufacturing of Submarine Composites</td>
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<td></td>
<td>– Fuel Cell Producibility</td>
<td>– Distortion Reduction for Additively Manufactured Electronic Chassis (SEWIP)</td>
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### 7.8 - Manufacturing Technology (ManTech)
Affordability (acquisition and life-cycle) for 5 key naval acquisition platforms
• **Mission:**
  – Development of novel manufacturing technologies and control methods to produce critical new and replacement parts on-demand

• **Funding:**  Approx. $1.0M/year

• **Execution:**  BAA / Grant

• **Current Focus:**
  – Cyber-Enabled Manufacturing Systems for Direct Digital Manufacturing (CeMS-DDM)
    • BAA Closed – Mar 2014 / Awards – Summer 2014
    • Goal – development of the fundamental principles for CEMS-DDM to closely couple computation and manufacturing
      – Enable prediction and control over manufacturing processes
      – Anticipate defect formation and initiate corrective actions in real-time

• **POC:**  Dick Fonda
• **Mission:**
  – Scale up and development of emerging manufacturing process innovations for both future platform affordability and to address manufacturing challenges inherent in product-related S&T programs to reduce cost of fielding new capabilities.

• **Funding:**  Approx. $0.9M/year

• **Execution:**  ManTech COEs

• **Current Projects:**
  – Fuel Cell Producibility
    • Goal – Address prodcucibility requirements for system/components of UTC Aerospace Systems Fuel Cell
    • Payoff – Significant cost avoidance as technology transitions into acquisition program in FY18-19
  – Mfg Process Optimization of Azimuth and Inertial MEMs (AIM) Disk Resonator Gyros
    • Goal – Optimize wafer processing / production of low cost high quality sensors for the Digital Magnetic Compass Silicon Disc Resonator Gyroscope (SiDRG)
    • Payoff – Reduced component cost of a low SWaPC replacement

• **POC:**  Paul Huang
• **Mission:**
  - Acceleration of recently discovered manufacturing technologies to reduce acquisition and ownership costs for DoN weapon systems (higher risk than ManTech)

• **Funding:**  Approx. $1.8M/year

• **Execution:**  ManTech COEs

• **Current Projects:**
  1. **SiC High-Efficiency Power Switches Wafer Process Improvement (DDG-51 Flight III)**
     - Goal - Improve epi-layer growth and device manufacturing technology to increase yield
     - Payoff – Reduced cost and increased power density resulting in ship power increase
  2. **Fire Safe Resins (VCS/ORP)**
     - Goal - Robust FST-safe material system/properties database for design of internal sub components
     - Payoff – Improved manufacturing efficiency and reduced cost for composite shipboard parts
  3. **Enabling Technologies for Integrated Mfg of Submarine Composites (VCS/ORP)**
     - Goal - Repeatable manufacturing approaches and associated cost/weight impacts
     - Payoff – Acquisition/life-cycle cost reduction; applicable to surface ships/other defense systems
  4. **Distortion Mitigation for Additively Manufactured Electronic Chassis (SEWIP)**
     - Goal - Rapid manufacture of reconfigurable, complex, monolithic aluminum electronics chassis
     - Payoff:  Procurement cost, lead time, and part count reduction

• **POC:**  ONR Program Officers / COEs
7.8 – Manufacturing Technology (ManTech)

• **Mission:** Industrial Preparedness
  - Development of enabling manufacturing technology -- new processes and equipment -- for implementation on DoD weapon system production lines
  - DoD 4200.15 states investments should:
    • Transition emerging S&T results to acquisition programs
    • Improve industrial capabilities in production, maintenance, repair and industrial base responsiveness
    • Advance manufacturing technology to reduce cost, improve performance, and responsiveness

• **Funding:** Approximately $55M

• **Execution:**
  - Seven (7) Centers of Excellence (COEs)
    • 6 Contracted, 1 Government

• **POCs:** ONR Program Officers / COEs
• **Addressing affordability (acquisition and life-cycle)**

<table>
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<tr>
<th>Affordability Initiatives</th>
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<tr>
<td>PEO (Subs) VIRGINIA ORP</td>
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<td>PEO (Ships) DDG 51 Class</td>
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<td>PEO (Carriers) CVN 78 Class</td>
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<td>PEO (JSF) F-35</td>
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<td>PEO (A) CH-53K</td>
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• **Investment Strategy focused on largest DoN acquisition programs as determined by:**
  - Total acquisition funding
  - Stage in acquisition cycle (remaining years of acquisition)
  - Platform cost reduction goals
  - Cost reduction potential for manufacturing

• **Recent Changes**
  - Addition of CH-53K

**ManTech - making a significant impact on affordability, highlighted by recent implementations and cost savings**
• Marine expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel
  - Triples external load carrying capacity of predecessor
  - Fully shipboard compatible and operable from austere/remote forward bases

• Rationale for ManTech Investment:
  - Production: 200 aircraft
  - Manufacturing lessons learned with desired improvements identified
  - Timing right to impact early manufacturing phase and FRP

• Status:
  - Working closely with PMA-261 and Sikorsky/subs to identify critical manufacturing issues
  - Some late FY15 project starts likely
Centers of Excellence

• Executed through Centers of Excellence (COEs)
  – Execute projects; manage project teams
  – Collaborate with acquisition program offices / industry to identify and resolve mfg issues
  – Develop and demo mfg technology solutions for identified Navy requirements
  – Facilitate transfer of developed technologies

• CNST → NSAM Center
  – Recompeted Summer 2014 with expanded mission; now includes aircraft assembly and fabrication
Centers of Excellence – Core Competencies

**Metalworking (NMC)** –
- Simulation & Modeling
- Materials Processing and Fabrication
- Near Net Shape Fabrication (including DDM)
- Surface Treatment

**Institute of Mfg & Sustainment Tech (iMAST / REPTECH)** –
- Laser Processing
- Materials and Composites Processing
- Manufacturing Systems
- Systems and Operations Automation
- Sustainment / Repair Technologies

**Electronics (EMPF)** –
- Automated Packaging
- RF Technology
- Wide Band Gap Technology
- Environmental

**Electro-Optics (EOC)** –
- Focal Plane Array & Sensor Technology
- Fiber Optics & Photonics
- Carbon Based Electronics
- Window and Dome Technology
- Lasers and Laser Weapon Systems

**Composites (CMTC)** –
- Automated Fiber Placement
- Out of Autoclave Composites
- Thick-Walled Composites
- Vacuum Assisted Resin Transfer Molding
- Controlled Volume Molding for High Temp Composites
- Manufacturing Automation for Polymer Composites
- Composites for Very Large Format Radomes

**Shipbuilding / Advanced Mfg (NSAM Center)** –
- Shipbuilding Technology
- Process / Fabrication Optimization
- Digital Work Instructions
- Modeling
- Spatial Scheduling
- Inspection Technology

**Energetics (EMTC)** –
- Propellants
- Munitions

**Distribution Statement A: Approved for public release**

Greg Woods – Prog Officer
Neil Graf – Prog Officer
Rich Henson – Prog Officer
Chuck Painter
NSWC – Indian Head
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<tr>
<td>3. ManTech Program Office Approval</td>
<td>Dec 2014</td>
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<td>4. Program Office Prioritization and Approval</td>
<td>Jan–Feb 2015</td>
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<td>5. Approved Prioritized Plan per Platform</td>
<td>Mar 2015</td>
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<td>8. Project Initiation (FY16 Projects) ***</td>
<td>Oct 2015</td>
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*** Industry Involvement
On track to save nearly $500M with current portfolio of approx. $69M

- Projected acquisition savings: $36.5M/hull
  - Cost savings to date: $32.4M/hull
  - 36 implemented projects per Electric Boat (8/2014)
- Projected class maintenance/repair cost savings: $100+M

Won 2013 DOD Value Engineering Achievement Award

- Letter of appreciation from HON Frank Kendall, USD (AT&L) – Jun 2014
- Presented to ONR ManTech, VCS Production Cost Reduction Team (PMS 450), and Electric Boat – Oct 2014

Annual Navy ManTech Budget returned with yearly VCS cost savings of >$60M
VCS Project Highlight
VCS Robotic Interim Products

Goal:
- Reduce welding costs for part family and interim product and major product assemblies by increasing the number of joints that can be welded using robotics
- Targeting 30% reduction in weld hours

Warfighter Impact / Payoff:
- Total Cost Savings: $500K/hull

Implementation:
- Electric Boat – Quonset Point – implementation targeted for Fall 2015
Goal:
• Develop composites technology for doubly-curved steel VCS sail sections to reduce acquisition and maintenance costs
  - Current sections difficult to fabricate and corrode frequently in harsh underwater environment.

Warfighter Impact / Payoff:
• Total Cost Savings: $3.5M/hull total
  - $1.8M/hull acquisition / $1.7M/hull maintenance

Implementation:
• Implemented VCS 2014 / anticipated implementation on ORP
Joint Strike Fighter
Affordability Initiative

- Navy impact – projected $700M savings for DoD aircraft on $27M Navy investment
- Joint Navy, Air Force and OSD ManTech collaboration

Canopy Thermoforming Automation
- $75-125M DoD savings on $1.4M investment

Automated Fiber Placement of BMI Materials
- $100M+ DoD savings on $3M investment

Controlled Volume Molding (CVM) –
- $20M+ DoD savings on <$200K investment

The partnership between the F-35 Program Office and the Navy ManTech Office is producing real benefits that will improve affordability of near-term production units. We look forward to increasing our collaboration for continued improvements in acquisition and life-cycle affordability.

Amanda Gentry, F-35 Blueprint for Affordability and Science and Technology Lead, Oct 2014
Navy ManTech Web Site

  - Project Book (snapshot of all projects active during past FY)
  - Points of Contact Directory

- **Navigation** – [www.onr.navy.mil](http://www.onr.navy.mil); click on “03T Transition” under Directorates heading; and click on “Manufacturing Technology”