

State of the Panel Ship Design and Material Technologies Panel

Monika Skowronska, Panel Chair

General Dynamics, NASSCO

NSRP SDMT Leadership

- Monika Skowronska: Panel Chair
- Vicky Dlugokecki: Panel Vice Chair
- Dan Sfiligoi: Major Initiative Team Lead
- Michael Gerardi: Major Initiative Team Lead



Ship Design & Material Technologies

Chair: **Monika Skowronska**
(NASSCO)

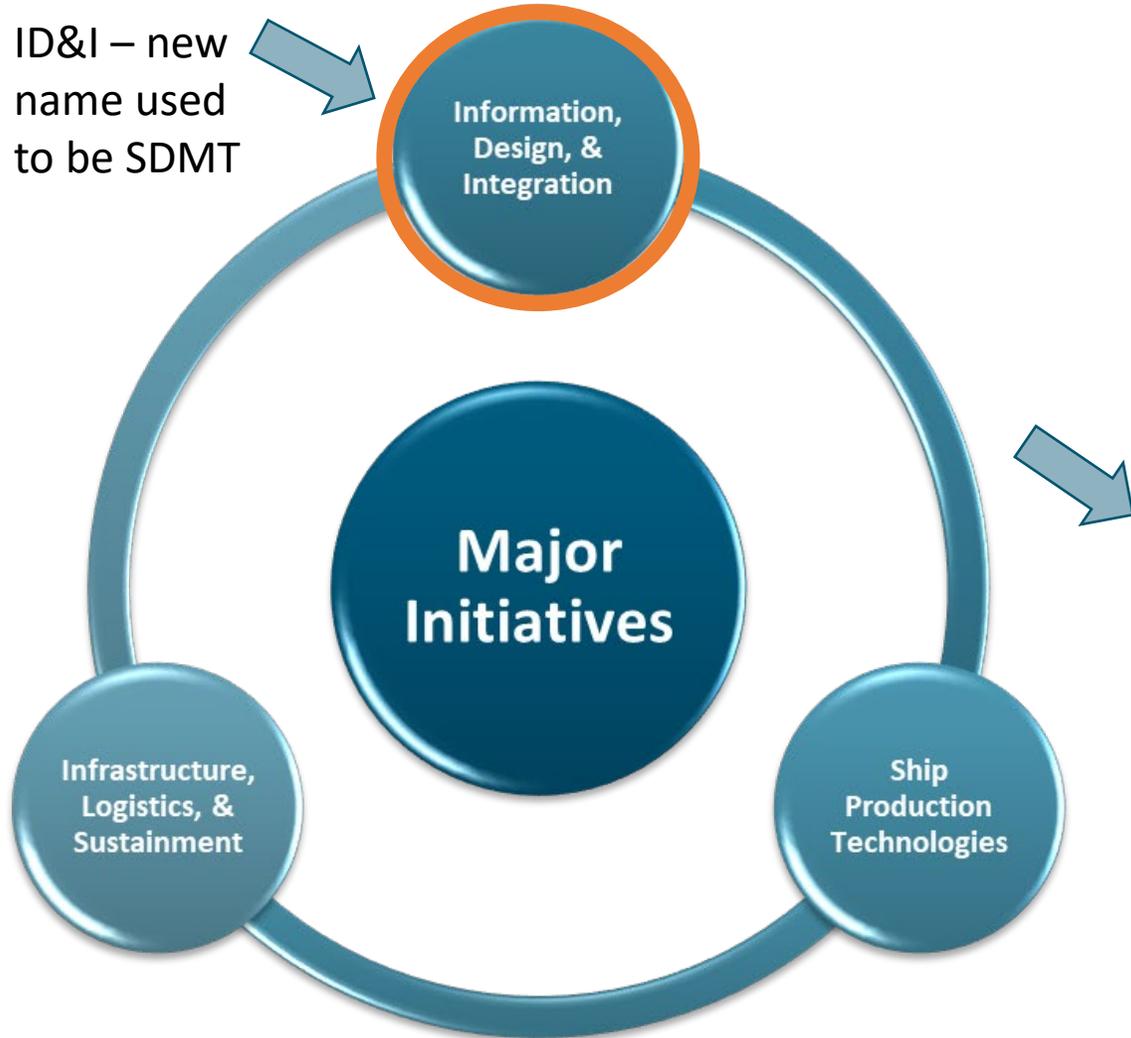
Vice Chair: **Victoria Dlugokecki**
(Naval Consultant)

Ship Design & Material Technologies

Lead: **Dan Sfiligoi**
(NASSCO)

Lead: **Michael Gerardi**
(BIW)

Major Initiative Name Change: ID&I



Extended Team		
Major Initiatives		
Information, Design, & Integration	Ship Production Technologies	Infrastructure, Logistics, & Sustainment
Panels		
Ship Design & Material Technologies	Electrical Technologies	Workforce & Compliance
Ship Warfare Systems Integration	Planning, Production Processes & Facilities	Sustainment
Business Technologies	Surface Preparation & Coatings	
	Welding Technology	

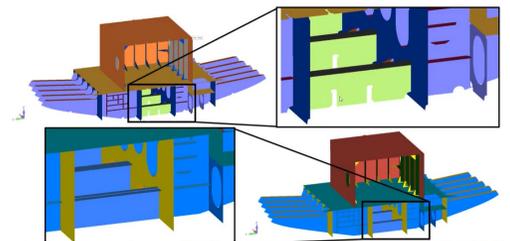
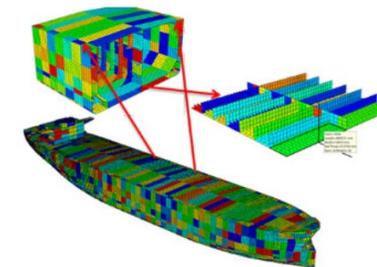
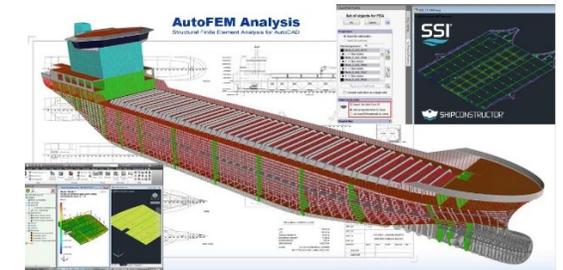
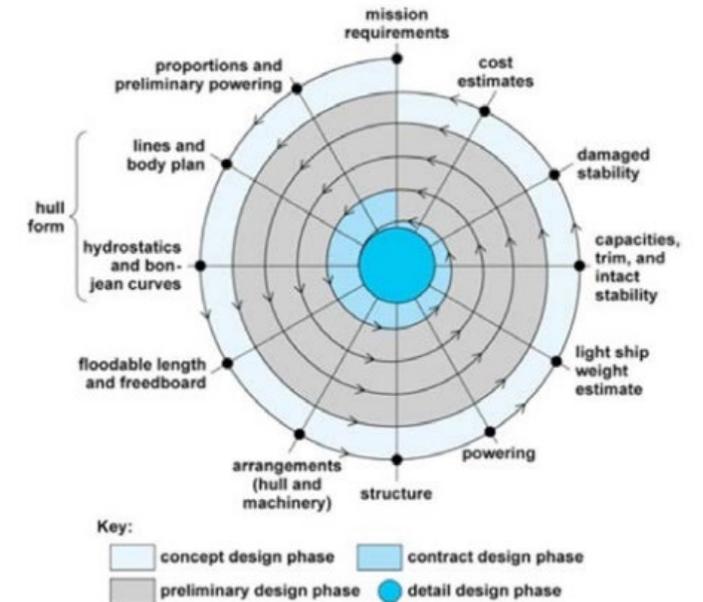
Ship Design and Material Technologies Panel's Mission

The SDMT Panel focuses on providing increased capabilities and cost reduction initiatives across the complete spectrum of design processes and the identification of materials to support rapid and efficient development, construction, sustainment, and disposal.

SDMT Specific Focus Areas

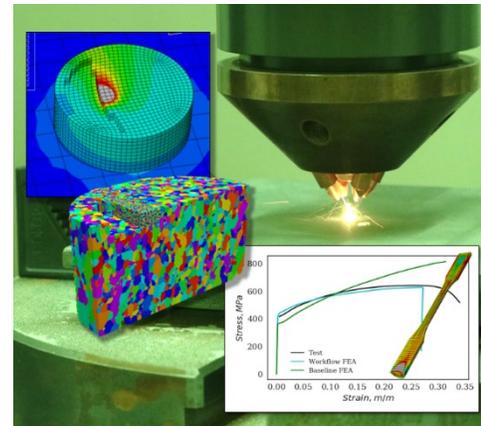
- Improving technologies in early ship design.
- Improving integration of all shipboard systems and undefined mission systems during design.
- Improvement of design technologies, including design and analysis tools, to reduce costs in production engineering and construction.
- Investigate material technologies to improve material performance, standardization, and overall material processes while reducing part count and total ownership costs during all phases of ship design and construction.
- Reduction of re-work in all areas of ship design and construction.
- Improving specifications and standards and investigating new technologies that can be incorporated into Rules or technical requirements documents for both commercial and naval shipbuilding programs.
- Collaborate and partner with other NSRP panels on topics and initiatives that encompass the other panel focus areas.

<https://www.nsrp.org/sdmt-panel/>



Benefit to the Navy

- Unique collaborative environment for US shipyards and Navy to work together on research projects
- Improving capabilities and reducing cost of US shipbuilding on a national level, contributing to building a more secure and capable Navy.
- Align our initiatives with NAVSEA (PEO Gap List)
- Value comes from cost savings through successfully completing projects which:
 - Standardize components, reduce variability, modularize installation
 - Approve technology which reduces onboard construction time
 - Develop workflows which aim to reduce component approval times
 - Create innovative and cost saving manufacturing methods
 - Develop tools for comment tracking and adherence to regulations



Simulation Workflow Development for AM (ATA)

Benefit: Prediction of AM part performance for faster design and potential for accelerated, model-supported qualification.



ASTM F1387 Testing for Mech. Attached Fittings (BIW)

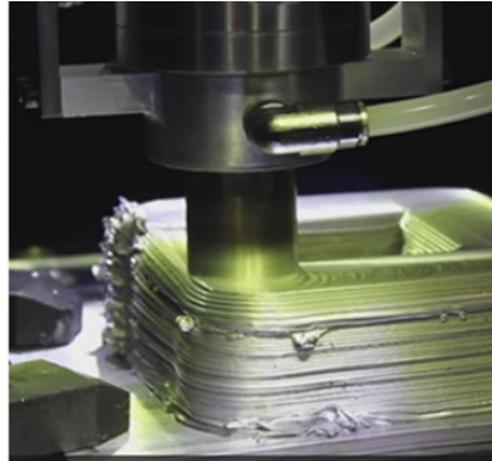
Benefit: Testing and approving a new type of fittings that significantly cuts installation cost by eliminating welding, getting implemented on DDG51.

Assistance to the state of the shipbuilding and ship repair industry

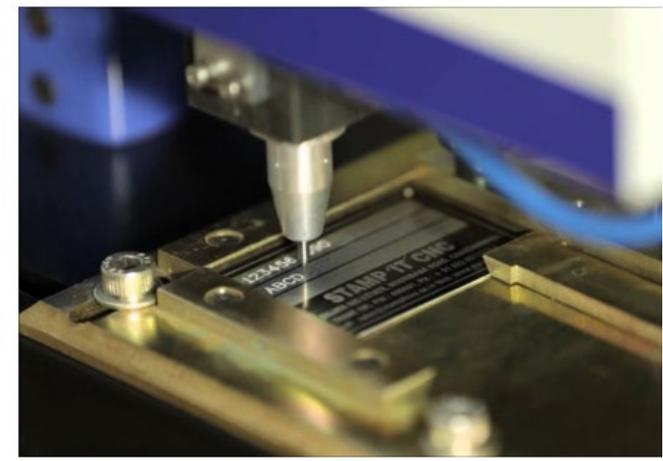
- Projects are shipyard agnostic and benefit both naval and commercial shipyards.
- Provide a platform for investigating and evaluating commercial technology in application to shipbuilding.
- Bring commercial shipbuilding and Navy together to allow collaboration and innovation.
- Projects benefits smaller shipyards that may not have large research and development budgets.



Standardization of Watertight Hatches and Scuttles (Ingalls)
Benefit: Standardization of hatches and scuttles, cuts cost of multiple variants.



Scaling Up of 3D Printed Castings (NASSCO)
Benefit: Development of a cost saving, US-sourced, AM alternative to casting manufacturing



Automated Label Plate Generation (SSI)
Benefit: Develop a process to reuse existing data already contained within the 3D design model for label plates.

Strategic and Technology Investment Plan

- January 24th-26th NSRP held a workshop in Summerville, SC to update SIP/TIP guidance documents.
- Documents identify high priority issues and current industry challenges where research proposals would be of particular interest.
- Updated ID&I Sub Initiatives:
 1. Reduce time for qualification and application of systems, materials, components and manufacturing technologies
 2. Advance and leverage digital shipbuilding
 3. Identify and implement flexibility, modularity, and scalability across platforms
 4. Investigate and apply solutions and best practices to support enterprise business processes and information management
 5. Develop design guidance to support, maintain, and sustain unmanned platforms
 6. Advance design, materials and processes that reduce sustainment/modernization costs and schedule
 7. Incorporate autonomy in design processes and decision support tools
 8. Define, integrate and implement innovative approaches to cybersecurity compliance, solutions, education & awareness



NSRP | National Shipbuilding Research Program

**Strategic
Investment
Plan**



MISSION

◆ Employ a unique collaborative framework to research, develop, mature, and implement industry-relevant shipbuilding and sustainment technologies and processes, improving efficiency across the U.S. shipyard industrial base and meeting future demand.

NSRP | National Shipbuilding Research Program

**Technology
Investment
Plan
FY23**



MISSION

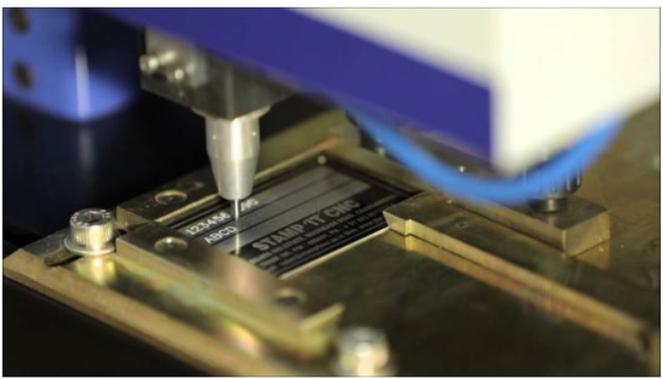
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Current SDMT Panel Projects

Automated Label Plate Generation

- **Project Lead:** Rob Parker, SSI
- **Shipyards:** Austal, Conrad, Fincantieri Marinette Marine

Goal: To develop a process to reuse existing data already contained within the 3D design model for label plates. This project will provide a process for passing digital data in a usable format label plate data directly to the supplier through purchasing, provide the label plate digital information to planning, QA, and production, and can be used to develop the Label Plate drawing.



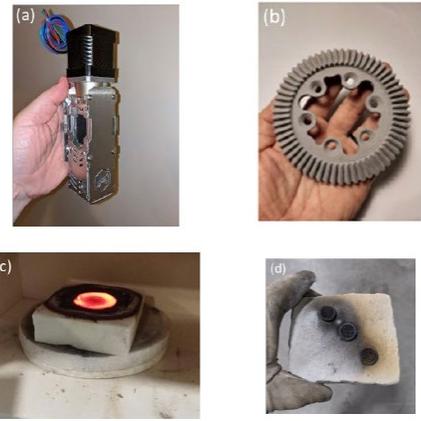
Reusing the digital data from the 3D Model to the Label Plate Manufacturer / Supplier

Dry Stores
2 – 10 – 1 – A

Development of an AM Capability for CuNi

- **Project Lead:** Scott Kasen, ElectraWatch
- **Shipyards:** Austal, Newport News, Metallum 3D
- **NAVY:** NAVSEA 05T, Dr. Justin Rettaliata

Goal: To enable a new generation of CuNi components, the project proposes to employ a first-of-its-kind hybrid manufacturing process. The approach uses the innovative combination of sand 3D printing and microwave heating. The use of this new hybrid process – which does not rely on intense local melting or a powder bed – overcomes the challenges of a LPBF metal 3D printing processes.



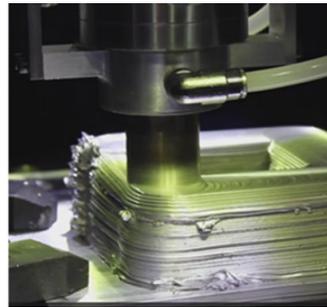
Projects Submitted in 2022: 9 Project Total

No.	Project	Submitted by
1	Using MELD to Additively Manufacture Flight Deck Tie Downs	Hepburn and Sons
2	Performance Improvement for 25Hz DSSM Spring Tray	Newport News
3	3D Printing of Supply Sensitive Parts	NASSCO
4	Next Generation of Design Review - Deeper Analysis with Zero Travel	SSI
5	Enhanced Visualization Progressing using COTS Construction System	SSI
6	Equipment Validation Through Scanning	SSI
7	Navy Product Lifecycle Management (PLM) Data Requirements Interface Mapping	SSI
8	Blucher Stainless Steel, Push-Fit Drainage System	Watts
9	Alternate Block Materials	DM Consulting

Project Down Select by Panel Member Vote

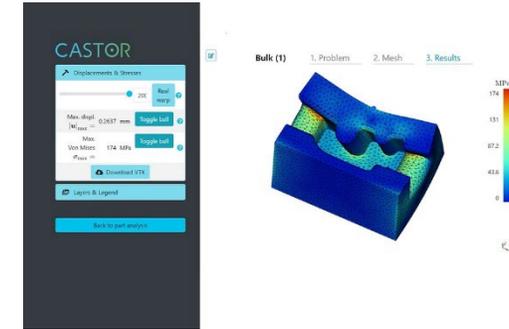
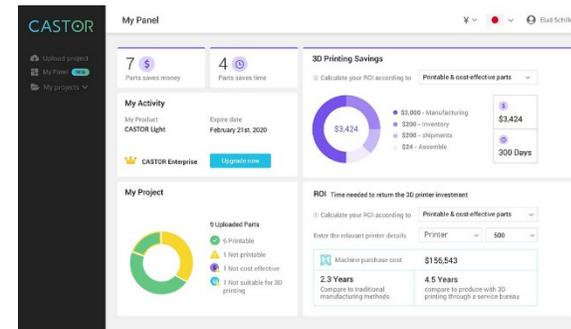
Using MELD to Additively Manufacture Flight Deck Tie Downs

Hepburn and Sons, MELD Manufacturing, Ingalls Shipbuilding, NSWC Carderock, NSWC Philadelphia)



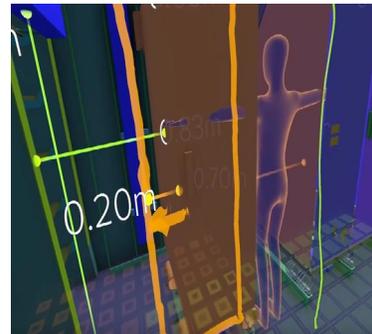
3D Printing of Supply Sensitive Parts

NASSCO, General Dynamics – Electric Boat, Additive Manufacturing Tech Warrant Holder, Submarine Industrial Base Director, PEO SSBN)



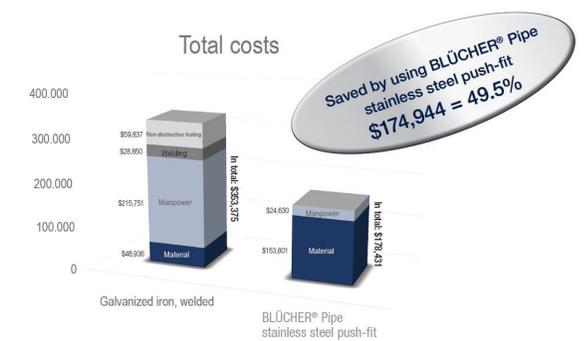
Next Generation of Design Review: Deeper Analysis with Zero Travel

SSI, Fincantieri Marine, Ship Space, D'Angelo Technologies



Blucher Stainless Steel, Push-Fit Drainage System

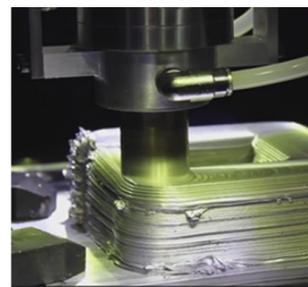
Watts Water Technologies/Blucher, Fincantieri Marinette Marine, Hi-Test Labs



Projects Selected for Award by ECB

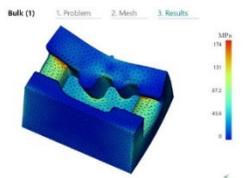
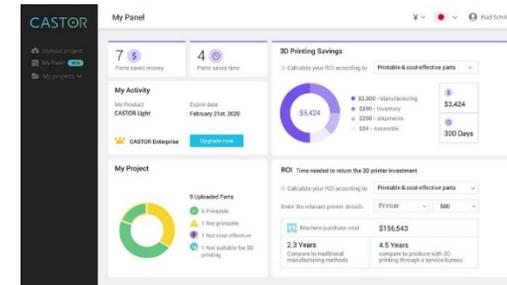
Using MELD to Additively Manufacture Flight Deck Tie Downs

- Hepburn and Sons
- MELD Manufacturing
- Ingalls Shipbuilding
- NSWC Carderock
- NSWC Philadelphia
- **Objective:** Use MELD's additive friction stir deposition (AFSD) technology to additively manufacture (AM) the tie downs and test them to ensure they match the performance of conventionally manufactured tie downs. It is proposed to print a universal tie down that can easily be adapted with the addition of a collar that matches the ship deck material structure. An advantage of the AFSD process is its ability to print different metals together.



3D Printing of Supply Sensitive Parts

- NASSCO
- Electric Boat
- Additive Manufacturing Tech Warrant Holder,
- Submarine Industrial Base Director,
- PEO SSBN
- **Objective:** The goal is to conduct research into parts which currently are not sufficiently meeting NAVY's production yield requirements. The objective is to evaluate and recommend part candidates which are best suited for the AM process. This will be achieved through partnering with an AM software company. Further research will be done to find commonalities and AM printers will be proposed which apply to broadest number of parts.



Past SDMT Meetings: 2021 Alameda, CA

- **Theme:** Alternative Marine Fuels and Ocean Energy
- **Tour:** Bay Ship and Yacht Co, Alameda, CA
- **Participants:** 90 Attendees Total
- **17 Technical Presentations:**
 - Alternate Marine Fuels (ABS, Sandia, Zero Emission Industries)
 - Hybridization of Ferries (Glosten)
 - Energy Storage (Convus)
 - Ocean Energy (Navy, CalWave, Makai)
 - Energy Security (Naval Post Grad School)
 - 8 NSRP Project Updates



Boundary Layer Technologies



90 ATTENDEES TOTAL
(31 IN PERSON + 59 VIRTUAL)



Past SDMT Meetings: 2022 Honolulu, HI

- **Theme:** Digitalization of Shipbuilding
- **Tour:** Pacific Shipyard International
- **71 Participants:**
 - NSRP Shipyards: NASSCO, Ingalls, Newport News, BIW, Electric Boat, Austal, Marinette
 - NAVY: NAVSEA Carderock, Pearl Harbor SY, ONR, NAVSEA Naval Undersea Warfare Center Division Keyport, NSWCPD Philadelphia PA, Tech Bridge
 - Other Yards: Pacific Shipyard and Philadelphia Shipyard
 - Local Companies: Makai, Innovate Hawaii, Ship Repair Association of Hawaii, Epsilon Systems
 - Classification Societies: American Bureau of Shipping
 - Industry: Siemens, Genoa, SSI, Viega, ATI, Auros, TruQC, Wartsila Defense, Malone Consulting, Gibbs & Cox, D'Angelo Technologies and many others.

27 PRESENTATIONS TOTAL,
24 TECHNICAL PRESENTATIONS



TOUR OF PACIFIC SHIPYARD INTERNATIONAL +
BOAT RIDE ON THEIR 3 POROTYPE BOATS



NSRP LEADERSHIP



71 ATTENDEES TOTAL (44 IN PERSON + 27 VIRTUAL): 2 FULL DAYS + 1 HALF DAY

Upcoming Meetings

- SDMT Break Out Session
 - Thursday: March 30th
- SDMT Summer Meeting
 - July 11th/12th/13th
 - Keyport NAVSEA Warfare Center
 - Keyport, Washington



This slide, titled 'Capabilities', lists various services and technologies offered by the center. It includes:

- Prototyping & Custom Engineered Solutions**
 - Custom Engineered Solutions for Material Readiness
 - Data science solutions for optimized and predictive maintenance
 - Reverse Engineering & Redesign
 - Advanced Depot Repair
- USW Weapons and Targets**
 - Advanced undersea weapons R&D
 - Advanced propulsion and energy
 - IMA Digital Twin
- Unmanned Underwater Vehicles**
 - Advanced undersea vehicles R&D
 - Advanced propulsion and energy
 - UxS payloads and integration
- Ranges – USW Test and Eval**
 - Range of the future
 - Physics-based test & training
 - Modeling and simulation
 - Sensors and threat emulation
 - T&E of autonomous systems
- Data Sciences and Analytics**
 - Predictable trend analysis
 - Reliability analysis
 - Manpower readiness tools
 - Obsolescence management
- Expanding America's Undersea Dominance**
Excellence in execution
Advancing undersea readiness through innovation
Urgency: Delivering tomorrow's capability today
Aligned, better, faster
- Undersea Defensive Warfare Systems**
 - Countermeasure set acoustic ISEA and development
 - Special operations forces undersea mobility support
- Theater Undersea Warfare**
 - Aircraft Carrier Tactical Support Center (CV-TSC)
 - Undersea Warfare Decision Support System (U
 - Littoral Combat Systems ASW Module
- Shipyard & Maintenance Innovation**
 - Advanced repair and maintenance technologies
 - Advanced materials / manufacturing
 - Industrial engineering
 - In situ automated forward repair systems

Questions?

