

NDIA

2017 Fall Conference Joint Undersea Warfare Technology

"Prepared for war... today?"



Agenda • Speaker Biographies • Technical Session Summaries • Attendee Information • Division Information • Attendee Roster

September 18-20, 2017

U.S. Naval Submarine Base, New London - Groton, CT

WELCOME TO THE 2017 JOINT UNDERSEA WARFARE TECHNOLOGY FALL CONFERENCE

"Prepared for war... today?"

- Focus on critical undersea warfare areas related to the development, production, testing and logistic support of underwater combat systems including mines, torpedoes, manned and unmanned underwater vehicles, countermeasures, sensors, weapon control and handling equipment; and the integration of systems aboard aircraft, ships and submarines.
- Provide periodic forums for government, academia and industry personnel at all levels to exchange information and views as they seek solutions to undersea warfare problems.
- Conduct studies and prepare reports in response to requests from the U.S. Navy to recommend solutions to specific problems or issues related to undersea warfare.

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SCHEDULE-AT-A-GLANCE

WELCOME RECEPTION

Mystic Marriott Hotel & Spa

Monday, September 18: 5:00 pm - 6:30 pm

PLENARY SESSION

U.S. Naval Submarine Base, New London

Tuesday, September 19: 8:00 am - 5:00 pm

NETWORKING DINNER

U.S. Naval Submarine Base, New London

Tuesday, September 19: 6:00 pm - 9:00 pm

TECHNICAL SESSIONS

U.S. Naval Submarine Base, New London

Wednesday, September 20: 8:00 am - 5:00 pm

Please provide your email address on the sign-in sheet at registration to opt-in for sharing your contact information post-conference. The sign-in sheet will be shared by email to all registered attendees.

I welcome all of our attendees to the National Defense Industrial Association's 2017 Joint Undersea Warfare Technology Fall Conference. The NDIA Undersea Warfare Division members are proud to bring you this annual conference.

This conference concentrates on the Navy's core competency mission of countering submarine and mine threats to the free and open flow of sea borne commerce and to the conduct of power projection from the sea. All Navy platforms and elements of the Navy force structure are involved in undersea warfare: submarines, surface combatants, fixed and rotary wing aircraft, surveillance units, and the Navy's command and control infrastructure. The USW Division has five active Technical Committees in which the Division focuses 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 the 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.

The NDIA's Undersea Warfare 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.

Sincerely,
CAPT Robert Dunn, USN (Ret)
Chairman, Joint Undersea Warfare Technology Fall Conference
Government Relations Manager, General Dynamics Electric Boat

Emergency Information

In case of emergency, dial 911.

Security

For security purposes, we respectfully ask that you check any personal items (luggage, computer bags, coats, etc.) with your hotel bellman, or leave them at your hotel. On-site at the conference, you must carry a valid photo ID with you at all times.

Conference badges are to be worn at all times during event. No badge = no access to ANY event venues.

Attire

Industry: Business Casual
Active Duty Military: Khakis
Military Speakers: Khakis
Civilian Speakers: Coat and Tie

Attendee Agenda

Please write your name at the top of your attendee agenda. A limited number of the handouts were printed to ensure one (1) for each registered attendee. If you lose your handout, the registration desk may not be able to give you a replacement until the conclusion of the conference.

If any part of your information is incorrect on the Attendee List in this handout, please stop by the conference registration desk so we can update our database. We appreciate you letting us know of any errors.

Attendee Opt-In

Please provide your email address on the sign-in sheet at registration to opt-in for sharing your contact information post-conference. The sign-in sheet will be shared by email to all registered attendees.

Surveys

We appreciate the comments and suggestions of our attendees. An electronic survey will be sent after the conclusion of the conference. We ask that you take a moment to complete the survey, as we strive to make each event better than the last.

TUESDAY, SEPTEMBER 19

0830 - 0850	Call to Order Mr. Mike Tucker, <i>Chairman</i> , NDIA Undersea Warfare Division
	Welcoming Remarks Gen Hawk Carlisle, USAF (Ret), <i>President and CEO</i> , NDIA RDML Jimmy Pitts, USN, <i>Commander</i> , Undersea Warfighting Development Center
	Introduction of Speakers Mr. Robert Dunn, <i>Chairman</i> , Fall NDIA Joint USW Technology Conference
0850 - 0920	ADM Frank Caldwell, USN, <i>Director</i> , Naval Nuclear Propulsion Program
0920 - 0950	VADM Joe Tofalo, USN, <i>Commander</i> , Submarine Forces
0950 - 1015	Break
1015 - 1045	VADM Chas Richard, USN, <i>Deputy Commander</i> , USSTRATCOM
1045 - 1115	VADM Dave Johnson, USN, <i>Principal Military Deputy</i> , ASN/RDA
1115 - 1130	Award Ceremony
1130 - 1300	Lunch
1300 - 1330	RADM Daryl Caudle, USN, <i>Commander</i> , Submarine Force U.S. Pacific Fleet
1330 - 1400	RADM Michael Jabaley, USN, <i>Program Executive Officer</i> , Submarines
1400 - 1430	RDML Dean Peters, USN, <i>Program Executive Officer</i> , Air ASW CAPT Ramsden, CoS CPRG
1430 - 1455	Break
1455 - 1525	RDML Carl Chebi, USN, <i>Program Executive Officer</i> , C4I
1525 - 1555	RDML DelToro, USN, NUWC
1555 - 1625	RADM Dave Hahn, USN, <i>Chief</i> , Naval Research
1625 - 1655	SES Brian Howes, OPNAV N97
1655 - 1700	Closing Remarks
1700	Adjourn
1800 - 2100	Networking Dinner

JOINT UNDERSEA WARFARE TECHNOLOGY FALL CONFERENCE
U.S. NAVAL SUBMARINE BASE NEW LONDON
TECHNICAL SESSION AGENDA

WEDNESDAY, SEPTEMBER 20

SESSION		0800	0830	0900	0930	1000
C4I Session Chair: Mr. Paul Rosboit	DEALEY CENTER AUDITORIUM	20002 Update on Theater ASW Buildout <i>Mr. Michael O'Hare</i>	20007 Theater ASW Collaboration: Undersea Warfare Decision Support System (USW-DSS) Status and Plans for Implementing a Theater ASW capability <i>Mr. Robert Schmidt</i>	19970 Quantum Machine Learning for Undersea Warfare C4I <i>CDR Ray Britt, USN & Dr. Joseph Dulny</i>	19987 Open Architecture, Non-Proprietary, AI Enabled, Multi-Domain Command and Control Solution <i>Mr. John Kloske & Mr. Jeff Strickrott</i>	BREAK
COMBAT SYSTEMS / WP Session Chairs: Dr. Bob Zarnich & Mr. John Linderman	BUILDING 83, ROOM 327	19969 Submarine Game Films: A New Training and Development Approach for the Submarine Force <i>Mr. Prescott Chartier</i>	19977 Submarine Learning Channel: YouTube for the Submarine Fleet <i>Mrs. Denise Myrick</i>	19995 Improving Sonar Operator Performance/Proficiency <i>CAPT Ronald Toland, USN</i>	19996 Tactical Sandbox Training <i>Mr. Chris Capuano, Mr. Matt Puterio, Ms. Amanda Rock & Mr. Ray Rowland</i>	BREAK
MINE WARFARE / AVIATION Session Chair: Mr. Jon Tobias & Mr. Glen Sharpe	BUILDING 83, ROOM 319	19874 Promoting Interoperability in the Mine Warfare Community through Common Data Standards <i>Dr. Jeffrey Dunne</i>	19938 NPS USW Systems Engineering Projects for 2017 & 2018 <i>RDML Rick Williams, USN</i>	19953 Automated Detection Association <i>Mr. Trent Christensen</i>	19963 Mine Counter-Mine (MCM) Studies at Naval Postgraduate School: Applying Systems Engineering to the Design and Analysis of Current, Planned and Possible MCM Systems, Tactics, and Technologies <i>Mr. Gene Paulo</i>	BREAK
UNDERSEA SENSORS Session Chair: Mr. Mike Janik	BUILDING 83, ROOM 317	19997 Seabed Surveillance System Modernization <i>Mr. Bill Traganza</i>	ONI 6 Undersea Sensors Brief 1	19976 Advanced Development Updates <i>Mr. Peter Scala</i>	19960 Deployable Surveillance Activities and Road Map <i>Mr. John Curtis</i>	BREAK
UNDERSEA VEHICLES Session Chair: Mr. Tom Ruzic	BLEDSOE HALL AUDITORIUM	20013 Undersea Weapons Program Plans <i>CAPT Steven Harrison, USN</i>	19974 PEO Submarines: Unmanned Systems Submarine Integration Integrated Product Team Bridges the Acquisition "Valley of Death" <i>Mr. Roger Johnson, Mr. Walter Smith III & Mr. Rickey Wall</i>	20000 Advanced Naval Technology Exercise 2017: Battlespace Preparation in a Contested Environment <i>Ms. Jessica Shaffer</i>	19946 ANTX 2017: Distributed Command and Control of UxV for IPOE <i>Mr. Matthew Ferro & Dr. Michael Incze</i>	BREAK

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SESSION		1030	1100	1130	1200
C4I Session Chair: Mr. Paul Rosbott	DEALEY CENTER AUDITORIUM	19940 Asia-Pacific Near-Peer Competitor C4ISR Capabilities for Seabed Warfare and the Implications for the U.S. Navy <i>Ms. Anna Stang</i>	19994 Navy's Optimum Investment of Technology Solutions for Undersea Constellation <i>CAPT Michael Boone, USN</i>	19993 Undersea Battlespace Preparation in Contested Environments <i>Mr. Larry Schluderberg</i>	LUNCH
COMBAT SYSTEMS /WP Session Chairs: Dr. Bob zamich & Mr. John Linderman	BUILDING 83, ROOM 327	19967 Achieving Cyber Resiliency in Undersea Warfare Systems <i>Mr. Patrick Kelley, Ms. Nicole Nunez & Mr. Jacob Sylvia</i>	19939 A Performance Model for Decision Making and its Application for Increasing Warfighter Performance and Safety <i>Dr. Joseph Gabriel & CAPT Ronald Steed, USN (Ret)</i>	ONI 9 Operationalizing Acoustic Intelligence	LUNCH
MINE WARFARE / AVIATION Session Chair: Mr. Jon Tobias & Mr. Glen Sharpe	BUILDING 83, ROOM 319	19983 An Affordable Man-Portable Synthetic Aperture Sonar Solution for Mine Warfare <i>Mr. Dan Lawrence</i>	ONI 8 Adversary MIW	19924 Rapid and Effective Prototyping using a Consortium-Based Other Transactions Agreement <i>Mr. Charlie Zisette</i>	LUNCH
UNDERSEA SENSORS Session Chair: Mr. Mike Janik	BUILDING 83, ROOM 317	19930 Bio-Inspired MEMS Underwater Direction Finding Acoustic Sensor <i>LT Josh Collins, USN</i>	19928 Undersea Low Light Sensors and Vision Processing for Detection and Classification <i>Mr. Michael Piacentino & Dr. John Tower</i>	19973 UUV Persistent Surveillance in Contested Area for ASW & ISR with EO/IR & SIGINT Sensor <i>Mr. David MacCulloch</i>	LUNCH
UNDERSEA VEHICLES Session Chair: Mr. Tom Ruzic	BLED SOE HALL AUDITORIUM	19941 Multi-Domain Autonomous Seabed Warfare – Demonstrating 3rd Offset Enabling Capabilities for the Maritime Domain <i>Mr. Jeffery Hoyle & Mr. Thomas Wears</i>	19986 Stackable Air-Powered Launcher System (STAPLS): Test Results and Integration Options <i>Mr. Kurt Hamel</i>	19966 ATT/CRAW Submarine Integration Efforts and Implosion Requirement Challenges <i>Dr. Ryan Chamberlin</i>	LUNCH

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SESSION		1300	1330	1400	1430	1500
C4I Session Chair: Mr. Paul Rosbolt	DEALEY CENTER AUDITORIUM	19961 Optical Tech Enabling Future Naval Force <i>CAPT Tom Dlugolecki, USN (Ret)</i>	19980 Wide Area Undersea Communications Through Intelligent Mobile Networks <i>Mr. Jeffrey Smith</i>	19962 Polarization Modulation and Demodulation Concepts for Future Wireless EM C4I Systems <i>Dr. Donald Steinbrecher</i>	19991 Deep Learning Neural Networks for Accurate Direction Finding <i>Mr. Robert Smarrelli</i>	BREAK
COMBAT SYSTEMS /WP Session Chairs: Dr. Bob Zarnich & Mr. John Linderman	BUILDING 83, ROOM 327	19812 Undersea Systems Update <i>CAPT Doug Adams, USN</i>	20012 Automated Solution Development <i>Mr. Steven Potochniak</i>	19931 Submarine Combat Systems - Integrating Future Payloads Today <i>Mr. John Woolbright II</i>	19978 Streamlining Submarine Software Deployment with Linux Containers <i>Mr. William Giacheri & Mr. Daniel Moniz</i>	BREAK
MINE WARFARE / AVIATION Session Chair: Mr. Jon Tobias & Mr. Glen Sharpe	BUILDING 83, ROOM 319	Captain Belvins		19965 Fielded Airborne ASW/ Mine Warfare MSI Systems <i>Mr. Matthew Apostolou</i>	ONI 3 Submarine Radiated Noise	BREAK
UNDERSEA SENSORS Session Chair: Mr. Mike Janik	BUILDING 83, ROOM 317	19998 Development of the Mobile Off-Board Clandestine Communications and Approach (MOCCA) – Small UUV Progress Status <i>Mr. Jason Osborn & Mr. Eric Will</i>	19999 High-Search Rate Off- Board Transducer for Mobile Off- Board Clandestine Communications and Approach (HOT MOCCA) <i>Mr. Andy Coon & Mr. Scott Stickels</i>	ONI 7 Undersea Sensors Brief 2	19945 Sea Lion Counter-UUV Interdiction System <i>Mr. Robert "Bob" Olds</i>	BREAK
UNDERSEA VEHICLES Session Chair: Mr. Charles Fratlick	BLED SOE HALL AUDITORIUM	19886 Undersea Warfare High Energy Power Systems and Future Risk Acceptance: An update for the NAVSEA High Energy System Safety Office and Changes to the Navy Lithium Battery and Fuel Cell Safety Program <i>Ms. Tamera Tucker</i>	19975 Technology Development for Lithium Ion Battery Platform Certification <i>Dr. Joseph Fontaine</i>	19947 Real-Time Internal Short Circuit Detection for Enhanced Safety and Reliability of Li-Ion Batteries for UUVs <i>Dr. Brian Barnett</i>	19929 Variable Speed Hydrodynamic Model of an AUV Utilizing Cross Tunnel Thrusters <i>LT Ian Taylor, USN</i>	BREAK

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SESSION		1530	1600	1630	1700
C4I Session Chair: Mr. Paul Rosbait	DEALEY CENTER AUDITORIUM	19927 Machine Learning and Artificial Intelligence in Cybersecurity <i>Mr. Joseph Beel</i>	19957 Converged and Hyperconverged Solutions for the U.S. Navy <i>Mr. Dave Alexander, Mr. Dave Kinsman & Mr. John Sprague</i>	ONI 2 Adversary C4ISR Overview	ADJOURN
COMBAT SYSTEMS /WP Session Chairs: Dr. Bob Zarnich & Mr. John Linderman	BUILDING 83, ROOM 327	20025 Program Update for the Dry Deck Shelter (DDS) Modernization Program <i>CAPT Newton, USN</i>	19857 Targets Design and Development to Meet Weapons System Test Needs <i>Mr. Dustin Clark</i>	19951 Predicting Obsolescence Dates Using Reliability Models <i>MAJ James Starling, USA</i>	ADJOURN
MINE WARFARE / AVIATION Session Chair: Mr. Jon Tobias & Mr. Glen Sharpe	BUILDING 83, ROOM 319	19972 Modern Day Sonobuoys and Application of Sonobuoy Technology to Other Applications <i>Mr. Timothy Rorick</i>	ONI 4 Submarine Active Acoustic Target Strength	20001 Theater ASW C2 and Air ASW <i>Dr. Chidambar Ganesh & Mr. Michael O'Hare</i>	ADJOURN
UNDERSEA SENSORS Session Chair: Mr. Mike Janik	BUILDING 83, ROOM 317	19934 Enabling the CNO's Vision - Networking Sensors in the USW Domain <i>COL (Ret) Greg Gardner, PhD</i>	19982 The Demonstrated Advantages of a Full Duplex Acoustic Underwater Network <i>Mr. Neil Judell</i>	19954 IVER3 AUV for Diver/Swimmer Detection Near Moored SSN <i>Mrs. Abby Bailey & Mr. David MacCulloch</i>	ADJOURN
UNDERSEA VEHICLES Session Chair: Mr. Charles Fralick	BLED SOE HALL AUDITORIUM	ONI 5 Unmanned Underwater Vehicles	19971 Dielectric Sensing Network Development for Fluid Absorption Detection in Thick Coatings <i>Dr. Matthew Strom</i>	19992 Supporting UUV Adoption Through a Set-Based Design Exercise in the ARL UUV Short Course <i>Ms. Lorri Bennett & Mr. Paul Bruhn</i>	ADJOURN

Join us for the Spring Conference!
 March 12-14, 2018
 San Diego, CA



Admiral James F. Caldwell, Jr.
Director, Naval Nuclear Propulsion
Program

Admiral James Caldwell 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.

Caldwell commanded USS Jacksonville (SSN 699) homeported in Norfolk, Virginia; Submarine Development Squadron (DEVRON) 12 in New London, Connecticut; Submarine Group 9 in Bangor, Washington; and the Submarine Force, U.S. Pacific Fleet, Hawaii. 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, Caldwell served on the Pacific Fleet Nuclear Propulsion Examining Board and later as Undersea Warfare (USW) 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, Nebraska and as Naval Inspector General, Washington Navy Yard, D. C. His most recent tour was on the (Office of Naval Operations) OPNAV Staff as the Director, Navy Staff.

He assumed his duties as the Director, Naval Nuclear Propulsion Program in August 2015.

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.



Rear Admiral Daryl L. Caudle
Commander, Submarine Force, U.S.
Pacific Fleet

Rear Adm. Daryl Caudle is currently serving as Commander, Submarine Force, U.S. Pacific Fleet; He is the principal advisor to the Commander, U.S. Pacific Fleet or submarine matters. Prior to this assignment, he was Deputy Commander,

U.S. 6th Fleet; Director of Operations U.S. Naval Forces Europe-Africa; and Commander, Submarine Group 8.

A native of Winston-Salem, North Carolina, Caudle graduated from North Carolina State University (magna cum laude) in 1985, where he majored in Chemical Engineering. He was commissioned after attending Officer Candidate School in Newport, Rhode Island.

Caudle holds advanced degrees from the Naval Postgraduate School, Masters of Science (distinction) in Physics, from Old

Dominion University, Masters in Engineering Management and from the School of Advanced Studies, University of Phoenix, where he obtained his Doctor of Management in organizational leadership with a specialization in information systems and technology. He is also a licensed professional engineer.

His early sea tours included assignments as division officer, USS George Washington Carver (SSBN 656G); engineer, USS Stonewall Jackson (SSN 634B); engineer, USS Sand Lance (SSN 660); and executive officer, USS Montpelier (SSN 765).

Caudle's first command assignment was as commanding officer of USS Jefferson City (SSN 759). As the Deputy Commander, Submarine Squadron 11, he served as Commanding Officer of USS Topeka (SSN 754) and USS Helena (SSN 725) due to emergent losses of the normally assigned Commanding Officers. He also commanded Submarine Squadron 3.

Tours ashore include assignments as Deputy Commander, JFCC-Global Strike; Assistant Force Nuclear Power Officer, Commander Submarine Force, U.S. Atlantic Fleet; Officer-in-Charge of Moored Training Ship (MTS635); Deputy Commander, Submarine Squadron 11; Assistant Deputy Director for Information and Cyberspace Policy on the Joint Staff (J5, Strategic Plans and Policy) in Washington, DC; Chief of Staff, Commander Submarine Force, U.S. Pacific Fleet; and as Deputy Chief for Security Cooperation, Office of the Defense Representative, Pakistan. His doctoral dissertation research was conducted on military decision making uncertainty regarding the use of force in cyberspace.

His personal decorations include the Defense Superior Service Medal (3 awards), Legion of Merit (2 Awards), Meritorious Service Medal (3 Awards), Navy and Marine Corps Commendation Medal (5 Awards), and the Navy and Marine Corps Achievement Medal (4 Awards).



Rear Admiral Carl P. Chebi
Program Executive Officer, Command,
Control, Communications, Computers
and Intelligence (PEO C4I) / Program
Executive Officer, Space Systems (PEO
Space Systems)

Rear Adm. Carl Chebi, a native of Holliston, Massachusetts, earned a Bachelor of Science in

Computer Systems Engineering and a commission as an ensign from the Naval Reserve Officer Training Corps at Rensselaer Polytechnic Institute. He is a graduate of the U.S. Naval Test Pilot School, Navy Fighter Weapons School and holds an Executive Master in Business Administration from the Naval Postgraduate School.

Chebi served operationally as an F-14 pilot in Fighter Squadron (VF) 142 deployed with USS Eisenhower (CVN 69), F/A-18 department head, executive officer and commanding officer of Strike Fighter Squadron (VFA) 192 deployed with USS Kitty Hawk (CV 63) to Atsugi Japan. During these tours he participated in Operation Southern Watch and numerous Western Pacific deployments.

His shore tours include service as an aircraft and weapons test pilot in both Air Test and Evaluation Squadron (VX) 23 and 30. He also

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SPEAKER BIOGRAPHIES

served as the deputy for Strike Aircraft Plans and Requirements for the Office of the Chief of Naval Operations (OPNAV). Chebi has served in numerous acquisition tours beginning with the U.S. Naval Test Pilot School where he was selected to fly the Mirage 2000 aircraft in France. His program management experience includes serving as a deputy program manager for the F/A-18 and EA-18G Program (PMA-265), Precision Strike Weapons Program Manager (PMA-201) and Naval Integrated Fires Program Manager (PMA-298). In August 2016, he assumed responsibilities as the vice commander, Naval Air Systems Command.

Chebi has over 3700 flight hours, 700 carrier arrested landings and has logged hours in the F/A-18 A-F, Mirage 2000, F-14A-D, F-15, F-16, P-51 and numerous other aircraft. He is the recipient of the Legion of Merit, Meritorious Service Medal and various unit and sea service awards.



Rear Admiral Moises DelToro, III
Deputy Commander for Undersea Warfare, Naval Sea Systems Command (SEA07); Commander, Naval Undersea Warfare Center

Rear Adm. Moises DelToro III, grew up in South Bend, Indiana, and enlisted in the Navy in 1980. He was commissioned via the University of Utah Navy ROTC program in 1987 with a Bachelor of Science in Mechanical Engineering. He holds a Master of Science in Engineering Management from the Catholic University and a Master of Science in Resourcing National Security Strategy from the Industrial College of the Armed Forces.

His sea tours include command of the USS Rhode Island (SSBN 740 Blue) from March 2005 to March 2008. During this period, the ship was awarded two Battle Efficiency Awards for operational excellence and three Commander-in-Chief, Atlantic Fleet Retention Excellence Awards. DelToro also served as a division officer aboard USS Pittsburgh (SSN 720); engineer officer aboard USS Maine (SSBN 741 Blue), and executive officer aboard USS Salt Lake City (SSN 716), deploying to the Mediterranean, North Atlantic and Western Pacific, as well as conducting several strategic deterrent patrols.

Ashore he served as Nuclear Propulsion Officer Candidate Program Manager at Navy Recruiting Command, Action Officer on the Joint Staff (J-8), and Non-nuclear Enlisted Community Manager at the Bureau of Personnel.

DelToro also served as executive assistant to the Director, Submarine Warfare (N-97) for one year before entering the Acquisition Professional Community in 2009, where he served in a number of assistant program manager positions. DelToro served as the program manager for Undersea Defensive Warfare Systems from December 2011 to April 2015. During this period the program was awarded a Secretary of the Navy Excellence in Acquisition Award and a Coalition for Government Procurement Excellence in Partnership Award. He was the recipient of the 2013 Naval Submarine League's Vice Admiral J. Guy Reynolds Award for Excellence in Submarine Acquisition.

DelToro assumed command of the Naval Undersea Warfare Center (NUWC) in July 2015. In this position, he is responsible for leading more than 5,000 scientists, engineers, technicians and support personnel, both civilian and active duty, within two NUWC divisions. NUWC provides full spectrum research, development, test and evaluation, engineering, and fleet support for submarines, autonomous underwater systems, and offensive and defensive weapon systems associated with undersea warfare.

Personal awards include the Legion of Merit (two awards), Defense Meritorious Service Medal, Meritorious Service Medal (two awards), and various other personal, campaign, and unit awards.



Rear Admiral David J. Hahn
Chief of Naval Research Director of Innovation, Technology Requirements and Test & Evaluation (OPNAV N94)

A native of Tampa, Florida, Rear Adm. David Hahn graduated from the U.S. Naval Academy with distinction in 1985, earning a Bachelor of Science in Mechanical Engineering.

Additionally, he holds a Master of Business Administration from George Mason University and has completed the Massachusetts Institute of Technology Seminar XXI program in International Security Affairs.

Prior to command, he served at sea aboard USS Casimir Pulaski (SSBN 633), USS William H. Bates (SSN 680) and USS Springfield (SSN 761), deploying to the North Atlantic and Western Pacific, as well as conducting several strategic deterrent patrols.

Ashore, he served as flag lieutenant to superintendent, U.S. Naval Academy; squadron engineer, Submarine Development Squadron (SUBDEVRON) 12; action officer, Joint Staff in the Command, Control, Communications and Computers (C4) Directorate; and legislative fellow on the staff of U.S. Senator John Warner.

Hahn commanded the USS Pittsburgh (SSN 720) from September 2003 to January 2007. In command, he deployed to the Caribbean Sea and Pacific Ocean and conducted an Engineered Overhaul in Portsmouth, New Hampshire.

Since becoming an acquisition professional in 2007, he has served as Joint Test and Evaluation test director and program manager, Advanced Submarine Research and Development and served as major program manager, Submarine Combat and Weapon Control Systems program.

Hahn's first flag assignment was as the senior technical advisor to the deputy chief of Naval Operations for Information Warfare/director of Naval Intelligence (OPNAV N2/N6). In November of 2016, he became the 26th chief of Naval Research with concurrent flag responsibilities as director, Innovation Technology Requirements and Test & Evaluation (OPNAV N94).

Hahn has been awarded the Defense Superior Service Medal, Legion of Merit, Defense Meritorious Service Medal, the Meritorious Service Medal (three awards), the Navy and Marine Corps Commendation Medal (four awards), the Navy and Marine Corps Achievement Medal and various campaign and unit awards.



Mr. Brian T. Howes
Deputy Director, Undersea Warfare
Division Chief of Naval Operations
(OPNAV N97B)

Mr. Howes is the Deputy Director, Undersea Warfare Division (N97B) on the staff of the Chief of Naval Operations (OPNAV). In this position, he is responsible for the division's programming and

budgeting, portfolio management, plans and studies, and internal business processes. Specifically, he oversees all N97 budgeting and programming activities relating to submarine platforms, payloads, manpower, training and readiness from science and technology efforts through acquisition and lifecycle management. He is responsible for development of the undersea warfare budget submission supporting the Chief of Naval Operations annual Program Objective Memorandum (POM) proposal to the Secretary of the Navy.

Mr. Howes was appointed to the Senior Executive Service in September 2015. Prior to joining the Senior Executive Service, Mr. Howes had a distinguished 29 year career as a commissioned officer in the United States Navy. As a career submariner, he commanded USS LA JOLLA (SSN 701), Naval Nuclear Power Training Unit, Ballston Spa, and, Submarine Development Squadron Five in Bangor, WA. His OPNAV experience included multiple tours on the staff of the Undersea Warfare Division, and as Deputy Director of the Navy Quadrennial Defense Review team.

Mr. Howes earned a Bachelor of Science degree in Nuclear Engineering from Northwestern University and a Master of Arts degree in National Security Affairs from the Naval Postgraduate School. He has received numerous awards throughout his career including the Legion of Merit and the Vice Admiral Stockdale Award for Inspirational Leadership.



Rear Admiral Michael E. Jabaley
Program Executive Officer for
Submarines

A native of Jackson, Mississippi, Rear Adm. Michael Jabaley graduated with high honors from Vanderbilt University in 1984 with Bachelor of Science in Mathematics and Computer Science,

and was commissioned via Officer Candidate School in Newport, Rhode Island.

Jabaley holds a master's degree in engineering administration from Virginia Tech, a master's degree in business administration from the Naval Postgraduate School, and is a graduate of the Command and Staff Course of the Naval War College and of the Joint and Command Staff Officer School of the Armed Forces Staff College (National Defense University).

Jabaley's sea tours include assignments aboard USS Drum (SSN 677), USS Ohio (SSBN 726), USS City of Corpus Christi (SSN 705) and command of USS Louisville (SSN 724) from May 2002 to August 2004.

On shore, Jabaley has served on the staff of commander, Submarine Group 8 in Naples, Italy; as a technical assistant to the director, Naval Nuclear Propulsion; on the staff of the Joint Chiefs of Staff as an operations officer in nuclear operations; as senior inspector of the Tactical Readiness Evaluation Team and Force Navigator on the staff of commander, Submarine Force, U.S. Pacific Fleet; and as deputy commander, Submarine Squadron (SUBRON) 1 in Pearl Harbor.

Jabaley served in the Virginia Class Submarine Program Office from 2006 to 2012, the last four years as program manager, delivering four of the Navy's newest fast attack submarines.

Jabaley was selected for flag rank in 2011. His flag assignments include Naval Sea Systems Command (NAVSEA) vice commander, command of Naval Undersea Warfare Center and NAVSEA deputy commander for Undersea Warfare. Jabaley was selected for his second star in March 2015 and relieved as program executive officer (PEO) Submarines in October 2015. His portfolio includes the Ohio Replacement SSBN and Virginia SSN programs, which are the 2nd and 3rd largest programs in the Department of Defense.

His awards and decorations include the Legion of Merit and the Bronze Star. He is the first recipient of the Naval Submarine League's Vice Admiral J. Guy Reynolds Award for Excellence in Submarine Acquisition. He is proudest of the accomplishments of his crew in earning the SUBRON-3 Battle Efficiency Award, awarded to USS Louisville in January 2004, and the accomplishments of his staff in earning the David Packard Excellence in Acquisition Award, awarded to the Virginia Program Office in October 2008.



Vice Admiral David C. Johnson
Principal Military Deputy Assistant
Secretary of the Navy for Research,
Development and Acquisition

Vice Adm. David Johnson, the son of a Navy captain and a Pensacola, Florida, native, graduated from the U.S. Naval Academy in 1982 with a Bachelor of Science in Aerospace Engineering.

Upon commissioning, Johnson reported to Trident Refit Facility in Bangor, Washington, where he served as docking officer, qualified as ship superintendent at Puget Sound Naval Shipyard and earned his engineering duty dolphins. Johnson graduated from the Massachusetts Institute of Technology in 1989 with a naval engineer degree and a Master of Science in Mechanical Engineering. Subsequently, Johnson held submarine acquisition and repair positions at the Supervisor of Shipbuilding in Groton, Connecticut, as a waterfront coordinator delivering Ohio class submarines and later as the program manager's representative for the Virginia-class submarine; at Trident Refit Facility Bangor as the planning officer; and at program executive officer (PEO) Submarines as the assistant program manager for USS Jimmy Carter (SSN 23).

Johnson became major program manager Virginia Program Office (PMS 450) in 2005. Under his guidance, the Virginia program reduced overall cost by \$4 billion and delivered four submarines to the fleet. The program was awarded the 2007 DoD Value Engineering Award and the 2008 David A. Packard Award for Acquisition Excellence.

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Johnson also established and served as the first Undersea Enterprise chief technology officer.

Johnson's flag tours include PEO Submarines, deputy commander for Undersea Technology (SEA 073), deputy PEO Submarines for the Ohio SSBN Replacement Program and commander, Naval Undersea Warfare Center. In October 2015, he assumed responsibilities as principal military deputy for the Assistant Secretary of the Navy Research, Development & Acquisition.

Johnson has received various personal and campaign awards, including the Defense Service Medal, Legion of Merit and the Meritorious Service Medal with three gold stars.



Rear Admiral G. Dean Peters
Program Executive Office for AIR ASW

A native of Louisville, Kentucky, Rear Adm. Dean Peters graduated from the U.S. Naval Academy in 1985. Peters has earned post-graduate degrees in aeronautical engineering and telecommunications and is a graduate of the U.S. Naval Test Pilot School, Class 102.

After earning his wings as a naval aviator in 1986, he flew the SH-2F Seasprite in support of multiple detachments deployed to the North Atlantic, Persian Gulf and Gulf of Mexico, completing anti-submarine warfare, surface warfare and counter-narcotics operations embarked on four different ship classes. He served as detachment officer-in-charge aboard USS Thomas C. Hart (FF 1092).

Peters' subsequent flying assignments included tours as a test pilot, instructor pilot and squadron department head.

As commanding officer of Air Test and Evaluation Squadron (HX) 21, the squadron accomplished more than 11,000 flight test hours and was the 2006 recipient of the Chief of Naval Operations (CNO) Safety Award.

Peters has served in numerous acquisition billets, including assignments as the MH-60R Seahawk avionics lead within the H-60 program office, deputy program manager for the Vertical Takeoff and Landing Unmanned Aerial Vehicle program and assistant program manager for systems engineering for all Navy and Marine Corps unmanned air vehicles.



Rear Admiral James E. "Jimmy" Pitts
Commander, Undersea Warfighting
Development Center

Rear Adm. James Pitts, a native of Milton, Florida, graduated from the United States Naval Academy in 1986 with a Bachelor of Science in Mechanical Engineering. Following his first sea tour, he attended the Naval Postgraduate School where he earned a master's degree in national security affairs.

At sea, his first submarine assignment was USS Grayling (SSN 646).

Additionally, he was temporarily assigned to USS Plunger (SSN 595) for a Western Pacific deployment, where he qualified in submarines. Follow-on assignments include: navigator on USS Hammerhead (SSN 663); combat systems officer on USS Hyman G. Rickover (SSN 709); and executive officer of USS Tucson (SSN 770). His at-sea command assignments were as commanding officer of USS Tucson (SSN 770) and commander, Submarine Squadron 7.

His shore and staff assignments include: Virginia requirements officer for the Submarine Warfare Division, Office of the Chief of Naval Operations (OPNAV N87); prospective executive officer instructor at Naval Submarine School; deputy commander for Submarine Squadron (SUBRON) 3; Program and Budget Branch chief on the Joint Staff; and as a chief of naval operations fellow; Strategic Studies Group. Most recently, Pitts was assigned to the OPNAV Staff as the Planning, Programming & Development Branch head and executive assistant to the deputy chief of naval operations, warfare systems (N9).

Pitts' personal awards include the Defense Superior Service Medal, the Legion of Merit (two awards), the Meritorious Service Medal (four awards), the Navy Commendation Medal (five awards) and the Navy Achievement Medal (two awards).



Captain Christopher P. Ramsden

United States Navy Chief of Staff, Patrol
and Reconnaissance Group

A native of Windham, NH, CAPT Ramsden graduated from Pinkerton Academy and holds a Bachelor of Science degree in Physics from Norwich University (1989) and a Master's of Science degree in National Resource Management from the Industrial College of the Armed Forces at National Defense University (2008). Additionally, he is a graduate of the Defense Acquisition University's Senior Acquisition Course.

CAPT Ramsden's sea tours include a first tour in Patrol Squadron TWENTY-SIX, Brunswick, Maine, deploying to Roosevelt Roads, Puerto Rico, and twice to Sigonella, Sicily supporting Operations DESERT CALM, SOUTHERN WATCH and SHARP GUARD. A disassociated sea tour aboard USS JOHN C. STENNIS as Operations Administration Officer, Command Security Manager and Officer of the Deck, completing an Arabian Gulf deployment and home port change to San Diego, CA, and a department head tour with Patrol Squadron FIVE, Jacksonville FL where he served as Tactics, Training and Operations Officer during deployments to Keflavik, Iceland and Sigonella, Sicily.

His shore tours include an assignment with Commander, Patrol Wings Atlantic/Task Force Eight Four in Norfolk, Virginia as Flag Lieutenant deploying to Guantanamo Bay, Cuba with JTF-160 during Operation SEA SIGNAL where he assumed the additional duties of Flag Secretary and Personal Security Officer, a shore tour with Patrol Squadron THIRTY as a Fleet Replacement Squadron NFO Instructor and Fleet Training Officer in the newly established Weapons Tactics Unit and a tour with PMA-205/290 in Patuxent River, MD where he served as the Assistant Program Manager for Training Systems (APMTS) for the P-8A Poseidon. Additionally, he served as the Deputy Director for Battlespace Awareness (BA) and

BA Functional Capability Board Lead, managing DoD requirements and resources in the BA portfolio for the Joint Staff, J2 in the Pentagon and Vice Chair of the Strategy and Policy Department, U.S. Naval War College, Newport, RI.

His command tours include the "Fighting Tigers" of Patrol Squadron EIGHT deploying in 2006 to the 5th and 7th Fleet AORs in support of Operations IRAQI FREEDOM and ENDURING FREEDOM, Task Force FIVE SEVEN (CTF-57) Forward in Manama, Bahrain, and Patrol and Reconnaissance Wing TWO in Kaneohe Hawaii.



**Vice Admiral Charles A.
"Chas" Richard**
Deputy Commander, U.S. Strategic
Command

A native of Decatur, Alabama, Vice Adm. Charles Richard graduated with honors from the University of Alabama in 1982 and has earned

master's degrees with honors from the Catholic University of America and the Naval War College.

His flag assignments include command of Submarine Group 10 in Kings Bay, Georgia, and the deputy commander of Joint Functional Component Command for Global Strike at U.S. Strategic Command (USSTRATCOM).

His operational assignments include command of USS Parche (SSN 683) as well as Submarine NR-1, then the U.S. Navy's only nuclear-powered, deep-submergence submarine. He also served aboard USS Portsmouth (SSN 707), USS Asheville (SSN 758) and USS Scranton (SSN 756).

Richard's recent staff assignments include service as the executive assistant and naval aide to the under secretary of the Navy; chief of staff, Submarine Force Atlantic; and command of Submarine Squadron (SUBRON) 17 in Bangor, Washington. Other staff assignments include director of resources on the staff of the under secretary of defense (policy); squadron engineer on the staff of SUBRON-8 and duty on the deputy chief of naval operations (submarine warfare) staff (OP 213). He has also served as a member of Chief of Naval Operations' Strategic Studies Group XXVIII, studying the integration of unmanned systems into naval force structure.

Richard previously served as the director, Undersea Warfare Division (N97) in Washington, D.C., and was responsible for the planning, programming and budgeting for acquisition, operational readiness and modernization of the submarine force and its support.

Richard assumed duties as deputy commander of United States Strategic Command in September 2016.

He has been privileged to serve on commands that have been awarded the Presidential Unit Citation, Joint Meritorious Unit Award, Navy Unit Commendation, Meritorious Unit Commendation and the Battle Efficiency "E" awards.



Vice Admiral Joseph E. Tofalo
Commander, Submarine Forces
Commander, Submarine Force Atlantic
Commander, Allied Submarine
Command

Vice Adm. Joe Tofalo grew up in upstate New York and graduated with distinction from the U.S. Naval Academy in 1983 with a Bachelor of

Science in Computer Science. He also holds a Master of Science in Engineering Management from Catholic University of America. His father was a 35-year career naval officer and his mother a Navy Women Accepted for Volunteer Emergency Service (WAVE), one of the first enlisted women in the Navy.

A career submarine officer, his at-sea assignments include: USS Flasher, USS Michigan and USS Montpelier. His at-sea command assignments were as commanding officer, USS Maine and commander, Submarine Squadron (COMSUBRON) 3.

Staff assignments include: three assignments on Commander, Submarine Forces staff; two assignments on Commander, U.S. Fleet Forces staff; four assignments on the chief of naval operations staff; U.S. Joint Forces Command; and the Joint Staff.

Selected for rear admiral in December 2009, his first flag assignment was as Assistant Deputy Chief of Staff for Global Force Management and Joint Operations, U.S. Fleet Forces Command. In August 2011, he relieved as commander, Submarine Group 10, and in December 2013 as director, Undersea Warfare on the chief of naval operations staff in the Pentagon.

Tofalo assumed his current duties in September 2015. As commander, Submarine Forces he 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) 144, CTF 84; commander, Anti-Submarine Warfare (ASW) Forces Western Atlantic; and CTF 46. As commander, Allied Submarine Command, he provides advice to the North Atlantic Treaty Organization Strategic Commanders on submarine related issues.

19812 Undersea Systems Update

The Program Executive Office Integrated Warfare Systems for Undersea Systems (PEO IWS 5.0) is responsible for maintaining a Cross-Enterprise focus in undersea warfare systems, developing Open Architecture Computing Environment as foundation for future warfare systems and coordinating ASW programs across the Enterprise. Advanced Development Programs, Surface Ship USW Combat Systems, ASW Command and Control Systems and ASW Systems Engineering make up the PEO IWS 5 Office.

19857 Targets Design and Development to Meet Weapons System Test Needs

The Targets Management Office (TMO) within the US Army PEO Simulation Training and Instrumentation (STRI), has provided target solutions to meet the testing requirements of various weapons systems within the US Army, Navy and Air Force. Currently, TMO has been increasingly tasked with developing and providing non-traditional target sets in addition to traditional foreign military hardware required for weapons systems testing.

19874 Promoting Interoperability in the Mine Warfare Community through Common Data Standards

This talk will begin with a brief history and overview of the MDM, but will primarily focus on describing current model modernization activities. This will include a discussion on the approach being taken, an overview of changes and modifications, and a summary of how the can be leveraged to benefit specific development efforts. We will conclude with information on how the MIW community can stay aware of – or even engage in – the model modernization efforts.

19886 Undersea Warfare High Energy Power Systems and Future Risk Acceptance: An Update for the NAVSEA High Energy System Safety Office and Changes to the Navy Lithium Battery and Fuel Cell Safety Program

High energy density power sources (e.g. silver zinc and lithium batteries) have been acknowledged mission and endurance enablers, in addition to platform and personnel hazards for over 40 years. Lithium batteries especially posed new risks and hazards to personnel and platforms resulting in the stand-up of the Navy's Lithium Battery Safety Program, codified under NAVSEAINST 9310.1. In the past, this effort has been managed by the Naval Ordnance Safety and Security Activity (NOSSA) for the evaluation and approval of lithium (and li-ion) batteries for Navy, MSC and USMC uses across numerous platforms, applications and System Commands. Changes are being made to the basic process and to the supporting guidance manuals to improve ownership and accountability.

19924 Rapid and Effective Prototyping using a Consortium-Based Other Transactions Agreement

Highlight the program that is providing rapid and effective prototyping technologies using a consortium-based Other Transaction Agreement. The presentation will illustrate how the Navy is successfully conducting projects through this program in benefit to its undersea mission. A discussion of what the program is, how it is being used by the undersea community, and the opportunity for others to use the program will be presented.

19927 Machine Learning and Artificial Intelligence in Cybersecurity

Machine learning and artificial intelligence (AI) are being applied more broadly as computing, data collection and storage capabilities increase. Machine learning and AI promise improved response with reduced human workload by automating repetitive tasks with AI. Machine learning provides the ability to rapidly analyze the overwhelming volume of data that our networks and applications see. As machines see this huge volume of data, threats are analyzed enabling the machine to learn and improve its responses. This presentation will address some current uses of machine learning and artificial intelligence in cybersecurity.

19928 Undersea Low Light Sensors and Vision Processing for Detection and Classification

In today's world modern day adversaries execute well thought out plans to implement techniques to disrupt and destroy infrastructure and inflict casualties wherever possible. Early threat warning is afforded through the use of surveillance sensors helping discover and identify undersea threats such as mines, submersibles, and other autonomous vehicles. The ability to sense, identify, and locate threats is a priority that can allow for timely decisions in executing counter-measures for disabling threats.

19929 Variable Speed Hydrodynamic Model of an AUV Utilizing Cross Tunnel Thrusters

The presentation will discuss the importance of accurately modeling AUVs for future USW/ASW endeavors of the US Military. An overview of model design, experimentation, and verification results will be provided. The presentation will also discuss why this research marks a significant progression in AUV modeling while also highlighting the capabilities, limitations, and future aspirations of the new model.

19930 Bio-Inspired MEMS Underwater Direction Finding Acoustic Sensor

Miniature sound sensors with direction sensing ability are of considerable interest to detect and localize threats in underwater environments. However, when sensor dimensions get smaller than the wavelength it is designed

to detect, the directional accuracy generally suffers. In this talk, the design, fabrication and characteristics of the underwater directional sound sensor will be described.

19931 Submarine Combat Systems - Integrating Future Payloads Today

This brief will focus on the integration of payloads into the Submarine Combat System (AN/BYG-1). It will provide a brief history of Submarine combat systems evolution, and then move quickly into how the integration of current and future payloads is being streamlined. The discussion will cover the steps PMS425 is taking to allow for quicker fielding of advanced payloads.

19934 Enabling the CNO's Vision - Networking Sensors in the USW Domain

NetApp has years of expertise on solving the challenges of securely managing data exchanges in distributed, disconnected and limited bandwidth tactical mission environments. We understand there is very limited distribution of sensor data which leads to the fleet fighting with a platform centric mindset. Within many parts of the Navy, data is stateful and often served by independent information silos.

19937 Tactical Tomahawk Weapon Control System Touch Screen Utilization Proof of Concept

Touch screen technology has become a staple in the modern world for its ease of use, intuitive interactions, and wide-ranging applicability. While this technology has become prevalent in the commercial world it has seen limited application in the Navy. As touch screen technology continues to become an everyday part of people's lives it is paramount that the Navy explore further utilization of this technology.

19938 NPS USW Systems Engineering Projects for 2017 & 2018

NPS Distance Learning Systems Engineering students conduct group thesis-equivalent 8-9 month projects to meet degree requirements. Current projects are "Mine Warfare after LCS" and "Next Generation MIW UUV's". There are about 17 students in these two groups, most students are from NSWC, PCD. Rear Admiral Williams will give a quick overview of the student progress thus far and discuss their plan for completion by DEC 2017. He will also provide information on how interested persons can attend the students' final presentation (in person or electronically) and/or be added to the final written report distribution list.

19939 A Performance Model for Decision Making and its Application for Increasing Warfighter Performance and Safety

We present research results regarding human decision making and describe the direct application of these results to Warfighter Performance and Safety. The topic is important

because the systems, training, and tactics that we develop are often in direct support of a decision to be made by an operator. Examples include the time-of-fire decision to launch a torpedo, the decision of a submarine Commander to proceed to periscope depth, and a decision made on a Theater ASW watch floor by operators observing the outputs of numerous supporting systems and information sources.

19940 Asia-Pacific Near-Peer Competitor C4ISR Capabilities for Seabed Warfare and the Implications for the U.S. Navy

This brief will seek to provide a summary of potential near-peer competitor capabilities and one set of possible near to mid-term solutions to this Seabed Warfare challenge and enhance freedom of maneuver in contested environments. In particular, the Office of the Secretary of Defense (OSD) Coalition Warfare Program (CWP) project, Undersea Power and Data Station (UPODS), will provide wireless charging and data transfer to unmanned undersea vehicles (UUVs), as well as integrate U.S. and Republic of Korea (ROK) undersea technologies.

19941 Multi-Domain Autonomous Seabed Warfare - Demonstrating 3rd Offset Enabling Capabilities for the Maritime Domain

Northrop Grumman, Huntington Ingalls, Battelle, Riptide Autonomous Solutions and Ultra-USSI partnered to conduct a multi-domain autonomous seabed warfare demonstration involving five unmanned underwater vehicles, two unmanned surface vehicles and an unmanned air vehicle surrogate collaborating to find, fix and finish adversary undersea infrastructure in a contested environment as part of the Advanced Naval Technology Exercise (ANTX) 2017. This session will present the ANTX 2017 scenario overview, enabling capabilities, demonstration results and lessons learned.

19942 Launch System Demonstration of UAV from Multiple UUVs

This session will discuss recent sea trials and experimental results of undersea launched unmanned aircraft vehicles (UAV) from submerged unmanned underwater vehicles (UUV). As the undersea domain becomes more highly contested, UUVs provide necessary augmentation of manned submarine mission chores, including penetration into high-risk areas.

19945 Sea Lion Counter-UUV Interdiction System

Unmanned underwater vehicles (UUVs) are quickly becoming an emerging technology capable of conducting long transits underwater with accurate navigation. They are readily available on the open market and can be easily outfitted with an explosive charge or other operative sensors intent on causing damage to Navy assets and critical infrastructure as well as potentially inflicting casualties on Navy and civilian personnel. The objective of this presentation is to explain and describe how the Navy's force protection sea lions can perform reacquisition and interdiction/markings of unmanned underwater vehicles operating in open water.

19946 ANTX 2017: Distributed Command and Control of UxV for IPOE

Distributed Command and Control (C2) of cross-domain (air/sea) unmanned vehicles (UxV) by major platform combat systems and mobile expeditionary units maximizes opportunities in battlespace characterization with reduced risk and timelines. In 2017, a team comprising NUWC DIVNPT and industry partners participated in two Advanced Naval Technology Exercises (ANTX) that demonstrated technologies and Concepts of Operations (CONOPS) with unmanned systems to support Intelligence Preparation of the Environment (IPOE) while maintaining extended stand-off distances and supporting in-stride data exfil, review, and re-tasking for single-sortie IPOE operations. This presentation will discuss the lessons learned during these events and underscore technology development required to operationalize unmanned systems supporting IPOE.

19947 Real-Time Internal Short Circuit Detection for Enhanced Safety and Reliability of Li-Ion Batteries for UUVs

TIAX/CAMX Power is developing a real-time early warning internal short & fault indication system for Navy Li-ion batteries to significantly enhance the safety of these batteries and allow them to be deployed reliably in a wide range of applications; UUVs, remote controlled devices and manned submersibles deployed from Navy platforms. The technology, which is well suited to redundant implementations to achieve added safety for personnel, equipment, and missions, provides early detection of internal short circuits in Li-ion batteries well before the point at which such situations can lead to safety events.

19951 Predicting Obsolescence Dates Using Reliability Models

Obsolescence management has the potential to assist in to the supply chain and lifecycle management of most combat systems. This research focuses on the obsolescence of data storage devices (hard disk drive (HDD)) using introduction dates and obsolescence dates (if known) to predict future obsolescence dates of current HDDs.

19953 Automated Detection Association

This work proposes a feature-based solution to the data association problem commonly seen in, but not limited to, simultaneous localization and mapping (SLAM) applications. Wide-azimuthal sector narrow-azimuthal beam forward-looking active SONAR systems collect many measurements on a target during a single pass, and multiple passes during a mission. Detection algorithms assimilate this information to produce an estimate of a target's mine-likeness, meaning many measurements must be correctly associated.

19954 IVER3 AUV for Diver/Swimmer Detection Near Moored SSN

L3 Technologies has demonstrated the ability to detect divers and swimmers in littoral waters using a COTS based Autonomous Underwater Vehicle (AUV), the IVER3, which is equipped with side scan and bathymetric sonar. This ability demonstrates how the capabilities of side scan and bathymetric sonar can be extended to potential threats beyond MCM. The IVER3 provides a persistent surveillance capability to patrol, detect, and report potential threats which could negatively affect submarine security. It is able to collect data and provide operators with the necessary information needed for submarines in port to detect and act upon waterborne threats.

19955 CyberSecurity Analytics Reference Architecture: You Have Eyes But Can You See

Network owners today are overwhelmed with choices in technologies, vendors and capabilities. CIO/CISOs are struggling with sorting through the maze of vendors to produce an overall architecture that is functional and within budget. Many vendors portray their product as the end all, be all for a specific section of the network but how they integrate into the overall architecture is critical.

19956 Desktop Virtualization in the United States Navy

Users regularly collaborate on multiple classification systems. Each of these domains creates not only a personal organizational challenge (different storage systems) but also the challenge of maintaining multiple disparate architectures. Issues ranging from physical security of data/HW to updating multiple operating systems with the appropriate patches continue to exponentially challenge all IT and Cyber professionals.

19957 Converged and Hyperconverged Solutions for the U.S. Navy

The past five to ten years have seen a dramatic shift in data center technologies. It's been typical to individually evaluate, procure, and deploy each technology needed to meet application needs – storage, storage networking, IP networking, compute, virtualization, etc. This session will address new architectures that accelerate technology deployment and simplify management for data center solutions in the Undersea Domain.

19960 Deployable Surveillance Activities and Road Map

The brief will outline current schedules, status, test results of funded systems, and plans for future transition to production for Deep Water Passive, Mobile Passive and Deep Water Active deployable systems. Included is discussion on opportunities for Industry participation in the near and far term.

19961 2017-08-03 NDIA Free Space Optical Tech Enabling Future Naval Force

Seizing the high ground has been the best advantage point for conducting C5ISR. However, US Navy Non-Kinetic C5ISR Warfare with current technology is most successfully executed from an undersea strategic and tactical position. C5ISR requires successful Electromagnetic Maneuver Warfare and Information Dominance. Optical Technologies are the future enablers for overcoming today's C5ISR operational obstacles.

19962 Polarization Modulation and Demodulation Concepts for Future Wireless EM C4I Systems

A transmission system incorporating a method for digitally synthesizing polarization modulation using mQAM symbols will be presented. Polarization modulation is effected by simultaneously transmitting two orthogonally polarized mQAM symbols selected from independent symbol sets. Polarization detection is effected by independently sampling the instantaneous magnitudes of wireless orthogonal polarization vectors intercepted by a uniquely designed air-interface plane (antenna). The incorporation of polarization modulation in transmission and reception does not interfere with the generation and detection of the mQAM symbol set.

19963 Mine Counter-Mine (MCM) Studies at Naval Postgraduate School: Applying Systems Engineering to the Design and Analysis of Current, Planned and Possible MCM Systems, Tactics, and Technologies

The Systems Engineering Department faculty and students at Naval Postgraduate School have examined a number of aspects of Mine Counter-Mine (MCM) operations over the last several years through the implementation of Systems Engineering. Recent MCM studies have focused on comparing legacy and near future (Littoral Combat Ship (LCS)), various autonomous unmanned mine detection systems, and a collection of mine neutralization systems launched from various ship platforms.

19965 Fielded Airborne ASW/Mine Warfare MSI Systems

The US Air Force has fielded high altitude airborne multi-spectral imaging (MSI) systems that have proven effective in maritime mission. Passive Multi-Spectral Imaging (MSI) EOIR sensors are accomplishing these missions, and others in the maritime domain. The US Air Force has fielded such a system (SYERS-2C), and will field second system by end of 2019 (MS-177A). UTC Aerospace Systems will present imagery from fielded and operational systems that provided a unique

standoff MSI mission capability in the USW area of interest. The presentation will cover operational imagery, sensor solutions capable of providing such mission capability, platform compatibility and program plans forward.

19966 ATT/CRAW Submarine Integration Efforts and Implosion Requirement Challenges

The Anti-Torpedo Torpedo (ATT) / Compact Rapid Attack Weapon (CRAW) under development at the Pennsylvania State University Applied Research Laboratory is being considered for submarine integration into the external countermeasure launcher (ECL). Recent efforts conducted under PMS415 funding have refined the challenges of integration and have identified the most critical design constraints. One of the most constraining challenges is meeting the external volume implosion requirements while maintaining the interfaces of the current ECL with ship structure. The brief will discuss the current state of ATT/CRAW integration and the efforts conducted to evaluate design solutions that meet the external volume implosion requirement while minimize the impact to existing interfaces.

19967 Achieving Cyber Resiliency in Undersea Warfare Systems

This paper describes the approach, methods and results of a COMSUBPAC cybersecurity exercise series which has been executed in 2017 to address this challenge. A series of three exercise events will be described along with the outcomes. The emphasis of this effort has been on non-material solutions within the DOTMLPF spectrum.

19969 Submarine Game Films: A New Training and Development Approach for the Submarine Force

Recent advancements in big data science have led to a system that allows describing 'how things work', or an ontology, which can be applied to recorded or real-time unstructured data. By applying ontologies to sonar display and audio data, we can deliver highly accessible and flexible training today that will improve operator performance even in the most complex and cluttered environments. This training approach looks at sonar analysis from the perspective of the human operator and as a critical thinking task.

19970 Quantum Machine Learning for Undersea Warfare C4I

Modern undersea warfare is a contest between C4I systems. The lethality of modern weapons is such that the first combatant to detect and launch against the other will likely win. In order to operate in the future military environment, it is necessary to develop increasingly effective C4I systems. Quantum Machine learning (QML) has the potential to increase C4I performance by enabling the development of new a category of operator aides to support decision-making. Here we introduce a breakthrough technology, quantum computing (QC), and how it can be applied to augment ML algorithms and enhance their performance before they are deployed to manned or unmanned undersea vehicles.

19971 Dielectric Sensing Network Development for Fluid Absorption Detection in Thick Coatings

US Naval submersibles are outfitted with outboard sensor packages, electrical components and other mission support equipment that are affixed to the hull via structural connections which "stand-off" the hull boundary. This equipment is typically encapsulated in thick polymer coatings. The configuration results in flooded gaps and spaces which require corrosion protection, inspection and other costly maintenance during a vessel's service life. We have developed a sensor network capable of detecting fluid permeation and pooling by evaluating the dielectric properties of the encapsulant. Development of this sensor package has moved from benchtop studies to large scale prototypes.

19972 Modern Day Sonobuoys and Application of Sonobuoy Technology to Other Applications

The evolution of production sonobuoy technology to special purpose and/or low rate initial production sonobuoys for modern-day applications is discussed with examples presented for the AN/SSQ-113 Sonobuoy, Digital Vertical Line Array Sonobuoy, and Tactical Surveillance Sonobuoy. Adaptations of production sonobuoy technology for other applications is also presented and includes a discussion on miniature vector sensors, compact hydrophone array systems for unmanned underwater vehicles, and compact, low-frequency, high-power sound projectors. These illustrative examples will underscore the efficacy concerning how sonobuoys and sonobuoy technologies have evolved to meet the present and future needs of anti-submarine warfare with an emphasis on acoustic transducers and transducer systems. Data from design studies and experiments will be shown to quantify the maturity of the technology and relevance to various mission specific applications.

19973 UUV Persistent Surveillance in Contested Area for ASW & ISR with EO/IR & SIGINT Sensor

The integration of L3 Technologies' IVER3 Autonomous Undersea Vehicle (AUV) with L3 sensor capabilities and

long-duration Al-H2O power system enables a modular system for persistent surveillance in contested areas. This AUV hosted payload system can perform a number of configuration-based tasks such as ASW, EO surveillance and SIGINT collection.

19974 PEO Submarines: Unmanned Systems Submarine Integration Integrated Product Team Bridges the Acquisition "Valley of Death"

This presentation will discuss how the PEO SUB UxS Submarine Integration IPT is speeding up the integration of unmanned technology and bridging the acquisition "Valley of Death" by providing the often missing implementation plan required to transition great ideas into innovative products deployed and utilized by the warfighter.

19975 Technology Development for Lithium Ion Battery Platform Certification

The increased energy density of lithium ion based systems is required to meet the ever expanding power and energy requirements of modern systems. However, the consequence associated with a catastrophic failure of a lithium ion battery is significant. Consequently, to date limited systems employing lithium ion batteries have been certified for deployment. Limited statistical data exist to quantify the risk level associated with an integrated lithium ion battery. Therefore, a method of mitigating a lithium ion battery failure which prevents propagation is required in order to achieve certification.

19976 Advanced Development Updates

Mr. Scala will provide an update to planned SONAR, Tactical Control and Electronic Warfare efforts and Future Submarine force needs.

19977 Submarine Learning Channel: YouTube for the Submarine Fleet

Submarine Learning Channel (SubLC) is a feature within the Seaware Learning Management System (LMS) built for the Submarine On Board Training (SOBT) program. SubLC is a You-Tube like video system which hosts 3-10 minute videos on a wide array of topics from gun maintenance to terminating a RJ-45 connector to how to don a Submarine Escape Immersion Equipment (SEIE) suit. SubLC videos can be assigned to sailors on board, their completions tracked, commented on, liked, disliked, favorited, and placed in a playlist. Development and implementation of SubLC has been tied to the concepts of Ready Relevant Learning and High Velocity Learning.

19978 Streamlining Submarine Software Deployment with Linux Containers

This presentation will describe Linux containers and the Docker container platform as well as associated technologies for container orchestration and runtime management. Experiences with deploying and running existing submarine

application software in containers and lessons learned will be discussed. A comparison with the more traditional virtual machines (hypervisors) will also be presented.

19980 Wide Area Undersea Communications Through Intelligent Mobile Networks

DARPA set out to develop and demonstrate innovative methods to increase the reliability, range, and expanse of acoustic undersea communications throughout large ocean basins via a recent SBIR solicitation. There is a critical DoD need to increase the reliability, range and expanse of acoustic undersea communications with manned and unmanned platforms and distributed sensing systems. The highly variable nature of the ocean environment results in complex propagation paths for acoustic signals. This variability severely impacts the reliability of communications such that undersea communication networks are limited to relatively short spacing distances on the order of 100's to a few thousands of meters so that reliable links are maintained. Spacing on these scales results in extremely large numbers of communication nodes and is impractical for providing pervasive communications throughout large ocean basins.

19982 The Demonstrated Advantages of a Full Duplex Acoustic Underwater Network

QinetiQ North America has developed technology that enables Simultaneous Transmit and Receive of signals, which is referred to as DOLPHIN for underwater acoustic applications. This technology allows full duplex ACOMMS using a co-located projector and hydrophone in an acoustic modem. This presentation will highlight the demonstrated advantages full duplex technology brings to underwater acoustic communications with an emphasis on networks.

19983 An Affordable Man-Portable Synthetic Aperture Sonar Solution for Mine Warfare

Riptide Autonomous Solutions has recently fielded a family of highly capable, low cost platforms that are ideally suited for a host of maritime challenge missions. These modular platforms can fill gaps where small, affordable units in high quantity offer an alternative to fewer, high cost subsea platforms. Applications such as neutralization, ASW, oceanographic monitoring, long-rang below-water ISR, and others will be examined. Design details of the Riptide 2 MP UUV will be discussed including the Kraken synthetic aperture sonar integration that will allow this platform to achieve increased capability for Mine Warfare missions.

19984 Autonomous Underwater or Surface Vessel (AxV) Open Autonomy Framework

SRI intends to perform a top down redesign of autonomous systems in order to automate their programming and configuration to the extent that the system becomes a turnkey solution. The warfighter should be able to deploy such a system in varying and changing circumstances

without it having to be redesigned or reconfigured by technical experts. The ability to quickly and reliably enhance a marine vehicle's (AxV) autonomous capabilities and perform in situ reconfiguration of the platforms, payloads and communications packages is paramount to making the warfighter more effective.

19985 AUV Ocean Energy Harvesting

A high priority for the US Navy is the capability for long-endurance autonomous underwater vehicle (AUV) missions that free manned ships for other duties. These missions include covert AUV operations with the ability to stay on station for months at a time to support intelligence, surveillance and reconnaissance (ISR) and other activities.

19986 Stackable Air-Powered Launcher System (STAPLS): Test Results and Integration Options

The availability of small-and medium-sized unmanned systems is growing. Their low cost drives a large user base, increased user proficiency, and new missions. These systems can and should be integrated into submarine payload loadouts but not at the expense of their larger counterparts or legacy systems. Electric Boat's stackable air-powered launcher system (STAPLS) demonstrates a low-impact, high-payload-fraction solution for deploying small-and medium-sized expendable payloads from a submarine.

19987 Open Architecture, Non-Proprietary, AI Enabled, Multi-Domain Command and Control Solution

SRI's vision for information dominance in the C4I multi-domain environment seeks to operationalize advanced predictive analytics to act as a force multiplier and extend the warfighter's reach and agility of response in dynamic operational environments. We propose to build upon SIMON, SRI's open architecture, non-proprietary domain awareness framework and add scalable AI capabilities to deliver a decluttered, collaborative, trusted environment where only the information relevant to the tasks at hand are displayed.

19990 Aluminum Combustion as Energy Source for Undersea Propulsion

Sustained power for unmanned underwater systems and vehicles is critical to maintaining and extending the present asymmetric advantages that the United States enjoys in the undersea domain. The use of aluminum powder and seawater as an energy source for underwater power is an on-going research effort because it is air independent: the water oxidizer is not carried on-board and is drawn from the environment.

19991 Deep Learning Neural Networks for Accurate Direction Finding

Small array apertures, interfering structures and dynamically changing channel characteristics have made accurate Direction Finding (DF) of threat emitters and signals of interest a difficult challenge for naval subsurface, surface and airborne platforms. DF array response is affected by each of these factors, resulting in exceedingly complex manifolds. Current DF systems typically use a monopulse approach, interferometry or attempt to match the array response to a previously measured or analytically generated manifold, e.g. by finding the best fit in the least squares sense. However, array processing for real-life applications goes beyond the standard theoretical models on which these approaches are based. In most practical implementations, array processing becomes a nonlinear optimization problem, so linear approximation methods such as vector projection or interferometry often fail. Unfortunately, conventional mathematical methods for nonlinear optimization (in a large number of dimensions) are not always robust, often yielding erroneous estimates for the parameters of an incident signal.

19992 Supporting UUV Adoption Through a Set-Based Design Exercise in the ARL UUV Short Course

UUV adoption requires an understanding of the many capabilities, constraints, and system interactions in a working UUV. In its role as a NAVY UARC, PSU ARL offers the UUV Short Course to share UUV expertise with operators, developers, and program managers. An exercise using set-based design techniques in a mission context gives participants an opportunity to combine lessons learned for a more complete understanding of UUV technology.

19993 Undersea Battlespace Preparation in Contested Environments

Future Naval missions require an array of manned and unmanned assets working in close coordination to leverage their respective strengths and deliver new capabilities. Integrating new and existing platforms to effectively operate across sea, air and space requires expanded Communications, Command and Control to include unmanned assets in multiple warfighting domains. As part of the Navy sponsored 2017 Advanced Naval Technology Exercise (ANTX) in Newport R.I., General Dynamics recently demonstrated the launch of a Bluefin SandShark small unmanned underwater vehicle (UUV) and an AeroVironment Blackwing unmanned aerial vehicle (UAV) from a large Bluefin-21 UUV to support such mission scenarios.

19994 Navy's Optimum Investment of Technology Solutions for Undersea Constellation

The Undersea Integration Program Offices' stated mission is to develop, deliver, and sustain secured, integrated, and interoperable Navy undersea command, control,

and communications capabilities for the Warfighter. As defined by SSG XXXII "dominance" is the ability to apply overwhelming force capabilities at the critical time and place that breaks an enemy's capability, removes the opportunity, or eliminates the will for organized resistance. In noncombat situations, it is the ability to control the operational environment, for which this topic's focus is the undersea domain. The Integrated Undersea Future Investment Strategy (IUFIS) establishes priorities and provides guidance for undersea investments in support of the undersea enterprise key pillars – platforms, payloads, modernization and people.

19995 Improving Sonar Operator Performance/Proficiency

A technology solution is required to improve surface sonar operator performance and acoustic analysis proficiency. There are limited opportunities for Surface Sonar Technicians (STGs) to train onboard using their embedded training systems, and there is limited training infrastructure in each fleet concentration areas that can support sonar and acoustic analysis proficiency training. There is a need to establish shore-based classrooms using a high-fidelity training system that is representative of the latest AN/SQQ-89A(V)15 USW Combat System variant.

19996 Tactical Sandbox Training

NUWC's Sandbox Training Applications present modern, practical, and efficient training solutions for preparing today's sailor with the fundamental knowledge needed to effectively perform their duties. The apps are dynamic, interactive, run on most modern computing platforms and feature modes for both student-led and instructor-led sessions; providing educators and students a high level of flexibility. The processes used to develop these applications rely heavily on the HVL concepts of continuous improvement, using tight feedback loops with both sailors and civilian SMEs to provide the best possible training solutions for today's ASW-centric fleet.

19997 Seabed Surveillance System Modernization

IUSS is prepared for surveillance of all submarines during wartime and peacetime and is a cost effective solution. We have kept pace with the threat so we can provide I&W to the fight. Over the last 10 years we have been asked to move from Phase 0 toward Phase 2. To achieve these gains, new CONOPs, out-of-the-box re-architecting and technologies are needed to evolve these systems.

19998 Development of the Mobile Off-Board Clandestine Communications and Approach (MOCCA) – Small UUV Progress Status

The MOCCA program develops an active sonar solution that mitigates the limits of passive submarine sonar sensors. The objective is to achieve significant stand-off detection and tracking range through the use of an active sonar projector deployed offboard a submarine and onboard an UUV. The submarine will need the ability to coordinate

the operational functions of the supporting UUV. Thus, MOCCA must also demonstrate the ability to achieve reliable clandestine communications between the host submarine and supporting UUV without sacrificing submarine stealth.

19999 High-Search Rate Off-board Transducer for Mobile Off-board Clandestine Communications and Approach (HOT MOCCA)

Summary not available.

20000 Advanced Naval Technology Exercise 2017: Battlespace Preparation in a Contested Environment

The Advanced Naval Technology Exercise (ANTX) 2017 is a multi-site event taking place at both the Naval Undersea Warfare Center's Narragansett Bay Test Facility in Newport, RI, and the Naval Surface Warfare Center Panama City Division, FL operational areas. ANTX demonstrates the future of Navy technologies in action today by providing a low-risk environment in which scientists and engineers may evaluate their technological innovations at the research and development level before their technologies become militarized and integrated at the operational level.

20001 Theater ASW C2 and Air ASW

The Navy is leveraging existing studies and campaign analysis to collectively determine how to best field a comprehensive Theater ASW capability. Enabling requirements include fully-realized USW data fusion technologies, collaborative mission planning, networked communications systems, centralized data management, and flexibility and robustness. A key to this strategy is to upgrade the existing Theater ASW command and control nodes. This paper will provide a short update on the progress to build out Theater ASW for the Navy and focus some of the key priorities for Theater command and control, including a discussion on the challenges of sharing data with partners and allies, synchronization of mission planning and C2 coordination.

20002 Update on Theater ASW Buildout

The Navy is leveraging existing studies and campaign analysis to collectively determine how to best field a comprehensive Theater ASW capability. Enabling requirements include fully-realized USW data fusion technologies, collaborative mission planning, networked communications systems, centralized data management, and flexibility and robustness. A key to this strategy is to upgrade the existing Theater ASW command and control nodes. This paper will provide a short update on the progress to build out Theater ASW for the Navy and focus on the data science challenges that IWS 5 and ONI are working on to ensure key data are collected, conditioned, and available for use by data analytics.

20007 Theater ASW Collaboration: Undersea Warfare Decision Support System (USW-DSS) Status and Plans for Implementing a Theater ASW capability

USW-DSS is the Navy's Anti-Submarine Warfare Command and Control (ASW C2) Program of Record (POR) system developed by Program Executive Office, Integrated Warfare Systems (PEO-IWS5) under the sponsorship of OPNAV N2/N6. USW-DSS brings together an integrated suite of ASW C2 tools for collaborative Mission Planning, Execution Monitoring, and Common Tactical Picture (CTP) in a networked environment. Build 2 Release 3 (B2 R3), currently fielded on 57 shore sites and ships, will continue to field until the next version of USW-DSS, Build 3, is certified in 2020. USW-DSS is being installed on SURTASS ships with a variant specific to IUSS, on LCS with a variant specific to LCS, and in the future on FF with a variant similar to CRUDES and CVN.

20012 Automated Solution Development

Mr. Potochniak will provide an update on automated solution algorithm development in the submarine combat system as well as the desired goals of automation support to the combat system operator to meet future submarine force needs.

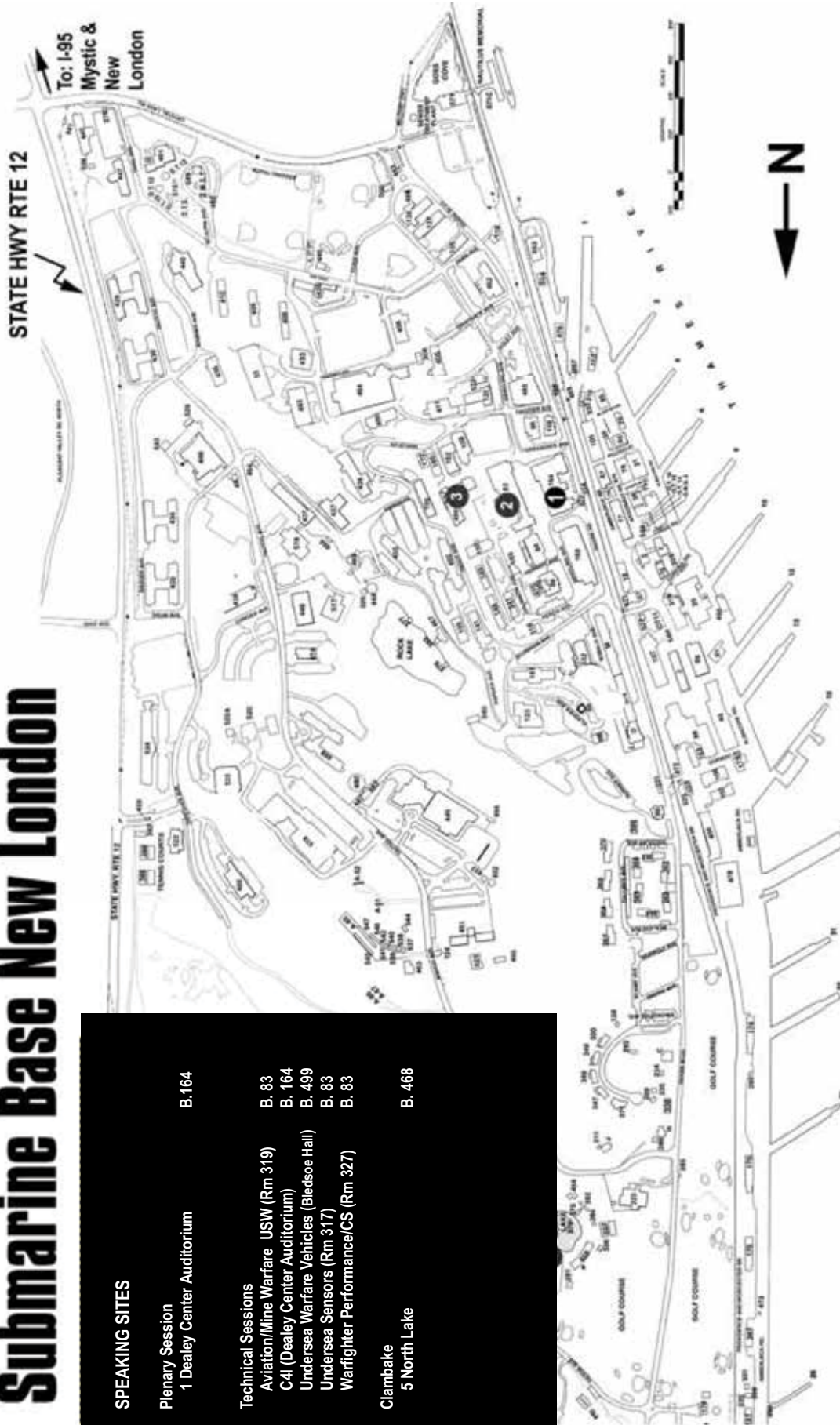
20013 Undersea Weapons Program Plans

This brief will provide industry an update on program plans for heavyweight and lightweight torpedoes. Programs to be discussed include MK48 ADCAP, Contender, MK54, and future lightweight weapon development.

20025 Program Update for the Dry Deck Shelter (DDS) Modernization Program

PMS 399 will provide a program update for the Dry Deck Shelter (DDS) Modernization program, both in terms of ongoing sustainment and projected modernization; advances in deployment of UUVs from Submarine Large Ocean Interfaces (SLOI); and the Mobile Anti-Submarine Training Target (MASTT).

Submarine Base New London



- SPEAKING SITES**
- Plenary Session
1 Dealey Center Auditorium B. 164
 - Technical Sessions
 - Aviation/Mine Warfare USW (Rm 319) B. 83
 - C4I (Dealey Center Auditorium) B. 164
 - Undersea Warfare Vehicles (Biedsoe Hall) B. 499
 - Undersea Sensors (Rm 317) B. 83
 - Warfighter Performance/CS (Rm 327) B. 83
 - Clambake
5 North Lake B. 468

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.

Monday, Sept 18, 2017

4:45 PM - 7:00 PM Bus will shuttle (as filled) from the alternate hotels to the Mystic Marriott for the reception.

Tuesday, Sept 19, 2017

6:30 AM - 9:00 AM Bus will shuttle (as filled) from the Hotels to the Naval Base.

10:00 AM - 4:00 PM Shuttle bus departs the Naval Base for the Hotels every hour.
Shuttle will depart at 10:15, 11:00, 12:00, 1:00, 2:00, 2:40, 3:00, and 4:00.

4:45 PM - 7:00 PM Bus will shuttle as filled from the Naval Base to the Hotels and back to the Naval Base.

8:30 PM - 9:30 PM Bus will shuttle from the Naval Base to the Hotels. Drop-offs only.

Wednesday, Sept 20, 2017

6:30 AM - 9:00 AM Bus will shuttle (as filled) from the Hotels to the Naval Base.

10:00 AM - 4:00 PM Shuttle bus departs the Naval Base for the Hotels every hour.
Shuttle will depart at 10:00, 11:00, 12:00, 1:00, 2:00, 2:40, 3:00, and 4:00.

5:00 PM - 6:30 PM Bus will shuttle from the Naval Base to the Hotels. Drop-offs only.

UNDERSEA WARFARE DIVISION LEADERSHIP

Division Chairman

Mr. Michael Tucker
Adaptive Methods

Fall Conference Chairman

Mr. Robert C. Dunn
GENERAL DYNAMICS Electric
Boat

Division Liaisons

Policy Issues

Deputy Chief of Naval
Operations for Warfare
Systems, N9

Technical Issues

Commander, Naval
Undersea
Warfare Center

ABOUT UNDERSEA WARFARE DIVISION

The Undersea Warfare (USW) Division concentrates on the Navy's key core competency mission of countering submarine and mine threats to the free and open flow of sea borne commerce and to the conduct of power projection from the sea. The division is very broadly based. All Navy platforms and elements of the Navy force structure are involved in undersea warfare: submarines, surface combatants, fixed and rotary wing aircraft, surveillance units, and the Navy's command and control infrastructure. The USW Division has five active Technical Committees: Sensor Systems, Mine Warfare Systems, Undersea Vehicles (including weapons), Aviation, and C4I and Combat Systems.

The world's national economies are interdependent, requiring an uninterrupted flow of goods and resources. Of this, 90% of the world's trade is by sea. The United States supports global trade and defends the rights of all nations to freely navigate the world's oceans, seas and waterways, while respecting sovereign territorial waters. Maintaining sea control helps guarantee the free flow of commerce and supports global maritime security.

SEA SHIELD is a supporting pillar for the freedom of maritime action and communication in the open ocean; U.S. Naval Undersea Warfare Forces need to be agile, forward-deployed, persistent, adaptable and ready. USW capability opens doors for expeditionary operations, power projection from the sea, and the ability to wage strike warfare to influence events ashore. It is an indispensable enabler for the SEA STRIKE pillar of support to joint force/coalition operations in the maritime and land environment.

The goal is that U.S. USW forces must be able to shape the subsurface battlespace through presence and deterrence, and when this fails, defeat an aggressor's submarine threat in order to render that actor unable to continue effective operations in that environment. To this goal, NDIA's USW Division works closely with the Navy to expand our working relationships, be a strong advocate for industry and its ability to assist the Navy to achieve its goals, and to be an integral part of the naval and university labs that attack technical issues.

UNDERSEA WARFARE DIVISION MISSION

To promote the exchange between government and industry of technical information and expansion of research and development in areas related to Undersea Warfare. To this end, the Undersea Warfare Division will serve as a communications conduit by providing a variety of ways for both government and industry to act in concert to solve problems, identify affordable solutions, meet specific requirements, and support both government and industry with advice on undersea warfare policies and acquisition planning.

OBJECTIVES

To achieve success in carrying out the MISSION, the following objectives govern the operations of the division:

- Focus on critical undersea warfare areas related to the development, productions, testing, and logistic support of underwater combat systems including mines, torpedoes, manned and unmanned underwater vehicles, countermeasures, sensors, weapon control, handling equipment; and the integration of systems aboard aircraft, ships, and submarines which have an undersea warfare mission.
- Provide periodic forums for government and industry personnel at all levels to exchange information and views in seeking possible approaches to the solution of undersea warfare problems.
- Conduct studies and prepare reports in response to requests from the Navy to recommend solutions to specific problems or issues related to undersea warfare.



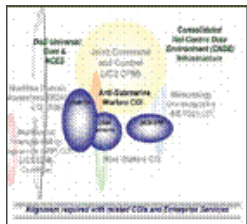
AVIATION USW
Chairman
Mr. Glen Sharpe
glen.sharpe@lmco.com
Lockheed Martin Corporation

The Aviation Committee focuses on the capability, integration and synergies that the airborne Undersea community brings to the fight. Because of the wide range of "aviation platforms," from wide-body fixed wing to rotary winged, as well as the gambit of unmanned systems, 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, littoral and large area search as well as the networking required to make all of this happen. The presentations cover a range, including theoretical discussions by academic institutions and laboratories, reports on experimental systems and systems being developed for Fleet introduction, and discussions of Navy programs of record.



UNDERSEA SENSORS
Chairman
Mr. Michael Janik
michael_f_janik@raytheon.com
Raytheon Integrated Defense Systems

The focus of the Undersea Sensors Committee is to provide guidance to the U.S. Navy about the application of cutting edge technology. Abstracts submitted to this section should 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 the disciplines and associated sciences.



C4I & COMBAT SYSTEMS
Chairman
Mr. Paul Rosbolt
prosbolt@spa.com
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. A special focus for this year's conference will be Information Assurance/Cyber-Security as it relates to Undersea Warfare.



UNDERSEA VEHICLES
Chairman
Mr. Tom Ruzic
Tom.Ruzic@hii-nns.com
Newport News Shipbuilding

The Undersea Vehicles Committee 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, mechanical and electrical systems. The technical committee presentations range from theoretical discussions by academic institutions and laboratories, reports on experimental systems and systems being developed for Fleet introduction, to discussions of Navy programs of record.



MINE WARFARE
Chairman
Mr. Jon Tobias
jtobias@ita-intl.com
ITA International

The Mine Warfare (MIW) Committee 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.

WARFIGHTER PERFORMANCE

Chairman
Mr. John Linderman
john.linderman@jhuapl.edu
The John Hopkins University-Applied Physics Lab

This special session on Warfighter Performance is intended to address evolving operational needs and solutions in the area of USW Warfighter Performance which employ 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.

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Technologies

Headquartered in New York City, L3 Technologies employs approximately 38,000 people worldwide and is a leading provider of a broad range of communication, electronic and sensor systems used on military, homeland security and commercial platforms. L3 is also a prime contractor in aerospace systems, security and detection systems, and pilot training. The company reported 2016 sales of \$10.5 billion. To learn more about L3, please visit the company's website at www.L3T.com.