NEDU CELEBRATES 75 YEARS

By: LCDR Marc Tranchemotagne

Established in 1927, the Navy Experimental Diving Unit completed 75 years of pioneering diving and hyperbaric research in 2002. Among NEDU's accomplishments over the past three quarters of a century are ground-breaking work developing standard decompression tables for air diving, helium-oxygen diving procedures, recompression treatment tables, surface decompression procedures, saturation diving, early sea-floor habitats, diver thermal protection, and submarine rescue.

Experimental diving began in the Navy in 1912 at the Brooklyn Navy Yard under the direction of Chief Warrant Officer George D. Stillson. His small group developed the first standard Navy diving equipment, tested Dr. John S. Haldane's theories on staged decompression, and extended the maximum diving depth of U.S. Navy divers from 60 to nearly 300 feet.

Navy diving stagnated immediately after World War I with the closing of the Diving School in Newport, Rhodes Island, but experiments with helium were conducted in cooperation with the Bureau of Mines in the mid-twenties.

The Navy Experimental Diving Unit was formally established in 1927 at the Washington Navy Yard adjacent to the re-established Diving School.

NEDU's early focus was on submarine rescue and experiments with helium diving. In the mid-1930s, Doctors C. W. Schilling, A. R. Behnke, and O. E. Van der Aue, became the first medical staff at NEDU. Their early experiments demonstrated the usefulness of oxygen for treating decompression sickness and proved conclusively that breathing high-pressure air caused physical and mental performance decrements. They also developed surface decompression procedures for submarine rescue.

The first operational use of helium was during the salvage of the USS SQUALUS, which sank in 243 feet of water off the Isle of Shoals near Portsmouth, NH. Equipment and procedures developed at NEDU, including the McCann Rescue Chamber, were essential to the rescue of the 33 crewmen who survived the initial sinking.

HT1/SEAL Dan Jakobs (SDVT-2) testing the new KMS-48 mask in conjunction with the MK-25.

During World War II, NEDU began work on early oxygen rebreathers, investigated oxygen toxicity, and tested captured enemy diving equipment. The unit also tested breathing systems and pressure suits for aviators and investigated altitude bends, a new phenomenon observed with the advent of high performance, high altitude aircraft.

In the 1950s, NEDU developed surface decompression tables using oxygen for air diving. In 1956, NEDU developed procedures for air diving that became the basis of the Standard Air Decompression tables, the Surface Decompression Using Air table, and the Repetitive Air Dive tables. These air tables became the standard worldwide.

In the early 1960s, CAPT George Bond, Medical Corps, began the first early experiments in saturation diving, Project Genesis, at the Submarine Medical Research Laboratory in Groton, Connecticut. He and his team of aquanauts conducted their first manned saturation dive, Genesis D, to 100 fsw at NEDU in the spring of 1963.

Saturation diving progressed dramatically through the 1960s and 1970s. New diving records were set and broken, including the first 600 fsw dive in 1964, the first 1,000 fsw dive in 1968 in a joint venture with Duke University, and a 1,600 fsw dive in 1973 at Taylor Diving and Salvage in New Orleans LA, which was then the world's largest hyperbaric facility. In the 1960s, NEDU developed recompression treatments that would become known as

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Treatment Tables 5 and 6, still in use today.

In 1975, NEDU relocated from the Washington Navy Yard to its present location on the Florida panhandle in Panama City. It was commissioned as a shore command under Naval Sea Systems Command. The new unit included the Ocean Simulation Facility—the largest manned hyperbaric facility in the world—and the Experimental Diving Facility for unmanned testing.

Through the 1970s and 1980s, NEDU tested a great variety of diving equipment and achieved new records for depth and duration in saturation diving. Among the equipment tested was the MK 12 Surface Supplied Diving System (SSDS), which replaced the MK V that George Stillson had tested in the 1920s, and which would be replaced by the MK 21/Superlight 17, also tested at NEDU.

Ocean Simulation Facility, 55,000 gallon wet pot.

During the 1980s and 1990s, NEDU did a large amount of saturation diving to evaluate diving equipment, examine deep saturation diver thermal protection problems, test active and passive diver thermal protection, validate decompression algorithms, test various carbon dioxide absorbents and scrubber systems, develop Treatment Table 7, and conduct mission-specific training for various special projects.

In 1998, the diving biomedical research and development functions from the Naval Medical Research Institute (NMRI) in Bethesda, MD, were consolidated with NEDU.

From 1999 to 2002, NEDU conducted two warm water diving studies to address concerns of the Naval Special Warfare community regarding critical gaps in the Navy's knowledge of warm water diving physiology.

ENCS/DSW Vern Geyman, SM1/DSW Jorge Guillen, DC1/DV Jeremy Mullis, HT1/DV Bart Washburn decompressing during USS MONITOR diving operations.

In 2001 and 2002, NEDU divers made essential contributions to the ex-USS MONITOR salvage project. The mission was a three-year, joint National Oceanographic and Atmospheric Administration and U.S. Navy expedition to recover artifacts from the historic site 16 miles south-southeast of Cape Hatteras Lighthouse off the North Carolina Coast.

In 2002, NEDU completed the final open-water demonstration dives for certification of the MK 16 Mod 1 UBA to 300 feet of seawater (fsw) in the Gulf of Mexico. The 300 foot open-water certification dives completed a four-year product improvement process that included: extending the working limit from 200 to 300 fsw, developing 1.3 atmosphere constant partial pressure of oxygen decompression tables for nitrogen (N_2O_2) and helium (HeO_2) diving, providing an HeO_2 repetitive dive capability for dives shallower than 200 fsw, testing an emergency breathing system (EBS) with integral communications, adding an integral buoyancy compensation device, and adopting an improved full face mask.

Over the past 75 years, NEDU has evolved from a small team of Navy divers to a diverse workforce of over 150 people including military divers from the Fleet, EOD, SEABEE, and SEAL diving communities; PhD scientists and engineers; diving medical officers, physiologists, and research psychologists; and many talented technicians and support personnel. NEDU's mission has evolved from Gunner Stillson's original assignment to evaluate diving equipment and procedures to a much broader mandate that includes a wide range of undersea and hyperbaric biomedical research and development. As NEDU looks towards the immediate future, we foresee research focused on procedures for contaminated water diving, advances in diver thermal protection, furthering our understanding of oxygen toxicity and decompression illnesses, and preserving a Navy capability for saturation diving.

The author wishes to acknowledge that much of the information on NEDU's early history was taken from a 50-year retrospective written by LT R. C. Carter, MSC, USN and published in the Fall 1977 Faceplate, "NEDU celebrates 50th Anniversary 1927-1977," and as NEDU Report 1-77, "Pioneering Inner Space: The Navy Experimental Diving Unit's First 50 Years."

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