NDIA

2023
UNDERSEA
WARFARE
FALL CONFERENCE

Undersea Warfare: The Critical Enabler to Integrated Deterrence

Conference Co-Sponsorship By: Naval Undersea Warfare Center Division, Newport

September 18 – 20, 2023 | Groton, CT | NDIA.org/USW

NAVSEA
WARFARE CENTERS
NEWPORT

Table of Contents

NDIA

Who We Are

The National Defense Industrial Association is the trusted leader in defense and national security associations. As a 501(c)(3) corporate and individual membership association, NDIA engages thoughtful and innovative leaders to exchange ideas, information, and capabilities that lead to the development of the best policies, practices, products, and technologies to ensure the safety and security of our nation. NDIA's membership embodies the full spectrum of corporate, government, academic, and individual stakeholders who form a vigorous, responsive, and collaborative community in support of defense and national security. For more than 100 years, NDIA and its predecessor organizations have been at the heart of the mission by dedicating their time, expertise, and energy to ensuring our warfighters have the best training, equipment, and support. For more information, visit **NDIA.org**

Schedule at a Glance

Monday, September 18

Registration
Mystic Marriott Hotel & Spa
3:00 – 7:00 pm

Networking Reception
Mystic Marriott Hotel & Spa
5:00 – 6:30 pm

Tuesday, September 19

Registration
Dealey Center Auditorium
7:00 am – 5:00 pm

General Session
Dealey Center Auditorium
8:00 am – 5:00 pm

Networking Clambake Reception
North Lake
6:00 – 7:00 pm
*A ticket is required to attend this event and will be distributed during on-site registration

Networking Clambake Dinner
North Lake
7:00 – 9:00 pm
*A ticket is required to attend this event and will be distributed during on-site registration

Wednesday, September 20

Registration
Dealey Center Auditorium
7:00 am – 5:00 pm

Technical Sessions
Various Base Locations
8:00 am – 5:00 pm

Welcome to 2023 Undersea Warfare FALL Conference

Welcome to the National Defense Industrial Association's 2023 Undersea Warfare Division Fall Conference. NDIA's Undersea Warfare Division (USW) members are proud to again bring you this annual event. This year's theme is *Undersea Warfare: The Critical Enabler for Integrated Deterrence*. NDIA's USW Division has five active Technical Committees that focus on the Navy's mission areas: Sensor Systems, Mine Warfare Systems, Undersea Vehicles (including weapons), Aviation, and C4I and Combat Systems and Warfighter Performance. The technical sessions on the second day of the conference focus on recent events, advancements, and challenges in each of these mission areas. The mission of NDIA's Undersea Warfare Division is to focus on critical undersea warfare areas related to the development, production, testing, and logistic support of underwater combat systems. This includes mines, torpedoes, manned and unmanned underwater vehicles, countermeasures, sensors, weapon control, and handling equipment; and the integration of systems aboard aircraft, ships, and submarines. NDIA's USW Division fosters the exchange of technical information between government and industry and the expansion of research and development in areas related to undersea warfare. To this end, the division furthers communication by providing a variety of ways for government and industry to work together to solve problems, identify affordable solutions, and meet specific requirements. The group also supports both government and industry with advice on undersea warfare policies and acquisition planning. Your feedback is highly encouraged to ensure we continue to meet your needs.

CAPT Eric Irwin, USN (Ret)
Chairman, Undersea Warfare Division Fall Conference
General Dynamics Electric Boat

Get Involved

Learn more about NDIA's Divisions and how to join one at **NDIA.org/Divisions**

Undersea Warfare Division

Who We Are

NDIA's Undersea Warfare Division fosters both the exchange of technical information between government and industry and the expansion of research and development in areas related to undersea warfare. To this end, the Division furthers communication by providing a variety of ways for government and industry to work together to solve problems, identify affordable solutions, and meet specific requirements. The Division also supports both government and industry by providing advice on undersea warfare policies and acquisition planning.

Leadership and Committees

Alan Lytle, PhD
Division Chair

Tom Callender
Division Deputy Chair

RADM Jim Shannon, USN (Ret)
Vice Chair

RADM John Tammen, USN (Ret)
Advisory Council Chair

CAPT Eric Irwin, USN (Ret)
Chair, Undersea Warfare Division
Fall Conference

CAPT Rob Dunn, USN (Ret)
Deputy Chair
Undersea Warfare Division
Fall Conference

CAPT Paul Rosbolt, USN (Ret)
Session Chair
Combat Systems, Warfighter
Performance & C4I

Kevin Hagan
Session Chair
Mine Warfare

Chuck Fralick
Session Chair
Undersea Vehicles

Glen Sharpe
Session Chair
Aviation Systems

Joe Cuschieri
Session Chair
Undersea Sensors

Event Information

Location

Conference Venue
U.S. Naval Submarine Base New London
1 Crystal Lake Road
Groton, CT 06340

Headquarter Hotel
Mystic Marriott Hotel & Spa
625 North Road (Route 117)
Groton, CT 06340

Attire

Civilian: Business
Military: Uniform of the Day

Survey and Participant List

You will receive via email a survey and list of participants (name and organization) after the conference. Please complete the survey to make our event even more successful in the future.

Event CONTACT

Krystal Heard
Associate
Director, Meetings
(703) 247-2558
kheard@NDIA.org

Britt Sullivan
Senior Director, Divisions
(703) 247-2587
bsullivan@NDIA.org

Erin Peters
Meeting Planner
(703) 247-2586
epeters@NDIA.org

Speaker Gifts

In lieu of speaker gifts, a donation is being made to the Fisher House Foundation.

Harassment Statement

NDIA is committed to providing a professional environment free from physical, psychological and verbal harassment. NDIA will not tolerate harassment of any kind, including but not limited to harassment based on ethnicity, religion, disability, physical appearance, gender, or sexual orientation. This policy applies to all participants and attendees at NDIA conferences, meetings and events. Harassment includes offensive gestures and verbal comments, deliberate intimidation, stalking, following, inappropriate photography and recording, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome attention. Participants requested to cease harassing behavior are expected to comply immediately, and failure will serve as grounds for revoking access to the NDIA event.

Event Code of Conduct

NDIA's Event Code of Conduct applies to all National Defense Industrial Association (NDIA), National Training & Simulation Association (NTSA), and Women In Defense (WID) meeting-related events, whether in person at public or private facilities, online, or during virtual events. NDIA, NTSA, and WID are committed to providing a productive and welcoming environment for all participants. All participants are expected to abide by this code as well as NDIA's ethical principles and practices. Visit NDIA.org/CodeOfConduct to review the full policy.

Anti-trust Statement

The NDIA has a policy of strict compliance with federal and state antitrust laws. The antitrust laws prohibit competitors from engaging in actions that could result in an unreasonable restraint of trade. Consequently, NDIA members must avoid discussing certain topics when they are together at formal association membership, board, committee, and other meetings and in informal contacts with other industry members: prices, fees, rates, profit margins, or other terms or conditions of sale (including allowances, credit terms, and warranties); allocation of markets or customers or division of territories; or refusals to deal with or boycotts of suppliers, customers or other third parties, or topics that may lead participants not to deal with a particular supplier, customer or third party.

Venue Map

Speaking Sites

PLENARY SESSIONS
1. Dealey Center Auditorium
   General parking is not available

TECHNICAL SESSIONS
1. Dealey Center Theater: Undersea Sensors
2. Building 83, Room 317: Undersea Vehicles
2. Building 83, Room 318: Aviation Systems
2. Building 83, Room 319: C4I
3. Bledsoe Hall: Undersea Vehicles
7. Building 84, Chaplin Center, Room 104: Combat Systems & Warfighter Performance
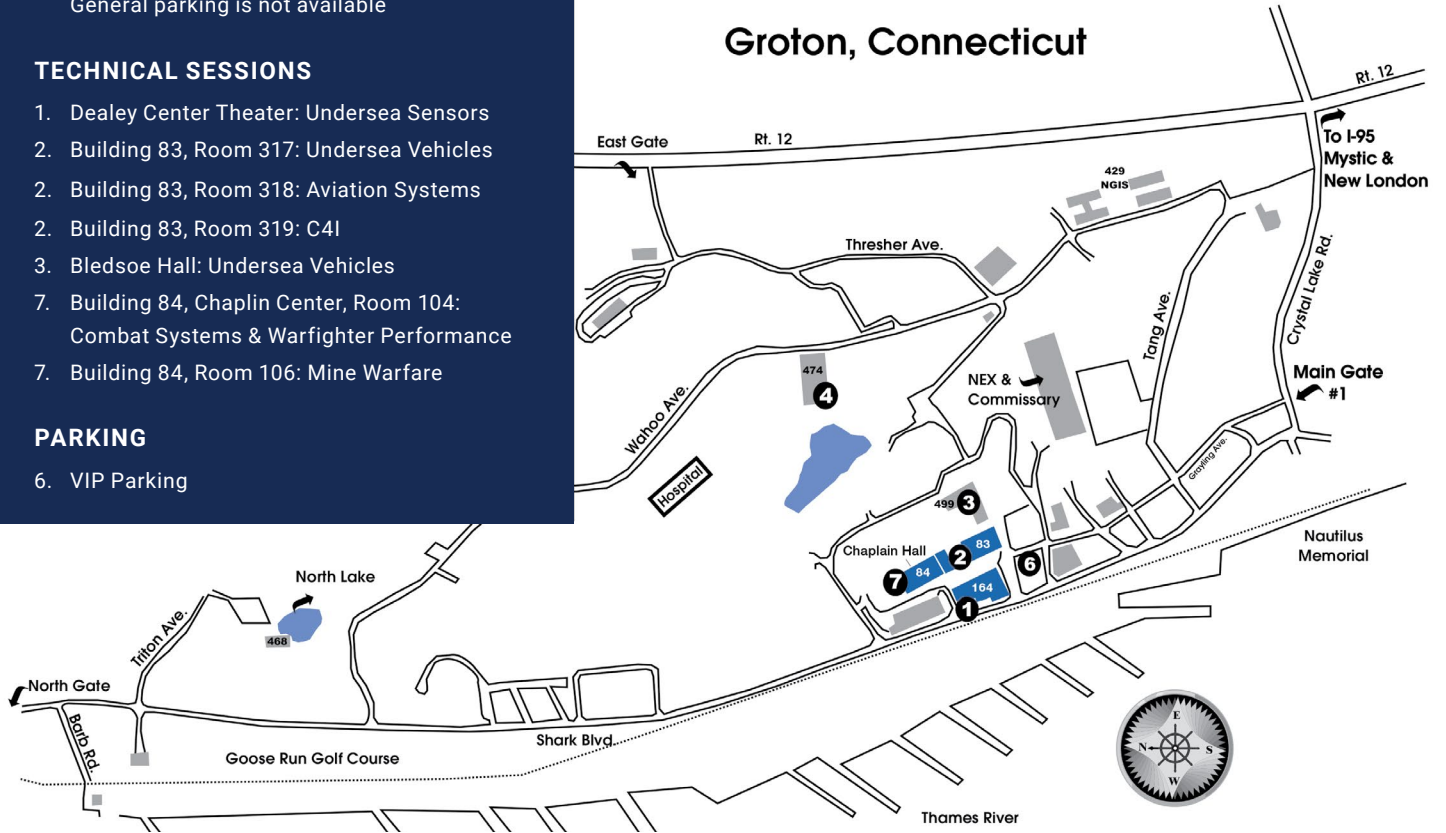7. Building 84, Room 106: Mine Warfare

PARKING
6. VIP Parking

Naval Submarine Base
New London
Groton, Connecticut

Agenda

MONDAY, SEPTEMBER 18

3:00 – 7:00 pm **Registration**
MYSTIC MARRIOTT HOTEL & SPA - MYSTIC FOYER

GENERAL DYNAMICS
Mission Systems

5:00 – 6:30 pm **Networking Reception**
MYSTIC MARRIOTT HOTEL & SPA - MYSTIC BALLROOM

NORTHROP GRUMMAN

TUESDAY, SEPTEMBER 19

7:00 am – 5:00 pm **Registration**
DEALEY CENTER AUDITORIUM

GENERAL DYNAMICS
Mission Systems

7:00 – 8:00 am **Networking Breakfast**
OUTSIDE PLAZA

L3HARRIS™

8:00 – 8:15 am **Welcome and Opening Remarks**
DEALEY CENTER AUDITORIUM

Alan Lytle, PhD
Chairman, Undersea Warfare Division, NDIA
Vice President, Strategy & Mission Solutions, Northrop Grumman Corporation

Jennifer Stewart
Executive Vice President, Policy & Strategy, NDIA

CAPT Eric Irwin, USN (Ret)
Chairman, Undersea Warfare Division Fall Conference
Warfare Analysis Program Lead, General Dynamics Electric Boat Corporation

8:15 – 8:45 am **Presentation**
DEALEY CENTER AUDITORIUM

ADM Frank Caldwell, USN
Director, Naval Nuclear Propulsion Program

8:45 – 9:15 am **Presentation**
DEALEY CENTER AUDITORIUM

VADM William Houston, USN
Commander, Naval Submarine Forces

9:15 – 9:45 am

Presentation
DEALEY CENTER AUDITORIUM

VADM Richard Correll, USN
Deputy Commander, U.S. Strategic Command

9:45 – 10:15 am

Networking Break
OUTSIDE PLAZA

10:15 – 10:45 am

Presentation
DEALEY CENTER AUDITORIUM

CAPT Drew Miller, USN
Commander, Undersea Warfighting Development Center

10:45 – 11:15 am

Presentation
DEALEY CENTER AUDITORIUM

Scott Bray
Deputy Director, Naval Intelligence, (OPNAV N2N6C)

11:15 – 11:45 am

Presentation
DEALEY CENTER AUDITORIUM

Dr. Martin Irvine
Executive Director, Naval Surface Warfare Center and Naval Undersea Warfare Center

11:45 am – 12:00 pm

Awards Ceremony
DEALEY CENTER AUDITORIUM

Pierre Corriveau
Awards Chair, Undersea Warfare Division, NDIA

12:00 – 1:15 pm

Networking Lunch
BASE GYMNASIUM

TELEDYNE
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1:15 – 1:45 pm

Presentation
DEALEY CENTER AUDITORIUM

RADM Scott Pappano, USN
Program Executive Officer, Strategic Submarines

1:45 – 2:15 pm

Presentation
DEALEY CENTER AUDITORIUM

Stefanie Link
Executive Director, In-service Submarines Program Executive Office, Attack Submarines (PEO SSN)

2:15 – 2:45 pm

Presentation
DEALEY CENTER AUDITORIUM

CAPT Todd Weeks, USN
Program Executive Officer, Undersea Warfare Systems

2:45 – 3:15 pm

Networking Break
OUTSIDE PLAZA

3:15 – 3:45 pm

Presentation
DEALEY CENTER AUDITORIUM

Dr. Matthew Sermon
Executive Director, Program Executive Office Strategic Submarines

Whitney Jones
Director, Submarine Industrial Base Program Executive Office Strategic Submarines (PEO SSBN)

3:45 – 4:15 pm

Presentation
DEALEY CENTER AUDITORIUM

Rob McHenry
Deputy Director, Defense Advanced Research Projects Agency

4:15 – 4:45 pm

Presentation
DEALEY CENTER AUDITORIUM

RDML Mark Behning, USN
Director, Undersea Warfare Division, Office of the Chief of Naval Operations (N97)

4:45 – 4:50 pm

Closing Remarks
DEALEY CENTER AUDITORIUM

CAPT Eric Irwin, USN (Ret)
Chairman, Undersea Warfare Division Fall Conference
Warfare Analysis Program Lead, General Dynamics Electric Boat Corporation

6:00 – 7:00 pm

Networking Reception
NORTH LAKE

Ticket Required

7:00 – 9:00 pm

Networking Clambake
NORTH LAKE

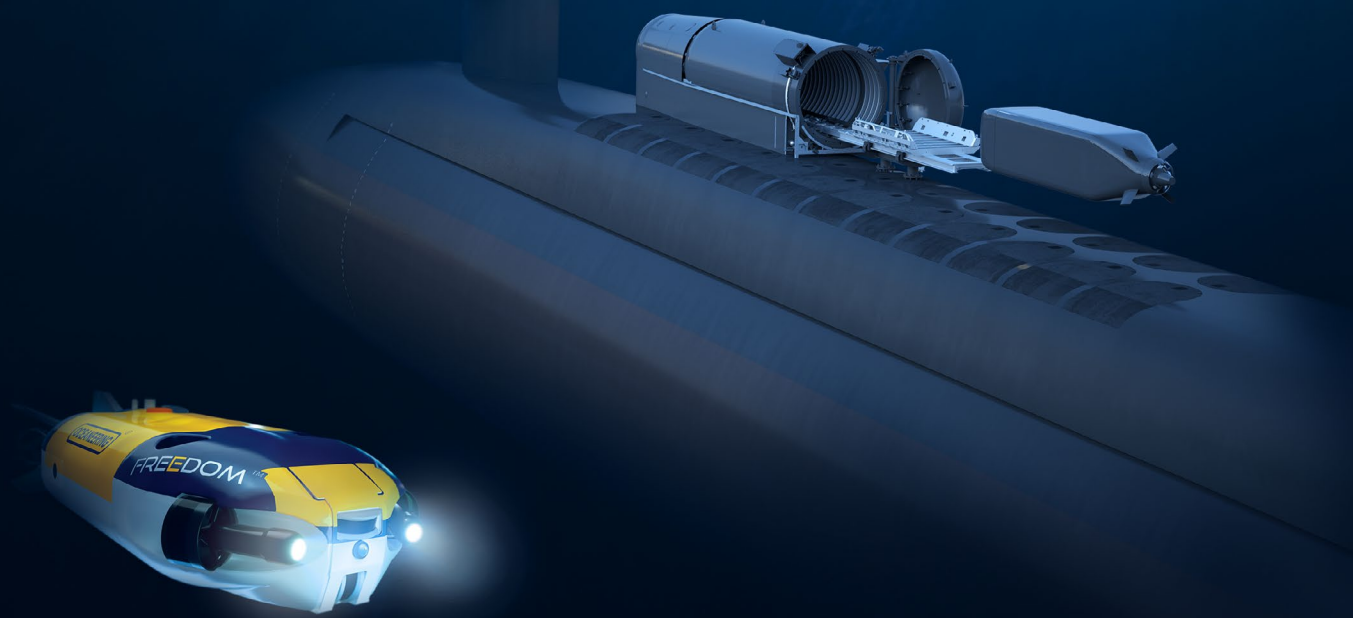**Ticket Required**

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Technical Sessions

WEDNESDAY, SEPTEMBER 20

7:00 am   **Registration**
DEALEY CENTER AUDITORIUM

7:00 am   **Networking Breakfast**
DEALEY CENTER OUTSIDE PLAZA

	Aviation Systems Glen Sharpe, Session Chair	Mine Warfare Kevin Hagan, Session Chair	Undersea Sensors Joe Cuschieri, Session Chair
	Building 83 Room 318	**Building 84 Room 106**	**Dealy Theater**
8:00 am		1555621 **Development of New Underwater Explosives and Warheads** Daniela Wagus ONR George McDaniel Naval Surface Warfare Center Indian Head Division	1543531 **DARPA Kraken Program Update** Katherine Woolfe DARPA Michael Ott DARPA
8:30 am	**NAVAIR PEO-Air ASW Programs** Shawn Slade NAVAIR	1573573 **Deep Neutralization** Emily Medina ONR	1570612 **PMS 485 Deployable Surveillance Systems Update** Susan LaShomb PMS 485 Deployable Surveillance Systems
9:00 am		1559222 **Mission-Level Modeling & Simulation of Mining Operations** Nicholas Evans The Boeing Company, Inc. Caroline Stocking The Boeing Company, Inc.	1575195 **IWS5 Sensor Systems Update** George Arnold IWS 5

GENERAL DYNAMICS
Mission Systems

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Undersea Vehicles Chuck Fralick, Session Chair	Undersea Vehicles Dr. Brian McKeon, Session Chair	Combat Systems & Warfighter Performance CAPT Paul Rosbolt, USN (Ret), Session Chair	C4I Dr. Robert Zarnich, Session Chair
Building 83 Room 317	**Bledsoe Hall**	**Building 84 Room 104**	**Building 83 Room 319**
1562196 **Unmanned Maritime Systems (PMS 406) Program Update** **Djueno Searles** PEO USC / PMS 406	1556393 **DARPA Manta Ray Program** **Kyle Woerner** DARPA	1556980 **Warfighter Decision Centered Design** **Dr. Joseph Gabriel** NUWC Division Newport **Kevin Pushee** NUWC Division Newport	1587195 **PMW 770: Accelerating Undersea and Shore Communications** **CAPT Paul Seitz, USN** Common Sub Marine Radio Room APM **Ebony Williams** PMW 770
1586768 **PMS 415 Update** **Gene Severtson** NAVSEA **Alex Dube** NAVSEA	1562362 **Seafloor Bottom Node** **Rick Cox** Leidos	1559563 **Virtual Undersea Battlespace: Enabling the SUBFOR Wargaming and Experimentation Center (SFWEC)** **Michael Pelczarski** NUWC Division Newport	1530205 **Undersea C3: Command, Control, and Communications** **Dianne Egnor** MITRE **Andrew Dominijanni** MITRE
1545983 **DARPA Hunter Program Update** **Katherine Woolfe** DARPA **David Pfundstein** DARPA	1547820 **Target Strength Signature Comparisons** **Thomas Bowling** NSWC Carderock Division **Saliou Telly** NSWC Carderock Division	1558995 **High Power Microwave (HPM) Systems** **Nishita Mirchandani** Syrnatec, Inc.	1576455 **Undersea Constellation Communications Architecture Study** **William Craig** NUWC Division Newport

9:30 am	1555096 **Navy STP: Transition Innovative Technology to Deliver Warfighting Capabilities** Donald Williamson ATSI	1573747 **MCM Capabilities and Vectors for Future Development** Emily Waymire NSWC Panama City Division	1575337 **IUSS Mobile Surveillance System Future Capabilities and Opportunities** Don Ringel NAVSEA PMS 485 Cooke Rabon NAVSEA PMS 485/ JHU APL

Networking Break
10:00 am — DEALEY CENTER OUTSIDE PLAZA

10:30 am	1576322 **Recent Breakthroughs in Air ASW Acoustic Automation** Laurence Riddle Signals Systems Corporation	1573750 **Making Naval Mining Improvements a Reality** Andrew Blair Naval Surface Warfare Center Panama City Division	1573183 **Wargaming the Future of Integrated Undersea Surveillance System (IUSS)** Scott Simpkins JHU - APL Brendan Gotowka JHU - APL
11:00 am	585236 **Minimization of In-Band Interferers on Airborne Anti-Submarine System Performance** Travis Cuprak RDA, Inc. Rob Kunz RDA, Inc.	1573304 **LCS Mission Modules Program Office (PMS 420) Update** Ed Sujecki LCS Mission Modules Program Office (PMS 420)	1548490 **Demonstration of MIMO Active Sonar Capabilities** Stephen Blackstock Applied Research Laboratories, University of Texas
11:30 am	1572847 **Higher Data Rate and Improved Spectrally Efficient Telemetry Options for Sonobuoy and Maritime Line of Sight Radio Communications** Howard Ebersman Ultra Maritime	1573309 **DARPA MIW Programs Update** Kyle Woerner DARPA	1556438 **Advancing Contextual Classification for Passive Sonar** Nathan Parrish Johns Hopkins University Applied Physics Lab

Networking Lunch
12:00 pm — BASE GYMNASIUM

1567206 **Fighting Into the Bastions: Getting Noisier to Sustain the U.S. Undersea Advantage** **Timothy Walton** Hudson Institute	1571984 **Stability Certification via Semidefinite Programming** **Austin Juhl** Johns Hopkins University Applied Physics Laboratory	1573623 **Building Operational Trust in Deployed Autonomy Platforms** **Tristan Endsley** The Charles Stark Draper Laboratory	1548322 **DARPA Timely Information for Maritime Engagements (TIMEly) Program Update** **Michael Ott** DARPA **Aaron Kofford** DARPA

1554994 **The Application of Machine Learning to Enhance Torpedo Target Classification** **Jillian Green** NUWC Division Newport	1555457 **Planning Unmanned Underwater Vehicle Motion to Improve Passive Bearing-Only Multi-Target Tracking** **James Turner** U.S. Naval Research Laboratory	1539047 **IWS 5.0 Program Status & Plans** **Glenda Leon** PEO IWS 5.0	1571831 **Enabling Operations Across the Air-Water Boundary – A Submarine Integration Perspective** **Michael Brawner** GD Electric Boat
1553115 **AI/ML-Based State of Charge Prediction to Support Mission Planning of UUVs** **Alex Stimpson** VTG	1556313 **Tetra Subsea Seabed Warfare Vehicle Providing Rapid Payload Capability** **Philip Anderson** Oceaneering International	1575323 **IWS5 Combat Systems Update** **George Arnold** IWS 5	1571131 **Non-Traditional Anti-Surface Engagement** **Alexander Cheij** Johns Hopkins University Applied Physics Lab
1556321 **Naval Undersea Warfare Center (NUWC) Keyport Unmanned Underwater Vehicle (UUV) Razorback AI/ML and 3D Rendering Digital Twin** **John Sprague** World Wide Technology **Jason Craig** World Wide Technology	1570261 **Toward UUV Obstacle & Hazard Avoidance in Forward Operating Areas** **David Malphurs** NSWC Panama City Division **Nicholas Palermo** NSWC Panama City Division	1561918 **USN Multi-Static Active Roadmap for Surface Ships and Submarines** **Meg Stout** PEO IWS 5.0	**Potential Adversary #1 Unmanned System Developments** ONI

LOCKHEED MARTIN

1:00 pm	1585020 **Advances in the Precision High Altitude Sonobuoy Emplacement (PHASE) Project** **Brian Montague** SeaLandAire Technologies, Inc.	1574115 **Mine Warfare Programs Update** **Gary Jones** Mine Warfare Program Office (PMS 495)	1570758 **Volumetric Low Frequency Broadband Synthetic Aperture Sonar for Deeply Buried Mines and Seabed Infrastructure** **Zachary Waters** Naval Research Laboratory
1:30 pm	1555000 **Triton UAS Communications Gateway** **Greg Loegering** Northrop Grumman **Dave Smallwood** Northrop Grumman	1557817 **Undersea Delivered Mines Development** **Abiodun Osho** Mine Warfare Program Office, (PMS 495)	**ACINT Update** ONI
2:00 pm	1574857 **Aviation Systems** **Suresh Mirchandani** BRYKA SKYSTOCKS, LLC **Yash Mirchandani** BRYKA SKYSTOCKS, LLC	1613180 **Angler** **Terry Miller** Advanced Acoustic Concepts **Jim Richardson** Advanced Acoustic Concepts	1556465 **Sensors for Environmental Superiority** **Dr. Andrew Greene** NUWC Division Newport
2:30 pm	1576866 **Advances in the Digital DIFAR Vertical Line Array (DDVLA) Sonobuoy** **Brian Montague** SeaLandAire Technologies, Inc.	1613162 **SUBPAC MCM Update** **Neil Szanyi** SUBPAC	1559417 **Unmanned Underwater Vehicle Sensor and C4I Solutions for Distributed Maritime Operations** **Marc Olivieri** L3Harris Technologies **Mike Smith** L3Harris Technologies

3:00 pm

Networking Break
DEALEY CENTER OUTSIDE PLAZA

1576539
New Capability for Submarines

Josh Peters
Newport News Shipbuilding

1569962
Developing the Next Generation Exercise Section for Undersea Vehicles

Matthew Ruggieri
Raytheon Technologies

1574821
Advancing Neurocognitive Assessment in Underwater Environments Through Tablet-Based Technology

Justin Handy
Naval Submarine Medical Research Laboratory

1576566
Submarine Non-Geostationary Orbit Satellite Communications Study

Matthew Atwood
NUWC Division Newport

1562058
Deep and Near-Surface Performance Analysis of a Non-Body-of-Revolution Submersible With Large Pod Appendages

Spencer Eves
U.S. Naval Academy

Jonathan Gibbs
U.S. Naval Academy

1576037
Submarine and UUV Integration

Michael Pascucci
HII-Newport News Shipbuilding

Chuck Trabert
HII-Newport News Shipbuilding

Potential Adversary #1 USW Tactics Update

ONI

1575861
Ekelund Range Simulator for Passive Target Motion Analysis (TMA) by UAS Robots

Donald Brutzman
Naval Postgraduate School (NPS)

Christopher Cirullo
Naval Information Warfare Center (NIWC) Pacific

1556086
Effect of Coupled High Pressure Salt Water Absorption and Low Temperatures on the Mechanical Characteristics of Additively Manufactured Polymers

Dr. James LeBlanc
NUWC Center Division Newport

1568581
Underwater Acoustic Options for Homing to a Target

Bob Melvin
Teledyne Marine

Ken Scussel
Teledyne Marine

Potential Adversary #2 USW Tactics Update

ONI

1574760
DEVSECOPS in Infrastructure - Creating Warfighting Advantage at the Speed of Relevance

Kelly Jones
Cisco Systems, Inc.

1572158
Unmanned Vehicle Launch and Recovery Demonstrations from Horizontal Payload Tubes

John Chapman
Electric Boat Corp

1556379
Experimental Measurements and Numerical Analysis to Support Corrosion Informed Design

Steven Policastro
U.S. Naval Research Laboratory

1552162
Cybersecurity Academic Collaborations for USW Combat Systems

Benjamin Drozdenko
NUWC Center Division Newport

3:30 pm	**Potential Adversary # 1 Submarine and USW Operations** ONI	1573314 **MCMGRU THREE's MHD Perspective** **CDR Mike Dalrymple, USN** MCMGRU THREE	1553987 **Detecting and Tracking Surface Ships Using Non-Traditional Processing of Forward Looking Sonar Data** **Richard Nielsen** The Boeing Company
4:00 pm	**Threats to Acquisition** ONI	1558991 **AI-MDCS Based Mine Warfare System** **Yash Mirchandani** Neoskye, Inc.	1559165 **Automated Torpedo Acoustic Classifier (ATAC)** **Sebastian Pascarelle** In-Depth Engineering
4:30 pm	**Threats to PNT** ONI	1556534 **Ongoing Naval Postgraduate School Research Efforts in Naval Mining** **LT Daniel Petersen, USN** Naval Postgraduate School	1574707 **The Multi Sensor Sonobuoy and Its Promise for ASW** **Jeffrey Ridgway** Information Systems Laboratories, Inc. **Jameson Bergin** Information Systems Laboratories, Inc.

5:00 pm   Conference Adjourns

1571381 **Sea Water Inflated Launch and Recovery System (SWI-LARS)** Robert Lohe Phoenix International Holdings, Inc. Mitchell Loyd Phoenix International Holdings, Inc.	1569714 **Project Mazu - Subsea Pulsed Power, High Voltage Discharge, and Plasma Study** Nate Gonzales General Dynamics Mission Systems	1568242 **Risk Management Framework (RMF) to Continuous ATO** Jim Pietrocini KBR	1571832 **Understanding the Future of Memory: Understanding the Significance of Compute Express Link** Brian Kornish Accipiter Systems
1534252 **Hybrid Drone: The World's Only Fully Multi-Modal (Maritime, Air and Land) UxS** Scott Kempshall HyALTA Aeronautics, Inc.	1562092 **Maneuvering Analysis of a Non-Body-of-Revolution Submersible with Large Pod Appendages** Allison Kalinowski U.S. Naval Academy Jonathan Gibbs U.S. Naval Academy	1559002 **Latency and Processing Power Optimization Through Neuromorphic Signal and Data Processing Approaches** Yash Mirchandani Neoskye, Inc.	1540438 **Controlling Your Destiny: Using State of the Practice Digital Electronic Systems Engineering To Develop DMSMS Solutions That Are Affordable to Sustain, Agile to Modernize, AND the Navy Owns the Data** James Chew Cadence Design Systems Steve Carlson Cadence Design Systems
1570243 **Non-Traditional Signature Susceptibility Characterization** Anne Fullerton NSWC Carderock Division Keegan Delaney NSWC Carderock Division	1578657 **An Apparent Impedance Approach to Advancing Corrosion Protection System Control** Matthew Strom U.S. Naval Research Laboratory Caelen Clark U.S. Naval Research Laboratory	1571086 **Human Centered Engineering Early in Systems Development: A Case Study of Telerobotic Manipulation** Kelly Sprehn Draper Meredith Pitchon Draper	1540508 **Better, Faster, Cheaper: Lowering Total Life Cycle Costs While Reducing Development Costs and Schedule** Adam Sherer Cadence Design Systems Dr. Yadu Zambre Air Force Research Laboratory

Bus Schedule

Due to heightened security measures, it is in your best interest to take the shuttle buses provided.
The use of POV is strongly discouraged and may result in entry delays and the risk of not being allowed access.

Tuesday, September 19

6:30 – 9:00 am
Buses will shuttle (as filled) from the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn) to the Dealey Center Auditorium.

10:00 AM – 4:00 pm
Bus departs the Dealey Center Auditorium for the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn) every hour.

Bus departs Dealey Center Auditorium at:
10 am | 11 am | 12 pm | 1 pm | 2 pm | 3 pm | 4 pm

4:45 – 5:45 pm
Buses will shuttle in a loop from the Dealey Center Auditorium to the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn).

5:45 – 7:00 pm
Buses will shuttle in a loop from the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn) to the Clambake.

8:00 – 9:30 pm
Buses will shuttle from the Clambake to the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn). Drop-offs only.

Wednesday, September 20

6:30 – 9:00 am
Buses will shuttle from the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn) to the Dealey Center Auditorium.

10:00 AM – 4:00 pm
Bus departs the Dealey Center Auditorium to the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn) every hour.

Bus departs Dealey Center Auditorium at:
10 am | 11 am | 12 pm | 1 pm | 2 pm | 3 pm | 4 pm

5:00 – 6:30 pm
Buses will shuttle from the Dealey Center Auditorium to the hotels (Mystic Marriott, Hilton Garden Inn, and Hampton Inn). Drop-offs only.
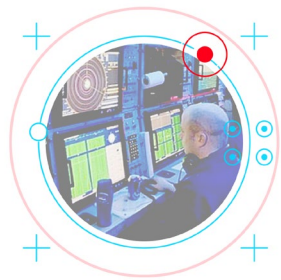
Track Information

Aviation Systems
Glen Sharpe
Advanced Acoustic Concepts

The Aviation Committee focuses on the technologies and capabilities that the airborne undersea warfighting community provides. This committee is interested in a wide range of "aviation platforms," manned and unmanned fixed wing and rotary winged. The committee is interested in articulating the contributions and potential of these weapons systems. Desired technical subjects cover the broad areas of signal processing, human factors, training, undersea capable weapons, sensors, man-machine interface, artificial intelligence (AI) littoral and large area search concepts. The presentations cover a large range, including theoretical discussions by academic institutions and laboratories, reports and roadmaps on experimental systems and systems being developed for Fleet introduction, and discussions of Navy programs of record.

C4I
CAPT Paul Rosbolt (Ret)
Systems Planning
and Analysis, Inc.

The C4I & Combat Systems Technical Committee focuses on Communications, Information Exchange, Data Fusion, and Command and Control enablers for the ASW Kill Chain F2T2EA (Find, Fix, Track, Target, Engage, and Assess). Committee presentations are given by academia, government and industry and cover a broad range of topics from theoretical discussions to updates on technology, programs of record and test results.

Mine Warfare
Kevin Hagan
Peraton, Inc.

The Mine Warfare (MIW) session provides the opportunity for industry, government, and academia to exchange information and express their views in addressing technical, programmatic, and operational issues and activities in the MIW community. The Committee addresses threats, programs, operations, CONOPS, and future technologies across the MIW spectrum of mine hunting, mine sweeping, neutralization, command and control, mining, and other areas of interest.

Undersea Sensors
Joe Cuschieri
Lockheed Martin Corporation

The focus of the Undersea Sensors session is to provide guidance to the U.S. Navy about the application of cutting edge technology. Abstracts submitted to this section relate to the following: underwater acoustic transduction and acoustic sensor arrays, electro-optic sensors, magnetic sensors, electrostatic sensors, chemical sensors, gravity sensors, signal processing, test and evaluation, operational use/sea test results, and theoretical studies. This list is not exhaustive but representative of several disciplines and associated sciences.
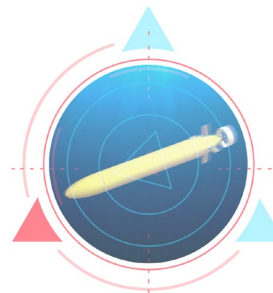
Undersea Vehicles
Chuck Fralick
Leidos

The Undersea Vehicles session focuses on both large and small hull undersea vehicles (both manned and unmanned) and unmanned surface vehicles. Technical subjects cover the broad areas of weapons, unmanned vehicles, defensive systems and hull, and mechanical and electrical systems. The technical presentations range from theoretical discussions by academic institutions and laboratories and reports on experimental systems and systems being developed for Fleet introduction to discussions of Navy programs of record.

Warfighter Performance & Combat Systems
CAPT Paul Rosbolt, USN (Ret)
Systems Planning
and Analysis, Inc.

This special session on Warfighter Performance & Combat Systems is intended to address evolving operational needs and solutions in the area of USW warfighter performance that employs a combination of components such as technology, HSI, Serious Games, Virtual Worlds, and other emerging concepts. Presentations in this session will address approaches that effectively combine cross discipline techniques and methodologies to provide real capability to the Warfighter across all USW Warfare Domains/Enterprises (i.e., Submarine, Surface, Air, and MIW Enterprises).

Human Systems Integration (HSI) – Improving data visualization techniques and enhancing intuitive decision making; improving the reliability of critical information Operator Capability

Training – Establishing linkages between theory, experiments, and training system design; integrating M&S to increase realism as well as cost efficiency of onboard submarine training capability

Health and Wellness – Reducing or countering the negative effects of fatigue, stress, illness, etc.; improving on-board environment with respect to atmosphere, nutrition, exercise, noise exposure, etc.

Abstract Descriptions

Aviation Systems

1555096

Navy STP: Transition Innovative Technology to Deliver Warfighting Capabilities

Williamson, D.

Provide overview of Navy STP, purpose of the program and benefits to the Department of the Navy and to defense industry prime contractors. Will include a real-time demonstration of online tools to search innovative technologies.

1576322

Recent Breakthroughs in Air ASW Acoustic Automation

Riddle, L.

This talk discusses recent breakthroughs in Air ASW active sonar automation, specifically the Multistatic Active Coherent (MAC) family of systems and the Directional Command Activated Sonobuoy System (DICASS). The results presented are based on many at-sea test flights, with a comparison to human operator performance.

1575644

MQ-9B SeaGuardian Anti-Submarine Warfare, Surveillance Capabilities and Operational Demonstrations Brief

Yelle, P.

Discuss MQ-9B SeaGaurdian recent Operational Testing during RIMPAC 2022, UxS Integrated Battle Problem (series), USS CARL VINSON Strike Group Integration and NORTHERN EDGE 2023 exercises. Brief will also discuss specific ASW capabilities currently integrated and projected capability upgrades as the program develops. Briefly discuss U. S. Pacific Fleet/SEVENTH Fleet ASW MQ-9B operational evaluation in FY 24 to the IPACOM AOR.

1572847

Higher Data Rate and Improved Spectrally Efficient Telemetry Options for Sonobuoy and Maritime Line of Sight Radio Communications

Ebersman, H.

This presentation looks to address challenges presented by modern adversaries that can be accomplished by increasing the data rates for sonobuoy and maritime communications while maintaining robustness and minimizing spectrum occupancy. It will cover high-performance and low-cost options which can become the basis for the next generation of secure line of sight communication waveforms.

1585020

Advances in the Precision High Altitude Sonobuoy Emplacement (PHASE) Project

Montague, B.

SeaLandAire Technologies, Incorporated (SLA), and Navmar Applied Sciences Corporation (NASC), are developing the Precision High Altitude Sonobuoy Emplacement (PHASE) technology to provide next-generation capabilities for sonobuoys. The PHASE system is a modified sonobuoy air descent module intended to significantly reduce sonobuoy time-to-splash and improve accuracy when deploying from high altitudes compared to that of a current production sonobuoy. This system could be applied to any parachute-based, air-deployable system in which time-to-splash and/or placement accuracy is critical.

1555000

Triton UAS Communications Gateway

Loegering, G. • Smallwood, D.

The Triton UAS, with its long range and persistence, will be able to act as a key communications gateway to both surface and subsurface naval assets.

1574857

Aviation Systems

Mirchandani, S. • Mirchandani, Y.

Bryka proposes a novel algorithm leveraging AI/ML technology to address the current gap in accurately and efficiently analyzing sensor data in the aerospace and aviation sector. The algorithm will be validated with sensor data from various conditions, including engine degradation modes, to enhance fault diagnostics, optimize decision-making processes, and make better use of engine sensor data. Bryka's technology has the potential to benefit a wide range of aircraft platforms, including fighter jets, cargo planes, and helicopters, leading to increased safety, lethality, and mission effectiveness in military aviation operations. Additionally, Bryka Inc. aims to integrate AI/ML algorithms with aviation sensors across different branches of the U.S. military while addressing security and resilience concerns.

1576866

Advances in the Digital DIFAR Vertical Line Array (DDVLA) Sonobuoy

Montague, B.

SeaLandAire Technologies, Inc. is developing the Digital DIFAR Vertical Line Array (DDVLA) sonobuoy to provide next-generation capabilities for airborne anti-submarine warfare. The precision of this new DDVLA sensor array will provide wide-ranging coverage of the undersea battlespace with fewer deployed assets. SeaLandAire made significant advances in the design and production of the DDVLA sonobuoy, which has been undergoing at-sea operational environment testing and has been successfully tested using both over-the-side and aircraft platform emplacements.

Mine Warfare

1555621

Development of New Underwater Explosives and Warheads

Wagus, D. • McDaniel, G.

In the recent past, research and development in undersea energetics has been limited. The shift in focus of the National Defense Strategy (NDS) sparked the need to revitalize undersea energetics. NSWC IHD has developed a new underwater explosive with improved characteristics that advances the state of the art for underwater weapons including mines and torpedoes. The explosive has completed an accelerated aging study leading to qualification. Once qualified it can be utilized in navy munitions pending system level final type qualification.

1573573

Deep Neutralization

Medina, E.

Deep neutralization.

1559222

Mission-Level Modeling & Simulation of Clandestine Mining Operations

Evans, N. • Stocking, C.

This project explores the use of extra-large unmanned underwater vehicles (XLUUVs) for clandestine mining operations using Advanced Framework for Simulation, Integration, and Modeling (AFSIM). AFSIM is a government-owned software tool used for multi-domain, mission-level modeling and simulation (M&S) analysis. This presentation will have two areas of focus: an overview of changes and enhancements to AFSIM undersea platform and environmental conditions; and a methodology for M&S analysis involving XLUUVs conducting undersea clandestine mining operations.

1573747

MCM Capabilities and Vectors for Future Development

Waymire, E.

MCM Capabilities and Vectors for Future Development.

1573750

Making Naval Mining Improvements a Reality

Blair, A.

Making Naval Mining Improvements a Reality.

1573304

LCS Mission Modules Program Office (PMS 420) Update

Saroch, G.

Update on PMS 420 Mine Countermeasures programs.

1573309

DARPA MIW Programs Update

Woerner, K.

Update on DARPA Mine Warfare programs..

1574115

Mine Warfare Programs Update

Jones, G.

Portfolio update brief focusing on upcoming opportunity areas for industry.

1557817

Undersea Delivered Mines Development

Osho, A.

To deliver underwater mines in support of U.S. Navy objectives. The presentation will highlight the development status of undersea delivered mines and lessons learned up to this point.

1613180

Angler

Miller, T. • Richardson, J.

Overview of the Angler system.

1613162

SUBPAC MCM Update

Szanyi, N.

An update on SUBPAC's approach to Mine Countermeasures.

1573314

Commander Mine Countermeasures Group THREE Operations

Dalrymple, M.

Introduction to COMCMGRU THREE and update on operations.

1558991

AI-MDCS Based Mine Warfare System

Mirchandani, Y.

Neoskye Inc, a minority woman-led small business, is actively working on a groundbreaking AI/ML based Mine Warfare System that automatically illustrates mine locations in any area of interest which protects and saves lives of DoD personnel.

1556534

Ongoing Naval Postgraduate School Research Efforts in Naval Mining

Petersen, D.

After discussions with OPNAV N97 and N 95, the NPS Expeditionary & Mine Warfare Chair accumulated information about ongoing and planned efforts among NPS faculty and students that could contribute to Naval Mining Topics in the 2023-2024 time frame. Some of these efforts were briefed by individual faculty to OPNAV N 95 and others as opportunities arose. Growing interest in Naval Mining can be partly attributed to furthering our understanding of Naval Mines as a part of the U.S. Navy's deterrence capability.

Undersea Sensors

1543531

DARPA Kraken Program Update

Woolfe, K. • Ott, M.

The presentation will cover results of recent at-sea test events for the DARPA Kraken program. Included will be a discussion of the capability's performance, concept of employment, and transition plans.

1570612

PMS 485 Deployable Surveillance Systems Update

LaShomb, S.

This brief details PMS485's Deployable Surveillance Systems (DSS) current activities and plans for rapid prototyping, production, and rapid fielding of surveillance systems under Middle Tier Acquisition (MTA) authority. DSS is focused on meeting gaps and emergent needs in the Integrated Undersea Surveillance Systems (IUSS) Program and support the concepts of Undersea Constellation and Full Spectrum Undersea Warfare. By utilizing MTA, the DSS team continues to transition innovative technologies rapidly to operations thereby maintaining overmatch in the undersea domain.

1575195

IWS5 Sensor Systems Update

Arnold, G.

Mr. Arnold, the IWS 5A Director of Advanced Development for Undersea Systems, will provide an update on IWS 5's submarine sensor system development. Mr. Arnold will address the status of EW sensors, new ASW sensors, and addressing Fleet needs, including the processing and OMI support for new sensors.

1575337

IUSS Mobile Surveillance System Future Capabilities and Opportunities

Ringel, G. • Rabon, C.

This brief details the current PMS 485 Mobile Surveillance Systems, Surveillance Towed Array Sensor System (SURTASS) efforts and plans for future Mobile Surveillance System capabilities. SURTASS is currently fielded on two Expeditionary and five T-AGOS platforms, and are programmed for seven T-AGOS 25 Class ships and 3 SURTASS-E.

1573183

Wargaming the Future of Integrated Undersea Surveillance System (IUSS)

Milano, A. • Gotowka, B.

ASW surveillance systems including IUSS are critical to the surveillance mission and the aging infrastructure is planned for recapitalization and modernization to remain on-pace with threat technology advances. A wargame invited participation from the operational Navy, strategic planners, technology developers and resource planners to consider the future architecture of IUSS under high probability scenarios. Results had immediate effect on near- and long-term planning for IUSS and scoped the problem space into directly actionable tasks suitable for further analysis.

1548490

Demonstration of MIMO Active Sonar Capabilities

Blackstock, S.

MIMO Active Sonar concepts and applications will be discussed, and analytical and experimental results will be presented.

1556438

Advancing Contextual Classification for Passive Sonar

Parrish, N.

Automatic target recognition (ATR) for acoustic contacts is a difficult yet critically important problem. In this talk, we argue that utilizing context over time, space, and frequency is critical to making accurate classification decisions on passive sonar detections and contacts. We will present three contextual classification approaches for the undersea domain: ORACL (Object Recognition and CLassification), 'Hands-Free' ORACL, and Long-Term Exploitation.

1570758

Volumetric Low Frequency Broadband Synthetic Aperture Sonar for Deeply Buried Mines and Seabed Infrastructure

Waters, Z.

The prosecution of threat targets and seabed infrastructure buried very deeply within the seabed (e.g. many target diameters) benefits from a novel sonar morphology that is designed to operate above the critical-angle and exploits the coupling of dilatational acoustic waves. Using data collected at-sea with a new autonomous underwater vehicle (AUV) based downward looking volumetric synthetic aperture sonar, we demonstrate the prosecution of very deeply buried targets with an area coverage rate commensurate with side-looking sonar systems. In this presentation, we review highly successful measurements executed during the BATLOPS 23 exercise against very deeply buried targets and overview adaptation of the sonar form factor for man-portable expeditionary systems.

1556465

Sensors for Environmental Superiority

Greene, A.

Environmental superiority, an enabler to holistic undersea superiority, will require an environmental sensing suite and associated integrated situational awareness tools. The envisioned capability will enable operators to manage risk and inform platform maneuver decisions regarding sonar lineups, weapons employment, assessment of risk to a variety of threat acoustic and non-acoustic sensors, and employment decisions regarding several offensive non-acoustic ASW sensors under consideration. This brief will provide an overview of acoustic and non-acoustic signature/sensor pairings relevant to SSN missions followed by an overview of types of sensors that can enhance operations now and inform SSN(x) design decisions based on future warfighting needs.

1559417

Unmanned Underwater Vehicle Sensor and C4I Solutions for Distributed Maritime Operations

Smith, M. • Olivieri, M.

Distributed Maritime Operations (DMO) utilizing agile Unmanned Underwater Vehicles (UUV) with autonomous maneuvers are now a reality. These emerging "low value" attritable platforms collectively with traditional manned underwater and surface assets can unlock never-before realized capabilities with multi-mission payloads. The missions include: 1) passive detection, 2) passive engagement, 3) targeting and non-kinetic offensive cyber strike. The integrated system exploits Man-Unmanned Teaming (MUM-T) across multiple domains and introduces a war room to host the Unmanned Mission Operation Center (U-MOC).

1553987

Detecting and Tracking Surface Ships Using Non-Traditional Processing of Forward Looking Sonar Data

Nielsen, R.

A surface ship's wake is detected with a Forward Looking Sonar (FLS) operating in the traditional active mode. Noise from the ship's propulsion system or the ship's sonar transmissions is detected by the FLS in a (non-traditional) passive mode. The ship's location is obtained from the intersection of the wake and the bearing of either the ship's propulsion noise or of its sonar transmissions.

1559165

Automated Torpedo Acoustic Classifier (ATAC)

Pascarelle, S.

The Automated Torpedo Acoustic Classifier (ATAC) solution, developed under an ongoing IWS 5A SBIR effort, is an automated acoustic classifier that implements

Cortical Processing – a model of the processes of sound decomposition and recognition that occur in the brain's primary auditory cortex. The unique feature set provided by Cortical Processing can distinguish acoustic signals that may overlap in conventional time-frequency analyses. Current results of the SBIR research will be provided based on two data sets provided by NUWC.

1574707

The Multi Sensor Sonobuoy and Its Promise for ASW

Ridgway, J. • Bergin, J.

Extensive acoustic quieting has decreased the detection range of passive acoustic sensors against modern submarines. The Multi Sensor Sonobuoy (MSS) design builds upon a standard SSQ-53F sonobuoy string, adding an extremely sensitive scalar B-field sensor and an even more sensitive E-field sensor to the standard acoustic sensors. This innovative design will extend detection range and improve target classification by sensing physically independent submarine signatures, all within an air-launchable sonobuoy package.

Undersea Vehicles

1562196

Unmanned Maritime Systems (PMS 406) Program Update

Searles, D.

An overview of the Unmanned Maritime Systems (PMS 406) Program Office focusing on program status, recent achievements, and PMS 406 contributions to the development and fielding of Unmanned Undersea Vehicles in support of Subsea and Seabed Warfare.

1586768

PMS 415 Update

Severtson, G. • Dube, A.

PMS 415 Update.

1545983

DARPA Hunter Program Update

Woolfe, K. • Pfundstein, D.

DARPA Program Manager, Dr. Katherine Woolfe, will provide a classified briefing on the Hunter program. The presentation will include updates on program testing of an XLUUV payload delivery system prototype.

1567206

Fighting Into the Bastions: Getting Noisier to Sustain the U.S. Undersea Advantage

Walton, T.

U.S. Navy submarines face an increasingly contested environment undersea. To maintain their ability to conduct offensive operations in adversary waters, the U.S. undersea force will need to increasingly rely on teams of uncrewed systems that suppress or destroy enemy undersea defenses, much as aviators have done against air defenses during the last century. This study proposes new approaches for offensive undersea warfare and addresses their implications for Navy force structure and investments.

1554994

The Application of Machine Learning to Enhance Torpedo Target Classification

Green, J.

The Department of the Navy is tasked with analyzing the effectiveness of torpedo operational software. At present, part of the process involves a team of analysts visualizing acoustic data to review and evaluate torpedo target classifications which can be difficult, time-consuming, and prone to bias. The objective of this study is to standardize analysis methods that support torpedo software advancements by utilizing the power of machine learning to enhance torpedo classification accuracy.

1553115

AI/ML-Based State of Charge Prediction to Support Mission Planning of UUVs

Stimpson, A.

The estimation of energy usage over a mission is a critical part of effective mission planning for UUVs. This talk presents an AI/ML-based model used to predict the state of charge of a vehicle based on data collected using a submersible simulator. The model was shown to have more accurate predictions than traditional methods and could be used both for comparative analysis during mission planning as well as real-time monitoring and evaluation of energy usage.

1556321

Naval Undersea Warfare Center (NUWC) Keyport Unmanned Underwater Vehicle (UUV) Razorback AI/ML and 3D Rendering Digital Twin

Sprague, J. • Craig, J.

As the world becomes increasingly interconnected, the application of advanced technologies like Artificial Intelligence/Machine Learning (AI/ML) and 3D rendering to feed digital high-fidelity Digital Twins becomes vital. One such application is the creation of a digital twin for the Unmanned Underwater Vehicle (UUV), Razorback, owned by the U.S. Navy's Naval Undersea Warfare Center (NUWC) Keyport.

1576539

New Capability for Submarines

Peters, J.

This topic will present the concept for adding an advanced classified capability to VIRGINIA Class and future submarines.

1562058

Deep and Near-Surface Performance Analysis of a Non-Body-of-Revolution Submersible with Large Pod Appendages

Eves, S. • Gibbs, J.

This work examines the powering, resistance, and near-surface maneuvering tradeoffs of appending a non-body-of-revolution submersible hull-form with large pod appendages with the aim of increasing the payload capacity and mission flexibility of the platform. Initial powering studies of three pod geometries underscored the sensitivity to the length and shaping of the pod afterbody. Hydrodynamic analysis with constrained tow tank model tests under deep and near-surface calm water conditions show the influence of configuration and longitudinal placement of the appendages on the viability of the design.

1556086

Effect of Coupled High Pressure Salt Water Absorption and Low Temperatures on the Mechanical Characteristics of Additively Manufactured Polymers

LeBlanc, J.

An experimental study has been performed to investigate the effects of sustained hydrostatic depth pressure salt-water immersion coupled with low temperatures on the mechanical and structural integrity properties of additively manufactured (AM) polymer and resin based materials. The significant findings of the study highlight that both saltwater immersion and low temperature have differing effects on additively manufactured materials based on the material composition of the base material, and thus significant consideration must be given to material selection in marine environments.

1572158

Unmanned Vehicle Launch and Recovery Demonstrations from Horizontal Payload Tubes

Chapman, J.

Unmanned undersea vehicle (UUV) launch and recovery maneuvers using a full-scale 21-inch horizontal payload tube mounted to the Electric Boat SeaLaunch test platform are presented. The payload tube is outfitted with a 21-inch diameter UUV Sabot System (UUVSS) developed by Legnos Boats Incorporated under an Office of Naval Research (ONR) small business innovative research (SBIR) grant (ONR Program Officer - Kelly Cooper).

1571381

Sea Water Inflated Launch and Recovery System (SWI-LARS)

Lohe, R. • Loyd, M.

The Sea Water Inflated Launch and Recovery System (SWI-LARS) is an innovative solution for Department of the Navy (DON) submarine torpedo tube launch and recovery (TTL&R) of UUVs. SWI-LARS utilizes a soft inflatable structure that has a compact and predictable shape in its deflated condition while rigid in its inflated condition. The system increases the effective range of UUV docking communications by physically hosting docking assist transducers beyond the shutter way while also guiding the UUV during recovery.

1534252

Hybrid Drone: The World's Only Fully Multi-Modal (Maritime, Air and Land) UxS

Kempshall, S.

The Hybrid Drone (HD) is the world's only fully multi-modal UAS. The design is a hybrid Unmanned Vehicle that allows a single vehicle to operate in all mediums (air, water and land) using a single set of drive motors. This transformational design is enabled by the Hybrid Advanced Mobility Propulsion System (U.S. Patents 10180083/11333032/11454245/11519418083 with additional patents pending).

1570243

Non-Traditional Signature Susceptibility Characterization

Fullerton, A. • Delaney, K.

During near surface operations the undersea vehicle's antennas (communications), masts (visualization), and/or snorkel (air exchange) may be exposed. As these near surface operations are common and essential, it is important to comprehensively understand vehicle susceptibility during these periods.

1556393

DARPA Manta Ray Program

Woerner, K.

DARPA and the two prime performers will present the progress of the Manta Ray program which will be conducting at-sea demonstrations in 2024. The Manta Ray program is developing a new class of long duration, long range, payload capable UUVs and advancing key technologies that will benefit other naval designs.

1562362

Seafloor Bottom Node

Cox, R.

Future Navy operations in forward areas requires increased cross-domain C4ISR infrastructure and capabilities for interoperability and support to a variety of subsea and surface assets, particularly unmanned underwater and surface vehicles (UUV/USV). To address these emergent requirements, Leidos has developed an in-water system integration laboratory (SIL) as a model and demonstrator that provides energy and communication services to subsea platforms. This presentation provides a 2023 update for the prior presented material.

1547820

Target Strength Signature Comparisons

Bowling, T. • Telly, S.

The target strength characteristics of submarines are important in undersea warfare. In this presentation, we examine how the design of submarines can affect target strength.

1571984

Stability Certification via Semidefinite Programming

Juhl, A.

To accurately approximate a dynamical system with a numerical method, maintaining method stability in a stable system is crucial. We use semidefinite programming (SDP) for a robust stability certification of numerical methods. The use of SDP to verify stability extends to Reinforcement Learning (RL), ensuring an RL-driven autonomous system's reliable decision-making, even in unfamiliar states. Our results demonstrate the effectiveness of SDP in achieving a robust stability certification for complex numerical methods. Further implications of our findings include ensuring stability in the development of new methods and reinforcing the utility of SDP in guaranteeing stability for RL policies.

1555457

Planning Unmanned Underwater Vehicle Motion to Improve Passive Bearing-Only Multi-Target Tracking

Turner, J.

Unmanned underwater vehicles (UUVs) must maintain situational awareness of nearby vessels to avoid detection or collision. In some applications, only bearing measurements from passive sonar may be available, and with bearing-only measurements, motion of the UUV is critical to estimate range and velocity of tracked vessels. This presentation describes an approach to autonomously track multiple targets with passive sonar and plan the motion of the vehicle to maximize the anticipated information gain from future sonar measurements.

1556313

Tetra Subsea Seabed Warfare Vehicle Providing Rapid Payload Capability

Anderson, P.

The Tetra system provides a capability for the submarine force to deliver a growing range of payloads without needing to develop individual vehicles to accomplish specific missions. It is a recoverable, highly customizable system that has demonstrated early success at rapid integration of effectors and sensors. As a fiber optically tethered vehicle, live feedback is provided to the operators, expediting the ability for data to be analyzed and tactical decisions to be made.

1570261

Toward UUV Obstacle & Hazard Avoidance in Forward Operating Areas

Malphurs, D. • Palermo, N.

As Unmanned Undersea Vehicles (UUV) become more prevalent in Fleet operations, asset loss due to inadequate on-vehicle situational awareness is a challenge that must be mitigated. NAVSEA Warfare Centers and the Office of Naval Research (ONR) have been addressing this challenge, with targeted research and development in advanced sensors, intelligent perception, and autonomy. This paper describes ongoing NAVSEA/ONR research into SONAR-based techniques for UUV obstacle/hazard avoidance, with emphasis on utility in forward operating areas and collaborative experimentation with coalition partners.

1569962

Developing the Next Generation Exercise Section for Undersea Vehicles

Ruggieri, M.

Raytheon is developing the next generation Fleet Exercise Section (FES) for the MK54 MOD 2 Lightweight Torpedo. The FES gathers and records real-time section level and subsystem data during operation, including from the Stored Chemical Energy Propulsion System (SCEPS), the guidance and control, and the sonar. We will review the key functions of the FES, the subcomponents that perform those key functions, and how the FES plays a key role in the test and evaluation program for torpedoes, as well as explore challenges to the development effort.

1568581

Underwater Acoustic Options for Homing to a Target

Melvin, B. • Scussel, K.

Torpedo Tube Launch & Recovery (TTL&R) of unmanned underwater vehicles will provide submarine-based autonomous oceanographic sensing and data collection in support of intelligence preparation of the operational environment. In this briefing, acoustic homing capabilities and options will be discussed pertaining to Undersea Warfare and TTL&R.

1556379

Experimental Measurements and Numerical Analysis to Support Corrosion Informed Design

Policastro, S.

Overall project goal is the development of a software suite that can ingest lead design yard's CAD drawings, map materials, and corrosion data to systems of interest, and estimate corrosion for designers to make decisions early in the design process. This work reports on comparison between galvanic corrosion measurements on pipe spools in seawater with corrosion model outcomes from a commercial FEA solver.

1569714

Project Mazu - Subsea Pulsed Power, High Voltage Discharge and Plasma Study

Gonzales, N.

As the uses of Unmanned Underwater Vehicles (UUV) continue to grow, acoustic systems that are adaptable and can actively adjust the frequency and magnitude of their output has become a sought-after capability for informational, offensive, and defensive purposes. This paper focuses on the possibilities of using pulsed power, high voltage discharge and plasma formation to accomplish this.

1562092

Maneuvering Analysis of a Non-Body-of-Revolution Submersible with Large Pod Appendages

Kalinowski, A. • Gibbs, J.

This work examines the maneuvering tradeoffs of appending a non-body-of-revolution submersible hull-form with large pod appendages with the aim of increasing the payload capacity and mission flexibility of the platform. Low speed static pitch and static yaw wind-tunnel testing performed at the 1/16th scale indicates the influence of the pod configurations on the submersible's maneuvering in the x-z and x-y planes. An examination of the influence of stern control surface configuration and of bow plane and stern control surface control authority in the presence of the different pod configurations is also presented.

1578657

An Apparent Impedance Approach to Advancing Corrosion Protection System Control

Strom, M. • Clark, C.

Present-day state-of-the-art corrosion and signature management technologies utilize impressed current cathodic protection (ICCP) to reduce thermodynamic driving forces for corrosion through measuring and manipulating electrochemical potentials from discrete locations. As a result, the control stability limitations of modern ICCP systems hinge on the chemical stability of sensing electrodes, a paradigm that appears to have reached its limits. In order to advance our ability to manage electrochemical systems in the undersea, new sensing and electrochemical control approaches need to be developed. This work focuses on the development of an apparent impedance detection (AID) technique as a potential path forward for advancing our ability to measure and manage multipole electrochemical systems, such as ICCP.

Warfighter Performance

1556980

Warfighter Decision Centered Design

Gabriel, J. • Pushee, K.

Submarine engagement outcomes are influenced by Pinnacle Decisions made by the Warfighters. The briefing will illustrate the importance of Pinnacle Decisions on engagement outcomes, show how these naturally align with tactical guidance, suggest how to measure these decisions, and provide a decision centered approach to incorporate Pinnacle Decisions into the design and evaluation of submarine operations and tools.

1559563

Virtual Undersea Battlespace: Enabling the SUBFOR Wargaming and Experimentation Center (SFWEC)

Pelczarski, M.

The Virtual Undersea Battlespace is a distributed, enterprise LVC M&S environment that supports a wide range of stakeholders and applications in the undersea community. A focal use case has been its support for the SUBFOR Wargaming and Experimentation Center (SF WEC), which features Fleet operator-in-the-loop experimentation with respect to high priority operational scenarios.

1558995

High Power Microwave (HPM) Systems

Mirchandani, N.

Syrnatec Proposed High Power Microwave (HPM) systems have potential applications in current U.S. missile defense agency platforms for disabling or disrupting the electronic systems of enemy missiles.

1573623

Building Operational Trust in Deployed Autonomy Platforms

Endsley, T.

Current autonomous systems require significant involvement and oversight by human operators, pulling them away from mission, and often requiring higher levels of support than envisioned. Technology with greater autonomy capabilities does not necessarily lead to better mission outcomes. Namely, the use of human and system in the loop simulations to support the development of operational trust in autonomous systems, and to provide critical information on user requirements during the systems engineering process.

1539047

IWS 5.0 Program Status & Plans

Leon, G.

The Program Executive Office for Integrated Warfare Systems, Undersea Systems (PEO IWS 5.0), is responsible for maintaining a Cross-Enterprise focus in undersea warfare systems, developing an Open Architecture Computing Environment as foundation for future warfare systems and coordinating USW programs across the Enterprise. Advanced Development Programs, Surface Ship USW Combat Systems, USW Command and Control Systems and USW Systems Engineering make up the IWS 5.0 office.

1575323

IWS5 Combat Systems Update

Arnold, G.

Mr. Arnold, the IWS 5A Director of Advanced Development for Undersea Systems, will provide an update on IWS 5's combat system improvements to ASW systems for surface and submarine platforms. Mr. Arnold will address process and system changes supporting faster fielding of more capability, giving our undersea forces decision advantage over any adversaries.

1561918

USN Multi-Static Active Roadmap for Surface Ships and Submarines

Stout, M.

Maritime Patrol and Reconnaissance Aircraft (MPRA) have practiced multi-static active operations for decades, going back to the Julie system. Numerous efforts are underway to bring multi-static active capability to surface ships and submarines, including U.S. Allies. The talk discusses the state of the art and why multi-statics is seen as a key capability for future operations and conflicts.

1574821

Advancing Neurocognitive Assessment in Underwater Environments Through Tablet-Based Technology

Handy, J.

Diving operations subject Navy divers to a variety of operational and environmental stressors that could negatively influence brain behavior and cognitive function. Modern technological approaches to assessing neurocognitive performance, often delivered on computerized electronic devices, have not been reliably adapted for use in these challenging environments. This presentation details recent work conducted by the Naval Submarine Medical Research Laboratory to develop a field-deployable, tablet-based neurocognitive assessment tool to bridge this significant technical gap for undersea medical research.

1568242

Risk Management Framework (RMF) to Continuous ATO

Petrocini, J.

Discuss the current RMF process to a C-ATO approach. Enhancing the cybersecurity posture, increasing agility, and streamlining the authorization.

1558995

Latency and Processing Power Optimization Through Neuromorphic Signal and Data Processing Approaches

Mirchandani, Y.

SRAM-based neuromorphic computing has the potential to revolutionize current U.S. missile defense agency platforms by enabling faster and more efficient processing, improved accuracy, and real-time decision-making.

1571086

Human Centered Engineering Early in Systems Development: A Case Study of Telerobotic Manipulation

Sprehn, K. • Pitchon, M.

As the Navy thinks about the tooling suite available for remotely operated vehicles (ROVs) and unmanned underwater vehicles (UUVs), the human operator remains at the decision points of vehicle control and operation. The ability for operators to control advanced machinery can be impacted by the type of end user input device, the display, autonomous elements provided, and the combination thereof. We explore these design options early in the development lifecycle and provide guidance on both requirements and iterative operator engagement to support mission success.

Combat Systems & C4I

1587195

PMW 770: Accelerating Undersea and Shore Communications

Seitz, P. • Williams, E.

The Undersea Communications and Integration Program Office will present current efforts to provide and sustain the most advanced Undersea C4I capabilities for the United States Navy's strategic and undersea forces. Special focus will be given on plans to accelerate delivery of required undersea communications capabilities that are affordable, integrated, and interoperable. Additionally, the program office will provide insight on efforts to invest significantly in modernizing and integrating the Navy's shore systems and infrastructure to meet cybersecurity requirements, deliver solid state solutions, and transition from serial to circuit connections.

1530205

Undersea C3: Command, Control, and Communications

Egnor, D. • Adams, M.

Interoperable extended range cross domain C3 enables actions requiring human in the loop decisions. Minimizing the time from decision to action and from detection to action opens options for new tactics. This project aims to enable trustworthy message-passing when usual communication modalities may be experiencing degraded performance, connecting warfighters with sensing modalities with unique perspectives.

1576455

Undersea Constellation Communications Architecture Study

Craig, W.

This talk presents the process and results of a recent assessment evaluating several potential undersea communications architectures in support of submarine operations. A specific mission scenario is chosen, and communications requirements are derived from that scenario to provide evaluation criteria. Several Undersea Constellation architectures, as well as current submarine communications methods, are defined and evaluated against those criteria. General conclusions of the assessment will be discussed.

1548322

DARPA Timely Information for Maritime Engagements (TIMEly) Program Update

Ott, M • Kofford, A.

The presentation will cover results of recent at-sea test events for the DARPA TIMEly program. Included will be a discussion of the capability's performance, upcoming test events, and transition plans.

1571831

Enabling Operations across the Air-Water Boundary – A Submarine Integration Perspective

Brawner, M.

This briefing will present the results from the ongoing efforts by General Dynamics Electric Boat to investigate and assess technologies and capabilities and develop concepts to address the challenges of submarine operations in Contested Environments.

1571131

Nontraditional Anti-Surface Engagement

Cheij, A.

Nontraditional approaches to subsea based kill chain schema could provide time and cost efficient solutions to deter or defeat adversary platforms in an invasion scenario. This presentation highlights the modeled efficacy, engineering feasibility, deployment logistics, and adversary counters of a repurposed subsea weapons system employed in scenarios of interest and simulated in AFSIM. Study outputs include considerations for the number of systems needed to achieve threshold objectives, transportation and deployment, employment, targeting, and C2 of systems.

1576566

Submarine Non-Geostationary Orbit Satellite Communications Study

Atwood, M.

The ongoing proliferation of non-geostationary orbit (NGSO) satellite communications (SATCOM) presents an opportunity for submarine usage. This talk presents the unique challenges faced in integrating NGSO SATCOM capabilities onto submarines, as well as the process developed for determining technical feasibility of various NGSO solutions (both fielded and planned) within existing submarine constraints.

1575861

Ekelund Range Simulator for Passive Target Motion Analysis (TMA) by UAS Robots

Brutzman, D. • Cirullo, C.

The Ekelund Range for Target Motion Analysis (TMA) is a public-domain algorithm for computing contact ranges from passive bearings. Uncrewed Air System (UAS) sensors and high relative speed can enable new capabilities for robot scouting. This work describes a simulator for evaluating such possibilities.

1574760

DEVSECOPS in Infrastructure - Creating Warfighting Advantage at the Speed of Relevance

Jones, K.

Leveraging practices associated with "Continuous Integration and Continuous Deliver" (CI/CD) used by software developers as part of a closed-loop automation and recovery strategy enhances the U.S. Navy's ability to delivery enhanced capability more rapidly and with greater reliability. DEVSECOPS, or Development (DEV), Security (SEC), and Operations (OPS), provides a security centric approach to transitions from point in time hardening of systems to full life-cycle security. DEVSECOPs focuses on security from the first line of code and can maintain that security through the lifecycle of the system.

1552162

Cybersecurity Academic Collaborations for USW Combat Systems

Drozdenko, B.

With regards to the pace of technology, academia is a wellspring for new ideas and prototypes, and our Navy community and the researchers within it may greatly reap the benefits of university collaboration. In this presentation, three ongoing academic collaborations are introduced, funded via ONR and the National Institute for Undersea Vehicular Technology (NIUVT) and Naval Engineering Consortium (NEEC) programs. These proposed approaches contribute to cyber-resilience by finding quantitative mechanisms for determining whether to grant access in a ZTA-based SoS, providing situational awareness of all applications running on a Naval SoS, and developing methods for handling non-network-based attacks on a Naval SoS.

1571832

Understanding the Future of Memory: Understanding the Significance of Compute Express Link

Kornish, B.

Higher resolution and more numerous sensors in Combat Systems and C4I Systems (CS/C4I) applications are increasing the demands on system memory. Compute Express Link™ (CXL™) has been introduced to enable memory expansion and improve its performance in computer systems of the future. This presentation will describe the features of CLX and why they are important to CS/C4I systems.

1540438

Controlling Your Destiny: Using State of the Practice Digital Electronic Systems Engineering To Develop DMSMS Solutions that Are Affordable to Sustain, Agile to Modernize, AND the Navy Owns the Data

Chew, J. • Carlson, S.

Diminishing Manufacturing Sources and Material Shortages (DMSMS), or parts obsolescence, plagues all DoD systems. We will present a more effective way to address the electronics systems DMSMS issue, increasing platform availability and operational readiness rate.

1540508

Better, Faster, Cheaper: Lowering Total Life Cycle Costs While Reducing Development Costs and Schedule

Sherer, A. • Zambre, Y

The Program Executive Officers within TEAM Submarine are tasked to address total life cycle costs during the development of new systems. While a daunting task, the DoD has in house capabilities to perform this task for electronic systems.

1530844

Low-Power, Portable Deperming Systems for Magnetic Silencing Treatment (Deperming) of Surface Warships

Pedersen, J.

Modern Navies use occasional Magnetic Silencing Treatments (Depermings) to eliminate permanent magnetization effects which cannot be masked with fitted Degaussing systems. Unfortunately the cost of required electrical power systems, the high schedule impact and safety risks significantly impede this vital activity getting planned into operational schedules. Revolutionary technology is available which can enable a new Modus Operandi for contemporary Deperming: "One day to wrap, one day to treat, one day to unwrap". This new technology is High Temperature Superconducting (HTSC) cabling systems.

Biographies

RDML Mark Behning, USN

Director, Undersea Warfare Division, Office of the Chief of Naval Operations (N97)

RDML Mark Behning is a native of Phoenix, AZ, and a 1990 graduate of the U.S. Naval Academy with a Bachelor of Science in aerospace engineering. He also holds a Master of Arts in national security and strategic studies from the Naval War College and has completed the Massachusetts Institute of Technology Seminar XXI program.

His sea tours include Division Officer assignments aboard USS Philadelphia (SSN 690), Engineer Officer aboard USS Charlotte (SSN 766), and Executive Officer aboard USS Alaska (SSBN 732). He commanded USS Nevada (SSBN 733) and USS Henry M Jackson (SSBN 730) and also served as Commodore of Submarine Squadron (SUBRON) 17 in Bangor, WA.

His shore tours included duty as the Tomahawk Strike Officer for Commander, U.S. Naval Forces Europe; Assistant Force Nuclear Power Officer for Commander Submarine Forces Atlantic; Deputy Commander, Submarine Squadron 17; Deputy for Strategic Forces, Nuclear Weapons, and Force Protection for Commander, Submarine Force, U.S. Pacific Fleet; Sea Based Strategic Deterrence Branch Head for the Director of Undersea Warfare (OPNAV N97); and Deputy Director and Chief of Staff for Strategic Systems Programs.

His flag assignments include duty as Deputy Director, Strategic Targeting and Nuclear Mission Planning, J5N, U.S. Strategic Command and he is currently serving as Commander, Submarine Group 9 and Commander Task Group 114.3.

He is responsible for the administrative control of assigned ships and submarine squadrons to man, train, and equip Pacific ballistic and guided missile submarines, as well as exercising tactical control of assigned ballistic missile submarines conducting strategic nuclear deterrent patrols in the Indo-Pacific area of operations.

His personal decorations include the Defense Superior Service Medal, Legion of Merit, Navy and Marine Corps Meritorious Service Medal, as well as other unit and campaign awards.

Scott Bray

Deputy Director, Naval Intelligence (OPNAV N2N6C)

Scott W. Bray is the Deputy Director of Naval Intelligence. In this capacity in the Information Warfare Directorate on the Staff of the Chief of Naval Operations, he delivers comprehensive, substantive intelligence assessments to Navy leadership, oversees intelligence activities and policies within the Navy, and represents the Navy in the Intelligence Community. Concurrently, Bray serves as the Director of the Naval Intelligence Activity, an echelon two command tasked with providing oversight and management of the Naval Intelligence Enterprise.

Bray has served in these roles since January 2020. He was appointed to the Senior Executive Service in 2007. Bray's experience includes intelligence analysis, intelligence collection, leadership of the Intelligence Community's East Asia efforts, and extensive interagency integration at the Intelligence Community's highest levels. He held a number of analytic positions within the Office of Naval Intelligence, including analyst in the Submarine Warfare Operations Research Division (SWORD), senior analyst for Chinese naval warfare, Subject Matter Expert on Chinese Strategy and Doctrine, and the Navy's Senior Intelligence Officer for China. He served as a Special Assistant to the US Defense Attaché in Beijing, China in 2007-2008. Bray's tenure with the Office of the Director of National Intelligence began in 2010, when he became the Principal Deputy National Intelligence Officer for Military Issues, where he oversaw the production of National Intelligence Estimates and other national level intelligence assessments on worldwide military issues.

From 2012 to 2020, Bray was the National Intelligence Manager for East Asia, the U.S. Intelligence Community's senior official for East Asia matters. He oversaw and integrated all aspects of the IC's collection, analytic, counterintelligence, foreign partnerships, and resourcing efforts for East Asia and served as the IC's senior representative to the White House and the interagency process for East Asia issues.

Bray earned a bachelor's degree in International Affairs from the Georgia Institute of Technology in 1996 and a master's degree in International Affairs from Columbia University in 1998. Georgia Institute of Technology named Bray a Distinguished Alumnus of the Sam Nunn School of International Affairs in 2015. He is a Presidential Rank Award, National Intelligence Superior Service.

ADM Frank Caldwell, USN

Director, Naval Nuclear Propulsion Program

ADM James Caldwell assumed his duties as the Director of the Naval Nuclear Propulsion Program in August 2015. ADM Caldwell commanded USS Jacksonville (SSN 699), homeported in Norfolk, VA; Submarine Development Squadron (DEVRON) 12 in New London, CT; Submarine Group 9 in Bangor, WA; and the Submarine Force, U.S. Pacific Fleet, HI. His sea tours include service in both the Atlantic and Pacific Fleets.

His operational assignments include duty as a Division Officer on USS Boston (SSN 703), Engineering Officer on USS Alabama (SSBN 731) (GOLD), and Executive Officer on USS Buffalo (SSN 715).

Ashore, ADM Caldwell served on the Pacific Fleet Nuclear Propulsion Examining Board and later as Undersea Warfare Requirements Officer on the staff of Commander in Chief, U.S. Pacific Fleet. He also served as Senior Member of the Naval Submarine Force's Tactical Readiness Evaluation Team; on the Joint Staff as Deputy Director for Politico-Military Affairs for Europe, the North Atlantic Treaty Organization, Russia and Africa; and Deputy Commander for U.S. Strategic Command's Joint Functional Component Command for Global Strike in Omaha, NE, and as Naval Inspector General, Washington Navy Yard, D.C. Prior to leading the Naval Nuclear Propulsion Program, he was on the Office of Naval Operations Staff as the Director, Navy Staff.

He received his commission graduating with distinction from the United States Naval Academy in 1981 with a Bachelor of Science in marine engineering. He also holds a Master of Science in operations research from the Naval Postgraduate School.

Admiral Caldwell's awards include the Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit, Meritorious Service Medal, Navy Commendation Medal, Navy and Marine Corps Achievement Medal, and the Naval Submarine League's Charles A. Lockwood Award for Submarine Professional Excellence.

VADM Richard Correll, USN

Deputy Commander, U.S. Strategic Command

VADM Richard Correll is a 1986 graduate of Rose Hulman Institute of Technology with a Bachelor of Science in chemical engineering. He also holds a master's in International Strategic Studies from the Fletcher School of Law and Diplomacy.

His command assignments include command of USS Topeka (SSN 754); Submarine Squadron (SUBRON) 11, San Diego, CA; and Submarine Group 7, Yokosuka, Japan. He also served at sea onboard the USS Henry M. Jackson (SSBN 730), USS Hyman G. Rickover (SSN 709) and USS Buffalo (SSN 715).

His staff assignments include U.S. Strategic Command, Director of Plans and Policy (J5), U.S. Fleet Forces Command, Director of Joint Maritime Operations (N3), Strategic Systems Programs Headquarters, Naval Personnel Command, Naval Reactors Headquarters in the "Line Locker" and an assignment on the staff of the Office of the Secretary of Defense as the Military Assistant to the Deputy Under Secretary of Defense for Strategy Plans and Forces and Military Assistant for the Under Secretary of Defense for Policy. His last assignment was on the staff of OPNAV N2/N6 as Director of Strategic Integration, where he was responsible for integration efforts involving intelligence and warfare systems requirements. In December 2022, he assumed his current duties as Deputy Commander U.S. Strategic Command.

Correll served on Navy teams that have been awarded the Naval Unit Commendation, Meritorious Unit Commendation and Battle Efficiency E Awards.

VADM William Houston, USN

Commander, Naval Submarine Forces

VADM William Houston is a native of Buffalo, NY and a graduate of the University of Notre Dame with a degree in electrical engineering. He was commissioned via the Navy Reserve Officer Training Corps (NROTC) program. He also holds a Master's of Business Administration from the College of William and Mary's Mason School of Business.

His sea tours include Division Officer assignments on USS Phoenix (SSN 702), Engineer Officer onboard USS Hampton (SSN 767), and Executive Officer onboard USS Tennessee (SSBN 734)(B). He commanded USS Hampton (SSN 767) in San Diego, CA and was Commodore of Submarine Squadron 20 in Kings Bay, GA.

His shore assignments include Flag Lieutenant for Commander Submarine Force, U.S. Atlantic Fleet; the Atlantic Fleet Nuclear Propulsion Examining Board; Special Assistant to the Director of Naval Reactors for Personnel and Policy; Deputy Commander for Submarine Squadron 20; the Principal Director for Nuclear Matters within the Office of the Secretary of Defense; the Submarine and Nuclear Community Manager, Military Personnel Plans and Policy (N133) and Division Director of Submarine and Nuclear Propulsion Distribution, Navy Personnel Command (PERS-42).

His flag assignments include Deputy Director for Strategic Targeting and Nuclear Mission Planning (J5N) United States Strategic Command, Director of Operations, Naval Forces Europe-Africa, Deputy Commander,

U.S. 6th Fleet, Commander, Submarine Group 8, and Director, Undersea Warfare Division, Office of Chief of Naval Operations (N97).

Houston assumed his current duties in September 2021 as Commander, Submarine Forces, is the undersea domain lead, and is responsible for the submarine force's strategic vision. As Commander, Submarine Force Atlantic, he commands all Atlantic-based U.S. submarines, their crews, and supporting shore activities. These responsibilities also include duties as Commander, Task Force (CTF) 114, CTF 88, and CTF 46. As Commander, Allied Submarine Command, he is the principle undersea warfare advisor to all North Atlantic Treaty Organization strategic commanders.

Dr. Martin Irvine

Executive Director, Naval Surface Warfare Center and Naval Undersea Warfare Center

Dr. Martin Irvine serves as the Executive Director for Naval Surface Warfare Center (NSWC) and Naval Undersea Warfare Center (NUWC), both Echelon III commands within Naval Sea Systems Command. In this role, Dr. Irvine is responsible for leading more than 29,000 civilian scientists, engineers, technicians, and support personnel within 10 divisions located across the country to perform research, development, test, and evaluation for the future Navy, and to provide in-service engineering and logistics support for the operating fleet.

Prior to assuming his current position, Dr. Irvine was the Executive Director, Submarine Forces, where he was the principal advisor to the Submarine Force Commander on all matters relating to Strategic Deterrence and Undersea Warfare programs and requirements. His responsibilities included the prioritization of future Submarine Force capabilities and the development of strategy, undersea technology adoption and the implementation of unmanned systems in the undersea.

Dr. Irvine was selected for appointment into the Senior Executive Service in July 2019. He has 25 years of experience as a civil servant for the U.S. Navy.

From 2019 to 2021, Dr. Irvine was the Technical Director of NUWC Division, Keyport in Keyport, WA. His duties included the oversight of Research, Development, Test & Evaluation (RDT&E), in-service engineering, maintenance and repair, fleet support and industrial base support for undersea warfare systems, countermeasures, and sonar systems. He directed NUWC Division, Keyport operations at a number of remote facilities located throughout the United States and overseas.

Dr. Irvine held the positions of a Senior Scientific Technical Manager (SSTM) and the head of the Readiness & Training Systems Department for the Naval Surface Warfare Center Dahlgren Division Dam Neck in Virginia Beach, VA, from 2014 to 2019. Dr. Irvine led a $300M organization of 600 personnel supporting U.S. Navy combat systems, integrated training systems, cybersecurity, rapid prototyping, and systems safety engineering.

From 2016 to 2018, Dr. Irvine served a two-year assignment as the SSTM Director of Systems Engineering, Office of the Deputy Assistant Secretary of the Navy for RDT&E. In this role, he developed and implemented appropriate technical standards and policies to direct systems engineering functions for naval acquisition.

From 2011 to 2014, Dr. Irvine held two Office of Naval Research Science Advisor positions. The first was for Commander of Navy Expeditionary Combat Command (COMNECC) in Virginia Beach, VA, from 2011-2013, and then from 2013-2014 for Commander, Submarine Forces (COMSUBFOR) in Norfolk, VA. In these roles, he served as the Commander's advisor on Science & Technology, as well as acting as the Chief of Naval Research's liaison between the research enterprise and the fleet.

From 2006 to 2007, Dr. Irvine was a research faculty member at the Applied Research Laboratory at Penn State University in State College, PA. Dr. Irvine's research focused on fluid dynamics for undersea warfare applications. He was a member of the Civil Engineering Department Graduate Faculty.

Dr. Irvine started his career in 1997 at the Naval Surface Warfare Center Carderock Division in West Bethesda, MD. From 1997 to 2006 and from 2007 to 2011, Dr. Irvine served as Division Head, Hydrodynamics Subject Matter Expert, and Research Engineer for research, experimentation, computational simulations, design, and acquisition for Navy ships and submarines, combatant craft and advanced hull forms.

Dr. Irvine holds a Doctor of Philosophy degree in mechanical engineering from the University of Iowa, as well as Bachelor of Science and Master of Science degrees in ocean engineering from Virginia Tech. He is a graduate of the Harvard Kennedy School of Government Senior Executive Fellows Program. He holds Defense Acquisition Workforce Improvement Act certifications in four career fields and is a member of the Defense Acquisition Corps.

Dr. Irvine has received many awards for his performance, including the Navy Superior Civilian Service Award for his service to Commander, Submarine Forces in 2023, the Navy Meritorious Civilian Service Award for his service to COMNECC in 2014, and the 2015 Warfare Center Collaboration Award for service as a member of the cross-Warfare Center Unmanned Vehicles and Autonomous Systems Working Group.

Whitney Jones

Director, Submarine Industrial Base, Program Executive Office Strategic Submarines

Whitney Jones is the Director, Submarine Industrial Base (SIB), a component of the Navy's (DON) Program Executive Office, Strategic Submarines (PEO SSBN).

As Director of SIB, Jones is responsible for leading enterprise efforts to develop and deploy the industrial base capacity and capability required to build and sustain submarine warfighting needs. In this capacity, Jones is accountable for collaborative efforts across defense workforce, technology, infrastructure development, process change, and data analytics. Her role focuses on fostering relationships between Navy and industry to improve communications, industrial processes, and capacity planning.

Before assuming the role as Director in February 2022, Jones served as Deputy, Shipbuilding Industrial Base Task Force, where she leveraged her shipbuilding acquisition and supply chain experience to coordinate cross-enterprise projects and oversee strategic communications. She also led Navy Enterprise response, engagement, and assessment of the impacts of COVID-19 on the defense industrial base,

working closely with industry to mitigate the pandemic's impact on key suppliers by maintaining defense supply chains as part of "critical infrastructure" exempt from work stoppages.

Additionally, she served as the submarine enterprise lead for a Columbia (CLB) and Virginia Submarine (VCS) Industrial Base assessment with Office of Secretary of Defense (OSD) Cost Assessment Program Evaluation (CAPE). During the same time period, she implemented submarine enterprise efforts on benchmark setting workforce development pilots including Accelerated Training in Defense Manufacturing (ATDM) and the Pennsylvania Talent Pipeline Project.

From 2017-2019 Jones gained valuable defense industry experience in roles that included strategy and communications support for the Columbia Class Submarine Program, and Strategy/Business Development for a major defense electronics supplier. Prior to these roles, she served in Team Ships, where she provided direct strategic communications and management support to the Flag Officer and Executive Director of Surface Ship Maintenance, Modernization, and Sustainment.

From 2015-2016, Jones was the Director of Operations for the DDG 1000 Zumwalt Class Destroyer Program. In this role, and in the year leading up to first-of-class delivery, she was responsible for all strategic operations and internal and external communications for the DDG 1000 program, to include setting program priorities and managing daily execution of program resources.

Early in her Navy civilian career, Jones served as a Contracting Officer Representative (COR) for a number of multi-million dollar projects, to include Primary COR on a Follow-On Technical Support (FOTS) services contract valued at $1.3B and requiring over 300 contracting actions per year in support of technical services and procurements. She began her career as the Communications Coordinator for the United Service Organization (USO) in Fort Myer, VA.

Jones earned her Bachelor of Arts in media & communications (with honors) from The University of Virginia in 2006. She has also earned Program Management Ceritifcation from the Defense Acquisition University. Her awards include DON Innovation Excellence Acquisition Team of the Year (July 2021) and numerous special action and performance awards from both her industry and government service.

Stephanie Link

Executive Director, In-service Submarines Program Executive Office, Attack Submarines (PEO SSN)

Stefanie Link is the Executive Director for In-service submarines for Program Executive Office Attack Submarines (PEO SSN). She is responsible for technical and programmatic matters for in-service nuclear powered submarines and deep submergence systems and related lifecycle support, maintenance planning and execution, and quality assurance and safety. Link was promoted to the Senior Executive Service in January 2023 and has 28 years of civilian service.

Prior to her promotion to Senior Executive service, Link served as the Deputy Construction Manager for the Columbia Class Submarine Program from October 2017 to January 2023. Link also served as the Columbia construction material manager from September 2015 to October 2017 and led the joint government and nuclear shipbuilder material and supplier base effort across the submarine and carrier program offices. During this time, she also served as a rotational action officer for Deputy Assistant Secretary of the Navy (DASN) Ships. From December 2012 to September 2015, Link was assigned as a future operations planner in Naples, Italy for Commander Navy

Installation Command's (CNIC) Europe, Africa, and Southwest Asia Region.

From February 2007 to December 2012, Stefanie served as the Puget Sound Naval Shipyard (PSNS) Depot Availabilities Manager for the NAVSEA Strategic and Attack Submarine Program Office in Washington, D.C. Link managed 14 Chief of Naval Operations Depot level submarine availabilities at PSNS to include engineered refueling overhauls for multiple strategic submarines, the USS San Francisco post collision repair and bow restoration, and other attack submarine maintenance periods.

From January 2001 to January 2007, she served in multiple assignments to include Availability Manager for the USNS Lewis and Clark (TAKE-1) with Supervisor of Shipbuilding, Bath, ME, San Diego Detachment in San Diego, CA, and Special Projects Engineer for the Supervisor of Shipbuilding (SUPSHIP) Groton serving as the senior on-site representative at PSNS for the USS Ohio and USS Michigan conversions from Strategic to Attack Weapons Systems platforms. Link began her career in Navy acquisition in 2001 serving as an Industrial Engineer for SUPSHIP Groton, supporting new construction efforts for USS Jimmy Carter and USS Virginia.

In May 1993, Link was commissioned through ROTC as a Second Lieutenant in the U.S. Army Corps of Engineers. During four years of active duty and six years as a reservist, she served in engineer officer assignments with the 5th Engineer Battalion (Corps)(Mechanized), the U.S. Army Corps of Engineers Headquarters, Europe in Wiesbaden, Germany and the 368th Engineer Battalion (Combat)(Heavy) in Londonderry, NH. Following completion of active duty, Stefanie was employed as an engineer with the Boeing Commercial Airplane Group from 1997-1998.

Link holds a Bachelor of Science in mechanical engineering from the University of Notre Dame and a Master of Science in engineering management from the University of Missouri at Rolla. She holds DAWIA Level III Certification in Program Management, and Level II certifications in systems planning, research, development and engineering, and manufacturing, production and quality assurance.

Link received the Meritorious Civilian Service Medal in 2023 and 2012 and the Department of Defense Acquisition Workforce Individual Achievement Award for Production, Quality, and Manufacturing in 2020.

Rob McHenry

Deputy Director, Defense Advanced Research Projects Agency

Rob McHenry is the deputy director of the Defense Advanced Research Projects Agency (DARPA). He rejoined DARPA in September 2022 after serving as founder and Chief Executive Officer of Bright Silicon Technologies, an optical microdevice manufacturing company.

McHenry has been an executive leader of organizations at the forefront of advanced technology development. He began his career as a nuclear submarine officer in the U.S. Navy, serving aboard the USS Portsmouth (SSN 707) and as a Special Assistant to the Chief of Naval Operations. Upon leaving military service, he supported DARPA, including technical development for

the DARPA Grand Challenge for Unmanned Ground Vehicles, and managed a consulting firm where he served as Director of Future Development for the Littoral Combat Ship program. From 2007 to 2012, McHenry was a Program Manager in DARPA's Tactical Technology Office, where he focused on complex autonomous systems in the maritime domain. His research in self-deploying unmanned ships (Sea Hunter) developed the first class of maritime vessels traveling long distances autonomously for months at a time. He also started the Long-Range Anti-Ship Missile program, which is a foundational breakthrough in autonomous weapons and successfully transitioned to the U.S. Navy as a program of record. In acknowledgment of his programs' impact on national security, he received the DARPA

Gamechanger Award in 2019. McHenry worked from 2012 until 2020 at the Palo Alto Research Center (PARC), where he held the roles of Energy Technology Program Manager, Vice President of Public Sector Operations, Chief Operating Officer, and Executive-in-Residence for the founding of a new business unit for advanced materials manufacturing.

McHenry received a Bachelor of Science in marine engineering from the U.S. Naval Academy, and a Master of Science in nuclear engineering from the Massachusetts Institute of Technology.

He serves on the board of trustees of the USS Hornet Sea, Air, and Space Museum in Alameda, CA, and is the coinventor of six patents for energy and optical systems.

CAPT Drew Miller, USN

Commander, Undersea Warfighting Development Center

CAPT Drew Miller, a native of Hilton Head Island, SC, graduated from the University of Florida in 1994 with a Bachelor of Science degree in mechanical engineering and was commissioned at Officer Candidate School in Pensacola, FL. He earned his master's of Business Administration from the University of Minnesota.

His sea duty assignments include serving as a Division Officer on USS Buffalo (SSN 715), Engineer Officer on USS Maine (SSBN 741G), and Executive Officer aboard USS Bremerton (SSN 698).

His staff assignments include Assistant Professor of Naval Science at the University of Minnesota NROTC Unit; Technical Assistant and Flag Aide to the Director at Naval Reactors; Branch Chief, Current Maritime Operations at United States Pacific Command; Deputy Director for Intelligence for Battlespace Awareness and Special Programs at Commander, U.S. Pacific Fleet; Deputy Director, Submarine/Nuclear Power Distribution Control Division (PERS-42B) at Navy Personnel Command; and Chief of Staff/Deputy Commander for Commander, Submarine Force Atlantic, Commander, Submarine Forces, and CTF 114.

He commanded USS Charlotte (SSN 766) in Pearl Harbor, HI from October 2012 through May 2016 and Submarine Squadron 4 from July 2019 to May 2021. He assumed command of Undersea Warfighting Development Center in May 2023.

CAPT Miller has completed five Western Pacific deployments and four strategic deterrent patrols in the Atlantic. He served on teams that have been awarded the Battle Efficiency 'E' and other unit awards.

RADM Scott Pappano, USN

Program Executive Officer, Strategic Submarines

RADM Scott Pappano is a native of Bethlehem, PA. He is a 1989 graduate of the U.S. Naval Academy with a Bachelor of Science in marine engineering and also holds a Master of Science in nuclear engineering from the Massachusetts Institute of Technology.

At sea, Pappano served onboard USS City of Corpus Christi (SSN 705), USS Albuquerque (SSN 706), USS Michigan (SSBN 727 Gold), and USS Ohio (SSGN 726). He commanded USS Buffalo (SSN 715) while forward-deployed in Guam.

Assignments ashore include duty with Commander, Submarine Development Squadron 12 Tactical Action Group; onboard X-Daniel Webster (MTS 626) at Naval Nuclear Power Training Unit Charleston, SC, Military Assistant to the Assistant Secretary of Defense for International Security Policy; and Executive Assistant to the Director, Programming Division (N80) on the Navy Staff.

After selection as an acquisition professional, Pappano served in the Special Operations Forces Mobility Program Office (PMS 399); as Executive Assistant to Commander,

Naval Sea Systems Command; and as Major Program Manager for the Strategic and Attack Submarine Program Office (PMS 392).

Pappano was assigned as Program Executive Officer, Columbia in March 2019. His previous flag assignments include Commander, Naval Undersea Warfare Center and Director, Comprehensive Test Facility.

Pappano served on teams that have been awarded the Joint Meritorious Unit Award, Navy Unit Commendation, Meritorious Unit Commendation, and the Navy "E" Ribbon.

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NAVSEA
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NEWPORT

Dr. Matthew Sermon

Executive Director, Program Executive Office Strategic Submarines

As of October 2021, Matthew Sermon is the Executive Director of Program Executive Office Strategic Submarines. Previously, Sermon served as the Executive Director for Program Executive Office Columbia Class Submarine and as the Executive Director, Amphibious, Auxiliary and Sealift Office, Program Executive Office, Ships. In his current role, he provides executive leadership to the Columbia Class Submarine acquisition program and the in-service SSBN/SSGN program, while also being assigned responsibility for revitalization of the Submarine Industrial Base. In this portfolio, he provides enterprise leadership for more than 250 acquisition personnel and approximately $130 Billion in acquisition and sustainment programs.

Sermon entered the Senior Executive Service in February 2019, and has been in federal service for more than 20 years. He has served in a variety of key leadership positions throughout his career, including Deputy Program Manager for the Columbia Class Submarine Program (2016-2019), a $100 billion DoD Major Defense Acquisition Program. During his tenure, he led the program through detail design, construction readiness, and significant sustainment planning activities. Before leading the Columbia Class, he was the Deputy Program Manager for the Zumwalt Class Destroyer (2014-2016) during test, trials, and delivery of the lead ship (DDG 1000). Prior to DDG 1000, he was the Deputy Program Manager for International Fleet Support in the Naval Sea Systems Command's Surface Warfare Directorate (2010-2014), where he was responsible for the management of more than $5 billion in Foreign Military Sales cases for more than 40 partner nations.

Other previous assignments include Principal Assistant Program Manager in the Support Ships, Boats, and Craft Program Office (PMS 325) in PEO Ships (2007-2010), where he led the $1.1 billion Egyptian Navy Missile Craft project while providing program management expertise for numerous other boat building projects.

Prior to starting in Navy civilian service, Sermon was a U.S. Navy Surface Warfare Officer (Nuclear). He received his Surface Warfare Officer qualification aboard USS Ramage (DDG 61). Additionally, Sermon served as nuclear engineering officer aboard USS Dwight D. Eisenhower (CVN 69) before leaving the uniformed Navy in 2004. He is a veteran of Operations Enduring Freedom and Iraqi Freedom.

Sermon is a member of the Acquisition Professional Community and has a Level III Certification in Program Management. He holds Defense Acquisition Workforce Improvement Act certifications in Production, Quality, and Manufacturing and Test & Evaluation, and has completed certification as a Project Management Professional (PMP). He received a Bachelor of Science degree in economics from the United States Naval Academy in 1999, and a Master of Science degree in engineering management from The Catholic University of America in 2006. He is a 2012 graduate of the Defense Systems Management College's Program Manager Course. During his distinguished federal service career, Sermon has received three Navy Civilian Meritorious Service Awards and one Navy Civilian Superior Service Award.

CAPT Todd Weeks, USN

Program Executive Officer, Undersea Warfare Systems

CAPT Todd Weeks graduated with Merit from the United States Naval Academy in May 1993 with a Bachelor of Science in naval architecture. In June 2006, he graduated Cum Laude from Norwich University with a Master of Arts in diplomacy. He is also a graduate from the Naval Command and Staff College at the Naval War College.

A submarine officer, Captain Weeks has served at-sea onboard USS SEAWOLF (SSN 21), as Engineer Officer onboard USS LOS ANGELES (SSN 688), Executive Officer onboard USS HELENA (SSN 725), culminating in command of USS ALEXANDRIA (SSN 757) from January 2011 until August 2013. He has deployed to the North Atlantic, Mediterranean, the Western Pacific and the U.S. Southern Command area of operations.

Ashore, CAPT Weeks served as Flag Lieutenant to the combined Commander, Submarine Group 2 and Commander, Navy Region Northeast, Material Officer for Commander, Submarine Squadron 22 in La Maddalena, Italy, and at the Submarine Warfare Division on the staff of the Chief of Naval Operations. From July 2005 to May 2006, he was a Federal Executive Fellow at RAND Corporation in Santa Monica, CA. While at RAND, CAPT Weeks co-authored *Sustaining U.S. Nuclear Submarine Design Capabilities*, a study analyzing the viability of the Submarine design base. Following command, CAPT Weeks was the Director of the Nuclear Propulsion Examining Board on the staff of Commander, U.S. Fleet Forces Command.

An acquisition professional, CAPT Weeks served as the Director of Mission Assurance in the Advanced Undersea Systems Program Office (PMS 394), as the Major Program Manager for Undersea Defensive Warfare (PMS 415), as the Major Program Manager for Advanced Undersea Systems (PMS 394), as the Executive Assistant to the Assistant Secretary of the Navy (Research, Development, and Acquisition), and most recently as the Major Program Manager for VIRGINIA Class Submarines (PMS 450).

CAPT Weeks assumed duties as Program Executive Officer, Undersea Warfare System in July 2023, where he is responsible for the acquisition, research, development, transition, and sustainment of all undersea weapon, countermeasure, combat system, training, and sensor systems.

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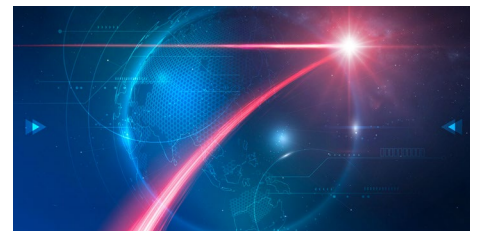### 26th Annual Systems & Mission Engineering Conference
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