

# FALL 2022 UNDERSEA WARFARE CONFERENCE

MAINTAINING OVERMATCH IN THE UNDERSEA DOMAIN

## UNDERSEA WARFARE DIVISION



**RONALD VIEN, SES**  
*Technical Director, NUWC  
 Center Division Newport*

### TECHNICAL DIRECTOR, NAVAL UNDERSEA WARFARE CENTER DIVISION NEWPORT

The next major naval conflict our nation will face will be far different from those fought over the past 80 years. Until recently, Department of Defense efforts focused on large-scale ground operations in urban environments primarily against insurgencies. Our military forces have been optimized on supporting these types of efforts and as a result, the focus moved away from

the warfighting domains that played a lesser role in Iraq and Afghanistan, most specifically in the undersea domain.

The geo-political threat landscape has shifted dramatically following the drawdown in those mountainous and desert regions, focusing now on the pacing challenge posed by China and acute threats posed by Russia.

Experts are describing this time of competition between the U.S. and China as the “decade of maximum danger” as China has increased their comprehensive national power and could adopt more risk-embracing foreign policies. Deterring the adoption of these policies requires a renewed focus on the maritime warfighting domains, most importantly the undersea.

Russia has historically been an aggressive competitor who has long held a strong interest in building influence through the use of the maritime domain. Their recent invasion of Ukraine shows that they are an unpredictable player on the world’s stage.

Through its technological superiority, the military overmatch of the U.S. has remained largely unchallenged in the period since World War II; however, due to the democratization of technology and the use of cyber operations to extract defense technologies, our strategic competitors have eroded our advantages in many warfighting domains. Despite this, the

undersea remains the sole warfighting domain where the U.S. retains a military advantage.

Day by day, our lead in the undersea domain is being eroded. Faced with increasingly stealthy platforms and seabed operations in the Atlantic, unprecedented shipbuilding capacity, increasing sensor capability and campaigns for global influence in the Pacific, threats from afar are even closer to home. Now is the time to redouble our efforts to maintain our overmatch in the undersea domain.

We must continue to persist in developing and refining technology to advance the state of the art in undersea warfare. We must design and deliver a new fast attack submarine focused on operating in and winning the fight in new theaters of war. We must explore and develop non-traditional solutions to ensure we maintain our strategic advantage in the undersea. We must explore new ways in which unmanned systems could execute missions that would prove to be too risky to be performed by our capital assets. We must embrace distributed sensing, not solely focusing on capabilities and modalities that are organically tied to platforms. We must learn how to transparently share data and information in theater to give decision-makers and coalition partners a common operating picture of the battlespace.

This is a once-in-a-generation challenge faced by the entirety of the defense enterprise. As we rise to meet this challenge, we must remember that no single entity will be able to deliver effective warfighting solutions alone. Only a concerted effort from defense leadership, the warfighter, the naval research and development establishment, industry partners, and academia will be sufficient to research, develop, test, deploy, support, and employ the latest technology that will allow our Navy to maintain overmatch in the undersea domain.

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## DIVISION CHAIR'S MESSAGE



**MIKE CORTESE**  
CHAIRMAN UNDERSEA WARFARE  
DIVISION

On behalf of the entire management team of the National Defense Industrial Association's (NDIA) Undersea Warfare Division (UWD), welcome to our Fall conference. To say that the past few years have been a challenge with respect to the

conduct of our normal classified forums would be a significant understatement. While we were able to conduct two of our conferences virtually, and hold the Fall conference last year in-person, COVID-19 restrictions still limited our attendance. This conference will be the first USW Division in-person conference with no restrictions that we have held in three years. I am sure you will agree it is great to be back in Groton, CT.

Our goal is to provide you the best classified forum for understanding the Navy's vision, objectives, and plan for maintaining undersea warfare superiority along with the best opportunity to interact with our diverse undersea warfare (USW) community. Please provide feedback on how we are doing and how we can improve. A special thanks to all of our plenary and technical committee speakers for taking the time to brief our USW community. Your briefs and the resulting discussions are the reason we are here. The information you provide is critical to both our support of the warfighter and the defense of our nation.

The importance and urgency of our USW effort is great. Growing regional and global threats continue to advance interests, operations, and capabilities that challenge freedom of the seas, nation sovereignty, and many of the freedoms we hold dear. Recent events in Ukraine and the continuing rapid rise of both China's conventional and nuclear weapons capabilities serve to remind us why our warfighters need our focus and dedication to develop the capabilities they require to succeed and preserve our way of life. Over the past decade, Navy and DoD leaders have consistently articulated the need to maintain our USW advantage, and addressing this need is captured in this year's Fall conference theme, "Maintaining Overmatch in the Undersea Domain", which focuses on maintaining and maximizing present undersea warfare capabilities and readiness, while designing and fielding the undersea warfare systems of the future. As our military partners outline their plans for more USW platforms, a broad array of new payloads, and the sensors and other supporting elements of a sophisticated network of undersea assets, it is more important than ever that members of government, industry and academia remain aligned, communicate effectively, and collectively move forward toward the shared goal of ensuring our USW dominance.

On behalf of the Executive Board, the Advisory Council, and NDIA, thank you and your organizations for your continued support of NDIA's Undersea Warfare Division, our warfighters, and these conferences. We hope you enjoy this Fall conference and look forward to seeing you at the Spring conference in San Diego, CA.

## SPRING 2022 NDIA UNDERSEA WARFARE AWARDS



**PIERRE CORRIVEAU, CHAIRMAN  
AWARDS COMMITTEE**

The Undersea Warfare Division (UWD) of the NDIA presents annual awards to assist in supporting and recognizing the USW defense technical and engineering base. We continue this legacy by conferring the 2022 Spring awards.

NDIA UWD is pleased to present

the **Vice Admiral Charles B. Martell-David Bushnell Award** to Dr. Kerry W. Commander, Chief Technology Officer at the Naval Surface Warfare Center Panama City Division; the **Vice Admiral Charles E. Weakley Award** to Ms. Lisa Blodgett, Force Projection Sector Head at the Johns Hopkins University Applied Physics Laboratory; and the **Captain George W. Ringenberg Award** to Mr. John Holmes, recently retired Director and Site Manager for L3Harris Technologies. In addition, we were pleased to present the **Rear Admiral Jack Jarabak Award** to LT Bridger Smith for his exceptional contributions in the field of undersea warfare.



**DR. KERRY COMMANDER**

**CHIEF TECHNOLOGY OFFICER, NAVAL SURFACE WARFARE CENTER PANAMA CITY DIVISION,  
PANAMA CITY, FLORIDA**

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

Over the course of his 37+ year career, Dr. Kerry Commander has led research activities in bubble acoustics, surface ship wake acoustics, torpedo countermeasures, acoustical oceanography, target scattering, underwater communications and mine countermeasures sonar systems development. He has served as an ONR Program Officer where his primary focus area was sensing technology for mine countermeasures and mine warfare. His involvement in antisubmarine warfare and swimmer defense led to the development of modeling capabilities, and integration of novel sensors into unmanned underwater vehicles. He has published extensively and regularly provides technical guidance and supervision to teams involved in the execution of R&D for undersea warfare.

Commander has been responsible for notable contributions

to the U.S. Navy including the first synthetic aperture sonar operating from a fully autonomous underwater vehicle, and the development of a unique and environmentally realistic, non-magnetic Very Shallow Water/Surf Zone test capability. He developed and executed the first Offensive Mining Program in Advanced Underwater Weapons System in more than 20 years.

His research findings distinguished him as an international leader in the acoustics community. His leadership significantly impacted the engineers and scientists he recruited and mentored with his extensive knowledge of Navy Research and Technology initiatives. Through these and many other outstanding and impactful contributions, Commander has ensured the advancement of the U.S. Navy Undersea Warfare Capabilities for many years to come.

**For his excellent leadership and unwavering dedication that has significantly benefited our Undersea Warfare Community, NDIA's Undersea Warfare Division is honored to present the 2022 Martell-Bushnell award to Dr. Kerry Commander.**





**MS. LISA BLODGETT**

FORCE PROJECTION SECTOR HEAD, JOHNS HOPKINS UNIVERSITY, APPLIED PHYSICS LABORATORY (JHU/APL)

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

Ms. Blodgett has more than 30 years of experience in USW including submarine warfare, anti-submarine warfare, mine warfare, and the strategic deterrence mission of the SSBN force. She is JHU/APL's Force Projection Sector Head where she directs and leads JHU/APL's efforts to enhance the capabilities of the nation's submarine fleet and ensure the readiness of submarine-based ballistic missile systems. Prior to this, she was JHU/APL's executive for USW providing strategic and technical direction to a team of several hundred scientists and engineers engaged in research, development, and operational support of USW systems and technologies.

Blodgett began her career at JHU/APL focused on delivering improved passive sonar capability to the fleet. As an expert in digital signal processing and passive sonar, she helped develop the capability to evaluate operational sonar systems

in the Navy's Advanced Processing Build/Acoustic Rapid COTS Insertion (ARCI) efforts. The ability to quantify proposed technology improvements proved foundational for the ARCI program, enabling the setting of priorities and sustainment of resource sponsor funding. In the early 2000's, Blodgett and her team focused on the SQQ-89 USW system where they evaluated the effectiveness of the proposed enhancements and provided the confidence required to develop and field the highly effective SQQ-89 A(V)15.

Blodgett has served in many leadership roles within the USW community while ensuring effective government and industry communications. Current positions include membership of the NDIA UWD Advisory, Council Co-Chair of the Submarine Technology Symposium, Naval Submarine League Board of Directors Member and Lead of the Nuclear Command, Control, and Communications (NC3) Task Force of the STRATCOM Advisory Group (SAG).

**In recognition of her noteworthy contributions to advancing the field of Undersea Warfare and in promoting effective government/industry communications, NDIA's Undersea Warfare Division is pleased to present Ms. Lisa Blodgett with the 2022 VADM Charles E. Weakley Award.**



**MR. JOHN HOLMES**

DIRECTOR AND SITE MANAGER, L3HARRIS TECHNOLOGIES (RET)

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

John Holmes has been an active member of the UWD NDIA executive board since 1998. During his over 20 years of leadership and service to the NDIA, Holmes has provided unwavering support to help the UWD execute its mission of fostering the exchange of technical information between government and industry and expanding research and development in areas related to undersea warfare.

Throughout his tenure on the UWD Executive Committee Holmes provided outstanding leadership. He served as the Mine Warfare Technical Committee Chair and Deputy Chair of the Awards Committee and most recently served the UWD Executive Team as Chair and Deputy Chair of the Spring Conference Committee. He has freely shared his valuable insights and lessons learned with executive committee members to ensure consistent conference integration and

messaging.

Holmes' guidance, dedication and leadership to the UWD over many years are noteworthy. His support to NDIA's annual Spring Conference, exemplified his organizational and communication skills by helping to obtain the finest available lineup of flag officers and program managers while aligning conference content and format to reflect the most prevalent and relevant issues facing the undersea warfare community. Holmes' unmatched skillset of advanced planning, innovation, flexibility and patience were exemplified throughout these challenging times.

**The Undersea Warfare Division is proud to recognize Mr. John Holmes with the 2022 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.**



**LT BRIDGER SMITH, 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 LT Bridger Smith, USN, for his personal commitment and academic achievements in the area of Undersea Warfare Technology.

While attending the Naval Postgraduate School from January 2020 to December 2021, Smith distinguished himself through outstanding performance in the Cyber Systems and Operations Curriculum. His exceptional research clearly demonstrates an intellectual ability, analytical skills, and mastery of undersea warfare. As a submarine officer with nuclear power school experience, he brought a unique perspective to the curriculum as well as his thesis work. LT Smith's thesis, "**A DevSecOps**

**approach for developing and deploying cloud-based, containerized software on submarines"** led a feasibility study for deploying hardened software containers on a scalable, submarine-compatible platform-as-a-service (PaaS) solution and helped the program team identify infrastructure gaps needed to realize DevSecOps in resource and connectivity constrained environments. His work accelerated essential capability development for delivering modern software solutions to submarines.

**The Undersea Warfare Division, in conjunction with the Naval Postgraduate School, takes great pleasure and welcomes the opportunity to recognize the important contributions of LT Bridger Smith, USN, by its award of the 2022 RADM Jack Jarabak Award.**

## NDIA UWD 2022 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.



**Ivana Escobar** is a Graduate Research Assistant at the Applied Research Laboratories, University of Texas at Austin. Escobar is also a doctoral candidate in Computational Sciences, Engineering, and Mathematics in the Oden Institute, an interdisciplinary program at the University of Texas at Austin. Her presentation will introduce a data assimilation framework that studies

sensitivities of ocean hydrography due to acoustic measurements. This work uses acoustic travel time observations to inform a cost function strongly constrained by an ocean circulation model through development of a new parameter-to-observable mapping.



**Joshua A. Robbins** holds a Bachelor of Science degree in Engineering Physics and a Master of Engineering in Mechanical Engineering, both from Cornell University. Currently, Robbins is a Ph.D. candidate in Aerospace Engineering at the Pennsylvania State University. In addition, he is an R&D Engineer at Penn State's Applied

Research Laboratory (ARL) where his responsibilities include autopilot and flight simulation development for torpedoes and unmanned undersea vehicles. His presentation will discuss preliminary research efforts at ARL to develop and test guidance and control laws for precise positioning of tethered payloads using fixed-wing unmanned aerial vehicles (UAVs). Potential applications include dipping sonar or undersea-to-air communications gateways. Proof of concept flight test data collected with a fixed-wing UAV will be presented and compared to a computer simulation of the tether dynamics. Future work will use the tether dynamics simulation and UAV test bed to develop algorithms to position a tethered payload subject to winds and model uncertainties.

# 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 am really looking forward to the clambake, having missed our usual San Diego, CA

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).

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 or 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 with 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 Center (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

The Mine Warfare (MIW) Committee has an outstanding agenda lined up for our technical session this year, with presentations expected from multiple Program Offices and Resource Sponsors, the fleet, DARPA,

ONR, Naval Special Warfare and even the Marine Corps. I am also excited to welcome Elliott Donald aboard as Deputy Chair.

The Fall conference comes at an especially relevant time for MIW, where the war in Ukraine has presented the need for updated mine countermeasures (MCM) capabilities into stark relief. Combatants have deployed what some estimate to be between 400 and 600 sea mines in the Black Sea. Though reporting suggests that minefields are primarily in Ukrainian territorial waters, enough moored mines have broken loose that they pose a grave threat to shipping throughout the region. Indeed, Turkey closed the Bosphorus Strait for a time earlier in the year due to the danger.

With this very real reminder of what could be at stake in the near future, the U.S. Navy's Sixth Fleet MCM Detachment served as the MCM tasking authority for Exercise Baltic Operations (BALTOPS) this past June. The detachment led four task units, which were the largest by number of units and the most diverse task group in the exercise.

The U.S. Navy's mine countermeasures program has taken a step forward in bringing new systems to the fleet that would counter these types of threats. In July, Program Executive Office, Unmanned and Small Combatants (PEO USC) announced the Initial Operating Capability (IOC) of the Unmanned Influence Sweep System, a key component of the Mine Countermeasures Mission Package (MCM MP) and the

Navy's first unmanned surface platform to reach IOC. The system joins three other mission modules, the Airborne Laser Mine Detection System, Airborne Mine Neutralization System and the Coastal Battlefield Reconnaissance and Analysis System in the MCM MP's Initial Operational Test and Evaluation later this year which will determine if all the fielded mission modules can successfully work together. The MCM MP will operate from LCS as well as vessels of opportunity such as Lewis B. Puller-class Expeditionary Support Bases (ESB). In August, the Navy contracted its fifth ESB, which is expected to be completed in 2027 and will join the three already in service and two that are currently under construction.

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 Unmanned Influence Sweep System is an unmanned, self-propelled, semi-autonomous surface vehicle equipped with capability to sweep acoustically and/or magnetically actuated naval mines. US Navy picture.*



# UNDERSEA WARFARE VEHICLES COMMITTEE



**TOM RUZIC**  
**CHAIRMAN**

**CHUCK FRALICK DEPUTY CHAIR**

The Program Manager for Unmanned Maritime Systems, PMS406, provided the following introduction.

The Navy continues to invest in a family of unmanned undersea vehicles (UUVs) to meet a variety of missions

for maintaining undersea domain superiority. Unmanned autonomous systems are designed to expand the Navy's undersea reach and persistence, and do the dull, dirty and dangerous work to complement, enhance and enable missions performed by manned platforms.

UUVs and unmanned surface vehicles (USVs) are being developed in response to Great Power Competition threats. The Tri-Service Maritime Strategy, released in December 2020, emphasizes the role of unmanned platforms in generating integrated all-domain naval power.

The Chief of Naval Operations' (CNO's) Navigation Plan, issued in January 2021 and recently updated in July 2022, identifies the need to develop unmanned capability and capacity in support of a larger, hybrid fleet of manned and unmanned platforms required for Distributed Maritime Operations. The CNO then released an Unmanned Campaign Framework in March 2021 that emphasized the future hybrid fleet requires a coordinated effort across the entire service to deliver true unmanned capabilities, and not just standalone unmanned platforms.

The Unmanned Maritime Systems Program Office (PMS 406), within the Program Executive Office, Unmanned and Small Combatants (PEO USC), is responsible for driving the majority of the Navy's development, delivery and sustainment of unmanned surface and undersea platforms, along with the development of key enabling technologies to support advanced autonomy.

PMS 406 is managing a diverse portfolio of medium, large and extra-large UUVs and USVs. Its Advanced Autonomous Capabilities division is leading the development and integration of technology enablers to support both UUVs and USVs. The office collaborates with program offices across PEO USC, as well as with Program Executive Office, Unmanned Aviation and Strike Weapons.

Despite the pandemic, the Navy's UUV and USV portfolios have made significant developmental progress. Contracts were awarded for the first Medium USV prototype, Large USV studies (to six industry teams) and for two additional Navy-funded Overlord prototype USVs; industry solicitations were issued

for Medium UUVs (MUUV) and Snakehead Large Displacement UUV (LDUUV) Phase 2; fabrication moved forward on five Orca Extra Large UUV (XLUUV) prototypes and the Snakehead Phase 1 vehicle; and deliveries of the Razorback dry deck shelter (DDS) medium UUV continued.

Prototyping and testing efforts also ramped up to validate new technology, develop concepts of operations and build trust in unmanned systems at both the Surface Development Squadron One (SURFDEVRON), headquartered in San Diego, and UUV Squadron One (UUVRON-1) in Keyport, WA. A variety of UUVs and USVs participated in a number of fleet exercises including Integrated Battle Problem 21, the Navy's first multi-domain manned and unmanned capabilities exercise, which was led by U.S. Pacific Fleet and executed by U.S. 3rd Fleet in April.

Site preparations have begun at Naval Base Ventura County (NBVC) in Southern California for the initial testing, experimentation and operations of large unmanned maritime prototype platforms, including five Orca XLUUVs, Sea Hunter and Seahawk USVs, four Overlord USVs, and the first MUSV prototype that begin arriving in FY22. Detachments from UUVRON-1 and SURFDEVRON will be collocated at Port Hueneme for collaborative testing, experimentation, and learning and maturation of doctrine, organization, training, material, logistics, personnel and facilities requirements.

The parallel development of modular unmanned platforms with standardized technology enablers ensures these vehicles, surface and undersea, will remain capable and sustainable throughout their service life. Along with the development and integration of these enabling capabilities and technologies – including standards, autonomy, communications, command and control, platform integration, payloads and sensors, networks, data and endurance – is a drive for standardization and commonality to meet future needs to upgrade sensors, add payloads and missions, and refresh autonomy technology as it matures.

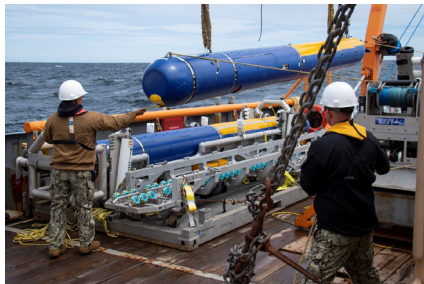
The Navy's recent work on foundational efforts like the Unmanned Maritime Autonomy Architecture (UMAA) and Common Control System (CCS) is key to achieving this goal. UMAA is a new standard for the development of common, modular and scalable autonomy software for unmanned vehicles that is independent of a particular mission and platform, and has been invoked contractually since 2019. CCS is a government-furnished vessel control software with common source code, user interface and components that the Navy can integrate into a variety of unmanned systems to provide common vehicle management, mission planning and mission management capabilities.

The Rapid Autonomy Integration Lab (RAIL) is the next step forward in executing the Navy's vision for development and deployment of unmanned system capability. The RAIL builds off the UMAA and CCS efforts to provide the infrastructure, tools and processes to develop, test, certify and deploy new and updated integrated software baselines to those vehicles. RAIL is the software factory that will continuously deliver improved combat systems to unmanned platforms.

The UUV program organization underwent several notable changes in Fall 2020 that will provide greater opportunity for collaboration to pursue opportunities for commonality, cost savings and sustainment efficiencies across this portfolio. A reorganization within PEO USC transferred the unmanned platforms in the littoral combat ship (LCS) Mine

Countermeasures (MCM) mission packages, including the Knifefish UUV and MCM USV, from PMS 406 to PMS 420 (LCS Mission Modules) to consolidate the efforts to complete Operational Testing and fielding of these systems into one program office. At the same time, PMS 340 (Naval Special Warfare) and PMS 408 (Expeditionary Missions) joined PEO USC, bringing a variety of small and medium UUVs programs and greater synergy across programs.

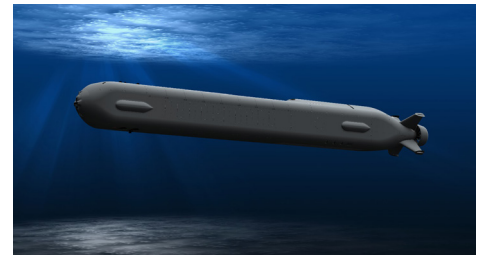
The following section provides a program snapshot on status and significant events expected across the Navy's unmanned UUV portfolio over the next year. Figures 1-2 provide photographs of the Razor UUV and figure 3 is an illustration of the Orca XLUUV.



**Figure 1. Razorback Littoral Battlespace Sensing Autonomous Undersea Vehicle**



**Figure 2. Razorback Medium UUV**



**Figure 3. Orca XLUUV**

### **Orca Extra Large UUV (PMS 406)**

The Orca XLUUV is a pier-launched, long-endurance vehicle with a modular design to accommodate a variety of large payloads. The Navy competitively awarded a fabrication contract to Boeing for five Orca prototypes and associated support elements in 2019 and fabrication of these prototypes continues. The first vehicle is expected to commence testing in 2022.

### **Snakehead Large Displacement UUV (PMS 406)**

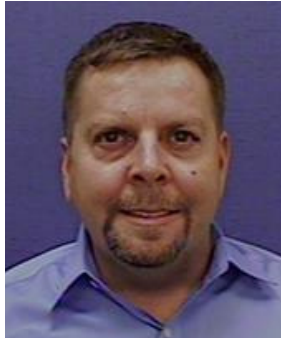
Snakehead LDUUV is the largest UUV capable of being hosted on a submarine with large ocean interfaces. Initial missions for Snakehead are Subsea and Seabed Warfare and Intelligence Preparation of the Operating Environment (IPOE).

Development continues on a single Phase 1 prototype vehicle intended to reduce risk in the areas of hull certification, lithium-ion battery hosting on submarines, and large UUV launch and recovery from submarines. A competitive solicitation for Phase 2 vehicles was issued in early FY21, with a contract award expected in FY22.

### **Knifefish Surface MCM UUV (PMS 420)**

Knifefish is part of the LCS MCM Mission Package and is specifically designed to find stealthy or buried mines. Low rate production of 10 UUVs awarded in 2019 continues along with development of additional capability to be inserted in future blocks.

# UNDERSEA WARFARE AVIATION COMMITTEE



**GLEN SHARPE**  
CHAIRMAN

**BOB KANYUK**  
DEPUTY CHAIRMAN

**CDR JUSTIN WISEN**  
NAVY LIASON (NAVAIR PMA-264)

It's a tremendous time of year for no other reason than its "Clambake" time! I hope everyone has had a safe summer and let me welcome you

back to Groton, CT for another informative relationship building Undersea Warfare conference.

Much has changed in the world since we last gathered so there will be lots to talk about. Let me start by wishing PMA-264 Program Manager Captain Dan Papp fair winds and following seas as he turned over command and to Captain Dennis Lloyd on June 2, 2022. Captain Papp was a tremendous supporter of the NDIA UWD and his subject matter expertise and leadership will be missed. We look forward to working with Captain Lloyd and leaning on his wisdom and Aviation ASW expertise going forward.

The Aviation Technical Session will tackle numerous relevant topics to include but not limited to undersea warfare intelligence collection, training simulation, artificial intelligence (AI), magnetic anomaly detection (MAD), active and passive acoustic sensing and processing.

Below you will find some informative articles of what has been going on in the Aviation ASW community that are in the public domain.

[Air Anti-Sub Warfare Systems Program Office welcomes new leadership | NAVAIR \(navy.mil\)](#)

## Air Anti-Sub Warfare Systems Program Office welcomes new leadership

NAVAL AIR SYSTEMS COMMAND,  
PATUXENT RIVER, Md.

Capt. Dan Papp requested to go ashore for the last time in a retirement and change of command ceremony on June 2 surrounded by family, colleagues, and friends.

After three years as program manager for [Air Anti-Submarine Warfare \(ASW\) Systems Program \(PMA-264\)](#) and 27 years of dedicated service, Papp bid farewell to his colleagues and thanked his family with humble remarks as he welcomed new leadership, Capt. Dennis Lloyd.

Maj. Gen. Greg Masiello, [Program Executive Officer for Air Anti-Submarine Warfare, Assault & Special Mission Programs](#), served as guest speaker at the ceremony where he commended Papp for his leadership, professionalism, and dedicated focus on the people during his time with the program.

"What I have learned from the science and professionalism of the men and women in PMA-264, and the extended [Commander, Patrol and Reconnaissance Group] family, to the profession of AWS, is remarkable, it is world class," said Masiello. "The products that you [PMA-264] produce are what the sailors use every day."

PMA-264 is responsible for the manufacturing and delivery of sonobuoys. They are air launched expendable, electro-mechanical ASW acoustic sensors designed to relay underwater sounds associated with ships and submarines to sophisticated remote processors principally on P-3C Orion, P-8A Poseidon, and MH-60R Seahawk aircraft.

Papp, a Chicago native, graduated with honors from Northern Illinois University. Following two years of enlisted Naval service, he received his commission through Officer Candidate School and was designated a naval flight officer in February 1998. Operationally, he served as the executive officer then commanding officer of Patrol Squadron (VP) 16, where his "War Eagles" successfully completed the first P-8A deployment and received the 2014 Captain Arnold Jay Isbell Trophy for ASW excellence. He completed several tours at NAVAIR and joined the Maritime Patrol and Reconnaissance Aircraft (MPRA) Program (PMA-290) as the P-8A current development and modification team lead following his command tour. In 2016, he served as the MQ-4C Triton integrated product team lead guiding the team through Milestone C, low-rate initial production, first fleet aircraft delivery as the program prepared for its early operational capability. Papp assumed command of PMA-264 in July 2019.

"To the team: you can take pride in knowing your work, quietly preformed, day in and day out is recognized by the fleet," said Papp. "PMA-264 is fortunate to have you, Capt. Lloyd, at the helm."

Lloyd is a graduate of the University of Texas at Austin, completing the Naval Reserve Officer Program and commissioning in August 1997. After attending undergraduate training at Training Squadron TEN and 86 (VT-10/VT-86) at Naval Air Station Pensacola, he was designated a naval flight officer in February 1999. His sea tours include two deployments with the Sea Control Squadron (VS) 24 in support of operations Southern Watch, Enduring Freedom, and Iraqi Freedom. He transitioned to the P-3C with deployments to several areas of responsibility

"Thank you for taking the time out of our busy day not only to recognize the Papp family's service to our country but celebrate PMA-264 as a command and to recognize the incredible work this workforce does for the nation," said Lloyd.

Lloyd comes most recently from PMA-290. He is a graduate of the Naval Test Pilot School completing multiple tours with Air Test and Evaluation Squadron TWO ZERO (VX-20). He served as a development test naval flight officer/project officer for



a variety of P-3C avionics, sonobuoys, sensors, and mission systems, deputy government flight test director/mission systems lead for the P-8A, and as chief test pilot and commanding officer. He has accumulated over 3,000 flight hours and over 300 carrier landings in more than 20 type/model/series aircraft.

"To the men and women of PMA-264, this day is really for you," remarked Lloyd. "I'm truly honored and humbled to get to be a part of this extremely talented team of dedicated individuals. We owe our best, all of us, each and every day to each other, our nation, our Navy, and most importantly to the sailors, airman, and Marines who we serve and who we must always have at the forefront of our thoughts and decisions."

PMA-264 plays a critical role in developing, acquiring and sustaining airborne anti-submarine warfare systems and sensor requirements for the fleet, PMA-290, the Multi-Mission Maritime Helicopters program.

[Boeing receives HAAWC full rate-production contract from U.S. Navy - Naval News](#)

## Boeing Receives HAAWC Full Rate-Production Contract From U.S. Navy

U.S. Navy awards Boeing High Altitude Anti-Submarine Warfare Weapon Capability, or HAAWC, full-rate production contract.

Boeing press release

The U.S. Navy has awarded Boeing a contract for the full-rate production of the High Altitude Anti-Submarine Warfare Weapon Capability, or HAAWC, with work expected to begin in the coming months. HAAWC is an all-weather add-on kit that enables the MK 54 torpedo to be launched near or below the cruising altitude of Boeing's P-8A Poseidon.

"This is an important milestone because it brings HAAWC one step closer to becoming fully operational and deployed by the Navy," said Dewayne Donley, program manager.

The contract includes production of HAAWC Air Launched Accessory, or ALA, kits and containers for the Navy and international customers. There are also provisions for Boeing to provide engineering such as design studies, testing, prototyping and/or analyses of production related issues. Repair service provisions include hardware repair and maintenance services for government-owned HAAWC ALAs and associated hardware and equipment. A provision item order option also allows the Navy to procure spare hardware in support of the program.

Carried on board the P-8A multi-mission maritime patrol aircraft, the advanced weapon system will meet the Navy's

operational need to conduct anti-submarine warfare from higher altitudes and longer distances. "Our solution transforms the MK 54 into a precision glide weapon in GPS-aided and GPS-denied environments," Donley said. "The HAAWC system provides flexibility by allowing the Navy to carry out anti-submarine operations throughout the full flight envelope of the P-8A."

To date, the global operating P-8 fleet has amassed more than 450,000 mishap-free flight-hours. [Home»News»Boeing receives HAAWC full rate-production contract from U.S. Navy](#)

[Navy Issues Sonobuoy Production Multiple-Award Delivery Order Contract - GovCon Wire](#)

## Navy Issues Sonobuoy Production Multiple-Award Delivery Order Contract

The U.S. Navy has issued a [multiple-award delivery order contract to manufacture sonobuoys](#) for the service, international partners and foreign military sales clients.

Multiple vendors will compete for sonobuoy delivery orders under MADOC to enable the Navy to replenish its expendable sonar systems used in anti-submarine warfare operations on a daily basis and maintain inventory levels in compliance with the military branch's munitions requirements process, Naval Air Systems Command said Wednesday.

The ordering period will kick off in fiscal year 2023 and run through FY 2027.

Capt. Dennis Lloyd, anti-submarine warfare systems program manager, said sonobuoys are critical to supporting the Navy and its allies in executing air ASW missions and the contract award is key to the future of sonobuoy production.

The ASW Systems Program (PMA-264) oversees the production and delivery of sonobuoys, which are air-launched acoustic sensors designed to transmit underwater sounds to remote processors aboard MH-60R Seahawk, P-3C Orion and P-8A Poseidon aircraft.

The Department of Defense uses the other transaction authority process to enable companies to conduct research, build prototypes and qualify new sonobuoy designs.

[Lockheed Martin](#) (NYSE: LMT) and [Erapsco](#) are the current sonobuoy suppliers to the Navy under a [\\$222 million contract modification](#) awarded in March.

# UNDERSEA WARFARE SENSORS COMMITTEE



**JOSEPH CUSCHIERI**  
ACTING CHAIRMAN

**MR. PETER SCALA**  
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The NDIA Undersea Warfare Fall conference takes place at the usual venue of the U.S. Naval Submarine Base in New London. The conference will be in-person and almost returning to “normal”. The Fall conference

schedule consists of the same three elements as at previous conferences. Starting on Monday with the opening networking reception, Tuesday is the day of Plenaries covering the various aspects of Undersea Warfare within the conference theme “Maintaining Overmatch in the Undersea Domain,” and the contributed technical papers will be presented by each of the Committee Chairmen on Wednesday.

The Undersea Sensors Committee received a large number of contributions with 23 total submissions. However, this year the Undersea Vehicles Committee received an even larger number of contributions – 34 and the Mine Warfare Committee received 18. While this is all good news because it demonstrates that there is great interest in sharing knowledge, there are a limited number of rooms where these presentations can occur. In the past the Undersea Sensors Committee could have up to two all day parallel sessions but given the number of papers received in the Undersea Vehicles and Mine Warfare Committees, an equitable share of available space was necessary. The result is unfortunately not all submitted abstracts could be accommodated. All abstracts were of excellent quality and selecting between all the submitted abstracts was a difficult decision to make. The hope is that those abstracts which did not make it this time will be included in future NDIA Undersea Warfare Conferences.

In line with the Fall 2022 Conference theme, “Maintaining Overmatch in the Undersea Domain” the topic of this issue of the newsletter is being dedicated to a brief overview of acoustic signature improvements and new acoustic sensors capabilities of the Virginia Block V submarines.

The Virginia Block V submarines include significant physical changes in the submarine structure, length, payload capabilities, and so on, over the Block IV platforms (an approximate 20% difference). In addition to the physical platform changes, the Block V platform will also include significant enhancements to upgrade its acoustic superiority. It has been determined that maintaining superiority in the acoustic signature and stealth are of critical importance. It is critical that U.S. submarines can operate undetected in or near enemy waters or coastlines. With low acoustic signatures, U.S.

Submarines will be able to conduct reconnaissance undetected and sense other platform movements and activities from farther ranges. Block IV already boasted an extremely low acoustic signature and Block V will be the quietest in the Virginia-class. The need for improved acoustic stealth and superiority is also driven by the fact that without such continuous improvements the U.S. undersea margin of technological superiority can be rapidly diminished in view of advances made by other nations.

On the acoustic sensor side of the design, the Block V sonar sensors will be updated and upgraded. Block V platforms will be receiving two Large Vertical Array (LVA) flank sonars together with the modernized Light Weight Wide Aperture Arrays (LwWAA). The Block V platforms will have six LwWAA located along the side of the submarine. The addition of the LVA on the Block V follows the recent fitting of the LVA on an Ohio Class platform (figure 4).

*Image: LWWAA is critical to the operation of the US Navy's Virginia-class submarines*



*Figure 4. SSN VLA upgrades part of the Acoustic Superiority Program. (US Navy Image).*

The LVA is a combination of a high-frequency and medium-frequency sonar system. The LVA, as its name implies, is vertically installed, one on either side of the submarine hull; each array is located towards the rear end of the platform. With this configuration, the LVA can provide close to 360-degrees of sonar coverage. Thus, unlike previous flank array configurations, the present configuration reduces blind spots at the stern. The LwWAA are hull mounted and are one of the first fiber-optic passive acoustic sensors. The LwWAA is considered critical for the planned operation of the Virginia Block V fleet. The LwWAA technology will be central in the future development of new generation undersea sensors. The LwWAA uses technologies based on lasers and fiber-optics that convert acoustic energy in the water into signals that can be processed to identify and classify targets.

The sonar data from the LVA and the LWWAA are digitally fused together with the data from other sonar systems - bow sonar and towed array if deployed. This combination of sensors gives the U.S. Navy a clear edge over the sensors used by other naval forces. All these improvements increase the system's directivity. Such emerging sonar technologies are focused on improvements in the technology of sensitive, passive acoustic sensors that have the capability to detect other surface and submerged platforms and their movements at much further ranges and with increased precision.

When taken together the acoustic stealth superiority and the superiority of the acoustic sensors and the processing, these improvements make the Virginia Block V one of the most technologically advanced submarines in the world. Combining the acoustic superiority with the increased capability because of the other 20% of changes that the Block V will bring, will make the Virginia Block V a discriminator compared to other attack submarines.



## CONFERENCE CHAIR'S MESSAGE FALL CONFERENCE



**ROBERT DUNN**  
CHAIRMAN

**ERIC IRWIN**  
CO-CHAIRMAN

The Fall conference theme, "Maintaining Overmatch in the Undersea Domain" 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. The plenary session will begin with our morning keynote speaker VADM Houston, Commander, Submarine Forces. Following him and throughout the morning briefs will be presented by the Commander, Submarine Force Pacific Fleet; Deputy Chief of Naval Operations for Information Warfare, OPNAV N2/N6; Technical Director, Naval Undersea and Surface Warfare

Centers; Program Executive Officer Strategic Submarines; and the Program Executive Officer Attack Submarines. VADM Wolfe will kick off the afternoon with the conference's keynote address. He will be followed by the Chief of Naval Research; Program Executive Officer Undersea Warfare Systems; Deputy Commander, Office of Naval Intelligence; Program Executive Officer for Unmanned and Small Combatants; Commander, Naval Meteorological and Oceanography Command; and the Director, Undersea Warfare Division, N97. This is one of the few industry opportunities to present questions to these leaders in a classified forum and I encourage you to do so.

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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