ANTX

ADVANCED NAVAL TECHNOLOGY EXERCISE

Participants & Technologies

SENEDIA
The SoutheasternNew England Defense Industry Alliance

NAVSEA
WARFARE CENTERS
NEWPORT

DISCOVER DEVELOP
NR&DE
NAVAL RESEARCH AND DEVELOPMENT ESTABLISHMENT
TRANSITION

COMMANDER TASK GROUP 80.7

HMI18

Human Machine Interaction

18-NUWC-GRA/0339

Table of Contents

Newport Participants

CNMOC Participants

Welcome Letter

Welcome to the 2018 Advanced Naval Technology Exercise (ANTX) at the Naval Undersea Warfare Center Division Newport! The theme this year is Human Machine Interaction, or HMI 18 for short. We're identifying science and technologies that enable or achieve coordinated detection, localization, tracking, and/or targeting for undersea, surface, and air environments. With this focus in mind, we are exploring the ways in which these technologies enable human trust in machines, to support operational decision making.

ANTX HMI 18 is the largest exercise we've hosted so far in terms of the number of participants, vehicles, and technologies. We are excited for you to see what our participants are exercising as a glimpse of the technology of tomorrow.

The site of ANTX HMI 18 is our Narragansett Bay Test Facility, a unique Navy research laboratory for testing underwater, surface, and aerial technologies that supports the rapid prototyping of Fleet systems.

This event brings together our partners from government, industry and academia as well as Fleet personnel who will be providing critical feedback to our participants.

Our broader goals for ANTX are:

- Collaboration. Many of the projects you'll see are the result of collaboration at previous ANTX events, creating synergies and building upon one another.
- Innovation. We are charged with getting technology to the Fleet faster. A venue like ANTX allows us to speed the evolution of technologies.
- Fleet Feedback. ANTX affords our government, industry and academia teams an excellent opportunity to engage Fleet operators in the research and development cycle, particularly with unmanned systems.

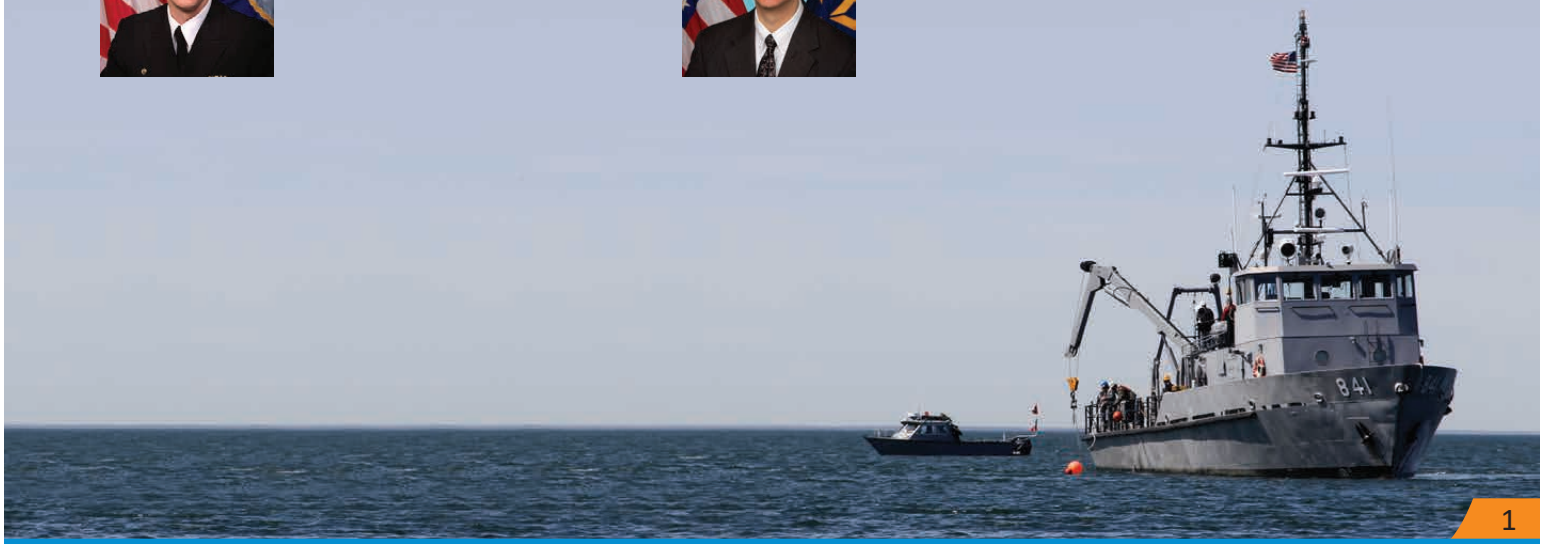
For ANTX HMI 18, NUWC Division Newport partnered with the Commander, Naval Meteorology and Oceanography Command (CNMOC), as they conducted exercises in their Gulf of Mexico operational area earlier this Summer. They will continue with an exercise at the Narragansett Bay Test Facility this week. To find out more about their exercises and their Command, make sure to visit them in the Mega Tent.

We have also collaborated with the Southeastern New England Defense Industry Alliance and combined ANTX with their Defense Innovation Days, to broaden our audience and leverage our shared interests.

NUWC Division Newport's work culture embraces High Velocity Learning (HVL) concepts. HVL drives us to See and Swarm problems, Share the Solutions throughout the enterprise, and Sustain the solutions and processes. ANTX events support our HVL culture as our participants See opportunities to enhance Fleet support. The collaborative Swarm at ANTX adds value to these technologies. Through the ANTX attendees and post-event communications, we are Sharing those solutions. Our hope is for participants to Sustain their dedication to improving Fleet technologies, achieving our shared vision of Undersea Superiority - Today and Tomorrow!

CAPT Michael R. Coughlin
Commanding Officer

Ronald A. Vien
Technical Director



Schedule

THURSDAY August 30, 2018

In-Water Exercises - Distribution D

0800-1130	Z-senz LLC NUWC Undersea Warfare Combat Systems Sparton Deleon Springs LLC ThayerMahan Inc. General Dynamics Mission Systems Advanced Acoustic Concepts Aviation Systems Engineering Company

Distribution A/Media

1300-1700	Riptide Autonomous Solutions Northrop Grumman Teledyne Marine NUWC Energy & Propulsion Branch/ QinetiQ North America
1400	Guest Speakers

FRIDAY August 31, 2018

In-Water Exercises - Distribution D

0800-1130	Teledyne Energy University of Rhode Island Aquabotix Technology Corporation SeaTrac Systems, Inc. Teledyne Brown Engineering
1130-1430	Hydroid, Inc. Naval Oceanography Special Warfare Center
1500-1600	ANTX Closing Ceremony

Senator Whitehouse learns about fuel cell technology at ANTX 2017.

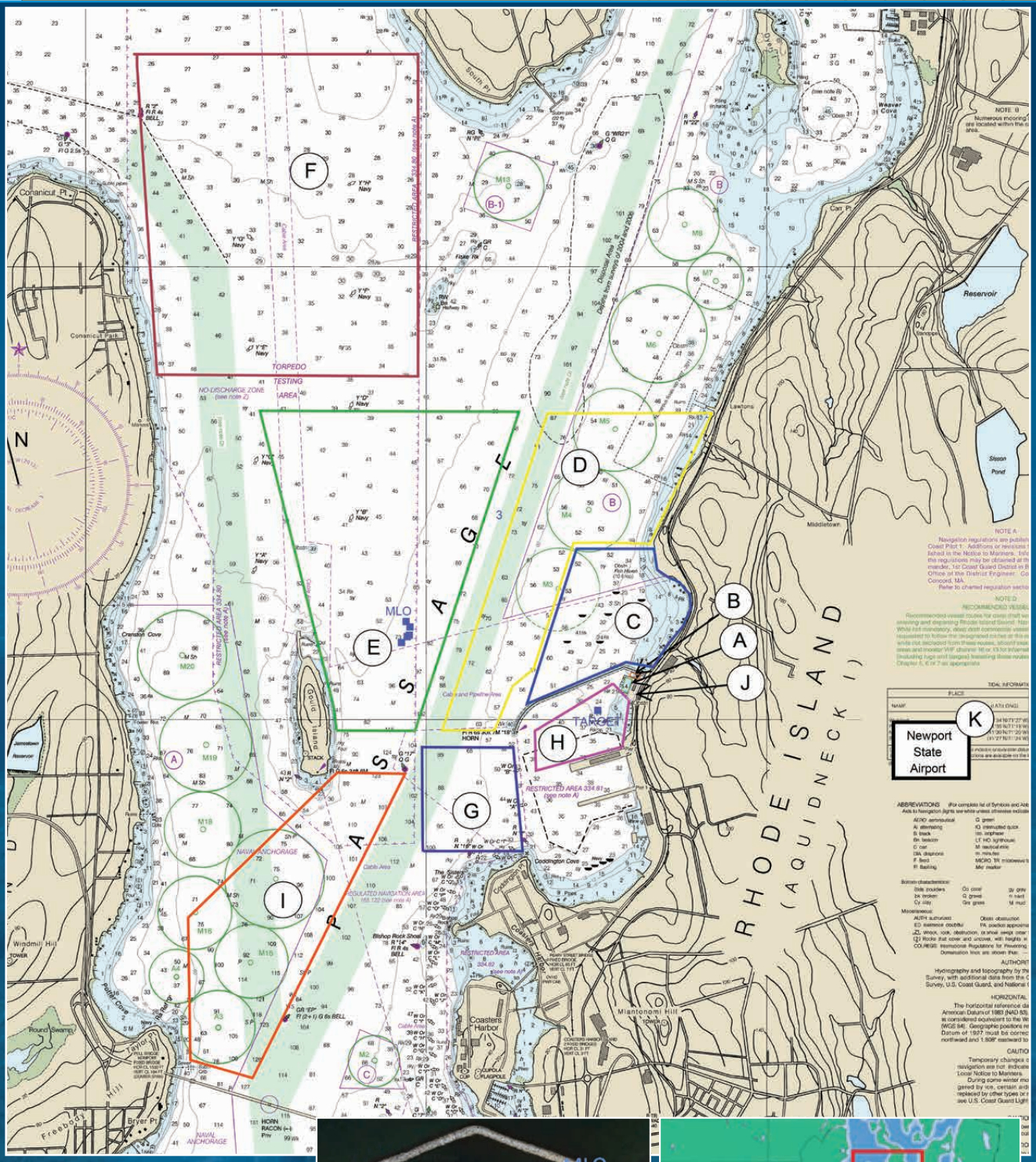
Unmanned autonomous vehicle exercises at ANTX 2017.

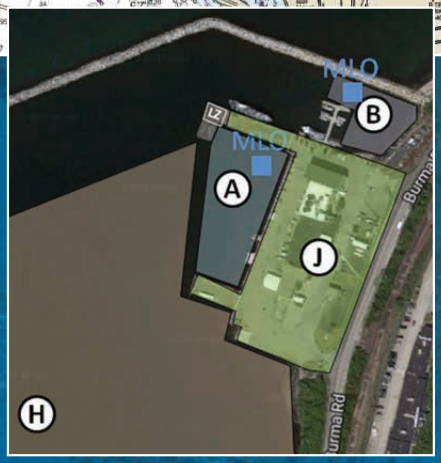
Pier Layout

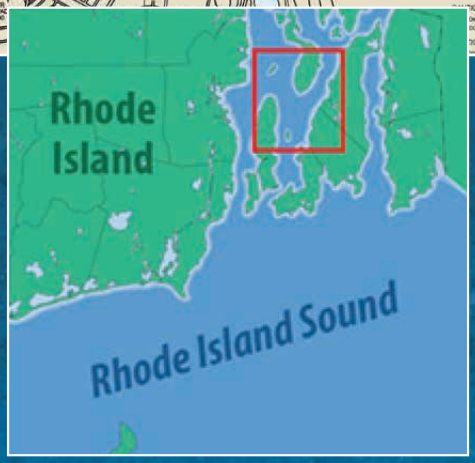
Displays

1. ANTX 2018 Command Center
2. NUWCDIVNPT Information Assurance
3. NUWCDIVNPT Networking
4. NUWCDIVNPT Range Operations
5. Leidos
6. Huntington Ingalls Industries
7. Teledyne Marine
8. Aquabotix Technology Corp.
9. Advanced Acoustic Concepts
10. Restrooms
11. SeaTrac Systems Inc.
12. Northrop Grumman
13. Lockheed Martin RMS - USS
14. Sparton DeLeon Springs LLC
15. NUWCDIVNPT, Code 25
16. Z-senz LLC
17. Collaboration Technologies, Inc.
18. Aviation Systems Engineering Co.
19. UAS Pad
20. General Dynamics Mission Systems
21. University of Rhode Island
22. NUWCDIVNPT Code 85/ QinetiQ
23. Riptide Autonomous Solutions
24. Teledyne Brown Engineering
25. Teledyne Energy
26. ThayerMahan, Inc.
27. Hydroid, Inc.
28. CNMOC
29. NUWCDIVNPT Code 40
30. NUWCDIVNPT Code 34
31. NUWCDIVNPT Code 70
32. ANTX 2018 Help Tent
33. Food Tent
34. General Dynamics Electric Boat
35. First Aid
36. NUWCDIVNPT Code 15
37. Department of Energy
38. STEM
39. NSWC Carderock
40. NUWCDIVNPT Code 1023

Operational Area







ANTX BY THE NUMBERS

2
MARITIME SWARMS

30
TECHNOLOGY EXERCISES

55
INDUSTRY, ACADEMIA, & GOVERNMENT PARTICIPANTS

1
FOCUS "HUMAN MACHINE INTERACTION"

29
RETURNING ANTX PARTICIPANTS

17
UNMANNED UNDERSEA VEHICLES

17
SENSORS

3
DAYS

6
UNMANNED SURFACE VEHICLES

3
UNMANNED AERIAL SYSTEMS

4
ARTIFICIAL INTELLIGENCE SYSTEMS

3
LASER SYSTEMS

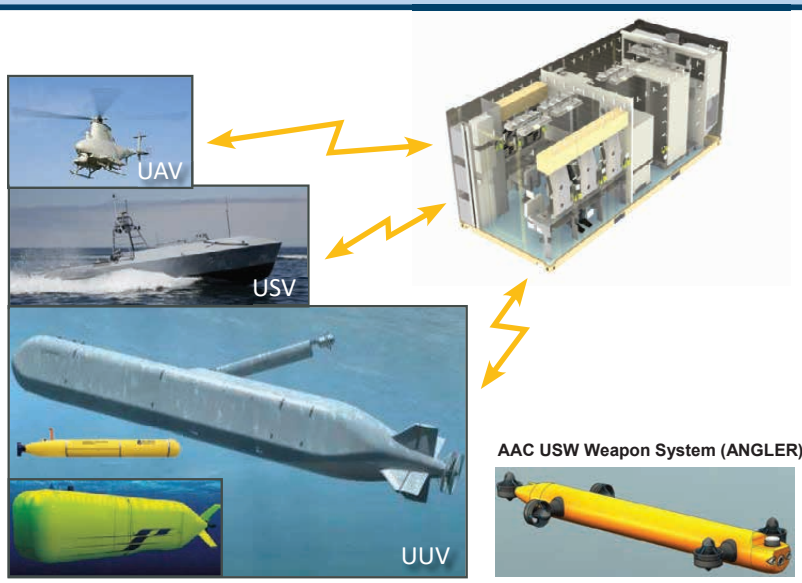
HMI 18
ANTX
ADVANCED NAVAL TECHNOLOGY EXERCISE
2018
HUMAN MACHINE INTERACTION

Common C3 for Unmanned Systems

Demonstration Lead:
Advanced Acoustic Concepts (AAC)

Deployable scalable Common Command, Control, and Communications (C3) of unmanned (air/surface/ subsurface) vehicles (UxV) from Vessels of Opportunity (VoO) and Forward Operating Bases (FOB) maximizes opportunities for plug and play composable battlespace management to reduce risks and timelines. AAC continues a tradition of Rapid Capability Insertion (RCI) leadership with this Mobile C3 (Mc3) solution, currently fielded as the operational LCS Mission Package Mobile Control Station (MPMCS). Mc3 offers the latest technology in a seamlessly integrated, open architecture, commercial off-the-shelf (COTS) system providing flexible support of any UxV control interface. Mc3 integrates tailored communications suite to support multiple UxV operations.

During the demonstration, Mc3 monitors and periodically controls a remotely operated AAC USW Weapon System (ANGLER) prototype to approach and engage a simulated undersea target.



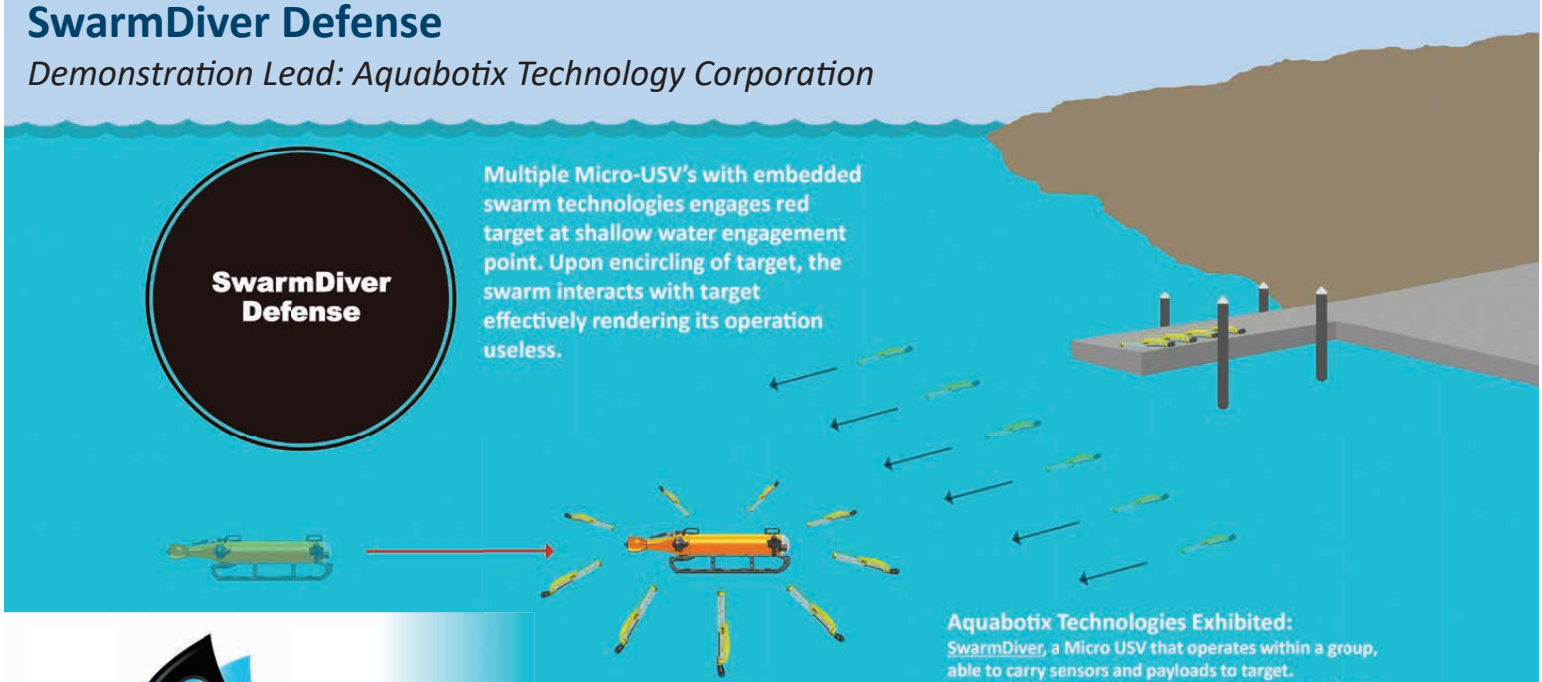
AAC USW Weapon System (ANGLER)

ADVANCED ACOUSTIC CONCEPTS
A DBS/THALES COMPANY

For more information, contact J. Ryan Parker, 202-349-3325, rparker@aaccorp.com

SwarmDiver Defense

Demonstration Lead: Aquabotix Technology Corporation



AQUABOTIX
Innovation for the Underwater World

Aquabotix Technologies Exhibited:
SwarmDiver, a Micro USV that operates within a group, able to carry sensors and payloads to target.
Integra, One-man deployable hybrid AUV/ROV, a force multiplier with many payload and sensor packages available.

For more information, contact Daniel Vandewiele, 508-676-1000, daniel.vandewiele@aquabotix.com

Lockblade Airborne Release

Demonstration Lead: Aviation Systems Engineering Company (ASEC)

ASEC will deploy a Sonoquad from a fixed wing aircraft, which will descend, automatically unfold and proceed to GPS waypoints to provide ISR to both the launch aircraft and/or surface users.

The ASEC Sonoquad provides a very low-cost, simple solution for remote high-fidelity sensor information from sanctuary altitudes. It is enabled by recent advances in commercial unmanned aerial system and allows inflight unfolding and flight stabilization after release from a standard A-size sonochute. The payloads are swappable and the Sonoquad is truly expendable.

ASEC
Aviation Systems Engineering Company

For more information, contact Bryan Barthelme, 301-862-1732 ext. 229, bryan.barthelme@asec-aero, www.asec-incorporated.com

Parametric Collaboration™ Technology

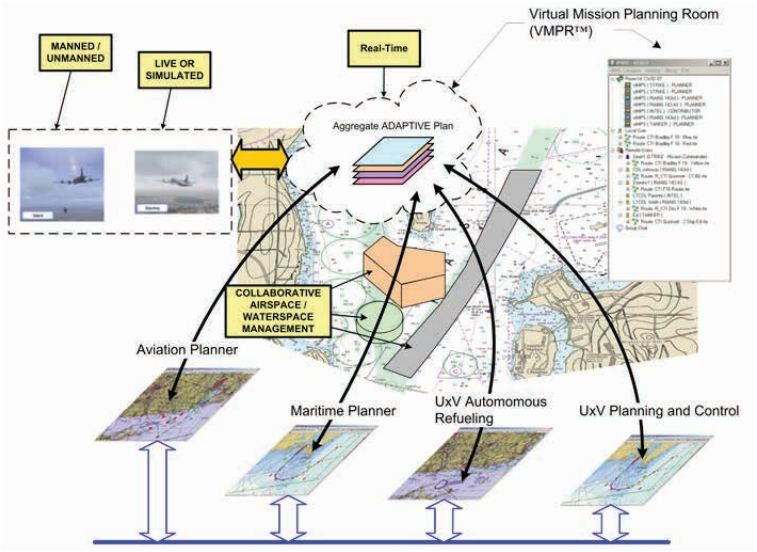
Demonstration Lead: Collaboration Technologies, Inc. (CTI)

At ANTX 2018, Collaboration Technologies, Inc. will demonstrate the application of its Parametric Collaboration™ technology to provide real-time interoperability for collaborative and adaptive mission planning using government and commercial off-the-shelf mission planning systems and simulators.

CTI designs, develops, and delivers custom Parametric Collaboration™ Frameworks to interconnect new and existing software systems to create human-machine optimized environments for group collaboration.

The resulting collaborative environments enable high-performance teaming of manned, semi-autonomous, and human-supervised platforms in a low-bandwidth network footprint.

“We Provide The Synergy” ™



ctl
collaboration technologies incorporated

For more information, contact Josh Trainer, 401-234-1145, jtrainer@collaborationtech.net

Build Authority Technology Mobile

Demonstration Lead: General Dynamics Electric Boat

Genera Dynamics Electric Boat (GDEB) is revolutionizing how submarines are designed, built, and maintained. By instituting innovative technology and new processes throughout the company, EB will transition from a paper based to model based environment. Shipyard employees will experience a culture shift as 3D models will be used in place of 2D drawings to build and validate components. A change of this magnitude requires significant socialization and training.

The Build Authority Technology (BAT) mobile is a mobile classroom equipped with the new tools and technology the trades will use to build the ship. We perform live demonstrations to create an interactive learning experience and engage users directly with the new tools. Feedback is gathered to continually refine the user interface or technology itself.

Quite literally, the BAT Mobile is GDEB's vehicle of change used to raise awareness and engage employees with the new tools revolutionizing the industry.

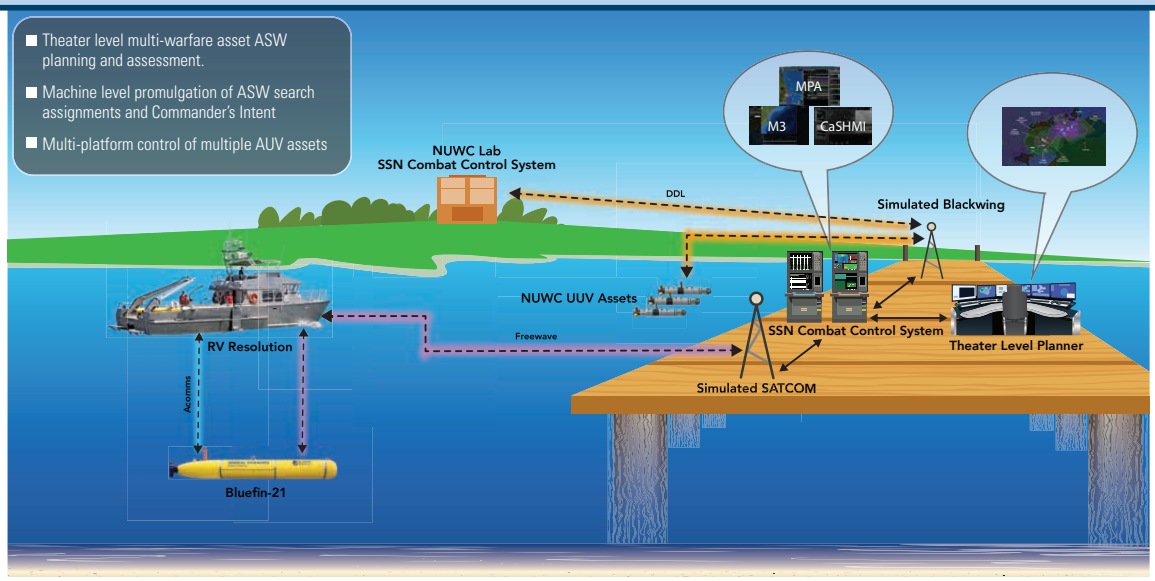
GENERAL DYNAMICS
Electric Boat

Integrated Product Development Environment

For more information, contact Karen Albert, 860-867-1896, kalbert@gdeb.com

Cross Domain C3 for Manned/Unmanned Systems Intelligent Collaboration

Demonstration Lead: General Dynamics Mission Systems



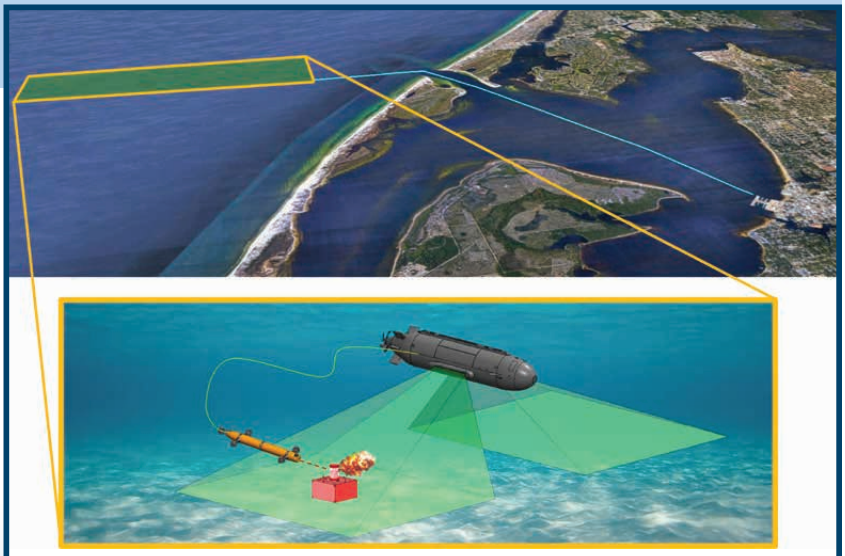
GENERAL DYNAMICS
Mission Systems

BLUEFIN ROBOTICS

For more information, contact Omer Poroy, 617-715-7019, Omer.Poroy@gd-ms.com

Seabed Warfare in Denied Waters

Demonstration Lead:
Huntington Ingalls Industries



A large-sized autonomous underwater vehicle (AUV) integrated with Synthetic Aperture Sonar and a weaponized unmanned underwater vehicle (UUV) clandestinely infiltrates a contested environment to perform a subsea survey and prosecute red infrastructure. Huntington Ingalls Industries, Advanced Acoustic Concepts, and Battelle will demonstrate a single-sortie detect-to-engage capability available in the near term.

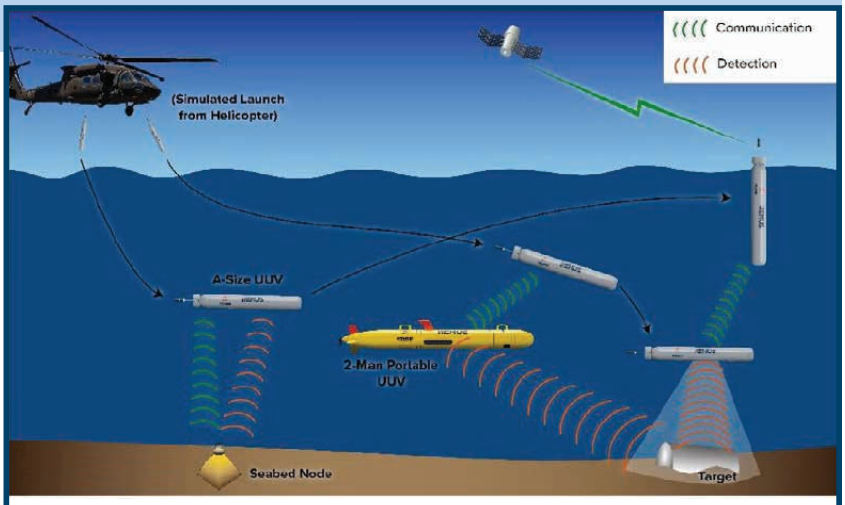
Technologies Demonstrated

Proteus, a payload centric LDUUV sized platform reconfigurable to house sensors and vehicles of opportunity | Real-time processing of SAS data with Automatic Target Recognition | Angler A-sized expendable UUV with 20mm supercavitating cannon

For more information, contact Ross Lindman, 850-249-2333, ross.lindman@hii-usg.com

Autonomous, Collaborative Undersea Sensing and Communications

Demonstration Lead: Hydroid, Inc.



This demonstration will focus on collaborative control and monitoring of a mixed fleet of assets for undersea sensing and data exfiltration operations. The assets include novel A-Size, air-launchable UUVs and a two-person portable UUV. The A-Size UUVs will be air-launched (e.g., simulated from the pier). They will both rapidly transit to a specified area. One will locate the seabed node in a simulated contested area, collect data, transit to a safe location, surface, and transmit the data. The other UUV will rendezvous with a two-person portable UUV that has been performing an area search. An object of interest will be identified and the two-person portable UUV will direct the A-Size UUV to perform a target reacquisition while it continues its area search. All of these operations will be controlled and monitored through a simple and intuitive interface on a rugged, weatherproof tablet. This interface was designed for mission planning, control, monitoring and post mission analysis for a fleet of mixed assets.

Salient Features of Demonstration:
A-Size UUV capable of air launch, high-sprint speeds, unique mobility modes (e.g., gateway buoy, zero-turn radius) and equipped with side scan sonar and Doppler velocity log.

For more information, contact Justin Reid, 508-564-8427, jreid@hydroid.com

Machine Deep Learning Demonstration of MIW ATR

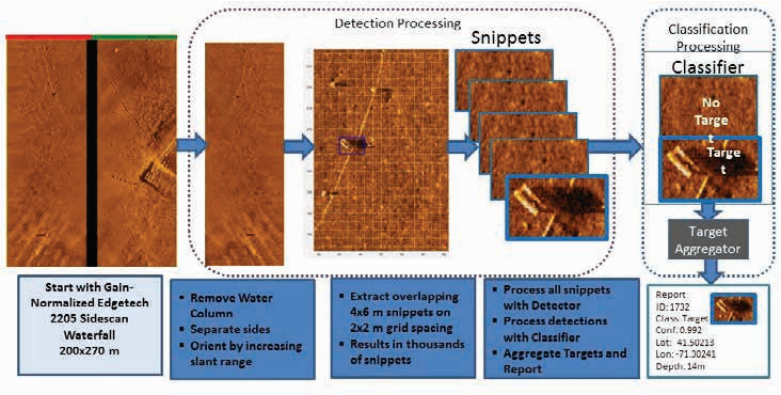
Demonstration Lead:
Lockheed Martin RMS - USS

The purpose of the demo is to showcase a newly developed Autonomous Target Recognition (ATR) solution for the detection and classification of mine-like objects on the seafloor and in the water column using machine deep learning technologies. This is a demonstration of an enabler technology for mine countermeasures.

The demonstration will consist of playback of Synthetic Aperture Side Scan Sonar data to detect mine-like objects, classify the objects and compare to ground truth data.

The ATR can be used as an operator aiding tool that could be Implemented following a successful unmanned underwater vehicle (UUV) mission using a Side Scan or Synthetic Aperture mapping sonar over a seafloor area of interest with mine targets and other clutter. The solution as an aid to the mine warfare operator, demonstrates how the operator will interface with the ATR solution to enhance both operator performance in target detection and classification.

While not demonstrated the ATR solution can be implemented in-situ on a UUV for single sortie detect-to-engage type missions.



LOCKHEED MARTIN

For more information, contact Joe Cuschieri, 561-494-2557, joe.cuschieri@lmco.com

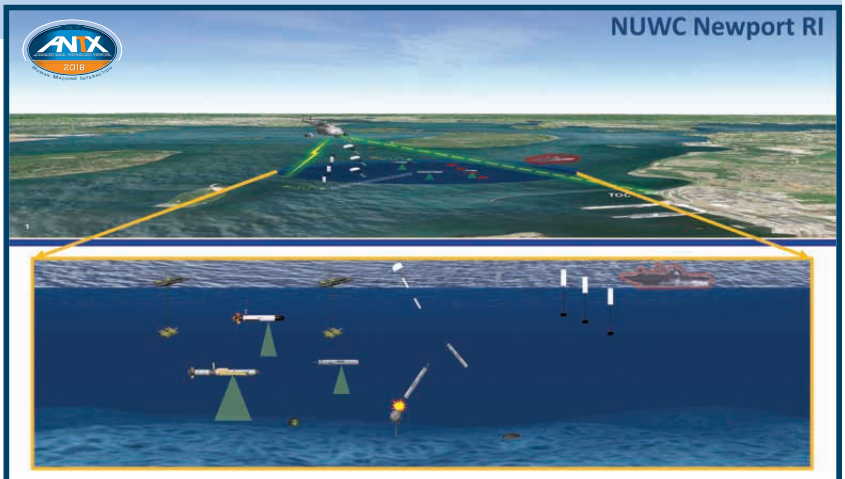
"Smart" Unmanned Maritime System of Systems for Counter Unmanned Underwater Vehicles (UUV)/Mine Warfare Operations

Demonstration Lead: Northrop Grumman

Collaborative autonomous systems (3 UUVs, 2 unmanned surface vehicles, and 1 unmanned aerial vehicle (UAV) surrogate) provide "Smart" mine detection and clearing with maritime intelligence, surveillance, and reconnaissance (ISR) operations. Northrop Grumman, Hydroid, Naval Oceanography Special Warfare Center, Ultra-USSI, and Advanced Acoustic Concepts will demonstrate defensive mining/maritime ISR operations using multi-domain autonomous platforms equipped with networked sensors and advanced mission management command and control.

Technologies Demonstrated

Advanced Mission Management and Control System (AMMCS) | Wave Gliders equipped as acoustic gateway and towed sensors | IVER with 3D bathymetric sensor and ATR to locate mines | REMUS micro-vehicles and sonobuoys autonomously deployed by UAV | Joint Architecture for Unmanned Systems Standards (JAUS)| TOPSIDE | Marine Open Autonomy Architecture (MOAA)



ADVANCED ACOUSTIC CONCEPTS
NORTHROP GRUMMAN
HYDROID A KONGSBERG COMPANY
Intelligent Marine Robots You Can Rely On
Ultra ELECTRONICS
USSI

For more information, contact Dan Redman, 858-618-5151, Daniel.redman@ngc.com; Larry Datko, 410-765-1066, Larry.datko@ngc.com

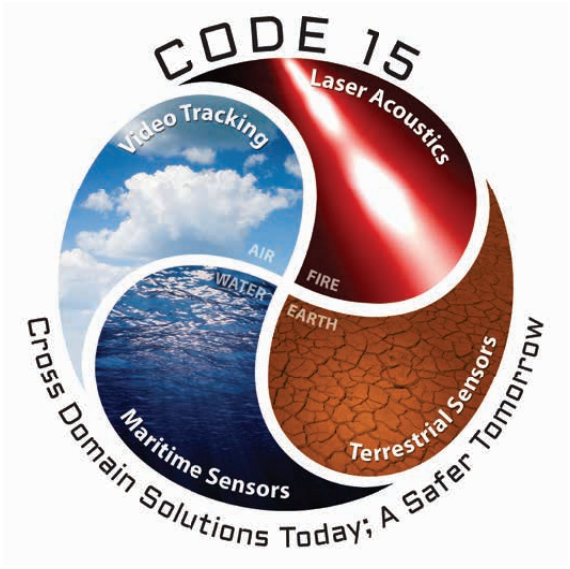
Distributed Sensing for Layered Defense

Demonstration Lead: NUWC Division Newport Sensors and Sonar Systems Dept.

This demo showcases three sensor types covering three different domains to provide a layered defense with persistent and comprehensive maritime awareness. The three sensors are: the advanced extended life sonobuoy (AELS), the low power array for persistent search (LPAPS), and a linear seismic sensor (LSS).

AELS provides a rapidly deployable acoustic detection capability with remote access and analysis. LPAPS enables surveillance of the seabed and shallow water. LSS delivers an expeditionary terrestrial capability for intrusion detection, localization, and threat identification.

The demonstration begins with the AELS and the LPAPS detecting UUVs and surface ships. The AELS provides an initial detection at range. As the target gets closer, the LPAS generates additional information used to classify the target. Finally, the LSS provides detection and localization information if the target moves onto the land. The three sensors will provide real time results integrated on a large screen display.



NAVSEA WARFARE CENTERS NEWPORT

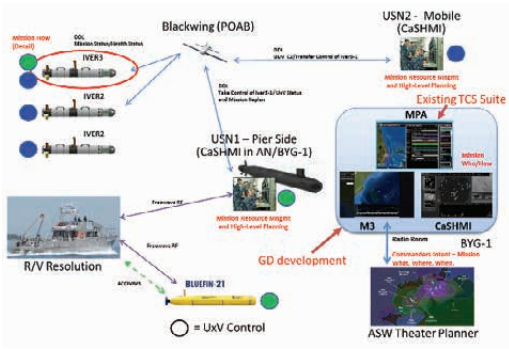
For more information, contact Chris Carbone, 401-832-4444, christopher.carbone@navy.mil

Command & Control of Unmanned Systems in a Distributed Control Environment For Cooperative Action

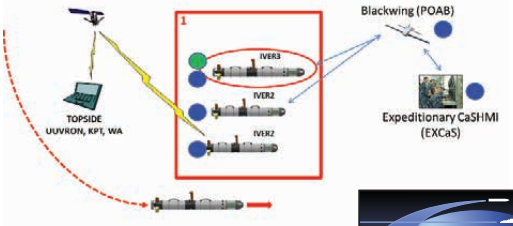
Demonstration Lead: NUWC Division Newport Undersea Warfare Combat Systems Department

A unique collaboration in technology development and demonstration by General Dynamics, L3 OceanServer, and the Naval Undersea Warfare Center (NUWC) at ANTX 2018 establishes for the first time an example of end-to-end Command and Control (C2) of heterogeneous unmanned systems (UxV) in distributed control networks. Progressive standards-based development of essential communications services, multi-vehicle management applications, and vehicle autonomy showcased in previous ANTXs and Fleet exercises will enable automated representation of broad theater-level directives provided as Commander's Intent to effectively determine low-level resource management, mission planning, and mission execution at the tactical C2 nodes and UxV system levels.

Essential components of this event include standardized representation of Commander's Intent, automated recognition of the directives for action within the multi-UxV management application Control Station Human-Machine Interface (CaSHMI), SAE JAUS protocols, and Fleet UxV systems and software to support rapid, low-cost transition of this development and concept of operations to operational status.



Automated Commander's Intent drives decision making at distributed C2 nodes. Low-level system planning and optimization is supported by on-board autonomy.



Long ingress by an Iver3 UUV and Iridium SBD/TOPSIDE extended range satellite C2 will be demonstrated.

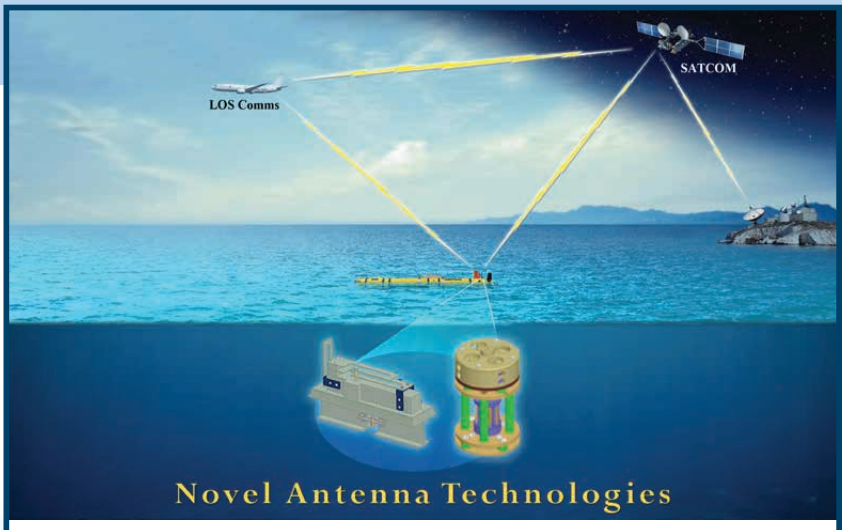
NAVSEA WARFARE CENTERS NEWPORT

For more information, contact Michael Incze, 401-832-3436, michael.l.incze@navy.mil

Compact Antennas for Unmanned Vehicle Communications

Demonstration Lead: NUWC Division Newport
Undersea Warfare Electromagnetic Systems Dept.

NUWC Division Newport's Undersea Warfare Electromagnetic Systems Department provides full-spectrum support for USW Communications and Electromagnetic systems, including Antennas, Periscopes, Electronic Warfare, Communications, Electro-Optics, and Electromagnetic Compatibility for Submarines, Unmanned Underwater Vehicles (UUVs), Unmanned Aerial Vehicles (UAVs), Unmanned Surface Vehicles (USVs), USW Networks, and Distributed USW Systems and Sensors. NUWC Division Newport has developed several innovative antenna technologies that dramatically reduce the volume requirements for antennas. These designs allow for supporting multiple communications bands within a single, compact antenna system, as well as enabling the support of capabilities that would otherwise be impractical with conventional design techniques. Designs are based on the implementation of metamaterials, as well as other novel antenna structures, and can be adapted to address future UUV requirements. A static display/poster presentation will be provided, outlining the capabilities of these antenna designs, and examples of fabricated antennas will be available for display.



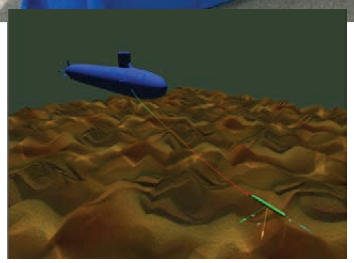
For more information, contact William Craig, 401-832-5470, William.p.craig@navy.mil

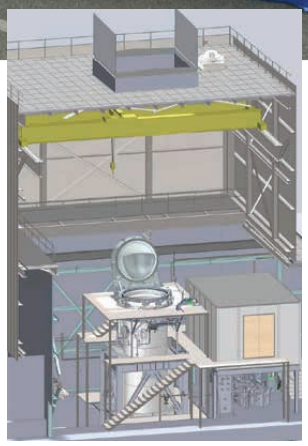
Platform and Payload Integration Technologies Display Booth

Demonstration Lead: NUWC Division Newport
Platform and Payload Integration Dept.

The Platform and Payload Integration Department of NUWC Division Newport will present a pier-side display booth. The display will highlight current department technologies and facilities pertaining to Submarine Missile/Payload Integration, and undersea warfare Launcher Systems. Additionally, current science and technology efforts related to the future of payloads and launching technologies will be highlighted. The booth will consist of posters as well as a virtual reality demonstration of the Virginia-Class Payload Tube Facility. The technologies to be highlighted include:

- Department overview describing its role in the ocean interface.
- Payload Tube Facility including Virtual Reality demonstration
- Project 1319
- S&T Efforts including Composite Materials, Implosion, Launch Dynamics





For more information, contact James LeBlanc, 401-832-7920, james.m.leblanc@navy.mil

Ranges, Engineering and Analysis Department Display

Demonstration Lead: NUWC Division Newport Ranges, Engineering and Analysis Dept.

The Ranges, Engineering and Analysis Department of NUWC Division Newport will present a pier-side display booth. The department delivers full-spectrum undersea Test and Evaluation and Fleet training capabilities by providing world-class instrumentation, facilities, engineering, and analysis.

Highlights include:

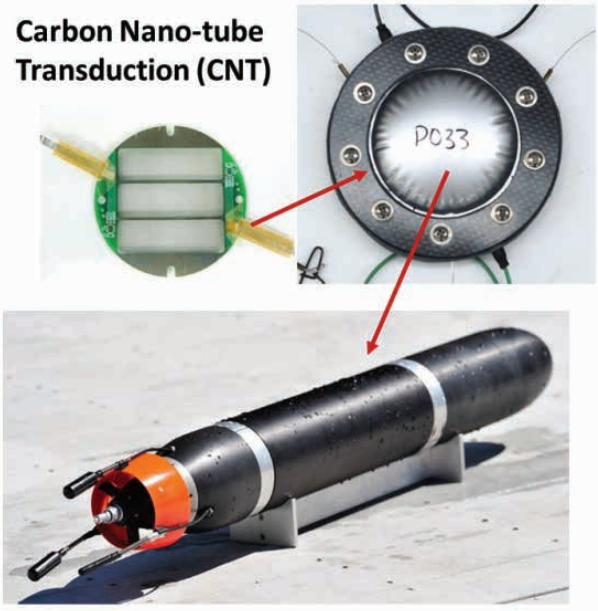
- Department overview describing the department's role in the systems development life-cycle at NUWC Newport
- Range technology and capability
- S&T efforts including novel structures and fabric architectures
- Marine mammal research and analysis

For more information, contact Erin Gauch, 401-832-6054, erin.gauch@navy.mil

Low-Frequency Thermal-Acoustic Source (Thermophone) Housed in a QinetiQ SeaScout Unmanned Undersea Vehicle (UUV)

Demonstration Lead: NUWC Division Newport Energy & Propulsion Branch and QinetiQ North America

This collaborative effort between NUWC Division Newport and QinetiQ North America will demonstrate a first-of-its-kind rapid prototype comprised of a low-frequency thermal-acoustic source (thermophone) housed in a QinetiQ SeaScout Unmanned Undersea Vehicle (UUV). The key enabler for this demo is a next-generation thermophone based on Carbon Nanotube Transduction (CNT) technology. Carbon nanotubes convert thermal energy to acoustic energy over a wide frequency range (~100 hz to >50kHz) in a much smaller form factor than comparable piezoelectric or mechanical conversion devices. The goal is to transmit an acoustic audio signal from the QinetiQ UUV to a bottom-mounted hydrophone and then project the output to the pier-side audience. The UUV will transit to its mission area where it will continuously circle the hydrophone and source a pre-programmed acoustic signal (range of tones and/or audio file). At the end of each 20-minute period of circling, the UUV will transition to a buoy-mode (position itself vertically in the water) and transmit an RF signal to a receiving device such as a cell phone on the pier.



QinetiQ Seascout Unmanned Undersea Vehicle

For more information, contact Christian Schumacher, 401-832-2455, christian.schumatcher@navy.mil

Swarmed Unmanned Underwater Vehicle Operations

Demonstration Lead:
Riptide Autonomous Solutions LLC

Advances in unmanned underwater vehicle (UUV) platform size, weight, and power (SWaP-C) reductions, coupled with improvements in stored energy densities, introduce the possibility of swarmed UUV operations. Missions benefiting from swarmed UUV tactics include: Minefield mapping-neutralization, ship takedown, in-port vessel destruction, in-stride overwatch for SOF operations, wide-area networked surveillance.

At ANTX 18, Riptide will execute a swarming UUV exercise to illustrate the following functional capabilities: Robustness to equipment and communications failures, diversity of capabilities/effectors brought to a single mission unit, real-time mission reconfiguration and adaptation, and multiplexed low cost element diffuse presence, complicating hostile reactions.

The proposed ANTX demo will feature at least 3 UUVs (objective of 10), demonstrating the following enabling mission capabilities: Jointly navigating ingress to target area, rotating GPS update acquisition, acquiring "final" target coordinates on randomized surface/update cycle, communicating target coordinates and attack plan to swarm elements, one or more UUVs transmit all command control data back to command center.

Riptide Autonomous Solutions

For more information, contact Jeff Smith, 617-820-4586, jeff@riptideAS.com

Unmanned Surface Vehicle Real Time Comms with an Underwater Asset

Demonstration Lead: SeaTrac Systems, Inc.

SeaTrac's Unmanned Surface Vehicle (USV) and Naval Oceanography Special Warfare Center's Unmanned Underwater Vehicle (UUV) will demonstrate how a Unmanned Surface Vessel (USV) can be a relay agent between UUV and Command. This allows the UUV to stay on task without needing to surface to communicate with Command, saves limited onboard energy, and allows Command to communicate more frequently with the UUV. Additionally, Command can modify a mission based on real-time data received from UUV. The USV communicates with UUV via underwater acoustic modem and with shore-based Command via radio link. The two vessels will meet at a given waypoint. Command will give the UUV a standard "mow the lawn" survey mission via the USV. The UUV will go down range and return on an offset, and the USV will go to the end point of the return leg. Then mission data will be downloaded to Command via the USV. This pattern will repeat until Command decides to change the survey area based on information received. The USV will remain submerged during the demonstration.

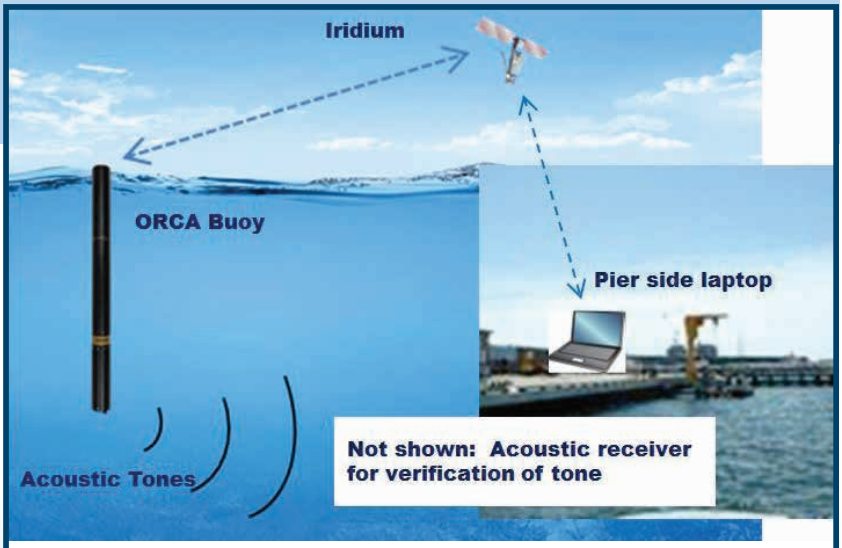
SeaTrac

For more information, contact Buddy Duncan, 617-285-8433, bduncan@seatrac.com, www.seatrac.com

Signal Ejector Deployed Satellite Communications with Confirmation Tones

Demonstration Lead: Sparton Deleon Springs, LLC

Submarines and other underwater assets periodically deploy satellite communications buoys that transmit pre-recorded data. The deploying platform is unable to confirm that the data has been transmitted and/or received. Sparton will demonstrate a 3-inch form factor device, designed to be deployed through a Submarine Signal Ejector (SSE) that allows for confirmation information to be received over satellite link through acoustic tones. The primary goal will be to demonstrate the full cycle of data exfiltration to confirmation for an underwater platform. Sparton DeLeon Springs LLC is a primary designer and manufacturer of sonobuoys for anti-submarine warfare and a provider of advanced maritime payload delivery systems. Sparton's product line is further complemented by acoustic projectors, hydrophones, and inertial measurement products.



sparton

For more information, contact Bob Kundinger, 386-740-0710, bkundinger@sparton.com

Fleet-Wide Damage Control and Ship's Husbandry ROV

Demonstration Lead: Teledyne Brown Engineering

Teledyne Brown Engineering and Teledyne Energy Systems are collaborating on a mission that demonstrates ROV operations powered by an autonomous Subsea Power Node.

The exercise will illustrate the use of a SeaBotix LBV300-5 Remotely Operated Vehicle (ROV) to demonstrate ship husbandry which includes hull and running gear inspections, local area searches to simulate foreign port inspection, and a simulated diver search and rescue mission. The ROV will be powered by an autonomous undersea fuel cell power node.

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

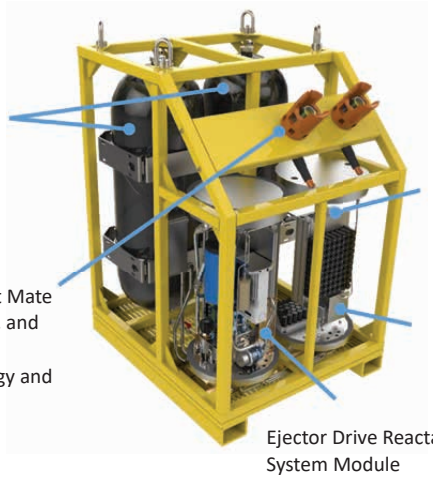
For more information, contact Craig Cates, 256-603-8762, craig.cates@teledyne.com

Subsea Power Node for the Forward Deployed Energy and Communications Outpost (FDECO) Precursor

Demonstration Lead:
Teledyne Energy Systems

Teledyne Energy Systems and Teledyne Brown Engineering are collaborating on a mission that demonstrates the essence of a Forward Deployed Energy and Communications Outpost (FDECO) capable of providing remote power. The TESI Subsea Power Node is a self-contained power generation station (via PEM fuel cell), coupled with its hybrid Power Conditioning Module, it is capable of providing instantaneous on-demand power for recharging unmanned underwater vehicles, enabling vehicles to remain on station for extended periods of time.

The demonstration will illustrate the robust nature of the on-demand power delivery system by directly powering the Teledyne Seabotix ROV as various power load demands are placed on the power node, while seamlessly providing the requisite power level with no assistance from shore power. Equipped with a Teledyne Benthos acoustic modem, the TESI Subsea Power Node will demonstrate the capacity of remote communications by providing information to the pier without the use of a tether.



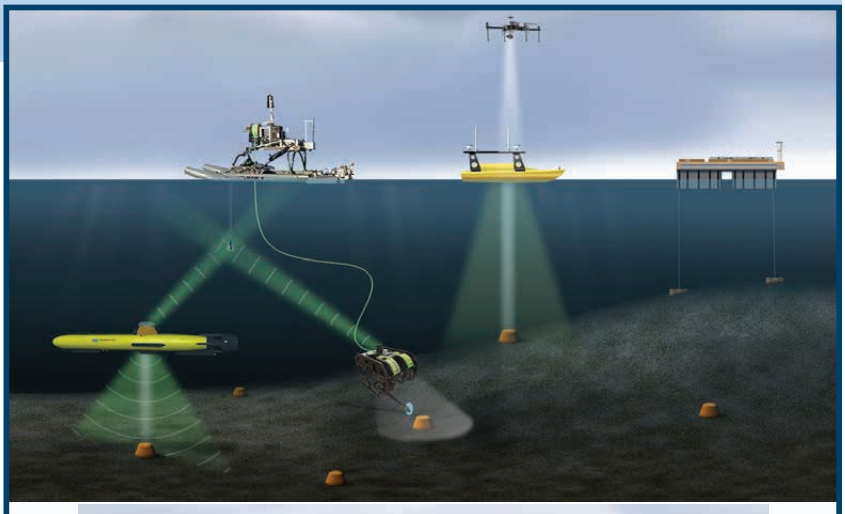
TELEDYNE ENERGY SYSTEMS Everywhereyoulook™

For more information, contact Andrew Leanna, 410-891-2374, andrew.leanna@Teledyne.com

System of Systems Approach to Expeditionary Mine Countermeasures

Demonstration Lead: Teledyne Marine

Teledyne Marine and its partners will showcase a System of Systems approach to expeditionary mine countermeasures (MCM) using multi domain unmanned assets. An Oceanscience Z-Boat ASV will launch to start a bathymetric and LIDAR survey from a Blue Isles Power Docks with solar power station. The Marine Advanced Research WAM-V autonomous surface vehicle (ASV), station-keeping in the area, launches a Planck Aerosystems unmanned aerial vehicle to track the Z-Boat from the air. The Gavia autonomous underwater vehicle (AUV), tended by a rigged hull inflatable boat (RHIB), dives to conduct a search-classify-map side-scan survey with CARIS-Onboard mosaicing data in real time and passing images to Charles River Analytics for Automatic Target Recognition (ATR). When all vehicles have completed their surveys and a mine-like-object is detected, the coordinates are passed to the WAM-V ASV. The WAM-V navigates to the coordinates and deploys a SeaBotix remotely operated vehicle (ROV). Greensea Systems' SmartFlight navigates the ROV to the target aided by the Benthos DAT and neutralization is simulated.

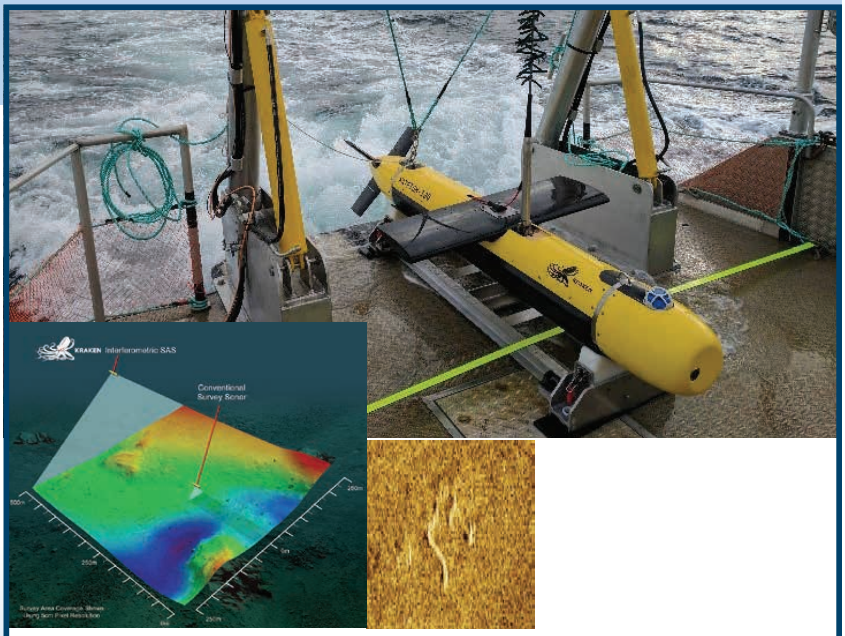


TELEDYNE MARINE Everywhereyoulook™ | charles river analytics | GREENSEA
WAM-V MARINE ADVANCED RESEARCH, INC | PLANCK AEROSYSTEMS | BLUE ISLES POWERDOCKS | TELEDYNE CARIS Everywhereyoulook™

For more information, contact Bob Melvin, 508-566-0709, bob.melvin@teledyne.com

SeaScout Seabed Search System

Demonstration Lead: ThayerMahan, Inc.



ThayerMahan, Inc. specializes in the design, manufacture, and operation of autonomous marine systems for government and industry partners. Founded by former U.S. Navy submarine officers, the company creates long endurance systems that perform many missions currently conducted by ships, aircraft, and submarines — and does so with a 99% cost reduction. ThayerMahan's primary offerings are Outpost, a long-dwell, mobile, acoustic surveillance system and SeaWatch, a long-dwell electronic surveillance system. Both products are available for direct sale or as part of a turn-key "search as a service" model.

At ANTX, ThayerMahan will demonstrate its latest offering. Partnering with Kraken Robotics, ThayerMahan is producing SeaScout, incorporating Kraken's world-leading Synthetic Aperture Sonar (SAS) into a seabed search system with class-leading search rate, resolution, and real time 3 cm resolution display of objects, at a small fraction of the cost of their competitors' systems.

ThayerMahan

For more information, contact Michael J. Connor, 703-343-6655, mconnor@thayermahan.com

GeoSled

Demonstration Lead: University of Rhode Island and Woods Hole Oceanographic Institution

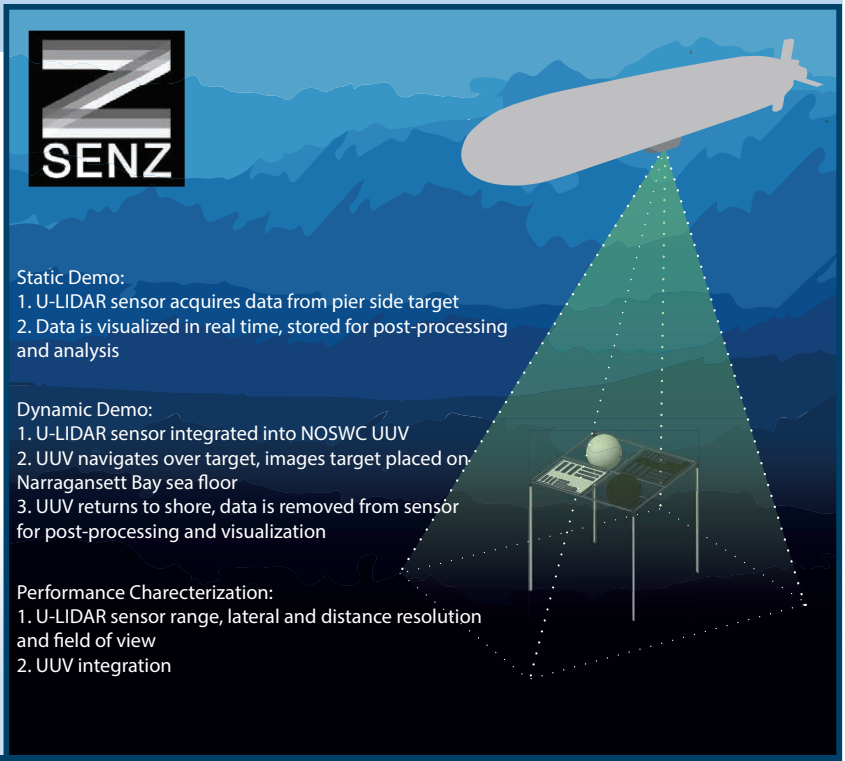
Self-noise radiated from underwater vehicles such as autonomous and remotely operated vehicles can impact their visual and acoustic measurements of the ocean ecosystem. These vehicles are commonly used to observe marine life. If fish, marine mammals, and other biota detect the noise from these vehicles it could skew population estimates. In addition, there are tactical reasons to measure vehicle self-noise. A collaboration between the Department of Ocean Engineering at the University of Rhode Island (URI) and Woods Hole Oceanographic Institution (WHOI) designed, built, and tested a system called the GeoSled. The GeoSled is equipped with four hydrophones assembled in a tetrahedron and also four equally spaced geophones in a linear configuration on the seafloor. These signals from these sensors are acquired on the WHOI Several Hydrophone Receive Unit systems. These systems have used Chip Scale Atomic Clocks for very accurate timing.

For more information, contact Dr. James Miller, miller@uri.edu

Underwater Light Detection and Ranging (U-LIDAR) Sensor

Demonstration Lead: Z-senz LLC

An underwater light detection and ranging (U-LIDAR) sensor will be tested at ANTX 2018 in static and dynamic demonstrations. These demonstrations allow for characterization and assessment of sensor performance by Z-senz LLC and U.S. Navy personnel. A pierside demonstration of the U-LIDAR sensor enables evaluation of system performance in turbid Narragansett Bay conditions by imaging a static target and comparing acquired data to sensor images obtained from a clean-water environment. A subsequent dynamic demonstration will be conducted by integrating the U-LIDAR sensor into the Naval Oceanography Special Warfare Command IVER3 unmanned underwater vehicle (UUV) and imaging targets placed on the bay floor at a depth of approximately 8 feet. The UUV with mounted sensor will navigate past the targets, acquiring distance sense data at ranges from greater than 15 feet to approximately 3 feet. Following the dynamic demonstration, data will be downloaded from the sensor and evaluated. Demonstration evaluation metrics include: detection range vs. illumination power, frame rate and imaging resolution.



For more information, contact Chris Brown, 206-963-7522, chris.brown@z-senz.com

NUWC Division Newport

TITLE	NAME	PHONE	EMAIL
ANTX Director	Dr. Peter Hardro	401-832-4340	peter.hardro@navy.mil
Integration Lead	Nick DelGreco	401-832-7182	nicholas.n.delgreco@navy.mil
Range Operations Manager	Kip Rainey	401-832-4037	lawrence.a.rainey1@navy.mil
Public Affairs Officer	Jeff Prater	401-832-2039	jeffrey.prater@navy.mil
Logistics Coordinator	Mike Geremia	401-832-7095	michael.geremia@navy.mil
Protocol/Invitations	Justin Mostert	401-832-7267	justin.mostert@navy.mil
Transportation Lead	Matthew Witzgall	401-832-3417	matthew.witzgall@navy.mil

CNMOC

ANTX Lead	Todd Bowers	228-688-4454	todd.bowers@navy.mil
Public Affairs Officer	Kaley Turfitt	228-688-4384	kaley.turfitt@navy.mil
ANTX Science Lead	Todd Holland	228-688-5320	todd.k.holland@navy.mil
ANTX Logistics Coordinator	CAPT Chris Kaiser	228-688-5620	christopher.l.kaiser@navy.mil
ANTX Vignette Lead	LTJG Kate Chibbaro	228-688-5643	katherine.chibbaro@navy.mil
NUWC ANTX Coordinator	Betty Jester	228-688-5993	betty.jester@navy.mil

Test Facility and Range provide ideal location for ANTX18

The Narragansett Bay Test Facility (NBTF), located in Newport, RI, is a Naval Undersea Warfare Center (NUWC) test and evaluation facility designed to support research and development work in advanced underwater weapons and weapons systems, weapon launchers, unmanned underwater vehicles (UUVs), oceanographic equipment, and other underwater and aerial technologies.

The NBTF is the hub for rapid prototyping and deployment of Navy systems for NUWC Division Newport and offers a variety of unique shallow water ranges allowing government, academic, and industry partners to expose prototype systems to real environments with a minimum risk of loss. It has been the site of NUWC Division Newport's Advanced Naval Technology Exercise since 2015.

The NBTF is home to an Engineering and Diving Support Unit comprised of civilian engineers, scientists, and technicians from across NUWC's product lines who are qualified U.S. Navy divers. In addition to their engineering expertise, they also bring vast experience working with waterborne technologies and the ability to solve problems and develop real-time engineering solutions.

Additional diving support is provided by contract divers who offer on-call services including underwater vehicle recovery, video surveys and searches, cable jetting, welding and cutting, and inspection of boats, piers, and obstructions.

The NBTF provides space for working or storage of materials, network connectivity, soldering station and approved lithium ion battery charging areas. There is also a spacious, state-of-the-art conference room overlooking the inner range as well as office space for customer use.

Facility assets include a water/pier-side crane, boat ramp, Sidescan Towfish, and Sector Scanner.

The NBTF support range craft fleet consists of 10 surface vessels ranging from small rigid-hulled inflatable boats (RHIB) to a 120-foot torpedo retriever fully equipped to support large vehicles and overnight operations.

Range Craft:

- Torpedo Retriever. TWR-841 is a 120' torpedo weapons retriever that supports torpedo recoveries and other tasks associated with range operations all along the East Coast. It is equipped with a 4,000-lb. crane, a 5,000-lb. A-frame and winch, a 13' inflatable support craft, a large working space on the back deck that can accommodate a 20' CONEX box style working lab to support testing a full galley, and berthing for 18 people to accommodate overnight operations.
- Research Vessel. RV-701 is a fiberglass hull vessel equipped with a 1,000-lb. crane and work platform modified to recover and deploy equipment such as UUVs. Two lab areas onboard are well suited to accommodate testing equipment and personnel. In addition, there is a full galley and berthing to accommodate 10 people for overnight operations.
- Work Boats. The WB-30 is a twin inboard 35' aluminum hull workboat that has a 1,000-lb. davit and a 500-lb. capstan winch. This craft can be modified to accommodate additional equipment to support testing. NBTF also has three 24' aluminum hull work boats, two RHIBs and a personal watercraft. The work boat fleet are all well suited to support projects with smaller technologies and to support the larger vessels providing range clearance, security and assistance with deployment and recovery of equipment.
- Dive Boat. The dive boat is a 27' aluminum hull vessel with center cabin that is equipped with a diver door/ladder assembly and has a clear 11'x7' working deck. While primarily used as a dive boat, it is routinely used to support testing of waterborne technologies.

Designated Ranges for Operation:

- Inner Range. The test area is 10,000 yards long and 2,750 yards wide. Depth varies from 60 feet at the firing pier on Gould Island to less than 20 feet on the northernmost end.
  - The test area is an elliptical depression located on the east side of Gould Island and has a maximum depth of 127 feet.
  - A fully instrumented range tracking system consisting of hydrophones that can be utilized in the inner and outer range. This system links back to a control station enabling customers to obtain real-time data during testing.
- Outer Range. The Outer Range, in the Rhode Island Sound Test Area, is a restricted area, 4,000 yards wide and 17,500 yards long. Water depth varies from 100 feet at the northern end to about 120 feet at the southern end.
- Airspace. NBTF has previously approved air space to conduct unmanned aerial systems (UAS) testing up to an elevation of 400'. Some of this air space is strategically co-located above the inner range water space to facilitate UUV/UAS communications.

For more information on the NBTF, contact Dillon Fournier, Range Operations Manager, 401-832-6140 or dillon.fournier@navy.mil.

SENEDIA
The Southeastern New England Defense Industry Alliance

The Southeastern New England Defense Industry Alliance (SENEDIA)

is proud to be a collaborator with

NUWC Division Newport's
Advanced Naval Technology Exercise.

Information on our Defense Innovation Days event can be found at:

www.defenseinnovationdays.com.

Save the Date: 2019 Defense Innovation Days - 26 – 28 August 2019 - Newport RI

UNDERSEA TECHNOLOGY INNOVATION CONSORTIUM UTIC

The Undersea Technology Innovation Consortium (UTIC) is proud to be the technology consortium for the NUWC Division Newport Other Transaction Agreement (OTA) for undersea and maritime innovation.

Unique opportunity to work collaboratively and leverage industry, academia and government capabilities to provide the needed undersea and maritime technical innovation.

For information on membership: undersea@underseatech.org

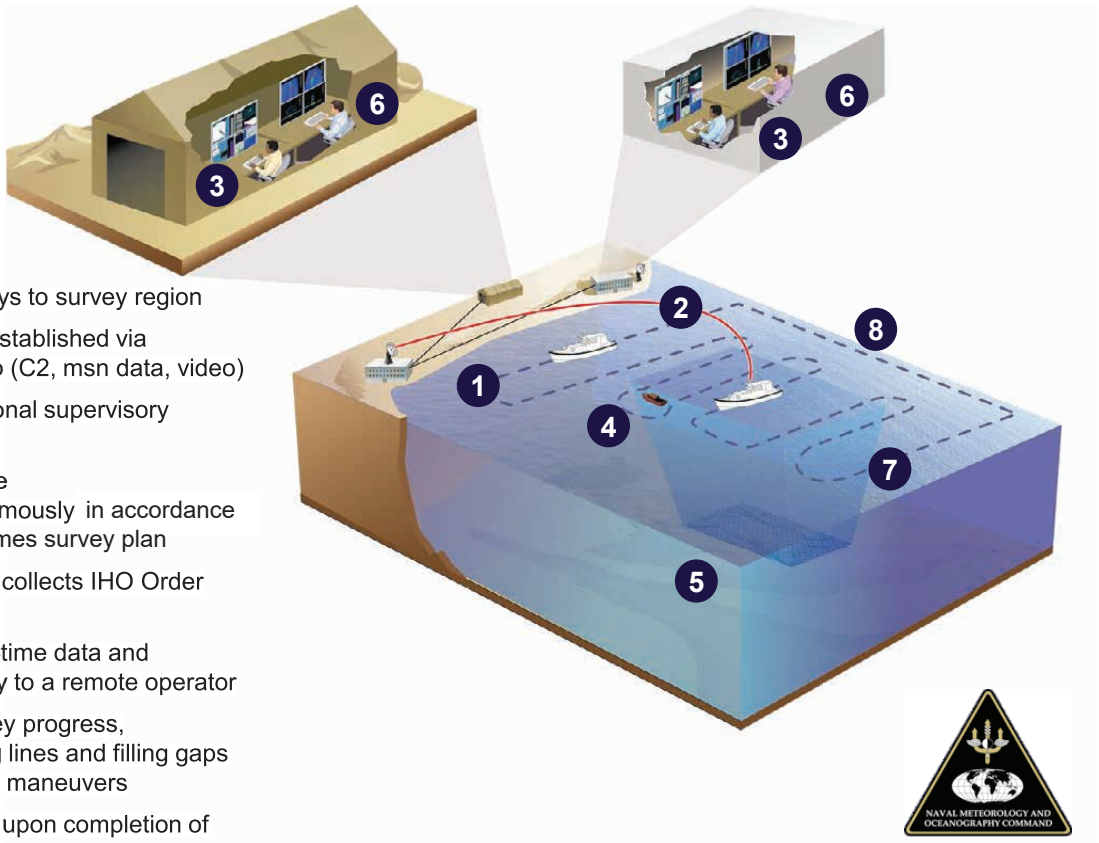
www.UNDERSEATECH.org

Human-Machine Optimization for Seafloor Mapping

Demonstration Lead: Leidos

leidos

1. R/V Pathfinder self-deploys to survey region
2. High bandwidth comms established via maritime broadband radio (C2, msn data, video)
3. Comms link enables optional supervisory control of Pathfinder
4. Pathfinder senses surface contact; re-routes autonomously in accordance with COLREGS and resumes survey plan
5. Pathfinder autonomously collects IHO Order One bathymetry
6. Comms link enables real-time data and mission payload summary to a remote operator
7. Pathfinder monitors survey progress, autonomously completing lines and filling gaps resulting from COLREGS maneuvers
8. Pathfinder returns to port upon completion of tasked mission



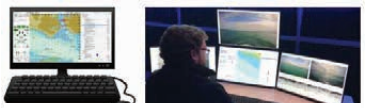
Similar to ANTX 2017, Leidos will demonstrate an autonomous bathymetric survey capability. Leidos will use the SeaHunter surrogate test vessel R/V-Pathfinder, equipped with a high-resolution bathymetry collection suite, to collect mission-specific data in the waters off Gulfport, MS. These data will include International Hydrographic Organization Order One bathymetric measurements of the sea floor, real-time meteorological observations, and ocean environmental characteristics. Expanding on the ANTX 2017 demo, Leidos will again telemeter these data ashore in real-time, but this year the transmitted data will include gridded bathymetric sea floor surface, partially autonomously processed onboard the R/V-Pathfinder. Navy personnel will complete the processing ashore by producing tactically useful products prior to R/V-Pathfinder's return to port. Concurrent with this activity, R/V-Pathfinder will operate in an autonomous navigation mode similar to SeaHunter. That enables precision track-following of survey plans while keeping the vessel compliant with Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGs) requirements. A new feature will be demonstrated that enables autonomous completion of survey lines that have been interrupted due to COLREGs maneuvering. Overall, Leidos expects to demonstrate an accelerated time from data gathering to product generation, a variety of manning options in the surface vessel, and the ability for ashore personnel to manipulate the survey in response to operational tasking.

For more information, contact Charles Fralick, 703-907-2555, charles.r.fralick@leidos.com

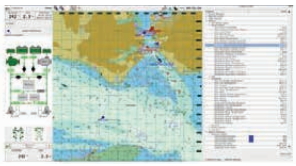
Human-Machine Optimization for Seafloor Mapping

Demonstration Lead: ASV Global and QPS Inc.

1. C-Worker deploys to a survey area to begin seafloor mapping mission
2. IVER3 deployed and performs subsurface survey while transmitting status updates through ACOMMS onboard C-Worker
3. C-Worker relays ACOMMS data through radio to base station
4. IVER3 mission remotely manipulated via ACOMMS real time
5. Bathy data collected by C-Worker displayed real time via QINSy to base station
6. Real time data monitoring/sensor configuration via QINSy
7. C-Worker and IVER3 recovered upon completing data acquisition



Base Station w/ ASView



RF COMMS

Mission Parameters, Data

ACOMMS

Mission Parameters

QPS
a SAAB group company

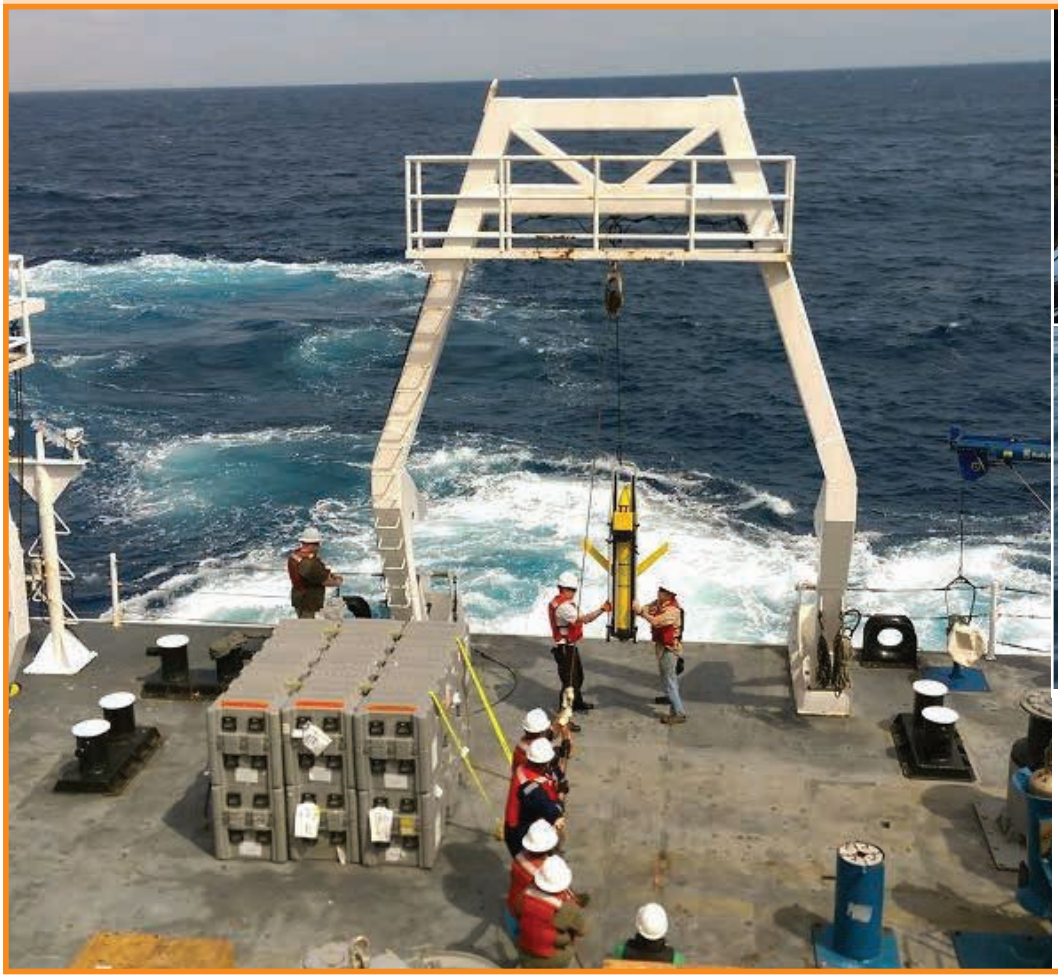
ASV unmanned marine systems

In this vignette, a C-Worker 5 USV (ASV Global) will collect high-resolution multibeam sonar data using QINSy hydrographic acquisition software (QPS) in an unmanned (supervised) mode. The QINSy application will be further used to demonstrate comprehensive mission planning, dynamic line generation and real-time data processing. Data and mission profile information will be provided near real-time to the shore-based control station for monitoring of mission status, data quality control, and rapid data exploitation. The C-Worker 5 will also be equipped with a Navy-supplied acoustic modem to provide remote, bidirectional data communications to a Navy IVER3 UUV system during seafloor mapping survey operations. UUV mission progress and status will be relayed near real-time to the shore-based control station.

For more information, contact
ASV Global, Brian Anderson, 713-357-6622, brian.anderson@asvglobal.com or
QPS Inc., Chris Malzone, 805-439-0117, malzone@qps-us.com

Wide Area Search

Demonstration Lead: Naval Oceanographic Office (NAVOCEANO)

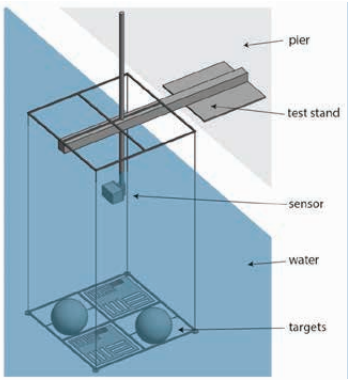


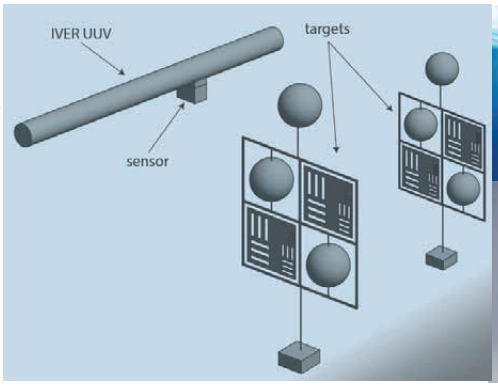
NAVOCEANO maintains a persistent autonomous underwater vehicle (AUV) monitoring presence in operating areas (OPAREAS) of interest to the Navy. The most common of the AUVs are floats and gliders. These instruments are deployed on a continual basis to provide data that is fed back to Stennis Space Center via satellite link. The data is then assimilated into the operational ocean models run on the Navy DoD Supercomputing Resource Center by Fleet Numerical Meteorology and Oceanography Command. As a result, a heightened state of battle space awareness exists prior to engagement. The Battle Space is monitored by the ASW reach back cell (RBC) to identify any tactically relevant ocean features in the model that are present in the area of interest (AOI), such as fronts and eddies. NAVOCEANO then redirects these assets to the concerning features so localized data can update and increase the accuracy of the ocean model. The updated ocean model data is used to generate parameters needed to run acoustic prediction models to support anti-submarine warfare assessments run by the RBC. This gives the warfighter the most current and accurate environmental parameters to base their decisions. Additional instruments are air-deployed to the AOI when data voids occur to maintain continual coverage.

For more information, contact Michael Toner,
228-688-4821, michael.toner@navy.mil

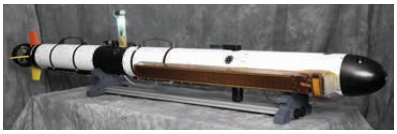
Intelligence Preparation of Environment (IPOE) for Naval Special Warfare

Demonstration Lead: Naval Oceanography Special Warfare Center (NOSWC)



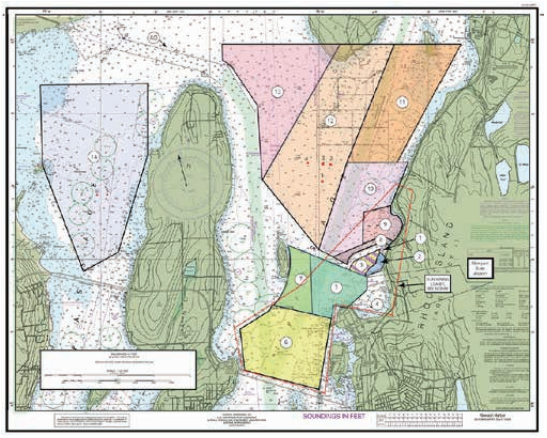


The Z-Senz underwater LIDAR (U-LIDAR)



Northrop Grumman AMMCS software UUV

Northrop Grumman AMMCS software UUV



Operational Area Breakdown in Narragansett Bay, Newport, RI

SeaTrac USV (15' long, 3kts)

SeaTrac Example Iver3 Model

NOSWC will conduct three demonstrations with three separate organizations: SeaTrac, Z-senz, and Northrop Grumman.

1) The SeaTrac Unmanned Surface Vehicle (USV) will communicate with the NOSWC Iver and a local beach party. Whilst on mission, the USV will establish acoustic communication with the Iver and download the altitude, depth, and location data. The data will be sent via an RF link to shore and displayed on Topside software. The beach party will re-direct the Iver and repeat the data relay process.

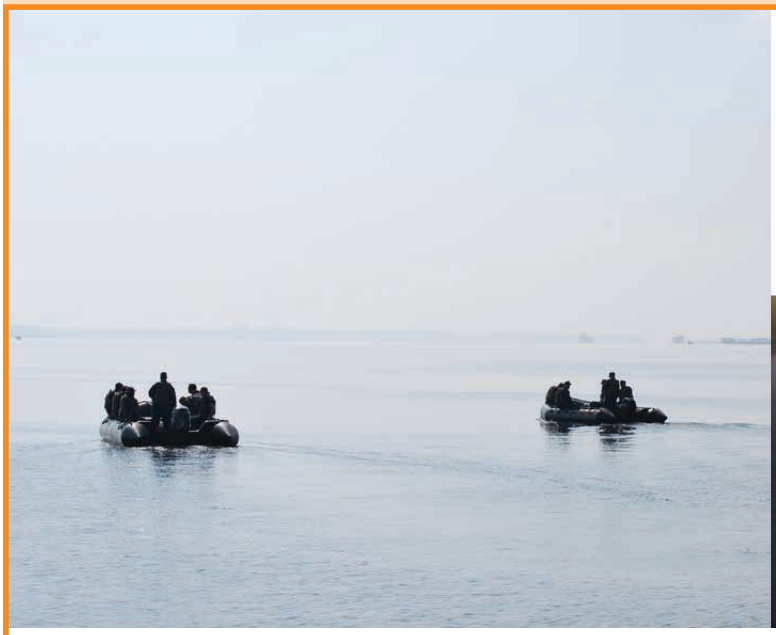
2) Z-senz's underwater LIDAR (U-LIDAR) will be mounted on a NOSWC Iver using a custom belt. The U-LIDAR will be range tested on 3D-printed targets placed in the operational area.

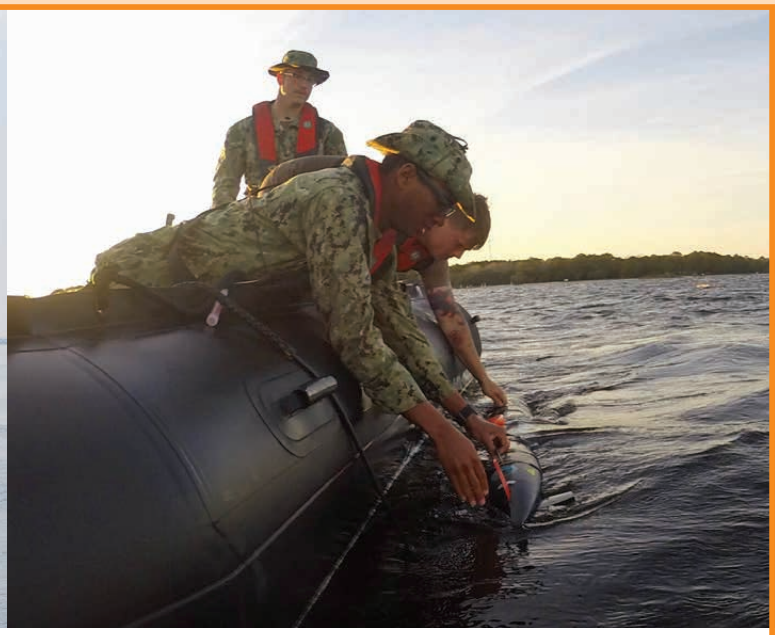
3) Northrop Grumman will use two NOSWC Ivers to demonstrate a capability to communicate Iver-identified objects of interest to Wave Glider USVs. One Iver will be used as a red cell target for detection, while the other Iver will be programmed with Northrop Grumman's backseat driver and Topside software compatibility. This blue cell Iver will patrol the operational area, using sonar and a command and control upgrade, relaying object detection to the USV. This and all integrated unmanned systems data, will be sent via an RF link to shore and displayed on the Topside software controls.

For more information, contact LT Claire Wilson, 619-537-1021, claire.wilson@socom.mil

Intelligence Preparation of Environment (IPOE) for Mine Warfare

Demonstration Lead: Naval Oceanography Mine Warfare Center (NOMWC)





NOMWC's participation in ANTX 18 allows the command to explore cutting-edge technological advances in the unmanned systems realm and their application to the "Initial Preparation of the Environment (IPOE)" mission. NOMWC is partnering with the Fleet Survey Team (FST), iXblue, Domo Tactical Communications (DTC), and NUWC Division Newport Ranges, Engineering and Analysis Department (Code 70).

NOMWC assessed a Synthetic Aperture Sonar (SAS) system that brings image-like fidelity to search, classification, and bottom mapping of objects. The SAS increases the detectability of buried objects. The NOMWC – FST – iXblue – DTC – NUWC Code 70 partnership explored the feasibility of iXblue's Global Positioning System (GAPS) as portable range technology. GAPS and Code 70's SeaRaven software provide operators with real-time situational awareness and C2 of UUV systems across a distributed Very Shallow Water (VSW) environment. Additionally, the test demonstrates two-way communications between the iXblue tracking system and FST's IVER UUV. DTC's system provides distributed C2 via two-way communications between onshore and offshore equipment, utilizing a communication mast for increased range. Increasing C2 range is essential to establishing shoreside tracking of underwater assets. NUWC's SeaRaven range display software combined iXblue's UUV positions with other tracking sources to build a common operating picture (COP). Overall, these technologies provide increased battlespace awareness, expanded C2 range of systems, extended mine detection, classification and localization capabilities, and reduction of man-hours.

For more information, contact
LT Brandon Anthony, 228-688-4909, brandon.anthony@navy.mil,
LT Travis Miller, 228-688-5527, travis.d.miller3@navy.mil

Maritime Mesh

Demonstration Lead: Domo Tactical Communications (DTC)

DTC's Mesh technology provides high-capacity multi-domain IP connectivity in challenging environments that sits seamlessly alongside existing public or private infrastructure. The ability to project a significant bi-directional capability into areas unreachable by existing technologies is tremendously powerful and can play a pivotal role in surveillance operations.

Offered in two variants, DTC's Phase 4 Mesh designed for a range of dedicated radio platforms and is available with 2 Watt and 5 Watt power options. Phase 5 is DTC's latest generation Mesh software designed for installation on both dedicated radio platforms and the multi-capability Software Defined Radio as a software application. All Phase 5 platforms offer the benefits of standard Mesh but are also Multiple Input/Multiple Output capable for increased data throughput (up to 70+ Mbps).

NetNode IP Mesh Phase 4 5W Robust

NetNode IP Mesh Phase 5 Robust

SOLO8 Software defined Radio (robust)Robust

SOLO8 Software defined Radio (concealment)

SOLO8 Software defined Radio (robust)

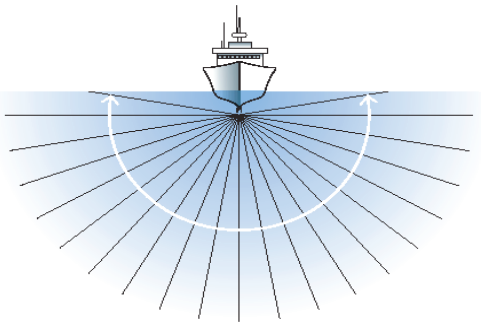
DTC

For more information, contact Grady Valentine, 571-253-4350, www.domotactical.com

Scalable Portable Acoustic Range for Persistent C2 in Contested Environments

Demonstration Lead: iXblue Defense Systems, Inc.

Global Acoustic Positioning System (GAPS) combines a 3D acoustic antenna and a high-grade inertial sensor into a man-portable system for high-precision tracking and C2 of undersea assets to a radius of a few kilometers. Robust performance in very shallow water (VSW) and in GPS-denied conditions, combined with the ability for a single system to simultaneously track and manage dozens of undersea assets, is anticipated to decrease mission time and offer increased agility to warfighters in contested environments. In addition, embedded telemetry through phase shift keyed acoustics allows for C2 of undersea assets in parallel to tracking from this single surface-to-subsurface node. Multiple GAPS will be utilized during the exercise to demonstrate distributed coverage over a wider area, and wireless mesh radios from DTC will be utilized to establish C2 over the horizon via unmanned airborne systems to allow for greater stand-off distances between portable nodes and human operators.



iXblue DEFENSE SYSTEMS

DTC

NAVSEA WARFARE CENTERS NEWPORT

For more information, contact Robert O'Malley, 281-633-6667, robert.omalley@ixblue-us.com

Navy Acoustic Situational Awareness System (ASAS)

Demonstration Lead: McQ Inc.

The Navy ASAS is designed to capture, identify, and localize signals defined in the Coast Guard Rules of Navigation to aid in autonomous maritime navigation. Secondary goals are to capture, identify, and localize other available signals (i.e., engine noise, speech). McQ plans to capture air acoustic data (~20Hz to ~20kHz) using a mic array on a pier to capture the acoustic whistle, bell, and other navigational sounds as well as engine noise from surface vessels in the area. This exercise will help McQ observe the real world environment the mic array is in for purposes of noting general activity and acoustic events to aid in analyzing the data. McQ will post process the data to demonstrate the processing of an acoustic situational awareness system for maritime use. Longer term, this system is designed to incorporate a processing module to provide real time feedback to autonomous systems or to other operators.

McQ
Tough sensors for an insensitive planet
An ISO 9001:2015 Registered Company

For more information, contact Robert Klug, 540-373-2374, rklug@mcqinc.com
James Morrison, 540-373-2374, jmorrison@mcqinc.com

Naval Meteorology and Oceanography Command

Naval Oceanography impacts every Navy platform, afloat and ashore, and every Sailor and Marine around the globe. There is not an aircraft that flies, a ship or submarine that sails without the people of Naval Oceanography. America's Navy starts with us! Naval Oceanography has approximately 2,500 globally distributed military and civilian personnel, who collect, process and exploit environmental information to assist Fleet and Joint Commanders in all warfare areas to guarantee the U.S. Navy's freedom of action in the physical battlespace from the depths to the stars. Naval Oceanography has more than two decades of experience operating more than 20 different unmanned systems for more than 250,000 miles of ocean. Unmanned systems are highly dependent on meteorology and oceanography conditions for mission success, and predicting the environment and its effects on unmanned systems is our specialty. We currently own and operate over 130 ocean gliders and almost 50 other autonomous underwater vehicles supporting Navy operations around the world.

NAVAL METEOROLOGY AND OCEANOGRAPHY COMMAND

COMMANDER TASK GROUP 80.7

For more information, contact Todd Bowers, 228-688-4454, todd.bowers@navy.mil

Oceans In Action Workshop: An Annual Gulf Coast Event Featuring New Technology Implementations and How They Improve Maritime Missions

Demonstration Lead: Marine Technology Society Gulf Coast Section and Mississippi Enterprise for Technology (MSET)

marine technology SOCIETY

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MSET

MISSISSIPPI ENTERPRISE FOR TECHNOLOGY
STENNIS SPACE CENTER

The Oceans In Action (OIA) Workshop was created to highlight new and emerging technologies being applied to address, expedite or enhance a maritime-related mission. Held in August, the event features presentations from federal, regional, state, academic and private organizations, as well as "tech talks" on new products or services entering the market. Exhibit tables allow technology vendors to display their newest inventions. In 2018, the Naval Meteorology and Oceanography Command and OIA collaborated to provide pier-side demonstrations of systems deployed during the Advanced Naval Technology Exercise (ANTX) Gulf Coast. The results of customized vignettes addressing various Navy scenarios were demonstrated at The University of Southern Mississippi's new Marine Research Center in Gulfport, MS. Additional details are available at www.mtsociety.org and www.mset.org.

For more information,
contact OIA Event Coordinator Laurie Jugan, Laurie.Jugan@usm.edu

NUWC Division Newport Educational Outreach

Demonstration Lead: NUWC Division Newport, Chief Technology Office

For more than 10 years, Division Newport has been at the forefront of NAVSEA Science, Technology, Engineering and Math (STEM) education initiatives. The program works with area students from grades 4 - 12 to spark an interest in STEM, with hands-on learning opportunities and competitions, both at their schools and at Division Newport. Each year, Division Newport scientists and engineers work with more than 5,000 area students. The fruits of these labors create a pipeline, and Division Newport is now hiring these students as part of it's workforce.

The Undersea Technology Apprentice Program and the FIRST Robotics Competition, both culminating activities for high school students, are being highlighted in the ANTX booth by employees who participated in the programs as students themselves, along with the vehicles designed and competed by the students.

For more information, contact Candida Desjardins, 401-832-3371, candida.desjardins@navy.mil

Notes

HMI 18

ANTX

ADVANCED NAVAL TECHNOLOGY EXERCISE

2018

Human Machine Interaction