ACCELERATING TO THE NAVY & MARINE CORPS AFTER NEXT

Navy ManTech Program

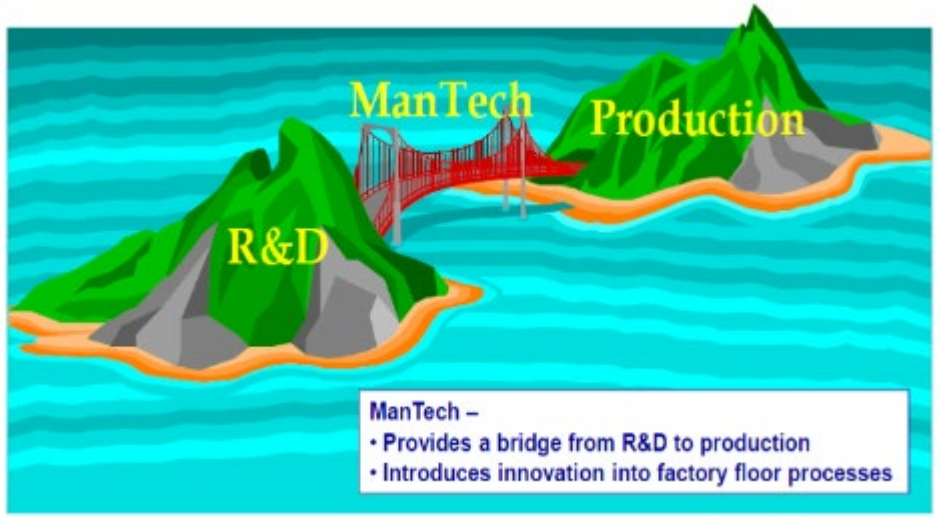
Impacting Key Platform Affordability

ManTech Overview for NSRP

Neil A. Graf
Manufacturing Technology (ManTech) Program Lead)
ONR Code 332 MT
Naval Materials S&T Division
29 March 2023

PE 0603680N – Manufacturing Technology (ManTech)

- **Established USC Title 10, Section 4841**
- **Mission:** Industrial Preparedness
  - Development of enabling manufacturing technology – new processes and equipment – for implementation on DoD weapon system production lines
  - DoDD 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
- **Execution:**
  - ManTech Centers of Excellence (COEs)
- **POCs:** ONR Program Officers / COEs



ManTech 101 – What It Can and Cannot Be Used For

ManTech Requirements (DoD 4200.15, E2.1.3)

- Well-defined DoD requirement for the technology
- Technology demo'd in lab environment
- Can be delivered in time to meet the requirement
- Results applicable to more than one weapon system, component, or end item
- Specific plan to transition, implement, and insert results
- Potential for multiple Component-sponsored investments identified
- Investment not duplicative of other activities, both within and outside ManTech

ManTech 101 (cont) – What It Can and Cannot Be Used For

ManTech Cannot Be Used For:

- Technology push, advancing general science
- Routine application of existing technology
- Implementation of manufacturing technology beyond the first-case application
- Product design (design for production analysis ok)
- Material development or optimization
- Purchase of off-the-shelf equipment (unless a minor portion of the investment and required to establish the first-case application of the ManTech deliverable)
- Purchase of capital equipment/facilities
- Component/system certification or qualification testing
- Technology proprietary to one company

Manufacturing Technology Program – FY24 Investment Strategy –

AT A GLANCE

Funding executed in two major areas – (1) Major Acquisition Platform Affordability and (2) Capability Acceleration, in close coordination with acquisition program offices, depots and shipyards, industry, NRE, Navy Labs, and Technical Warrant Holders.

FY24 Investment Strategy

1. Major Acquisition Platform Affordability (est. 80%)

PEO (SSN)	PEO (SSBN)	PEO (Ships)	PEO (Carriers)	PEO (USC)	PEO (JSF)
VIRGINIA Class	*COLUMBIA Class*	*DDG 51 Class*	*CVN 78 Class*	*FFG 62 Class*	*F-35*

2. Capability Acceleration (est. 20%) - supports CNO direction to get capabilities to the fleet faster

Thrust Areas			
1	Unmanned / Autonomous Vehicle Production	5	Energetics Production Improvement
2	Directed Energy	6	Hypersonics Fabrication
3	Advanced Submarine Technology Fabrication	7	Other ONR Manufacturing Maturation
4	Sustainment Technology		

WHY IS THIS IMPORTANT

- **Platform Affordability –** ManTech has a significant role in providing cost savings to major acquisition platforms. Close coordination with acquisition program offices and industry ensures implementation on production lines.
- **Capability Acceleration –** ManTech's manufacturing expertise allows for rapid manufacturing maturation to benefit both S&T and acquisition programs to get capabilities to the fleet faster.

Investment Strategy Addition
Capability Acceleration

- **Target per CNR – 20% of ManTech budget**

- **Seven initial thrust areas identified**
  - Some new for ManTech (i.e., Unmanned / Autonomous Vehicle Production)
  - Others derived from Affordability Initiatives (i.e., Advanced Submarine Fabrication)

	Capability Acceleration Thrust Area	Platforms
1	Unmanned / Autonomous Vehicle Production	Various
2	Directed Energy	FFG(X) / LSC
3	Advanced Submarine Fabrication Technology	VCS / CLB
4	Sustainment Technology	Ships / Aircraft
5	Energetics Production Improvement	Various
6	Hypersonics Fabrication	Various
7	Other ONR Manufacturing Maturation	Various

Execution through COEs

- **Centers of Excellence (COEs)**
  - Execute projects and manage project teams
  - Collaborate with acquisition program offices / industry to identify and resolve manufacturing issues
  - Develop and demonstrate manufacturing technology solutions for identified Navy requirements
  - Facilitate transfer of developed technologies

CNM	**Center for Naval Metalworking (CNM)**
CMTC	**Composites Manufacturing Technology Center (CMTC)**
PennState Electro-Optics Center	**Electro-Optics Center (EOC)**
EMC ELECTRONICS MANUFACTURING CENTER	**Electronics Manufacturing Center (EMC)**
EMTC	**Energetics Manufacturing Technology Center (EMTC)**
PennState Institute for Manufacturing and Sustainment Technologies	**Institute for Manufacturing and Sustainment Technologies (iMAST)**
Naval Shipbuilding and Advanced Manufacturing CENTER OF EXCELLENCE	**Naval Shipbuilding and Advanced Manufacturing (NSAM) Center**

Navy ManTech Organization

Code 33 – Sea Warfare and Weapons Department

Gina Walker
Ellen Reed
Megan Gavarkavich
Stephanie Marsh
Kassia Rivera
Contracts – ONR Code 253

Dr. Thomas Fu
ONR 33 Department Head

Dr. Jennifer Wolk
Code 332 - Naval Materials and Mfg
Division Director

Sarah Mitchell
Denise Piastrelli
Maddie Maldonado
Gabe Puente-Lay
Prince Adu-Jamfi
Laurel Rubinstein
Matt Vincent
Bill Palko
Don Szczur
Allegient Defense Team

Neil Graf
ManTech Lead / Program Officer
Composites Manufacturing Lead

COR:
- **CMTC**
- **EMTC**

ManTech Portfolio Manager:
- **Capability Acceleration**
- **Air Platforms (Affordability)**
- **Ship Platforms (Affordability)**

JDMTP Navy Principal / JDMTP Chair

Scott Bartlett (NSWC-CD)
CMTC Technical / Programmatic Support
JDMTP Composites Subpanel - Chair

Paul Huang
Program Officer
Manufacturing Enterprise Lead

COR:
- **NSAM**
- **iMAST**

ManTech Portfolio Manager:
- **Sustainment**

JDMTP AME Subpanel

Tech. Advisory Committee Representative
- **MxD / Mfg Institutes**

Guest Researcher at NIST

Mike Hackert
Program Officer
Electronics Manufacturing Lead

COR:
- **EMC/EMPF**
- **EOC**

ManTech Portfolio Manager:
- **PEO (IWS)**

JDMTP Electronics Subpanel

Will Crespo, NSWC-Crane
EOC / EMC Technical / Programmatic Support
JDMTP Directed Energy Working Group

Dr. Jeffrey Farren
Program Officer
Metals Manufacturing Lead

COR:
- **CNM**

JDMTP Metals Subpanel

NSWCCD Coordination

6.2 Development Lead

Legend
- ONR
- Technical Support
- Contractor Support

Navy ManTech Active Projects

Platform	Active Projects	Total Investment ($M)
VIRGINIA Class Submarine	27	140.4
COLUMBIA Class Submarine	22	37.1
CVN 78 Class Carrier	7	46.8
DDG 51 Class Destroyer	19	117.8
Total	91	342.1

Affordability Assessments / Recognized Cost Savings

- **Affordability Assessments (estimate of total savings per hull)**
  - Acquisition Program Office-approved process for assessing cost savings of current ManTech portfolio
  - Assess both acquisition and life-cycle savings semi-annually
- **Recognized Cost Savings (by Shipyard)**
  - Recognized savings/hull for projects in portfolio that have either implemented to date or are in the process of implementing
  - Measurement of progress against estimated total savings per hull
  - Submitted by the applicable shipyard annually

Acquisition Affordability Assessment (Nov 2022)		
Platform	**Total # Affordability Projects**	**Probable EROM Cost Reduction Per Vehicle ($M)**
CVN 78 Class Carrier	**61**	**88.4**
DDG 51 Class Destroyer	**95**	**52.1**
VIRGINIA Class Submarine (VCS)	**174**	**68.2**
COLUMBIA Class Submarine (CLB)	**57**	**48.1**

VIRGINIA / COLUMBIA Class Submarine Affordability Initiatives

VIRGINIA Class Submarine (VCS) Initiative

- Investment: approximately $140.3M to date
- Total estimated acquisition savings: $67.7M/hull
- Recognized cost savings to date: $45.5M/hull
  - 68 projects implemented or in the process of implementation (Fall 2022 General Dynamics Electric Boat update)
- **Significant class maintenance / repair cost savings**

Extended affordability focus to COLUMBIA Class submarine (CLB)

- **Investment:** approximately $37.1M to date
- **Total estimated acquisition savings:** $39.8M/hull
- **Recognized cost savings to date:** $16.1M/hull
  - 15 projects implemented or in the process of implementation (Fall 2022 General Dynamics Electric Boat update)

Annual Navy ManTech budget returned with yearly VCS cost savings of >$80M

RECENT SUCCESS STORIES

Deep Hole Drilling

- Transformed the process of deep hole drilling by developing an annular mag-base drill
- Leveraged commercial-off-the-shelf drills and existing technology used in other industries
- Implemented new drill and established a new process for deep hole drilling
- Five-year savings of $3.3M for CVN (new construction and overhaul) and $2.4M for DDG; total a five-year savings of $8M; additional savings anticipated from other shipyards
- Implementation planned in FY24 at Newport News Shipbuilding, Bath Iron Works, and Ingalls Shipbuilding

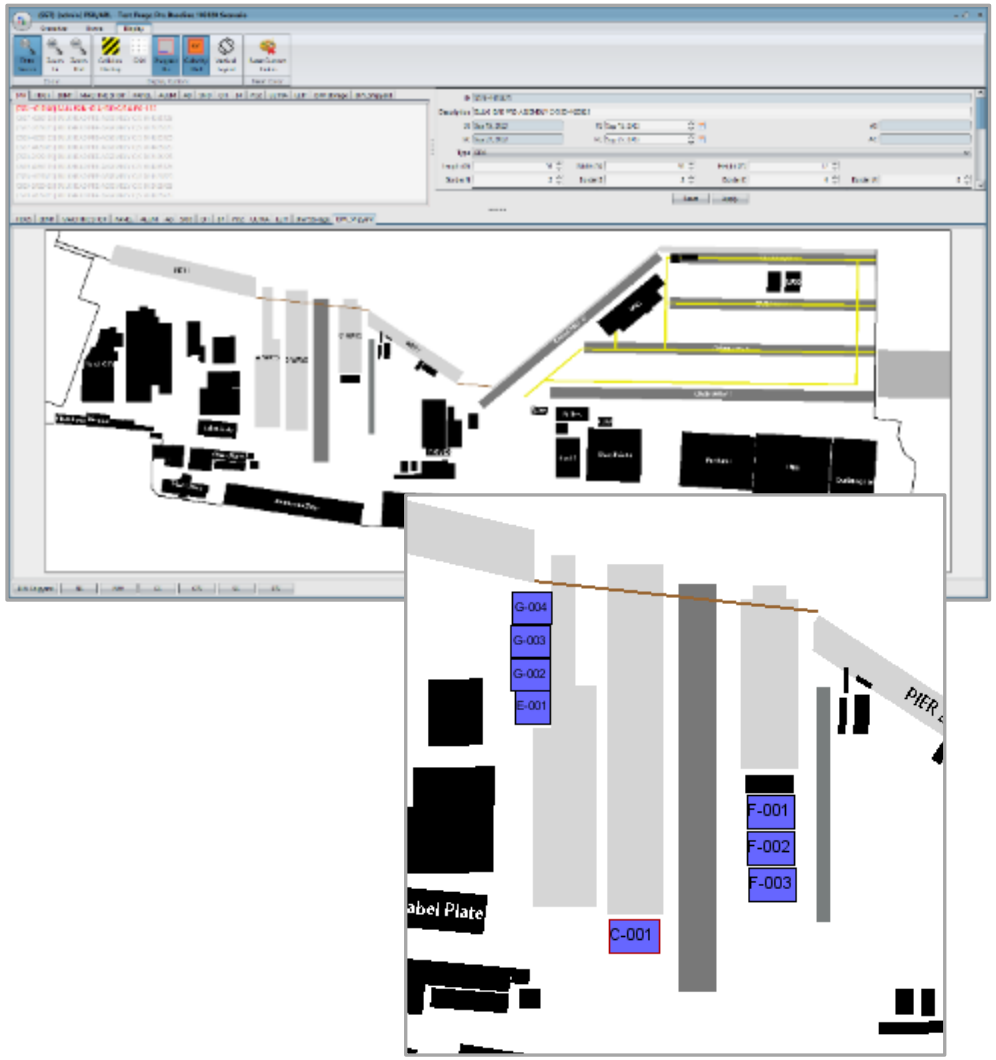
Digital Data for Next-Generation Measurement / Location Tools

- **Applied digital thread to ship and submarine manufacturing processes used to locate and install paint masking and hanger stud positions**
- **Demonstrated the ability to use existing product model information in complex ship construction activities**
- **Total five-year savings of $12.9M; reduced hull construction costs by:**
  - CLB – $1.7M (non-recurring) and $809K (recurring)
  - VCS – $1.1M (non-recurring) and $501K (recurring)
  - DDG 51 – $510K (recurring)

IMAST
INSTITUTE FOR MANUFACTURING AND SUSTAINMENT TECHNOLOGIES

Critical Asset Management

- Developed a tool that interfaces with Bath Iron Works' (BIW's) current capacity planning tools and digitally tracks and plans critical assets to support the DDG 51 structural unit assembly plan
- Software also integrates the added capabilities of asset maintenance planning and asset tracking
- Software and tool implemented at BIW in August 2022
- Estimated to save ~$650K per year

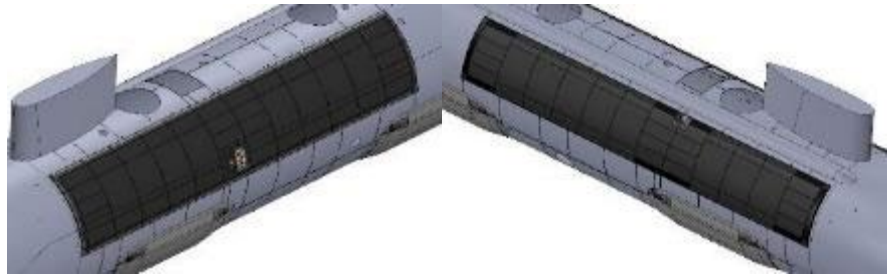


Portable Welding Robot for VCS and CLB

- Developed a system that can be broken down, transported, and set-up on a job site within a standard shift
- All essential welding variables were developed and integrated into the robot controls
- Prototype portable welding robot system will be implemented at General Dynamics Electric Boat in FY24
- Five-year savings of $10.35M are estimated for VCS, VPM, and CLB

Submarine Coatings Process Fabrication Development

- Reduced the fabrication costs of planned improved VCS special hull treatment (SHT) coatings for VIRGINIA and COLUMBIA Class submarines
- Developed lower-cost, high-quality, repeatable manufacturing processes
- Initial implementation of 350 sq ft of SHT on SSN 781
- Installed 3,365 sq ft of SHT on SSN 775; sea trial planned for FY23
- Reduced cost by as much as $1,000 per sq ft



IMAST

INSTITUTE FOR MANUFACTURING AND SUSTAINMENT TECHNOLOGIES

Cold Spray for CVN Sustainment

- Developed and qualified cold spray repairs for CVN components that lower repair costs, provide higher quality repairs, and reduce repair times
- Reduced life-cycle costs; cost avoidance of ~75%
- ~50% improvement in repair time
- Repairs components that do no have existing repairs: 3 unique components identified; >10 total instances

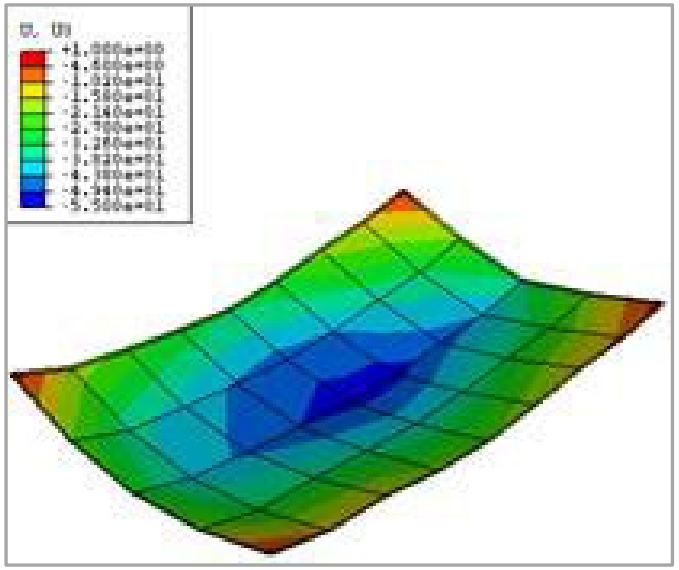
IMAST
INSTITUTE FOR MANUFACTURING AND SUSTAINMENT TECHNOLOGIES

VCS Seawater System Large Diameter Ball Valve Improvements

- Identifying and validating potential coatings, process parameters, and sealants to improve ball valve life-cycle performance in Navy submarines
- Optimizing the coating material systems' interface with the valve ball and seat and preventing formation of calcareous deposits
- Improves fleet readiness and performance and reduces life-cycle costs; significant cost savings are anticipated

Shaped Plate Automation and Verification

- Demonstrated prototype that improves shaped-plate fabrication and verification processes to automatically form steel into complex, 3D shapes and significantly minimizes lead-time and costly downstream rework
- Estimated cost savings of $1.53M per DDG hull, $2.64M per LHA hull



Navy ManTech Video

Save the Dates

- **Defense Manufacturing Conference 2023**
  - 11-14 Dec 2023
  - Music City Center
  - Nashville, TN
- **ShipTech 2024**
  - 21-22 Mar 2024
  - Charleston, SC
  - pending approvals

SHIPTECH

Questions?

- **For more information,**
  - Access https://www.nre.navy.mil/work-with-us/navy-mantech
  - E-mail navymantech@allegientdefense.com