

Naval Submarine Medical Research Laboratory



FACT SHEET

Naval Submarine Medical Research Laboratory
Naval Submarine Base New London Box 900
Groton, CT 06349-5900
Phone: DSN: 694-3263 COM: (860) 694-3263
Fax: (860) 694-4809
Email: :admin@nsmrl.navy.mil

The Naval Submarine Medical Research Laboratory (NSMRL) is DoD's Center for Undersea Biomedical Research. The laboratory's mission is to protect the health and enhance the performance of our warfighters through focused submarine, diving and surface research solutions. Established in World War II, NSMRL was responsible for selecting personnel for training at the Naval Submarine School, conducting specialized training in submarine medicine for hospital corpsmen and medical officers, and researching the medical aspects of submarines and diving. Today NSMRL continues to be the biomedical R&D leader in submarine medicine, health effects of submarine atmospheres, auditory sonar information processing, selection qualification of submariners, escape and rescue from disabled submarines, diving bioeffects, and hearing conservation technology.

Achievements:

- Sea Lab 1 undersea habitat project
- International Orange/air-sea rescue red
- Saturation diving and decompression tables
- Hearing conservation in noisy environments
- Safe exposure guidance for personnel in the presence of intense low and high frequency sonars
- Identification of submarine air trace constituents
- Pressurized Submarine Rescue Manual
- Data-based medical qualification policies
- Farnsworth lantern for screening color vision
- Underwater acoustic signal discrimination and classification

Located on Submarine Base New London, Groton, CT, NSMRL researchers have access to three submarine squadrons in Submarine Group Two; the Navy Submarine School; the Naval Submarine Support Facility; Naval Undersea Medical Institute; and the Electric Boat Division of General Dynamics, which builds our nation's submarines.



NSMRL's five multi-disciplinary research teams use highly capable facilities including their own hyperbaric, hypobaric and anechoic chambers, auditory and vision laboratories, diving boat and technical library.. Several colleges and universities are nearby, including the US Coast Guard Academy, Connecticut College, and the University of Connecticut.

A healthy highly performing Submarine Force is essential to the nation's security.

Genesis Hypo/hyperbaric Chamber



1000 m3 Anechoic Chamber



Testing diver responses to sonar



Research

Submarine Medicine

- Researchers focus on ways to optimize the health and job performance of our undersea warfighters. Their goal is to increase mission effectiveness by reducing attrition due to conditions, both psychological and physical, which may cause a submariner to be unfit for submarine service. The team represents the lead for the NAVSEA-sponsored Submarine Atmosphere Health Assessment Program.

Diving Bioeffects

- Researchers are working on ways to optimize the performance and safety of Navy divers. Their goal is to increase mission effectiveness by reducing workplace hazards and providing underwater noise-protection tools. Underwater noise can impact the diver through hearing damage and damage to internal organs, such as the lungs and brain. Research facilities include a saturation diving chamber certified to pressures simulating 350 fsw and a fully instrumented hyperbaric treatment chamber.

Hearing Conservation

- The Hearing Conservation Team focuses on ways to identify the early stages of noise-induced damage to the human ear. Current research involves the evaluation of new methods for evoking otoacoustic emissions that are thought to be (a) sensitive to the early stages of noise-induced hearing loss (NIHL) and (b) a measure of susceptibility to NIHL. Our approach is to evaluate these methods both in the laboratory (for validity, reliability, and sensitivity to temporary noise-induced changes) and in the field with noise-exposed at-risk personnel (for detecting the early stages of permanent noise-induced changes).

Information Processing & Display

- Scientists are working to optimize the quality of information presented to Navy operators (e.g. fire control and submarine sonar consoles). Their goal is to increase mission effectiveness by decreasing operator workload and improving the human-machine interface. Displays that help the operator separate desired from undesired information will increase situation awareness, reduce workload, and improve the identification, classification and tracking of signals of interest.

Submarine Escape & Rescue

- Researchers are conducting basic and applied research in the biomedical and bioengineering aspects of crew survival and escape from disabled submarines lying on the ocean floor. The primary goal is to develop equipment, procedures and guidance to optimize submarine disaster survival. In addition, the team serves as a center of excellence and subject matter experts on submarine rescue and escape for the operational fleet, policy makers and industry.

Examples of Accomplishments

- Biomedical evaluations and recommendations for new submarine survival and escape equipment
- Continuous and impulsive underwater noise guidance
- 34,000 students screened for suitability for submarine duty
- Passive sampling technologies and procedures for submarine atmospheres
- Design specifications and evaluations of: noise reducing stethoscopes, sonar headsets, and colorized sonar waterfall displays

Examples of Operational Support

- Developed guidance for diver safety and Environmental Impact Statement to allow nation's most capable antisubmarine sonars to operate
- Engaged in fatigue countermeasures projects to help sustain underway submariners
- SEAREX – a computer-based decision system that maximizes safety and success during escape and rescue
- Revisions to Submarine Atmosphere Control Manual
- Saved an estimated 120 careers and at least \$5M by safely returning to duty first-time renal stone formers and men with peptic ulcers
- Development & evaluation of advanced forms of passive and powered atmospheric CO₂ scrubbing methods
- Development of saturation diving and decompression tables
- Psychological screening of candidates for submarine service to predict and prevent submariner attrition
- Headset assessments and recommended specifications for advanced auditory sonar systems
- Submarine Escape Action Levels for atmosphere contaminants
- Submarine survivor guidance procedures & computerized algorithms
- Guidances for exposure to SONAR (e.g., LFA, hand-held & advanced SEAL Delivery Systems)
- New passive, non-intrusive sampling technology for contaminants