

NAVAL UNDERSEA WARFARE CENTER DIVISION NEWPORT



Hack the Reef

Applying artificial intelligence to underwater soundscapes



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MESSAGE FROM LEADERSHIP

The Naval Undersea Warfare Center Division Newport is pleased to present the 2022 Annual Overview!

As our nation relies more on our Navy's submarine fleet, the demand for our products and services has increased; the Division Newport workforce understands this urgency and importance and is poised to meet those demands as the Navy's technical stewards of the undersea domain.

Much of the work we perform throughout our technical departments exceeds the classification of this document but in these pages you will see how, as a Command, we provided expert, efficient support to the United States Navy, celebrated each other's accomplishments, shared our work with a high-level visitors, and embraced diversity within our workforce. Here is what you will learn about Division Newport:

- Working with the Fleet, other military services, and fellow warfare centers enabled us to share solutions.
- Collaborating with our industry and university partners advanced our technologies in small but significant ways.
- Efforts to inspire the next generation of scientists and engineers included robotics programs and internships.
- Digital transformation and cyber resilience are a regular part of our operations as we continued to ramp up these efforts.
- Innovation continued to be a driver for our workforce as we hosted numerous events to flex our creativity and problem-solving skills.
- Unmanned vehicle research, development, test & evaluation remained at the forefront of how we build our future Navy.

The metrics offer a snapshot of the behind-the-scenes work of our business departments while the photo collages show a workforce that is engaged, enthusiastic, and One Team!

Special thanks to all of our readers for showing an interest in our Command. To our workforce: thank you for your hard work, your camaraderie, and your dedication to Fleet excellence!



Ronald A. Vien

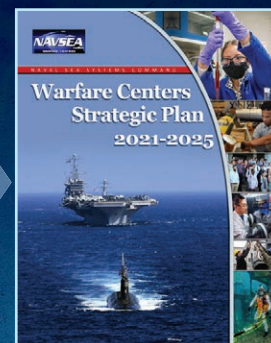
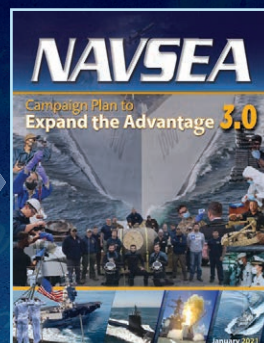
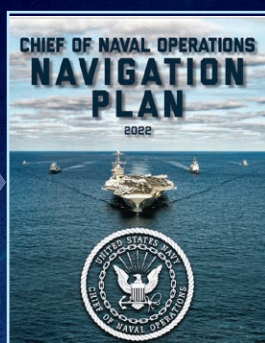
Ronald A. Vien, SES
Technical Director
NUWC Division Newport



Chad F. Hennings

CAPT Chad F. Hennings
Commanding Officer,
NUWC Division Newport

Higher-level Navy Strategic Guidance





UNDERSEA SUPERIORITY: TODAY AND TOMORROW



Mission:

We advance the state of the art in undersea warfare, ensuring maritime dominance through our research, development, and Fleet support.

Strategic Goals:

- Fleet Readiness
- Next-Generation USW Systems
- Workforce Excellence
- Excellence in Technical and Business Processes
- Leading-Edge USW Infrastructure

NAVAL UNDERSEA WARFARE CENTER DIVISION NEWPORT

LEADERSHIP CHANGES



Dawn Vaillancourt was selected as Division Newport's Business Director. In this role, she is responsible for aligning business operations with the Division's Strategic Plan, mission and vision. She will work across Division leadership with a focus on business process efficiencies; and stewardship of our technical domains. She oversees the Customer Advocate, Field Team and Strategic Planning offices, and is responsible for Command strategy workload planning, technical and business capability health, corporate investments, performance assessment, and workforce shaping across the Division. Most recently, Vaillancourt served as the head of the Strategic Planning Office, where she led high-level initiatives related to strategy, technical capability health, investments, and performance management over the past two decades. For her considerable efforts, she earned a Meritorious Civilian Service Award in 2020.



Robert Mayo was selected as Director of USW Electromagnetic Systems where he provides technical leadership dedicated to the identification and fielding of new technologies, engineering innovations and potential game-changing capabilities to be introduced to the Fleet in response to emerging threats. Mayo had served as the Technical Project Manager (TPM) for the Electromagnetic Maneuver Warfare Advanced Technology Development Program, where he led a diverse team of personnel in advancing critical spectrum technologies funded by a number of Navy, DoD, and non-traditional sponsors. He also served as the TPM for the NextGen electronic warfare (EW) system and as the EW Technical Direction Agent. Mayo has more than 35 years of experience in submarine Electronic Warfare, Imaging and Communications systems operations, analysis, design, development, testing and fielding. He initially served as a RadioMan First Class/E-6, Submarine qualified, gaining operational experience that has fueled his desire to advance the spectrum capabilities of the U.S. Navy submarine force.



Richard Bashour was selected as the new Director of Undersea Warfare Unmanned Systems and Autonomous Behavior. Bashour started working at NUWC in 2002 as an ocean engineer in the unmanned undersea vehicles (UUV) branch with a focus in the mechanical and systems design of UUVs after receiving his Bachelor of Science degree in Ocean Engineering from the University of Rhode Island. He has accumulated over 20 years of UUV experience gaining extensive technical, acquisition, and programmatic knowledge of UUVs and autonomous behavior focused on delivering UUV capabilities to the Fleet. He started the first three years of his career working on the development of the Mid-Sized Reconfigurable Vehicle, which helped set the stage of the medium-class UUVs known today. He then served as a Technical Project Manager (TPM) and advanced UUV technologies and capabilities. Bashour succeeded in managing the development, maturation, and transition of multiple UUV technologies through accelerated acquisition processes. Over the past two years, he has served as the TPM for the Command's Medium UUV Portfolio consisting of four UUV acquisition programs in support of both the expeditionary mine warfare and submarine communities.

Collaboration resulted in successful mission for Razorback

In June, subject matter experts from Division Newport supported the successful deployment of the Razorback from a Host Submarine during offshore training with Unmanned Undersea Vehicles Squadron One, the platform, and divers in collaboration with industry partners. Razorback is an autonomous underwater

vehicle with environment sensing payloads that could help submarines have eyes in more places underwater. This effort followed months of preparation and was sponsored by the Unmanned Maritime Systems Program Office.



Image courtesy of Defense Visual Information Distribution.

Snakehead vehicle reached milestones

Division Newport's Snakehead large displacement unmanned undersea vehicle (LDUUV) prototype hit a number of major milestones, including its christening in February and a key demonstration in July.

A U.S. Navy team led by Division Newport staff demonstrated an end-to-end intelligence preparation of the operational environment (IPOE) mission with the Snakehead LDUUV at the Narragansett Bay Test Facility (NBTF).

Snakehead, a modular, reconfigurable, multi-mission LDUUV deployable from submarines and surface ships, provides guidance and control, navigation, situational awareness, propulsion, maneuvering, and sensors in support of the IPOE mission. Snakehead is innovative in the areas of hull materials, lithium-ion battery certification, advanced sensors, and launch and recovery from both submarines and surface vessels.

The accomplishment of this mission in the system's intended operational environment was a big step for the program to gain confidence in the vehicle software and hardware systems, as the team push toward extended endurance operations and layering additional system capability. The IPOE mission is a critical step toward understanding an area of interest and feeds into planning a relevant course of action to support the warfighter.

To date, Snakehead has conducted 155 in-water sorties and more than 78 hours of runtime utilizing a government-owned and controlled modular open system architecture to include vehicle controller software; autonomy software; and command, control and communications software — TopsideC3 — for mission planning, operations and analysis. Since last year, the team has conducted up to 190 hours of simulations using full-up vehicle hardware-in-the-loop and software-in-the-loop simulation tools. These simulated missions ensure the software operates as intended and mission parameters are set correctly and confirmed by the vehicle.

The February christening was jointly hosted by the Program Executive Office Unmanned and Small Combatants and Division Newport at the NBTF.



Snakehead team at vehicle christening.

Engineers contributed to success of sink exercise

In June, engineers from Division Newport participated in the Valiant Shield 2022 Sink Exercise (SINKEX) event. Prior to the event, the team trained ship's force on the Mark 75 digital missile simulator, which was utilized onboard to simulate launches in preparation for the SINKEX. This event culminated with the successful launching of the Harpoon missile. Additionally, the Virtual Submarine land-based system was used to conduct the end-to-end engagement in real time with received live data. This was the first time Division Newport's Virtual Submarine was used with this level of fidelity. The Submarine Combat and Weapons Control Program and the Precision Strike Weapons Program sponsored this tasking.



Image courtesy of Defense Visual Information Distribution.



Image courtesy of Defense Visual Information Distribution.

Virtual Submarine supported large-scale Navy exercise

In July, Division Newport engineers collaborated with Commander, Submarine Force Pacific and the Navy Warfare Development Center to coordinate and execute several live and virtual naval experimentation events involving two submarines and Division Newport's Virtual Submarine as part of Rim of the Pacific (RIMPAC) 2022 events. To execute this exercise, Temporary Alterations and Temporary Engineering Change Insertions were installed on submarine platforms to enable afloat experimentation and evaluation by at-sea fleet operators. Lessons learned are planned for incorporation in tactical guidance, program of record system design and future joint-force experimentation opportunities. RIMPAC is the world's largest international maritime warfare exercise; this particular experimentation focused on kill-chain completion across the Navy enterprise, specifically with the command and control infrastructure and decision-making process for currently fielded and planned capabilities. The Submarine Combat and Weapons Control Program Office is among the sponsors for this effort.

NUWC detachment supported mission-critical test and evaluation

The Atlantic Undersea Test and Evaluation Center (AUTEC) Range continued to provide a multitude of Range services in support of the Navy's Fleet Training and Readiness, Research, Development, Test and Evaluation missions. As one of the Department of Defense's Major Range and Test Facility Bases (MRFTB), AUTEC is part of the core DoD Test and Evaluation (T&E) infrastructure preserved as a national asset to provide T&E capabilities supporting the DoD acquisition system. While its primary function is to test current and emerging capabilities to support the DoD mission, AUTEC also provides a critical training and certification environment for warfighters and the equipment that they will take into combat.

As such, Division Newport delivered in-water tracking and other range systems to ensure AUTEC resources are mission-ready and provide high accuracy and reliable data. In fiscal year 2022 the AUTEC Range supported more than 1,700 hours of range tracking and 1,700 hours of non-tracked hours that included support for: Submarine Command Course and submarine tactical development and weapons certifications, Helicopter Maritime Strike Weapons School Helicopter Advance Readiness Programs, Surface Ship Radiated Noise Measurement, and Surface Ship Anti-Submarine Warfare Certification. T&E included various ship and submarine combat systems, sonar and other shipboard sensor accuracy certifications such as Combat System Ship Qualification Trial, Virginia-class Weapon System Accuracy Trials, and unmanned underwater vehicle testing. During this period AUTEC Range users included 33 ships and submarines, 32 rotary wing and 135 fixed wing aircraft, and 288 torpedoes.



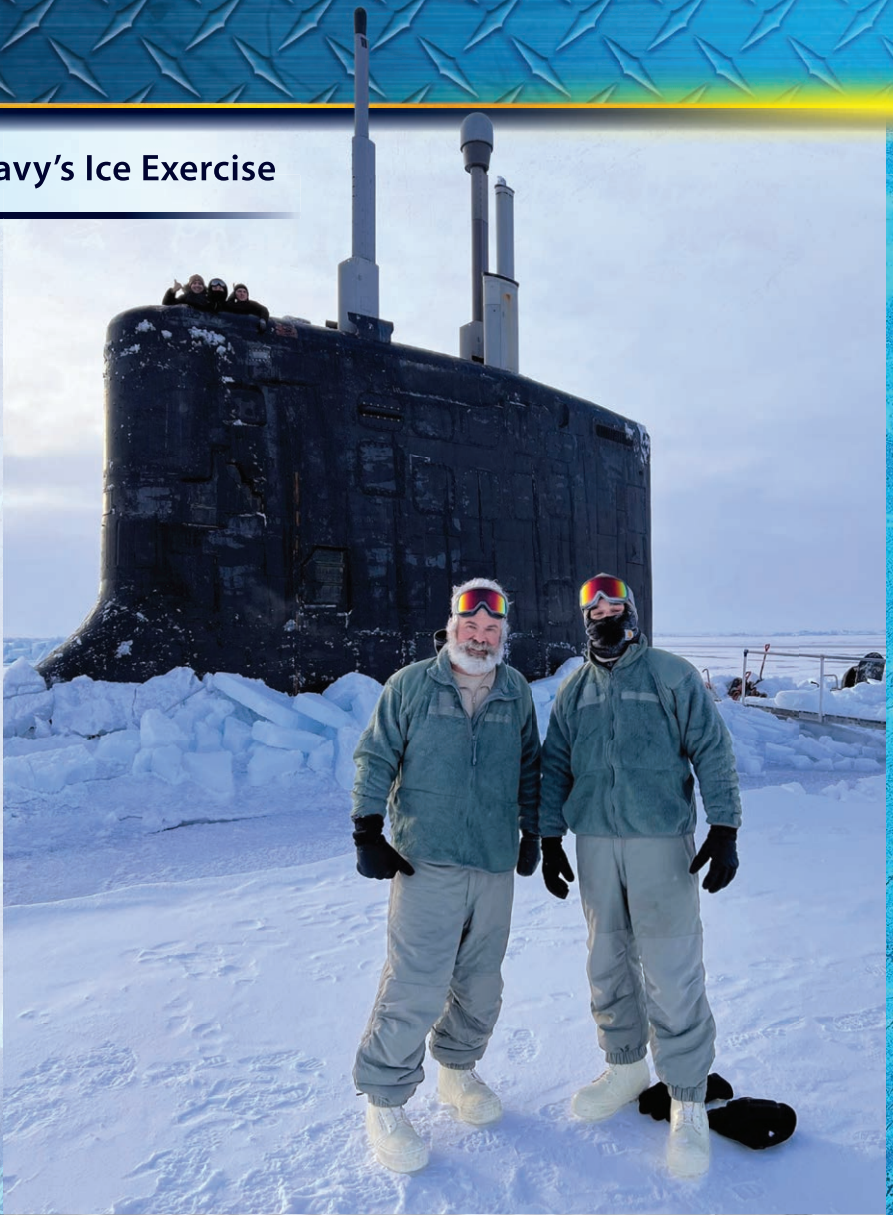
AUTEC test range

Division Newport teams supported Navy's Ice Exercise

A three-week work assignment led a group of Division Newport employees to the top of the world on a grueling, productive, and rewarding adventure. In early March 2022, the teams began their journey to the Arctic Circle, more specifically, U.S. Navy Ice Camp Queenfish as part of the Navy's biennial Ice Exercise (ICEX), a real-world assessment of the operational readiness of the region. During ICEX, fast-attack submarines fired exercise torpedoes under the Arctic ice, which Navy divers and torpedo recovery team members then recovered. Division Newport environmental planners and submarine tactical development staff also supported the event.

ICEX 2022 provided an opportunity for Navy specialists and civilian scientists to conduct research from a floating ice camp where they collected data on Arctic conditions and how equipment and unmanned undersea vehicles respond to extreme temperatures.

Division Newport has supported ICEX environmental logistics since its inception. Every two years, U.S. Fleet Forces Command and the Arctic Submarine Laboratory tap into the command's Mission Environmental Planning Program (MEPP) team for its expertise in environmental compliance, marine mammals, and biological resources.





Part of that operational readiness is understanding the performance of torpedoes in the Arctic. Division Newport provided the expertise, torpedo software, tracking and performance data as well as troubleshooting and guidance to leadership in the command tent and aboard submarines. A Torpedo Recovery Team recovered five exercise torpedoes from under the ice with average temperatures in excess of -25°F with wind chills as low as -55°F . All members of the teams performed exceptionally well in spite of the harsh Arctic environment.

Members of Division Newport's Engineering Diving Support Unit have supported previous ICEX events, as part of the Torpedo Recovery Team, however, this was the first year, that a Division Newport diver integrated with other dive teams to complete an under-ice torpedo recovery. The process for recovering a torpedo in the Arctic is detailed and arduous, which is made more complex by extreme cold temperatures and windy conditions.

ICEX allows the Navy to increase experience in the region, advance understanding of the Arctic environment, and continue to develop relationships with other services, allies, and partner organizations.



Vice Adm. Galinis toured Command

Naval Sea Systems (NAVSEA) Commander Vice Adm. William J. Galinis visited Division Newport in May for extensive tours of the warfare center's facilities and operations. A surface warfare officer earlier in his career, Galinis took over NAVSEA's 45th commander in June 2020. During his tour of Division Newport, Galinis got an up-close look at how the warfare center innovates and executes in its areas of expertise.

At the Towed Systems Complex, Sensors and Sonar Systems Department employees gave an in-depth explanation of how the facility operates. The complex is used to support the full spectrum of science and technology, advanced development, and in-service engineering of submarines and surface ships, including towed sensor arrays — used for submarine and surface ship range and detection — and advanced development and handling systems. The facility is used for fabrication, test and evaluation, repair and refurbishment of towed sensor array modules, as well as prototypes, fleet sensors and fleet training — operation and



Vice Adm. William J. Galinis, NAVSEA Commander

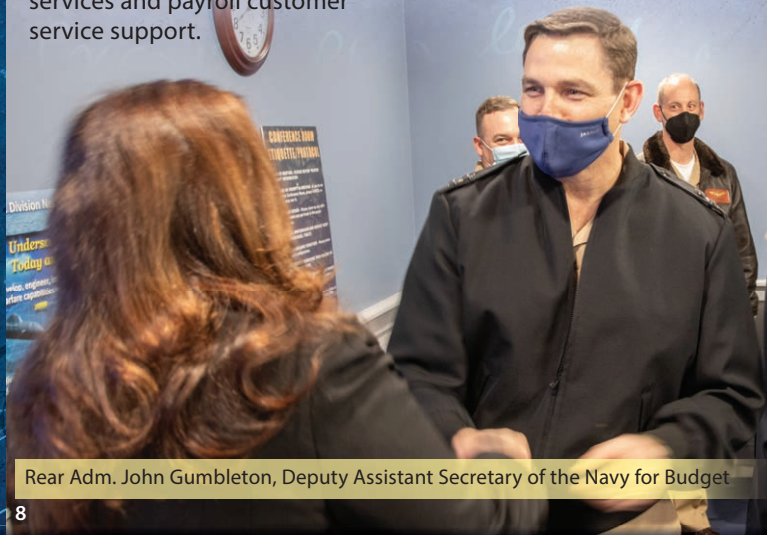
maintenance — on submarine and surface ship towed array handling systems.

Galinis also toured the facilities responsible for submarine communications, periscope repairs, weapons and defensive systems, unmanned systems, combat control systems and payload integration.

Visit from Navy's top financial director highlighted Division's fiscal health

A visit from the Navy's top financial director, Rear Adm. John Gumbleton, in January provided an opportunity to spotlight the warfare center's fiscal management process. Gumbleton serves as the Deputy Assistant Secretary of the Navy for Budget, as well as the director of the Fiscal Management Division, within the Office of the Chief of Naval Operations. During the visit, the admiral learned how the Comptroller Department is a critical cog in Division Newport's success.

Operating under a Navy Working Capital Fund model means that Division Newport functions under business financial management principles in a buyer-and-seller approach. The Comptroller Department is responsible for a number of critical tasks as a means to ensure the fiscal health of the organization. These include, but are not limited to, managing travel services; administrating all incoming and outgoing funding; coordinating financial planning, analysis and monitoring of all programs; developing and monitoring operating budgets; and providing all accounting services and payroll customer service support.



Rear Adm. John Gumbleton, Deputy Assistant Secretary of the Navy for Budget



Lisa Radocha (center), Executive Director of PEO SSN

Executive director of NAVSEA's attack submarines program toured Command

Lisa Radocha, executive director of NAVSEA's Program Executive Office for Attack Submarines (PEO SSN), visited Division Newport in November for laboratory tours and discussion.

"With so many ships in construction, the legacy your folks are creating and the work with them is so important," Radocha said during the visit. "You have a pipeline of talent here and people come here because of the work that you do."

As executive director and a member of the Senior Executive Service, Radocha oversees attack submarine platform acquisition, development and sustainment.

Division Newport plays an important role in this process as the warfare center provides research, development, test and evaluation, engineering and fleet support for submarines, autonomous underwater systems, undersea offensive and defensive weapons systems, and countermeasures associated with undersea warfare.

Under Secretary of Defense for Research and Engineering toured Division Newport

Division Newport welcomed the Under Secretary of Defense for Research and Engineering Heidi Shyu for discussions on the organization's operations and tours of some of its facilities in June. In her role, Shyu serves as the Chief Technology Officer for the Department of Defense (DoD), mandated with ensuring the technological superiority of the U.S. military, and is responsible for the research, development and prototyping activities across the DoD enterprise.

Under Secretary of Defense for Research and Engineering Heidi Shyu

“*I was very impressed by what I saw,” Shyu said. “The quality of analysis, and the integration of engineering with the user’s perspective in such a great facility. Undersea is such a critical domain of military power in which we absolutely must maintain dominance.”***”**

Congressman Langevin discussed complex challenges in cybersecurity

In November, U.S. Rep. James Langevin (D-RI) made his final visit to Division Newport as the representative for Rhode Island’s 2nd Congressional District to give a speech on the challenges of maintaining cybersecurity superiority.

“I have to admit, I’m a little sentimental being here for my final speech at the NUWC campus as a sitting member of Congress,” Langevin told the crowd gathered in Chafee Auditorium. “As you know, I decided not to seek re-election so my term will come to a close at the end of this year, but I really am thrilled to speak with you



Former U.S. Rep James Langevin (D-RI)

during such a crucial moment in world history. As we combat threats from around the globe, the ability to project power has never been more critical than it is right now.”

Assistant Secretary of the Navy for Energy, Installations and Environment toured Division Newport

Division Newport welcomed Assistant Secretary of the Navy (ASN) for Energy, Installations and Environment (EIE) Meredith Berger in May for tours and a series of award presentations.

Berger presented Division Newport with the Chief of Naval Operations Award for Safety Ashore in the large, non-industrial category — the second consecutive win for the warfare center. The award recognizes the overall quality of the many innovative programs managed by Division Newport’s Safety and Occupational

Health Branch, including compliance to safety and health standards and proactive mishap prevention efforts. In addition to the awards presentations, Berger also toured a number of Division Newport’s facilities that tie into her role as ASN for EIE. She is responsible for providing oversight and policy for Navy and Marine Corps energy and climate resilience; infrastructure sustainment, restoration and modernization; military construction; acquisition, utilization and disposal of real property and facilities; environmental protection, planning, restoration and natural resources conservation; and safety and occupational health.



Assistant Secretary of the Navy for Energy, Installations and Environment Meredith Berger

Argus system evaluated by Coast Guard for counter-unmanned vehicle capabilities

The Argus Expeditionary Maritime Defense System team partnered with the U.S. Coast Guard (USCG) Research and Development Center to evaluate capabilities that could aid the Coast Guard's detection efforts, particularly with counter-unmanned undersea vehicle (UUV) missions. As part of its efforts to provide maritime security and protect critical infrastructure, the Coast Guard is looking for solutions that would enable detection of UUVs in near-shore environments.

The proliferation of unmanned systems poses a threat to littoral areas and requires quick, effective, and flexible defense systems. To provide a viable solution to this challenge, Argus employs commercial off-the-shelf active sonars to detect, track, classify, deter and defeat undersea targets and combines it with radar and forward-looking infrared cameras to track surface and airborne targets — all in an expeditionary system.

Argus is composed of field-tested components (sensors, effectors, etc.) that can be tailored to fit specific missions. Its command and control software integrates sensor data into one common operating picture, providing multi-domain situational awareness and critical input to the deter/defeat technologies.



Division Newport - Coast Guard collaboration

Also participating in the event were fleet operators from Unmanned Undersea Vehicle Squadron One who operated IVER-3 UUVs as the "threat" to be detected and mitigated. Staff from the Coast Guard Research and Development Center and USCG Maritime Safety and Security Team Cape Cod — one of the anti-terrorism teams of the Coast Guard — were on hand to evaluate the system, assess interoperability with their response assets and tactics, and generate feedback on Argus deployment and operation from a Coast Guard perspective. After integration and training with their teams and response boats, the Coast Guard rapidly reacted to information provided by Argus and performed response maneuvers against the IVERs.



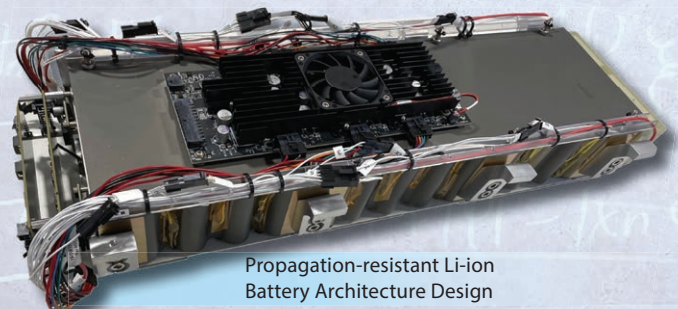
Decision Making and wargaming

Team supported the Wargaming and Experimentation Center

In August, scientists and engineers supported a Modeling and Simulation (M&S)-enabled event in support of the Submarine Force Wargaming and Experimentation Center (WEC). This event enabled Fleet operators situated at the WEC facility in Pearl Harbor to exercise multiple simulated submarines within a complex, high-priority operational scenario. Enhancements to M&S capabilities for this event included operator weapon control and alerts via Virtual Worlds interfaces, and sophisticated threat entities behaviors directly facilitated by the deputy director of the Undersea Aggressor Squadron, participating on-site at the WEC. Multiple warfare centers provided M&S capabilities support using distributed, interconnected networks. For the first time the execution of the Long-Range Fires vignette was simultaneously supported at Division Newport during the execution of this WEC event. The results of this and preceding WEC events have directly informed Concept of Operations for submarine employment. During the hot wash, the Fleet participants expressed a desire for more frequent opportunities to make use of these capabilities. This effort was supported by Warfare Center Strategic Investment as well as Navy Enterprise Modeling and Simulation funds via the Office for the Chief of Naval Research and Director, Innovation Technology Requirements and Test and Evaluation.

Team developed first-of-its-kind, submarine-safe Lithium-ion battery

Division Newport's Power and Energy team, comprised of innovative engineers and scientists, collaborated with warfare centers, industry, and Navy labs to enable a critical technology for the Fleet. In support of the Navy's Advanced Undersea Systems Program Manager (PMS 394), Ships Unmanned Systems Battery Initiative, the team partnered with the Naval Surface Warfare Center (NSWC) Carderock, NSWC Crane, the Navy Research Laboratory, NASA, and industry to develop lithium ion (Li-ion) batteries that not only provide two times more energy to unmanned systems over existing nickel metal hydride batteries, but are seeking final approval for use inside a submarine. The team designed passive propagation resistant Li-ion architectures and manufactured a first-of-its-kind battery with industry leaders for the safe use on-board a submarine platform. In addition, using Li-ion batteries to power UUVs will enable critical capabilities for the fleet. Division Newport's team is the lead for the battery design and development as well as platform integration. They achieved several critical milestones to solve the safety issues and risks involved with Li-ion batteries on a submarine. By designing a common architecture, their solution will have multiple applications.



Propagation-resistant Li-ion Battery Architecture Design

Additive Manufacturing Working Group met to discuss latest efforts

Representatives from NAVSEA warfare centers and other Navy research installations met at Division Newport in October for a meeting of the Additive Manufacturing Warfare Centers Working Group to discuss their latest efforts in the domain. In addition to the warfare centers, representatives from the Deputy Assistant Secretary of the Navy, Naval Information Warfare Center (NIWC) Pacific, NIWC Atlantic, NAVSEA Engineering and Logistics Directorate Technology Office, Department of Energy Naval Nuclear Laboratory, and the Naval Research Laboratory participated. Each day opened with tours of Division Newport's facilities, followed by presentations and discussions on each organization's efforts in additive manufacturing. Participants toured the Advanced Concepts in Mechanical Engineering Lab, anechoic chamber, wind tunnel, Undersea Warfare Platform and Payload Integration Department Makerspace, Ranges, Engineering and Analysis Department Additive Space, Chemistry Laboratory, Bio-inspired Research and Development Laboratory, and the Narragansett Bay Test Facility.



Additive Manufacturing Working Group



SSTM Workshop

Technology leaders collaborated on solutions to Navy challenges during forum at Division Newport

Rapid prototyping senior scientific technical managers (SSTMs) from across Naval Research and Development Establishment (NRDE) gathered at Division Newport for an undersea warfare forum in August to discuss future Navy requirements and how to quickly transition capabilities to the warfighter.

The role of the SSTM is to provide senior technical leadership across the NRDE, Navy, Department of Defense, academia, and industry to expedite solutions from concept through transition and fielding of new technologies. The group focused on eliminating stovepipes, sharing best practices, and leveraging fleet exercises to pursue rapid insertion of technology. At the end of the forum, the team shared their ideas with Dr. Brett Seidle, the new Deputy Assistant Secretary of Navy Research, Development, Test and Evaluation, who will roll out his vision for the organization to build a cohesive NRDE team.

This working group's understanding of mission threads and capability gaps allows them to better engage with the fleet and Navy leadership with the ultimate goal of promoting a culture of innovation and collaboration to drive transition and technology insertion. Other goals include improving warfare center collaboration, implementing collaborative processes and tools, and enhancing warfare center communication.

Ocean sciences community gathered for knowledge sharing, planning

In September, Division Newport hosted close to 100 scientists for the Task Force Ocean Technical Exchange Meeting (TOTEM) addressing "Environmental Impact on Submarine Sonar Systems." Task Force Ocean (TFO) promotes oceanographic research in academia as it pertains to the U.S. Navy and its challenges. In particular, TFO seeks to connect oceanographic data to the warfighter in an efficient, effective manner and emphasizes the importance of the oceanographer in naval operations whose role is to collect operationally relevant data and distill it quickly for the warfighter. TOTEM gathered the Fleet-support community including academia (Naval Postgraduate School, Woods Hole Oceanographic Institution, University of Rhode Island, Scripps Institute), Navy research (Office of Naval Research, Naval Research Laboratory, Naval Undersea Warfare Center, Naval Surface Warfare Center), and operational commands (Fleet Numerical Meteorology and Oceanography Center, Commander, Navy Meteorology and

Oceanography Command, Naval Oceanographic Office, Undersea Warfare Development Center) to discuss what is known, unknown, needed, and useful in order to ensure continued success in mission objectives.



Task Force Ocean meeting

INDUSTRY ENGAGEMENT

Industry partners collaborated at Northeast Tech Bridge's Demo Day

In September, the Northeast Tech Bridge hosted its first Demo Day to introduce new undersea technology from local start-up companies to a Navy audience. The event, which featured seven companies, technology demonstration, and information sessions, was held at the Narragansett Bay Test Facility.

The Office of Naval Research (ONR) established a series of technology, business, and workforce programs to create an effective agility network across the naval research and development establishment, and to promote partnerships with government, academia, and industrial partners. Tech Bridges are ONR-sponsored entities that bring together innovative organizations to accelerate results and solutions for the Navy. One way they do that is by increasing local access to innovation ecosystems.



Welcome to Demo Day!

The Northeast Tech Bridge is the government side of the Tech Bridge with focus areas such as undersea vehicles and undersea sensors. Ultimately, the first Demo Day achieved its goal of connecting industry to the Division Newport workforce.



Q&A



Demonstrating current technology

Underwater wireless network tested at Narragansett Bay Test Facility

Division Newport assisted Massachusetts-based small business Bionet Sonar by underwater testing its new wireless technology called HydroNet at the Narragansett Bay Test Facility in February. HydroNet is an open, modular, and programmable underwater modem that powers an autonomous wireless communications system bringing the internet underwater and empowering the network with artificial intelligence-driven, software-defined technologies. For the test, the team deployed two wireless modems that were connected to two Bionet smart buoys, which allowed for interface and computing capabilities. The smart buoys were connected to the company's server through a secure channel. During the two days of testing, the team collected the data needed to move its project forward. The Defense Advanced Research Projects Agency, through the Small Business Innovation Research and Small Business Technology Transfer (SBIR/SBIT) programs, funds the HydroNet project. The SBIR/SBIT programs encourage small businesses to engage in government research and development with the potential for commercialization.



Industry using Narragansett Bay Test Facility

In-water testing pushed technology forward

Division Newport's Northeast Tech Bridge partnered with the non-profit 401 Tech Bridge to scan the industrial landscape for inexpensive unmanned surface vehicles (USV) with sonar capabilities. They identified a vehicle and technologies that included an acoustic array, acoustic data acquisition system, and onboard processor; they were able to automate the fusion of data from multiple vehicles and sensors. The industry partners were invited to the Narragansett Bay Test Facility to test how these technologies would work together. Division Newport's command and control system Topside C3 was also employed to aggregate the information. In a matter of days, companies who had never worked together were reaching solutions. By the end of the week, one company was optimizing the USV path planning, while another had its vehicles in-water passing sonar data. The sonar data was integrated into a multi-sensor multi-target fusion engine, and the data was being displayed on Topside C3. The effort collected sonar data for future algorithm development, which applies to a wide array of USVs with sonar capabilities. The industry-Navy interaction proved invaluable as they were able to understand needs and make adjustments in real time.



Collaboration with Commercial Fisheries Research Foundation yielded beneficial results

An endeavor with researchers from the Commercial Fisheries Research Foundation (CFRF) may lead to improved fishing operations in Narragansett Bay while giving Division Newport a better-encompassing picture of the underwater environment. For Division Newport, being the technical stewards for the undersea domain requires an all-encompassing knowledge base; this extends to having a deep understanding of the domain in which submarines operate.

As part of an agreement with CFRF, Division Newport ocean engineers collected temperature data in Narragansett Bay to better understand the relationship between population densities of specific species of fish and water temperature. To ascertain this information, a distributed temperature sensor (DTS) measured water temperatures for several days near Gould Island in Narragansett Bay. As expected, there were water temperature fluctuations of several degrees based on the tide, sun, and wind, but there were some unexpected temperature shifts in other areas that the DTS identified that typically are missed using a single



point-based measurement of temperature. After determining the safest and most effective means of utilizing a DTS, the team concluded this method could greatly benefit the fishing community. The overall objective is to identify technology interests that benefit the Navy and the state — especially in support of the blue economy.



Rhode Island proposed opportunities for Narragansett Bay, Division Newport

Smart Bay, a new Rhode Island initiative that is part of the U.S. Economic Development Administration's Build Back Better Regional Challenge, and the Blue Economy were the focus of a briefing in February.

Rhode Island's blue economy addresses the sustainable use of ocean resources for economic growth, improved livelihood and jobs, and ocean ecosystem health. The Blue Economy spans seven sub-industries: defense, marine trades, fisheries, offshore renewable energy, ports and shipping, tourism and recreation, and aquaculture. Narragansett Bay, in particular, offers an opportunity to set up data-collecting infrastructure that will benefit all seven industries. Division Newport would benefit from the environmental and acoustic data collected through the initiative and the creation of a digital environment for modeling and simulation. Smart Bay would make Narragansett Bay "transparent" through data streams from underwater communications, underwater GPS, high-resolution bathymetry and sonar imaging, distributed temperature and environmental sensing, underwater video and localization devices. The data from these sources can be collected at various "Smart Bay hubs" and made accessible to industry, academia, and government. The idea is to collect higher fidelity information and more specific information about the Bay, connect resources using a secure distributed integration network, and compute using universities' high-performance computing centers.



Division Newport co-hosted Industry Days

Division Newport and the Rhode Island Chapter of the National Contract Management Association co-hosted the 17th biannual 2022 Industry Days in October. Presentations covered Division Newport's technical program information, long-range plans and strategies, highlighting near-term procurement requirements. Each of Division Newport's technical departments provided a two-year forecast of anticipated procurements, as well as initiatives to address future technical, budgetary and performance challenges. This gave businesses insight into potential government projects, as well as the ability to network with government decision makers and industry partners.

EDUCATIONAL OUTREACH



Division Newport hosted Naval Engineering Education Consortium students, faculty

Students and faculty from universities across the country gathered at Division Newport for an annual meeting of the Naval Engineering Education Consortium (NEEC) held in June. "NEEC Day" was packed with presentations, a poster session, networking, and lab tours. NEEC, which is directed by NAVSEA and implemented at the 10 warfare centers, executes projects that target the Navy's most relevant technology needs. The program has three main objectives — acquire academic research results that address Navy technological challenges; hire talented students; and develop exceptional working relationships with science and engineering colleges, universities, professors, and academics.

Deputy Assistant Secretary of the Navy for Research, Development, Test and Engineering Dr. Brett Seidle kicked off "NEEC Day 2022" via a Teams meeting.

"What we're doing plays a critical role in achieving goals on multiple fronts," Seidle said. "It's strengthening the cadre of scientists we have and strengthening our partnerships with academia. Warfare Centers bring technical capability to the Navy and the nation. Our impact on success will be about technical advantage. It's important to have innovation. This program allows us to build strong bridges. There are 440 science and engineering students participating in NEEC efforts."

If you're working on our Navy's problems right now, we'd love to have you come work for us."

University projects parallel Warfare Center technical capabilities, including (but not limited to): advanced materials, advanced sensor technologies, autonomous systems, machine learning, neural networks, and artificial intelligence. Projects address a wide range of Navy technology areas including naval surface and air range systems engineering, naval systems material readiness assessment, sensors and surveillance systems, surface combat control systems and unmanned systems engineering and integration.

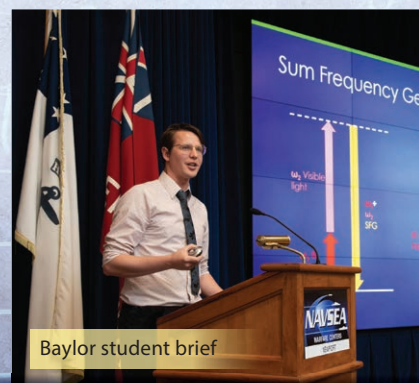


Partnership with academia aimed to advance autonomous capabilities

Division Newport partnered with Baylor University on a Naval Engineering Education Consortium (NEEC) project to improve the autonomous capabilities of robots. The objective of this project, titled, "Improved Robot Autonomy using Neuromorphic-Based Stochastic Computing," is to use novel computing techniques to provide improved autonomous robot capabilities by fundamentally changing the way onboard computation is performed. A critical step to this is understanding how to exploit the sensed environment in novel and efficient ways.

NEEC, established by NAVSEA and executed by the warfare centers, aims to develop and attract new professionals into the broad technical fields associated with current and future U.S. Navy ships and submarines. Three Baylor University students had the unique opportunity to continue their NEEC project by working alongside technical experts at Division Newport as participants in the Naval Research Enterprise Internship Program. The students worked on-

site all summer, conducting circuit and algorithm co-development, computer simulation and circuit hardware experiments. The group also assessed the performance of a proposed method utilizing a bio-inspired, neuromorphic engineering-version of stochastic computing. The goal of the project is to develop better onboard computation systems for small, autonomous robots performing missions such as surveying, mine detection and mine countermeasures. If successful, potential applications could include integration into systems to improve navigation, acoustic localization or underwater sound tracking in challenging environments.



Bring a Child to Work Day introduced young audience to science and engineering

Division Newport employees and their family members stood at attention one morning in April as the American flag swiftly raced up the flagpole during morning colors, signifying the official start of Bring a Child to Work Day, an annual event that had experienced a two-year hiatus because of the pandemic. More than 375 participants attended the day designed for children ages 9 to 17. A schedule of 34 workshops offered a greater understanding of what employees at Division Newport do and why it matters. Long lines formed as participants waited for the popular "Lasers at Work" demonstration. There, scientists showed how light appears on the electromagnetic spectrum. The group also conducted an experiment where they used an interferometer and laser beam to measure the pulse of a volunteer from the audience. The Acoustic



Electricity demonstration

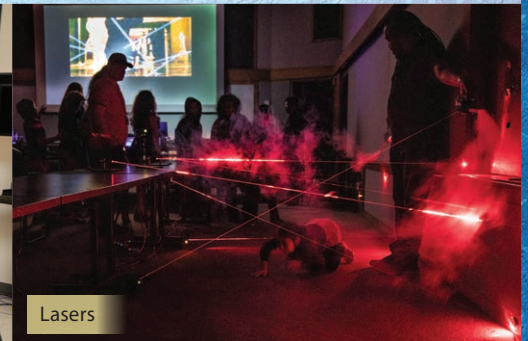
Wind Tunnel, Anechoic Chamber, Propulsion Test Facility, Material Testing Laboratory, self-guided tour through Torpedo Alley and Spot robot tutorial proved to be popular with children and employees as well. Events were aimed at encouraging would-be scientists and engineers.



Manning control panel



Periscopes



Lasers

Educational Outreach continued to inspire

Each year, Division Newport's Educational Outreach Program energizes more than 100 Division Newport scientists and engineers to go into schools and interact with more than 5,000 students. These interactions can be informal like judging science fairs, or formal opportunities through internships like the Naval Research Enterprise Internship Program, the Naval Engineering Education Consortium, or the Science, Mathematics and Research for Transformation program. Division Newport works extensively with universities throughout the country through its University Lecture Series and various partnership agreements. Three congressionally sponsored university collaborations that began in the past five years have strengthened this bond. The largest of the three, the National Institute for Undersea Vehicle Technology, works with partners from the University of Rhode Island, University of Connecticut and Electric Boat to address problems in a variety of technical areas. Similar operations are ongoing with the Mechanics of Undersea Science and Engineering and Marine and UnderSea Technology collaboratives that operate with Brown University and the University of Massachusetts Dartmouth, respectively.



Robotics

Students learned robotics through Command's educational programs

Excitement and interest in careers in science, technology, engineering and math (STEM) has been the goal of Division Newport's Educational Outreach Program for decades. Sea Lab — just one of two STEM programs conducted last summer — has been in place for more than 10 years.

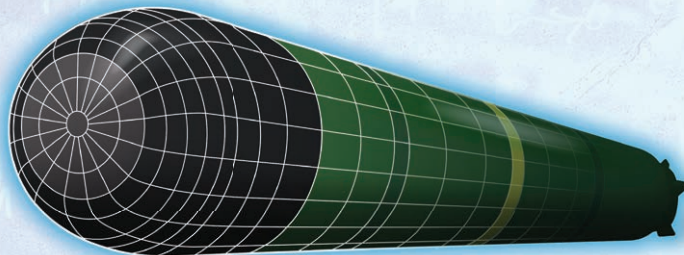
Students from regional schools attended the six-week program aimed at teaching the fundamentals of engineering: mechanical, electrical, logic, and problem solving. The students built a robot from scratch, and then programmed it to operate in different directions and to pick up and move different items. Sea Lab also gave students the opportunity to experience new areas of academia and spark new interests.

Another program, the Undersea Technology Apprentice Program (UTAP) is held each summer in two, three-week sessions in Division Newport's Undersea Collaboration and Technology Outreach Center. The program offers high school students an opportunity to work with advanced technology while developing real-world applications of science and math lessons learned at school. In UTAP, students create and program an underwater vehicle to pick up weighted objects, identify the name of a ship, and move in the various directions. The program provided a unique opportunity for students to learn valuable lessons as the teams had to work through unanticipated obstacles that arose while their vehicles were in the water.

Teams employed Model-Based System Engineering to great success

Engineers demonstrated excellence with their innovative model-based system engineering (MBSE) simulation via an executable model entitled "Submarine Requirements Model-Based System Engineering-Torpedo Salvo." MBSE was applied to systems engineering problems to show an actual use of the technique in applicable technical areas. The torpedo salvo model was developed with the future in mind, allowing for further functions, and physical and logical architectures to be added along with other ship design elements added as needed to enhance the model. The torpedo salvo model resulted in the use of MBSE techniques to explore the SSN(x) Design space starting in fiscal year 2022. The original investment of \$60,000 resulted in approximately \$3 million of direct funding for MBSE tasking across multiple warfare centers.

In the past year, the Combat System Trainers program grew exponentially to serve both the submarine and surface fleet, as well as multiple program offices with state-of-the-art trainers. Considering pandemic issues and strain on essential mission deliveries, Combat Systems Trainers leadership focused on rapidly



enhancing Fleet Readiness with innovative ideas that inspired self-empowerment. The engineering team established, coordinated, and executed a digital transformation engineering philosophy and methodology to decrease employee learning curves. The team also encouraged MBSE knowledge, usage, and innovative thought. Their efforts resulted in implementation of four engineering techniques: virtualization, MBSE, agile software development, and programmatic use of JIRA, which have met the digital transformation efforts.

New Testing Approach Targeted Cyber Resilience

A team of engineers from the Undersea Warfare Combat Systems Department applied a new and comprehensive approach to cybersecurity testing. Influenced by feedback from Director, Operation Test and Evaluation reports, the Virginia/Columbia Early Development Test Group set out to add cybersecurity technical rigor to its test processes with the result being a thorough, carefully crafted process that implements penetration testing at early phases of operational test and evaluation. Their efforts significantly added confidence to the Virginia and Columbia programs with regard to cyber.

The Division Newport team applied an innovative approach to operational testing by adding Red Team penetration testing at the development stage of new platform technology. These subject matter experts developed an approach that will continue to be used as more technical insertions arise. The ultimate beneficiary is the warfighter who will receive more cyber-resilient systems from the onset of platform integration.



Reducing computing space paved the way for future unmanned systems

Improving computational efficiency is a crucial step in creating an intelligent optimal control system for unmanned undersea vehicle (UUV) models and their ability to learn and improve in real time. Deep Reinforcement Learning, or Deep RL, a subset of machine learning, and its associated algorithms are computationally intensive. While the Navy is currently developing AI/ML solutions on servers that have a wealth of computational services, UUV development is challenged by not having access to the computing power of a large data center. As part of the Navy's intelligent autonomous systems strategy, Division Newport is looking to develop smaller and distributed capabilities as a complement to larger, more powerful, and proven capabilities. To enable this, Division Newport is looking at edge computing as a possible solution. Edge computing processes data closer to where it is being generated — this allows for more intelligent autonomous systems that can learn at machine speed given data collected in-situ during deployment. These improvements lead to greater action-led results in real time. Researchers are working to develop Deep RL algorithms with reduced computational requirements from that of a data center to an edge-computing device employed by a UUV. By reducing the resources needed for massive computational capabilities to the size of an edge computing device, this will allow UUVs to not just run missions but learn from them and adapt, thereby giving UUVs the ability to improve their performance in real time. Computationally efficient machine learning solutions will maximize the capabilities of edge-computing devices and reduce the computing resources needed for memory, time, and energy. Issues of Size, Weight, and Power, or SWaP, will be significantly alleviated.

Innovation event devised novel solutions to challenges at Navy ranges

Problem-solvers from across Division Newport brainstormed solutions for Hack the Range II: Long-Range Weapon, a sequel to Hack the Range: Range Security. The event held in May sought to identify novel solutions to challenges of how Navy ranges will support the development, testing, and training of advanced capabilities of weapons and autonomous vehicles with extended range, endurance, and capability.

Hack the Range II followed the same process as previous innovation events: brainstorming, team forming, idea development, and final pitch presentation, ending with a panel of judges selecting a winning idea. For Hack the Range II solutions to be effective, novel approaches and technology had to be cost-effective, fieldable, and supportable. Approaches where the unit under test — torpedo or UUV — is either augmented (added test equipment such as pingers) or unaugmented (no modification to the unit) were considered in the solution space. Event results will inform the undersea ranges vision and roadmaps that support long-range weapons and long-endurance UUVs.



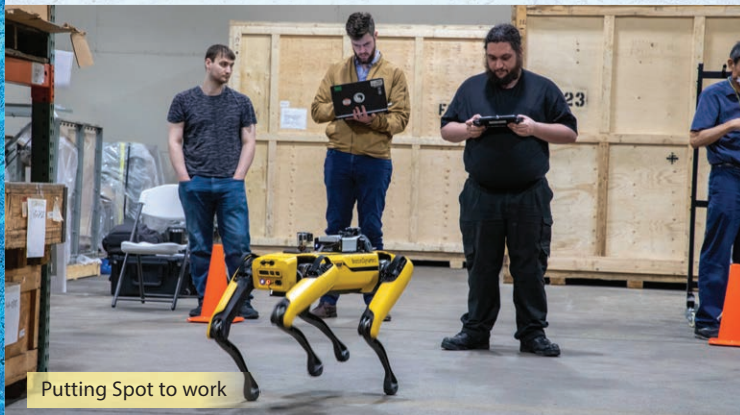
Voting for ideas



Forming teams

Innovators employed “Spot” in machine learning challenge

Six teams of Division Newport innovators gathered at a warehouse on Naval Station Newport for the “Spot Robot Warehouse Challenge Innovation Event” in June. The challenge provided an opportunity to demonstrate an effective end-to-end machine learning pipeline to autonomy.



Putting Spot to work

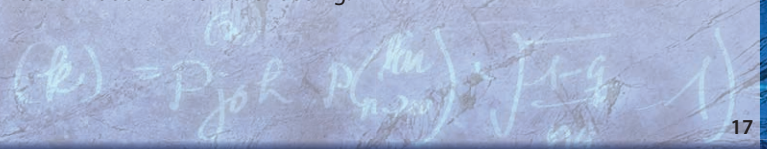


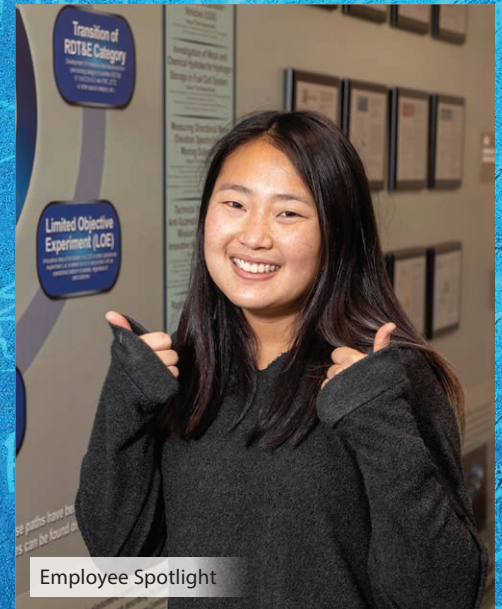
Programming Spot

The process allowed teams to develop solutions to some core problems such as identification and tracking of items, detecting misplaced items, and identifying missing or changed items in a warehouse environment. A product of Boston Dynamics, “Spot” is a four-legged robot designed to automate routine inspection tasks and data capture safely, accurately, and frequently. Engineers acquired Spot for the Division Newport workforce to develop their skills in autonomy. For this challenge, teams used Spot to identify objects of varying sizes, shapes, and visual characteristics.

The U.S. Navy contends with many complex and dynamic environments from detecting mines in cluttered landscapes to identifying changes to our critical infrastructure. Navy logistics is an example of a critical function to supply the necessary materials to keep the fleet on its mission.

The event successfully showcased teams’ ability to work on algorithms that are the basis of artificial intelligence and machine learning. Support from Naval Surface Warfare Center Philadelphia Division (NSWC PD), University of Massachusetts Lowell, and Brown University — all of whom brought their own Spot robots to the challenge — provided collaboration beyond Division Newport’s science and technology community. The warfare center teams will collaborate to explore the idea of leveraging mutual strengths. NSWC PD would use its advanced autonomy as a sensing platform, while Division Newport would provide a machine learning classifier via a docker container suitable for deployment on its Spot. As far as possible transition for use by the U.S. Navy, this event showed Spot could assist with shipyard maintenance tasks in addition to warehousing.







Scientist spotlight



Industry Day



Cyber Amazing Race



Engineer spotlight



Frozen lemonade day



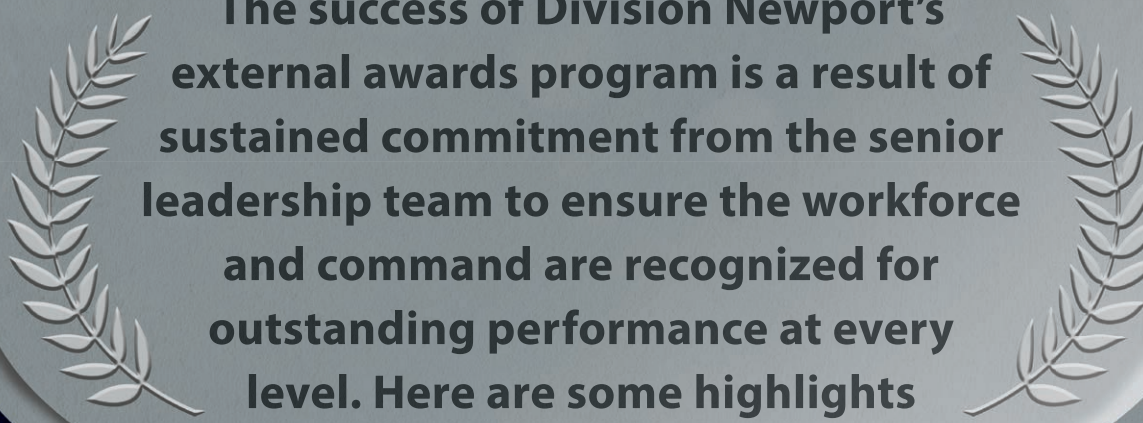
Battle of Midway lecture



VIP tours



Working with Fleet operators



The success of Division Newport's external awards program is a result of sustained commitment from the senior leadership team to ensure the workforce and command are recognized for outstanding performance at every level. Here are some highlights from the award winners:

**DoN Meritorious
Civilian Service Award**

Gary Huntress

ONR Prize for Affordability

Dr. David Tonn

**CNO/SECNAV Safety
Excellence Awards**

NUWC Division Newport

**Program Executive Office Integrated
Warfare Systems Excellence Award**

TACNAV Team

5.0 FFG 62 Team

**Russell Egnor Navy Media Awards -
Audio Long-form Production**

John Vannucci

**Providence Business News Women in
Business Career Achievement Award**

Patricia Eno

**Dr. Delores M. Etter Top Scientists
and Engineers for the Year Awards**

Dr. Lauren Freeman

Dr. Michael Visich

VACOLUM Group - Cyber Red Team

**American Society of Naval Engineers
(ASNE) Awards**

Alexander Rinaldi

NAVSEA Excellence Awards

AN-BYG-1 Virtual Twin Team

Dr. Lauren Freeman

Digital Engage for Diversity and Inclusion

Team Melon

Leadership in a Diverse
Environment Team

Helen Martha Sternberg Award

Katherine Hurtado-da Silva

NAVSEA Warfare Centers Awards

DDG 1001 Team

Rapid Prototyping & Experimentation
with Unmanned Systems Team

Barracuda Team

Combat Systems Trainers Team

MIWATS FMAUV Team

Research Commons Team

Snakehead Team

**ONR Dr. Arthur E. Bisson Prize for
Naval Technology Achievement**

Dr. Harold Robinson

ONR Prize for Affordability

Daniel Orciari

**DoD Workforce
Recruitment Program Awards**

Donald Gomes

DoN Acquisition Excellence Awards

Undersea Warfare Training Range Team -
Meagon Coffey and Russell Racette

**DoN Meritorious
Civilian Service Award**

John Visneuski Jr.

**Program Executive Office Integrated
Warfare Systems Excellence Award**

David Pineault

SSUSW Towed Systems Team

80 Atlantic Thunder 22 Hulk
Data Collection and Battle
Damage Assessment Team

IWS5 Sonar Dome Rubber Window
In-Service Support Team

**Women of Color Technology
All-Stars and Technology Rising Stars**

Adilah Khan

Jennifer Caldwell

Marie Levada

**National Defense Industrial
Association Bronze Medal**

Dr. David Rivera

**Black Engineer of the Year Award -
Modern-Day Technology Leader**

Calvin Roldan

**Black Engineer of the Year Award -
Science Spectrum Trailblazer**

Abner Barros

**Institute of Electrical and Electronics
Engineers Professionalism/Technical
Achievement/Literary Awards**

Dr. David Rivera

Annual Awards ceremony highlighted workforce superlatives

Division Newport honored 335 employees for their outstanding achievements, during the Annual Awards ceremony held in June. Highlighting the critical contributions of the organization to the U.S. Navy. There were more than 350 nominations in 35 award categories — including both teams and individuals — with a cash prize associated with each award.

“While our award winners represent the best of 2021, all nominees should be proud of their successes over the past year. You are truly in elite company,” said Division Newport Director of Corporate Communications Jeff Prater, who served as master of ceremonies.



“Let’s not forget the ultimate beneficiary of your hard work is the fleet and these awards highlight that fact that what we do matters!”



SPECIAL EVENTS

Naval Station chaplain delivered message of remembering America's past

Naval Station Newport chaplain Lt. Daniel Morrison urged the nearly 75 people gathered around the Command flagpole in May for Division Newport's Memorial Day remembrance event to embrace the past to create a better future.

"Remembering is not in the DNA of our culture. As a chaplain, I believe that occasions for remembrance like Memorial Day — like today's event, in and of itself — call us not only to recall the events of the past intellectually, but to recognize that we are part of something much larger than ourselves," Morrison said.

Division Newport leadership and members of the installation's Military Detachment joined Morrison — the keynote speaker for the event — to pay tribute to the 34 men who died in service to their country while working at NUWC's predecessor organizations.

“They call us to embrace — dare I say, participate — in the past and come to understand that we maintain a connection with those who have gone before us.”

Lt. Daniel Morrison

Branch heads spotlighted during panel event for Women's History Month

Humility, communication, authenticity, and flexibility rounded out the top skills needed to be the head of a Division Newport branch, according to six employees who currently hold the title during a panel event in March. Co-hosted by the Women in Science and Engineering (WiSE) employee organization and Federal Women's Program (FWP) Special Emphasis Program, the event was for employees to get a feel for what it's like to be a branch head and learn how to work toward that type of leadership role. It was organized as part of Division Newport's Women's History Month celebrations. Throughout the event, panelists described why they applied for the branch head role and what skills are needed. A question-and-answer session with the audience was held after the presentations.

Branch Head Panel

Ice cream, lemonade draw employees to celebrate summer

Two events held under the command tent were aimed at gathering employees for some summer fun. Division Newport's Civilian Morale, Welfare and Recreation (CMWR) activity and Food Service Board hosted a gathering in honor of the first day of summer, offering free frozen lemonade and discounted merchandise at the CMWR store. Additionally, employees were invited to an ice cream social hosted by the New Professionals Network. The event was aimed at introducing both new and experienced employees from different departments. The crowd was comprised of summer interns, new hires and employees who have been with Division Newport for over 30 years.

Ice Cream Day

Summer fun

Division Newport hosted hiring events throughout the year

Division Newport held a series of hiring events throughout 2022. In November, a hiring event was held with 150 resumes collected and 18 on-the-spot job offers made to prospective employees. Division Newport had more than 100 positions available as recruiters were looking for engineering, science, business, financial, contracting, security, math, physics, and cybersecurity personnel. Division Newport hosted similar events in June and May.



Meeting potential new hires

Deputy Technical Director retired in June

Following a prolific 39-year career, Division Newport's Deputy Technical Director Don Aker retired in June. Throughout his career, Aker distinguished himself as an exemplary technical leader and visionary who has helped shape Division Newport's highly skilled civilian workforce and develop a culture of innovation, collaboration, and excellence that is recognized throughout the Warfare Centers. Since beginning his federal career, Aker excelled at a series of increasingly challenging positions; his efforts to foster this culture of business and technical excellence and share Division processes/best practices across the Warfare Center enterprise are his legacy.



Retirement ceremony



Pitching ideas

Shark Tank events sparked innovation by generating more patents

Scientists and engineers pitched patentable ideas ranging from the practical to the theoretical during a "Shark Tank" event in July. Participants had the opportunity to chat with members of the Chief Technology Office and a panel of experts about their ideas to find out if they are patentable. Some employees attended with prototypes and formal presentations, while others simply bounced ideas off the panel. Held periodically throughout the year, Shark Tanks provide not only greater guidance in the patent process, but also a means for which inventors can connect with other scientists and engineers who may have done similar work. The event is based on the premise of the reality TV show "Shark Tank," where five titans of industry listen to new ideas proposed by budding entrepreneurs and decide whether or not to invest in the proposal.

WORKFORCE DEVELOPMENT

Engineers received fellowships for upcoming academic year

Six Division Newport engineers received fellowships for the 2022-2023 academic year to attend school on a full-time basis while receiving their salary. The one-year Fellowship Academic Degree Training Program (ADTP) is primarily intended for graduate-level students whose doctorate or master's programs are near completion. All Division Newport federal employees with at least two years of employment may apply for this program. The recipients applied for the Fellowship Program in April, and went through a highly competitive selection process. First, there was an initial screening, then an interview with a selection panel where each applicant had to explain the degree they were pursuing and the relevancy of it to their job at Division Newport. The selection panel then discussed the applications, reviewed recommendations and financial budgeting. The Technical Director made the final Fellowship Program selections. This year's recipients were notified during a surprise gathering with Command leadership.



Fellowship recipients

Cross-department team highlighted benefits of mentoring

The Newport Mentors Team hosted a series of events throughout the year to establish mentoring programs to influence workforce stability, career opportunities and knowledge sharing. The events, which included a cornhole tournament and social Bingo, brought together employees from a variety of disciplines and levels of experience to match up for a mentoring experience. Newport Mentors supports the Navy's mission to build a team to compete and win, and they continue to explore ways the command can facilitate the mentor/mentee relationship and develop sustainable mentorship programs.



Newport Mentors team

Employees recognized for patents, publications and transitions

More than 60 current and former Division Newport employees were recognized for their science, technology, research and innovation accomplishments during a "Patents, Publications and Technology Transitions" awards ceremony held in February.

The first of the Command's quarterly ceremonies was held in front of the new "Wall of Innovation." Technical Director Ron Vien opened the February ceremony by discussing Division Newport's mission and its long history of growth, innovation and evolution into new technical areas.

"I'm a bit biased, but we're pretty cool, what we do here at NUWC, and it's work like this that really demonstrates our people and technical capabilities," Vien said.

Eighteen current and former employees were awarded 12 patents, an important part of the innovation process as patents protect intellectual property, award inventors for innovative ideas and make novel technologies available to the broader scientific and engineering communities.

According to Division Newport's Director of Research, "Patents keep Division Newport at the forefront of technical excellence and help the Division attract the best and brightest talent. For employees who are awarded a patent, it's beneficial for career development, being recognized for their contributions and achievements, and can even result in royalties."



Wall of Innovation

WORKFORCE SNAPSHOT



3,576

Federal Civilians



31

Military



2,404

Contractors

\$109K



average gov't civilian salary

72%

of workforce
are scientists
and engineers

54%

of workforce
has Bachelor's
degrees as their
highest degree
(1,923 total)



37%

of scientists and
engineers with
advanced degrees
(951 total)

4%

employees have PhDs
as their highest degree
(151 total)

86%

of workforce has a
four-year degree or higher



Veterans make up

16%

of the
workforce

Reservists make up

3%

of the
workforce

Age Breakdown of Workforce

20-29.....	21.4%
30-39.....	23.8%
40-49.....	18.9%
50-59.....	20.5%
60-69.....	14.4%
70+	1%

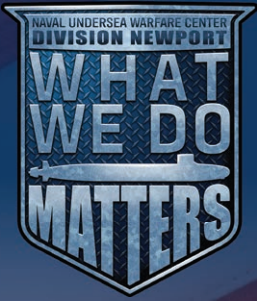


(Government Personnel Only)

CELEBRATING VETERANS



Thank you for your service, NUWC Veterans!



Each month throughout the year, Division Newport featured an employee who has served in the military. Profiles included details about their time in the service, their careers at Division Newport and photos. In November, veterans were invited to gather in the Collaboration Center for a 'Cuppa Joe' in honor of Veteran's Day. Attendees represented their branch of the military by wearing ship, squadron or company ball caps and patches, and shared stories about their service.



Celebrating Division Newport Veterans

BALANCED SCORECARD

Financial Perspective

		Target	Results
Sustain Business Excellence in Working Capital Fund Management	Actual \$ Direct (New Orders) (\$M)	\$899	\$877
	Total Direct Work-Years	2,730	2,716

Customer/Stakeholder Perspective

		Target	Results
Ensure Regulatory Compliance	Environmental Spills	0	>0
	Security Violations	0	0
	Electronic Spills	0	>0
Ensure Strategic Awareness and Communications	% Available Mission Critical Field Team Positions Filled	100%	75%
Execute Technical Commitments as Promised	Customer Survey Overall Satisfaction Rating	90%	92%

Internal Perspective

		Target	Results
Meet Commercial Acquisition Objectives	% of Contract Obligated Funds Awarded to Small Business	33%	42%
Steward Technical Capabilities	% RDTE Current FY Authorized Funding	40%	40%
	% of Total S&T Work-Years	8%	5%
	Number of S&T Direct Work-Years	160	141
	Number of S&T Indirect Work-Years (NISE)	75	46
	Refereed Open Literature Publications	55	27
Foster Innovation and Collaboration	Patent Applications Filed	48	41
	Invention Disclosures	60	53
	Number of Active Partnership Agreements	120	107
	Number of Distinct Partners	190	204
	Number of New Partnership Agreements Established	70	54
Optimize Internal Investment Portfolio	Number of Technical Publications	154	190
	% Investment Portfolio Collaborative With Other Activities	40%	54%

Employee Perspective

		Target	Results
Recruit and Retain High Caliber Workforce	End Strength	3,583	3,576
	Employee Net Gain/Loss	0	0
	Retention Rate: 5+ Years	90%	83%
	External Award Nominations	107	129
Train and Mentor Workforce in Mission-Critical Competencies	Employees with Advanced Degrees (Total Workforce)	34% Masters; 6% PhDs	27%/4%
	Scientists and Engineers with Advanced Degrees	40% Masters; 7% PhDs	37%/5%
	% of Employees that are Compliant with DAWIA Field Certifications	100%	100%
	% of Employees that are Compliant with DAWIA Continuous Learning Points	100%	96%
	% of Employees on Track for Financial Management Certification	80%	100%

Incoming and Outgoing Funds



FY22 Reimbursable Orders Received

\$877.1M



FY22 Outgoing Funds

\$84.3M



Financial Improvement and Audit Remediation efforts continued

The Division Newport Financial Improvement & Audit Remediation (FIAR) team continued to support the Department of Defense (DOD) and Department of Navy (DON) fifth-year audit. A new audit roadmap developed in fiscal year (FY) 2022 from the DON states that the Navy is planning to achieve an audit opinion in FY2028. The DOD and DON will continue to leverage metrics and dashboards in audit roadmaps, and the governance process to measure progress, foster accountability, and use working groups to find solutions to common barriers. In addition, the annual audit cycle is increasingly integrated into the Department's normal course of business operations. To date, Division Newport's FIAR team responded to and supported multiple on-site and virtual audit reviews, thousands of audit sample requests, corrective actions and findings with a 100% on-time delivery of data. In FY2022, the FIAR team concentrated efforts on internal testing in financial areas including civilian pay, travel, financial statement reporting, and contractor vendor pay. Division Newport remains in a constant state of audit readiness by having business processes that are sustainable, traceable, and repeatable.



Comptroller hosted knowledge forum

Vouchers Processed
7,611

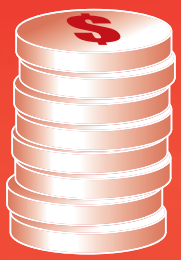


Travel Orders
Processed
9,087



Contracts Department

ECONOMIC IMPACT



\$1.5 Billion
Total Funding



92%

of FY22 Funds obligated on contract were competitively awarded

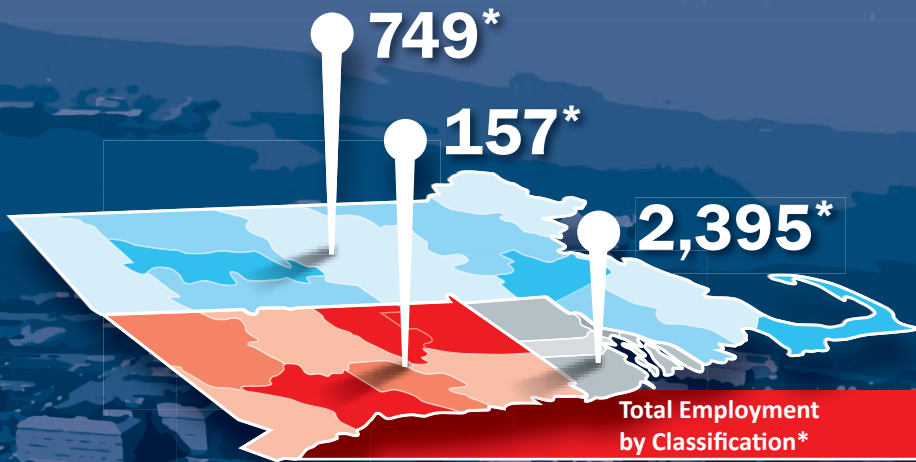
\$299 Million
in Small Business Obligations

54

New Partnership Agreements Established

\$109K

Average Government Civilian Salary



3,301

Civil Service Employees in Southeastern New England

Rest of U.S. 275*

**These numbers reflect government civilians only.*

Total Employment by Classification*	Civil Service Employment	Contract Work-Years	Est Overall Employment
Engineering/Science	2,564	787	3,351
Technician	258	454	712
Information Technology.....	203	122	325
Professional Administrative	502	660	1,162
Administrative Support	21	128	149
Clerical	12	41	53
Wage Grade/Other	1	212	213
Students.....	15	0	15
Total	3,576	2,404	5,980

Data as of 9/30/22

*Includes all detachments



Appreciating the workforce



Visiting NSW Technical Director Dale Sisson, SES



Briefing VIPs



Industry utilizing the test facility



Computer lab



New Professional Network



At-sea testing



Recruiting event



Combat Systems team



EEO pot luck



Spotlighting Division Newport Veterans



Happiness is being an engineer



Tangents podcast team



Engineering and Diving Support Unit



Engineer Spotlight



Team Melon



Bowling after work



Knowledge Forum speaker



Department All Hands



The HSI Team



CANES Team



Experimental Payload Group



Connecting with colleagues



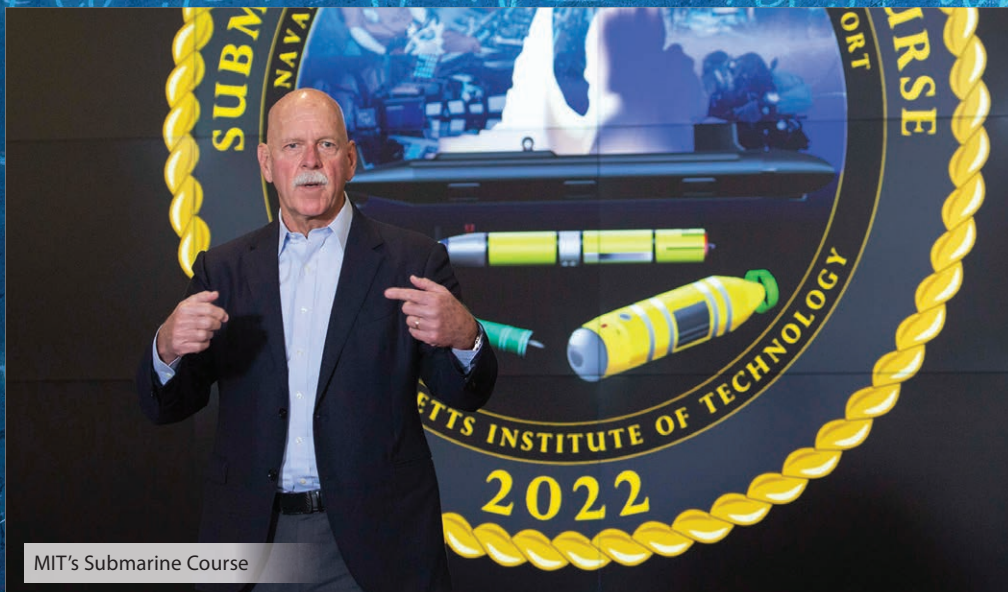
Holiday singalongs



Cornhole tournament



Hawaiian Shirt Day



MIT's Submarine Course



Taking the oath



Department Lunch

A LOOK AHEAD

“*Seapower forged our nation and, for generations, a strong Navy has guaranteed the rules-based order that underpins global security and prosperity. The decisions and investments we make this decade will shape the maritime balance of power for the rest of this century. We can accept nothing less than success.*”

- Chief of Naval Operations (CNO)
Adm. Mike Gilday,
CNO Navigation Plan, 2022



As we move deeper into what has been referred to as a “Decade of Maximum Danger,” our role as the Navy’s technical stewards in the undersea domain has emerged as critical to the defense of our nation. Our efforts contribute to building, improving, and maintaining our fleet of submarines to ensure our undersea superiority and sustain strategic deterrence against those adversaries willing to disrupt our way of life.

As paradigms of operational landscapes shift, we must embrace and integrate disruptive technologies that yield asymmetric advantages. We are looking toward increasing computing power, developing software- and hardware-independent solutions, and leveraging gains in the artificial intelligence and machine learning realm, but must continue to look toward future disruptors on the technological horizon.

NUWC Division Newport is and always has been at the forefront of undersea technology and we answer the call to deliver solutions and capabilities to the submarine Fleet. We will make impressive strides to realizing our vision of Undersea Superiority: Today and Tomorrow.

This is not a finite task. There’s always more work to be done and our workforce is our greatest advantage.



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WHAT WE DO MATTERS

