

Naval Information
Warfare Center



PACIFIC

NIWC PACIFIC

Naval Information Warfare From Seabed To Space

NMWC Pacific provides development, basic and applied science, test and evaluation, systems engineering and integration, installation, and support of fielded Information Warfare systems from seabed to space.



TODAY

THE NAVY IN OPERATION PRODUCTION, INSTALLATION AND IN-SERVICE SUPPORT

At every step we work directly with the Fleet to make sure our systems are easy to use, easy to maintain, and easy to update, anytime and anywhere, ensuring today's Sailors and Marines have the tools they need to complete their missions and come home safe.

We use clean energy sources, underwater optical communications, and autonomous unmanned systems to enable a vast expansion of the Navy's pervasive and persistent presence beneath the water's surface.



CONSOLIDATING NETWORKS

We are replacing shipboard networks with the Consolidated Afloat Networks and Enterprise Services (CANES)—the most ambitious Fleet-wide network upgrade the Navy has ever undertaken. CANES consolidates and enhances five shipboard legacy network programs to provide integrated voice, video, data, and system-management for more than 40 command, control, intelligence, and logistics applications.

MARINE MAMMALS



The U.S. Navy Marine Mammal Program (Reconnaissance and Interdiction Division) trains bottlenose dolphins and California sea lions to perform tasks such as ship and harbor protection, equipment recovery, mine detection, and clearance. Animal teams have been deployed for use in combat zones during the Vietnam and Iraq wars.



3D SCANNING / ADDITIVE MANUFACTURING

We are advancing the use of three dimensional (3D) printing and cloud scanning across all platforms to fabricate hard to source or obsolete parts, reduce costs, and reduce reliance on vulnerable supply chains.

PREDICTIVE MAINTENANCE



One example of predictive maintenance is the Center's support of the V-22 Osprey. Capabilities supporting continuous integration and automation of operational, maintenance, and logistical processes, along with technical data, combine to improve aircraft readiness, and reduce sustainment costs.

TOMORROW

THE NAVY UNDER CONSTRUCTION

ENGINEERING, DEVELOPMENT, TEST AND EVALUATION

OUR REACH EXTENDS FROM SEABED
TO SPACE

*We build small satellites that give the Navy
unprecedented global coverage, and robotics*



COMPILE TO COMBAT PLATFORMS

Compile to Combat in 24 Hours (C2C24) aims to modernize the afloat end-to-end architecture and increase speed to capability. This involves four key pillars: data standardization, use of shared infrastructure, automating functional and cybersecurity controls testing, and use of the Cloud.



INTEGRATED CYBER OPERATIONS

The Center's Cyberspace/Information Technology workforce of more than 1,000 certified professionals helps safeguard the Cyber domain and provide our forces with information superiority to decisively characterize and eliminate threats. Integrated Cyber Operations defend critical command and control capabilities, and provide situation awareness for combatant commanders.



LIVE/VIRTUAL CONSTRUCTIVE SIMULATIONS

Live simulations represent the natural physical environment in which systems and platforms may be used for rehearsal and training purposes. Modifications provide capability for supporting performance assessment and maintaining range safety.

Virtual simulations provide a common environment for multiple users to interact by replicating warfighting equipment and operational environment conditions.



SPACE COMMAND AND CONTROL

Networks deployed for defense and other government applications include global strategic networks with fiber-optic backbones and tactical networks that rely on terrestrial wireless components.



UNMANNED VEHICLES

Unmanned systems in the air and at sea provide greater autonomy and integrate with manned counterparts. Development of data transfer capabilities provides stealthy, wide-band, on-demand communications for manned and unmanned undersea systems and above-water platforms.



Elegant engineering ensures our systems are rugged, robust, reliable, and resilient.

THE FUTURE

PLANNING THE NAVY AFTER NEXT SCIENCE AND TECHNOLOGY

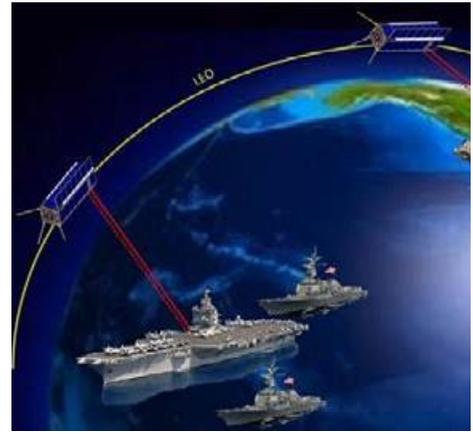
We are melding quantum computing and human engineering to secure the strategic and tactical advantage for America's military forces and partners.

We bring the power of information to the front lines of cyber war.



SMALL SATELLITE COMMUNICATIONS

One example of small satellite communications is High Bandwidth Anti-jam Low Probability of Detection Optical Network (HALO-Net) which utilizes nanosatellites' low size, weight, and power optical communications capabilities. HALO-Net addresses critical Navy requirements such as assured communications in a contested environment and resiliency in satellite communications. Future naval communications will rely on traditional radio-frequency architectures augmented with high-bandwidth, anti-jam, optical, communication links.



GRAPHENE

Graphene's potential as ballistic armor material has become evident from mechanical strength investigations, and research of graphene's high conductivity is leading to better energy density in battery storage. Graphene is remarkably strong (about 200 times stronger than steel), extremely thin, is an excellent conductor of heat and electricity, and can be combined with other elements (including gases and metals).



ARTIFICIAL INTELLIGENCE/MACHINE LEARNING

NIWC Pacific's innovators use AI to augment human performance and increase Navy productivity via its capacity for intricate and redundant tasks. Rather than replace human participation, AI supports our forces while they defend the country.

Machine learning is a set of methods and technologies that underlie Artificial Intelligence. As the number of potential applications of machine learning has exploded in recent years, NIWC Pacific is building a community to bring machine learning experts together with Navy applications and data.



SUPER SWARMS

Designed to accompany small infantry units as they work in dense urban environments, a swarm of autonomous drones and ground robots will assist with military missions.



STRATEGIC LOCATION

THE CUSP OF THE PACIFIC RIM,
WITHIN THE NATION'S LARGEST
FLEET CONCENTRATION AREA

- Located in San Diego, Hawaii, Guam, and Japan
- Close to our major customers
- Integrated and networked with naval and joint operational users, and with government, industrial, and academic partners
- High-speed fiber connecting to Department of Defense engineering enterprise

UNIQUE FACILITIES

CYBER, C4ISR, AND SPACE
LABORATORIES PROVIDING RESULTS
UNACHIEVABLE ELSEWHERE

HIGH PERFORMANCE COMPUTING CENTER (HPCC)

The high-end supercomputers offered by the NIWC Pacific HPCC allow our scientists and engineers to address complex computational challenges, solving problems in domains such as machine learning, modeling and simulation, and signal processing. NIWC Pacific was designated as an Affiliated Resource Center (ARC) in 2010. ARCs are DoD laboratories and test centers that share their systems and expertise with the DoD high performance computing community.

MIXED REALITY LAB

Mixed reality is an immersive technology created by computer-generated sensory input such as sound, video, graphics or GPS data, where physical and digital objects interact in real time. The Center is home to the Battlespace Exploitation of Mixed Reality (BEMR) Lab.

By looking at how commercial technology is being used, NIWC Pacific researchers are hard at work developing low-cost technology that can be used for Navy applications.



TRANSDEC ACOUSTIC POOL

The TRANSDEC pool is filled with six million gallons of water and simulates a vast underwater expanse. The pool's design eliminates all extraneous man-made or natural biologic noises and permits precise control of surface and underwater conditions.



ANTENNA PATTERN RANGE

Brass ship models with working antennas are placed in the center of the turntable for hemispherical antenna radiation pattern measurements. While computer modeling techniques are continuously improving, the brass model is currently still the best method for broadband antenna design and direction-finding array configuration.



TESTING AND INTEGRATION OF NANOSATELLITES LAB

Small satellites extend communications beyond the direct range of larger satellite networks. The Accelerated Capability for Testing and Integration of Nanosatellites (ACTION) Lab develops, tests, and deploys small satellites capable of supporting underutilized radio frequencies communications, optical communications and intelligence, surveillance, and reconnaissance payloads.



THE RIGHT WORKFORCE

Naval Information Warfare Center



PACIFIC

NIWC Pacific is comprised of approximately 5,500 scientists, researchers, and engineers, and is a member of an exclusive team of military research labs that make up the Department of Defense's biggest brain trust.

Our workforce is diverse, distinguished, and dedicated to shaping the future of warfare.

For Fiscal Year 2020

5258 civilians
222 military

~32%
Percentage of workforce that is active duty, reservist, or veteran.

The Center is home to a large core of active duty personnel working alongside a civilian workforce at a Navy research facility.
4342 with SCI clearances

1523 Personnel with Masters Degrees

NIWC Pacific is home to a highly educated, credentialed workforce of
206 Ph.Ds

~535 Civilians directly support C4ISR with the fleet around the world.

~3514 Applicants for 71 positions in the New Professionals Program, with an average GPA of 3.42.

PARTNERING WITH INDUSTRY

We serve as a bridge between Fleet requirements and our industry partners.

Technology Transfer provides an important pathway to move Navy innovation from lab to market and ultimately to the Fleet.

PARTNERING WITH ACADEMIA

- San Diego State University
- Carnegie Mellon
- University of California, San Diego

Cooperative Research and Development Agreements (CRADAs) allow parties to share research and development, resources, personnel, equipment, and costs, enabling development of new capabilities, technologies and IT.

PARTNERING WITH EDUCATION AND COMMUNITY OUTREACH

Each year thousands of students, hundreds of teachers, and dozens of events are supported by a corps of over 500

NIWC Pacific volunteers.



Forward thinking and forward leaning...we are pioneers, explorers, discoverers, and visionaries.

OUR PAST

LEGACY OF DISCOVERY



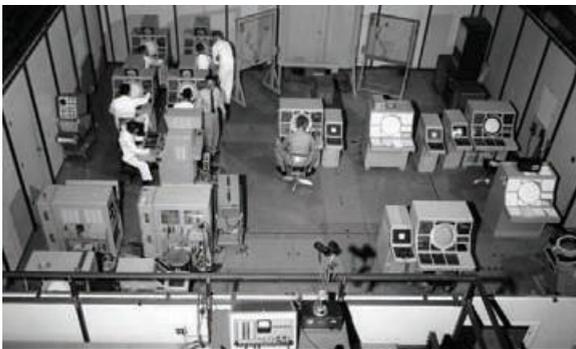
SUBMARINE OPERATIONS



UNDERWATER ACOUSTICS



LASER RESEARCH



NAVY TACTICAL DATA SYSTEM

For more than eighty years, NIWC Pacific has been at the forefront of on-point science and discovery—and we are just getting started.

The Center has a storied past filled with invention, innovation and integration of game-changing technologies, engineering breakthroughs and first-ever solutions—many of which were once thought impossible.

As a warfare center, first and foremost, the Center has developed one-of-a-kind laboratories, test beds and ranges to support the development of antennas, sensors, unmanned systems, integrated architectures, cyber capabilities, and seabed to space networks.



ACOUSTICS / RADAR



ARPANET

We are doers, writing the next chapter in our celebrated history, guided by the genius and brilliance of those who came before us.

TECHNOLOGY TRANSFER

Facilitating the sharing of new ideas and innovative technologies with our external partners

In 1980, Congress enacted the Technology Transfer (T2) program to maximize taxpayer benefit by providing a means for the transfer of knowledge, expertise, facilities, equipment, and other resources between Federal labs and external partners such as industry and academia.

NIWC Pacific, seeks collaborative opportunities, and participates in efforts that facilitate or stimulate the transfer of technology.

The NIWC Pacific T2 Office uses its partnering and licensing agreements to enable spin-off, dual-use, and spin-on activities which leverage NIWC Pacific and external resources.



- An in-house project used a Cooperative Research and Development Agreement (CRADA) to test NIWC Pacific's Van Atta array retro-reflectors in space for the first time, and confirmed the retro-reflectors can improve the ability of government space object tracking organizations to detect and track nanosatellites.
- Companies evaluated NIWC Pacific's Multi-robot Operator Control Unit (MOCU) under CRADAs to determine if they would include MOCU in their respective proposals to an Army program of record. MOCU was included in the winning proposal and is transitioning into the Army program.
- NIWC Pacific continues partnering with a local startup and licensee by entering into a CRADA to grant the startup access to the marine mammal medical database in exchange for royalties on any discoveries. The company has applied advanced technologies to biosamples to identify molecules and therapeutic targets that may improve marine mammal health, with potential translation to human health.

Fiscal year 2020: 59 Active CRADAs, 39 CRADA Actions For information call (619) 553-2717 and ask for Technology Transfer

As a primary research arm of the Naval Information Warfare Systems Command (NAVWAR), NIWC Pacific is a recognized leader, providing scientific, technological and engineering support in the fields of Command and Control, Communications, Integrated Cyber Operations, Transport and Computing Infrastructure, and autonomous unmanned systems.

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