# FACEPLATE

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# FACEPLATE

*. . . the official magazine for the divers and salvors of the United States Navy*



FRONT COVER: Diver dons newly-developed thermal protection suit for flight to operational test site at Casco Bay, Maine (see page 14).

INSIDE FRONT COVER: EA2(DV) Stewart Dahl chooses the MK 5 for his underwater reenlistment ceremony (see page 22).

BACK COVER: The Military Amphibious Reconnaissance System (MARS) cuts through choppy seas during tests off Panama City, FL (see page 21).

# SOUNDINGS

## AIR FLORIDA AIRCRAFT WRECKAGE RECOVERED FROM POTOMAC RIVER

Mobile Diving and Salvage Unit TWO, Little Creek, Virginia, was tasked with Navy on-site command of the diving and salvage efforts to recover the Air Florida Boeing 737 aircraft which crashed in the Potomac River on takeoff from Washington National Airport on January 13, 1982. LCDR Stephen Delaplane directed operations at the scene, and will report on the successful recovery efforts in the Spring issue of FACEPLATE. NAVSEA OOC provided logistic support to the Navy salvage forces. Various support equipment, including a mobile communications and personnel support trailer, portable generator and light tower, and diver heating units, were rushed to the salvage site from Emergency Ship Salvage Material (ESSM) Base assets located at Williamsburg, Virginia.

## THROUGH-WATER COMMUNICATIONS SYSTEM DEVELOPED AT NCSC

The Through-Water Communications System (TWCS), developed at the Naval Coastal Systems Center, Panama City, Florida, will enable the untethered SCUBA diver to communicate vocally with other similarly equipped divers and with his surface support. It is designed so that the diver may transmit without the use of his hands, if required. This is possible by the use of a voice-operated transmit switch (VOX), activated by the diver's voice. A rechargeable battery pack on one end of the case supplies power. The batteries may be charged while still in the communicator if speed of turnaround is not important; but, the battery pack may be replaced for quick turnaround.

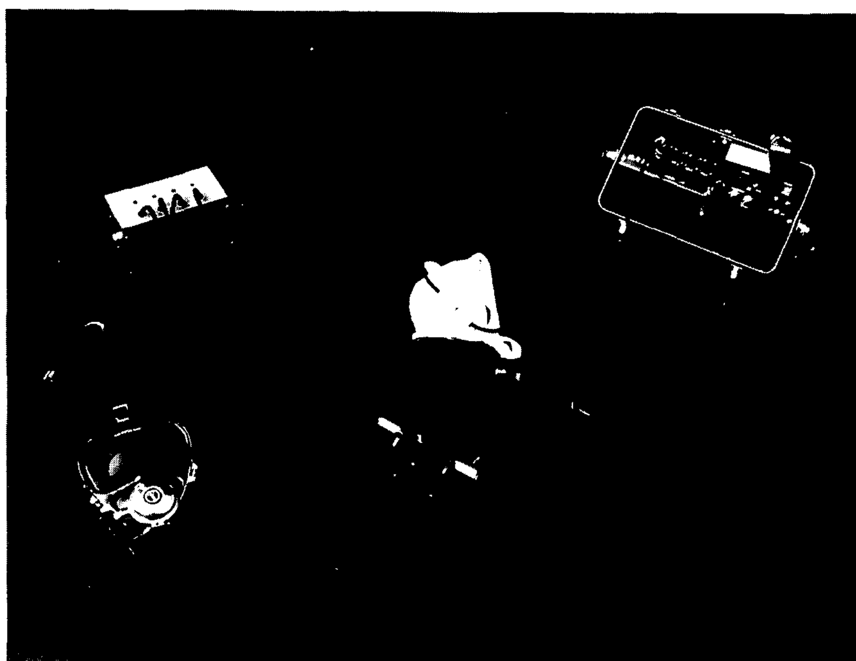
TWCS TECHEVAL has been completed; OPEVAL will soon take place, followed by initial Fleet introduction in early 1983.

## 500-METER DIVE COMPLETED AT NORWEGIAN UNDERWATER TECHNOLOGY CENTER

The Norwegian Underwater Technology Center (NUTEC) has recently successfully completed a 33-day simulated saturation dive to 500 MSW at its hyperbaric facilities in Bergen, Norway, climaxing over a year of preparation and training of topside and dive team personnel.

The exercise, called Deep Ex II, was supported financially and by loan of personnel through several commercial sources: Norske Shell, Statoil, British Petroleum, Norsk Hydro, Det Norske Veritas, Seaway Diving, Comex Houlder, Wharton Williams Taylor, Bergship, Nordex Wilco, Oceaneering, and the Royal Norwegian Council for Scientific and Industrial Research (NTNF). The dive's work schedule included testing of new equipment, welding techniques, and comparison of helium-oxygen and helium-oxygen-nitrogen trimix.

The extensive support received from commercial petroleum organizations is evidence of the increased emphasis being placed upon diver participation in underwater activity at the greater depths of the continental shelf.



New Through-Water Communications System provides divers with untethered communications capability.

## NAVY DIVERS ASSIST IN EXPERIMENTS WITH SPACE SHUTTLE

Navy engineers and divers at the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, California, participated in an at-sea experiment during the historic second flight of the space shuttle Columbia.

The experiment, conducted by the Naval Ocean Systems Center (NOSC), San Diego, took place off Anacapa Island in a 200-foot water depth. It was timed to coincide with Columbia's flight over the Santa Barbara Channel along the California coastline.

According to LCDR G. S. Guthrie, head of the Ocean Operations Division at NCEL, data were collected on wind, wave, sea swell, sea and air temperatures, and subsurface current starting one hour before and ending one hour after Columbia's overflight. "NOSC personnel," LCDR Guthrie stated, "will use these data to determine the accuracy of oceanographic data recorded aboard Columbia itself."

NCEL support during the experiment included precision laying, rigging, and retrieval of four 20-foot-long spar buoys. LCDR Guthrie said that NCEL's LCM-8 diving boat was placed in a two-point moor over the assigned location, and the buoys deployed around the LCM-8's position. The buoys were instrumented by NCEL divers, including BMCS (MDV) D. Whitaker, and the boat itself was highly instrumented with polarized lens cameras and accelerometers.

As Columbia flew over the coastline, additional data were obtained by radar imaging equipment aboard a Marine F-4 aircraft, surveyors on shore, and aerial stereo photography. USS QUAPAW also participated in the experiment.

According to LCDR Guthrie, scientists and engineers who participated in the at-sea experiment regard it as highly successful. "The accuracy and amount of data gathered appear to be excellent," he said.

Another at-sea experiment is planned during an upcoming flight in 1984.

## CONFERENCE FOCUSES ON NAVY PIER AND PORT FACILITIES

Designing modern pier systems and port facilities to accommodate the larger, more sophisticated Navy vessels of the 1990's and beyond was the topic of a recent Navy conference.

The workshop was sponsored by the Navy Civil Engineering Laboratory, Port Hueneme, California.

Representing the Commander-in-Chief, Pacific Fleet, Pearl Harbor, was CAPT Earl H. Russel, USN; representing the Commander-in-Chief, Atlantic Fleet, Norfolk, was CDR J. P. Bivins, CEC, USN. Other attendees were personnel from Navy design organizations, Fleet users from the submarine and surface combatant vessel communities and facility maintenance organizations who came from bases as distant as Yokosuka, Japan.

The workshop focused on closing the gap between modern Fleet requirements for shore support and the aging port facilities. New maintenance philosophies, advances in propulsion systems and a greater dependency on sophisticated electronic equipment place greater demands on shore support for vessels of 1985 and beyond.

Working groups, representing members from various Naval Commands, identified requirements, criteria and state-of-the-art ideas for conceptual pier designs. The subject debated was whether the Navy should design new pier configurations dedicated to given classes of major combatant, amphibious and service vessels as it has with submarines and aircraft carriers.

The workshop concentrated on pier designs in the near term, 1985-88—when the port site is fixed and space constrained—as well as on long-term revolutionary concepts that will overcome constraints on optimum berthing and shore support.

As new ships are introduced into the Fleet, the work begun by the workshop will provide one element in the Navy's improvement of shore facilities to ensure that port systems are in total consonance with development of the Fleet's weapons systems.

## SAY "MOBDIVSALU"

The following commands were redesignated on January 30, 1982. The new designations and short titles should now be used in all correspondence referring to these commands.

- Harbor Clearance Unit One (HCU-1) of Pearl Harbor, Hawaii, is redesignated Mobile Diving and Salvage Unit One (MOBDIVSALU ONE) (FPO San Francisco, CA 96601)
- Harbor Clearance Unit One (HCU-1 DET) of San Diego, California, is redesignated Mobile Diving and Salvage Unit One Detachment (MOBDIVSALU ONE DET) (Naval Station, San Diego, CA 92136)
- Harbor Clearance Unit Two of Little Creek, Virginia, is redesignated Mobile Diving and Salvage Unit Two (MOBDIVSALU TWO) (FPO New York, NY 09501)

## PRESERVER CELEBRATES 38TH ANNIVERSARY

*LCDR W. T. Bassett, USN and PNC D. W. McGrew, USNR*

During a birthday celebration for USS PRESERVER (ARS-8) on January 12, 1982, crewmembers paused to reflect on the venerable ship's achievements spanning the last four decades. Now in her thirty-eighth year since commissioning, PRESERVER is the tenth oldest naval ship in the active fleet and the oldest salvage vessel.

PRESERVER is one of two ships still in commission known to have sustained battle damage in World War II. During the Battle of Leyte Gulf, a skip-bomb penetrated her hull, and, although it failed to explode, caused flooding and extensive damage to her after engineering spaces. An eight-inch projectile struck the ship in the crew's head forward; fortunately, no one was there at the time. In a 1945 newspaper account, PRESERVER crewmembers documented 27 holes or dents in her hull and superstructure from the bombing and refer to PRESERVER as the "Lucky-P," boasting that in spite of her participation in significant actions, not one casualty had ever occurred aboard her. Conducting salvage operations between Majuro, Eniwetok, and Kwajelein, her duties took her to the Marshall Islands, Guam, Okinawa, and eventually to Japan.

PRESERVER was designed primarily for salvage, rescue, and towing services. She is equipped with portable and installed pumps, air compressors, winches, beach gear and diving equipment. From 1952 to 1962, she deployed annually as duty salvage ship for Arctic operations. From 1964 to 1979, she continued to operate in the Mediterranean and along the East Coast, providing a variety of services in gunnery, mine recovery, towing and diving operations. In 1979, PRESERVER was designated a member of the Naval Reserve Force. In addition to continuing her regular support to the Fleet, she serves as a training platform for her Selected Reserve crew as well as other reservists who are assigned for annual active duty training. PRESERVER's many awards include three battle stars for actions in WW II, two Navy Meritorious Unit Commendations and, most recently, the Coast Guard Unit Commendation with operational distinguishing device for her part in the successful salvage efforts of USCGC BLACKTHORN (WLB-391) in Tampa Bay, Florida, in 1980.

On the occasion of her 38th anniversary, Commander Service Group TWO, RADM J. T. Parker, cited PRESERVER and "all who have served in her . . . for . . . a well-known reputation for high-quality service to the Fleet." Commodore R. H. Fred, Commander Service Squadron EIGHT, also saluted the officers and men for "outstanding services . . . (and the) dedication and superior efforts . . . (which) have given PRESERVER a first-class reputation." PRESERVER's skipper, LCDR W. T. Bassett, remarked at the cake-cutting ceremony, "We're not just getting older; we're getting better!"

## PANAMA CITY GRADUATES FIRST FEMALE DIVING OFFICER

Ensign Francesca Hall is the first female officer to successfully complete the 18-week curriculum for salvage diving officers since the U.S. Naval School of Diving and Salvage in Washington, D.C., was disestablished and re-established as the U.S. Naval Diving and Salvage Training Center, Panama City, Fla., June 1, 1980.

Her graduation date was January 15.

ENS Hall demonstrated her ability to handle all of the Navy's current diving systems, including SCUBA, MK 1, MK 5, and the MK 12 SSDS. She also led her class in the theory and computations portion of ship salvage training.

Her subsequent tours will include temporary duty onboard USS PUGET SOUND (AD 38) and further training at the Surface Warfare Officer School in Newport, R.I.

*(NCSC Underseer)*

BRUNSWICK divers with MK 12 helmets.

## BRUNSWICK DIVERS QUALIFY ON MK 12 SSDS

*JO2 Gary Hopkins, USN*

Divers aboard USS BRUNSWICK (ATS-3) recently had the opportunity to try out the new MK 12 diving rig during a week of diving operations a few hundred yards offshore Kona Bay, Hawaii.

The 18 Navy divers aboard BRUNSWICK—four officers and 14 enlisted men—are operating to requalify and familiarize themselves with the new MK 12 equipment.

LT Kenneth D. Harvey, Executive Officer and Navy diver aboard BRUNSWICK, sees the move to the MK 12 as a big step in Navy diving:

"The MK 5 is a good rig, probably one of the safest the Navy's got, but it's a heavy, clumsy thing. Unfortunately, turnaround time—the time it takes for the suiting and unsuiting of a diver—is slow. That's not the case with the MK 12; it's very easy to work with and is a big improvement in diving."

# TRANSITIONS

## LCDR SWANSON RELIEVES CAPT ROPER AS SUPDIV

CAPT James E. Roper will be departing as the U.S. Navy Supervisor of Diving on April 1. LCDR Ray Swanson will relieve him.

LCDR Swanson enlisted in the Navy in 1958 and began his diving career as a first class deep-sea diver in 1962. He has continuously served in various diving and Explosive Ordnance Disposal billets since then and comes to NAVSEA from COMSUBDEVGRU ONE, where he was Staff Salvage Officer and Diving Systems Maintenance Officer. LCDR Swanson became an Engineering Duty Officer in 1974 while serving at the Navy Experimental Diving Unit.

LCDR Ray Swanson relieves CAPT James E. Roper as SUPDIV on March 8, 1982.

## BRADY, PRICE AND BLOECHEL RETIRE AT NEDU

Navy divers HTCS(DV) John T. Brady, MMCS(DV) Kenneth W. Price, and BMC(DV) James H. Bloechel retired on December 16 at a ceremony in their honor at the Navy Experimental Diving Unit, Panama City, Florida. The three represent over 70 years of naval service, with BMC(DV) Bloechel having served for 30 years. Each has made significant contributions to the Navy's diving program. CDR Robert A. Bornholdt, NEDU commanding officer, lauded each retiree for individual achievements and service. All three plan to remain in the Panama City area.

*(NCSC Underseer)*

## OLD SALT OFFERS WORDS OF WISDOM ON TOWING TERMINOLOGY

The following exchange of correspondence between Captain W. F. Searle, USN (Ret), Chairman of the Society of Naval Architects and Marine Engineers' Panel on Salvage and Rescue Towing (tasked by SUPSALV to review the new draft U.S. Navy Towing Manual), and Mr. Almon A. Johnson, designer and manufacturer of the widely used automatic towing machine which bears his name, will be of interest.

Letter from the Chairman to Mr. Johnson:

*Dear Mr. Johnson,*

*I am continuing to work on the revisions to the Navy's draft Towing Manual. This letter has to do with that. We seem to use a mix of terms when referring to the unit of equipment variously named:*

- *Towing winch*
- *Towing engine*
- *Towing machine*

*Would you please give me some words of wisdom on the use of these terms. Perhaps we ought to indicate that they are all, or perhaps two of them, synonymous. A footnote might do the trick. Aside from the three terms above, how do you recommend we term the item called an "automatic-tensioning towing winch/machine/engine"? You will appreciate that in the manual we will be referring to the item in general terms; that is, without calling it an Almon Johnson product, except, of course, when we are specifically talking about your winch/machine/engine. How should this terminology go . . . ?*

*W. F. Searle*

Response from Mr. Johnson to the Chairman:

*Dear Mr. Chairman,*

*I am just in receipt of your letter of 14 October 81 in which you call attention to the fact that the towing equipment on towing vessels has been referred to as towing engine/towing machine/towing winch. It is a point which would probably be confusing to crewmen.*

- *The term "towing engine" has been used ever since the machine was driven by a steam engine, way back when. It is a term universally used by old-timers, and I note that you also frequently use it in correspondence and conversations.*
- *When I designed our towing equipment, I thought that it should*

(Continued on pg. 26)

# View from OOC

Colin M. Jones, CAPT, USN
*Director of Ocean Engineering,*
*(Supervisor of Salvage & Diving)*

As my tour of duty draws to a close, I would like to take this opportunity to express a number of thoughts. First, it has been a genuine pleasure, and an opportunity for which I am very thankful, to have served as the U.S. Navy Supervisor of Salvage and Diving. I have enjoyed working with the salvage and diving community once again, and have found this tour of duty both challenging and rewarding.

In looking back over the efforts of the past several years, we have made some progress on a number of fronts. First, we have certainly managed to effect a careful review of our national salvage posture. Second, we have introduced to the Fleet the MK 12 equipment. And, third, we have made significant strides in the following areas: improving the budgetary support for the procurement of new and replacement salvage machinery; improving the readiness posture of the Emergency Ship Salvage Material bases; and improving both EOD and SPECWAR diving equipment support.

Recently, FACEPLATE contained a write-up on line-throwing rockets, the salvor's missile battery (see Fall 1981 issue). This article by LCDR Gray of USS OPPORTUNE gave an excellent overview of one of the more powerful tools in our kit bag. The line-throwing rocket is perhaps one of the examples that separates a salvage tug from the average tug employed in point-to-point towing. It is important that we reiterate from time to time those capabilities on our salvage ships which make them unique and separate them from ordinary tugs. We frequently find ourselves being criticized because of the complexity, size, and so forth, of our Navy salvage ships.

Our Navy salvage ships, however, have a lot of equipment on them and a lot of capability that is not found on an ordinary tug. For example, in addition to the line-throwing rocket, we have significant capability on our salvage ships for the manufacture of patches and for the repair of equipment; and, we have a built-in diving capability. We have a significant fire-fighting capability, and we have a substantial pumping and emergency power capability in the portable equipment contained in the hold of the salvage ship.

I would also like to make a few remarks about our fire-fighting capability. In reviewing the history of salvage in World War II, it is interesting to note that, on several occasions, when the salvage force was called upon to assist a war ship, and particularly in several cases with larger war ships (cruisers, for example), the salvage force initially took over the fire-fighting effort while the ship's force tackled the damage control efforts. The ship's force was more familiar with their own damage control capability than those from off the ship. This ability to supplement the crew of a war ship in controlling major fire or damage is an integral part of the salvage community's responsibilities. It is one of the things we are trained to do and is the reason why it is so important that our crews be continually trained and retrained in fire-fighting procedures.

Navy salvage vessels typically possess capabilities for emergency repair, fire-fighting, emergency pumping, and the ability to pass a wire or a line on a damaged ship in adverse situations where the use of line-throwing guns or heaving lines may be impractical. Additionally, the salvage ship carries a great deal of wire, fittings, and hardware, which gives it the ability to hook up to and tow ships which have received varying degrees of battle damage.

It is important that we continue to exercise these capabilities so that our personnel understand what capabilities they have and how to use them. It is for these reasons that I was particularly delighted to receive such a fine article on the line-throwing rocket, and I hope it will stimulate our salvage ships in the Fleet to break these devices out of the locker and exercise them.

---

*CDR Chuck Maclin will relieve CAPT Jones, who will be reporting to Pearl Harbor Naval Shipyard for duty in June.*

# DEFECTIVE DIVING HOSE FOUND IN THE FLEET

L.J. Milner
NAVSEA OOC

A phone call from a Fleet diving ship to the Supervisor of Diving reported that while a diver was over the side he experienced an insufficient air flow. Upon opening his air control valve all the way, there was no increase in air flow, indicating a possible blockage of some type in the hose. The Supervisor of Diving requested the hose to be forwarded to NAVSEA for examination.

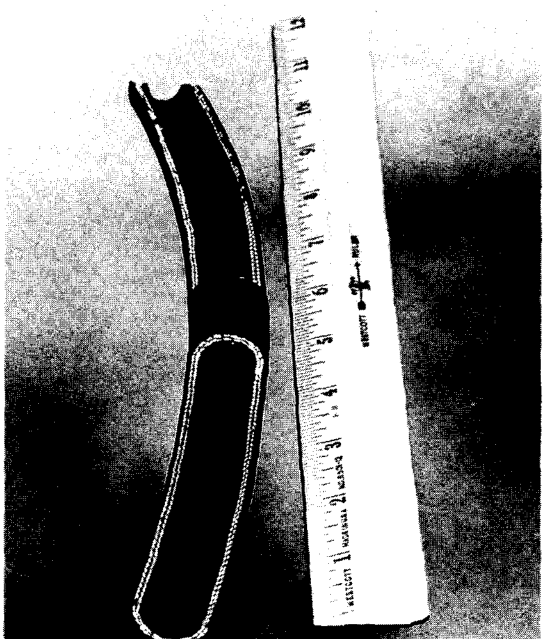
Prior to the arrival of that hose from the ship, another call came to NAVSEA, this time from UCT-1. The caller explained that while preparing a length of diving hose for first-time use, by flushing with water in accordance with the Diving Manual, he observed only a trickle of water flowing from the other end. He suspected a large blockage of some type in the hose. It, too, was forwarded to NAVSEA for examination.

Both hoses arrived at NAVSEA within two days of each other and were immediately transported to NSWC for X-ray and other examinations. There was suspicion that perhaps the hoses had suffered an inner tube wall failure, or perhaps a field mouse had made a home in the hose. The X-rays of both hoses revealed much more than expected. The hoses had been manufactured with a large build-up of rubber inside, located near the hose mid-section. The blockage area was approximately one inch long with an opening of only 3/32" diameter for the flow of air.

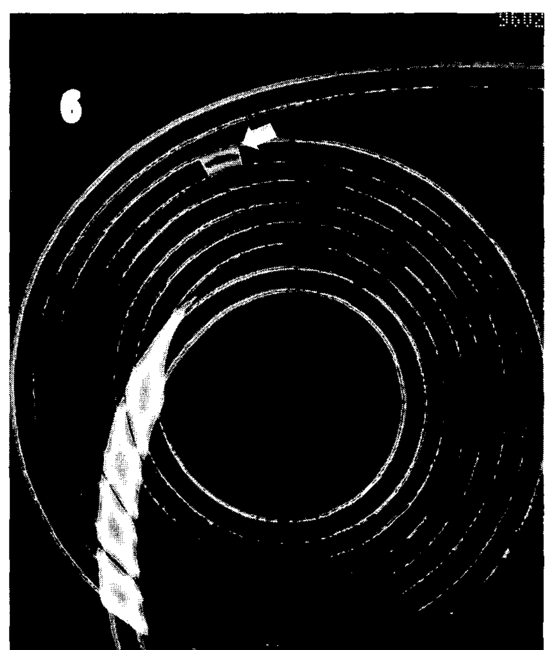
The defective diving hoses were standard 100-foot lengths (FSN 9C-4720-01-044-0864), one dated 11/79 and the other dated 12/79. All diving hose manufactured under that FSN were now suspect. An AIG message (AIG 82-2) NAVSEA message 032200Z DEC 81 was sent to all diving commands and the Defense Construction Supply Center (DCSC) to immediately inspect and test all diving hoses in the Fleet and the supply system for a blockage defect. To date, only one other hose has been found to have this defect.

The Supervisor of Diving has directed that the hose manufacturer and the DCSC quality Control Manager take immediate action to review and correct their hose manufacturing inspection and acceptance processes to ensure that no more defective hose will be delivered to the Fleet.

A reminder to all hands: Page 6-69 of the Diving Manual, Paragraph 6.4.5.3, Air Hose B, Predive, states: "Flush new hose with fresh water and dry with oil-free air." Although the instruction to flush with fresh water prior to first use was not intended to detect hose defects, by following that requirement UCT-1 identified a defective hose prior to manned use. Had the diving ship performed such a test on their new hoses, the defective hose would have been identified and could have been removed from service without endangering a diver.



Large build-up of rubber left only 3/32" diameter opening for flow of air.




X-ray inspection revealed area of blockage in air hose.

# NEW UNDERWATER TELEVISION SYSTEM INTRODUCED TO THE FLEET

*Carleton Smith*
*Naval Coastal Systems Center*
*LCDR Bill Evans, CEC, USN*
*Navy Experimental Diving Unit*

Recognizing the increasing costs of maintaining the Underwater Damage Assessment Television System (UDATS) and the great technological advances in integrated circuitry in the last decade, the Navy has been engaged in the development of an improved underwater television system.

The result, through a Navy contract with Hydro Products of San Diego, California, is a union of best available features into a unit called the Diver Helmet-Mounted Television System (DHMTS). Although the DHMTS is a black-and-white system, color television systems are also being evaluated for special operational uses.

DHMTS was used with MK 12 SSDS during recovery of SEALAB I off Panama City, Florida, last summer.

## Description

The DHMTS is a closed-circuit television system specifically designed for underwater use. It consists of an underwater camera and light that provide simultaneous television monitoring and video/sound tape recording capabilities. The camera/light is designed for use by a diver in either a hand-held or helmet-mounted mode. A surface control unit and video tape recorder/power supply allow for the transmission, receipt, display, and recording of video information.

Power is supplied to the camera and light from the control unit through a cable; this same cable transfers video signals from the camera to the control unit. A depth sensor transducer provides diver depth data which appears on the control unit monitor and may be recorded on the video tape recorder.

DHMTS components include camera/light (foreground), and (l-r): video recorder and power supply, surface control unit, and cable reel.

## Applications

The primary use of the DHMTS is for underwater visual inspection of submerged objects such as ship and submarine hulls, and for inspection of objects to be recovered or salvaged. The DHMTS may also be operated on the surface provided the camera never views into direct sunlight, and the light is never operated out of water for more than 30 seconds at a time.

The system also incorporates several special design features to ensure ease and flexibility in system use, and to provide capabilities for alternate system configurations.

The camera/light is specially designed to allow for either hand-held or helmet-mounted operation. A pistol-grip handle is provided for hand-held operation. Alternating between these two operating positions while a diver is underwater can easily be accomplished in under 30 seconds by a diver wearing three-fingered gloves.

### Distribution

The following Commands have each received one Diver Helmet-Mounted Television System, except for SURFLANT, which maintains two systems:

MOBDIVSALU ONE DET
Naval Station, San Diego, CA 92136
(Contact: LCDR Peck, A/V 958-1230)

SURFLANT
Code N 4112 A
Norfolk, VA 23511
(Contact: LT Sawyer, A/V 690-4260)

Naval Diving and Salvage Training Center
Panama City, FL 32407
(A/V 436-4651)

Charleston Naval Shipyard
Shop 72, Bldg. 57
Charleston, SC 29408
(Contact: J.P. Connoly, A/V 794-5390)

CHESDIV NAVFAC Support Facility
Bldg. 252
Portsmouth, VA 23702
(Contact: G. Philips, A/V 961-7653)

SIMA
Mayport, FL 32228
(Contact: Sr. Chief Peterson, A/V 960-5413)

USS HUNLEY (AS 31)
FPO Miami, FL 34082

USS ORION (AS 18)
FPO New York, NY 09513

## *DHMTS USED TO VIEW UNDERWATER DAMAGE AT ALABAMA DAM*

The Diver Helmet-Mounted Television System (DHMTS) was delivered to the Fleet in the Fall of 1981 and has already made significant contributions to several Navy diving operations. Last September, for example, divers and technicians from Mobile Diving and Salvage Unit TWO (MOBDIVSALU TWO), the Navy Experimental Diving Unit, and the Naval Coastal Systems Center travelled to Holt Lock and Dam on the Black Warrior River near Tuscaloosa, Alabama, and used the DHMTS to inspect a 12- × 12-foot culvert. The culvert, one of two water inlets to the lock system, was suspected of having cracks which may have resulted from settling of the earthen part of the dam by approximately 10 inches.

Barge traffic through Holt Lock and Dam near Tuscaloosa, Alabama.

MOBDIVSALU TWO transported their dive system to the dive site on two trucks. The set-up and subsequent dives with the DHMTS went off like a well-rehearsed drill. The divers quickly adapted to the operation of the new system, which was mounted to the MK 12 SSDS helmet. The divers worked at a depth of 78 feet, and as far as 100 feet into the culvert.

DHMTS was used to inspect damage 100 feet inside a 12-foot-by-12-foot culvert at a depth of 78 feet.

The DHMTS very effectively enabled the Army Corps of Engineers to direct, from the surface, the divers' inspection of the damaged culvert. The video record will also be an invaluable tool in further analysis of the damage, and will enable the Corps to knowledgeably contract to effect any required repairs.

# QUALITY DEFICIENCY REPORTING

*Prompt and correct reporting to the proper contact will help insure against the possibility of diving and salvage related accidents. Take the time to read these guidelines, inspect your equipment, and act now to report any incidences of quality deficiency.*

*K. T. GROSS, LT, CEC, USN*

Recently, a serious problem was brought to the attention of the Supervisor of Diving regarding the inability of two lengths of deep-sea air hose to pass sufficient air volume. This particular incidence caused concern since the condition of the deep-sea air hose indicated a potentially life-threatening situation. The first discovery involved an air hose which had been in service. The second incidence was discovered in a new length of hose, and was more evident.

The problem to which I refer was determined and characterized by the staff at NAVSEA OOC and was shown to be a result of an internal blockage by a deformity of the hose wall. The deformity was apparently created during fabrication of the hose bore. A plug of neoprene rubber was formed in the airway when the inside hose mandrel, used to form the bore, separated, leaving only a one-eighth-inch diameter passage where the mandrel splice-wire remained attached. A physical restriction of the hose resulted at the location of the separated mandrel. The occurrence of this particular problem was found to be inconsistent throughout the overall production lot since its cause was attributable to an error in the accepted and proven production procedure.

Efforts to identify and correct these fabrication problems were made possible through NAVSEA OOC only after conscientious investigation by the diving station personnel who originally noticed the irregular air flow. Hose test and recall instructions were addressed by AIG 82-2 (NAVSEA 032200Z DEC 81).

It is important to note that, as the diving and salvage equipment acquisition manager and technical authority, NAVSEA OOC must be notified as soon as a condition is recognized where either a procedural or material deficiency exists, particularly in situations potentially threatening safety or loss of life, in order to ensure that appropriate corrective measures can be pursued. Although reporting to the Naval Safety Center of such safety related problems is covered by NAVSAFECENINST 5101.2A, via the Safety Gram, the submission of a Safety Gram alone cannot guarantee swift response and correction of the problem by the office technically responsible for the condition of new diving and salvage equipments being delivered to the Fleet, and for design defects experienced in equipments previously delivered to Fleet diving and salvage units and currently in service. It must therefore be emphasized that in order to correct problems experienced with equipment

*. . . the fabrication problems were identified and corrected by NAVSEA OOC only because the diving station personnel noticed and reported the irregular air flow.*

and software at the Fleet level, it is incumbent on all diving personnel to ensure that the scope of the observed problem is brought to the attention of the individual's immediate supervisor and subsequently through the chain-of-command. In order to ensure that diving and salvage-related problems receive proper attention, the unit should formally or informally notify this office. You cannot expect to see the problem corrected by complaining to your buddies. Complaining about the problem rather than pursuing its solution lowers the morale, efficiency and overall readiness of the unit.

*You cannot expect to see the problem corrected by complaining to your buddies.*

Defective material received through the Navy Supply System and material procured from local non-Navy sources, falling under Danger Categories I or II, should be reported to the cognizant technical authority by submission of message or speedletter to the Navy Fleet Material Support Office (FMSO), Mechanicsburg, PA, in accordance with paragraph 4273 of NAVSUP publication T 485, "Afloat Supply Procedures," and implemented by NAVSUPINST 4440.120E. The format for processing "Quality Deficient Materials Reports" (QDR) is contained in Enclosure (3) of NAVSUPINST 4440.120E and shall be used in conjunction with Standard Form (GSA) 368 available through the Navy Supply System. Activities that submit message format quality deficiency reports to the coordinating activity, Fleet Maintenance Support Office (FMSO), will also include the cognizant material manager as an information addressee on all initial message reports in order to eliminate delays in message handling via message readdressals.

In the case of diving and salvage equipment, the cognizant material manager is NAVSEA OOC and should be included as an action/information addressee on all such correspondence. In accordance with the NAVSUPINST, all NAVSEA reporting activities must also provide an information copy of all Quality Deficiency Reports (SF 368 Form or Message format) to: Naval Sea Systems Command, (NUVEP/UMR Office-SEA 982X, Portsmouth Naval Shipyard, Portsmouth, New Hampshire 03801).

These reporting procedures apply to all quality deficient Navy Stock Account (NSA) and Appropriations Purchases Account (APA), including warranty period failures and short life defects or failures occurring during initial service as a result of normal use. NAVSUPINST 4440.120E governs report submission procedures for operating forces and to components of the Naval Material Command and of the Chief of Naval Education and Training. Procedures for 1H and 2H NSN cognizance coded material have been modified, requiring report submission procedures in accordance with NAVSEAINST 4855.7.

Deficiencies relative to technical manuals and to the Planned Maintenance Sub-system (PMS) documentation shall be reported and subsequently corrected by submission formats governed by OPNAVINST 4790.4, and NAVSEAINST 4790.3A, respectively. If you as the diving supervisor should require any additional assistance or guidance in reporting procedures, please be encouraged to contact your command supply officer.

The Fleet Maintenance Data System (MDS), established under the Navy 3-M program by OPNAVINST 4790.4, serves as a repository and management tool for supply and technical activities to identify and track statistical anomalies of material deficiency for equipment and systems. The particular diving or salvage equipment, for which a deficiency has been reported by a user activity, is identified by an Equipment Identification Code (EIC) in accordance with NAVMATINST 4790.3A. This EIC ensures proper documentation of material problems through submission of OPNAV Form 4790/2K, NAVSUP Form 1250, DD Form 1348, as appropriate. Since use of the MDS is intended primarily as a means for accumulating long-term operating statistics for individual equipment, one should not plan to use this procedure to effect correction of defective material alone. The preferred procedure in this case should be as described in the previous paragraph. However, the MDS serves a necessary function of determining and refining equipment life-cycle data required for Navy supply support planning.

Finally, let me add that the staff of the office of the Supervisor of Salvage and Diving exists for your benefit. They are available to offer consultation, and technical advice on all matters concerning diving and salvage. Please do not hesitate to contact this office directly for help in resolving valid problems. If the staff at NAVSEA OOC cannot answer your question immediately, the question or problem will be thoroughly researched and you will be given a viable answer within the shortest time possible.

*To contact NAVSEA, write to:*
*Commander*
*Naval Sea Systems Command*
*Office of the Supervisor of Salvage and Diving*
*Code OOC-DB*
*Washington, D.C. 20362*
*or call:*
*AUTOVON 227-7606*
*Commercial, 703-697-7606*

# NEW THERMAL SUITS PUT TO THE TEST

*In a series of rigorous field tests in cold waters from Maine to Alaska, divers kept warm wearing the prototype Passive Diver Thermal Protection System (PDTPS) developed by the Naval Coastal Systems Center.*

*Maxwell W. Lippitt, Jr.*
*Naval Coastal Systems Center*

Cold water impairs diver performance and reduces dive duration. Moreover, mission scenarios for the military diver often preclude use of tethered, active heating systems. The Naval Coastal Systems Center (NCSC), Panama City, Florida, has undertaken the development of diver thermal protection equipment to satisfy the requirements of all Navy and Marine Corps cold water diver applications (see FACEPLATE, Summer 1978 and Summer 1980).

Recently, a highly successful series of field tests with the prototype Passive Diver Thermal Protection ~~System~~ (PDTPS) was completed, leading to numerous design improvements in the system and bringing final system configuration and Approval for Navy Use closer to fruition.

Long-distance surface swim with new thermal suit during operational tests at Casco Bay, Maine.

### System Components

Briefly, the PDTPS is a modular, variable-volume dry suit system. A flexible, watertight outergarment keeps the diver dry. Inlet and exhaust valves are used to control suit inflation as necessary to prevent squeeze. Thermal insulation is provided by insulating underwear which is worn over a cotton long-john comfort layer and socks. Dry gloves with insulating liners keep the diver's hands warm. Other components include an independent suit inflation source, inflation hoses, a diver urine collection system for long-duration missions, fin guards to prevent loss of swim fins, and other optional accessories, including a thermally-insulated cap and a cold-weather face protector.

### Field Tests

The field tests conducted with the PDTPS were the culmination of several years' research, development, test and evaluation activity to meet specific operational requirements. By early 1980, as a result of local testing in Panama City, the PDTPS design baseline had been finalized for subsequent operational field tests in which Fleet activity divers participated.

Above, left: Test dive in frigid waters of Kodiac Island, Alaska. Above and below: High-speed boat recovery at Casco Bay, Maine.

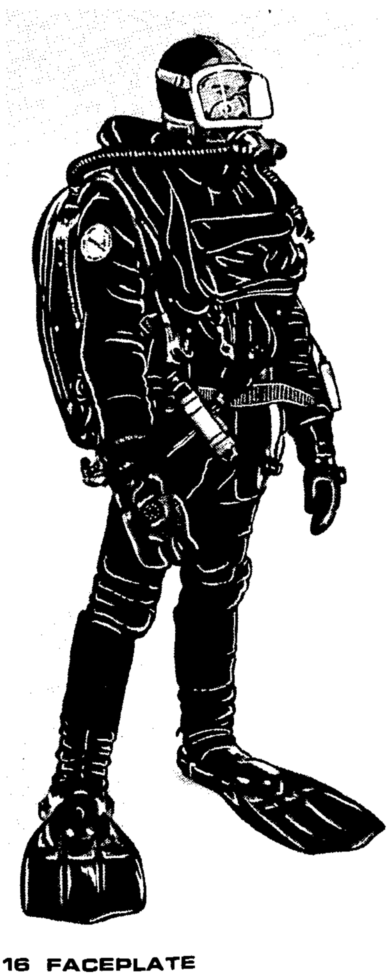
The following are brief descriptions of these field tests.

*Casco Bay, Maine.* In late July, 1980, NCSC and Navy Experimental Diving Unit (NEDU) personnel conducted simulated missions with Fleet activity divers and Fleet support personnel at Casco Bay, NAS Brunswick. The equipment and the divers themselves were put through a rigorous series of tests, including long-distance surface and subsurface swims, high-speed boat cast-and-recovery and missions with closed-circuit UBA. Following the tests, the divers were debriefed individually and in groups to gain insights into suit features and possible improvements. Among the areas that were improved prior to the next series of tests were the substitution of calf weights for ankle weights, and an improved glove configuration to eliminate seal leakage. Following the Casco Bay tests, a range-of-motion evaluation at NEDU demonstrated that subjects wearing the PDTPS achieved a level of 90-percent-of-nude mobility, exceeding performance requirements.

*Whidbey Island, Washington.* At NAS Whidbey Island, Fleet personnel prepared for Operation

Brim Frost wearing the prototype PDTPS. Nearly 30 manhours of underwater operations were accomplished in the 39° to 42°F waters. Further suit refinement areas were noted, while two accessories, an Arctic face protector and polyolefin cap, proved effective and were enthusiastically accepted by the divers.

*Kodiak Island, Alaska.* In this test series, the PDTPS supported Navy diving missions during Operation Brim Frost. A new outergarment configuration incorporated improvements identified during the Casco Bay and Whidbey Island tests: improved seaming, redesigned wrist seals and foot/ankle restraints areas, pockets for weights in the calf restraints, an added suit size, and relocation of the inflation valve. During the tests, despite surface water temperatures of 36°F, no unacceptable levels of cold stress or impaired performance were reported by the divers. Two divers, for example, efficiently accomplished a five-hour mission with no thermal problems. Only two minor equipment problems (involving boot traction and wrist ring wear) were noted, and both have since been corrected.

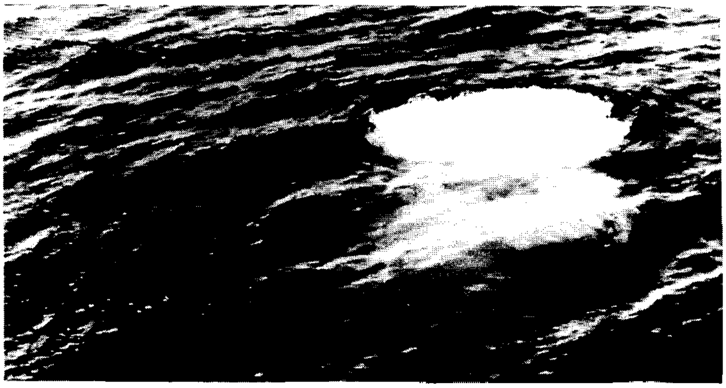


Diver is prepared for start of test mission (above) while another waits (below). At left, the PDTPS fully donned.

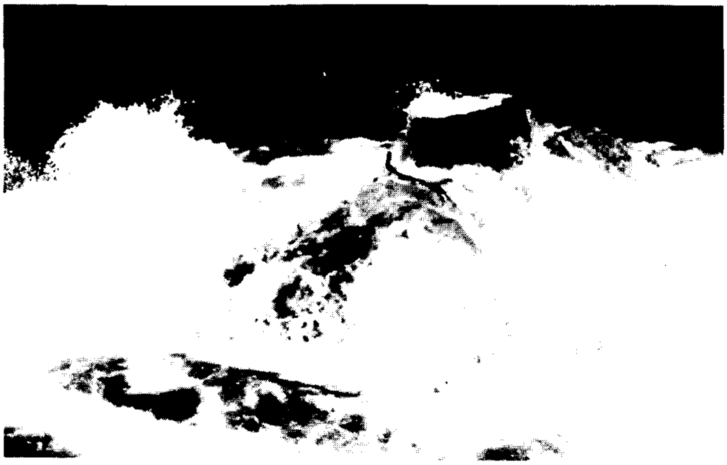
The PDTPS has been developed specifically for long-duration, cold-water missions. However, other Navy diving activities may certainly benefit from a system that eliminates much of the discomfort involved in conducting shorter operations in very cold water. The PDTPS development and test process has shown that most problems that arise can be resolved, and that an optimum use of the system in a particular application can be determined. Evaluation of Explosive Ordnance Disposal and Underwater Construction Team applications of the PDTPS are scheduled for later this winter.

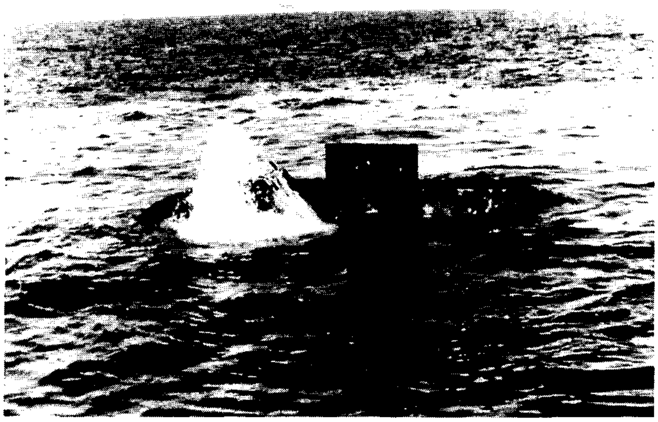
# HOW SEALAB I CAME UP

*This series of photographs, taken by Mr. Jerry Pelton of the Navy Experimental Diving Unit, captures the dramatic moments as SEALAB I was brought to the surface off Panama City, Florida, last summer after spending 13 years submerged in 65 feet-of-seawater (see FACEPLATE, Summer 1981). The 40-foot-long, 10-foot-diameter underwater habitat was raised by a team of divers and salvors from the Naval Diving and Salvage Training Center, the Navy Experimental Diving Unit, and the Naval Coastal Systems Center. SEALAB I is now undergoing restoration and later will be placed on permanent display in front of the Institute of Diving Museum in Panama City.*



Clockwise, from top: Bubble activity heralds the appearance of the habitat, brought to the surface by two lift bags, one of which parted. A 60-foot-long chain attached to SEALAB payed out automatically, helping to control the air-filled vessel during ascent.





# A LOOK AT NMRI'S NEW HYPERBARIC RESEARCH FACILITY

*The Naval Medical Research Institute (NMRI) is the Navy's largest biomedical research facility. The newest addition to NMRI's capabilities is the Hyperbaric Research Facility, which houses a hyperbaric chamber complex capable of simulating ocean depths down to 3400 feet-of-seawater.*

*John C. Naquin*
*Mark E. Bradley, M.D., F.A.C.P.*
*Lomaye Hurley*

The Naval Medical Research Institute (NMRI), located in Bethesda, Maryland, is a tenant activity of the National Naval Medical Center. It is at the Naval Medical Research Institute that 90 percent of the Navy's basic hyperbaric medical research is conducted.

Within one hour from Bethesda are 49 research-related facilities, ranging from universities to marine oceanographic activities. Because of the accessibility to this scientific community, the Navy selected NMRI as the site to construct a new hyperbaric research facility.

The Hyperbaric Research Facility is contained in a two-story building of approximately 36,000 square feet. The upper floor is composed of administration and laboratory spaces. The lower floor is dedicated to the Chamber Complex.

The Facility's mission is to conduct fundamental research on problems confronting the operating forces in the undersea environment. Specifically, the Facility is concerned with research into the biomedical and physiological phenomena experienced in depths to 3,360 feet-of-seawater (FSW).

The Pressure Complex consists of five interconnected, high-yield steel pressure vessels, totaling approximately 3,000 standard cubic feet water volume. The Man-Rated Chamber Complex consists of three permanently joined pressure vessels, each capable of being pressurized to a simulated depth of 2,250 FSW (68 ATM).

The diving chamber is composed of a sphere (or igloo) atop a cylinder (wet pot). The wet pot can be filled with water and undersea operations simulated by fully equipped divers.

The living chamber is a cylinder in which the divers or occupants can work and live at simulated depths for extended periods of time. It contains bunks, wash basin and water closet.

The outer chamber is a cylinder used primarily as an elevator between the surface and operational proceedings at depth.

The Man-Rated Chamber Complex 1500 consists of two permanently-joined pressure vessels, each capable of being pressurized to a simulated depth of 3,360 FSW. The research chamber is a large cylinder in which the diver or occupant can perform programmed exercises or simulated underwater tasks. The interim chamber is a sphere used primarily as an elevator between the surface and either the research chamber or the diving chamber.

The following are some of the major sub-systems and their functions:

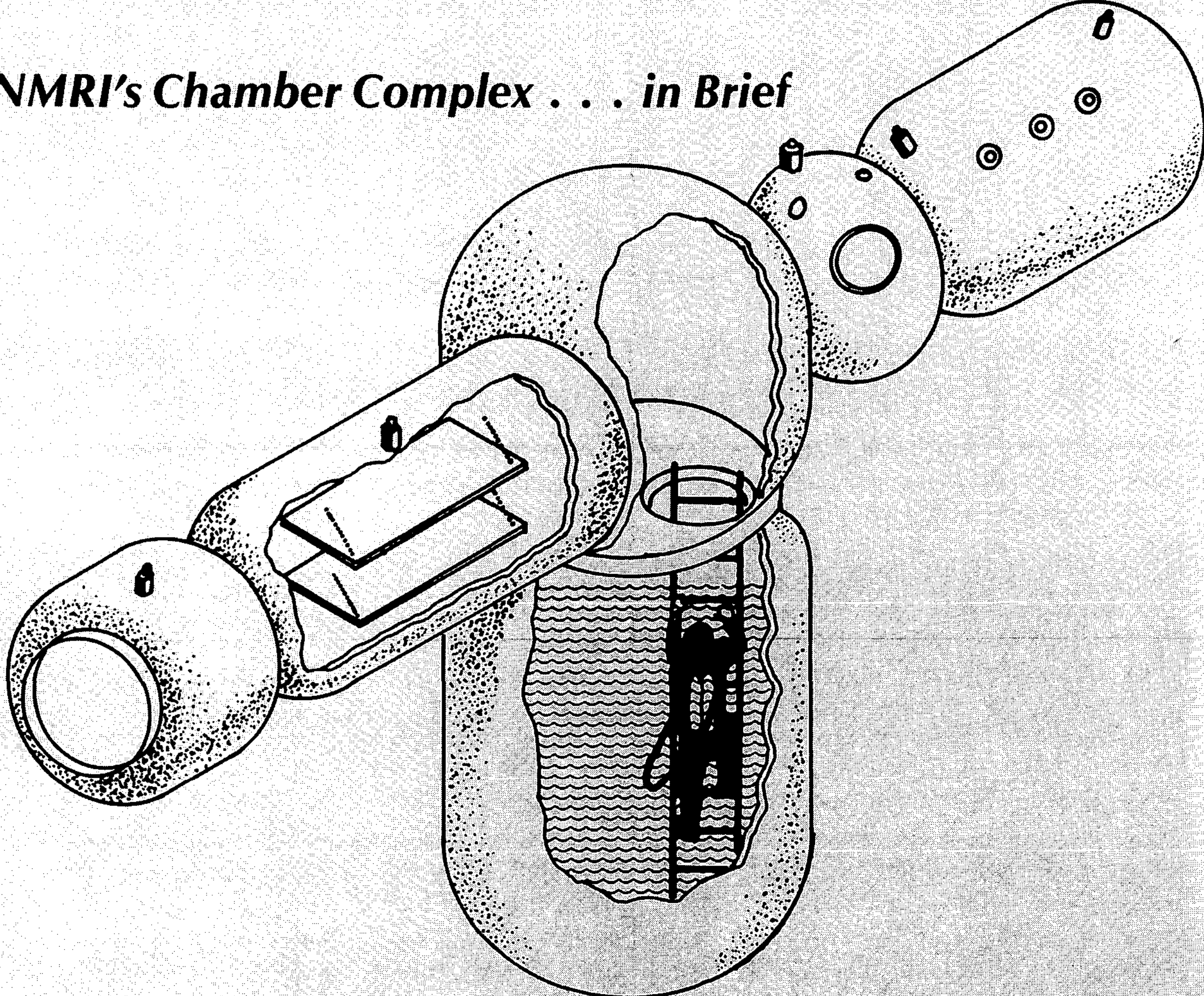
- The standby power system provides electrical power to critical loads in the event of both a primary and secondary power failure.

- The gas farm consists of an arrangement of high-pressure gas storage cylinders, compressors, and associated piping, valves, and controls capable of storing the required volume of helium, air, oxygen, and mixed-gas for life support, medical and emergency use, and distribution to the required gas systems in all chambers. The gas farm also includes a reserve and emergency gas supplies.

- The communications system provides voice

(Continued on pg. 20)

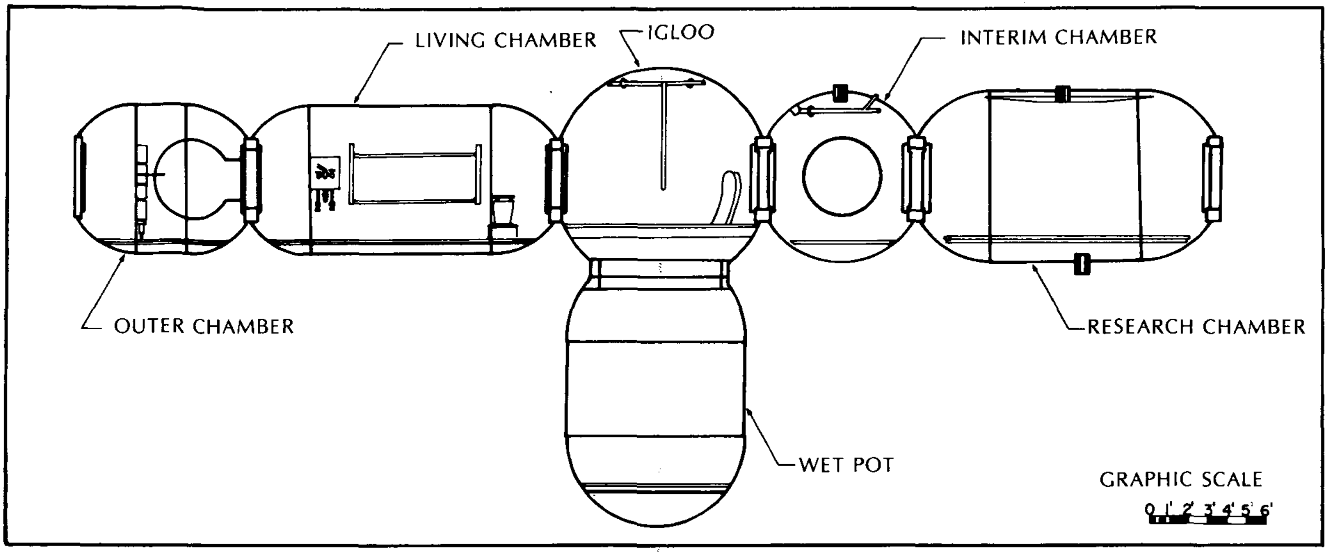
# NMRI's Chamber Complex . . . in Brief



The Hyperbaric Research Facility chamber complex features the most recent developments in chamber design and construction. It includes five separate dry chambers, a wet diving chamber mounted vertically beneath the center chamber, and the necessary systems for life support, operating control, communication, fire protection, water conditioning, instrumentation, and data acquisition. Three separate atmosphere conditioning systems control chamber temperature, humidity, oxygen make-up, and the removal of carbon dioxide, particulate matter, and contaminants. Computer terminals in the control room provide immediate access to the central data processing equipment on the second floor of the building.

Three of the dry chambers and the wet chamber are rated to 1,000 psi; the other two dry chambers can be pressurized to 1,500 psi. The dry chambers, each of which is equipped with viewing ports, service locks for food and supplies, feed-through connections for monitoring instruments, and communication penetrations, have been designed to support diver habitation for 90 days.

The central dry chamber provides access for diver excursions into the wet chamber, in which the environmental parameters of temperature, light level, and pressure are controlled by topside personnel to meet individual project requirements. Water temperature can be varied from 34°F to 110°F, providing a wide test range for thermal studies.




(Continued from pg. 18)
communication between chamber occupants and operator personnel, plus video monitoring of chamber activity. The system consists of four separate sub-systems which are as follows: head-set communication system, intercom system, sound-powered system, and a closed-circuit television system which allows the chamber operator to observe the interior of each chamber.

• The built-in-breathing system provides the capability to supply chamber occupants with breathing gases which may differ from the chamber atmosphere. The gases and gas mixtures used for experimentation, medical treatment, and casualty management are supplied to the chamber occupants through an oral-nasal mask. Mixed-gas can be supplied for all chamber pressures.

• The oxygen makeup system provides for automatic replenishment of consumed oxygen with overriding manual injection capability for each of the chambers.

• The inert gas pressurization and vent system for the complex provides for pressurization and depressurization of all chambers. The chambers can be pressurized independently or in any combination.

• The air pressurization system supplies the Complex with 360 psig of air for dives to 250 FSW.

• The sanitary system removes liquid and solid wastes from the chamber under pressure conditions. The research, living, and diving chambers each have a complete sanitary system.

• The fire-extinguishing system is a wet pipe system utilizing water as the extinguishing agent. Each of the chambers has a complete and separate system.

• The potable-water system provides water for drinking and sanitary purposes to the living and diving chambers. Each chamber receives water from its own pressurized tank outside the chamber. The tank water level, system pressure, and hot water temperature are all automatically controlled.

• The test media or diving water conditioning system controls the temperature, turbidity, and microorganism content of the water in the diving chamber. The temperature control of the system is completely automatic. Turbidity and microorganism content are regulated through filters.

• The atmosphere conditioning systems control the temperature, humidity, carbon dioxide, contaminant, and particulate content of the chamber environment. Three closed-loop systems provide direct environmental control of the hyperbaric chambers.

• The gas analysis system provides the means to analyze the various gases used throughout the facility. The gas analysis system consists of four subsystems: the sample input subsystem, carbon dioxide analyzers, oxygen analyzers, and trace gas analysis by a computerized scanning-type mass spectrometer and gas chromatograph.

During operations, the hyperbaric complex is staffed by both military and civilian personnel, and is capable of supporting six human subjects inside the chambers for as long as three months. One of the most sophisticated hyperbaric systems in the world, the NMRI Chamber Complex is dedicated to the basic research necessary to extend man's depth and time mobility beneath the ocean.

*Next issue: FACEPLATE will feature NMRI's ongoing biomedical research activities in seven different program areas.*

# What's New On MARS?

*William W. McCrory*
*Naval Coastal Systems Center*
*Panama City, Florida*

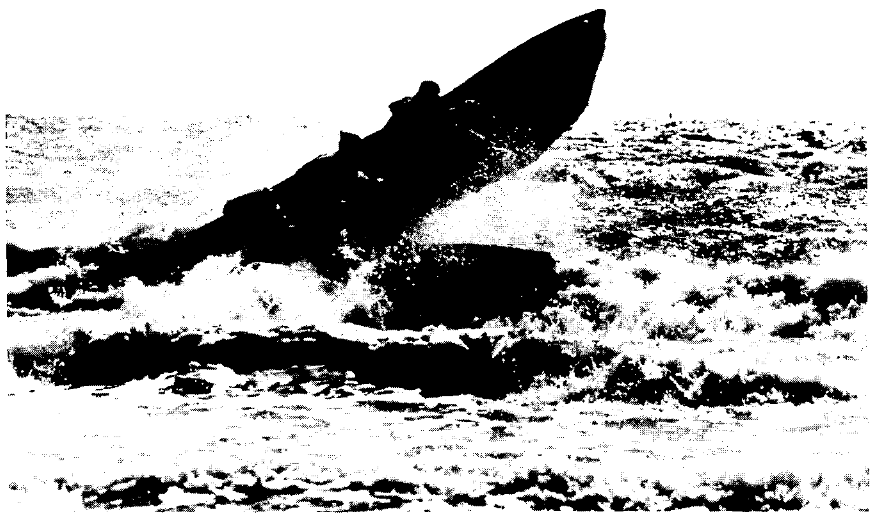
Engineers and technicians at the Naval Coastal Systems Center were tasked to develop a system to replace the 25-year-old Inflatable Boat, Small (IBS). The result of this task is the Military Amphibious Reconnaissance System (MARS) which is aimed at satisfying the objective of transporting Marine Corps reconnaissance and other swimmers from a point at sea to shore to perform their mission and returning them to their ship or other rendezvous.

One of the objectives for MARS is to use new materials and new technology which have been developed over the past two-and-a-half decades sinc.e the development of the IBS ir the early 1950's. The basic requirements established early in 1975 have been revised by the Army and Marine Corps as a joint service operational requirement.

MARS consists of an inflatable boat, an engine equipped with a drain valve and noise-dampening jacket, a fuel system, and ancillary and support equipment.

MARS is capable of being transported across land by man and vehicle, "locked out" of a nuclear submarine, helo-cast from a helicopter, or air-delivered by a C-130. It is capable of transporting loads up to 1,000 pounds at speeds of 20 knots, with a fuel consumption of 2 to 7 miles per gallon, depending on load, speed, and sea condition.

Marine Corps approval for service use was accomplished during the latter part of FY 1980. Marine Corps funding for a follow-on product improvement has been received, and redesign of the boat to reduce its weight to 150 pounds is under way.



MARS, a versatile craft developed for Marine Corps reconnaissance and swimmer missions, can be locked-out of a submarine, helo-cast, or air-delivered to operational sites.

# ". . . of Spun Copper and Brass"

*The fondness and respect among U.S. Navy divers for the venerable, old MK 5 Diving Rig comes across in words and deeds, as shown in this series of photographs submitted to FACEPLATE by PH2(DV) Brian Cahill of the Atlantic Fleet Audio-Visual Command, NAS Norfolk, Virginia, on the occasion of EA2(DV) Stewart Dahl's underwater re-enlistment at UCT-1, Little Creek, Virginia, last July; and in the original poem, "Ode to MK 5" submitted by BMCS(MDV) Darrell D. Williams.*

## ODE TO MK 5

Old friend, you've been around so long,
We're all sad to see you go.
Your safety record's the very best;
You have the other's beat ten-fold.

I'll never forget our first meeting,
When I was a lad of seventeen,
I wanted to try you out so much,
I could see you in my dreams.

You are a veteran of many wars,
But you carry your wounds well.
You've taken young boys down to glory
And brought grown men out of hell.

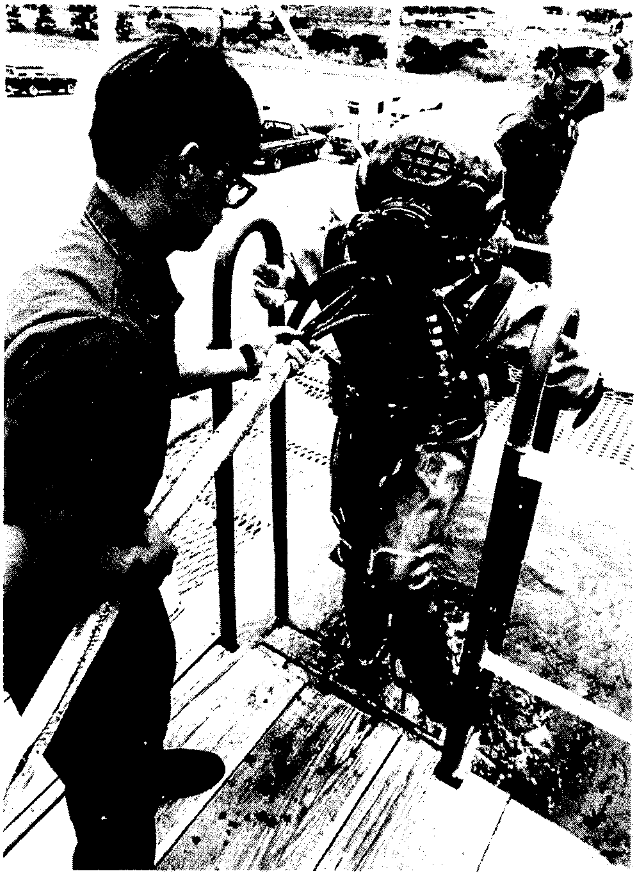
I know we say you're ancient,
And your job on earth is through.
But when MK 12 can't do the job,
We'll have to call on you.

I have cursed you on many occasions,
But thanked you on many more,
For bringing me back safely,
From off the ocean floor.

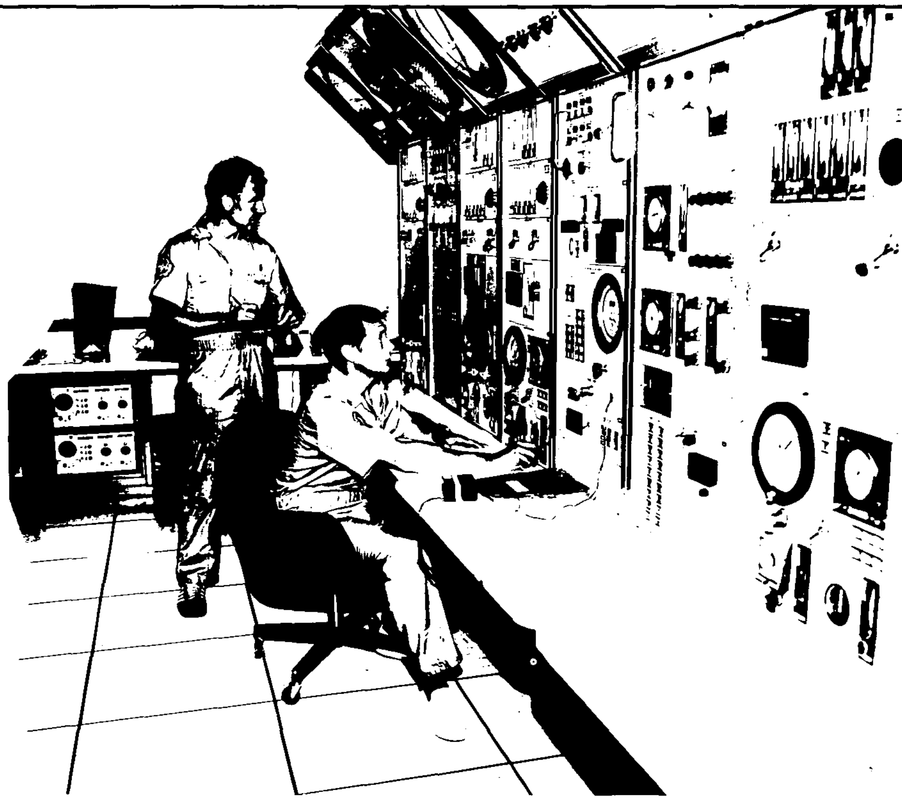
No more heavy weight belts,
Or hats of spun copper and brass;
But compared to all the others,
You had a lot more class.

I know someday we'll meet again,
And bring back memories gone;
So I won't say good-bye old friend,
I'll just say, . . . "so long."

Darrell D. Williams
BMCS(MDV), USN



# NEDU Reports



**Navy Experimental Diving Unit Report 1-80.** *Evaluation of Commercially Available Buoyancy Compensators.* James R. Middleton, AD No.: A084487

*Abstract:* The Navy Experimental Diving Unit evaluated methods of inflation and performance characteristics of fourteen commercially available buoyancy compensators for use with standard scuba. As a result of manned and unmanned testing, five buoyancy compensators were found to be preferred for use by Navy divers.

**Navy Experimental Diving Unit Report 2-80.** *Evaluation of Commercially Available Open-Circuit Scuba Regulators.* James R. Middleton. AD No.: A086822

*Abstract:* In June 1979 the Navy Experimental Diving Unit performed unmanned tests on 36 open-circuit scuba regulators currently manufactured in the United States. Breathing resistance, respiratory work and first stage performance were evaluated. Results of these tests produced a new NEDU scuba regulator performance requirement to replace the current requirement taken from Mil-R-24169A. Of the 36 regulators tested, 7 regulators met the upgraded performance standard, 22 regulators and one full face mask met Mil-R-24169A, and 6 regulators did not meet Mil-R-24169A.

**Navy Experimental Diving Unit Report 4-80.** *Prolonged Oxygen Exposures in Immersed Exercising Divers at 25 FSW (1.76 ATA).* C. A. Piantadosi, R. L. Clinton, and E. D. Thalmann. AD No.: A084328.

*Abstract:* Twenty-four oxygen exposures lasting 80 to 271 minutes were performed by six immersed exercising subjects at 25 FSW (1.76 ATA) in both warm and cold water. Two types of exercise were performed: moderate work (50 watts) for long periods of time, and graded (25-150 watts) lasting 85 minutes. In 21°C water, moderate exercise lasted $228 \pm 39$ min, with a mean $VO_2$ of $1.72 \pm 0.11$ liter/min. In 4°C water, the duration was $163 \pm 22$ min, with a mean $VO_2$ of $1.83 \pm 0.16$ liter/minute. The differences in duration of oxygen exposure in warm and cold water reflect termination at an inspired $PCO_2$ of 7.5 mmHg, a level reached earlier in cold water because of $CO_2$ absorbent exhaustion. In 21°C water, the $VO_2$ for graded exercise ranged from 1.51 to 3.00 liter/ minute and in 4°C water, from 2.00 to 3.16 liter/minute. Central nervous system oxygen toxicity was not observed during these exposures, although two divers had clinical and spirometric evidence of early pulmonary oxygen toxicity.

**These research reports have been issued by the Navy Experimental Diving Unit, Panama City, FL. Non-DOD facilities desiring copies of reports should address their request to National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151. DOD facilities can obtain copies from the Defense Technical Information Center (DTIC), Cameron Station, Alexandria, VA 22314. Prices vary according to the individual report. Include report's AD Number with each request.**

The absence of CNS oxygen toxicity is attributed to low flow resistance and minimization of dead space, which caused a low inspired $PCO_2$, although the divers' experience with oxygen diving and their excellent physical condition may have contributed as well.

**Navy Experimental Diving Unit Report 6-80.** *First Article Test of the MK I Mod 0 Mask (U.S. Divers).* D. J. Schmitt. AD No.: A084722

*Abstract:* A MK I Mod 0 First Article, produced under U.S. Government Contract N-0024-79-C-4259 by U.S. Divers Company was evaluated by Navy Experimental Diving Unit to determine if the First Article satisfactorily met contract drawing and performance specifications. Test results showed that the First Article performed in a satisfactory manner, and NEDU recommends that U.S. Divers Company be authorized to continue full production under contract specifications.

**Navy Experimental Diving Unit Report 7-80.** *Is the Weight Loss of Hyperbaric Habitation A Disorder of Osmoregulation?* L. W. Raymond, AD No.: A086318.

*Abstract:* To examine the weight loss of hyperbaric helium-oxygen habitation, we measured the exchange of liquids and calories in six men who lived in this atmosphere for 32 days. The maximum pressure was 49.5 ATA. The men lost 3.7 to 10.1 kg, in spite of warm ambient (31-32°C) temperatures and adequate calories (2,737 kcal/d) provided for the sedentary ways of chamber living. Weight loss and a calculated fluid deficit were accompanied by significant hemoconcentration, shown by increases in serum proteins. These changes were followed by a rise in urinary aldosterone and vasopressin, but not thirst. Weight loss in hyperbaric atmospheres is probably multifactorial, but our data suggest an uncoupling of normal osmoregulation may have occurred in the present set of subjects. This may have been due to altered lung mechanics, increased catecholamines, or effects of high pressure on cellular responses to vasopressin.

**Navy Experimental Diving Unit Report 8-80.** *MK 12 SSDS Helmet Adjustable Exhaust Valve Assembly Evaluation.* M. A. Coulombe. AD No.: A086070.

*Abstract:* Failure of the tempered, spring-stop pin in the helmet adjustable exhaust valve assembly of the MK 12 SSDS has required further evaluation of existing and proposed exhaust valve configurations. Test results indicate the adoption of recommended retrofit and design change proposals.

**Navy Experimental Diving Unit Report 9-80.** *Unmanned Evaluation of U.S. Navy EX-16 UBA Pre-Production Model.* James R. Middleton. AD No.: A091221.

*Abstract:* The EX-16 UBA Pre-Production Model underwent unmanned performance testing in January through March 1980. Parameters evaluated were breathing resistance, $CO_2$ absorbent canister characteristics, and $PO_2$ setpoint control functions. All areas evaluated were found to be adequate for manned testing.

**Navy Experimental Diving Unit Report 10-80.** *Respiratory Heat Loss Limits in Helium-Oxygen Saturation Diving.* C. A. Piantadosi. AD No.: A094112.

*Abstract:* Convective respiratory heat transfer in divers breathing cold helium-oxygen is a major avenue of body heat loss for which there is no effective thermoregulatory compensation. Review of recent studies of hyperbaric respiratory heat loss provides a physiological data base for updating current minimum inspired gas temperatures for saturation diving. The new proposed inspired gas temperature-depth curve is based upon a maximum convective respiratory heat loss of 20 $W.m^{-2}$ for a resting diver maintaining thermoneutral skin temperature in a hot-water suit. This level of respiratory heat loss is predicted to allow an average rectal temperature drop of 0.25°C per hour, and will support a four-hour mission. The new limits are designed to allow divers with any ventilatory response to exercise or cold to gain heat from exercise, although it is expected that most of the exercise heat remaining after obligatory increases in respiratory heat loss from the ventilatory response to the exercise, will be dissipated through the diver's skin as he adjusts his hot water flow and temperature for comfort.

**Navy Experimental Diving Unit Report 11-80.** *Testing of Decompression Algorithms for Use in the U.S. Navy Underwater Decompression Computer (Phase I).* Edward D. Thalmann, Ian P. Buckingham, and W. H. Spaur. AD No.: A091206.

*Abstract:* Methods for programming a wrist-worn Underwater Decompression Computer (UDC) were investigated and tested. All testing was done on the MK 15 UBA which supplies a constant $PO_2$ of 0.7 ATA in $N_2$. Testing was done submerged in water temperatures of 73°F to 78°F and with dive subjects performing moderate exercise. A total of 445 man-dives were conducted in depths of 175 FSW, and a total of 22 cases of decompression sickness occurred. A total of 5 methods for computing decompression profiles were investigated and, of these, one was selected as being the most suitable for programming the UDC. The method chosen would not decompress divers safely from all profiles so its use was restricted to a maximum time of 30 minutes at 150 FSW. This restriction was integrated into the program so the UDC could warn the diver if he were exceeding permissible limits at any depth. A total of 178 man-dives were done within the restriction placed on the UDC with only 2 cases of decompression sickness observed. A series of non-repetitive diving tables using the selected method was also produced to permit safely diving the MK 15 UBA without a UDC.

**Navy Experimental Diving Unit Report 12-80.** *MK 12 Surface-Supported Diving System Component Corrosion Protection Evaluation.* E. H. Pahl. AD No.: A103343.

*Abstract:* Improved casting techniques, improved and alternate coating systems, and uncoated aluminum low-pressure manifold blocks of the MK 12 Surface-Supported Diving System mixed-gas recirculator, all with anodic protection, were tested for corrosion resistance in a simulated seawater environment. Incorporation of anodic protection and reconsideration of coating systems are recommended.

(Continued from pg. 7)

*not be called a towing engine inasmuch as it is not engine-driven. Rather, I called it a "towing machine" and I have pretty well stuck to that term over the years. I think it quite important that it be called a "towing machine" to differentiate it from other types of towing equipment. To me it means something other than a winch, which terms "anchor windlass" for handling anchor chain, and "cargo hoist" for handling cargo. Towing machine ranks with these latter two.*

- *The term "towing winch" is used by other manufacturers on their drawings, specifications, and, I presume, in quotations also. To my thinking, their equipment is just that—a winch and not a towing machine.*

*I agree with you that the same term should be used in all cases and I feel that inasmuch as most of the Naval auxiliary vessels are equipped with our "automatic towing machine" that the new breed of Naval crewmen will recognize and use that term instead of "towing engine" with which the older towboat men are familiar.*

*A. A. Johnson*
*Almon A. Johnson, Inc.*

*Editor's Note*: Readers of FACEPLATE will be pleased to know that Mr. Johnson, spry at the ripe old age of 90, remains interested in the Navy's towing problems. He goes to the office three days a week and manages his firm's world-wide activities from his home on other days. Though his eyesight is impaired, he seems to have a photographic memory of every detail and dimension on all of the drawings and instruction books which cover his automatic-tensioning towing machines. Except for the T-ATF's, which were designed/specified without the rescue towing requirement and which have only a "portable salvage capability," all the Navy's Fleet Tugs, Salvage Tugs, Auxiliary Tugs and Submarine Rescue Ships have always had a Johnson-type automatic-tensioning towing machine. This includes the EDENTON Class (ATS-1-3) which, though the machine was built in England, has a unit conforming to Almon Johnson design. In fact, the ATS-1 Class building specification for the ship's "main battery" was patterned on the Almon Johnson towing machine originally designed and built for the commercial rescue salvage tug ALICE MORAN in the mid-60's. The new construction ARS-50 has an improved version of this latter automatic-tensioning towing machine.

NAVSEA Instruction 9597.4 "Towing Engines Manufactured by Almon A. Johnson, Inc.; Service Program for" describes the procedures for obtaining TECHREP services for this type of machine. (At the next revision of this instruction, the terminology will be cleaned up!) This TECHREP service is also applicable to the ATS-1 Class and has been found useful by ships and tugs having towing or mooring winches of other manufacturers.

All Navy ships which normally engage in towing operations shall ensure that they hold copies of NAVSEAINST 9597.4, "Towing Engines Manufactured by Almon A. Johnson, Inc.; Service Program for," and NAVSEAINST 9582.1, "Towing Hawsers and Towing Hawser Log." These directives were originally distributed by SNDL to all ships involved in towing operations.

***LET'S HEAR FROM YOU!***

As the official magazine for the U.S. Navy diving and salvage community, FACEPLATE publishes information concerning the latest equipment, procedures and other newsworthy events in our scope of endeavor.

For this purpose to be best served—and for you the reader to be best informed—it is imperative that the magazine receive inputs from all Fleet and shore-based activities. Without such support, FACEPLATE cannot adequately fulfill its intended mission.

We'd like to hear from all of you. We are not looking for literary masterpieces, but basic written accounts and photographs of operational experiences, observations, or opinions that would be of interest to other FACEPLATE readers. We are also seeking regular inputs for the Old Master column and for Soundings, which in the future will carry author bylines to give credit where credit is due. And, let us know about changes of command, retirements, and promotions.

Remember, FACEPLATE is the primary vehicle for the exchange of information within the increasingly important and expanding field of Navy diving and salvage. *FACEPLATE's accounts of people, programs, and operations become a part of the historical record of U.S. Navy diving and salvage. There's no reason why you cannot become a part of it.* If we collectively, as a community, share in this news-gathering effort, FACEPLATE will continue to be a hallmark of the U.S. Navy diving and salvage community.

# The Old Master

## *"Going by the Book"*
## *(Is the Diving Manual Sacred?)*

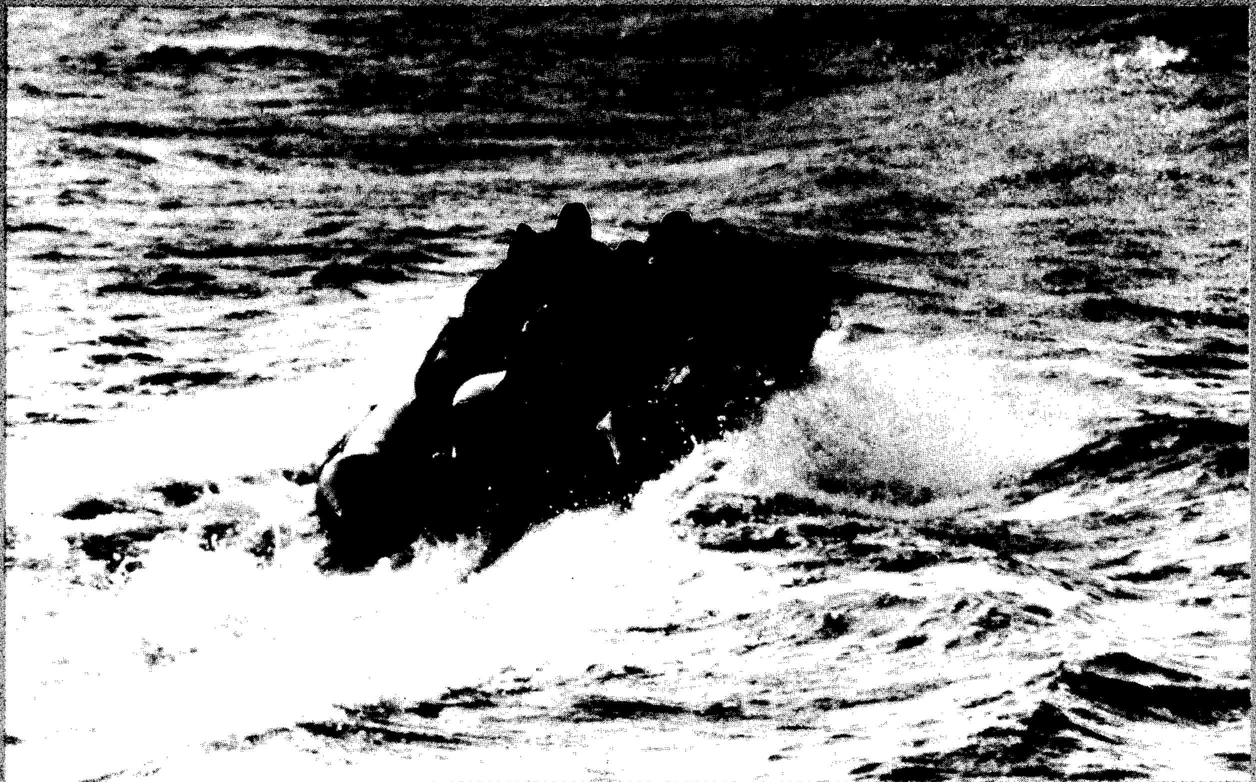
The U.S. Navy Diving Manual . . . Is it the diver's bible or is it merely a manual of guidelines for Navy divers?

The U.S. Navy Diving Manual is a comprehensive collection of information pertinent to the U.S. Navy diving program. The Diving Manual addresses such varied subjects as diving history, diving medicine, descriptions of contemporary diving system hardware, and decompression and hyperbaric treatment procedures, to name but a few. It becomes apparent that certain subjects are provided to the reader more for interest's sake or for guidance, while others are intended as doctrine allowing no latitude for deviation. Navy divers must, for instance, strictly comply with certain portions of the Navy Diving Manual, such as the various decompression tables.

It should become obvious to the reader that the degree to which the Diving Manual is implemented at the local level depends upon one's interpretation of its contents. Coincidentally, as this is an official publication receiving diverse and unregulated distribution, changes and additions can be effected only on a periodic basis determined by economics. Consequently, contradictions to current Navy Diving policy are occasionally encountered which may require specific interpretation and resolution by the on-scene master diver or diving supervisor based upon his previous diving experience. Therefore, the answer to the original question is that the Diving Manual is, in fact, both the diver's bible *and* a guide. We Navy divers are often required to apply common sense to determine which is rule and which is to be treated as only useful information.

In any publication as comprehensive as our Diving Manual, covering such an ever-evolving and technical field as diving, it is virtually impossible to keep it up-to-date and free from error. If anyone discovers a mistake or is in doubt about the interpretation of any portion, he should contact the Supervisor of Diving (AUTOVON 227-7606; Commercial (202) 697-7606) or the Navy Experimental Diving Unit (AUTOVON 436-4351; Commercial (904) 234-4351). All proposed changes and/or revisions to the Diving Manual are reviewed by the Navy Experimental Diving Unit and the U.S. Navy Bureau of Medicine and Surgery (as applicable) and are submitted to the Supervisor of Diving for final approval, publication and Fleet-wide distribution.

In summary, the Navy Diving Manual may not be perfect; however, if you use it properly and intelligently, you'll never be wrong.



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