

FALL 2023 UNDERSEA WARFARE CONFERENCE

UNDERSEA WARFARE: THE CRITICAL ENABLER TO INTEGRATED DETERRENCE

UNDERSEA WARFARE DIVISION



TECHNICAL DIRECTOR, NAVAL UNDERSEA WARFARE CENTER DIVISION NEWPORT

NAVSEA Warfare Centers: Greater than the Sum of Our Parts

One of the most important roles of the NAVSEA Warfare Centers is to provide advanced warfighting capability to the fleet and deliver relevant and innovative solutions for combat-ready ships,

DR. MARTIN IRVINE, JR.
Executive Director

submarines, and systems. However, we are delivering these capabilities with razor thin margins, which means that our task is to widen the gap to provide decisive advantages to our naval warfighters.

With the release last year of the National Defense Strategy, the Nuclear Posture Review, and the Missile Defense Review, the Department of Defense highlighted the importance of integrated deterrence in response to the pacing threat from China and the acute threat from Russia. To enable integrated deterrence, the DoD envisions increased cooperation with existing allies and the formation of a resilient defense ecosystem across the department, other U.S. federal departments and agencies, Congress, the private sector, allies, and partners. Simply put, we can't meet complex and interconnected challenges alone.

The National Defense Science and Technology Strategy released earlier this year referred to international allies and industry partners as "integral" to the DoD's research and development efforts and committed to expanding opportunities to co-research and co-develop with them. The DoD will continue to leverage the broad innovation ecosystem across academia, federally funded research and development centers (FFRDCs), university affiliated research centers (UARCs), DoD laboratories, national laboratories, non-profit entities, commercial industry, and other government departments and agencies.

Earlier this year, Secretary of the Navy Del Toro called for "growing" the DoN and DoD marketplace. He noted that the number of new vendors that had never done business with the Navy has increased in previous years, and we must continue to invite new businesses that don't traditionally do work with the department.

Warfare Centers are aligned to higher-level guidance

The NAVSEA Warfare Centers are fully aligned with this higher-level guidance and the NAVSEA priority of building a team to compete and win. We assemble this team from the best talent in our workforce and our government, industry, and academic partners to build a vibrant innovation ecosystem to address the significant challenges facing the Navy and the nation. Expanding our warfighters' advantage rests on enabling the Warfare Centers' innovation ecosystem by initiating and leveraging DoN and DoD partnerships and growing relationships with partners in industry and academia.

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An array of partnership vehicles and opportunities are available

We have a range of opportunities and vehicles available to encourage productive partnerships, from Cooperative Research and Development Agreements to Work for Private Party to Broad Agency Announcements. One of our CRADAs with an industry partner is enabling rapid advances across our intelligent automation thrust, including improvements in automation, the establishment of our artificial intelligence/machine learning data storage, development and evaluation environment; unmanned systems control and sensor processing; and modeling and simulation to support training environments for the warfighter.

Other Transaction Authority (OTA) contracts allow federal agencies to enter into transactions other than procurement contracts, grants, or cooperative agreements. As such, they are not subject to traditional Federal Acquisition Regulations-based contracting, which has so many rules and regulations as well as rigid compliance to competitive processes that non-traditional industry partners often stay away from Navy contracts. We've had considerable success using OTAs. For example, the speed of the Naval Surface Technology Innovation Consortium's OTA, managed by a Warfare Centers Division and industry partner, allowed for a 90-day turn from request for prototype proposal to contract award, enabling the conventional prompt strike hypersonic development program to contract with a non-traditional defense contractor to provide new, low-cost sensor technologies to support critical flight test activities. An excellent reference for all of the paths available to working with the Warfare Centers is *Doing Business with the Warfare Centers*, which can be found at https://www.navsea.navy.mil/Portals/103/Images/Warfare_Centers/DoingBusinessWithWC%20Jan%202022.pdf?ver=hKPwRRR3Is-E3B1xSVIi1w%3d%3d

We're always looking for new and more effective ways to make naval technical programs successful, and attracting new players to the research and development arena is a key piece of that. We actively participate in multiple NavalX Tech Bridges, which partner a local R&D activity with local stakeholders to help build the industry network of problem solvers. Collaborative environments are created in commercial spaces, offering a more easily accessible location to foster

connections between Navy and industry technical problems to companies, universities and other innovation partners.

Exercise events such as the Advanced Naval Technology Exercises (ANTX) and Silent Swarm are another way to bring industry, academia, and government R&D organizations together to demonstrate emerging technologies and engineering innovations in operationally relevant environments and scenarios. During Silent Swarm 2023, a team from Air Force, Army, and Navy labs, academic institutions, and industry partnered to experiment with technologies that can be employed on small multi-domain unmanned systems. The event was sponsored by the Office of the Undersecretary of Defense for Research and Engineering with support from the Michigan National Guard and the National Oceanic and Atmospheric Administration.

Turning to "crowdsourcing" is another way we grow a collaborative innovation ecosystem. Prize Challenges offer alternatives to traditional contracting for the purpose of seeking a solution to a technological problem. A contract is not involved, rather a challenge is posted and a monetary prize is offered to elicit problem solutions from the American public. GSA's site <https://challenge.gov> fosters this crowdsourcing opportunity for all federal agencies.

Let's keep thinking outside the box

Just as we at the Warfare Centers continuously strive to think outside the box, we encourage our potential industry partners to do the same. Innovation by definition should be flexible and agile, so we should not be constrained by searching for a 100 percent solution out of the gate. To paraphrase Ms. Heidi Shyu, Under Secretary of Defense for Research and Engineering, innovations could be a 70 or 80% solution to solve a vexing warfighting problem. And let's not limit our efforts to seeking technology innovations. We should also seek ways to improve our business systems; increasingly bring people with a wide range of experience into our workforces; encouraging learning, growth, and "cross-pollination;" and get better at communicating our value and contributions to our nation's security. Ultimately, harnessing our unique strengths and those of our partners, we can better support the American naval force to meet both today's operational demands and the warfighting needs of the future.

DIVISION CHAIR'S MESSAGE



ALAN LYTLE
CHAIRMAN UNDERSEA
WARFARE DIVISION

On behalf of the leadership team of the NDIA Undersea Warfare Division, it is my distinct pleasure and honor to welcome you all to the 2023 Fall Conference. Our "Clambake" is a choice opportunity to reconnect with colleagues, form new relationships, and participate

in an important dialogue amongst government, industry and academia. The purpose of this symposium is to make sure we are all strongly aligned to maintain our nation's pre-eminent position in the undersea domain.

As SECDEF Austin remarked during the release of the 2022 National Defense Strategy¹:

"We're seamlessly integrating our deterrence efforts to make a basic truth crystal clear to any potential foe ... the cost of aggression against the United States or our allies and partners far outweigh any conceivable gains."

This emphasis on an "integrated deterrence" is of particular import as threats of conflict rise with China and Russia. Our common goal within the partnership of government, industry and academia is to ensure options are ready when needed and extended where possible. The unsurpassed capabilities, performance and reputation of the undersea community have

been the backbone of U.S. deterrence for almost seventy years and have never been more important to our nation, our partners, and our allies. As our nation seeks to maintain our undersea advantage and contribute to our integrated deterrence, the question becomes what actions we can collectively take as the undersea community to advance our position with a specific emphasis on combat readiness and operational availability of our undersea forces.

On behalf of the Executive Board, the Advisory Council, and NDIA, we thank-you and your organizations for your continued support of the National Defense Industrial Association, the Undersea Warfare Division, our warfighters, and these conferences. A special thanks to our plenary speakers, program managers, and technical presenters for taking the time to brief our USW community.

One final note of appreciation. My sincere thanks to Mike Cortese for his tremendous leadership of the Undersea Warfare Division over the past four years. Together we weathered the transition of canceled to virtual to a return to unlimited in-person conferences. It was a challenging period, and we could not have asked for a better person at the helm. I could not have asked for a better guide and mentor. When you see Mike, please say thank-you.

We hope you enjoy this Fall Conference. Thank-you for attending. Thank-you in advance for constructive feedback so we can continue to improve your experience and the value this event brings.

<https://www.defense.gov/News/News-Stories/Article/Article/3202438/dod-releases-national-defense-strategy-missile-defense-nuclear-posture-reviews/>. Accessed July 28, 2023.

SPRING 2023 NDIA UNDERSEA WARFARE AWARDS



PIERRE CORRIVEAU
CHAIRMAN

CAPT TERRY HAID, USN (RET)
DEPUTY CHAIR

DAN TUBBS
COMMITTEE MEMBER

CHUCK FRALICK
COMMITTEE MEMBER

The Undersea Warfare Division (UWD) of the National Defense Industrial Association (NDIA) presents annual awards to assist in supporting and recognizing the USW defense technical and engineering base. We continue this legacy by

conferring the 2023 Spring awards.

NDIA UWD is pleased to present the **Vice Admiral Charles B. Martell-David Bushnell Award** to Mr. Stephen J Plunkett, Director of Technology Development at the Naval Undersea Warfare Division Newport; the **Vice Admiral Charles E. Weakley Awards** to Mr. Ronald Vien, former Technical Director at the Naval Undersea Warfare Center Division Newport and Mr. Andrew B. Fuller, Technical Director for Mine Warfare at NAVSEA PMS 495; and the **Captain George W. Ringenberg Award** to Capt. Paul Rosbolt, USN (Ret), Naval Surface Warfare Analysis Lead at Systems Planning and Analysis. In addition, we are pleased to present the **Rear Admiral Jack Jarabak Award** to ENS Brendan Gloyd, USN for his exceptional contributions in the field of Undersea Warfare.



MR. STEPHEN J. PLUNKETT
DIRECTOR OF TECHNOLOGY
DEVELOPMENT, NAVAL
UNDERSEA WARFARE DIVISION
NEWPORT, RI

The VADM Charles B. Martell-David Bushnell Award for exceptional contributions in the field of ASW and/or Undersea Warfare Technology.

Mr. Stephen J. Plunkett's 30+ year Navy career has been characterized by his technical expertise, management skills, professionalism, and dedication to the Navy's mission by providing a foundation for resolving undersea warfare (USW) problems critical to national security. He has been the force behind novel technology initiatives that have led to numerous advanced technology efforts which have significantly contributed to the Navy's undersea warfare superiority.

As Director of Technology Development at the Naval Undersea Warfare Center Division, Newport, Mr. Plunkett continues his legacy of fostering the transition of USW technologies to the fleet through the development of targeted internal investment projects and strategic partnerships with other Warfare Centers, national laboratories, and industry. Previously, as Head of the Advanced Technology, Modeling & Simulation

Division, Mr. Plunkett pursued a broad and diverse USW technical portfolio that included technology development and rapid prototyping, to quickly transition enhanced USW performance to the fleet. His leadership of Navy-wide, multi-disciplinary teams of scientists and engineers have produced innovative technical solutions that address challenging USW missions.

Mr. Plunkett served as a Principal Investigator and Program Manager for ONR's Lightweight Torpedo Swampworks Project where he performed groundbreaking analytical studies backed by at-sea validation experiments which addressed a most challenging ASW mission. Under his technical and programmatic leadership two advanced torpedo sonar systems for the MK 54 MOD 1 and the MK 48 MOD 8 were transitioned to the fleet. Through these and many other notable and impactful contributions, Mr. Plunkett has ensured the advancement of the United States Navy Undersea Warfare Capabilities for many years to come.

For his excellent leadership and unwavering dedication that has significantly benefited our Undersea Warfare Community, the Undersea Warfare Division of the National Defense Industrial Association is honored to present the 2023 Martell-Bushnell award to Mr. Stephen J. Plunkett.



MR. RONALD A. VIEN
TECHNICAL DIRECTOR (RET);
NAVAL UNDERSEA WARFARE
CENTER DIVISION NEWPORT.

The VADM Charles E. Weakley Award for meritorious service and noteworthy contributions to effective Government Industry communications in the field of Undersea Warfare.

Mr. Vien has more than 35 years of experience in Undersea Warfare. He served as Technical Director for the Naval Undersea Warfare Center Division Newport from 2008-2023 and was responsible for leading USW R&D, test and evaluation, systems engineering, analysis, and fleet support capabilities for submarines, surface ships, autonomous underwater systems, and offensive and defensive undersea weapon systems. As Technical Director, Mr. Vien led a diverse team of scientists, engineers, and technicians to help the Navy develop its most advanced submarine sonar system, the Large Vertical Array (LVA).

Throughout his career, Mr. Vien has been committed to

sharing and growing the knowledge base within the greater DoD community through regular contributions at USW conferences and events. He regularly participates in major USW Conferences: Submarine Technology Symposium, Southeastern New England Defense Industry Alliance Defense Innovation Days and Charleston (South Carolina) Defense Alliance. For the National Defense Industrial Association (NDIA) USW Division Fall Conference, Mr. Vien has delivered Plenary Session Keynote presentations and was integral in Division Newport becoming the recognized co-sponsor of the conferences.

Mr. Vien freely shares lessons learned to foster collaboration between academia, industry, Navy Labs, and the acquisition community, that have resulted in innovative solutions that support a strong national defense.

In recognition of his noteworthy contributions to advancing the field of Undersea Warfare and in promoting effective government/industry communications, the Undersea Warfare Division of the National Defense Industrial Association is pleased to present Mr. Ronald A. Vien with the 2023 VADM Charles E. Weakley Award.



MR. ANDREW B. FULLER
TECHNICAL DIRECTOR FOR
MINE WARFARE; NAVSEA PMS
495.

The VADM Charles E. Weakley Award for meritorious service and noteworthy contributions to effective Government Industry communications in the field of Undersea Warfare.

Mr. Fuller has more than 40 years of experience in Mine Warfare, has been the Technical Director of PMS 495 (Mine Warfare Program Office) since 2009, and is responsible for technical management of more than 50 Mine Warfare programs, encompassing naval mines and mine neutralization systems, mine countermeasures sensors, and command and control systems used in onboard MCM-1 class ships, MH-53 helicopters, as well as new system development.

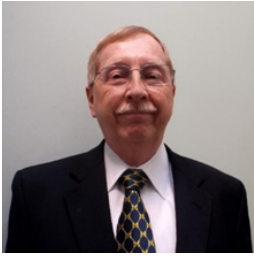
As Technical Director, Andy enjoys building a collaborative community within the Navy, industry, and academia, to ensure that Mine Warfare systems are developed, fielded, and supported to the highest standards. His extensive knowledge of systems engineering best practices, doctrine, and breadth of maritime knowledge are plainly evident during program execution. During his tenure, he has fielded the Airborne Laser Mine Detection System, Airborne Mine Neutralization System,

and the Coastal Battlefield Reconnaissance and Analysis System, all components of the Mine Countermeasures Mission Package.

Mr. Fuller is an avid Mine Warfare science and technology advocate within the Navy's acquisition community. He continues to brief senior leaders in support of his vision of achieving in-stride, detect-to-engage mine countermeasures. His reputation of technical excellence led to the start of Barracuda, a new mine neutralization program. He nurtures international relationships through Mine Warfare presentations to allies and partners, including NATO.

Andy has been an active member of NDIA for more than 15 years, attending Undersea Warfare conferences and presenting the Navy's Mine Warfare program and its technical challenges. He freely shares lessons learned, fostering collaboration between government, industry and academia, and resulting in innovative solutions that support a strong national defense. He mentors many NDIA members to improve their technical knowledge and expertise.

In recognition of his noteworthy contributions to advancing the field of Undersea Warfare and in promoting effective government/industry communications, the Undersea Warfare Division of the National Defense Industrial Association is pleased to present Mr. Andrew B. Fuller with the 2023 VADM Charles E. Weakley Award.



CAPT. PAUL ROSBOLT, USN (RET)
NAVAL SURFACE WARFARE
ANALYSIS LEAD; SYSTEMS
PLANNING AND ANALYSIS INC.

*The **Captain George Ringenberg Award** is presented to those who, through their service and leadership, have made noteworthy contributions*

to the Undersea Warfare Division.

Capt. Paul Rosbolt, USN (Ret) has been an active member of the UWD NDIA executive board since 2008. During his 15+ years of leadership and service to the NDIA, Paul has provided unwavering support to help the Undersea Warfare Division execute its mission of fostering the exchange of technical information with government and industry while enabling the expansion of research and development in areas related to undersea warfare.

Paul began his naval warfare career as an NROTC student at the University of Michigan. He went on to have a stellar career in Surface Warfare culminating in his selection as the Commanding Officer of the USS Gates and later becoming the Commanding Officer of Destroyer Squadron 24. His last shore duty assignment was as Major Program Manager for

PEO-IWS5 where he led all submarine and surface ship ASW processing improvements. He also served as the Acquisition Lead for the CNO's ASW Task Force.

Paul has been an enthusiastic supporter of the NDIA USW Executive Board. He served as the C4I and Combat Systems Technical Committee Chair since 2010. His leadership has resulted in continuously developing and securing a strong slate of technical presentations and featured speakers. His committee's success illustrates Paul's skills in advanced planning, innovation, flexibility, and patience. His programs are anxiously awaited by the USW Community and are exceptionally well attended.

Paul's contributions during Executive Board meetings have provided valuable insights and lessons learned which he freely shares to ensure consistent conference integration and messaging from Spring to Fall.

The Undersea Warfare Division is proud to recognize Capt. Paul Rosbolt, USN (Ret) with the 2023 Captain George Ringenberg Award for his outstanding contributions and service to the U.S. Government, the National Defense Industrial Association, and the Undersea Warfare Division.



ENS BRENDAN GLOYD, USN
ACADEMIC ACHIEVEMENTS
IN USW UNDERSEA WARFARE
TECHNOLOGY, NAVAL
POSTGRADUATE SCHOOL,
MONTEREY, CALIFORNIA

*The **Rear Admiral Jack Jarabak Award** is presented by the UWD in conjunction with the Naval Postgraduate School's Undersea Warfare Executive Committee, to*

recognize a deserving student for their contribution in the field of USW.

This year the award is presented to ENS Brendan Gloyd, USN, for his personal commitment and academic achievements in the area of Undersea Warfare Technology.

While attending the Naval Postgraduate School from January 2021 to December 2022, ENS Gloyd distinguished himself through an outstanding academic performance in the Applied Mathematics Department where he won the Warren Randolph Church Award for Excellence in Mathematics. His thesis work blended Undersea Warfare, Physics, Applied Mathematics, and the Explosive Ordnance Disposal/Naval Special Warfare communities in the development of a novel method to track Unmanned Underwater Vehicles. His thesis, "Signal Detection of Unmanned Underwater Vehicles by a Single Acoustic Vector Sensor" led to an invited talk at the 15th International Mine Technology Symposium.

The Undersea Warfare Division, in conjunction with the Naval Postgraduate School, takes great pleasure and welcomes the opportunity to recognize the important contributions of ENS Brendan Gloyd, USN, by its award of the 2023 RADM Jack Jarabak Bronze Medal Award.

NDIA UWD 2023 ACADEMIC SPEAKER AWARD



DR. MICAH CLARK
CO-CHAIR, ACADEMIC
FELLOWSHIP COMMITTEE



MR. SCOTT TILDEN
CO-CHAIR, ACADEMIC
FELLOWSHIP COMMITTEE

The NDIA Undersea Warfare Division (UWD) established the Academic Fellowship Program in 1990 to provide financial aid to Ph.D. candidates at universities closely associated with the Navy's undersea warfare community. The objective is to encourage outstanding science and engineering students specializing in fields pertinent to undersea warfare to present their research at our conferences. The student candidate pool is derived from the Navy's University Affiliated Research Centers (UARCs), the Naval Postgraduate School (NPS), and other academic institutions. This fall, we are pleased to host two academic research contributors from these organizations presenting the topics described below.



Stephen Blackstock is an Engineering Scientist at Applied Research Laboratories: The University of Texas at Austin, where he works on signal processing aspects of underwater sonar systems. He is also a Ph.D. student at the University of Texas at Austin, studying acoustics in the Walker Department of Mechanical Engineering. His presentation will discuss the application of Multiple Input Multiple Output (MIMO) signal processing methods to active sonar design. MIMO sonars employ nearly-orthogonal waveforms to enable capabilities that are not possible with conventional active sonar. Potential applications include "super-resolution" beamforming, Doppler estimation, transmitter health evaluation, and "sonar privacy" in multi-broadcaster environments. Results from Mr. Blackstock's in-water MIMO sonar testing suggest several tactically relevant new capabilities which are relatively easy to implement in existing Navy sonar systems.



Austin Juhl is a former enlisted member of the Kansas Air National Guard. He is currently a Ph.D. student at the New Jersey Institute of Technology where his research revolves around numerical analysis and convex optimization. Mr. Juhl is also a Ph.D. intern at the Johns Hopkins University Applied Physics Laboratory, contributing to the development of autonomy test and evaluation algorithms. His presentation will explore the utilization of semidefinite programming (SDP) as a tool for achieving robust stability certification in numerical methods. This approach draws parallels with existing work that employs SDP to certify stability in deep neural networks (DNNs) and reinforcement learning (RL) policies.

UNDERSEA COMMAND, CONTROL, COMMUNICATIONS AND COMBAT SYSTEMS COMMITTEE



PAUL ROSBOLT
CHAIRMAN

DR. BOB ZARNICH
DEPUTY CHAIRMAN

JOHN LINDERMAN
WARFIGHTER PERFORMANCE
SESSION CHAIRMAN

Greetings, all! I'm really looking forward to the clambake, having missed our usual San Diego

conference! We have some really interesting speakers lined up this year.

In **C4I**, we will hear from Captain David Kuhn on plans and advances in Undersea Communications. We will also hear three really interesting presentations from DARPA. In the first, Dr. Katherine Woolfe will provide a secret level brief discussing new DARPA-developed technologies to counter the growing undersea surveillance threat. The second, given by Mr. Aaron Kofford, will brief us on the **TIMELY** program, which aims to develop concepts for a heterogeneous underwater network architecture. The third, also given by Mr. Kofford, provides a final report on the Cross-Domain Maritime Surveillance and Targeting (CDMaST) program. Both Dr Woolfe and Mr. Kofford are program managers in DARPA's Strategic Technologies Office.

In **Warfighter Performance**, Dr. Ben Lawson will discuss medical research and development approaches for supporting future psychological readiness of the US Navy submarine force via supportive technologies and assessments.

In **Combat Systems**, we will hear from CAPT Leroy Mitchell, PEO IWS5 on the numerous USW programs under his cognizance, including: Submarine and Surface Ship Advanced Development products such as Advanced Processing Build (APB) for submarines, Advanced Capability Build (ACB) for surface ships, and Sonar Sensor Development; AN/SQQ-89A(V)15, Multi-Function Towed Array (MFTA), Carrier Tactical Support Center (CV-TSC), NAUTICA; and USW Systems Engineering. In addition, he manages the Undersea Warfare Decision Support System (USW DSS), highlighted below.

USW DSS is the pillar USW C2 battle management aid (BMA) program of record (PoR) supporting intelligent C2 of theater and group forces (e.g. surface, subsurface, and air) against high-end adversaries. USW DSS enables planning and

execution of USW group and theater operations; provides "best fit" asset/sensors assignments for exploitation of the environment; manages available resources; balances mission objectives versus risk; and provides a vulnerability assessment of the operational environment.

USW DSS is installed in carrier strike group (CSG) platforms (CVN, CGs/DDGs), Surveillance Towed Array Systems (SURTASS) ships, embarked Destroyer Squadron Staffs, and select shore nodes to include the Naval Oceanographic Processing Facilities (NOPF), and Commander Task Force (CTF)/Theater USW Commander (TUSWC) HQs that enable the networking of USW forces to collaboratively plan and execute USW missions. USW DSS contains applications for environmental analysis, collaborative search planning, force management, sharing a common tactical picture with networked tactical decision aids (TDAs), sensor tracks and sensor metrics, automated and manual cross-platform track fusion, search execution measures of effectiveness, graphics storage, recall, and USW briefing support. The applications also improve effectiveness by decreasing the time required to search an area to a desired probability of detection. USW DSS interfaces the Global Command and Control System-Maritime (GCCS-M), Link-11/16; the Surface Ship ASW Combat System (AN/SQQ-89); and on aircraft carriers, the CVN Tactical Support System (CV-TSC).

The current afloat variant, Build 2 Release 3 (B2R3), has been delivered to numerous surface combatants and ashore training and support sites. B2R3 is a software centric application that is loaded on commercial-off-the-shelf (COTS) computing environments, including being hosted on the Consolidated Afloat Network and Enterprise Services (CANES) application on those platforms that have a CANES infrastructure.

USW DSS Build 3 (B3) is hardware agnostic and virtualized, focused on implementing a new architecture enabling rapid incremental delivery of theater and group USW C2 capabilities. B3 provides shared situational awareness across the USW theater and group commanders and their platforms. Tactical situation displays allow for track management and fusion, USW contact management, and aid the tactical picture to help with decision-making. Cross-platform data exchanges with other USW DSS nodes and systems enable track and TDA dissemination, sensor performance predictions, measured environment, mission plans, and electronic status boards.

UNDERSEA MINE WARFARE COMMITTEE



KEVIN HAGAN
CHAIRMAN

ELLIOTT DONALD
DEPUTY CHAIRMAN

On July 16th, the White House announced that Russia had laid mines in the Black Sea, placing blame for adding to the hundreds of mines reportedly deployed in the region since the invasion of Ukraine in February 2022. Adversaries will

note the crippling effects of mining, both psychologically and operationally, and will continue to seek the same advantages over the U.S. Navy. Fortunately, the Navy appears to be finally making progress not only in revitalizing its mine countermeasures (MCM) forces, but also its own mining capability.

In May, the MCM Mission Package and AN/AQS-20 mine hunting sonar both reached initial operational capability. Officials have said that the Navy's goal is to embark the MCM Mission Package aboard Independence-class LCSs and deploy the first to Bahrain and 5th Fleet by 2025 which would fulfill the Navy's legal obligation to replace the four aging Avenger-class MCM ships currently homeported there. With competing demands for capability, however, the Navy

may seek options other than LCS to host the MCM MP or options other than the MCM MP, itself. In January, VADM Roy Kitchener, Commander Naval Surface Forces, suggested that the Navy's Explosive Ordnance Disposal Community's Expeditionary MCM Companies could supply at least a partial capability to free up LCS for surface warfare missions in 7th Fleet.

Over the last year, there's been little news about the Navy's new Hammerhead mine program but sometimes in acquisition no news is good news and the new system should give U.S. forces options beyond the legacy Quickstrike system. Even that system is being targeted for added capability, with a Quickstrike Extended Range variant tested off the coast of Kauai, Hawaii at the Pacific Missile Range Facility in March of this year.

You'll be able to get more information and answers direct from the horses' mouths during this year's Mine Warfare Technical session. Leadership for both the Mission Modules (PMS 420) and Mine Warfare (PMS 495) program offices are on a packed agenda that also includes DARPA, ONR, and Naval Surface Warfare Center's Panama City Division. In the meantime, as always, I want to encourage government, industry and academia to keep lines of communication open and work together towards solutions that give our Sailors the best capabilities in the world.



The MCM Unmanned Surface Vehicle, which is part of the MCM Mission Package in the mission bay of an Independence-class Littoral Combat Ship. U.S. Navy Photo

UNDERSEA WARFARE VEHICLES COMMITTEE



CHUCK FRALICK
CHAIRMAN

Undersea warfare technology is experiencing funding, innovation, and growth at an unprecedented pace around the world. While the U.S. Navy is benefitting from that investment and growth, our adversaries are out-accelerating us on the pace of development and modernization in some areas. More

than ever, our investments and technology development must be finely honed to maintain our warfighting edge and avoid programmatic missteps. It's also worth noting that it isn't enough to discover new technologies—those technologies are utterly irrelevant until they are developed, integrated, procured, supported, and fielded. It takes a truly cohesive government/industry partnership to ensure we provide our warfighters with the superior technical edge they need to prevail in combat and strategic deterrence.

While the Columbia class receives the lion's share of attention given its technical excellence and high cost, other areas of undersea vehicles are booming as well. The XLUUV (Orca) program is progressing and will offer the Navy with a "heavy lift" capability in autonomous uncrewed vehicles (AUVs) unmatched in the world. Long range, high-endurance operation for transporting a multitude of payloads will provide the Navy with game-changing undersea delivery capability. The Medium Unmanned Underwater Vehicle (MUUV) program, called Razorback, is well underway and will result in an AUV capable of supporting both submarine and surface vessel-

hosted missions, including torpedo tube launch and recovery. Recently, new large displacement uncrewed underwater vehicle (LDUUV) requests for information have been issued by PMS 406 and the Defense Innovation Unit (DIU).

Countermeasures have also enjoyed growth recently including the Acoustic Device Countermeasure Mark 5 (ADC MK 5) and the upcoming ADC MK 6 from PMS 415. The MK 5 is a submarine signal ejector (internally launched), 3-inch vehicle, and the MK 6 is a 6-inch vehicle that will replace the current Virginia-class externally-launched countermeasures. It has been some time since the Navy enjoyed major updates to its torpedo countermeasures and these programs will help protect our ships from modern adversary weapons for many years to come.

Over time we have become less enamored with the "bus" and have zeroed in on ensuring proper payload performance specifications, systems engineering, and manufacturing sustainability. What we must also ensure is that we know how to properly test, evaluate, and protect all of these new high-performance vehicles so that they not only perform as intended, but are highly resistant to non-traditional attack, supply chain limitations, and obsolescence. Increasingly, "trusted autonomy" and hardening of systems against all manner of non-kinetic attack are rising to the forefront as the major challenges to undersea vehicle viability. Through the combination of proper program development, execution and sustainment, and a whole-of process approach, we can maximize every dollar spent and avoid missteps that will impact the ability of our warfighters to perform when called upon.

UNDERSEA WARFARE AVIATION COMMITTEE



GLEN SHARPE
COMMITTEE CHAIRMAN

BOB KANYUK
DEPUTY CHAIRMAN

CAPTAIN DENNIS LLOYD
NAVY LIASON

Welcome back to the greatest place on earth to get immersed in undersea warfare! I would like to start off by wishing PMA-299

H-60 Multi-Mission Helicopters Program Manager Captain Todd Evans fair winds and following seas as he turned over command to Captain Will Hargreaves. I believe you will find Captain Hargreaves as a very wise, approachable subject matter expert to guide the helo community into the next phase. There is so much going on in the world and many challenges are being tackled by the Navy, Industry, Academia and allies are chartered to address in the Great Power Competition. Aviation ASW platforms, sensors, and weapons are vital contributors to pacing threats around the world. The Aviation session is loaded with experts and leaders in the acquisition, design and development of new technologies that can provide the Navy with advantages over adversaries. I look forward to reuniting with colleagues and networking with new attendees who share the same passion and drive to be a part of the team that supports undersea warfighters. Below you will find some informative articles of what has been going on in the Aviation ASW community that are in the public domain.

Multi-Mission Helicopters Program Office Welcomes New Leadership

[Multi-Mission Helicopters Program Office Welcomes New Leadership - The BayNet](#)

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md.— Capt. Todd Evans was relieved by Capt. William Hargreaves in a change of command ceremony on Dec. 19. Family, colleagues, and friends witnessed the Multi-mission Helicopters Program Office (PMA-299) welcome Hargreaves as new program manager.

Mr. Gary Kurtz, Program Executive Officer for Air Anti-Submarine Warfare, Assault & Special Mission Programs (PEO(A)), served as guest speaker at the ceremony where he recognized Evans' many successes and his exemplary leadership over his four years as program manager while welcoming Hargreaves into the MH-60 and PEO(A) communities.

"I've watched [Capt. Evans] from afar during his years as program manager for PMA-299 and I've been in awe of the leader that he is," said Kurtz. "I've witnessed you selflessly listen, observe, offer trust, and take action when issues were not easy and solutions were complex and challenging, leading your team and modeling the example of leadership we all aspire to."

PMA-299 provides full-spectrum, world-wide support for the U.S. Navy's and international partners' MH-60R and MH-60S helicopters and user communities. Currently, PMA-299 has 13 Foreign Military Sales (FMS) cases with the last three being achieved under Evans' leadership.

Among the many achievements and awards PMA-299 has won over the years in international and domestic acquisition, Evans was the recipient of the Danish Commerce Award of Excellence. This award, never before given outside of the Kingdom of Denmark, was presented in recognition of the Danish FMS case that included the acquisition of the MH-60R, a flight simulator, aircrew and maintainer training, all delivered on time and \$33M under budget.

Evans also was touted by Kurtz for his steadfast leadership during COVID and other major organization changes during his tenure. While facing critical increased health protection measures across the command and the world-wide, then navigating organizational restructuring, Evans' ensured the highest state of readiness at the lowest flight hour cost. Kurtz remarked, "he provided [his team] consistency in a time of inconsistency all without losing program readiness across his platforms."

"The banner that is written on your office window is #WINNING. And that is exactly what he has done these last for years: win! Win for the program. Win for his people. Win for the PEO. Win for the fleet. And win for our nation," Kurtz concluded.

Evans' took a moment to thank his PMA-299 team, his previous program managers who paved the way, and the program's international partners. "Regardless of the uniform, if young people are climbing into a Seahawk they are the fleet," said Evans. "Thanks for the opportunity to serve, it has been an extremely rewarding and satisfying journey."

Evans will report next as the NAVAIR Military Deputy for Sustainment.

Captain William Hargreaves is a graduate from the U.S. Naval Academy, class of 1997, with a Bachelor of Science degree in Mechanical Engineering. Following primary training at NAS Whiting Field, he was designated a Naval Aviator and reported to HS-10 at NAS North Island for training in the H-60 Seahawk

Hargreaves continued his service at NAVAIR as an H-60 department head and government flight test director at HX-21, he then reported to PMA-299 as MH-60R and MH-60S production lead. In 2015, Captain Hargreaves went to U.S. Naval Test Pilot School as their executive officer and then their commanding officer until 2018. Prior to today, he served as the director at the effects deployment office within Precision Strike Weapons Program Office (PMA-201).

As Hargreaves addressed the crowd he said, "I know that I inherit a team that boldly enters the arena every day and I look forward to the opportunity to join every one of you."

Said Kurtz, "I'm confident in Captain Hargreaves leadership as he steps into the program manager role at PMA-299. All of PEO(A) welcomes you to this challenging yet rewarding position."

PMA-299 is one team providing world class rotary wing warfighting capability and support to the global maritime community.

U.S. And Australian Navy Partnership Proves Maintenance, Readiness; Wins Awards

[U.S. And Australian Navy Partnership Proves Maintenance, Readiness; Wins Awards - The BayNet](#)

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md.—For the first time, the U.S. and Royal Australian Navies have successfully demonstrated a periodic maintenance interval (PMI) on a U.S. Navy MH-60R Seahawk in Australia. The milestone demonstrates both countries' commitment to advancing military readiness in the Indo-Pacific region.

H-60 Multi-Mission Helicopter Program's (PMA-299) Special Projects Team developed a unique, and expedited, acquisition strategy leveraging U.S. and Australian "mateship" to complete the first-ever U.S. Navy aviation Maintenance Repair and Overhaul (MRO) in the Indo-Pacific region. An essential piece to readiness is the ability to address emergent MRO requirements outside of normal domestic sites. Broadening the MH-60R MRO facilities and infrastructure around the globe, specifically in today's world climate, allows for a wider maintenance reach in time of conflict while increasing cooperation with our allies. This century-long alliance remains advantageous in this region.

H-60 Multi-Mission Helicopter Program's (PMA-299) Special Projects Team developed a unique, and expedited, acquisition strategy leveraging U.S. and Australian "mateship" to complete the first-ever U.S. Navy aviation Maintenance Repair and Overhaul (MRO) in the Indo-Pacific region. An essential piece to readiness is the ability to address emergent MRO requirements outside of normal domestic sites. Broadening the MH-60R MRO facilities and infrastructure around the globe, specifically in today's world climate, allows for a wider maintenance reach in time of conflict while increasing cooperation with our allies. This century-long alliance remains advantageous in this region.

"Demonstrating successful PMI on a U.S. Navy MH-60R in Australia is a testament to our two nation's shared trust and commitments in our century-long partnership with the Royal Australian Navy," said Capt. William Hargreaves, PMA-299 program manager. "Achieving this maintenance event expands our aircraft's footprint ensuring the fleet is ready to fight tonight."

U.S. and Australian forces have fought together in every significant conflict since World War I. Showcasing the allegiance and confidence between these allies by entering into an agreement for maintenance and inspection further deepens the "mateship" connection.

Twelve years ago, PMA-299 and Royal Australian Navy's were further united in a foreign military sale for MH-60 Romeo helicopters.

Sikorsky Aircraft Australia Limited (SAAL), a subcontractor to Lockheed Martin Rotary Mission Systems, began the PMI in late-October 2022 in Australia, and completed two months under the projected 10-month timeline. PMI on the MH-60R included material acceptance and inspection, repairs, and an aircraft functional check flight. The U.S. Navy will conduct post-PMI flight checks upon arrival at Helicopter Maritime Strike Squadron (HSM)41, the U.S. Navy's West Coast Fleet Replacement Squadron (FRS) in San Diego, CA.

"The principal aim of this activity was to demonstrate to the U.S. the capability of Australian industry and the pathway available to perform maintenance, repair and overhaul of this helicopter in our region," said Commodore Darren Rae, Royal Australian Navy Director General Navy Aviation, Aircrew Training and Commons. "This demonstration of Australian industry's support to U.S. Navy helicopter maintenance is a hallmark for the steady progress being made in the U.S.-Australian Alliance."

Strengthening the U.S.' partnerships and ensuring a free and open Indo-Pacific region is critical to the nation's security and to its allies; partnerships like this help defend common interests.

"We have made strides in this PMI demonstration," said Hargreaves. "We now have the ability to rapidly address emergent MRO requirements, if necessary, outside of standard activity sites during contingency operations."

The successful PMI, deeply rooted in innovative acquisition strategies and contract execution, also hailed a NAVAIR Commander's Award in May 2023 and an Australian Day Honours Award in January 2023.

The NAVAIR Commander's Awards recognize outstanding teams and individuals across NAVAIR who have demonstrated creativity, agility and accountability in delivering the capability the fleet needs, on time, at a price we can afford.

Hargreaves recognized his team's achievement and went on to say "winning the NAVAIR Commanders Award for this effort truly validated the team's efforts to further strengthen ties between the two countries and entrusting them to complete the PMI as if on U.S. soil."

Similarly, and in recognition of the significance of this milestone, Australia's former MH-60R Seahawk Romeo Helicopter Assurance Program Co-Lead, Commander Andrew Newman, was presented an Australia Day Honours Award in January 2023 of a Conspicuous Service Cross for his outstanding achievements and devotion to pursuing this activity.

PMA-299 provides full-spectrum, world-wide support for the U.S. Navy's and international partners' MH-60R and MH-60S helicopters and user communities. The MH-60R Seahawk is the U.S. Navy's essential submarine hunter and anti-surface warfare helicopter enabling anti-submarine and surface warfare.

Additional PMIs in Australia are possible. Once the aircraft has returned to the U.S., the USN will review all after actions for future potential contract agreements.

UNDERSEA WARFARE SENSORS COMMITTEE



JOSEPH CUSCHIERI
CHAIRMAN

The Undersea Sensors Committee received an excellent number of contributions with a total of 18 submissions. While this is always good news as it demonstrates that there is great interest in sharing knowledge, there are only a limited number of slots for these presentations. Adding parallel

tracks for the same committee, in this case the Undersea Sensors committee, was not considered a good option based on the feedback after the 2022 conference and therefore all committees are limiting their session to only one track. The downside is that not all submitted abstracts could be accommodated and unfortunately, some abstracts were declined and a few were placed as alternates. All submitted abstracts are of excellent quality and selecting amongst the submitted abstracts was not an easy decision. The hope is that those abstracts which did not make it at this time will be resubmitted and considered for future NDIA Undersea Warfare Conferences.

In line with the Fall 2023 Conference theme, "The Critical Enabler to Integrated Deterrence" the topic of this issue of the newsletter is being dedicated to a brief overview of current trends in undersea sensor development.

USW undersea sensors are evolving from many different aspects. There is the material development aspect with new transducer materials, array configurations and hardware capability providing more efficient collection of the sensor data. As such, the need for data processing and data display methods continue to increase as systems of sensors continue to evolve utilizing fixed and mobile underwater sensors. Another aspect of the undersea sensor evolution is the use of automation and artificial intelligence (AI) being integrated into the solution to enhance the detection, classification and tracking of quiet diesel and non-diesel attack submarines which because of the submarine stealth can edge closer to the shallow coastal waters.

The Navy's Maritime Surveillance Systems (MSS) provides a common Integrated Undersea Surveillance System (IUSS) for data collection, signal processing and display system software. It includes a necessary hardware suite to combine the data collected from various sensors including fixed fields of hydrophones and sonar sensors (Sound Surveillance System (SOSUS) and Distributed System (FDS)); the relocatable or deployable sonar sensors (Advanced Deployable System (ADS)); and surface ships and submarines deployed towed arrays sonar sensors (Surveillance Towed-Array Sensor System (SURTASS)). Also, in the plan is to integrate the low-frequency active (LFA) bistatic sonar sensor. The data from this network of surveillance sensors

is passed on to the Surveillance Direction System (SDS) that provides the C³ (command, control, and communications) and the data fusion. By combining the various capabilities of the surveillance networks of sensors (SOSUS, FDS, SURTASS, etc.) Navy anti-submarine warfare (ASW) experts can enhance the technology for marine surveillance and increase the effectiveness in the detection and classification of modern diesel and nuclear submarines in regional, littoral, and broad ocean waters.

While combining the data and information collected by the various sensor systems has the potential to increase the combined systems effectiveness, this comes with the need to have new capabilities to handle the various data streams. This is where some of the new enhancements in technology are being deployed. New capabilities that leverage modern data processing and display, data processing automation, insertion of array processing technologies (GPUs) and the use of AI are being developed to process and display the data received from all fixed and mobile underwater sonar systems. Affordability is ensured by capitalizing on the Navy's Acoustics-Rapid COTS Insertion (ARCI) program.

In closing there are a few side topics worth mentioning. One of which is the DARPA HOTS BAA. The DARPA HOTS - High performance analog sensor microelectronics technology that operate at extreme high temperature sensors - may not be considered as mainstream for ASW sensors or acoustic sensors. However, DARPA is seeking miniature sensor technology that can operate at high temperatures. The mention here is therefore because of the new sensor technology that DARPA is seeking. The expectation is that similar technologies will soon be required for acoustic sensors - not just temperature sensors - that will change the way one thinks about sensors and sensor data. The second side topic is related to both the writeup above and the DARPA HOTS concept. We all know that undersea sensors capabilities have increased with new transducer material technologies. Sensors are more sensitive and hence can be made smaller or with increased range. The militarization of sensors has opened up the spectrum of how the sensors are used, making the sensors more adaptable for large and small platforms and fixed sensor applications.

As mentioned previously, there is the transformation through the use of AI and adaptation of machine learning algorithms. AI and machine learning can perform real-time data analysis for automatic target recognition, threat detection, identification, classification, and tracking. AI and machine learning is improving the distinction between friendly and hostile targets with fewer false alarms. While we cannot state that AI and machine learning can replace the operator, it is certainly aiding the human operators to decrease the workload making naval operations more efficient.

CONFERENCE CHAIR'S MESSAGE



Eric Irwin
Conference Chairman

ERIC IRWIN
CHAIRMAN FALL CONFERENCE

ROBERT DUNN
CO-CHAIRMAN FALL
CONFERENCE

The fall conference theme, "Undersea Warfare: The Critical Enabler for Integrated Deterrence" focuses on maintaining and maximizing present undersea warfare capabilities and readiness, while designing and fielding the undersea warfare systems of the future. This year's outstanding group of plenary speakers represents the full spectrum of undersea warfare expertise.



Robert Dunn
Conference Deputy Chairman

The plenary session will include the following speakers:

- Director of the Naval Nuclear Propulsion Program - ADM Frank Caldwell
- Commander Naval Submarine Forces - VADM William Houston
- Deputy Commander, U.S. Strategic Command - VADM Richard Correll
- Commander, Undersea Warfighting Development Center - RDML (sel) Drew Miller
- Deputy Director of Naval Intelligence, (OPNAV N2N6C) - Mr. Scott Bray
- Executive Director, Naval Surface Warfare Center (NSWC) and Naval Undersea Warfare Center (NUWC) - Dr. Martin Irvine
- Program Executive Officer, Strategic Submarines - RADM Scott Pappano
- Executive Director for In-service submarines for Program Executive Office Attack Submarines - Ms. Stefanie Link
- Program Executive Officer, Undersea Warfare Systems - RDML(sel) Todd Weeks
- Deputy Director, Defense Advanced Research Projects Agency - Mr. Rob McHenry
- Director, Undersea Warfare Division, Office of the Chief of Naval Operations (N97) - RDML Mark Behning

Conference attendance provides you the opportunity to gain insight into the challenges and capability gaps that the Navy faces across the entire spectrum of the undersea domain. Take advantage of this opportunity to hear our Defense and Navy leader's views on the issues confronting the Navy-industry-academia team as we navigate the waters of an uncertain future that will present new challenges to sustaining our undersea dominance.



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NDIA HEADQUARTERS

Ms. Krystal Heard
kheard@NDIA.org

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communicate activities and plans.
For inputs or suggestions contact:
Laurie Carter, Editor
Rite-Solutions, Inc.
lcarter@rite-solutions.com
Tel: (703) 517-9904