

The Ocean Simulator houses two chambers; one wet chamber 15 feet in diameter and 45 feet long, and a dry chamber complex eight feet in diameter and 62 feet long. The wet chamber is rated man-safe

for pressures to 1,000 psi and will allow testing systems and equipment in a simulated deep-ocean environment.

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The Ocean Simulation Facility, better known as the "OSF," is located at the Naval Coastal Systems Laboratory in Panama City, Florida. It is a complete and unique facility for research, development, test and evaluation of equipment and systems involving man working in simulated deep undersea environments.

The OSF includes a complex of chambers, man rated for safe operation to 1000 psi, consisting of a wet chamber 15 feet in diameter and 45 feet long and a 62 foot long upper dry chamber complex, eight feet in diameter.

The dry chamber complex consists of two 12 foot long main chambers, each

containing an outer lock eight feet long. A center lock, 10 feet long, is interposed between the main dry chambers and is connected to the wet chamber below by a dry trunk eight feet in diameter and six and one half feet high.

Entry hatches in the dry chamber complex are 42 inches in diameter. The overhead entry hatch in the center lock and the hatch openings in the top and bottom of the center trunk are 48 inches in diameter. Small pass-through locks are located in the center lock, each dry chamber and each outer lock.

Each main dry chamber is sized to accommodate four men for extended habitation. Berths, lights, showers,

potable water and sanitary facilities are provided. An emergency breathing system, communications, closed-circuit television surveillance, and an automatic fire protection system are provided. A personnel transfer capsule can be mated to the end of one of the outer locks to permit transfer of saturated subjects either for decompression or in an emergency.

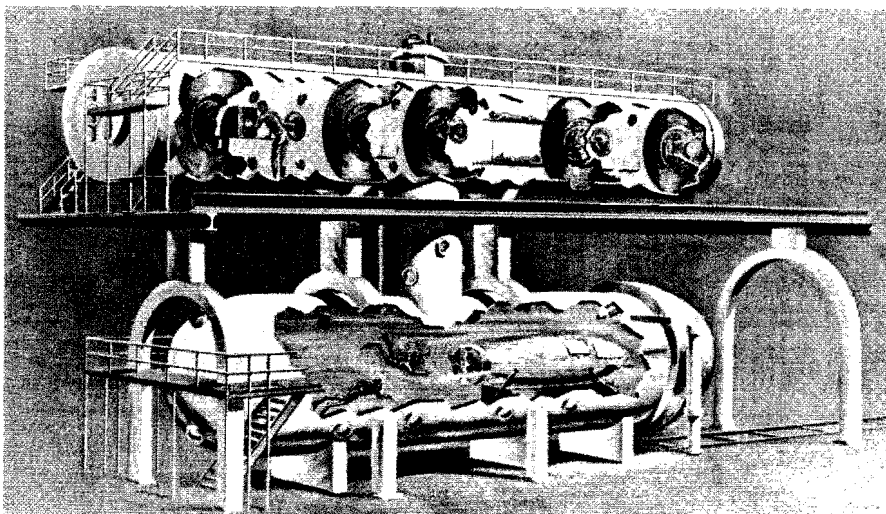
The wet chamber provides unusual flexibility for conducting a variety of man-machine test programs. One end of the wet chamber has a hemispherical door which provides full-diameter access for inserting large test vehicles and equipment.

Chamber volume is about 7,000 cubic feet and holds 53,000 gallons of water. Chamber wall penetrations are available for operating equipment and heating exposure suits. A complete lighting system is built into the chamber. Emergency breathing systems are located at various sites.

Monitoring and control of the chamber complex are carried out in the control room where a central console and other individualized consoles are located. Selected read-outs are provided at the central console for monitoring overall operation; and individual consoles permit control and monitoring of biomedical data, the environmental control system, chamber operation and equipment test data.

Closed circuit television permits visual monitoring of all chamber

AT SEA ON LAND — Artist's concept of the chambers showing two SCUBA-equipped men and a mini-submersible in the wet chamber. The upper dry chamber can house four men for extended times. Linking the two chambers is a six-foot-long dry trunk.



THE NAVY CIVIL ENGINEER

Pseudo Sea

interiors. A gas analysis system is provided for analysis of chamber gas and trace gases throughout the complex.

The chamber complex is housed in a three story, 22,500 square foot structure which includes a high bay area, mechanical equipment room, biomedical and scuba laboratories, control room, administration facilities, check-out pool, experimental equipment assembly area and two bridge cranes.

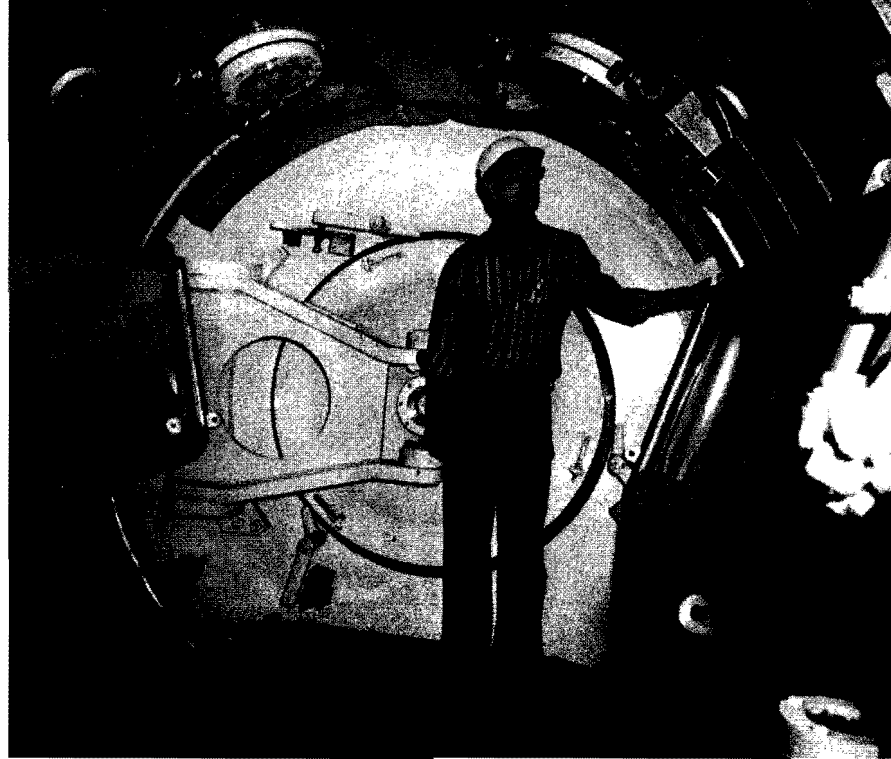
The idea for a deep ocean engineering pressure facility became a formal request with the submission of a DD Form 1391 on Feb. 1, 1967 by the U.S. Navy Mine Defense Laboratory (now the Naval Coastal Systems Laboratory), Panama City, Florida.

Estimated cost at that time was six million dollars. Eight years and \$10 million later, the "idea" has become a reality.

The project was designed and constructed under the direction of Southern Division, Naval Facilities Engineering Command. Because of the project's complexity, a separate Resident Officer in Charge of Construction office was set up at the site under the direction of LCDR Bob Edmiston.

After engineering feasibility studies to determine elements of the system, identification of the developmental work required, and programming sequence, a program cost estimate was prepared.

Sanders and Thomas, Inc. of Pottstown, Pennsylvania, was selected as the Architect/Engineer for the project and



DEEP HOME — ROICC Inspector Earl Allen indicates relative size of the dry chamber.

was awarded the first phase of the total design package in August, 1967.

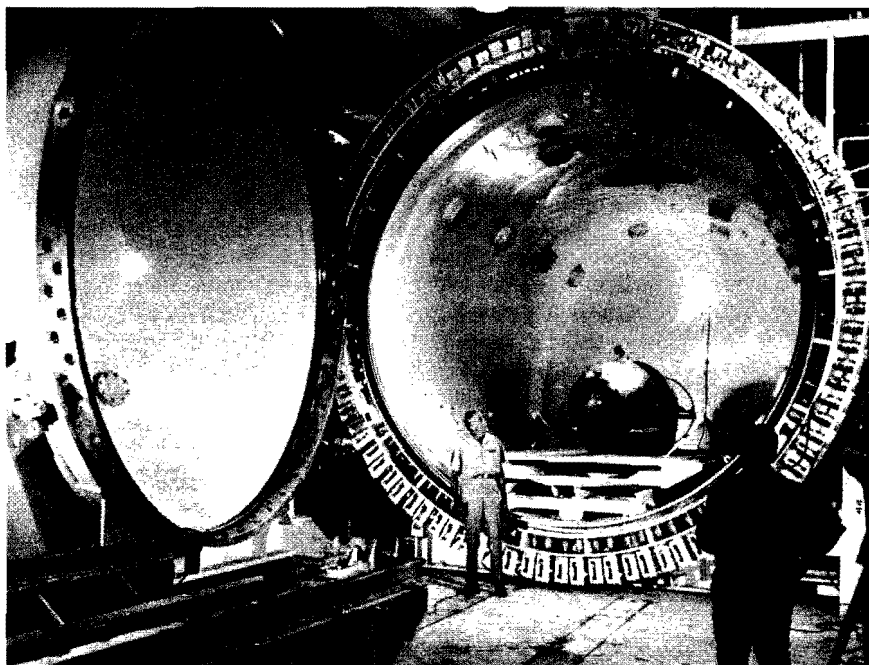
The programming sequence called for work to be accomplished in three segments or packages.

Construction of the building to house the pressure vessels was the first segment—or package A.

Construction began in July 1969 under Dyson and Company of Pensacola, Florida, and cost \$1.2 million. While package A was under construction, the pressure vessels, package B, were being readied by Hahn & Clay at their Houston, Texas plant.

Cost of this portion totaled \$2.4 million.

WET CHAMBER — A massive, full-access door is fitted to one end of the wet chamber. This door allows large equipment to be tested without disassembly.



The package C portion of the project included life support systems, controls and instrumentation and was awarded to the Northrop Corporation of Anaheim, California, in November 1970.

Cost of package C totaled \$5.7 million before the contractor completed work in May 1974.

Any project of this type must be certified "man safe" before use. A system certification team, headed by Dr. M. Yachnis of NAVFAC, was assembled to assure the facility met all safety requirements. The certification team identified a number of modifications and corrections which were formulated into package D. This package was handled by Naval Coastal Systems Laboratory personnel and certification was granted in February 1975.

Certification stipulates the facility shall be operated manned or unmanned to a maximum depth equivalent of 2,250 feet of seawater at chamber shell temperatures not less than 34°F, and that seawater will not be used in the chamber.

Since certification and the beginning of operations by the Navy Experimental Diving Unit, approximately 12 dives have been made. Most of these were manned to depths of 30 feet to 750 feet. The latest dive involved five men for 24 days to a depth of 750 feet. A 30-day manned dive to 1,000 ft. is planned for fall.

Now that the OSF is an actuality, the Navy has available a testing facility in a controlled environment that provides distinct economic and safety advantages over testing under the unpredictable conditions of the open sea.