

# SPRING 2025 UNDERSEA WARFARE CONFERENCE

ENABLING JOINT AND COMBINED FORCE ASW / MIW / SSW  
OPERATIONS IN CONTESTED AREAS

UNDERSEA WARFARE DIVISION



## Collaborating and Innovating to Achieve Effects in Contested Seas



**Rear Adm. Rick Seif,**  
*Commander, Submarine  
Force, U.S. Pacific Fleet  
Undersea Warfare in  
Contested Environments*

The United States Joint Force, and the Combined Forces of our Allies and Partners, must not assume that we will operate in permissive environments in future conflicts. As potential adversaries ramp up all-domain access denial efforts, we must accelerate our own efforts to assure access and maintain our advantage—particularly in the undersea. While there is no substitute for persistent submarine presence in the Indo-Pacific, undersea warfare is much more than submarines. In future competition, cross-domain integrated undersea forces, with truly interchangeable

and highly capable partners, will be the key to deterrence. And should deterrence fail, it will be the key to decisive victory in combat. We must increase interoperability through complex joint and combined maritime exercises like Rim of the Pacific (RIMPAC) 2024, which featured 29 countries, 40 surface ships, three submarines, and over 150 aircraft. Our collaboration with partners such as the Indian Navy increases undersea domain awareness capabilities for both nations. We are approaching a watershed moment in bolstering our Allies' USW capabilities, as Australia prepares to obtain their first conventionally-armed nuclear powered submarines under AUKUS Pillar 1.

### A Joint Fight in the Maritime Domain

The Joint Force recognizes that a future conflict will likely be focused in the maritime domain and will highly leverage stealth forces and innovative kill chains. The keys will be how we integrate across domains, share data and information, and quickly leverage technology. In recent years, the U.S. Marine Corps has tested and fielded its unmanned NMESIS missile system to target ships from great distances. U.S. Army Apache

helicopters have rehearsed striking maritime targets during SINKEXes. Even our U.S. Air Force partners demonstrated a maritime QUICKSINK capability during RIMPAC 2024, proving that a B-2 Spirit stealth bomber can defeat surface vessels. Of note, the Air Force continues to practice the key capability to deliver Quickstrike mines into the maritime battlespace from extended ranges. Each service adapts to the needs of the combatant commander in a time of conflict. That flexibility is imperative for success in the maritime domain.

### Integrate New Capabilities Faster or Perish

The AUKUS agreement highlights how Indo-Pacific allies and partners can increase their reach in the undersea fight, through the rapid development of emerging technologies under Pillar 2. Increased information-sharing in the areas of artificial intelligence and unmanned undersea vehicles are groundbreaking advancements. The maturation of UUV torpedo tube launch and recovery, hypersonics, and cyber and quantum technologies will be game changers in the combined force's ability to break into a contested environment. However, our potential adversaries are working in the same direction. It is imperative for us to stay at the leading edge of implementing and fielding new technology to deliver effects faster than the adversary.

## INSIDE THIS ISSUE

<i>Division Chair's Message</i> .....	2
<i>Fall 2024 NDIA Undersea Warfare Awards</i> .....	3
<i>NDIA UWD 2024 Academic Speaker Award</i> .....	4
<i>Committee Letters</i> .....	4
<i>Conference Chair's Message</i> .....	12

## Collaborating and Innovating to Achieve Effects in Contested Seas (Continued)

### A Challenge to Industry

Defense industry partners: There is a national imperative to unleash the creativity and ingenuity of your teams to match emerging technologies to the ever-changing undersea warfare requirements of the operators. Your participation in this conference and engagement with the armed forces of each nation present will help define how our Joint and Combined

Force responds to future maritime challenges. I look forward to meeting many of you at the 2025 Spring Undersea Warfare (USW) Conference and engaging in productive discussions of how we can improve our lethality and survivability today, and how we can prepare our forces to maintain our future advantage.

## Division Chair's Message



**ALAN LYTLE**

**CHAIRMAN UNDERSEA  
WARFARE DIVISION**

On behalf of the leadership team of the National Defense Industrial Association (NDIA) Undersea Warfare Division, it is my distinct pleasure and honor to welcome you all to the 2025 Spring Conference.

As always, this event would not have been possible without the strong collaboration and support from COMSUBFOR and UWDC. I want to personally thank VADM Gaucher and RDML Van Poots for their support and that of their staffs. Lastly, I want to thank the staff here at the Admiral Kidd Conference Center for their superb support.

CNO called us all to action in her 2024 NAVPLAN to raise readiness of the fleet by 2027. We know the cause of that concern. We know the reason for the date. Our theme this year is reflective of that call to action and a subset of the needs to support readiness of our coalition forces:

*Enabling Joint and Combined Force ASW/MIW/SSW Operations in Contested Areas*

I welcome our aviation, surface and undersea leaders in government, academia, and industry to share important

dialogue in a classified venue with the specific focus on advancing our readiness in the undersea domain.

This year we have the honor of sharing this symposium with our AUKUS tri-lateral security partners. The importance of the undersea domain to our global security is well established, as is the importance of strong allied partnerships. It is within this backdrop that we are exceptionally pleased to welcome our Royal Navy and Royal Australian Navy colleagues to this spring conference.

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

One final note of appreciation. My sincere thanks to Jim Gray and Ron Toland for their leadership as Spring Conference Chair and Deputy Chair, respectively. Without their significant volunteer efforts, we would not have this conference. When you see Jim and Ron, please say thank you.

We hope you enjoy this Spring Conference. Thank you for attending. Thank you in advance for constructive feedback so we can keep improving your experience and the value this event brings.

# Fall 2024 NDIA UNDERSEA WARFARE AWARDS



**AWARDS COMMITTEE:**  
**PIERRE CORRIVEAU, Ph.D.;**  
*Chairman*

**CAPT TIM SALTER, USN (RET)**  
*Deputy Chair*

**CHUCK FRALICK**  
*Committee member*

The Undersea Warfare Division (UWD) of NDIA presents its Bronze Medal Award to recognize outstanding individual achievements in either Science or Engineering in the field of Undersea Warfare. The Bronze Medal is awarded to deserving

individuals in the principal Navy and University Laboratories engaged in Undersea Warfare-related activities. By recognizing these individual achievements, the UWD seeks to:

- ✓ Reward achievement in the field of Undersea Warfare
- ✓ Inspire accomplishment by other workers in the field;
- ✓ Increase public awareness of the field and its importance to defense preparedness.

NDIA's UWD was pleased to continue this legacy by conferring the Bronze Medal Awards to the following individuals during the Plenary Session of the Fall 2024 USW Conference in Groton, CT.



**MR. RUSSELL R. DUKEK**  
NAVAL SURFACE  
WARFARE CENTER  
CARDEROCK DIVISION  
BETHESDA, MARYLAND

Over a career spanning 40+ years, Mr. Dukek has distinguished himself as a technical leader in the area of

Acoustic Signature Measurement Systems development and operations. Over the course of his career, Mr. Dukek has been a key contributor to the development of acoustic and vibration measurement technology. He has led the development of data acquisition and signal processing capabilities at the Southeast Alaska Acoustic Measurement Facility (SEAFAC) as well as systems supporting shipboard data collection and analysis.

Under Mr. Dukek's leadership, the Navy has been provided with the complex measurement systems required to assess and improve the acoustic signatures of ships and submarines. Mr. Dukek's achievements have directly affected the stealth advantages enjoyed by operational U.S. submarines and the future Fleet.

**Mr. Dukek's innovation, unwavering dedication and accomplishments have significantly contributed to the success of the Naval Surface Warfare Center, the United States Navy, and the nation.**



**MS. ANGELA R. SARICH**  
THE JOHNS HOPKINS UNIVERSITY  
APPLIED PHYSICS LABORATORY  
LAUREL, MARYLAND

In her 24-year career, Ms. Sarich has advanced undersea warfare through the assessment of underwater warfare systems. Her

expertise includes operations research, military utility, metrics development, and simulation and modeling. She has led nine major studies to assess the military utility of existing and potential future undersea warfare systems and has overseen many more limited assessments and studies that have positively impacted the undersea warfare community.

Ms. Sarich led an effort to assess the SSBN force's security, and the Navy's adoption of her proposed metrics and approach have contributed to maintaining and improving force posture. Her major contributions to the undersea warfare community have ensured the safe operation of SSBNs on patrol and have provided quantitative information to U.S. Navy decision-makers responsible for directing investments in undersea warfare.

**Ms. Sarich's unwavering dedication and accomplishments have significantly contributed to the success of the Applied Physics Laboratory at Johns Hopkins University, the United States Navy, and the nation.**

Fall 2024 NDIA Undersea Warfare Awards Continued



**MR. ALLEN S. COUTURE**  
NAVAL UNDERSEA  
WARFARE CENTER  
KEYPORT DIVISION  
KEYPORT, WASHINGTON

With over 35 years’ experience in USW systems, technologies and capabilities spanning career

positions in the United States Navy and Civil Service, Mr. Couture is a proven visionary, problem solver, and leader of change. After a successful career in the Navy, culminating as the OIC of the Kaneohe Bay Weather Center, Mr. Couture embarked on a civil service career with the Naval Undersea Warfare Center. He led the development of the Ford Island Simulation Technology Testing Facility and conducted ONR-sponsored S&T, developing enabling technologies for synthetic training. Most recently he led a cross-Warfare Center project that resulted in a distributed Test and Evaluation data management and aggregation system in support of Live, Virtual, and Constructive initiatives for Joint warfare. The result of Mr. Couture’s leadership and technical efforts have contributed significantly to warfighter readiness and mission availability.

**Mr. Couture’s unwavering dedication and accomplishments have significantly contributed to the success of the Naval Undersea Warfare Center Keyport Division, the United States Navy, and the nation.**



**MR. MARK A. CAMPBELL**  
NAVAL UNDERSEA  
WARFARE CENTER  
NEWPORT DIVISION  
NEWPORT, RHODE ISLAND

Over the course of his 34+ year career with the Naval Undersea Warfare Center, Newport Division,

Mr. Campbell has been recognized as a technical subject matter expert in torpedo software algorithm development. Since 2007, Mr. Campbell has served as the Lead Design Engineer for the Torpedo Advanced Processing Build Algorithm Program. His responsibilities on all torpedo software algorithms have contributed to successful deliveries of multiple warshot Lightweight Torpedo and Heavyweight Torpedo software upgrades to the U.S. Navy. Most recently, Mr. Campbell has led the re-architecture of torpedo software culminating in a common design for all U.S. torpedoes.

His leadership and expertise have resulted in the significant improvement and advancement of essential undersea weapon capabilities for today’s Navy and in the future. In addition, Mr. Campbell’s broad technical capabilities have been invaluable on a wide variety of undersea warfare topics.

**Mr. Campbell’s unwavering dedication and accomplishments have significantly contributed to the success of the Naval Undersea Warfare Center Newport Division, the United States Navy, and the nation.**

NDIA’s UWD is honored to recognize these significant contributions to the Undersea Warfare community through our awards program.

**Congratulations to the Awardees!**



# NDIA UWD 2024 ACADEMIC SPEAKER AWARD



**DR. MICAH CLARK**  
CHAIRMAN, ACADEMIC  
FELLOWSHIP COMMITTEE



**MS. JENNY ROBERTS**  
DEPUTY CHAIR, ACADEMIC  
FELLOWSHIP COMMITTEE

The NDIA 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 (UARC)s, the Naval Postgraduate School (NPS), and other academic institutions. This spring, we are pleased to host two academic research contributors from these organizations presenting the topics described below.



**Terele Parker** is a Research and Development Engineer at the Pennsylvania State University's Applied Research Laboratory, where he works in both computational and applied electromagnetics. Mr. Parker is also a Ph.D. student at Penn State in the Electrical Engineering Department. His presentation will discuss Electromagnetic Interference (EMI)

Susceptibility Analysis Utilizing the Modified BLT Equation in order to prevent the EMI between the electronic systems on Unmanned Underwater Vehicles (UUV). This discussion will present a numerical method utilizing the Transmission Line Method (TLM) to analyze the field to wire coupling of electromagnetic waves produced by native systems. This approach provides fast accurate insight of the susceptibility of electronic components.



**Elliott Turner** is a Graduate Research Assistant at the University of Texas at Austin's Applied Research Laboratories where he helps develop unmanned underwater vehicles (UUVs) and associated systems. Mr. Turner is also a mechanical engineering graduate student at the University of Texas at Austin, and his focus is on dynamic systems and controls. His presentation

will cover the development of a variable ballast system (VBS) for small UUVs that minimize system size while keeping cost and lead-time low. His presentation will also cover how a VBS is able to enhance UUV capabilities and performance including extending range and loitering time.

# Undersea Command, Control, Communications and Combat Systems Committee



**CAPT PAUL ROSBOLT,  
USN (RET)**

CHAIRMAN

**DR. BOB ZARNICH**

DEPUTY CHAIR

**JOHN LINDERMAN**

WARFIGHTER PERFORMANCE  
SESSION CHAIR

Greetings all and welcome to San Diego! It's been a snowy winter inside the D.C. beltway; I'm sure glad to be here! We have a great line-up in our Combat Systems/C4I technical session, including Program Manager's from IWS5, PMS425, PMS408, and PMW770!

And now a word from our Sponsor, **Captain Leroy Mitchell, Program Executive Officer (PEO) for the Undersea Warfare Systems IWS 5.0 Program Office in the U.S. Navy.**

Greetings Fellow Undersea Warriors,

Time flies, and it's hard to believe this will be my last conference as I prepare to transfer in June. Serving as the Navy Liaison to this committee and leading IWS 5.0 for the past three years has been an honor. Unfortunately, the global security environment remains complex, and we are rapidly approaching a critical period where conflict could become a reality by 2027. That considered, the theme of this conference—Enabling Joint and Combined Force ASW/MIW/SSW Operations in Contested Areas—could not be more relevant.

Executing these missions has always been a team effort, just as delivering capability to the Joint and Combined Force is a shared responsibility. We're seeing an increase in integrated operations with our sister services and allied partners. The

AUKUS partnership is maturing and holds the potential to be a game-changer in the Pacific, while the arrival of the new frigate cannot come soon enough given the critical capabilities it will bring.

From where I sit, this reinforces the urgency for us in the Acquisition Community to stay laser-focused on developing and fielding capabilities that not only keep pace with the evolving threat but also anticipate it. At the same time, we must ensure the reliability of what we deliver—because when our forces sail into harm's way, workarounds are not an acceptable solution. I've said this before, and I feel compelled to emphasize it again.

Meeting these challenges in today's fiscal and government environment won't be easy. With significant shifts on the horizon, we must be prepared for changes in how we budget and execute capability development and delivery. Innovation remains key. In IWS 5.0, we are already adapting, restructuring our workforce to better meet growing demands. For those who regularly work with us, you'll soon see these changes firsthand.

Never forget that we in the Acquisition Community are a critical enabler for Joint and Combined ASW/MIW/SSW operations in contested environments. As you engage in discussions and briefings at this conference, I encourage you to think outside the box. The best solutions don't always require more funding; sometimes, they come from better communication, smarter integration, and leveraging existing capabilities more effectively. Let's work together to ensure we deliver the most advanced and reliable solutions to the Fleet.

2027 is closer than we think—let's get to work.

Warmest regards,

Mitch

# Undersea Mine Warfare Committee



**KEVIN HAGAN**

CHAIRMAN

**ELLIOTT DONALD**

DEPUTY CHAIR

The Mine Warfare Committee has another solid agenda this Spring, with a great mix of government, academia, and industry presentations. We're planning for two speakers from ONI's TAC-33 and SABRE organizations

to lead off with threat weapons and tactics briefs. These are expected to be shortened versions of the two, 90-minute discussions held during our luncheon at Johns Hopkins Applied Physics Lab last December. If you weren't able to make it then, don't worry; we're planning for another event in the future. If you did attend, we'd love to get your feedback on how the meeting went and what we could do differently next time. The event was a first for the Undersea Warfare Division and we'd like to not only continue it, but also improve it as we move forward.



*The USS SANTA BARBARA (LCS-32) "Blue Crew" mine warfare team poses in front of its embarked Mine Countermeasures Unmanned Surface Vehicle. (U.S. Navy photo)*

The evolution in U.S. Naval Mine Warfare continued its journey over the last six months, with PEO Unmanned and Small Combatants awarding contracts for Mine Countermeasures Mission Modules to multiple industry partners to support fielding of the Mine Countermeasures (MCM) Unmanned Surface Vehicle (USV) and its modular payload delivery systems (PDS). Bolling Shipyards received an Advanced Material Order to execute MCM USV improvements identified in operational testing. That work is scheduled to be completed in September of this year. RTX was tapped to deliver five Mine Hunting PDSs, which deploy and recover AN/AQS-20 sonars, by the end of FY26. Finally, Textron was awarded the production contract for the Minesweeping PDS, which integrates the acoustic and

magnetic Unmanned Influence Sweep System, with the first four units expected to be delivered in early FY27. The production model Minesweeping PDSs will join the two pilot and four low-rate initial production systems already delivered.

Textron will also continue to develop the experimental Magnetic and Acoustic Generation Next Unmanned Superconducting Sweep (MAGNUSS) technology under supervision of the Office of Naval Research. MAGNUSS capitalizes on enabling technologies in high-temperature superconducting magnets, which run at extremely high electrical currents with near-zero resistance, to sweep magnetic influence mines. Because the technology doesn't require a towed cable, it could permit deployment of the capability aboard multiple types of surface vessels, as opposed to the specialized hulls traditionally required for influence sweep operations. MAGNUSS is designed to be coupled with a non-towed acoustic generator that Navy researchers have also been developing.

A third potential MCM USV payload also continued development. RTX's Barracuda Mine Neutralization System program of record completed hydrodynamic testing, bringing it closer to full-scale production and fielding. A 26-pound, semi-autonomous unmanned underwater vehicle (UUV), Barracuda uses sonar and electro-optical sensors to locate and neutralize sea mines on the ocean floor and near—or on—the ocean's surface. Testing, which was conducted at Naval Surface Warfare Center, Carderock Division, confirmed the system stability in elevated sea states and currents, and demonstrated autonomous target detection, tracking, and relative positioning. A production contract for 128 systems was initially awarded in 2018, with critical design review completed in March 2023. Low-rate initial production is expected by 2027.

Meanwhile, currently fielded capabilities are being steadily integrated into the fleet. In December, USS SANTA BARBARA (LCS-32), preparing for its maiden deployment this year, became the first ship to complete mine warfare training milestones with the MCM USV. Portions of the MCM Mission Package (MP) achieved Initial Operational Capability in March of 2023 following testing supported by USS CINCINNATI (LCS-20) and the first complete MCM MP was deployed aboard USS CANBERRA (LCS-30) the following month. USS TULSA (LCS-16) rounds out the three MCM MP plankowners, which will begin Middle East deployments over the next two years. A subsequent four INDEPENDENCE class ships will embark MCM MPs and deploy to the 7<sup>th</sup> Fleet area of responsibility.

The MCM MP is currently comprised of the AN/AES-1 Airborne Laser Mine Detection System and the AN/ASQ-235 Airborne Mine Neutralization System, which are employed from an MH-60S Seahawk helicopter, as well as the Mine Hunting and Minesweeping PDSs, deployed from the MCM USV.

Though upbeat about these developments, CAPT Scott B. Hattaway, Director of the Surface and Mine Warfighting Development Command's Mine Countermeasures Technical Division, tempered his optimism, telling the audience at the

## Undersea Mine Warfare Committee (Continued)

Naval Leaders' Combined Naval Event 24 conference that, "The United States has the privilege, and I would say the challenge, of being the first ones out of the gate and putting it into theater. I'm not saying we got it right, I'm saying we're first out of the gate."

Deployment of the new capability is critical to the Navy, however, as it will allow leadership to finally decommission the remaining AVENGER class MCM ships and MH-53E Sea Dragon airborne MCM helicopters.

In mining news, the Navy selected General Dynamics Mission Systems to develop the Mining Expendable Delivery Unmanned Submarine Asset (MEDUSA) system. MEDUSA will be a torpedo tube-launched, expendable, clandestine maritime mining system with long-range offensive capabilities that meets requirements for future submarine delivery of ocean mine payloads. The system will consist of a medium-class UUV, supporting equipment, and payloads. This contract is for prototype design, test, and risk reduction. The contract includes program management, design, systems engineering, fabrication, and testing and integration, potentially through 2032. If development efforts show promise, four prototype units may be ordered as early as 2026.

As it awaits deployment of the first MCM MPs, U.S. Navy fleet units have remained busy honing their MCM skills and operating closely with allies. In September of 2024, Sailors from Explosive Ordnance Disposal Mobile Unit EIGHT and Mobile Diving and Salvage Unit TWO participated in Exercise Sea Breeze 24.3. This series of exercises seeks to address the current maritime mine threat, assess allied MCM capabilities, and seek effective means to enhance Black Sea regional maritime security. Operating alongside their American counterparts were sailors from Bulgaria, Denmark, Estonia, France, Georgia, Japan, Norway, Romania, Sweden, Türkiye, and Ukraine. Though this was an

exercise, the danger is very real in this part of the world. Since the 2022 Russian invasion of Ukraine, regional navies have disposed of over 100 mines, and preparing for a large-scale post-conflict demining effort is of critical concern.

Also in September, the U.S. Naval Surface and Mine Warfighting Development Center participated in Exercise Dynamic Move 2024. Sixteen countries, including Belgium, Bulgaria, Greece, Italy, Netherlands, Norway, Poland, Romania, Türkiye, Georgia, Iraq, Japan, Jordan, Morocco, and Ukraine, converged on the Naval Mine Warfare Training and Evaluation Centre in La Spezia, Italy, for a series of tabletop exercises that sought to strengthen participant mine countermeasures capabilities and enhance participating force interoperability.

In October, and on the other side of the world, Commander Mine Counter Measures Squadron (COMCMRON) SEVEN joined Republic of Korea (ROK) Navy Mine Squadron 52 and seventeen other nations for Multi-National Mine Warfare Exercise (MNMIWEX) 24 in Busan, ROK. Part of an annual series of exercises hosted by the ROK Navy, MNMIWEX 24 increased MCM proficiency among its multi-national naval force. The largest of this annual exercise held to date, COMCMRON-7 and forces from Australia, Canada and New Zealand embarked the tank landing ship ROKS Cheon Wang Bong (LST-686), which teamed with AVENGER Class MCM ship USS PATRIOT (MCM-7) to conduct mine hunting operations during an eight-day at-sea phase.

That's it for my roundup of open-source news since the Clam Bake. I hope you enjoy this Spring's technical program and, as always, I encourage each of you to keep lines of communication open between government, industry and academia, as we continue to support those who go in harm's way.



# Undersea Warfare Vehicles Committee



**CHUCK FRALICK**  
CHAIRMAN

**BRIAN MCKEON**  
DEPUTY CHAIR

**RICH WORTMAN**  
AC REPRESENTATIVE

Progress in developing Navy  
Uncrewed Undersea Vehicles (UUVs)

is increasingly experiencing a changing acquisition landscape that could serve to speed delivery to the fleet and allow faster lifecycle changes. This changing landscape applies to all sizes of vehicles and is likely attributable to at least four focus areas. They include:

- a. More emphasis on commercial UUVs (or variations of them) and autonomy suites
- b. More efficient acquisition approaches
- c. AUKUS
- d. Looming timelines that need to be met

There has been a definitive move from niche UUVs like the Large Diameter UUV (LDUUV) called Snakehead or similar, to variants of existing commercial vehicles developed by industry. These systems had some complex requirements that led to long Navy testing and delays in fielding. Much of the real estate on these vehicles was occupied with sensors and payloads that did not allow flexibility for different payloads. What is true of most commercial vehicles is they are focused on flexibility and cost. That flexibility directly addresses payload modularity, speed to reconfiguration, and broad applicability.

It is also not surprising that many of these commercial variants of UUVs are being purchased through the contracting methodology called Other Transactional Authority (OTA). This approach to obtaining UUVs tends to streamline the process

since federal laws and regulations that apply to procurement contracts are more friendly under OTAs. Furthermore, OTAs allow the customer various options to select the winner. For instance, an in-water demonstration and in-person presentation among industry participants can be the basis for selection. OTAs can be used for research, prototype, and production. Production can be non-competitively awarded after the demonstration of the Prototype.

Similar results have been achieved in Australia where the purchase of UUVs is critical for homeland protection. The Royal Australian Navy (RAN) has also used variations of commercial UUVs for their requirements and demonstrated these systems during exercises like the RAN Exercise Autonomous Warrior 2023. AUKUS has only enhanced this approach for the U.S., UK, and Australia by relaxing export restrictions and collaboration on vehicle solutions and further opened up communication of capabilities across the three countries.

This shift toward commercially available UUVs and UUV technology represents a fundamental change in how the Navy and allied forces approach undersea autonomy. The focus is now on:

- Rapid fielding: By leveraging mature commercial technologies, the Navy can deploy operational UUVs much faster than traditional development cycles
- Cost efficiency: Avoiding bespoke designs reduces development costs, while open architectures enable multi-mission flexibility without requiring entirely new platforms
- Interoperability: As allied nations like Australia adopt similar commercial platforms, opportunities for joint operations and shared logistics increase, strengthening coalition capabilities

In sum, the Navy's evolving UUV strategy reflects a broader shift toward agility, affordability, and interoperability; ensuring that undersea autonomous systems can be fielded quickly to meet operational timelines and effectively in an increasingly contested maritime environment.

# Undersea Warfare Aviation Committee



**GLEN SHARPE**  
COMMITTEE CHAIRMAN

**BOB KANYUK**  
DEPUTY CHAIR

**CAPT DENNIS LLOYD, USN**  
NAVY LIAISON

Welcome back to San Diego, new members to NDIA's UWD and those who have been longterm members

currently contributing to the undersea warfare battlespace. Much is going on in our domain, and as a Navy and industrial base enterprise, we are all busy keeping pace with geopolitical changes, and filling ASW technology gaps.

The Aviation session consists of diverse experts from government, industry, and academia who will share their expertise, plans, and results of their efforts to address global undersea warfare threats. You can expect to hear about and network with those who have acquired, researched, and developed the technologies to achieve Undersea Overmatch.

I want to thank you for supporting the Aviation ASW committee and look forward to the relationships we will build together and improved capabilities we can assist each other with in support of our sailors.

Below are selected public domain articles summarizing some of what is going on within the Aviation Undersea Warfare domain.

*Military Aerospace: "Navy asks Sparton for 20,000 multistatic sonobuoys for anti-submarine warfare (ASW) in \$107.1 million deal" dated Jan. 16, 2025, Military Aerospace: Multistatic sonobuoys for anti-submarine warfare (ASW).*

*"Navy asks Sparton for 20,000 multistatic sonobuoys for anti-submarine warfare (ASW) in \$107.1 million deal" dtd: Jan. 16, 2025*



*PATUXENT RIVER NAS, Md. – U.S. Navy anti-submarine warfare (ASW) experts are replenishing their supplies of advanced air-launched sub-hunting sonobuoys that work together with other sonobuoys to detect, pinpoint, and track enemy submarines.*

*Officials of the Naval Air Systems Command at Patuxent River Naval Air Station, Md., announced a \$8.4 million order Thursday to ERAPSCO in Columbia City, Ind., for as many as 5,000 AN/SSQ-62 air-launched directional command active sonobuoy system (DICASS) sonobuoys.*

*The Navy is seeking to boost anti-submarine warfare (ASW) capabilities of multistatic, active, and passive sonobuoy.*

## ASW Acoustic Sensors

Sonobuoys are air launched expendable, electro-mechanical ASW acoustic sensors designed to relay underwater sounds of ships and submarines. Sonobuoys enable Navy ASW forces to track potentially hostile submarines operating in the open ocean and in coastal areas that could be threats to Navy carrier battle groups or other forces. Information from these systems can help enable precision attacks with air-launched torpedoes.

Navy fixed-wing aircraft and helicopters can drop a pattern of sonobuoys, which relay information back to the aircraft by radio link, to determine the exact locations of enemy submarines.

The AN/SSQ-125 modified high-duty-cycle sonobuoys work together with the Navy's AN/SSQ series of sonobuoys, which consist of the SSQ-36 bathythermograph (BT); SSQ-53 passive directional low frequency analyze and record (DIFAR); SSQ-62 directional command active sonobuoy system (DICASS); SSQ-101 air deployed active receiver (ADAR); SSQ-110 multi-static non-coherent source; and SSQ-125 multi-static coherent source.

## Multistatic Fields

The AN/SSQ-125 sonobuoy is a source in a multistatic field, and can generate a variety of waveforms, and is designed to work with the AN/SSQ-53F, AN/SSQ-77C, and AN/SSQ-101 (ADAR) sonobuoys.

A multistatic sonar system contains several spatially diverse monostatic or bistatic sonar components with a shared area of coverage, and enable Navy ASW operators to use sensor fusion to combine the power of the separate sonobuoys.

The AN/SSQ-125 sonobuoy is a source in a multistatic field, and can generate a variety of waveforms, and is designed to work with the AN/SSQ-53F, AN/SSQ-77C, and AN/SSQ-101 (ADAR) sonobuoys.

## Programmable RF Channel

The AN/SSQ-125's RF channel can be programmed to any of the standard sonobuoy operating channels. At any time after deployment, the AN/SSQ-125 can be commanded to change its operating parameters or depth (deeper only), generate a ping, or scuttle.

The AN/SSQ-36B provides vertical temperature profiles of the ocean layer for ASW and research, and used widely in ASW operations to evaluate local effects of seawater temperature on sonar propagation and acoustic range prediction.

The AN/SSQ-53F uses four hydrophones—each one a multichannel directional piezoelectric ceramic transducer—that

## Undersea Warfare Aviation Committee (Continued)

operate at depths of 90, 200, 400, and 1,000 feet to listen for potentially hostile submerged enemy submarines. Aircraft can drop a pattern of sonobuoys, which relay information back to the aircraft by radio link, to determine the exact locations of enemy submarines.

The SSQ-53F has three sensors: a constant shallow omni (CSO), an advanced DIFAR sensor, and a calibrated wideband omni. The buoy digitally conditions and amplifies the acoustics and provides directional data that helps establish azimuthal bearing to the submarines being tracked.

### Range and Bearing

The AN/SSQ-62E DICASS sonobuoy is for detecting and localizing submarines in preparation for attack. It can provide range and bearing to the target to fix position, and can support any of the four acoustic frequencies as selected via the Electronic Function Select.

The AN/SSQ-101 ADAR sonobuoy provides a commandable passive search capability, and functions as the receiver in a multistatic active receiver system. The device uses a pentagon-shaped horizontally oriented pattern of hydrophones to detect and beam form underwater sound waves.

## Undersea Warfare Sensors Committee



**JOSEPH CUSCHIERI**  
CHAIRMAN

NDIA's USW Division Spring Conference will be held in person for the second year in a row and will have five technical tracks instead of the four tracks from last year with the organization of the tracks following the traditional track topic order held in previous years.

For the second conference in a row, the Spring Conference includes the participation of our AUKUS partners. However, this time AUKUS participation is limited to the Tuesday's Plenaries and will be held in parallel to the technical tracks. Presentations in the tracks have been segregated to those which are AUKUS released and those which are not. This will prove to be interesting!

Similar to the Fall Conference, if you meet any attendees from the AUKUS countries—Australia and the UK—please make them feel welcome and part of the team. The AUKUS participation presents new opportunities that may present themselves for collaboration in the future. As always, it is up to each one of us to follow our company policies when talking to foreign allies.

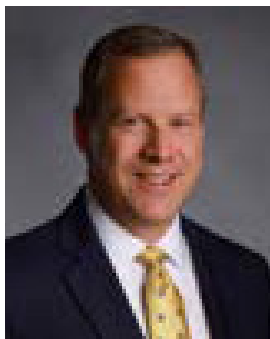
The Undersea Sensors Technical Committee has a full day of very interesting and engaging presentations which align with the theme of the Conference "Enabling Joint and Combined Force ASW/MIW/SSW." The Undersea Sensors Technical Committee session kicks off Wednesday morning with a presentation by Naval Information Warfare Center (NIWC) on Applying Reinforcement Learning for Modeling Submarine Evasive Behavior in a Multistatic Sonar Field. This is followed

by three presentations, one by IWS 5 on Submarine Sensor System Development, one by PMS 485 on Deployable Surveillance Systems Update, and another one by PMS 485 on Mobile Surveillance Systems Future Capabilities. After the first networking break, the session starts with a presentation on ONR's Code 32 ASW diverse portfolio of projects that support the Navy's USW mission. We have two presentations wrapping up before lunch on Undersea Maritime Domain Awareness with Long Endurance USVs and From Testing to Tactical: Integrating Advanced Sensors and Algorithms on Large Displacement Unmanned Underwater Vehicles (UUVs) for Subsea & Seabed Warfare and Mine Warfare Operations by NSWCD.

The afternoon session after the networking lunch kicks off with a presentation on Sea Archer/Sea Sniper by NUWC Newport, followed by an ONI presentation on New Chinese/Russian Undersea Sensors and Data Processing for Improving Long Range Detection of Ultra Quiet Vessels. The ONI presentation is followed by a presentation on Continuous Monitoring of Ports, Harbors, and Infrastructure Critical to National Security. A presentation on Biohybrid Robot Jellyfish Act As Buoyancy-Controlled Vertical Profiling Samplers by NUWC, Newport is scheduled before the afternoon networking break. Afterwards there are two more presentations before we conclude the day. The first is on Using the DoD REMEDE Facility For PEO USW Programs and the second on All Models are Wrong: New Perspectives on ASW Operations Research, which anchors the Undersea Sensors session.

Thanks to the presenters without whom we would not have such successful Undersea Sensors technical tracks and on behalf of the presenters we want to thank everyone for attending the presentations. Safe travels and will be looking forward to meeting again in the 2025 Fall Undersea Warfare Conference.

## CONFERENCE CHAIR'S MESSAGE



**CAPT JIM GRAY, USN (RET)**  
SPRING CONFERENCE CHAIRMAN

After the NDIA USW Spring Conference last year, we received positive feedback about the value of the conference. I want to thank all of the plenary and technical speakers who made it such a success. This years' planning committee has been working hard to exceed the bar that was set last year and we are excited for the evening reception kick off

on March 17. The conference theme, aligned with the Navy's focus, is ***"Enabling Joint and Combined Force ASW / MIW / SSW Operations in Contested Areas"***.

As in the past, holding the conference in a Fleet concentration area provides ready access to leaders from all warfare communities who are focused on planning and operational readiness. This group of Navy Leaders has the responsibility to ensure our forces provide a credible deterrent and if needed are prepared to decisively win in battle.

This year we have included an AUKUS component with Australian and UK military and industry both speaking and present in the audience. We are fortunate to have this classified forum where leaders have agreed to share their thoughts on the state of Undersea Warfare and the gaps that need to be filled to support the warfighter.

As our adversaries evolve so too does the U.S. military to lead the threat. Technical session topics were solicited that focus on recent events, advancements, and challenges with emphasis on:

New or repurposed ASW / MIW / SSW undersea sensors that enable operations in contested areas

Combat system or C4I improvements that enhance capability to do high end ASW by January 2027

Closing MIW capability gaps to facilitate mine warfare in a non-permissive environment

Aviation Multi-platform, coordinated ASW operations and employment of enabling interoperable sensors, weapons, & processing technologies

Lower cost, more flexible, and smarter USVs to address missions with mass and interoperability.

We are fortunate to have an array of distinguished speakers who will share their views on the current state and needs of undersea warfare. Our plenary speakers will discuss many facets of the complex issues and gaps associated with undersea warfare. They will cover current thinking about operations and planning in the Pacific, warfare development initiatives, Joint warfighting, readiness, acquisition, and requirements.

As the conference chair, I hope that all attendees have a productive, informative, and enjoyable conference. Hope to see you there.

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