

"The Evolving Undersea Force (2030 - 2070)"

UNDERSEA WARFARE DIVISION



DON MCCORMACK
ED, NAVAL SURFACE AND
UNDERSEA WARFARE
CENTERS



RDML MOISES DELTORO
USN, COMMANDER, NUWC

COLLABORATING TO LEVERAGE EMERGING TECHNOLOGIES A MESSAGE FROM THE NAVAL UNDERSEA WARFARE CENTER

When we consider the undersea battlespace in the decades to come, we know that it will be unlike anything we've encountered before. Traditional adversaries will undoubtedly continue to challenge our position as the world's preeminent Navy, while individual, unforeseen actors, armed with the latest technological disrupters will likely emerge as well. The rapid development and adoption of technology, coupled with a marked increase of vehicles – both manned and autonomous – under the ocean's surface, calls for a novel response from the Navy, industry, and academia. Rapid technology adoption has allowed our adversaries to reduce the technological gap that for decades has set the United States Navy apart from the rest of the world. As a result, conventional approaches to undersea power projection must be supplanted by new capabilities and methods to deliver them.

"The NAVSEA Warfare Centers have developed Long Range Research and Development Plans (LRRDPs) for surface, undersea, mine and expeditionary warfare mission areas, as well as for platforms and lifecycle support technologies across our 10 divisions."

There is clear direction from the Department of Defense (DoD) and Navy leadership to reduce technology cycle times to get products into the hands of our Warfighters more quickly. Those of us working on technical solutions must do our part to help make that happen. In August, the Naval Undersea Warfare Center in Newport hosted the second Annual Naval Technology Exercise (ANTX), a three-day event designed to demonstrate future Navy technologies in action today (see sidebar). ANTX brought together Naval Warfare Centers, industry partners both large and small, and academia to showcase the latest in unmanned systems and related technologies on the

INSIDE THIS ISSUE

Division & Conference Chair's Message.....	4
Spring 2016 NDIA UWD Awards.....	5
NDIA UWD 2016 Academic Speaker Award	7
Aviation Committee Committee	8
Undersea Vehicles Committee.....	11
Mine Warfare Committee	13
Sensor Systems Committee	15
Command, Control, Communications and Combat Systems Committee	16
USW Acquisition Stakeholders	17



COLLABORATING TO LEVERAGE EMERGING TECHNOLOGIES

Narragansett Bay Test Facility range. With more than 22 participants, ANTX offered a prime example of the type of collaboration we must continue to pursue to provide better tools in our warfighters' toolkits. Scientists and engineers from government, industry, and academia had the opportunity to learn about one another's technologies, share ideas, and evaluate one another's technological innovations in a low-risk environment at the research and development level before the technologies become militarized and integrated at the operational level. A primary focus of the event was to achieve DoD's goal of accelerating the technology development cycle from concept to in-water testing through rapid prototyping and speed-to-fleet development. One of the most significant benefits was giving the participants an opportunity to see how their systems interacted in an actual in-water environment. The systems could then be refined and improved in real time.

Collaborative events like ANTX also demonstrate our fundamental, joint responsibility to build partnerships and shape a workforce able to quickly adapt and respond to rapid and escalating technology changes. Government and industry partnerships are more critical now than ever before. We must leverage each other's strengths and meet the future challenges as one community. Initiatives like Secretary of Defense Ash Carter's recently unveiled "Force of the Future," which ensures our military has the best technology and more flexible tools for recruiting, developing, and retaining military and civilian employees will certainly help. Our success will depend upon our ability to shape our processes as quickly as we need our workforce to respond to technological changes.

While most government organizations are also dealing with similar workforce shaping challenges, our positions as technical experts within the Naval Sea Systems Command (NAVSEA) Warfare Centers and industry are unique in many ways. Fulfilling our missions means preserving capabilities and offering technical advice and solutions across the full-spectrum life cycle of Navy's platforms and systems, some of which can be in service for 30-50 years or more. This requires us to balance priorities and investments to sustain the capabilities needed for today with the development of skills for tomorrow.

However, preparing for today's requirements is relatively easy compared to trying to forecast what's coming 10, 25, or even 50 years from now. Fortunately, several strategic documents help guide us in developing technological solutions. The Secretary of Defense's Third Offset Strategy identifies the elements of the future battlespace and serves as a call to action for military organizations and those in the defense industry to deter threats from those able to produce or acquire technologically advanced weapons systems. Chief among future efforts is a recognition that industry continues to develop many of the cutting edge technologies that we must adopt if we hope to outpace our adversaries. We will continue to look to industry to provide innovative and affordable technology solutions. The foundation

of the Third Offset is centered on finding the right combination of technologies and operational and organizational constructs to achieve a competitive advantage and subsequently bolster conventional deterrence.

Additionally, the Chief of Naval Operations' "Design for Maintaining Maritime Superiority" addresses how the Navy will adapt to global security changes in both technology and the maritime domain while continuing to fulfill its mission. In describing the strategic environment, the document identifies four lines of effort - strengthening naval power from the sea, achieving high velocity learning at every level, strengthening our Navy team for the future, and expanding and strengthening our network of partners - all of which are relevant for those of us working within the undersea domain. There is a clear connection between the need to adopt technological advances quickly and the need to ensure our people have the right training and tools to effectively utilize those advances. The NAVSEA Warfare Centers' current climate of innovation, where we explore new possibilities while still maintaining the technical excellence associated with our current product lines, meshes with ADM Richardson's design plan.

The NAVSEA Warfare Centers have developed Long Range Research and Development Plans (LRRDPs) for surface, undersea, mine and expeditionary warfare mission areas, as well as for platforms and lifecycle support technologies across our 10 divisions. Just as importantly, the LRRDPs identify the workforce skill sets required to develop and deliver these technologies. We'll continue to draw on traditional technical skills (e.g., electrical and mechanical engineering, chemistry, physics), while building workforce abilities in non-traditional areas (e.g., quantum physics, metamaterial science, nanotechnology). This mix of skill sets will drive workforce shaping strategies, hiring and training initiatives, external and internal partnerships, and facility requirements.

Within the undersea community, undersea warfare (USW) Science and Technology (S&T) Objectives provide additional guidance and are synced to fleet needs and warfighter requirements. The objectives, developed in concert with USW S&T stakeholders, align with and build upon the focus areas established in the Naval S&T Strategy. Our USW S&T investment portfolio attempts to balance near-term needs without sacrificing basic research or the pursuit of long-term revolutionary technologies tied to future capabilities. The distribution and balance among these efforts is critical to ensure that our undersea warfare investments are healthy, relevant, and address real needs and requirements. At the same time, we remain cognizant of potential future threats and trends to ensure we are prepared for what's next.

Though challenging in the absolute sense, shaping a workforce for the future also requires us to foster a culture of continuous innovation and collaboration. Adaptability and flexibility aren't words commonly associated with government bureaucracies,

COLLABORATING TO LEVERAGE EMERGING TECHNOLOGIES

but cultivating those qualities are the only way forward. Fortunately, the Warfare Centers – and the Naval Undersea Warfare Center, in particular – have roots in innovation that go back over a century.

We must continue to explore alternative approaches that would enable us to better seek and secure non-traditional skills. For example, a number of federal agencies, including the Navy and the Department of Homeland Security, are aggressively looking for new ways to recruit and compensate cybersecurity professionals outside of the traditional government pay systems. Some of the options being weighed, such as hiring skill sets rather than technical degrees, could certainly be useful in our efforts to harness the brightest minds in novel and constructive ways. Beyond the hiring hurdles, stimulating professional growth and providing relevant training opportunities for this optimal workforce will be critical to retaining them. Cross-disciplinary collaborative teams offer potential solutions to help accelerate employee learning, foster knowledge transfer, and meet product delivery timelines.

While a host of new technologies and complex forces have altered what it means for the Navy to provide maritime security, our fundamental responsibilities still remain: we must protect America from attack, further our strategic interests, assure our allies and partner nations, and make our adversaries think twice before threatening us or making reckless decisions. As we implement strategies designed to seize the potential offered by emerging technologies to give our Navy an asymmetric advantage, we recognize that we cannot do it alone. The Navy and industry will need an adaptable and highly skilled workforce that possesses the right training, experience, and agility to thwart our adversaries' attempts to exploit those same technologies and instead leverage them for our own advantage. The integration of our workforce and technology is going to be the key to our future force's success. The NAVSEA Warfare Centers are committed to working with industry and academia to ensure we have the right people in place to develop the systems, technical solutions, and tools that continue to give our warfighters an unmatched technological edge.

ANTX 2016 by the Numbers

400+ - Attendees over the three-day event

22 –Participating organizations

3 – Aerial drops of the Compact Rapid Attack Weapon (CRAW) shape in Narragansett Bay

14 - Support boats used

9 –Months of planning

For more information about ANTX 2016 or to learn more about next year's event, contact Tom Fulton at 401-832-6075 or via email at: thomas.fulton@navy.mil.



DIVISION CHAIR'S MESSAGE

PAUL NORMAND, CHAIRMAN
UNDERSEA WARFARE DIVISION



On behalf of the entire management team of National Defense Industrial Association Undersea Warfare Division, welcome to our Fall Conference. We have an outstanding team of speakers for our conference and that is due to the hard work and perseverance of Michael Cortese, our Fall Conference chairman. Thank you for your dedication to NDIA UWD and your efforts to make this conference as successful as possible.

Biennially, we develop a report that we provide to the Navy's Undersea Warfare leadership. The most recent report addresses topics that are of concern to this enterprise:

- Need to leverage industry to get solutions to the warfighter faster,
- Concern of the maturing of the USW professions and the need to reinvigorate our teams,
- The need for business case for IR&D investments,
- Enhanced government-industry engagements.

The Navy and NDIA are listening. Recently, members of the Undersea Warfare Division engaged the Navy to discuss these important topics. Everyone is committed to make our (Navy and industry) efforts a team effort and to leverage each other to maximize the investments in undersea warfare. NDIA corporate headquarters provided you the opportunity to bring our next generation undersea warfare leaders to the conference at a reduced registration fee. The inputs our executive team received from members helped us deliver an actionable report to the Navy.

On behalf of the Executive Board and the Advisory Council thank you for your continued support of the National Defense Industrial Association and the Undersea Warfare Division. We hope you enjoy the Fall Conference and look forward to seeing you at the Spring Conference in San Diego.

CONFERENCE CHAIR'S MESSAGE

MICHAEL CORTESE, CHAIRMAN
ROBERT DUNN, CO-CHAIRMAN
FALL CONFERENCE

This year's theme, "The Evolving Undersea Force (2030-2070)" focuses on the Navy's vision for sustaining undersea superiority in the future.

We have a terrific group of plenary speakers who comprise the full spectrum of undersea warfare expertise. This year's plenary session will begin with our keynote speaker ADM Caldwell, the Director, Naval Reactors. Following him will be the Commander, Submarine Forces; Commander, Naval Surface Force, U.S. Pacific Fleet; Chief of Naval Research; Program Executive Officer C4I; Executive Director, Naval Surface and Undersea Warfare Centers; Program Executive Officer Air ASW Programs; Chief of Staff, Patrol & Reconnaissance Group; Commander, Undersea Warfare Development Command; Commander, Naval Meteorology and Oceanography Command; Director, Unmanned Weapons Systems, N99; Program Executive Officer Submarines; and the Director, Undersea Warfare Division, N97.



Attendance provides you the opportunity to gain insights into the challenges our Navy faces across the 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.

SPRING 2016 NDIA UNDERSEA WARFARE AWARDS



DAVID MEDEIROS, CHAIRMAN
AWARDS COMMITTEE

At this year's Spring Conference, the Undersea Warfare Division (UWD) of the National Defense Industrial Association (NDIA) was pleased to present the Vice Admiral Charles E. Weakley Award to RADM (ret) Jerry Ellis of the Naval Post Graduate School, the Vice Admiral Charles B. Martell-David Bushnell Award to Mr. David Pistacchio of the Naval Undersea Warfare Center, Division Newport and the Captain George W. Ringenberg Award to Mr. Bruce Roulstone, Assistant Vice President, Operations of the NDIA. In addition, we had the special pleasure of presenting the Rear Admiral Jack Jarabak Award to LT James Ball at his new duty station on board USS GUNSTON HALL (LSD-44) in Norfolk, Va on May 27th. LT Ball was unable to attend the Spring Conference in San Diego.



RADM (RET) JERRY ELLIS
NAVAL POST GRADUATE SCHOOL, MONTEREY
CALIFORNIA

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

"JERRY" ELLIS, USN RET of the Naval Post Graduate School.

RADM (Ret) Ellis provided outstanding leadership and support to the entire undersea warfare government/ industry community while serving in various positions within the Department of Defense. His proactive leadership and his commitment to open communications between the Navy and industry has been reflected in all of these assigned roles resulting in many improved USW capabilities for our Navy.

His extensive leadership and contributions to the field of Undersea Warfare were highlighted during his 36 years of naval service where he served as Commander Submarine Force, U.S. Pacific Fleet. Following his retirement he entered the Senior Executive Service in June 2000, continuing on as the Director of the Deep Submergence Program and Director, Defense Liaison Division; Special Assistant for Undersea Strategy in the Office of the Secretary of the Navy; and Chair and Professor of Practice of Undersea Warfare and the Director of the Undersea Warfare Research Center at the Naval Postgraduate School.

Under his leadership, he insured that our submarine force was ready and capable in every aspect to conduct undersea warfare whenever called on to do so. As the CNO's principal advisor on Submarine Rescue, Deep Submergence Vehicles, and Deep Diving Operations; he insured that these programs were prepared to provide their critical support to undersea battlespace. While serving as the senior advisor to the Secretary of the Navy for policy relating to the Department of the Navy's Undersea Warfare Strategy, he did an in depth assessment of the status of the fleet and industry and made critical recommendations to the Secretary. While at the postgraduate school, he has continued the open discussion on undersea warfare by bringing in leaders from industry and the military to present current topics on

developments in this critical warfare area. He is also developing the future leaders and experts for the Navy's continued efforts in undersea warfare. RADM Ellis has consistently engaged the NDIA Undersea Warfare Division's Spring and Fall conferences and the selection of award NPS recipients and their participation at the conferences.

In recognition of his noteworthy contributions to advancing the field of Undersea Warfare and in promoting effective government/industry communications, the Undersea Warfare Division of the National Defense Industrial Association was pleased to present RADM Jerry Ellis with the VADM Charles E. Weakley Award.



MR. DAVID PISTACCHIO
NAVAL UNDERSEA WARFARE CENTER,
DIVISION NEWPORT

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

Pistacchio of the Naval Undersea Warfare Center, Division Newport in recognition of his numerous lifelong contributions to maintaining the U.S. Navy's superiority in undersea warfare.

As a consultant to OPNAV, NAVSEA, Fleet Commands, and the S&T community he has led the development and fielding of several new capabilities including a long range underwater acoustic modem. As a NAVSEA Technical Warrant Holder for Submarine Sonar Systems, he was often relied upon by the Fleet to provide independent advice regarding the suitability of degraded submarine sensors to provide intended capabilities. As a Science Advisor to the Submarine Pacific Fleet, he demonstrated several new technologies to the force during at-sea exercises, including an unmanned aerial vehicle and a non-traditional sensor system. Most recently, his expertise in the field of Anti-Submarine Warfare was being leveraged to demonstrate the unique abilities of large vertical arrays and non-traditional sensors to support long range target detection. He has also been a prolific contributor to technical sessions at many NDIA Undersea Warfare symposia. Currently, he is serving as the Deputy Technical Director for Technical Excellence at the Naval

SPRING 2016 NDIA UNDERSEA WARFARE AWARDS

continued from page 5

Undersea Warfare Center, Division Newport.

Mr. Pistacchio's outstanding contributions to his field have inspired many scientists and engineers at Division Newport. In many ways, Mr. Pistacchio's efforts have contributed to our Submarine Force's technical and tactical advantage over all adversaries.

Mr. Pistacchio has devoted his entire professional career to the continuous improvement of Navy undersea systems and the Undersea Warfare Division was honored to present this prestigious award to him.



MR. BRUCE ROULSTONE
ASSISTANT VICE PRESIDENT, OPERATIONS
NATIONAL DEFENSE INDUSTRIAL
ASSOCIATION

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

Division. This year's recipient of this prestigious award was Mr. Bruce Roulstone.

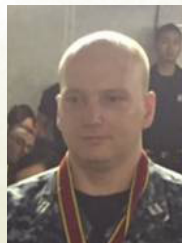
Mr. Bruce Roulstone, a 17-year veteran Assistant Vice President of Operations on the National Defense Industrial Association (NDIA) staff, contributed significantly to our national security and the Undersea Warfare Division as a leader and facilitator of high level technical engagement, dialog, and information exchange between industry and the Government across a myriad of undersea warfare programs and issues.

Across his career, Mr. Roulstone served NDIA within several standing, warfare-centric divisions including Combat Vehicles, Strike, Land Attack, Air Defense, Missile Defense, Bombs and Warheads, Homeland Security, Munitions, Tactical Wheeled Vehicles, and most significantly the Undersea Warfare Division.

A seasoned standout among the NDIA leadership, Mr. Roulstone is known for operational excellence and his warm, engaging leadership style. An exceptional mentor and leader to the junior directors and managers within the NDIA Operations Department and his many Divisions, Mr. Roulstone directed cohesive, highly-effective operational teams with superior morale and low personnel turnover.

Over his many years of service to the Division, Mr. Roulstone organized and directed over 68 conferences and Government-Industry meetings and roundtables, including the Division's long-standing and highly popular Submarine Clambake conference. The Undersea Warfare Division's conferences are among NDIA's most popular and well attended and provide unique and valuable interface and dialog among senior industry and government executives and Navy senior officers. Under Mr. Roulstone's leadership the Undersea Warfare Division developed into the strongest, most influential, and successful of the 37 divisions of the Association.

Mr. Roulstone's efforts significantly contributed to the continued success of both our spring and fall conferences which enable critically important government / industry interactions and the UWD was pleased to recognize his contributions with this award.



LT JAMES S. BALL, USN

The **Rear Admiral Jack Jarabak Award** is presented each year by the Undersea Warfare Division in conjunction with the Naval Post Graduate School's Undersea Warfare Executive Committee, to recognize a deserving student for his or her contribution in the field of USW as part of their study

requirements. This year the award was presented to LT James S. Ball, USN, for his personal commitment and academic achievements in the area of Undersea Warfare Technology. Lieutenant James Ball distinguished himself while attending the Naval Postgraduate School from March 2013 to March 2015 in the difficult and highly technical Undersea Warfare Curriculum, Physical Oceanography track. His thesis entitled "Double-Diffusive Convection in Rotational Shear," improves the analysis of microstructure signatures of stratified wakes generated by moving submersibles in the water. The thesis goes beyond typical high-level conceptual studies and utilizes parallel processing of complex, computationally intensive simulations to significantly reduce run time requirements from years to days. His exceptional efforts were published in the highly regarded Journal of Physical Oceanography in December 2015.

The UWD, in conjunction with the Naval Postgraduate School, took great pleasure in recognizing the important contributions of LT Ball, by presenting him this well-deserved award.



THE RADM JACK JARABAK AWARD WAS PRESENTED TO LT JAMES BALL BY NDIA UWD DIVISION'S DEPUTY CHAIRMAN, MIKE TUCKER, ONBOARD ON BOARD USS GUNSTON HALL (LSD-44) AT THEIR TOWN HALL MEETING. ABOUT HALF SHIP'S CREW OF 300 WERE IN ATTENDANCE.

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

Congratulations to the Awardees!



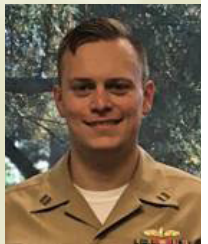
NDIA UWD 2016 ACADEMIC SPEAKER AWARD



DR. JAMES KISENWETHER, CHAIRMAN
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 formed by the Navy's University Affiliated Research Centers (UARC)s and the Naval Postgraduate School (NPS). NPS was the only school with a candidate in position to brief a relevant topic for the Fall Conference. We welcome nominees for the 2017 Spring Conference and hope for broader participation.

LT Josh Heaney from NPS will be discussing an information assurance technique and associated operational test results using: "Chart Check: In-House Development to Provide Data Assurance for Digital Navigation Charts". The Executive Board appreciates your efforts in welcoming LT Heaney.



After 6 years of chairing this committee, I am stepping down after the Fall Conference. The Executive Board is passing on the leadership to a colleague of mine at ARL Penn State, **Mr. Mark Rothgeb**. Mark is our laboratory leader in Undersea Systems Autonomy, works with many students in our Intelligent Systems Laboratory, and has a good understanding of the rigors of academic research. Please welcome Mark

UNDERSEA WARFARE AVIATION COMMITTEE

GLEN SHARPE, CHAIRMAN

CAPT DOUGLAS S. BLEVINS, USN (NAVAIR PMA-264), NAVY LIAISON



Welcome back to Groton and hope everyone has had a great summer. I'm sure looking forward to a great session that builds up existing relationships and forges new ones with subject matter experts from across the undersea warfare domain. First off I would like to thank Captain Matt Tobler for his outstanding service and commitment

to the Aviation Committee as the Navy Liaison and wish him and family fair winds. Captain Tobler has turned over command of NAVAIR PMA-264 to Captain Douglas S. Belvin who will assume the role as the Aviation Committee Navy Liaison. Please join me in welcoming Captain Belvin aboard! Aviation undersea warfare is much more than fixed and rotary wing platforms that drop sonobuoys or deploy dipping sonar although that is an important element. It's the community involvement and expanded vision to include unmanned aerial vehicles (UAV) that will address a wide variety of undersea warfare and maritime surveillance scenarios in a rapidly changing world that is most impressive. Advances in acoustic and non-acoustic sensors, weapons, signal processing, and training is making tremendous strides to keep up with the warfighting advancements of our adversaries. More specific accomplishments since we last met are provided below and released in the public domain.



Rear Adm. Dean Peters assumes command of Navy's Air Anti-Submarine Warfare, Assault and Special Missions Program Executive Office

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md.

—The former Commander, Naval Air Warfare Center Aircraft Division and Assistant Commander for Research and Engineering, Naval Air Systems Command, took the helm of the Program Executive Office for Air Anti-Submarine Warfare, Assault and Special Mission Programs (PEO(A)) March 31 at Naval Air Station Patuxent River, Md. With simply a handshake between them, Rear

Adm. Dean Peters became the tenth program executive officer for PEO(A), relieving Rear Adm. CJ Jaynes. PEO(A) manages approximately \$9 billion annually and oversees more than 30 type/model/series aircraft, which accounts for about 40 percent of the naval aviation aircraft inventory. Peters graduated from the U.S. Naval Academy in 1985, has earned post-graduate degrees in aeronautical engineering and telecommunications, and is a graduate of the U.S. Naval Test Pilot School, Class 102. He has more than 3,800 flight hours in both fixed and rotary wing aircraft. Jaynes, who took the helm at PEO(A) in July 2013, plans to retire.



P8-A

U.S. NAVY GAINS EXPERIENCE AS FIELDING OF P-8A POSEIDON EXPANDS

U.S. Navy crewmembers have given Boeing's P-8A Poseidon positive reviews as the 737-derivative maritime patrol aircraft starts to enter service more widely in the U.S., as well as internationally. The first P-8A delivery (of up to 15) to the Royal Australian Air Force is scheduled for November, when the country will join India on the growing list of international operators. The UK also plans to acquire nine examples of the type.

Ultimately, the U.S. Navy plans to acquire 117 jets. So far, six East Coast patrol squadrons have completed the transition from the venerable Lockheed P-3C Orion to the Poseidon after training by Patrol Squadron Thirty (VP-30), the Navy's fleet replacement training unit at Naval Air Station Jacksonville, Florida. VP-16, known as the "War Eagles," achieved safe-for-flight status to fly the P-8A in January 2013 and became the first operational squadron that December when it deployed with six Poseidons to Kadena Air Base, Japan, in support of the 7th Fleet.

The focus now shifts from the East Coast base to NAS Whidbey Island, located in Puget Sound off Washington state. VP-30 will oversee transition training there of six West Coast squadrons, beginning in October with VP-4, the "Skinny Dragons," the first of three Hawaii-based squadrons to relocate temporarily to Whidbey Island for transition to the P-8A.

Last month, Boeing (Chalet B6, OE G4) hosted media representatives at NAS Jacksonville, home to the original P-8A integrated training center. The “ITC” is a 165,000-square-foot facility that contains 30 classrooms, 10 CAE-built Level D full-motion simulators—called operational flight trainers—and seven weapon systems trainers.

The Navy’s third largest base, NAS Jacksonville also hosts a P-8 maintenance training facility with seven virtual maintenance trainers and command-and-control and training buildings for the Northrop Grumman MQ-4C Triton unmanned aircraft, which will eventually join the Poseidon on maritime patrols. These will be operated by Unmanned Patrol Squadron 19 (VUP-19), which was established in October 2013.

At the time of the media visit, there were about a dozen British RAF personnel training on the P-8A under the UK’s maritime surveillance skills-retention program, “Project Seedcorn,” and 38 Australians, the Navy said.

Navy personnel were enthusiastic when describing the P-8A, a Boeing 737-800 military derivative with reinforced 737-900 wings that costs an estimated \$180 million per copy. “Antisubmarine warfare is our bread-and-butter and our primary focus in training,” said Lt. Cmdr. Eric Andrews, a VP-30 training commander and former P-3 instructor pilot. “We can go a lot farther a lot faster and stay on station a lot longer than we can with the P-3.”

The P-8A operates from a ceiling of 41,000 feet down to 200 feet above the water’s surface. Leading a tour of the aircraft’s flight deck, Lt. John Falzetta, a 29-year-old instructor pilot, attested: “This aircraft performs equally well as the P-3 at low level.”

A standard nine-person Poseidon crew consists of three pilots, five mission system operators and one crewmember assigned to load sonobuoys. In the cabin, five mission crew stations with top and bottom screens line the port side of the fuselage; these are manned by electronic warfare and acoustic specialists.

Lt. Nikee Giampietro, a tactical coordinator or “TACCO” with VP-30, said the P-8 mission consoles provide moving map displays with own-ship position, whereas the P-3C display is a black screen that does not indicate the aircraft’s relative position.

With storage capacity for 129 sonobuoys—50 percent more than the P-3 can carry—and with three rotary- and one single-shot launcher in its aft section, the Poseidon offers more mission flexibility, Giampietro said. The performance of the pneumatic launchers has been good, although not without some bugs, she reported. “It really helps our training evolution when you’ve flown the plane—to be able to teach things,” she added.

There were, however, a few criticisms of the new aircraft.

With a stated range of 1,200 nautical miles and four hours on station, the P-8A can be refueled in flight, but without that capability the four-engine P-3C turboprop can stay in the air longer, at 13 to 14 hours. And “the visibility in the flight station” is better on the Orion, Andrews observed. “A couple more windows, especially aft of the wing, would have been nice,” added Cmdr. Andrew Miller, who leads the P-8A fleet-integration team.

Boeing was on contract to supply 80 P-8As to the U.S. Navy, and during the media tour it announced the delivery of the 40th Poseidon. The manufacturer has delivered another eight P-8Is to the Indian Navy.

In January, Boeing was awarded a \$2.5 billion contract modification from the Naval Air Systems Command to supply 20 Lot 3 full-rate production P-8s, including four for Australia.



MQ-4C Triton UAS demonstrates new capabilities during flight test

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md. – The Navy recently demonstrated two key capabilities for the Triton Unmanned Air System (UAS) program that will enhance future fleet operations.

During a flight test June 2, an MQ-4C Triton and P-8A Poseidon successfully exchanged full motion video for the first time inflight via a Common Data Link (CDL), marking another interoperability step for the program.

The test demonstrated Triton’s ability to track a target with its electro-optical/infrared camera to build situational awareness for a distant P-8 aircrew.

“In an operational environment, this would enable the P-8 aircrew to become familiar with a contact of interest and surrounding vessels well in advance of the aircraft’s arrival in station” said Cmdr. Daniel Papp, Triton integrated program team lead.

The MQ-4C Triton’s ability to perform persistent intelligence, surveillance and reconnaissance within a range of 2,000 nautical miles will allow the P-8A aircraft to focus on their core missions.

Last week also marked the completion of Triton’s first

UNDERSEA WARFARE AVIATION COMMITTEE

continued from page 9

heavy weight flight that will expand Triton's estimated time on station significantly. Triton operated in the 20,000 foot altitude band in the heavy weight configuration for the first time and completed all test objectives. A second heavy weight flight on June 14 had Triton operating in the 30,000 foot altitude band.

"The heavy weight envelope expansion work will enable Triton to realize its long dwell capability and become the unblinking eye for the fleet," Papp added.

Triton is designed to fly missions of up to 24 hours at altitudes over 10 miles high, allowing the system to monitor two million square miles of ocean and littoral areas at a time. Since its first flight in 2013, Triton has flown more than 455 flight hours. The Navy will continue testing Triton at Patuxent River to prepare for its first planned deployment in 2018.

PEO(U&W) Public Affairs (301) 757-9703



Part of new East Coast Undersea Warfare Training Range finished

Jacksonville, Fla. — A new Navy facility, part of a future undersea warfare training range that will provide realistic and challenging littoral training in a simulated environment for ships, submarines and aircraft, has finished construction on the East Coast.

The completion of the Cable Termination Facility (CTF) for the Navy's East Coast Undersea Warfare Training Range (USWTR) was commemorated with a ribbon cutting ceremony April 26 at Naval Station Mayport, Florida.

The CTF is designed to house the electronics and infrastructure needed to link shore processing equipment to the USWTR's future offshore undersea equipment, said Bruce Macomber, deputy program manager of the Ocean Systems Integrated Product Team in the Naval Aviation Training Systems program office (PMA-205).

"The CTF is the facility for system components and the



Barking Sands Underwater Range Expansion (BSURE)

information hub for raw acoustical data/communications from the offshore undersea range," he said. "It provides shelter and climate control for electronic systems, houses the power control and system health checks, as well as provides lightning protection for the range and building."

As a modular building, the CTF's concrete walls were formed off base, trucked in, lifted by two cranes and then ultimately assembled onsite. Inside, a 6-inch pipe, placed 100 feet underground and extending 4,000 feet seaward off the beach, holds undersea cables. Eventually, these cables will connect to multiple clusters of CTF equipment that will process the optical signals and data flowing from the USWTR's acoustic receptors located several miles offshore in shallow water.

Funded by PMA-205, Macomber said his team worked to streamline the USWTR's acquisition process and as a result, the range achieved Milestone C in September 2012, and is scheduled to reach full operational capability in 2023.

"This is a giant step forward for the USWTR program and the future for the Navy's premiere 'Center of Excellence' for littoral anti-submarine warfare training," Macomber said. "The PMA-205 USWTR team is a phenomenally successful group of civil servants and they should be very proud."

The USWTR is being designed and built by a team from PMA-205, the Naval Undersea Warfare Center (NUWC) in Newport, Rhode Island, and L-3 MariPro, along with several Navy specialty activities.

AIR-1.0 Public Affairs

(301) 757-6910

UNDERSEA WARFARE VEHICLES COMMITTEE

TOM RUZIC, CHAIRMAN
CHUCK FRALICK, DEPUTY CHAIRMAN
MICHAEL GRANT, NUWC, NAVY LIASON



The Big Three Challenges for UUVs

Despite the fact they've been under development for decades, Unmanned Underwater Vehicles, or UUVs, are still in their infancy for the U.S. Navy.

Unmanned vehicles are best known to us in the airborne realm. Many of these

are not "unmanned" at all – they are actually remotely piloted. Truly unmanned vehicles have no human in the loop. The vehicle is given a set of instructions, launched, and a human has no interaction with it until the mission is complete. The most common example of this at the retail level is the Roomba vacuum cleaner. To be sure, self-driving cars are coming onto the scene, self-driving tractors aren't far behind, and there is even work being done on developing autonomous cargo ships.

In order for a UUV to have military utility it must be stealthy, which rules out most forms of communications. Sticking up a mast for radio communications and acoustic communications give away the position of the vehicle, so the operational airborne model of "unmanned" vehicles in other environments will not work in the undersea domain.

Three of the large technical barriers that remain for the enterprising entrepreneur to address are: autonomy, stored energy and reliability.



Remus-6000

Autonomy

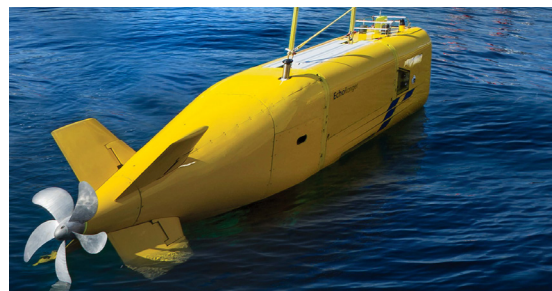
Navigating undersea is arguably the most difficult environment for any unmanned vehicle. Currents, variations in salinity and temperature, avoiding obstacles and other vehicles are just some of the challenges. Advances in computing processing, miniaturization, software and algorithms all contribute to ongoing improvements in this area. Fleets of airborne drones performing impressive light shows are just beginning to illustrate what is possible with software and netted sensors. One day, such advancements will enable undersea fleet operations in a swarm of pilotless vehicles to perform routine missions be they force protection, harbor surveillance or offensive mining.

Decision making algorithms to avoid a sea mount, fishing net, or mine like object is fundamental. Navigation, way points,

"The important thing to remember is that while there are many advancements being made in the undersea environment by the oil and gas and telecommunications industry, none of those are specifically unmanned, stealthy nor possess military utility."

sea keeping and target discrimination must be perfected. Just getting to a location is not enough. Completing a mission includes data gathering, launching a weapon, leaving a payload or sending real time intelligence to an information node. Self-scuttling, cyber security and tamper proof design is also critically important.

Many advances have been made in the area of autonomy, largely due to vehicles developed for other environments. However, this still remains one of the most compelling challenges for unmanned undersea vehicles.



Echo Ranger

Stored Energy

The energy demand for undersea vehicles is daunting. While SSNs have perfected the limitless power of nuclear energy, that's not an option for unmanned vehicles. Energy density for vehicles is easily the limiting factor for range and endurance. Battery technology, fuel cells, and even solar power have been the focus of intense development for more than a decade. Tremendous advances have been made, but much work remains to be done. Not only is improving the power density of the source a challenge, those gains cannot be offset by auxiliary and control systems or thermal management.

Safety is an important issue as the limits are pushed in stored energy. While the vehicle is unmanned, it still must be handled and stored. Dense energy storage requires appropriate safeguards that must be thoroughly tested. Consumer products with battery safety issues are all too common.

Reliability of stored energy systems take enormous amounts of

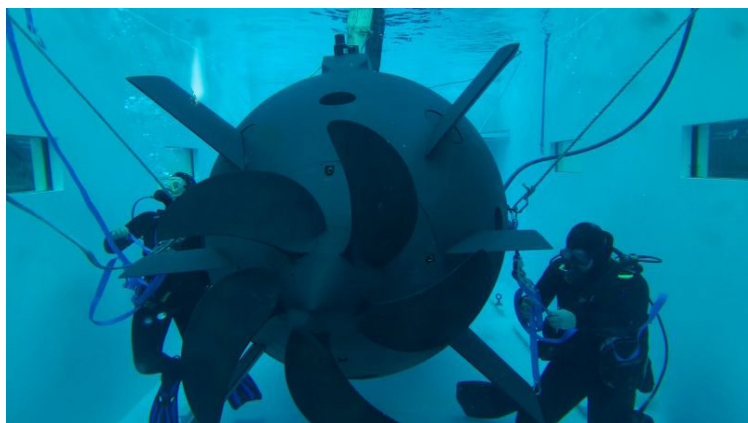


KnifeFish

testing to ensure they will continue to work when far away from human intervention. Flawless operation is rarely an attribute of a newly developed technology.

Any power system is only as good as the control system that governs it. Ramping power up and down, response time, and management of any by products has to be adequately accounted for. The vehicle's autonomy system will inevitably be tied in to power control, and reliable sensors are needed.

Recharging of the energy system is another possible design requirement. The Navy has initiated development of a Forward Deployed Energy and Communications Outpost and wireless power transfer for a vehicle proximate to a power station or a larger vehicle holds forth many possibilities.



Proetus

Reliability

One of the most overlooked but most important requirements of any UUV is overall system reliability. The fact that there will be no human aboard to do anything for any system plays into every design consideration. For the long endurance mission, no crewmember will be there to clean a filter, adjust a setting, or detect a hydraulic leak.

As such, systems and components must be able to operate the length of the deployment with no maintenance. The need to operate at times on the surface in varying sea states, and submerged at various pressures in a corrosive environment may play havoc with commercial off the shelf components that have been perfected in domains other than undersea.

Systems designed for robust performance with no maintenance or adjustment despite the potential for marine growth, temperature extremes, and corrosion present a unique set of

challenges.

Depending on the mission, many UUV applications may require the unit be recoverable, either for data exfiltration or reuse.

Designing a vehicle with anti-tamper attributes is another unique demand for military undersea vehicles. Because it may end up in enemy hands it is important that others be able to perform the minimum amount of reverse engineering. Most important is the cyber security of any data or software contained in the C4I systems on board.

So, what?

Many members of the NDIA Undersea Warfare Division are well aware of the challenges posed by unique environment and the military requirements of UUVs. Many of those same members are making strides to meet them. The important thing to remember is that while there are many advancements being made in the undersea environment by the oil and gas and telecommunications industry, none of those are specifically unmanned, stealthy nor possess military utility. The challenges highlighted here make the UUV problem particularly difficult to solve, which is why so many technically advanced companies and highly qualified individuals are working on it.



Mark 48 Torpedo

UNDERSEA MINE WARFARE COMMITTEE

ERIC HOLMES, CHAIRMAN
JON TOBIAS, DEPUTY CHAIRMAN



This year's conference theme, "The Evolving Undersea Force (2030-2070)", forces us to think beyond the Littoral Combat Ship for the future of US Naval Mine Warfare (MIW). Yet we are not where we need to be with the transition from our dedicated MIW force, as the LCS-based Mine Countermeasures (MCM) systems as a whole have not performed as expected

(see the Spring Conference newsletter). There will still be gaps in capability and capacity once the current developing MCM systems are fully implemented. For the MIW force of 2030, given an understanding of the development time frames required of sophisticated MIW systems, the pace of science and technology (S&T) investments, and the system development and prototyping necessary to support this future force, efforts need to start by the end of this decade. Programs at ONR, DARPA, and NSWC Panama City and technology developments in Industry and academia, will all feed the future systems.

Before we look at the future, I want to mention significant developments in US Naval Mine Warfare, including last year's reorganization of the Naval Mine and Anti-submarine Warfare Command (NMAWC) creating the Surface and Mine Warfighting Development Center (SMWDC), the creation of the Unmanned Systems Warfare Directorate (OPNAV N99), the cancellation of the Remote Minehunting System (RMS), the combining of the RMS program office (PMS 403) with the Unmanned Maritime Systems program office (PMS 406) and the Large Displacement Unmanned Underwater Vehicle (LDUUV) acquisition re-plan with the Naval Undersea Warfare Center (NUWC) designated as the lead systems integrator. LDUUV will directly support future MIW requirements from survey to MIW payload delivery. This reorganization and the emergence of unmanned vehicles, is a step towards the future MIW. Additionally mining has finally garnered the attention and support needed to start to bring back a vital capability for our Fleet commanders.

Today's developing systems, the Knifefish minehunting UUV and the Unmanned Influence Sweep Systems (UISS), have projected IOC's of 3Q FY18 and 4Q FY19 respectively. The Mine Hunting Unmanned Surface Vehicle (USV) (MHU) program is providing an interim USV based mine hunting capability using the AQS-24 towed sonar, with MHUs currently deployed in the CENTCOM AOR. PMS 406 will determine how to satisfy the requirements left unmet by the RMS program cancellation. And though the MIW program office (PMS 495) primarily manages the majority of existing legacy MIW systems, they are also looking at enhanced capabilities, particularly in the area of improved

mine neutralization, leveraging the ONR Single Sortie Detect to Engage (SS-DTE) Future Naval Capability (FNC). PMS 420 released the new program schedule path for replacing the RMS with a combination of USV and UUV by late FY19.

Mining took center stage at the Spring Conference in San Diego, as we had an excellent set of presentations to a large audience by the resource sponsor (LT Andrew Castrodale, N952), the technical director of NSWC-Panama City (Ed Stewart) and the ONR Science and Technology lead (Emily Medina). The resurgent mining efforts are based on Fleet pull, the desire to get more advanced mining capabilities than existing mine technology and to replace our aging inventory with more modern and capable systems. There are numerous funded efforts underway that support the near term requirements, as well as specific investments in support of this more comprehensive future vision.

A mix of unmanned and manned (MH-60S helicopters) systems, LCS-based, is intended to fulfill the US Navy MIW requirements, even before the MH-53E Sea Dragon helicopters and Avenger class MCM ships are retired. It is doubtful that these systems will be sufficient in numbers and capabilities to meet the needs in all maritime theatres. Different unmanned systems, other than those that we are currently developing for MIW, will likely be needed.

This is where OPNAV N99 comes into play, with their charter for rapid prototyping of unmanned systems. Clearly future MIW will consist of a heavy reliance on unmanned systems, USVs, UUVs and even Unmanned Air Vehicles (UAVs). Larger vehicles than those that are LCS-based, extended range and endurance, autonomy and COLREGS (International Regulations for Preventing Collisions at Sea), communications and reliability are capabilities that will be needed. Rapid prototyping and the associated demonstration and test should lead to developing future CONOPS and the maturation of unmanned vehicle requirements and designs. But this addresses primarily the platforms. We will need technology developments in better sensors and algorithms, fire and forget neutralizers, and detection through identification and neutralization from a single platform in a single pass. N99, cooperatively with N95, could be leading the way towards the "Evolving MIW Force; 2030-2070".

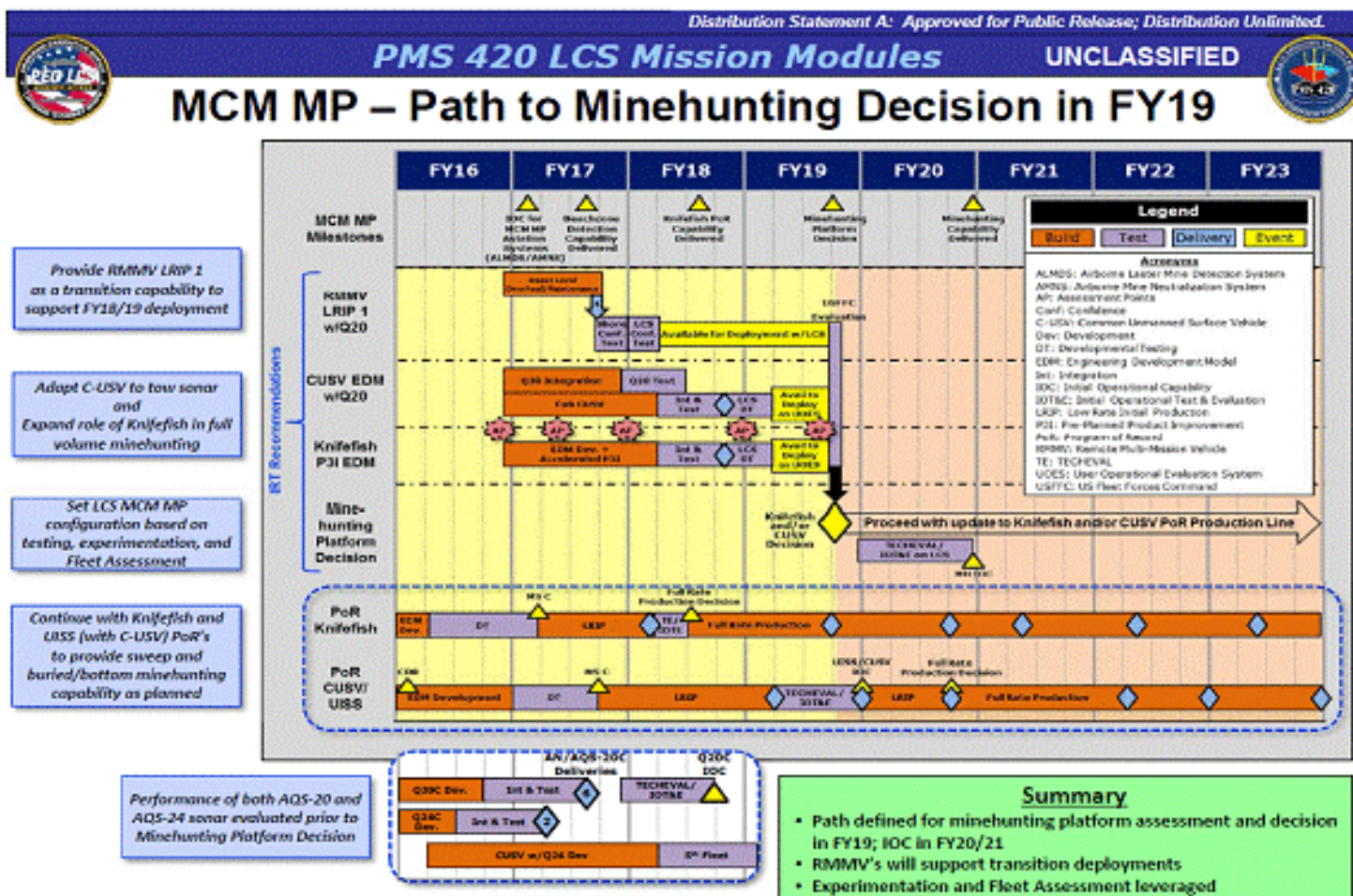
Two recent developments, the ASW Continuous Trail Unmanned Vessel (ACTUV) and the Extra Large UUV (XLUUV) Echo Voyager, do not fit into the traditional unmanned maritime vehicle paradigm as they do not require a capital ship to deploy, recover and service. The ACTUV could be a forerunner of the Medium Displacement USV (MDUSV), a long endurance semi-autonomous surface vessel with significant capability for hunting, sweeping, and neutralization. An XLUUV could perform mine hunting, Intelligence Preparation of the

UNDERSEA MINE WARFARE COMMITTEE

continued from page 13

Operational Environment (IPOE), mine delivery, or small UUV (e.g. MK 18) deployment and recovery.

In closing, there are some personal thoughts to convey to all who are interested in and have been active in the MIW committee sessions. First, I would like to thank Terry Miller for his support from the Undersea Warfare Division Advisory Council, as his extensive MIW background has been very helpful. Unfortunately, Barry Bakos had to step down as the MIW Committee Deputy Chair just prior to the Spring Conference. He deserves a big thank you for everything he has done over his years of service to this committee. Though predominantly staying in the background, I could not have functioned in running the committee without Barry's help. I wish Barry the best in his efforts post-NDIA MIW. Jon Tobias has stepped in to be the MIW Deputy Chair and you will be seeing more of Jon starting with the Clambake (though he already stepped in admirably in San Diego).



UNCLASSIFIED

UNDERSEA WARFARE SENSORS COMMITTEE

MICHAEL JANIK, CHAIRMAN

JOSEPH CUSCHIERI, DEPUTY CHAIRMAN

PETER SCALA (PEO IWS 5A), NAVY LIAISON



The Sensors Committee spring session addresses sensor needs for submarines and surface ships as well as sensors on fixed surveillance systems, distributed netted sensors and unmanned vehicles. This year's theme "The Evolving Undersea Force (2030-2070)" emphasizes the need for new sensors and signal processing that is derived from our current capability. These sensors

and signal processing will be necessary to maintain tactical and strategic awareness in the evolving maritime undersea battle space. During this session we will receive a brief from our Navy liaison Mr. Pete Scala, Director of IWS5A Advanced Development. Mr. Scala will discuss the AxB process, APB-15 sensor algorithms and new conformal submarine arrays. Mr. Bill Traganza of PMS485 Maritime Surveillance Systems, will address the Integrated Undersea Surveillance Systems (IUSS) sustainment and modernization needs required to meet emerging threats and achieve the desired undersea dominance vision in this new era. In addition, Mr. John Curtis will discuss the PMS485 roadmap for Deployable Systems Technology. Sensor material technology advances by texturing lead magnesium niobate-lead titanate system (PMN-PT) will be discussed by Dr. Rich Meyer of the Applied Research Laboratory/Penn State. Mr. Jason Osborn of BAE will discuss



"This year's theme "The Evolving Undersea Force (2030-2070)" emphasizes the need for new sensors and signal processing that is derived from our current capability."



textured material evaluation of using set of flextensional acoustic projectors built with PMN-PT and conventional ceramic drivers.

These presentations are just a sample of the exciting session we have planned. NDIA is a team effort. Forums such as the USW Division of NDIA bring together intellectual resources, i.e. the Uniformed Services, Navy Labs, Academia, and Industry. We all work together to share information, collaborate, and coordinate our investment resources so that we can provide the best systems to the warfighter. The presenters are key to the information transfer and I want to thank them for their effort. I want to thank Joe Cuschieri, the Deputy Chairman, for helping organize the agenda. I also want to thank Tiffany Wilson for providing very significant support. Putting USW Sensors Session together would be impossible without her. Finally, I'd like to express our sincere appreciation to Pete Scala from the IWS 5 PEO who is the Navy Liaison for our USW Sensors committee. Pete has a wealth of pertinent experience and is a strong asset to the team.

UNDERSEA COMMAND, CONTROL, COMMUNICATIONS AND COMBAT SYSTEMS COMMITTEE

PAUL ROSBOLT, CHAIRMAN

DR. BOB ZARNICH, DEPUTY CHAIRMAN

JOHN LINDERMAN, WARFIGHTER PERFORMANCE SESSION CHAIR

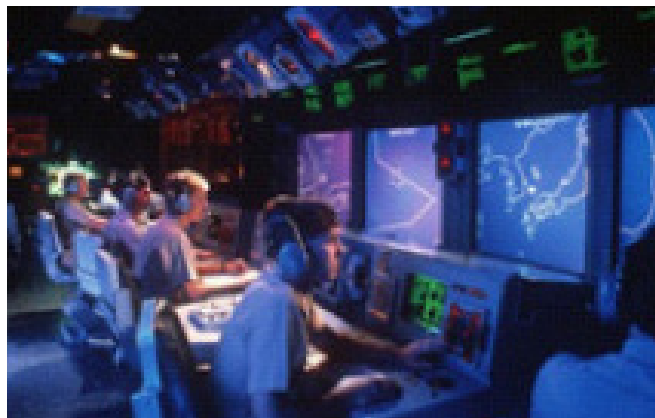
CAPT DOUG ADAMS, USN (PEO IWS 5), NAVY LIAISON



Greetings, All! I'm looking forward to a great conference in New London! Any excuse to get out of this Washington heat is a good one. We have two great technical sessions lined up for Wednesday 21 September. In C4I, we have a series of presentations on theater/area ASW and the networks required to support it. In a combined Combat Systems and Warfighter Performance

session, we will hear from the IWS5 on their plans for the SQQ-89 USW combat system, and from PMS 425 on their plans for the submarine BYG-1 combat system.

I'd like to give you some perspective on two topics that you will hear about during the conference. The first is Theater ASW. For those of you not up on the operational difference, Theater ASW (TASW) is concerned with finding, tracking, and if necessary engaging adversary submarines (and potentially UUV's!) in those ocean areas not within the local area of a strike group. TASW is done under the control of a fleet ASW Commander (CTF's 34, 54, 74, 84) and uses a variety of sensors---submarine, surface ship, P-3/P-8 and IUSS—to search out broad ocean areas. With the increase in the world-wide submarine population, a great deal of effort has been placed in upgrading our sensor capabilities. That work is ongoing, and much of the sensor session is devoted to giving you a better appreciation of it. Recently there has been recognition that effective TASW is dependent not only on sensors, but on the networks required to get the data back to the commander, and on the tools required by the commander to be effective. You will hear about both these during the C4I session. PMW770, under CAPT Ed Anderson, is taking the lead on undersea networks, and has series of briefs based on what is in place and what is planned. IWS5, under CAPT



Doug Adams, is co-chairing a TASW IPT with CTF-34. The IPT's charter is to assess the needs of the TASW Commander and his/her watch team across the entire DOTMLPF (Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities) spectrum and make recommendations for improvements. In the C4I session, we have briefs on both the overall IPT process, and on USW-DSS, which will be a key component of the TASW Commanders command and control toolkit.

The second topic is Distributed Lethality. This is a concept that has been developed by VADM Tom Rowden, Commander Naval Surface Forces, who you will hear in the plenary. It is the Surface Force's response to the need to reinvigorate our sea control capability/capacity. Sea Control (as opposed to sea denial) is the ability to use the sea for our purposes, when needed and where needed. This is not just a wartime requirement---much of the world's economy is dependent on the free movement of goods across the ocean. During the Cold War, our ability to do sea control was contested by the Soviet Union. Our forces reflected that challenge—all of our surface combatants were equipped with long range surface to surface missiles and practiced the surveillance and targeting required for their use. Surface, IUSS, and submarine ASW systems were highly effective. Carrier Air Wings included long range ASW/SUW aircraft. After the Cold War, our use of the sea was uncontested. Navy strategy and investment focused on the ability to deliver ordnance ashore, in support of the joint force. With the rise of potential naval adversaries, the Navy must refocus on those systems and tactics required to assure our control of the sea. The Distributed Lethality concept rests on three pillars---enhancement of offensive systems so every platform is a threat to the adversary, enhancement of defensive systems so that platforms can stand and fight, and distribution of those forces geographically, so that a potential adversary has to account for the every US Navy platform, vice concentrating on our carrier and amphibious strike groups. The Surface Navy is moving rapidly to realize this concept. Bottom line: If it floats, it fights!



UNDERSEA WARFARE ACQUISITION STAKEHOLDERS

Office	USW Equity	Contact Number
ASN RD&A	Navy Acquisition Executive	703-695-6315
ASN RD&A	Principal Military Deputy	703-692-0028
ASN RD&A	Principal Civilian Deputy	703-695-6315
DASN Ships	Ship Programs	703-697-1710
DASN Unmanned Systems	Unmanned Systems	703-695-6315
DASN Air	Air Programs	703-617-7794
DASN RDT&E	R&D Programs	571-256-4972
PEO IWS	Integrated Warfare Systems	202-781-2964
IWS 5	Undersea Systems	202-781-4159
PEO LCS	Littoral Combat Ship	202-781-3900
PMS 420	Mission Modules	202-781-2303
PMS 515	Frigate Program	202-756-7570
PMS 406	Unmanned Systems	202-781-1393 / 4103
PMS 495	Mine Warfare	202-781-1842
PEO SUB	Submarines	202-781-4003
PMS 394	Advanced Undersea Programs	202-781-7456
PMS 397	OHIO Replacement	202-781-1294
PMS 401	Acoustic Systems	202-781-1556
PMS 404	Undersea Weapons	202-781-0474
PMS 415	Defensive Systems	202-781-3733
PMS 425	Combat Systems	202-781-2695
PMS 435	Sensor Systems	202-781-5086
PMS 450	VA Class	202-781-2582
PMS 485	Maritime Surveillance Systems	619-537-0513

Office	USW Equity	Contact Number
USSOCOM	Special Operations	813-826-6994
USSOCOM AE	Acquisition Executive	813-826-9402
PEO Maritime Systems	Undersea Warfare and Sea Based Systems	813-826 9500
PMS 340	SDV and SWCS acquisition	540-653-5867
PMS 391	Submarine Rescue	202-781-3148
PMS 399	Undersea SOF Mobility	202-781-3684
PM Undersea Systems	DCS, S351, and Button 5.60 acquisition	813-826-4758
NAVSPECWARCOM	Requirements/Resources	619-437-3937
Naval Special Warfare Group THREE	SOF Undersea Warfare	619-437-3937
NAVSEA	Sea Systems	202-781-0100
SEA 05	Engineering	202-781-1710
SEA 07	Undersea Warfare	202-781-4451
Naval Undersea Warfare Center - HQ	USW Research & Engineering	202-781-2314
Naval Undersea Warfare Center - Newport	USW Research & Engineering	401-832-8398
Naval Undersea Warfare Center - Keyport	USW Research & Engineering	360-396-2340
NAVAIR	Air Systems	301-757-7825
PEO A	Air ASW	301-757-5376
PMA 205	Training Systems	301-757-6944
PMA 264	ASW Systems	301-757-5747
PMA 290	Patrol and Reconnaissance	301-757-5703
PMA 299	Helicopter Programs	301-757-5409
SPAWAR	Space and Naval Warfare	619-524-7000
PMW 770	Undersea Integration	619-524-7906
SMWDC	Surface Warfighting Effectiveness	619-556-3042 / 3069

Office	USW Equity	Contact Number
UWDC	USW Development Center	860-694-5529
DEVRON FIVE	UUV Lead	360-315-4447
SUBFOR	Naval Submarine Forces	757-836-1317
SURFFOR	Naval Surface Forces	619-437-2942
AIRFOR	Naval Air Forces	757-341-7002
NECC	Expeditionary Combat Command	757-462-4316
SSP	Strategic Systems	202-433-7812
CPRG	Patrol Squadron Training & Readiness	757-836-6500
OPNAV N9	DCNO Warfare Systems	703-695-9811
OPNAV N95	Expeditionary Warfare Resourcing	703-692-1536
OPNAV N96	Surface Warfare Resourcing	703-697-6437
OPNAV N97	Undersea Warfare Resourcing	703-693-4253
OPNAV N98	Air Warfare Resourcing	703-695-9682
OPNAV N99	Unmanned Programs	571-256-8587
OPNAV N9I	Program Integration	703-614-9648
OPNAV N2/N6	Undersea ISR Capability	703-614-0283
C3FLT	Fleet Requirements	619-767-4907
C4FLT	Fleet Requirements	904-270-4779
C5FLT	Fleet Requirements	+973-1785-6030
C6FLT	Fleet Requirements	+39-081-568-5547
C7FLT	Fleet Requirements	+080-2184-5182
PACFLT	Fleet Requirements	808-471-9727
CFFC/LANTFLT	Fleet Requirements	757-836-5807

NDIA

National Defense Industrial Association

NDIA HEADQUARTERS

Director, Meeting & Event Operations

Tammy Kicker

tkicker@ndia.org

Tel: 703.247.9494

Meeting Planner

Tiffany Wilson (twilson@ndia.org) 703.247.9467

Please notify Tiffany of address changes.

NDIA UWD NEWSLETTER

Published periodically to communicate activities and plans. For inputs or suggestions, contact:

Ms. Laurie Carter, Editor

Rite Solutions, Inc.

lcarter@rite-solutions.com

Tel: 703.517.9904