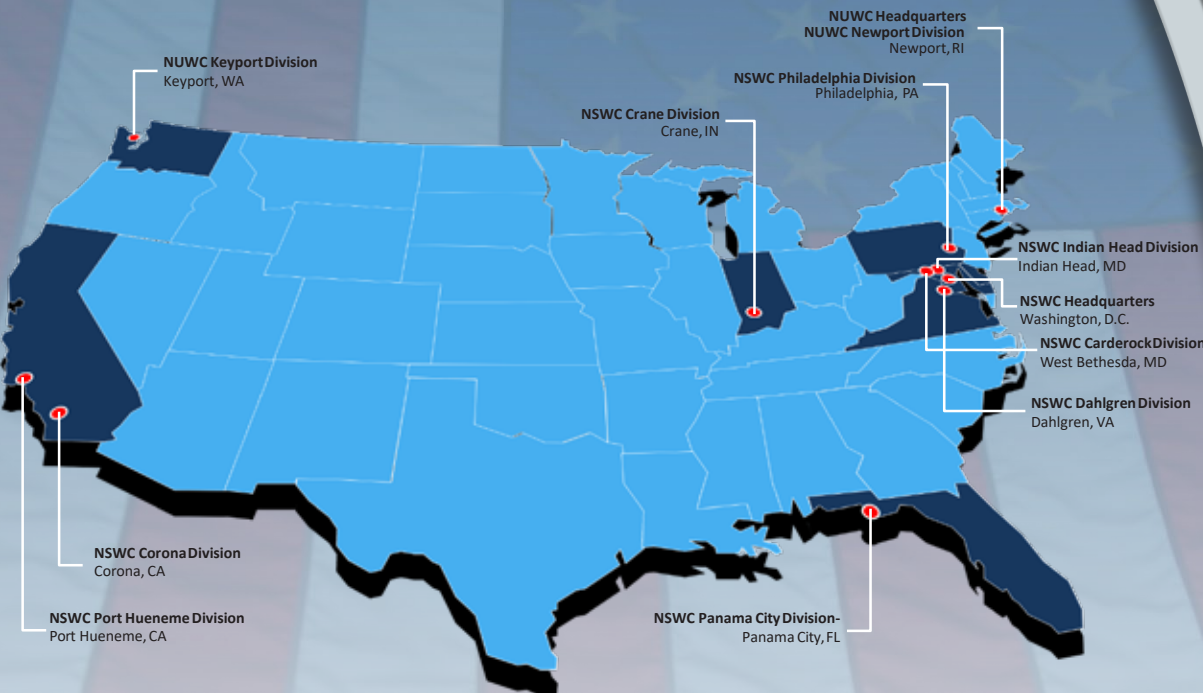


WARFARE CENTERS

NAVAL SURFACE WARFARE CENTER | NAVAL UNDERSEA WARFARE CENTER

PROGRAMS

10 Divisions - One Team



7,322
Ship/Submarine
Modernizations/
Tech Insertions

145
Technical
Capabilities

17,755
Depot Refurbs/
IMA Repairs

164+
Unique
RDT&E
Facilities

141,525
Technical/
Logistic Hotline
Call Responses

1,657
Fleet Fly-Away
Teams Dispatched

\$8.2B
Contracted
Annually

443
Customers

PERSONNEL

15,721
Scientists &
Engineers
representing

52% of the
Navy's
Scientific &
Engineering
Expertise

6,820
Masters Degrees

909
PhDs

144
Patents Filed

Roles of the Warfare Centers

- Make naval technical programs successful
- Provide a bridge between the technical community and the warfighter
- Determine and develop capabilities for the fleet
- Verify the quality, safety, and effectiveness of platforms and systems
- Design, develop, and field solutions for urgent operational fleet needs

WARFARE CENTERS

NAVAL SURFACE WARFARE CENTER | NAVAL UNDERSEA WARFARE CENTER

Innovate for the Fleet after Next

Build an Affordable Fleet for Tomorrow

Sustain the Fleet of Today

TRL 1-2 Concept to Application

TRL 3-4 Analysis, Testing, Prototyping

TRL 5 Operational Demo

TRL 6-7 Included in POR, industry transition

TRL 7-8 Acquisition and Fielding

TRL 9 Capability Delivered to Warfighter



Basic Research

Applied Research

Rapid Prototyping

Operational Testing

Technical Risk Assessments

Production Engineering and Support

Install: Modernization & Alterations

Technology/Obsolescence Management

- Early ideation fueled by naval R&D priorities
- Project funding transitioned to sponsor
- Patents
- Technology transfer

- First tested in LOE or developmental / operational experiment
- New or enhanced capability demonstrated
- Leave behind capability following operational demo

- Industry incorporates innovation
- Sponsor invests in R&D for rapid prototyping and fleet demonstration
- Included in an acquisition program in the FYDP

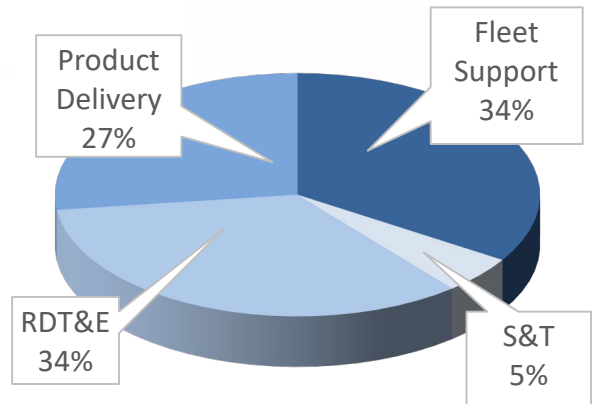
- Tests at major ranges/Land Based Testing facilities
- Live, Virtual, and Constructive training & experimentation
- System engineering
- Integrated logistics support

- ISEA fly-away teams sustain fleet operations
- Manage depots and facilities/IMA repairs
- Technology refresh
- Tech assists/ distance support

Delivering Readiness, Capability, and Capacity

- Warfare Centers play an important, value added role as a member of the acquisition team
- Warfare Centers' life cycle engineering capabilities help ensure safe, affordable and effective products are delivered to the warfighter
- Warfare Centers have a disciplined process for accepting and assigning the right work to the right site based on technical capabilities; and for sizing the workforce to the funded workload
- Warfare Centers continually shape the workforce size, workforce talents, and facilities to meet long-term strategic needs
- Warfare Centers are determined to standardize processes and procedures to become more efficient, structured, and transparent
- Warfare Centers advance cybersecurity, improve virtual infrastructure, and obtain the necessary tools to support the Navy's digital transformation
- Warfare Centers initiate and leverage partnerships with other government activities, industry, and academia to foster a collaborative culture

FY23 Reimbursable Funding



Warfare Centers Leadership



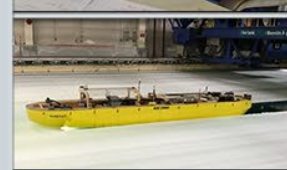
Dr. Martin Irvine, Jr., SES Executive Director



RDML Thomas J. Dickinson, USN Commander

NSWC CARDEROCK DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Urgent Dry Dock Assessment: Provided high fidelity Modeling and Simulation to support critical dry dock repair decisions for Navy leadership. Other collaborators include Naval Sea Systems Command, Strategic Systems Program, Puget Sound Naval Shipyard, and Naval Facilities Engineering Command, as well as industry experts. The Carderock team provided structures, dynamic impact, and hydromechanics expertise to assess risks and develop mitigation strategies.



International Submarine Races: Hosted the 17th International Submarine Races in its David Taylor Model Basin in Bethesda, Md., in June 2023. The biennial STEM event allows students to display their talents and problem-solving capabilities in submarine and hull design challenges. The event this year was the first in-person races since the one prior to the pandemic in 2019. Teams from across the United States, Poland, the United Kingdom and Canada participated.



COLUMBIA Propulsor Delivery: Responsible for managing the design and delivery of submarine propulsors. This year, the first major propulsor component was delivered to the shipbuilder in support of USS COLUMBIA (SSBN 826) construction. It was delivered on schedule to the Contract Delivery Date. This was a landmark moment for NSWC Carderock and the Navy Propulsor Team, which has conducted a wide-ranging design, testing, and construction effort over the last decade.



NSWC CARDEROCK DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

Naval Surface Warfare Center (NSWC) Carderock Division is the Navy's center of excellence for ships and ship systems. For over 100 years, NSWC Carderock Division has helped preserve and enhance the nation's presence on and under the seas. NSWC Carderock Division is the full-spectrum research and development, test and evaluation, engineering, and fleet support organization for the Navy's ships, submarines, military watercraft, and unmanned vehicles with insight into new concepts and diverse technologies for the Navy fleet of the 21st Century. NSWC Carderock Division's expertise spans from naval architecture and marine engineering, to electrical and mechanical engineering, to computer engineering and physics.

NSWC Carderock Division specializes in ship design and integration; environmental quality systems; hull forms and propulsors; structures and materials; signatures, silencing systems, and susceptibility; and vulnerability and survivability systems.

NSWC Carderock Division's unique laboratories, modeling and simulation facilities, at-sea-assets, and large-scale, land-based engineering and test sites at our headquarters in West Bethesda, Maryland, and seven detachment locations across the country contribute to the full-spectrum nature of our mission.

Navy and maritime communities have come to depend on our expertise and innovative spirit in developing advanced platforms and systems, enhancing naval performance, integrating new technologies, and reducing operating costs.

NSWC Carderock Division will continue to solve challenging engineering problems to meet future fleet needs.

Mission

To provide full-spectrum research and development, test and evaluation, analyses, acquisition, and fleet support for the Navy's ships, ship systems, and associated Navy logistics systems. Specific emphasis is to provide the core technical capabilities required for the integration of surface and undersea vehicles and associated systems, to develop and apply science and technology associated with naval architecture and marine engineering, and to provide support to the maritime industry.

Vision

To be the Navy's trusted partner for identifying and providing world-class, innovative, and cost-effective solutions for advanced ship and ship systems, for providing technical solutions to the warfighter, and to keep our fleet at sea.

Thrust Areas

- Ship, Submarine, and Unmanned Vehicle Design and Integrity
- Advanced Manufacturing
- Digital Strategy
- Signature Management
- Unmanned Mobility Systems

Technical Capabilities

- Ship and Submarine Design and Integration
- Ship and Submarine Acquisition Engineering
- Ship and Submarine Concepts, Analyses of Alternatives, and Design Tool Development
- Combatant Craft and Expeditionary Vehicles
- Unmanned and Maritime Intelligent Autonomous Systems
- Hull Forms and Fluid Dynamics
- Propulsors
- Surface, Undersea, and Weapon Vehicle Materials and Manufacturing Technology
- Surface and Undersea Vehicle Structures
- Alternative Energy and Power Sources Research & Development
- Surface, Undersea and Expeditionary Vehicle Vulnerability Reduction and Protection
- Surface and Undersea Vehicle Acoustic Signatures, Silencing Systems, and Susceptibility
- Surface and Undersea Vehicle Non-Acoustic Topside Signatures, Silencing Systems, and Susceptibility
- Ship Environmental Treatment Systems, Management, and Safety

- Surface and Undersea Vehicle Underwater Electromagnetic Signatures, Signature Mitigation Systems, and Susceptibility
- Fleet Signatures Systems
- Advanced Fabrication of Scaled Pressure Hulls and Scaled Models

Major Facilities

- David Taylor Model Basin — West Bethesda, MD
- Maneuvering and Seakeeping Facility (MASK) — West Bethesda, MD
- Deep Submergence Pressure Tank — West Bethesda, MD
- Anechoic Flow Facility — West Bethesda, MD
- Structure Evaluation Laboratory — West Bethesda, MD
- Explosives Test Pond — West Bethesda, MD
- Ship Materials Technology Center — West Bethesda, MD
- Magnetic Fields Laboratory — West Bethesda, MD
- Acoustic Research Detachment — Bayview, ID
- Large Cavitation Channel — Memphis, TN
- Southeast Alaska Acoustic Measurement Facility (SEAFAC) — Ketchikan, AK
- South Florida Ocean Measurement Facility (SFOMF) — Fort Lauderdale, FL

Workforce Profile - 2023

- Total: 2,854
- Scientists & Engineers: 1,822

Advanced Degrees - 2023

- Ph.Ds - 191
- Masters - 819

Total Annual Funded Program - 2023

- \$1.2 billion
- Contracts issued: \$431 million

Carderock Division Leadership



Lawrence Tarasek, SES
Technical Director



CAPT Matthew Tardy
Commanding Officer

Carderock Division Sites



NSWC CORONA DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Large Scale Exercise 2023 - Comprehensive LVC Battlespace Implementation: Enabled the execution of Large Scale Exercise 2023 by providing an unprecedented global live, virtual, and constructive (LVC) immersive battlespace. The LVC environment seamlessly connected Fleet Maritime Operations Centers, Marine Expeditionary Force Combat Operations Centers, Carrier Strike Groups, Amphibious Ready Groups, both in-port and underway warships on a global scale, marking a significant milestone for the Fleet and naval warfare training.

Government Equipment Management Information System (GEMIS): Designed, developed and deployed GEMIS, as standalone module within the Combined Portfolio Assessment System (COMPASS). This centralized information system manages the active total portfolio of new ship construction Participating Acquisition Resource Manager (PARM) work including the delivery of government furnished equipment and information allowing for continuous information sharing between PARMs and Ship Acquisition Program Managers to benefit shipbuilding programs.

Deployment of Warfighting Data Service: Functioning as the NAVWAR Data Pillar Lead in support of PO, orchestrated the installation and delivery of containerized data integration fabric allowing for over-the-air functionality of Warfighting Data Services to afloat platforms – a first for the Department of the Navy. Modern data pathways facilitate seamless integration and empower the development of AI/ML capabilities in real-time and at scale. Successfully conducted a pilot program for Data Scientist at Sea, supporting intelligence efforts aboard CSG-1 by developing innovative tools and battle management aids to meet a wide range of requirements.

NSWC CORONA DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

NSWC Corona Division has served as the Navy's independent assessment agent since 1964. With experience in gauging the Navy's warfighting capability, NSWC Corona is a leader in NAVSEA data analytics. Utilizing networked data environments, data analytics and visualization, and measurement technology to bridge the Navy's data silos, Corona enables informed decision-making for the warfighter. With more than 3,800 engineers, scientists, and support personnel, Sailors, and contractors, NSWC Corona is located in Norco, California, with detachments in Fallbrook and Seal Beach and personnel in 14 additional locations.

Readiness Assessment

Corona Division manages programs to provide the Fleet and Shore community with transparency into the material readiness of critical weapon, combat, C41, and HM&E systems and the factors that are driving material readiness. Corona provides reliability, maintainability, and availability (RM&A) metrics for over 600 systems and 2800 variants (C51 and HM&E on surface ships and submarines) delivering automated & predictive analytics. Products and services have broad utilization across Navy Program offices, In Service Engineering Agents, Regional Maintenance Centers, OPNAV, and the Fleet. The Readiness Assessment capabilities and products are evolving to address the Navy's increasing expectations for improved transparency into readiness, cost, and Fleet maintenance/modernization processes.

Performance Assessment

Corona Division has its technical roots in conducting analytical data-driven performance assessments on offensive and defensive systems of the surface Navy supporting acquisition T&E and Fleet exercise feedback. Capabilities span across data, rigor, systems, and collaborations in order to facilitate comprehensive assessments in a timely manner. Corona executes best practices in data requirement documentation to assure the right data is available to answer the critical questions. Corona maintains collaboration spaces equipped to receive large volumes of data and the ability to store, process, analyze, and report out results in a classified environment. Corona has implemented automation and adopted visualization software to streamline the delivery of robust event reconstruction with embedded communication, video streams, and ground truth in a short amount of time (a handful of hours for Fleet Operational Training exercises, for example).

Range Systems Engineering

Corona Division provides Naval surface and air range systems engineering and technology solutions for Naval and Joint training and testing, engineering, integrating, and installing instrumentation on test and training ranges, including shipboard systems and remote range areas. Corona operates and maintains Fleet tactical training ranges and network environment and is the Fleet's technical engineering agent for the Fleet training live, virtual, and constructive (LVC) capability. Corona ensures that existing and future range systems meet the Fleet's demand for combat realism, live mission monitoring and replay, and information and data collection for analysis and assessment.

Measurement Science and Engineering

Corona Division is designated as the Navy's Test and Monitoring Systems technical advisor responsible for disseminating calibration guidance to over 2,750 personnel across the Navy enterprise, and ensuring accurate and traceable measurements to international standards to reduce the risk of wrong test decisions and improve Fleet lethality. Corona authors the detailed calibration procedures used to perform nearly 500,000 calibrations each year on the Navy's more than 1.6 million pieces of test equipment; and uses the results from these calibrations to establish and optimize calibration periodicities to ensure the proper risk vs. cost trade-off. Corona operates the Gage and Standards Laboratory, serving as the technical authority for NAVSEA combat systems special interface gage requirements. Corona also conducts strategic systems testing and analysis, and surveillance assessment for Trident Reentry Systems Mk4, Mk4A, and Mk5.

Quality and Mission Assurance Assessment

Corona Division provides quality and mission assurance for Strategic and Missile Defense systems that have a very low tolerance for failure or problem systems where the program manager requests focused support. Corona develops and tailors Quality and Mission Assurance (Q&MA) requirements which outline program office expectations for management and customer involvement in key technical processes during acquisition and sustainment such as system engineering, test, configuration control, reliability, manufacturing. In addition, Corona provides training to the contractor and government community on Q&MA requirements, conducts assessments, and provides on-site technical experts to determine and improve the effectiveness of the Q&MA activities and rigor.

Ground Combat Weapons and Ammunition Test, Evaluation, and Assessment

Corona provides ground ammunition and weapons engineering expertise to the USMC and ammunition community. Working directly with the acquisition community and warfighter, Corona supports fleet logistics, combat operations, and training by providing

cradle to grave research and development, test and evaluation, lifecycle engineering, and acquisition expertise.

Mission

Provide transparency to warfighting readiness through data analytics and assessment, engineering the Fleet's Live-Virtual-Constructive training environment, and assuring the accuracy of measurements.

Vision

Optimize decision-making for warfighting and fleet readiness.

Technical Capabilities

- Weapon Systems Performance Assessment
- Quality and Mission Assurance Assessment
- Metrology, Test, and Monitoring Systems Assessment
- Naval Surface & Air Range Systems Engineering
- Weapons Systems Interface Assessment
- Naval Systems Material Readiness Assessment
- Strategic Systems Testing and Analysis, and Surveillance Assessment
- Ground Combat Weapons and Ammunition Test, Evaluation, and Assessment

Major Facilities

- Joint Warfare Assessment Lab
- Measurement Science and Technology Lab
- Daugherty Memorial Assessment Center
- Weapons Surveillance and Test Lab

Workforce Profile - 2023

- Total: 1,943
- Scientists & Engineers: 1,127

Advanced Degrees - 2023

- Ph.Ds - 40
- Masters - 463

Total Annual Funded Program - 2023

- \$900 million
- Contracts issued: \$513 million

Corona Division Leadership



Dianne Costlow, SES
Technical Director



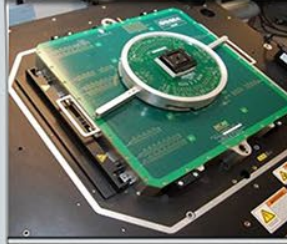
Captain Michael P. Aiema, USN
Commanding Officer

Corona Division Sites



NSWC CRANE DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Silent Swarm 2023: Hosted Silent Swarm 2023 at the National All-Domain Warfighting Center in Michigan. The event brought together over 300 participants, doubling participation from 2022, from multiple DoD, industry, and academic organizations to further develop early-stage Electromagnetic Spectrum Operations capabilities. More than 30 technologies in electromagnetic spectrum-related capabilities participated in the two-week long event. Technologies of interest included Electromagnetic Warfare Support, Electromagnetic Warfare Protection, Electromagnetic Warfare, and radio frequency enabled digital payload delivery and resilient communications. The Silent Swarm Team created a unique multi-domain experimentation environment that excels as an accelerant for rapid technology development. The underpinnings of the Silent Swarm experimentation vignettes are focused on creating advantage in multi-domain maritime environments, which align to operational Fleet priorities and USMC Expeditionary Advanced Base Operations. These efforts directly align to multiple Crane Technical Capabilities

Microelectronics Commons: As national leaders with technical excellence in Microelectronics, Crane serves as the lead contracting activity for the Microelectronics Commons (Commons), which is a key national initiative that is executed with oversight by the Office of the Under Secretary of Defense for Research and Engineering's Principal Director for Microelectronics. This initiative benefits the Navy, DoD, and the nation in spurring development of a domestic microelectronics manufacturing industry by forging critical partnerships with commercial industry, academic, and government partners. The Commons supports laboratory to fabrication "lab-to-fab" testing and prototyping hubs to create a network focused on maturing emerging microelectronics technologies, strengthening microelectronics education and training, and developing a pipeline of talent to bolster local semiconductor economies and contribute to the growth of a domestic semiconductor workforce.

The Commons is a CHIPS Act-funded national network for onshore microelectronics hardware prototyping, lab-to-fab transition of semiconductor technologies, and semiconductor workforce training. The Commons complements other CHIPS Act-funded efforts, resulting infrastructure and collaborations across the ecosystem, supported by CHIPS Act appropriations and the White House, are intended to provide a fertile foundation for future innovation and onshore manufacturing and to serve as an asset for Government and commercial prototyping needs.

Led ONR effort to enhance electro-optics, infrared technology at sea: Hosted a milestone workshop for a new program dedicated to improved maritime electro-optic and infrared (EO/IR) technology. The workshop included participants from across industry, government, and several federally funded laboratories. The Office of Naval Research program, a new Future Naval Capability called Multi-SpecTral High Resolution Imaging and Targeting Sensor (MUST-HITS), addresses research challenges and opportunities in high-resolution imaging and integration technology areas. Crane played a key role in establishing the Navy's first electro-optic infrared Program of Record for the surface Navy, called Shipboard Panoramic Electro-Optic Infrared—MUST-HITS is an upgraded situational awareness and targeting capability that will be transitioned into SPEIR for the fleet in future upgrades. The Program of Record is supported through PEO IWS 2.0. Crane supports EO/IR technology across all domains of the DoD, from early research to late life-cycle support, and has an excellent history of transitioning new technology into the Fleet.

NSWC CRANE DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

Located on the third largest naval installation in the world, NSWC Crane Division's total focus is to support the warfighter by leveraging its technical capabilities for the rapidly changing combat environment. Anchored by technical expertise, a strong work ethic and total lifecycle leadership, NSWC Crane Division's personnel and preeminent facilities set the standard for excellence in acquisition, engineering and sustainment.

NSWC Crane Division's electronic warfare (EW) mission area provides innovative, leading-edge, technical solutions for military actions that use electromagnetic energy to control the electromagnetic spectrum. This includes destroying an adversary's combat capability, gathering intelligence data and ensuring friendly use of the electromagnetic spectrum. NSWC Crane Division's technical solutions are employed across air, ground, maritime domains for the joint and coalition forces. With more than one-half million square feet of offices and labs, NSWC Crane Division has a critical mass of co-located personnel and secured facilities to provide responsive, affordable, total lifecycle leadership. Several outdoor test ranges with encroachment protection, the most comprehensive mobile radio frequency (RF) threat simulators and multiple anechoic chambers are only some of the best-in-class resources available at Crane.

NSWC Crane Division's expeditionary warfare mission area is dedicated to providing the elite warfighter with reliable and practical solutions, expertly delivered and deployed to ensure safe and effective missions. NSWC Crane Division delivers specialized training and support for the advanced warrior, providing a decisive advantage in sensors and communications, power systems and interconnect technology, mobility and maneuverability, special munitions and weapons. NSWC Crane Division is known for rapid technology transition, integrating threat assessment, proven solutions and risk management with product deployment and training. Co-located personnel and facilities demonstrate NSWC Crane Division's commitment to total lifecycle leadership, offering a unique ability to accelerate response for the warfighter.

NSWC Crane Division's strategic missions experts are focused on innovative technical solutions to deter and defend against aggression and defeat threats worldwide. NSWC Crane Division's strategic missions experts and preeminent facilities provide high reliability electronics and sensors for successful global deterrence and ballistic missile defense. In fact, every ballistic missile in U.S. arsenal carries key components developed or supported by Crane. NSWC Crane Division is dedicated to innovative science, processes and policies that advance technologies such as printed circuit boards and trusted microelectronics. Experts are committed to developing and deploying the technology that ensures that weapons systems are fully reliable and always available to the warfighter.

Mission

Provide acquisition engineering, in-service engineering and technical support for sensors, electronics, electronic warfare and special warfare weapons. Apply component and system level product and industrial engineering to surface sensors, strategic systems, special warfare devices and electronic warfare/information operations systems. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.

Vision

Combating our nation's greatest threats, NSWC Crane Division is the indispensable mission expert, leveraging our deep technical heritage to deliver solutions through innovation and strategic partnerships.

Technical Capabilities

- Electronic Warfare Systems Research, Development, Test & Evaluation (RTD&E)
- Infrared Countermeasures and Pyrotechnic RDT&E and Life Cycle Support
- Strategic Systems Hardware
- Expeditionary Warfare and Systems
- Advanced Electronics RDT&E
- Sensors and Surveillance Systems Engineering, Integration, RDT&E Acquisition & Life Cycle Support
- Hypersonic Weapon Systems RDT&E
- Power and Energy Systems
- Electro-Optic and Infrared Technology
- Force Level Electromagnetic Warfare Mission Analysis, Advanced Concepts and Technologies

Major Facilities

- Rapid Innovation Prototyping Lab
- Special Weapons Assessment Facility
- Lake Glendora Underwater Test Facility
- Infrared Countermeasure Technology Complex
- Crane Artificial Intelligence Development Lab (CrAIDL)
- Spectrum Technology Advanced Research (STAR) Lab
- Anechoic chambers (3)
- Linear Accelerator Test Facility
- Strategic Weapons Systems Engineering and Evaluation Complex
- Electronic Warfare Systems Engineering Complex
- Electro-Optics Engineering and Test Facility
- Failure Analysis/Material Analysis Lab

Workforce Profile - 2023

- Total: 3,763
- Scientists & Engineers: 1,829

Advanced Degrees - 2023

- Ph.Ds - 146
- Masters - 766

Total Annual Funded Program - 2023

- \$2.4 billion
- Contracts issued: \$2.5 billion

Crane Division Leadership



Dr. Angela Lewis, SES
Technical Director



Captain Rex Boonyobhas,
USN Commanding Officer

Crane Division



NSWC Crane
Crane, IN

NSWC DAHLGREN DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

SLBM Fire Control Software: The Submarine Launched Ballistic Missile (SLBM) Fire Control team finalized development of the Fire Control System (FCS) 656 software revision. This software revision, planned for US deployment in October 2023 and available for UK deployment in October 2024, will provide support for the MK4B Reentry Body, Trident II missile performance updates, and SLBM targeting enhancements. The SLBM software team also completed development of two critical software tools. The Strategic Planning & Operational Flexibility SSP Alteration (SPALT) software provides non-real-time targeting capabilities and enhanced cybersecurity and is planned for deployment to the Fleet in October 2023. The SLBM Mission Planning Functions Real Time Warplan Efficiency Generator and Gatekeeper software is a nuclear execution tool used at both Nuclear Command and Control sites and aboard SSBN submarines and will be effective with the upcoming FCS 656 software revision.

Electromagnetic Maneuver Warfare: Electronic Warfare and Spectrum Operations portfolio in B Dept delivered a number of products supporting the fleet. Notably, 35 Real Time Spectrum Operations (RTSO) Own Force Monitoring (OFM) systems have been delivered to date with 19 installed onboard Navy ships. The OFM system provides Battlespace Awareness of own ship emissions which is critical in understanding how our Naval Ships and Systems operate within the electromagnetic spectrum. In Electronic Warfare the Soft Kill Coordination Software (SKCS) team has delivered 13 tactical Software builds this FY in support of the Surface Electronic Warfare Improvement Program Block 2 and 3 which included electronic attack capabilities, support for additional platforms as well as many other updates and new features. The SKCS team continues to work other EW effectors such as the NULKA team, the Airborne Off board Electric Warfare team and the Long Endurance Electronic Decoy team to define architectures and integration with SKCS as they mature towards fielding.

NSWC DAHLGREN DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

NSWC Dahlgren Division is a shore command of the U.S. Navy under the Naval Sea Systems Command (NAVSEA), which engineers, builds and supports America's Fleet of ships and combat systems. NSWC Dahlgren Division has two primary sites – its headquarters at Dahlgren, Virginia and Dam Neck Activity in Virginia Beach, Virginia – as well as detachments and off-site locations across the United States.

NSWC Dahlgren Division provides science, technology, engineering and systems integration leadership and innovation that our nation's naval and joint forces rely upon for superior warfighting capability. NSWC Dahlgren Division works closely with the warfighter to fully understand operational challenges and requirements and provides the bridge to technology innovations and prototypes to develop capabilities with our private and industrial partners. This critical linkage results in delivery of effective, affordable and timely warfighting capabilities for our current fleet and the future fleet.

Mission

We deliver warfare systems to protect our nation and defeat our adversaries.

Vision

Design, develop, and integrate technologically superior, 21st century warfare systems.

Thrust Areas

Building on our core, target and prioritize technical opportunities in the following strategic thrusts:

- Lead electric weapons design, development and integration.
- Institutionalize mission engineering and analysis.
- Incorporate cyber warfare engineering in our naval systems.

Technical Capabilities

- Campaign, Mission, and Platform Level Surface Warfare Systems Analysis and Modeling
- Weapon Systems Analysis, Effects, and Effectiveness
- Radar and Electro-Optic Systems
- Surface Warfare Systems Engineering and Integration Research, Development, Test & Evaluation (RTD&E)
- Surface Combat Systems Engineering and Integration RDT&E
- Surface Combat Control Systems Science & Technology (S&T), RDT&E
- Surface and Expeditionary Conventional Weapon Control Systems RDT&E
- Surface Warfare System and Force Level Certification/ Independent Verification and Validation (IV&V)
- Human Systems Integration Science and Engineering
- Surface and Expeditionary Missile Systems Integration
- Conventional and Electromagnetic Gun Weapon Systems RDT&E
- Directed Energy Systems RDT&E
- Weapons Systems Integration for Surface, Air and Ground Unmanned Systems
- Expeditionary and Other Weaponry Systems RDT&E
- Strategic Mission Planning, Targeting, and Fire Control Systems
- Re-Entry Systems
- Surface Electronic Warfare Systems Architecture and Combat Systems Integrations RDT&E
- Surface and Expeditionary Warfare Systems Safety
- Surface Warfare Electromagnetic Environmental Effects
- Chemical, Biological, and Radiological Defense Systems
- Asymmetric Warfare Engineering and Embedded Systems
- Physical and Non Physical Vulnerability Analysis
- Integrated Surface Combat Control Systems Support
- Integrated Training Systems
- Integrated Topside Design (ITD)
- Surface Combat Computing Systems S&T, RDT&E
- Surface Warfare Threat Engineering
- Mission Engineering
- Hypersonic Weapons Systems Integration and RDT&E

Major Facilities

- Advanced Spatial Technology Research Analysis Lab
- Asymmetric Technology Innovation Lab
- Bateman Chemical, Biological and Radiological Warfare Lab
- Electromagnetic Environmental Effects Facilities
- Electromagnetic Railgun Launch Facility

- Explosive Experimental Area
- Force Integration and Interoperability Lab
- Human System Integration Lab
- Information and Special Warfare Systems Lab
- Integrated Combat Control Systems Lab
- Integrated Training Capabilities Lab
- Integrated Warfare Systems Lab
- Maginot Open Air Test Site
- Naval Directed Energy Warfare Lab
- Open Architecture Computing Facility
- Platform Integration Lab
- Potomac River Test Range
- Search and Track Sensor Test Site
- Submarine-Launched Ballistic Missile Lab
- Surface Sensor and Combat Systems Facility

Workforce Profile - 2023

- Total: 4,915
- Scientists & Engineers: 3,290

Advanced Degrees - 2023

- Ph.Ds – 137
- Masters - 1,316

Total Annual Funded Program - 2023

- \$2.3 billion
- Contracts issued: \$1.2 billion

Dahlgren Division Leadership



Dale W. Sisson, Jr., SES
Technical Director



Captain Philip Mlynarski, USN
Commanding Officer

Dahlgren Division Sites



NSWC INDIAN HEAD DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Energetics Comprehensive Modernization Plan: The Department of the Navy is focused on wartime preparedness and increasing the capability, capacity, and readiness of the fleet. As the Navy's only government-owned/government-operated arsenal, Indian Head provides surge capacity and advances state of the art, providing enduring comparative advantages for naval munitions and naval warfighting capability. The Navy's Energetics Comprehensive Modernization Plan (ECMP) includes more than 500 infrastructure modernization projects for Indian Head, balanced across its core competencies of research and development, test and evaluation, engineering, manufacturing, and logistics & fleet support. The Navy is investing significantly in Indian Head's readiness to speed munitions and other services to the fleet faster. Across FY23 and FY24, modernization projects unlock latent production capacity for solid rocket motors, warheads, and other critical programs.

Production at new Agile Chemical Facility: The newly opened Agile Chemical Facility (ACF) officially produced its first energetic material in May 2023. The \$82.9 million ACF is the most advanced nitration facility in the world, built to produce six mission critical nitrate esters in larger quantities (nearly three times larger) than legacy plants and to be able to rapidly switch between these products. These nitrate esters are critical components of explosives and propellants used in high-end Joint Service ordnance including torpedoes, mines, rockets and missiles. This one-of-a-kind facility is aimed at ensuring the United States remains at the forefront of global strategic competition by providing a Navy organic manufacturing capability on domestic soil. The ACF has a robust remote control system with extensive interlocks, providing for efficient operations with fewer personnel, effective process control and adaptability, and significantly enhanced safety compared to legacy plants. Beyond providing the Navy with a modern production facility for critical energetics materials, the ACF commissioning and start up methodology provided the Arsenal at NSWC IHD with a model program to refurbish and re-establish new capabilities and capacity through the Navy's Energetics Comprehensive Modernization Plan that began implementation in FY23.

Unmanned Systems (UxS) Enhancements Unveiled to the DoD EODT&T Program Board: In September 2023, the Explosive Ordnance Disposal Technology Center (EODTECHCEN) held a ribbon cutting ceremony for a new facility located at the Unmanned Systems range at the EODTECHCEN.

The UxS facility, co-located adjacent to the robotics test range, provides state-of-the-art test methodologies to support emerging technological development in the areas of artificial intelligence, platform integration, and open architecture/interoperability for unmanned ground vehicles. The facility also offers testing and concept development opportunities for military and law enforcement unmanned aerial vehicles. To outpace adversaries, the UxS facility is seeking further capability growth to support testing and concept development with additional platforms, such as unmanned surface vehicles and unmanned underwater vehicles.



NSWC INDIAN HEAD DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

Naval Surface Warfare Center Indian Head Division (NSWC IHD) brings together the largest full spectrum energetics facility in the Department of Defense (DoD) with the largest concentration of explosive ordnance disposal (EOD) technology resources and information in the world.

Energetics are explosives, propellants, pyrotechnics, reactive materials, related chemicals and fuels used in propulsion systems and in ordnance.

One of 10 Warfare Center divisions within the Naval Sea Systems Command (NAVSEA) enterprise, the main site for NSWC IHD is a 3,200-acre peninsula along the Potomac River on Naval Support Facility Indian Head, in Indian Head, Md.

NSWC IHD has a separate EOD campus, also in Indian Head, Md.; two official detachments in Picatinny, N.J. and McAlester, Okla.; six off-site locations; and employees stationed throughout the world.

NSWC IHD has the largest workforce in the DoD dedicated to energetics and EOD — over 2,300 strong and comprised of more than 900 scientists and engineers (more than 50 holding doctorates). The command also boasts EXU-1, an Echelon V command dedicated to collecting, processing, exploiting and analyzing improvised and conventional weapons, ordnance and components; and to providing near real-time targeting information and intelligence to EOD forces. The division's business base totals approximately \$1.1 billion.

The Division's unique synergy and balanced capabilities address all aspects of the energetics technical discipline including basic research, applied technology, technology demonstration, prototyping, engineering development, manufacturing, acquisition, low-rate production, scale-up, in-service engineering/mishaps, failure investigations, surveillance, EOD technology/information and demilitarization.

Mission

Provide research, development, engineering, manufacturing, test, evaluation and in-service support of energetic systems and materials (chemicals, propellants and explosives) for ordnance; warheads; propulsion systems; pyrotechnic devices; fuzing, electronic devices; cartridge actuated devices and propellant actuated devices (CAD/PAD); packaging, handling, storage and transportation (PHST); gun systems; and special weapons for Navy, Joint Forces, and the Nation. Develop and deliver EOD technology, knowledge, tools and equipment and their life cycle support through an expeditionary work force which meets the needs of the Department of Defense, combatant commanders, and our foreign and interagency partners. Execute other responsibilities as assigned by Commander, Naval Surface Warfare Center. Support the Executive Manager for EOD Technology and Training.

Vision

As a field activity of the Naval Sea Systems Command and part of the Naval Research and Development Enterprise, NSWC IHD is the leader in ordnance, energetics and EOD solutions for the Department of Defense.

Technical Capabilities

- Threat and Countermeasure Information Development and Dissemination for Explosive Ordnance Disposal (EOD), Improvised Explosive Device (IED), and Counter Remote Control Improvised Explosive Device (RCIED) Electronic Warfare (CREW)
- Technology Development and Integration for EOD, IED, and Specialized CREW Applications
- Energetic and Ordnance Component and Ordnance Systems for Science & Technology, Emergent and National Need Requirements
- Energetic and Ordnance Components and Ordnance Systems for Air Warfare
- Energetic and Ordnance Components and Ordnance Systems for Surface Warfare
- Energetic and Ordnance Components and Ordnance Systems for Expeditionary and Undersea Warfare
- EOD Unmanned Systems
- Conventional and Improvised Weapons Exploitation
- Chemical, Biological, and Radiological Defense Systems
- Force Protection Systems Engineering, Integration, and Equipment Ashore

Major Facilities

- Aircrew Escape Ordnance Devices Development & Prototyping Complex
- Detonation Physics Research, Development, Test and Evaluation (RDT&E) and Acquisition
 - Bombproofs, blast chambers, self-contained gun ranges
- Solventless and Solvent-Based Energetics Processing Facilities
- Novel Materials R&D
 - Nano-energetic materials characterization
 - Complete suite of analytical capabilities

- Cast Composite Rocket Motor and PBX R&D & Scale-Up Complex
- Ordnance Test Facilities
- Chemical, Physical Property and Metallurgy Labs
- Quality Evaluation/Surveillance Facility
- Specialty Energetic Chemical Scale-up Facility
- High Pressure Explosives, Physics & Combustion Lab
 - Bomb testing, Strand burning; Combustion instability testing
- Microelectromechanical Systems (MEMS) Explosives-rated Clean Room
- Underwater Warheads RDT&E and Modeling & Simulation
- Foreign Ordnance Electronics Exploitation Laboratory
- Magnetic Signature Test Facility
- Ordnance Disassembly Complex
- Hypervelocity Test Facility
- Oxygen Cleaning Laboratory-EOD Diver Complex
- Gun Test Facility
- Packaging, Handling, Storage and Transportation Test Lab
- Gun Integration facility (Turret Facility)

Workforce Profile - 2023

- Total: 2,374
- Scientists & Engineers: 902

Advanced Degrees - 2023

- Ph.Ds - 93
- Masters - 386

Total Annual Funded Program - 2023

- \$1.5 billion
- Contracts issued: \$673 million

Indian Head Division Leadership

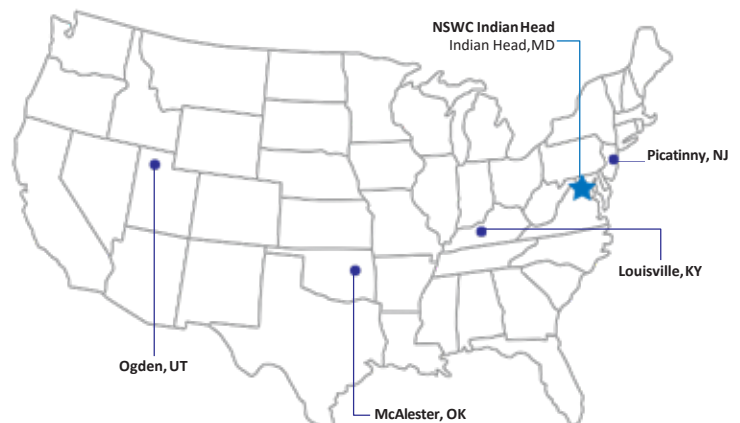


Ashley G. Johnson, SES
Technical Director



Captain Steve Duba, USN
Commanding Officer

Indian Head Division Sites



NUWC KEYPORT DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

MK48 Mod 4 Road to Reactivation: Successfully demonstrated the process of reactivating a weapon that was deactivated more than 15 years ago, returning a viable asset to the fleet. The MK 48 Mod 4 torpedo baseline was removed from U.S. Navy service and slated for demilitarization. The Division successfully exercised two MK 48 Mod 4 weapons as the culmination of a 45-day challenge issued by the Undersea Weapons Program Office (PMS 404). One weapon was a standard Mod 4 configuration demonstrating the base capability, and the other was a modified variant demonstrating an advanced capability.

Keyport Torpedo Maintenance Activity Excellence: The Torpedo Maintenance Activity, represented by the Intermediate Maintenance Activities and the Depot, demonstrated sustained excellence in Fiscal Year 2023, as validated by the Torpedo Certification Examination Boards and overall productivity. The Pearl Harbor IMA achieved a perfect score on their annual certification exam with all Excellent ratings; the Depot came close to a perfect score with four of six Excellent ratings; and the Keyport IMA showed steady upward progress on their ratings. Despite material challenges, production delays, and other unanticipated issues, the IMA successfully exceeded Operational Tempo expectations for Fiscal Year 2023 as it delivered more than its planned quantity of heavyweight torpedo builds. In summary, Keyport IMA's efforts helped the Torpedo Enterprise achieve an overall positive growth in heavyweight torpedo war shot inventory while meeting all fleet requirements to provide safe and reliable weapons.

Tiny Digital Acoustic Logger Collaboration: In Fiscal Year 2023, a Keyport team collaborated with Georgia Technical Institute and Scripps Institution of Oceanography at University of California at San Diego to design and test a small form factor data recorder capable of continuous recording at 1,000 meter depths for four days. The team transitioned from a concept for the Tiny Digital Acoustic Logger to deployment in eight months and built the two prototypes in five days. Initial trial was successful as the unit continuously logged data for the full 24-hour deployment at depth.

NUWC KEYPORT DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

With a proud history spanning more than 100 years, NUWC Keyport Division is a global network of people, facilities, and capabilities, united in all we do by a culture of innovation and a common purpose: to expand America's dominance in the undersea domain. One of two divisions of the Naval Undersea Warfare Center, NUWC Keyport Division's advanced technical capabilities directly support the full spectrum of Navy undersea programs.

NUWC Keyport Division's primary location is in the community of Keyport, Washington, on the Kitsap Peninsula. Other Washington locations include an annex at Naval Base Kitsap-Bangor, and undersea ranges in Puget Sound and the Hood Canal, which combine state-of-the-art support infrastructure with unique natural conditions.

The command also maintains detachments in California and Hawaii, operating sites in Guam and Nevada, an office in Japan, the Naval Sea Logistics Center, in Pennsylvania, and the Nanoose Range in the waters of British Columbia, Canada. Our people frequently deploy around the world to support the U.S. fleet and allied militaries.

NUWC Keyport Division's current workforce consists of approximately 2,200 civilians and 30 Sailors.

Mission

Provide advanced technical capabilities for test and evaluation, in-service engineering, maintenance and industrial base support, fleet material readiness, obsolescence management and logistics support for undersea warfare.

Execute other responsibilities as assigned by the Commander, Naval Undersea Warfare Center.

Vision

Expanding America's Dominance in the Undersea Domain

Technical Capabilities

- Pacific Undersea Warfare (USW) Test and Evaluation (T&E) Range and Test Facility Operations
- Independent USW Systems T&E and Experimentation
- Undersea T&E Test Systems
- Undersea Weapons Maintenance and Repair
- Obsolescence Management & Sustainment Technology Solutions
- Undersea Warfare Systems Material Depot
- Undersea Weapons In-Service Engineering (ISE) and Integrated Product Support (IPS)
- Submarine USW Systems ISE and IPS
- Theater USW Systems
- Fleet Training and Training Management Systems
- Naval Sea Logistics Center (NSLC): IPS for Surface and Undersea Systems
- NSLC: Central Design Agent for Navy and NAVSEA Corporate Logistics Data Systems
- NSLC: Ships Planned Maintenance System
- NSLC: NAVSEA Operating Materials and Supplies (OM&S) Management
- Unmanned Undersea Vehicle Maintenance and Repair
- Unmanned Undersea Vehicles ISE and IPS

Major Facilities

- Additive Manufacturing and Rapid Prototyping Technologies Facilities (Keyport)
- Collaborative Test & Evaluation Capability Center (Keyport)
- Combat Systems Depot (Keyport)
- Custom Engineered Solutions/Obsolescence Resolution Facilities (Keyport)
- Fleet Integrated Simulation Technology Testing Facility (Pearl Harbor)
- Fleet Operational Readiness Accuracy Check Sites (Hawaii)
- Fleet Test and Evaluation Facilities (San Diego and Hawaii)

- In-Service Engineering Facility (Keyport)
- Magnetic Silencing Facilities (Pearl Harbor)
- Pacific Northwest Undersea Range Complex (Washington)
- Repair Technology Development Complex (Keyport)
- San Clemente Island Underwater Range (California)
- Shipboard Electronic Systems Evaluation Facilities (Hawaii)
- Torpedo, Anti-Torpedo and UUV Maintenance Depot/Intermediate Maintenance Activity (Keyport and Pearl Harbor)
- Torpedo Demilitarization Facilities (Hawthorne)
- Torpedo Exercise Support Facility (Guam)
- Undersea Warfare Mines Depot (Hawthorne)
- Unmanned Undersea Vehicle Homeport/Barb Hall (Keyport)

Workforce Profile - 2023

- Total: 2,719
- Scientists & Engineers: 627

Advanced Degrees - 2023

- Ph.Ds - 28
- Masters - 439

Total Annual Funded Program - 2023

- \$1 billion
- Contracts issued: \$415 million

Keyport Division Leadership



Darren Barnes
Technical Director (Acting)



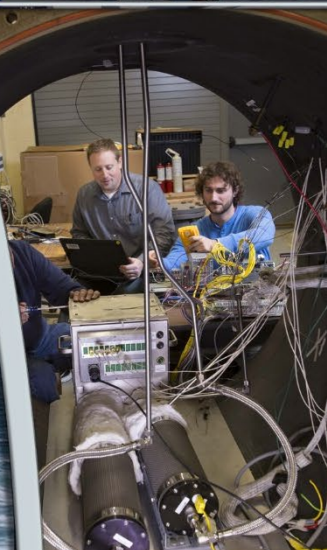
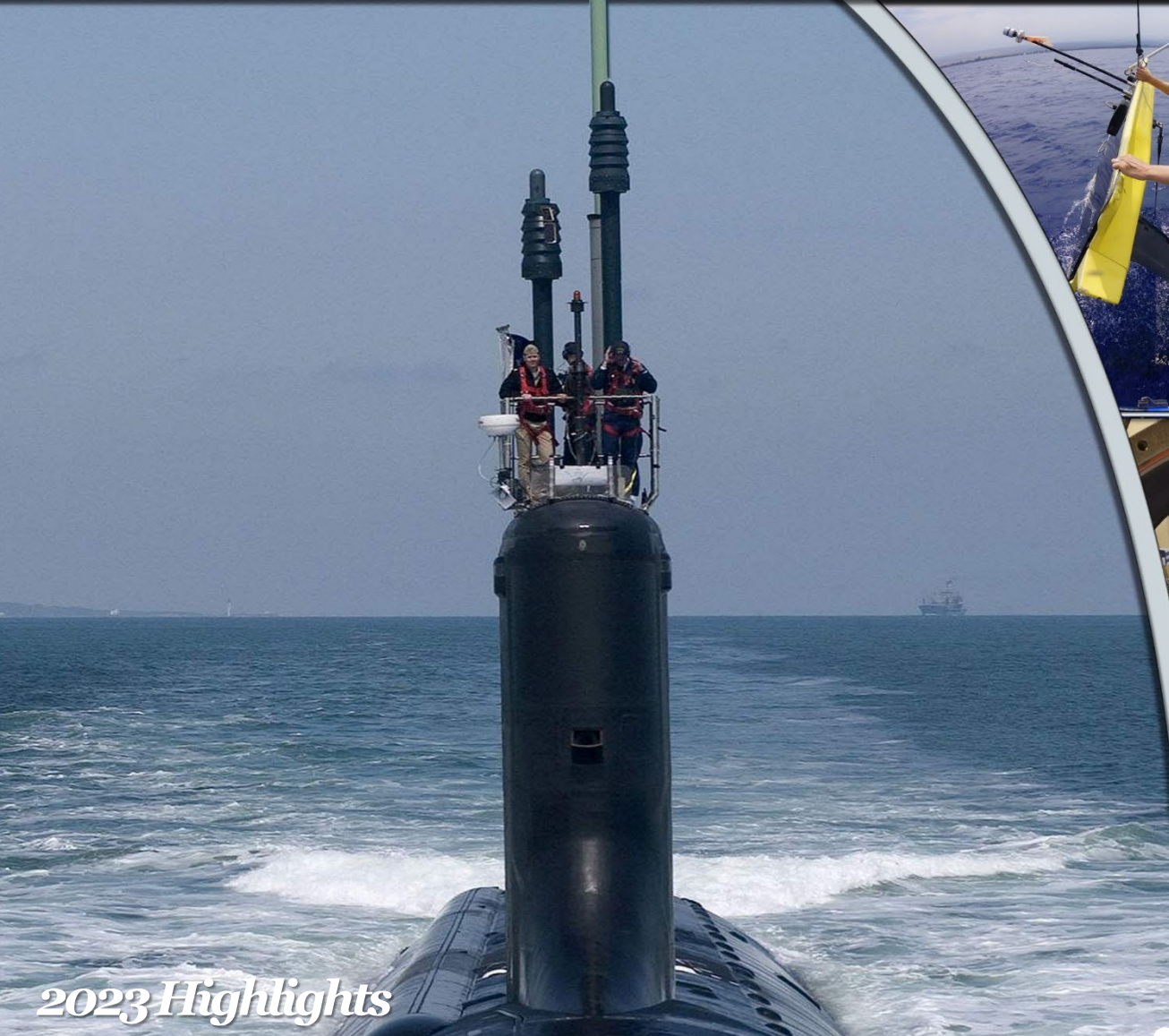
Captain Clinton P. Hoskins, USN
Commanding Officer

Keyport Division Sites



NUWC NEWPORT DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Fleet Support/Shipyard Support: Played a vital role in supporting the U.S. Navy submarine force, including monitoring / responding to Hotline calls, CASREP reports, and providing on-site / distance support for Forward Tech Assists (FTA). Fleet support efforts included 128 shipboard tests and installs, 738 depot refurbis, 649 DLA 339 responses, 24 Fleet COSAL Feedback Reports, 2 Certification audits, 4 Imaging Fleet Tech Assists, 251 BYG1 and 102 Imaging CASREPs, 140 Fleet Support (BYG1) and 167 (Imaging) Hotlines, 82 Chats (BYG1), and distance support/hotline support for 45 Submarine Communications issues. In addition to direct fleet support, Newport developed and hosted a three-day public Shipyard training event in support of Extended Dry-Docking Selected Restricted Availability work on Block III VIRGINIA Class platforms, in preparation for the first overhaul of the VIRGINIA Payload Tube and associated launcher systems. This collaboration between Warfare Center and Shipyard subject matter experts is improving overhaul efficiency and efficacy by focusing on developing the workforce and bridging the gaps created by large-scale personnel turnover.

Unmanned Vehicles: Razorback personnel from Newport, Keyport, and Unmanned Undersea Vehicles Squadron (UUVRON) successfully installed OpenAUV software on Razorback vehicle 1. The OpenAUV architecture allows rapid insertion of capability into the vehicle utilizing Government-owned software. Initial capability was demonstrated in July 2023. Within three months of receiving the Razorback DDS UUV (Vehicle 1), the Newport Experimental Payloads Group fully integrated the OpenAUV software architecture, conducted land-based systems testing, modeling and simulations, and at-sea Verification and Validation events. The EPG team completed these efforts with an embedded HII software engineer to familiarize the employee for future Razorback DDS UUV upgrades, Fleet operators who supported the V&V events, and the In-Service Engineering Agent to develop documentation for the Engineering Change Proposal process.

Deliver Combat Power: Executed Virginia Warfare Material Certification Program (VVMCP) Testing at-sea on USS VERMONT (SSN 792) in June, coordinating with multiple entities including Commander Submarine Squadron Four (CSS 4), North Atlantic Treaty Organization Force Accuracy Check Sites (NATO FORACS), Atlantic Undersea Test and Evaluation Center (AUTEC), and Ship's Force. The Newport team led the combined team from across multiple organizations to overcome unexpected challenges both on-platform and on-range in order to successfully collect all required test data. The team demonstrated a Mk 39 Expendable Mobile Anti-Submarine Warfare Training Target (EMATT) TRACKEX capability. All Exercise Weapons were launched successfully and all three Anti-Submarine Warfare shots were classified Bullseyes by the AUTEC Range. Finally, the team led execution of a new Rapid Weapon Shot Reconstruction strategy with the AUTEC Range House where a playback file was made available to CSS 4 and the USS VERMONT for evaluation of the TORPEX performance. This was IAW joint direction from COMSUBLANT and COMSUBPAC to develop a capability for immediately reconstruction capability consistent with Periscope depth transmission windows and processing times.

NUWC NEWPORT DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

NUWC Newport Division, one of two divisions of the Naval Undersea Warfare Center, is the Navy's full-spectrum research, development, test and evaluation, engineering, and fleet support center for submarine warfare systems and many other systems associated with the undersea battlespace. NUWC Newport Division provides the technical foundation that enables the conceptualization, research, development, fielding, modernization, and maintenance of systems that ensure our Navy's undersea superiority.

NUWC Newport Division is responsible, cradle to grave, for all aspects of systems under its charter, and is engaged in efforts ranging from participation in fundamental research to the support of evolving operational capabilities in the U.S. Navy fleet. The major thrust of NUWC Newport Division's activities is in applied research and system development.

With headquarters in Rhode Island, NUWC Newport Division operates detachments at West Palm Beach, Florida and Andros Island in the Bahamas. Remote test facilities are located at Seneca Lake and Fisher's Island in New York; Dodge Pond in Connecticut; Fort Story, Virginia; Okahumpka, Florida; and Rota, Spain.

Mission

NUWC Newport Division provides research, development, test and evaluation, engineering, analysis, and assessment, and fleet support capabilities for submarines, autonomous underwater systems, and offensive and defensive undersea weapon systems, and stewards existing and emerging technologies in support of undersea warfare. Executes other responsibilities as assigned by the Commander, Naval Undersea Warfare Center.

Vision

Undersea Superiority: Today and Tomorrow

Technical Capabilities

- Undersea Warfare (USW) Communication Systems
- USW Communication Antenna Systems
- USW Combat Systems
- USW Trainer Systems
- USW Sensor and Sonar Systems
- Submarine Periscopes and USW Imaging Systems
- USW Electronic Warfare, Signal Intelligence (SIGINT), Information Operations (IO) Sensors and Systems Integration
- Undersea Surveillance Systems
- USW Launcher Systems and Payload Integration
- USW Platform Tactical Missile Integration
- USW Autonomous Vehicles
- Torpedo and Sonar Defensive and Countermeasure Systems
- Torpedoes and Undersea Weapons
- USW Analysis
- USW Environmental Assessment Effects Analysis
- Undersea Range Technology and Application
- USW Systems Test and Evaluation
- Subsea and Seabed Systems (Newport missions)
- Atlantic USW Test & Evaluation (T&E) Range and Training Operations
- Submarine Electromagnetic Environmental Effects (E3)

Major Facilities

- Acoustic Wind Tunnel
- Anechoic Chamber
- Chemistry Lab
- Combat Systems Evaluation & Analysis Laboratory

- Environment Centric Weapons Analysis Facility
- Launcher Laboratory
- Narragansett Bay Test Facility
- Over-water Arch Facility
- Propulsion Test Facility
- Quiet Water Tunnel
- Submarine Towed and Deployed Systems Research, Development, Test and Evaluation Complex
- Survivability Test Facility
- Undersea Warfare Analysis
- Virginia Payload Tube Facility

Workforce Profile - 2023

- Total: 3,565
- Scientists & Engineers: 2,611

Advanced Degrees - 2023

- Ph.Ds - 156
- Masters - 944

Total Annual Funded Program - 2023

- \$1.5 billion
- Contracts issued: \$979 million

Newport Division Leadership



Marie Bussiere, SES
Technical Director



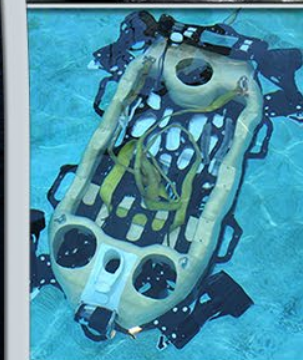
Captain Chad Hennings, USN
Commanding Officer

Newport Division Sites



NSWC PANAMA CITY DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Mine Countermeasures Mission Package Initial Operational Capability (MCM MP IOC): Sailors conduct mine countermeasures (MCM) unmanned surface vessel launch and recovery operations in the mission bay of the USS CINCINNATI (LCS 20). The MCM MP allows an LCS or a vessel of opportunity to conduct the full spectrum of detect-to-engage operations (hunt, neutralize, and sweep) against mine threats using sensors and weapons deployed from the MCM Unmanned Surface Vehicle, an MH-60S multi-mission helicopter, and associated support equipment. Panama City's efforts will enable the Navy to deploy the first MCM MPs in Fiscal Year 2025, providing much-needed modernized MCM capabilities to the fleet.



PCD Day: Every business and technical branch from Panama City was on display for the tenants of Naval Support Activity Panama City during the Navy Lab's first ever PCD Day, May 18. This event featured friendly contests, trivia, educational opportunities to learn about all the great work each group is doing, getting to know more about the many developmental opportunities available at the Navy Lab and more.



Groundbreaking on new Littoral Innovation and Prototyping Facility: The official party from Panama City's Littoral Innovation and Prototyping Facility Groundbreaking Ceremony kicked-off the first building construction project onboard Naval Support Activity Panama City, Fla., since 2018's Hurricane Michael, April 21. This new building features a massive laboratory and includes a support space capable of housing workspace and laboratories for our engineers and scientists. The official party consisted of (left to right) Congressman Neal Dunn, representing Florida's 2nd Congressional District, Panama City's Commanding Officer Capt. David Back, Panama City's Technical Director Dr. Peter Adair, and Commander Michael Mosi, NSA PC commanding officer.



NSWC PANAMA CITY DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

Located on over 650 acres along St. Andrews Bay in Panama City, Florida, NSWC Panama City Division is the Navy's technical center of excellence for littoral warfare and coastal defense. NSWC Panama City Division employs over 1,400 civilian employees, of which the majority are scientists and engineers, who research, develop, test and evaluate capabilities in four core mission areas of mine warfare, diving and life support, naval special warfare and amphibious and expeditionary warfare. NSWC Panama City Division also patents innovative ideas and rapidly prototypes tomorrow's capabilities to fleet users by capitalizing on a talented workforce and a prime location on the Gulf of Mexico.

Mission

The mission of Naval Surface Warfare Center Panama City Division is to conduct research, development, test and evaluation, in-service support of mine warfare systems, mines, naval special warfare systems, diving and life support systems, amphibious/expeditionary maneuver warfare systems, other missions that occur primarily in coastal (littoral) regions and to execute other responsibilities as assigned by Commander, Naval Surface Warfare Center.

Vision

Ensuring Warfighting Dominance in the Littoral Battlespace

Technical Capabilities

- Personal Protective Systems for Extreme Environments
- Expeditionary, Littoral, and Maritime Security System Engineering and Integration
- Air Cushion Vehicle Systems
- Expeditionary Maneuver Warfare Systems Engineering and Integration
- Special Warfare Maritime Mobility Mission Systems and Mission Support Equipment
- Mine Countermeasures (MCM) Detect and Engage Systems, Modular Mission Packaging, and Platform Integration and Handling
- Littoral Mission Systems Integration and Modular Mission Packages Certification
- Unmanned Systems Engineering & Integration, Autonomous Operations, Joint Interoperability and Common Control
- Mine Sensor and Target Detection Technology, Mine Delivery Integration, and Minefield Architecture
- Diving and Life Support Systems
- Surface Life Support Systems for Extreme Environments
- Subsea and Seabed Systems (Panama City missions)

Major Facilities

- Mine Warfare Complex
- Littoral Warfare Research Facility
- Littoral Warfare Systems Facility
- Diving & Life Support Complex

- Special Warfare Research Engineering Complex
- Expeditionary Warfare Complex
- Landing Craft Air Cushion Facility
- Human Systems Integration Usability Lab
- USMC Amphibious Raids and Reconnaissance Integration Facility
- Coastal Test Range
- Prototype Fabrication Facility
- Fanselau Coil Facility
- Joint Gulf Test Range

Workforce Profile - 2023

- Total: 1,621
- Scientists & Engineers: 962

Advanced Degrees - 2023

- Ph.Ds - 71
- Masters - 436

Total Annual Funded Program - 2023

- \$600 million
- Contracts issued: \$250 million

Panama City Division Leadership



Dr. Peter Adair, SES
Technical Director



Captain David Back, USN
Commanding Officer

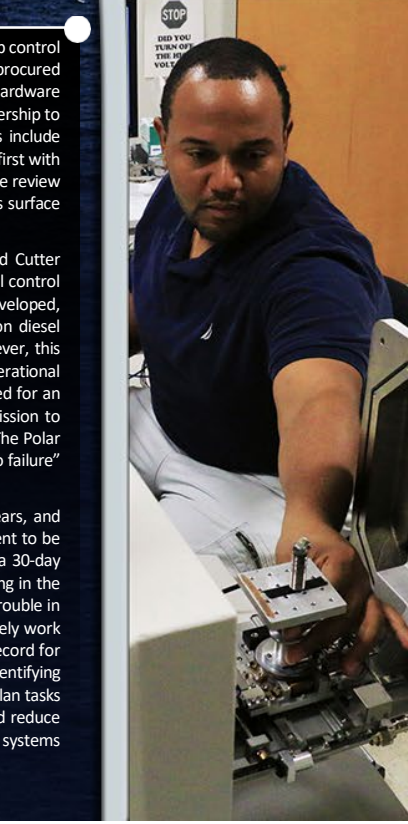
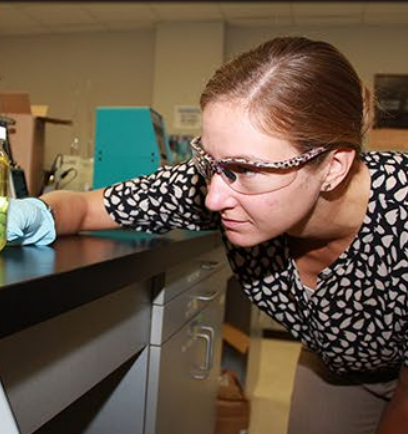
Panama City Division



NSWC Panama City
Panama City, FL

NSWC PHILADELPHIA DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Ship Control System – Government (SCS-Gov) Fielded on All USS Nimitz Class Aircraft Carriers: Successfully completed the initial upgrade and standardization of ship control system products across all USS NIMITZ (CVN 68) Class Aircraft Carriers. Ship Control System – Government (SCS-Gov) replaced proprietary ship control systems procured ship-by-ship on CVN 68 by the shipbuilder that had various operational, supportability, and reliability deficiencies; two major areas of concern included significant hardware obsolescence issues and management and maintainability of the associated software applications and operating systems. Philadelphia was challenged by Navy leadership to come up with a “wheel to rudder” solution leading to a government controlled and managed design and software known as SCS-Gov; key related parameters include improved human system integration (operability), diagnostics, redundancy, and cybersecurity. The effort to replace these shipbuilder systems with SCS-Gov started first with installations on USS RONALD REAGAN (CVN 76) in 2010 through to USS GEORGE WASHINGTON (CVN 73) in 2023. SCS-Gov was also highlighted in the comprehensive review and associated ship class design review boards, and is now being enhanced and pursued as the commonality and mission/safety critical solution across the various surface ship classes, and will play a crucial role to strengthen and advance the Navy’s maritime superiority strategy.

United States Coast Guard Cutter (USCGC) POLAR STAR (WAGB-10) Collaborative Modernization Effort: Culminating in 2023, Philadelphia’s U.S. Coast Guard Cutter (USCGC) Polar Star team, in collaboration with the USCG and USCG Ship Repair Yard, successfully replaced the existing machinery control system and electric diesel control system on the nation’s only U.S. Navy’s Heavy Polar Class icebreaker capable of making the ice channel to McMurdo Station in Antarctica for resupply. The team developed, designed, tested, installed, and procured a new government-owned cutting-edge propulsion control system that provides control and monitoring of propulsion diesel engines and generators, gas turbines, reduction gears, main motors and ancillary equipment. Typically, an install of this magnitude requires 8-12 months; however, this modernization took place in 120 days without impacting the ship’s mission and is projected to extend the service life of the ship well into the 2030s and boost operational reliability through the ship’s remaining service life. Extending the ship’s service life through this upgrade will save tens of millions of dollars by eliminating the need for an accelerated construction schedule for the replacement ship class. The ship deployed on time in November 2022 for its yearly Operation Deep Freeze (ODF) mission to Antarctica with three Philadelphia personnel aboard to ensure any necessary support was available for the duration of the cutter’s unique & imperative mission. The Polar Star successfully returned to homeport without incident after successfully completing ODF ‘23 in April 2023. The Polar Star is considered a national asset with a “zero failure” mission operation requirement.

Establishment of a Powertrain Program of Record: Due to funding constraints, Powertrain equipment across 11 systems, including shafts, main reduction gears, and waterjets, the technical community had become extremely reactive to all issues. This caused surface ship powertrain systems reliability and Life Cycle Management to be inadequate and directly impact warfighting readiness and on time deliver as seen from the over 1,076 Powertrain Casualty Reports being open for longer than a 30-day period from 2019 through 2022. Additionally, a SEA21 Analysis in support of VCNO tasker, Perform to Plan, identified Main Reduction Gears and Waterjets as being in the top 10 systems affecting on time delivery of ships from availabilities. Without a change in funding and tasking, powertrain systems would continue to experience trouble in their sustainment and on time delivery from availabilities. Philadelphia stood up a working group to address these issues throughout the Fleet, rather than reactively work the problems with dwindling In-Service Engineering Agent funds. The team developed and submitted a paper for approval to establish a Powertrain Program of Record for POM25 identifying the construct for funding through 2SCOG via Fleet funding sheets. The program began in FY23 with base funding from NAVSEA 05Z to start identifying issues and building the framework to lead into FY25. The program is focusing on reducing lengthy CASREPs by increasing parts availability and Class Maintenance Plan tasks that involve more periodic inspections of systems. Utilizing Corona Division data to evaluate and identify where improved maintenance tasks or inspections could reduce instances of growth work. Initial deep dives into these areas followed by a steady pro-active approach is expected to have a large impact on the health of these 11 systems across 12 ship classes, achieving NAVSEA’s Warfighter Readiness mission areas of Clear the Pier, Expeditionary Maintenance and Mission Assurance.

Approved for public release; distribution is unlimited.

NSWC PHILADELPHIA DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

The Naval Surface Warfare Center (NSWC) Philadelphia Division traces its founding to Nov. 18, 1910, when the Secretary of the Navy established the Fuel Oil Testing Plant (FOTP) to provide technical assistance to the Fleet as the U.S. Navy converted from coal to oil to fire its steam-powered ships.

In the century since, the organization's name has changed as its engineering responsibilities increased in scope: from FOTP; to Naval Boiler Laboratory; Naval Boiler and Turbine Laboratory; Naval Ship Engineering Center, Philadelphia Division; and Naval Ship Systems Engineering Station (NAVSSSES).

When the Secretary of the Navy approved the establishment of the NAVSEA Warfare Centers in 1991, NAVSSSES became part of the NSWC Carderock Division, but retained its status as a separate command. NAVSSSES increased its capability in 1999 with the opening of the Machinery Research and Development Center. On Oct. 1, 2015, the Philadelphia command began the latest chapter in its history when it stood up as an Echelon four-level command, the Naval Surface Warfare Center (NSWC) Philadelphia Division.

NSWC Philadelphia Division is responsible for the machinery systems core equity of the ship and ship systems product area for the U.S. Navy, and serves as a central point for academia and industry to join forces with Navy technical experts to develop solutions to needs in naval machinery.

Consistent with its core equity responsibility, NSWC Philadelphia Division fulfills key functions including research, design, development, shipboard and land-based test and evaluation, acquisition support, in-service engineering, fleet engineering, integrated logistics support and concepts and overall lifecycle engineering.

NSWC Philadelphia Division provides the Navy's primary technical expertise and facilities for both naval machinery research and development and naval machinery lifecycle engineering.

Mission

NSWC Philadelphia Division provides research, development, test and evaluation, acquisition support, engineering, systems integration, in-service engineering and fleet support with cybersecurity, comprehensive logistics, and life-cycle savings through commonality for surface and undersea vehicle machinery, ship systems, equipment and material.

Vision

Shape the Navy's future by continuously expanding machinery systems advantages through technical dominance.

Technical Capabilities

- Surface and Undersea Vehicle Machinery Systems Integration
- Surface and Undersea Vehicle Mechanical Power and Propulsion Systems
- Surface and Undersea Vehicle Electrical Power and Propulsion Systems
- Surface and Undersea Vehicle Auxiliary Machinery Systems
- Surface and Undersea Vehicle Hull and Deck Machinery Systems
- Surface and Undersea Vehicle Machinery Automation, Controls, Sensors and Network Systems
- Advanced Logistics Concepts and HM&E Life Cycle Logistics Support
- Ship Recoverability and Damage Control
- Hull, Mechanical & Electrical (HM&E) for Undersea Vehicle Sail Systems and Deployed Systems
- Shipboard Waste and Hazardous Materials Management Systems
- Surface Ship and Undersea Vehicle Machinery Systems Integrity
- Shipboard Habitability Systems
- SUBSAFE Supervising Authority and SUBSAFE/Level I Material Certification

Major Facilities

- Electric Drive Test Facility (EDTF)
- DDG-51 Land-Based Engineering Station (LBES)

- Shock & Vibration Laboratory (Deck Simulating Shock Machine)
- Submarine Life Support Test Site
- Gas Turbine Life Cycle Support Facility
- Advanced Data Acquisition, Prototyping Technologies, and Virtual Environments Lab (ADAPT.VE)
- Large Scale Machinery Anechoic Chamber
- Submarine Sail Test Site
- Submarine Towed Buoy Facility
- Weapons & Cargo Elevator Land Based Engineering Site
- Shipboard Hydraulics Lab
- Fluid Systems Machinery Silencing Lab
- Depth Control Valve Silencing Facility
- Volumetric Flow Calibration Laboratory

Workforce Profile - 2023

- Total: 2,812
- Scientists & Engineers: 1,632

Advanced Degrees - 2023

- Ph.Ds - 29
- Masters - 661

Total Annual Funded Program - 2023

- \$1.4 billion
- Contracts issued: \$803 million

Philadelphia Division Leadership



Nigel C. Thijs
Technical Director



Captain Joseph Darcy, USN
Commanding Officer

Philadelphia Division



NSWC Philadelphia
Philadelphia, PA

NSWC PORT HUENEME DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS



2023 Highlights

Formidable Shield (ASD/FS21) Exercise Concludes with Several Successful Firsts: NSWC Port Hueneme Division played a critical role in executing Formidable Shield 2023 (FS-23) from the UK Ministry of Defense Hebrides Range, May 8-26. FS-23 demonstrated allied interoperability in a live-fire joint and combined Integrated Air and Missile Defense (IAMD) environment using NATO command and control structures. The NSWC Port Hueneme team supported this exercise by launching a new IAMD-T target and providing range integration and launch support activities for two GQM-167 targets and a Dutch Barracuda target. The IAMD-T successfully demonstrated terminal guidance, collected data to assess the Hebrides Range Flight Termination System, and presented a ballistic target to the joint forces in an IAMD scenario.

U.S. Navy Executes First Integrated Laser Test At Sea: The NSWC Port Hueneme Division executed the first-ever combined combat system ship test qualification aboard USS Preble (DDG 88) at the Point Mugu Sea Range. The team verified HELIOS's capability against stealth air and surface targets and had a combined event with the gun weapon system. HELIOS is the first system that the U.S. Navy has ever incorporated into existing combat systems. During the CSSQT, the NSWC PHD team took on the task of engaging the first laser weapon with air and surface targets using a destructive laser with the intent to practice tracking and actually burn holes through targets.

NSWC PHD Marked a Milestone Anniversary Reaching 60 Years of Navy Fleet Support: On July 10, NSWC Port Hueneme Division marked its 60th Anniversary with a stand-up reenactment of NSWC PHD's creation six decades ago, revealing a rich heritage of naval traditions. Naval officials and representatives from local, state, and federal government celebrated the command's launch 60 years ago on July 8, 1963 under order of the Secretary of the Navy. The reenactment of the ceremony that established the command's earlier template as a technical support agent for missile systems provided a forum for leaders to discuss visions of the naval base's future, as well as stir memories from the command's early days of servicing Talos, Terrier, and Tartar missiles.

NSWC PORT HUENEME DIVISION

NAVAL SEA SYSTEMS COMMAND
WARFARE CENTERS

Naval Surface Warfare Center Port Hueneme Division (NSWC PHD) maintains technical expertise at locations across the United States with engineering and logistics in Port Hueneme, Calif.; search radar engineering in Virginia Beach, Va.; and live-fire testing in White Sands, N.M. NSWC PHD is the Navy's center of excellence for in-service engineering, test and evaluation, and integrated product support for surface warfare combat and weapon systems. Since its inception in 1963, NSWC PHD has supported fleet combat and weapons systems by providing highly-skilled personnel and state-of-the-art facilities to lead the development and support of Navy surface ship warfare systems throughout their life cycle.

NSWC PHD focuses its technical capabilities on Next Generation In-Service Engineering, which involves direct connectivity to the fleet on a global basis and the immediate availability of around-the-clock access to products, services and fleet-support capabilities. Next Generation In-Service Engineering supports predictive system failure, remote diagnostics and corrective action via real-time networked communications.

Mission

Integrate, test, evaluate, and provide life-cycle engineering and product support for warfare systems

Vision

Keeping our Navy underway, combat ready and effective

Capabilities

"Cradle to Grave" lifecycle engineering and sustainment planning to ensure combat and weapon systems work together effectively to accomplish ship, strike group and theater warfare assigned missions. Naval enterprise area assignments include surface, aviation, expeditionary combat, NETWAR FORCENet and undersea for over 50 major acquisition programs.

Onshore and at-sea live-fire testing of naval weapons in support of weapon system acquisition (missiles and laser systems), assembly of weapons for live-fire testing, launch of research rockets and assembly, including launch of low and medium fidelity theater ballistic targets.

Technical Capabilities

- Strike Force Interoperability and Theater Warfare Systems In-Service Engineering (ISE), Test & Evaluation (T&E), and Integrated Product Support (IPS)
- Surface and Expeditionary Combat Systems ISE, T&E, and IPS
- Surface and Expeditionary Weapon Systems ISE, T&E, and IPS
- Underway Replenishment Systems ISE, Research, Development, Test & Evaluation, and IPS
- Surface and Expeditionary Missile Launcher Systems ISE, T&E, and IPS
- Radar Systems ISE, T&E and IPS
- Directed Energy and Electric Weapon Systems ISE, T&E, and IPS
- Littoral Mission Module ISE, T&E, and IPS
- Ballistic Missile Defense T&E Specialized Target Vehicle Development, Integration, and Deployment
- National Technical Means and Space Effects Integration

Major Facilities

- Self Defense Test Ship
- Surface Warfare Engineering Facility

- Underway Replenishment Test Site
- Littoral Combat Ship Mission Package Support Facility
- Vertical Launch System Launcher Lab
- Engineering Development Lab
- Desert Ship – White Sands, N.M.
- Radar Lab – Virginia Beach, Va.

Workforce Profile - 2023

- Total: 2,851
- Scientists & Engineers: 919

Advanced Degrees - 2023

- Ph.Ds – 18
- Masters - 590

Total Annual Funded Program - 2023

- \$1.2 billion
- Contracts issued: \$434 million

Port Hueneme Division Leadership



Jeffrey Koe, SES
Technical Director



Captain Tony Holmes, USN
Commanding Officer

Port Hueneme Division Sites

