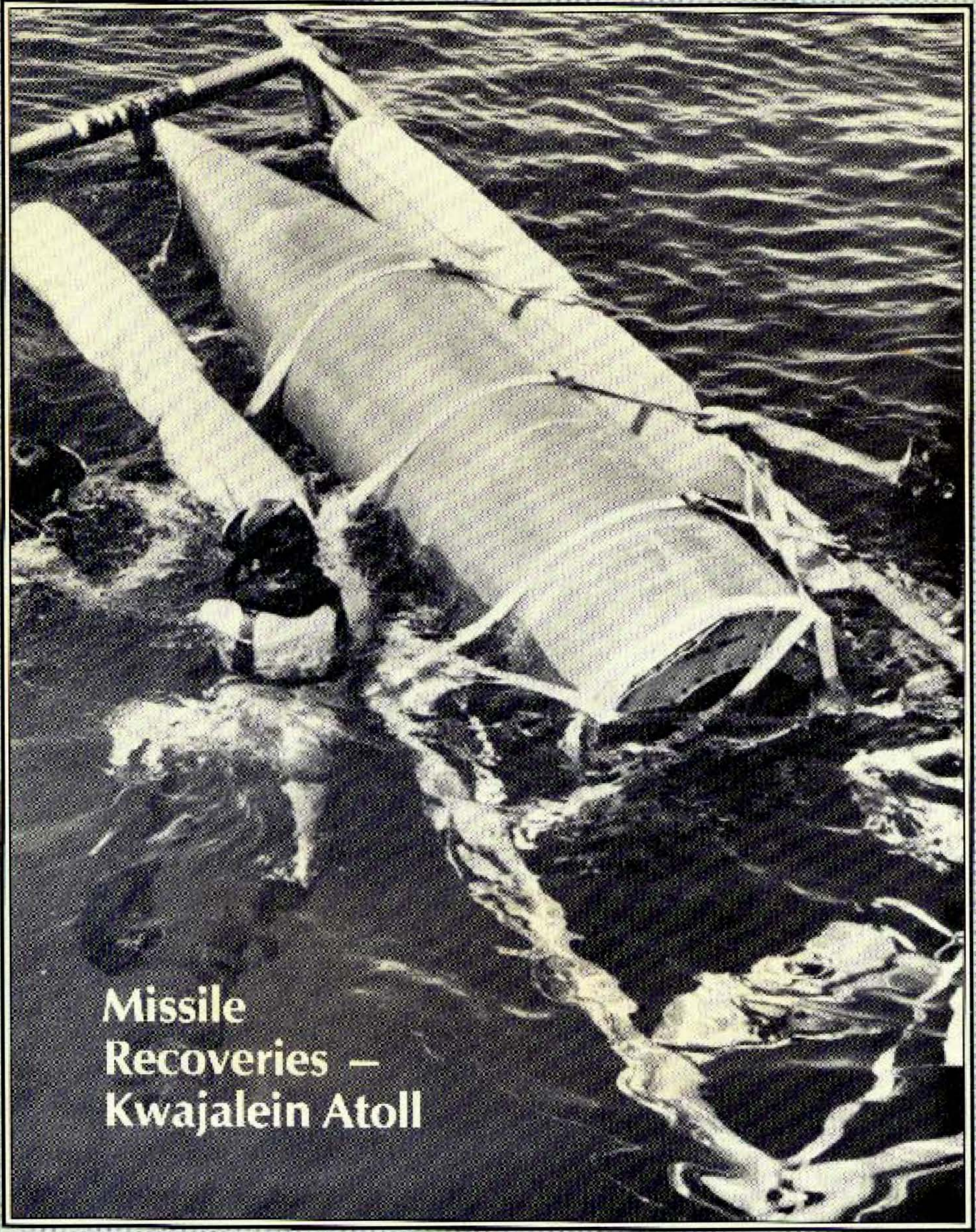
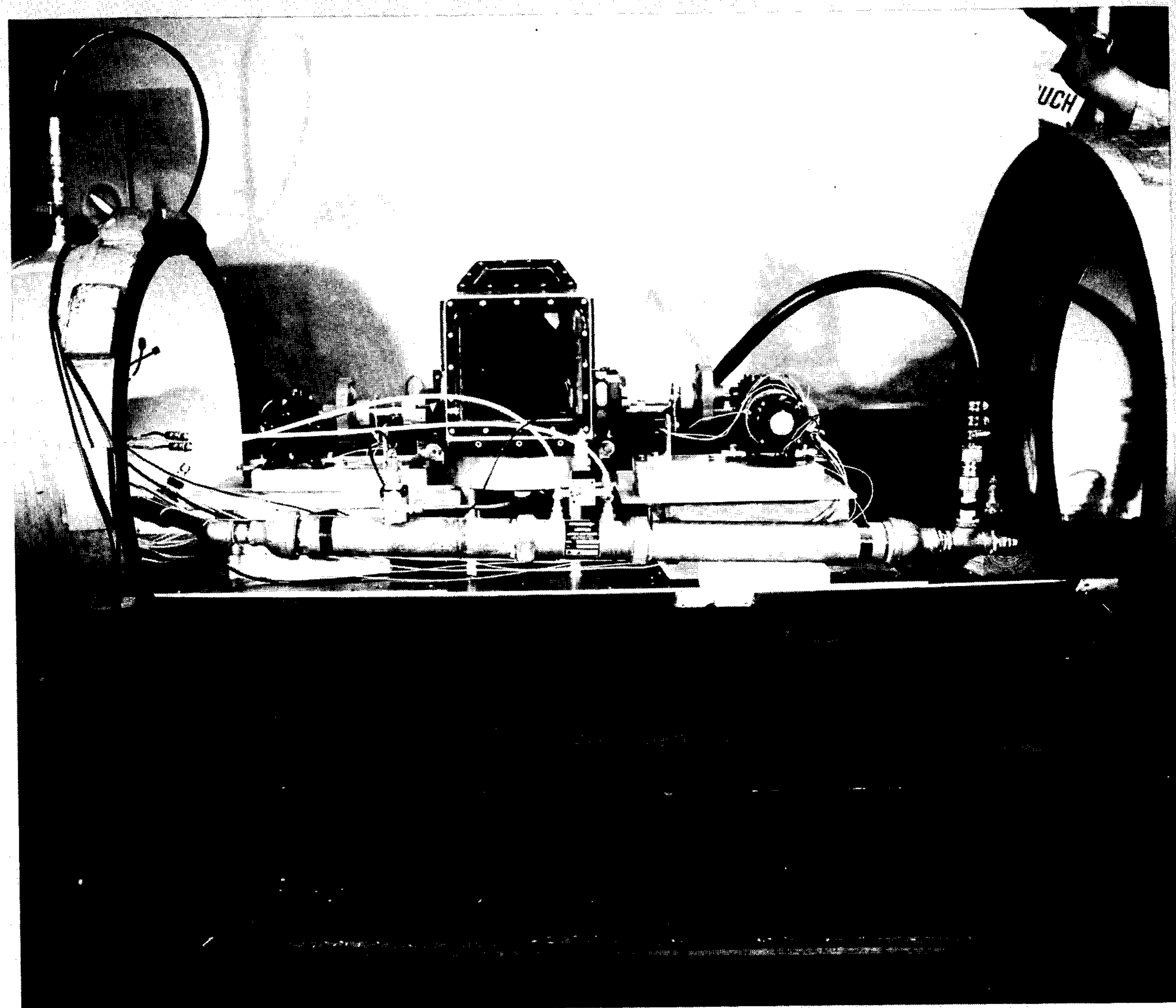
FACEPLATE





Helmet test at
NCSC's Hydrospace Laboratory,
Panama City, Florida
(see page 18).

VOLUME 13, NO. 3

FACEPLATE

THE OFFICIAL MAGAZINE FOR THE DIVERS AND SALVORS OF THE UNITED STATES NAVY

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FRONT COVER: Underwater Demolition Team divers recovering missile package at Kwajalein Atoll (see page 12).

BACK COVER: Restored SEALAB I on display at the International Diving Museum, Panama City, Florida (see page 6).

SOUNDINGS

LCDR Whall Relieves CDR Cwiklinski at NEDU

LCDR David G. Whall has relieved CDR Stanley F. Cwiklinski as Executive Officer of the Navy Experimental Diving Unit (NEDU) in Panama City, Florida. LCDR Whall has also assumed CDR Cwiklinski's duties as Assistant Editor-in-Chief of FACEPLATE.

CDR Cwiklinski has reported to Commander, Naval Surface Force, U.S. Atlantic Fleet, in Norfolk, Virginia, for duties as Force Diving and Salvage Officer, U.S. Atlantic Fleet (Code N331).

LCDR Whall was previously Senior Projects Officer at NEDU. Prior to this, he served as Executive Officer of Mobile Diving and Salvage Unit ONE (then called Harbor Clearance Unit ONE) in Little Creek, Virginia.

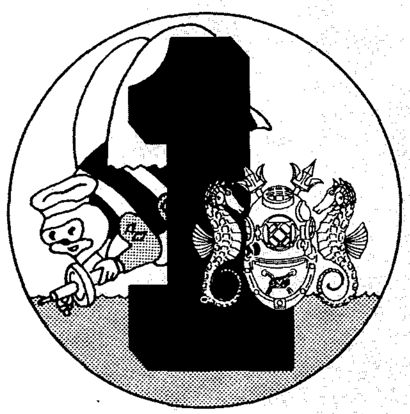
Change-of-Command for USS PIGEON

CDR William E. Shotts relieved CDR H. Warfield Leeke, Jr., of command of the twin-hulled submarine rescue ship USS PIGEON (ASR 21) in a change-of-command ceremony at Naval Station, San Diego, California, on August 12.

CDR Leeke will report to Holy Loch, Scotland, where he will serve as Executive Officer of the submarine tender USS HUNLEY (AS 31).

Commander Shotts, of Salem, Oregon, received his commission from Officer Candidate School in Newport, Rhode Island in 1968. After attending submarine school, he served in various submarines before attending the Deep-Sea Diving Officer program in Washington, DC, and Saturation Diving Officer school in San Diego, California.

Change-of-Command at UCT-ONE



LCDR Frank P. DiGeorge, III, relieved LCDR Tim R. Brandenburg as Officer-in-Charge, Underwater Construction Team ONE, in a change-of-command ceremony at the Naval Amphibious Base, Little Creek, Virginia, on August 6.

LCDR Brandenburg has reported to Mare Island Naval Shipyard, California, where he is attached to the Western Division, Naval Facilities Engineering Command, Construction Contracts Office.

Prior to reporting to UCT-ONE, LCDR DiGeorge completed a two-year tour of duty as Senior Assistant Officer in Charge of Construction with Southern Division at Naval Air Station, Pensacola, Florida. Among other duties during a tour with the Office of the Supervisor of Diving in Washington, DC, from 1977 to 1980, LCDR DiGeorge served as Assistant Editor-in-Chief of FACEPLATE.

UCTs were formed in 1970 as specially trained Seabee detachments for the purpose of engineering, construction, and repair of underwater facilities. They are capable of accomplishing both inshore and deep ocean tasks of some complexity, operating as independent units or as an augment to other units.

Stock Number for Teflon Packing Cord

In reference to AIG 239 81-13, NAVSAFECEN 081355Z SEP 81, a temporary National Stock Number (NSN) has been assigned by the Navy Ships Parts Control Center (SPCC) to obtain braided Teflon packing cord for use in stuffing gland penetrators for recompression chambers. The present stock number is 1H0099LLHDJH089, and covers Teflon packing cordage under MIL-P-24396.

Correction – Ordering NEDU Reports

The accession number for ordering NEDU Report 9-81, "Cost Analysis of NEDU's Helium Reclaimer," was incorrect as listed on page 7 of the Spring 1982 issue. The correct number is AD-A108 409. On page 6, the accession number (AD-A105 608) was omitted for NEDU Report 15-80, "Test and Evaluation of Bauer Portable High-Pressure Breathing Air Compressor, Model Varius G-3."

The cost of NEDU Technical reports is $3.00 per report for a paper copy, $0.95 for microfiche, to U.S. Government Agencies, DoD facilities, or private sector government contractors. These users should order from the Defense Technical Information Center, Cameron Station, Alexandria, VA 22314.

For public users ordering from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151, prices will vary according to the size of the report.

NEDU Has New Lead Diver

A ceremony marking the beginning of the fifth Commanding Officer's tour at the Navy Experimental Diving Unit (NEDU), Panama City, Florida, was conducted on August 27. CDR Frank E. Eissing, USN, relieved CDR Robert A. Bornholdt, USN, as Commanding Officer, NEDU. During the ceremony, CDR Bornholdt was awarded the Meritorious Service Medal by CDR Charles S. Maclin, Director of Ocean Engineering and Supervisor of Salvage, Naval Sea Systems Command.

CDR Eissing reports to NEDU from duty as Director of Ship Silencing at the Naval Sea Systems Command, Washington, DC. The son of a retired Navy Master Diver, he brings to NEDU a strong background in diving and practical engineering.

"Having the great honor to be responsible for the most sophisticated diving facility in the world and leading the hairiest divers in the world!"

—CDR Eissing

In his remarks, CDR Eissing commented that even though he had been away from diving for some time, he "found this community is still filled with the same high principled and resourceful individuals that have always managed to find their way into this fantastic part of the Navy." Continuing, he stated, "It is a great responsibility that we all share in maintaining the U.S. Navy's world leadership in diving and salvage. You and I, this small group of highly talented individuals, are the pushers of the diving technology of tomorrow, not only for the Navy, but the entire military establishment. We will continue to push diving technology as hard as we can to keep that world supremacy."

CDR Bornholdt awarded Navy Achievement Medals to EMCS(DV) Peter W. Sykas, USN, and HMCS (DV) Colin K. Blair, USN, for superior performance over the previous year. He commended all NEDU personnel for their outstanding effort and excellent support over his previous two years as Commanding Officer.

A retirement ceremony was conducted for CDR Bornholdt immediately following the Change of Comand.

CDR Eissing graduated from the U.S. Naval Academy in 1963 and subsequently served on destroyers. After being awarded Masters and Professional degrees from the Massachusetts Institute of Technology in 1968, he was designated Engineering Duty Officer and served as a Quality Assurance Officer, Supervisor of Shipbuilding, Newport News, Virginia. Completing mixed-gas training at NSDS in 1970, he was assigned as Officer-in-Charge of the MK 2 MOD 0 Deep Dive System and Diving Systems Engineer, Commander Submarine Development

"When I came to NEDU, I traded the shipwrecks of the Pacific for the hyperbaric chambers of this facility—I loved it."

—CDR Bornholdt

Group One, San Diego, California. As the OPEVAL Test Director of the DDS MK 2 MOD 0, CDR Eissing participated in an open-ocean dive to 1010 feet-of-seawater in May 1972 (then a U.S. Navy Record). Upon completion of that successful OPEVAL, he was assigned as Deep Ocean Systems Rescue Material Officer, COMSUBDEVGRU ONE.

During his next tour as Ship Superintendent and Fleet Ballistic Missile Submarine Project Officer at Mare Island Naval Shipyard, CDR Eissing served on various submarines and was designated Engineering Duty Officer Qualified in Submarines. Following shipyard duty in 1977, he was assigned as Ship Systems Engineering Officer for the TRIDENT Submarine Acquisition Project in Washington, DC, and subsequently Director of Ship Silencing, Naval Sea Systems Command.

Continued ►

CDR Nelson Retires in Panama City

On July 1, at a retirement ceremony conducted at the Naval Diving and Salvage Training Center, Panama City, Florida, Commander James R. Nelson ended 37 years of Naval service. During that period his career ran the spectrum from his initial enlistment and recruit training in 1946 to that of commanding officer of seven different ships and operational units.

While serving a tour of duty as commanding officer of River Assault Division 112 in the Mekong Delta, Vietnam, in 1967, Commander Nelson was awarded the Navy Cross, the Silver Star, two Bronze Star Medals and two Purple Hearts.

At the retirement ceremony Commander Nelson was presented the Meritorious Service Medal in recognition of his efforts in establishing the Naval Diving and Salvage Training Center. The citation read in part, ". . . Commander Nelson's superb performance of duty was the motivating force in his command completing a most difficult transition from a 52-year-old Diving School to a new and highly sophisticated Diving Training Center. During this period, he continued to train divers on schedule to meet critical Fleet shortages despite ongoing construction delays that postponed delivery of the first hyperbaric system at the new facility for almost seven months . . ."

Taking part in the ceremony were Captain Raymond D. Bennett, Commanding Officer, Naval Coastal Systems Center, and Commander Bruce C. Banks, Commanding Officer, NDSTC, who relieved Commander Nelson as commanding officer of the Training Center in April. The Nelsons will be making the Panama City area their home.

CDR Rad Nelson receives plaque of his duty assignments from HTCM(DV) W. F. Curtis, MCPOC.

PRESERVER Earns Three Awards

"As a member of the Naval Reserve Force since 1979, USS PRESERVER (ARS 8) appears to be accomplishing more and more each year – and doing it with fewer active duty crew," said LCDR W. T. Bassett, commanding officer of PRESERVER, which is homeported in Little Creek, Virginia.

"Of the 93 billets on PRESERVER," he said, "only 47 are active duty." PRESERVER's reserve crew, which is comprised of drilling members from the Tidewater area, drill on-board one weekend a month and embark for two weeks training duty each year. They continually train to maintain watch-station quals and are an integral part of the crew.

Proof of PRESERVER's overall excellence was apparent when the dust settled in this year's competition for Battle Efficiency and Departmental Excellence Awards. The salvage and rescue vessel was successful in achieving a Battle "E", a Green Communications "C", and her fourth consecutive Red Engineering "E".

"PRESERVER crewmembers are pleased to receive the recognition these awards denote," said LCDR Basset. "I know they're good. Now I'm happy everyone knows."

During this years competitive cycle, PRESERVER completed salvage of the USAF FB-111 and two USMC F4 aircraft, provided OPAREA target towing support for Atlantic Fleet ships, served as a training platform for the Naval Surface Force Atlantic Fleet Diving School, conducted two open-ocean towing missions, and assisted in the shock testing of USS KIDD (DDG 993) and USS ARKANSAS (CGN 41) in the Straits of Florida.

Roles, Challenges and Directions — A Perspective of U.S. Navy Diving and Salvage

CDR Charles S. Maclin, USN
Director of Ocean Engineering/
Supervisor of Salvage

It's good to be back in the salvage and diving business again. As you may know, I previously spent four years in SEA OOC as the Assistant for Salvage and as Deputy Director. I then worked in the CV Service Life Extention Program (SLEP) for eight months before relieving CAPT Jones as OOC in May of this year. One of my first official functions was to address the Salvage Diving Officer Class which graduated from NDSTC in Panama City, Florida, on the 18th of June. I would like to reprint my remarks in this column, as I think they set the tone for what I will be trying to accomplish during my tour as SUPSALV.

☐ ☐ ☐

Captain Banks, staff, guests, graduates.

I want to express my appreciation to Captain Banks for inviting me to address you this morning, as I consider this one of my more important and pleasurable duties.

To the graduates, let me first congratulate you on successfully completing the salvage officer's course. It is a very significant accomplishment indeed. Secondly, I commend you on your choice of a career pattern. You have truly entered the Navy's most challenging and rewarding line of work; certainly it is the most fun.

This morning I would like to talk to you about three topics:

☐ The role and function of the Supervisor of Salvage,

☐ My perception of the diving and salvage community and its future, and finally,

☐ Your role in the community.

The Office of the Supervisor of Salvage is in the Naval Sea Systems Command and is physically located in Crystal City in Washington. I report directly to Vice Admiral Fowler who is NAVSEA himself. The principle role I play is to be the technical manager for anything involving diving, diving system certification, salvage, towing, search and recovery, offshore oil pollution abatement, and underwater ship maintenance.

"The new salvage ships will be the most capable we can obtain . . . Right now we are ahead of the power curve . . . All indications are that we are building the ship right."

My most important role, however, is to provide operational support to the Fleet in any of these areas.

In order to give you a better feel of what we do, let me cite a few examples:

☐ *Diving* — We write the dive manual and are procuring and distributing the MK 12. Hopefully, we can start phase-out of the MK 5 in the near future. My plans are for us to concentrate on improving the diver's ability to do work in the shallower depths by improving the rigs he works in, improving the tools he works with, and providing the technology to accomplish his assigned tasks.

☐ *Certification* — Our office certifies all the surface-supplied diving systems in the Navy — right now, that means about 250 systems. My goal in this area is to provide more definitive guidance to the Fleet on how to achieve and maintain certification.

☐ *Salvage* — Our efforts right now are concentrated on improving the Emergency Ship Salvage Material System by increasing the number of bases in the Pacific, restoring equipment to a ready-for-issue condition, and procuring new, more modern equipment. A large part of our time is being spent in ensuring that the new salvage ships — the ARS 50 — will be the most capable ship we can obtain. The project is exciting and my office and the two service squadron commanders are working together very closely to make sure the salvage Navy has the right salvage and diving platform. Right now, we are ahead of the power curve — the foredeck has been

"The field of underwater ship maintenance is by far the most challenging to the Navy diver – the horizon is unlimited."

mocked up in full scale and reviewed; the fantail and its associated towing facility are scheduled for mock-up in August. All indications are that we are building the ship right.

Future efforts in salvage will include development of an at-sea fire-fighting capability, improvement in use of underwater explosives, and development of fendering systems to permit at-sea cargo transfer.

In the towing area, the Office is making a comeback after having neglected that area for some time. We have initiated an R&D effort at MIT to study the forces involved between towed bodies so that we can better design towing rigs. Also on my watch I will push to complete the revision to the towing manual–something that has been in the mill for about four years.

Unfortunately, we have suffered a slowdown in the search and recovery area – while engaged in an operation last December, the DEEP DRONE, our 4,000-foot, remote-controlled vehicle, suffered a collision with the support ship and is now severely bent. Repair costs are in the neighborhood of $600,000. We are working very hard to identify the repair funding as the DEEP DRONE is an extremely valuable asset. Her most impressive job to date has been the recovery of the pieces of a CH-46 helicopter from a depth of 3,000 feet. During this month-long recovery operation, she made 29 dives and accumulated approximately 190 hours of bottom time – a very impressive performance in the vehicle world. Not only that, we got the entire helo back as well.

Another responsibility of my office is the combatting of Navy offshore oil pollution. To do this, we have an inventory of 24 34-foot skimmers, about 25,000 feet of oil boom, offloading pumps, and ancillary equipment. So far, we haven't had to clean up any Navy spills, but we have assisted the Coast Guard on many occasions – the CAMPECHE spill being the most notable. Our ongoing efforts in pollution abatement are relatively low-key at this time – we are looking at our ability to handle hazardous spills and how to protect personnel above and below the surface.

"For a long time, the salvors have been the step-children of various factions within the Navy . . . I perceive that the decline is about to be arrested."

In underwater ship maintenance, I feel we have just scratched the surface towards creating a capability to maintain ship hulls when they are waterborne. Right now, this field is by far the most challenging to the Navy diver – the horizon is unlimited – the key to its success is performance by the diver and the willingness of Navy management to take on the challenge.

To date we have, in cooperation with the Fleet and the lab [Naval Coastal Systems Center] here at Panama City, developed techniques to perform underwater stereo photography, underwater magnetic particle crack detection, and underwater ultrasonic thickness measuring. We have developed a myriad of underwater tools – including a prototype multi-brush hull scrubber. All of these things are not in the Fleet yet, but we have used most of them on actual jobs. Other maintenance-related operations include the change-out of SPRUANCE and PERRY class propellers, bottom blow valve installations for the 1052's, and the development and installation of cofferdams around the struts of SPRUANCE class destroyers in order to clad-weld the leading edges of the struts that had deteriorated due to cavitation erosion. Even as I speak, there is a team from the NCSC over in Naples assisting the Fleet divers in investigating and repairing the cracks in the rudder of a Fleet oiler [*see page 24*].

As I mentioned previously, operational support is perhaps our most important function.

Operational support is provided in several different ways – I will touch on just a few of them –

☐ First, through the ESSM system, an inventory of about $30 million worth of salvage equipment, we provide support through loan of the equipment to Fleet units.

☐ Second, we can provide on-scene advice and consultation through the various personnel in my office, both civilian and military. The civilians may not wear a blue suit, but in fact they are often more experienced than the blue-suiter on scene and can provide valuable advice.

☐ Lastly, we maintain contracts with various commercial companies in order to provide assistance and supplement Fleet assets.

So much for my role – now to the community itself.

For a long time, the salvors have been the step-children of various factions within the Navy. The result of this was a steady reduction in the salvage Navy's capabilities. We have lost many ships and craft; we saw the next generation of tow ships go to MSC for operation; and we have lost experience in the ranks due to retirements and the lack of salvage jobs.

I perceive that the decline is about to be arrested. The salvage

"The (diving and salvage) community will prosper only so long as you demonstrate that you are better professionals than the destroyermen and the submariners."

Navy now has a strong sponsor in OPNAV. OP-37, the sponsor for salvage, is daily fighting the budget battle to obtain more funds for the salvage program. The community itself has a new identity in the 1140 officer – a professional in every sense. You are about to have a new salvage ship in which to serve and perform the minor miracles that are commonplace in salvage work. Finally, I believe that over the last couple of years my office has gotten its priorities oriented in the right direction and is now performing a definite service to the salvage community.

Now, as to your role in the community – you've got the best of all worlds. All you have to do is go out and do the fun part – get wet and demonstrate that you're the best divers the Navy has turned out to date. It won't be easy to have fun – you've got to go out and convince the people that you work for that performance and getting the job done in the water is the name of the game.

The community will prosper only so long as you demonstrate that you are better professionals than the destroyermen and the submariners.

At the same time, in your eagerness to perform, don't forget that it takes a lot of one-the-job training to excel in the salvage business, and that every once in a while you may need some help – either from your squadron, your alma mater here, the Experimental Diving Unit next door, or from my office.

Whatever it is, we all are ready to assist – just ask.

Thank you for your attention, I wish you the best in your new assignments.

□ □ □

As a bottom line of this column, I want you all to know that NAVSEA OOC exists for only one reason: to support the Fleet salvage and diving community. Let us know how we can be of assistance.

View from SUPDIVE

Who Can You Name?

LCDR R. P. Swanson, USN
Supervisor of Diving

Divers are a unique group within the military establishment. This uniqueness is recognized by the special emblem we so proudly wear. The quotation, "Only the man who steps into the ring knows," certainly applies to our chosen specialty of diving. A diver, more than anyone else, knows what diving is all about. He knows both the danger and the gratification; but, more importantly, he knows what it takes to make a diver.

You will note in this issue all the courses of instruction that are offered in diving. I personally think we have the best training in the world, but for some reason, we just never have enough applicants. Why?

The new Diving and Salvage Training Center is able to accommodate all candidates for training. Where is the problem, or what is it?

I believe we are not recruiting divers, and therefore are failing to perpetuate a smooth, steady input of diver training candidates. An accelerated P.R. approach to diver recruitment with flashy posters is not the answer because it is prone to recruiting many applicants who never could really hack it as a diver.

The answer rests in our own motivation. You and I need to hand-pick candidates, encourage them, and conduct more indoctrination dives, thereby providing diving candidates that can be worthy to wear that emblem we so highly value.

Who can you name today that is actively diving because of your personal effort to recruit a diver?

Update: The International Diving Museum

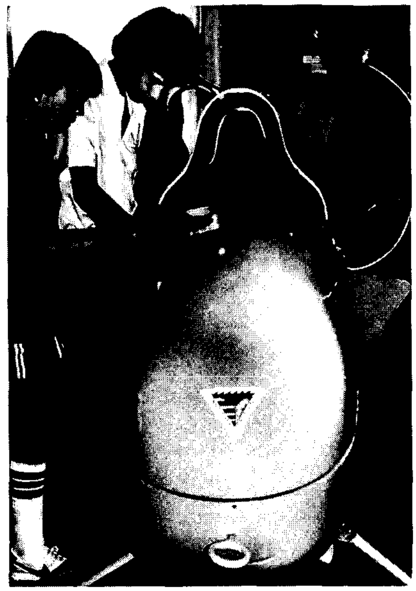
A recent visit by FACEPLATE to the Institute of Diving in Panama City, Florida, revealed some significant developments in the evolution of this private, non-profit, educational organization formed in 1977 for the advancement of professional, literary, and scientific knowledge related to man's underwater activity.

The Institute's newly-opened International Diving Museum boasts a rapidly-growing collection of diving equipment and artifacts. Among the standouts: an American-made, turn-of-the-century, Miller-Dunn hand pump (similar to the Siebe-Gorman model); a wide range of early diving rigs, both military and commercial; exhibits depicting the history of diving; a model of the U.S. Navy SEALAB III habitat; and a Trieste sphere. Outside, the recently-salvaged and restored SEALAB I habitat is displayed, along with an early U.S. Navy swimmer delivery vehicle, and a single-lock recompression chamber.

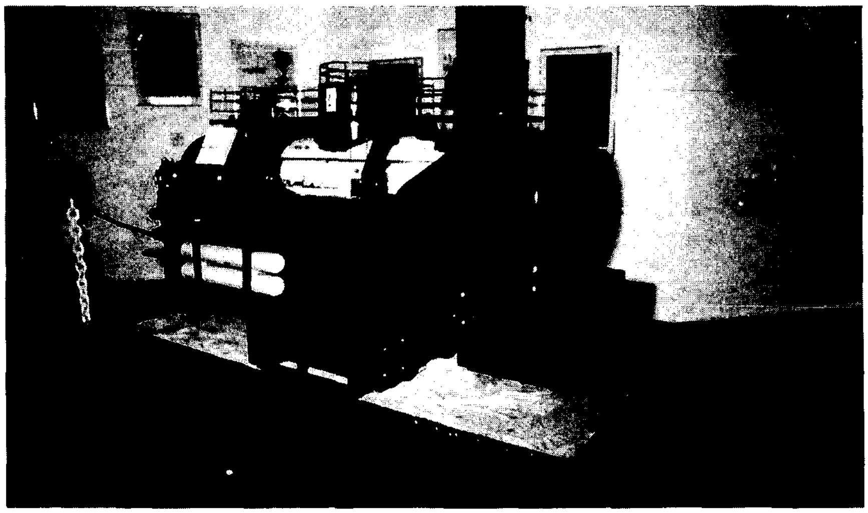
Individuals from the U.S. Navy diving community have been a major source of support to the Institute, due in no small measure to the concentration of Navy diving facilities and personnel in the Panama City area. The Institute currently has a membership of over 800 individuals representing the military, commercial, sport, and research diving communities nationally.

Mr. Tom James, Executive Secretary, may be contacted for further information about the Institute at the following address: Institute of Diving, P.O. Box 876, Panama City, FL 32401. Telephone: (904) 769-7544.

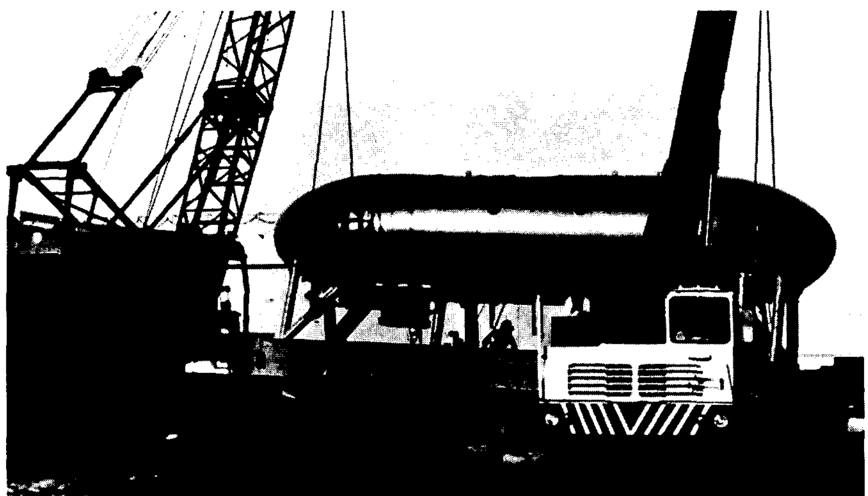
American-made Miller-Dunn hand pump.



Visitors inspect an early mini-sub.



Model of U.S. Navy SEALAB III underwater habitat.



Arrival of restored SEALAB I habitat at Museum.

Seawater Diver Tools Tested

Unique System Developed at NCEL Uses Seawater, Rather Than Oil, as the Working Fluid

Six years of research and development at the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, California have culminated in the successful, first-ever test of a complete seawater hydraulic diver tool system.

In an outdoor seawater tank at NCEL, Navy divers operated various prototype components of the system. Of particular interest was the performance of the unique, NCEL-developed motor that uses seawater instead of oil as the working fluid. The 3″ × 3″ × 3″ motor, weighing only seven pounds, was attached to an underwater impact wrench. A diesel-hydraulic power supply furnished pressurized seawater to the motor.

A Navy diver operates a seawater hydraulic-powered impact wrench in the shallow water test tank at the Naval Civil Engineering Laboratory, Port Hueneme, California. The exercise marks the first time divers used seawater, instead of oil, as the working fluid in a hydraulically-powered, underwater tool. The wrench drilled a ⅜″ diameter hole in a ½″ steel plate. The hose supplies pressurized seawater to the vane motor which drives the chuck. (Oil systems require two hoses.) The tool also can loosen and tighten bolts and can provide more than 1,100 foot-pounds of torque on a one-inch bolt in less than 10 seconds.

Technological Breakthrough

Laboratory Project Engineer Stanley Black, who developed the motor, said the purpose of the test was to demonstrate and prove the functional and practical use of the seawater system. Components evaluated included pumps for supplying pressurized seawater; special flow control valves, hoses and fittings; filters to remove contaminants; and the tool (in this instance, the impact wrench).

Divers from NCEL's Diving Locker performed the underwater tests. Thomas Conley, the Laboratory's lead technician in seawater hydraulics, supervised the testing. The overall program is sponsored by the Naval Sea Systems Command. Westinghouse Electric Corporation (Oceanics Division) designed and fabricated the motor and system under NCEL's specifications.

Since 1976, NCEL has been testing and evaluating individual components of the seawater system, leading to the first total-system underwater tryout. Development of the double-entry, balanced vane motor represents a technological breakthrough, making possible more advanced and safer diver tools. Recently, the motor met a target of more than 200 hours of testing at 80 percent of rated power (3 hp).

Advantages and Applications

Black pointed to many advantages of the seawater hydraulic concept over tools operated by oil hydraulic motors. Obviously, the use of oil is eliminated. That means no environmental pollution and no contamination of the working fluid. There is no need for a return hose; less pump power is required; and the drag force from current and surge is reduced. Divers will find that the elimination of back pressure will provide increased tool working depth. Fire hazards also are eliminated.

The potential for seawater hydraulic systems is not limited to diver tools. The technology is adaptable to such areas as submersibles, amphibious vehicles, submarines, and shipboard machinery.

Based on data developed from this successful test of prototype components, NCEL will design and fabricate a system suitable for Fleet use.

Sultana Shoals Grab USNS CHAUVENET

USS BRUNSWICK Recalls Crew to Assist the 3,700-Ton Survey Ship, Badly Holed and Balanced on the Edge of a 600-Foot Drop-Off in the Sulu Sea, Philippines

PH1 Felimon Barbante, USN
Seventh Fleet Public Affairs Office
Subic Bay, R.P.

When crewmen of a salvage and rescue ship are on liberty, thoughts of being recalled to the ship for a major salvage operation are always in the back of their minds.

It was during their last weekend in Subic Bay, Republic of the Philippines, during a six-month Western Pacific deployment recently when the call came for the crew of USS BRUNSWICK (ATS 3).

The survey ship USNS CHAUVENET, (T-AGS 29) operated by the Military Sealift Command, had run aground on Sultana Shoals in the Sulu Sea approximately 330 miles south of Manila. BRUNSWICK was summoned to assist her.

Recall

The duty crew aboard BRUNSWICK scurried about making telephone calls to round up the rest of the crew. Within 12 hours, BRUNSWICK was under way with most of her 115-man crew.

"You've got to be ready at a moment's notice," HTC Jeff Hamm said. "The ship's crew is always on call."

No sooner had BRUNSWICK left the pier when deck hands began unwinding wire lines from their spools, neatly laying them out in figure eights on the forecastle and fantail in anticipation of a de-beaching and towing operation.

The sweltering heat did not subside as every available deck hand tugged wire lines and moved anchor chains while assembling six "legs" of beach gear. Each leg consisted of an anchor attached to 90 feet of chain and 1,500 feet of 1⅝" diameter wire rope.

While the crew readied necessary equipment, the ship's officers, chiefs and salvage advisors planned the operation in as much detail as possible with the information they had.

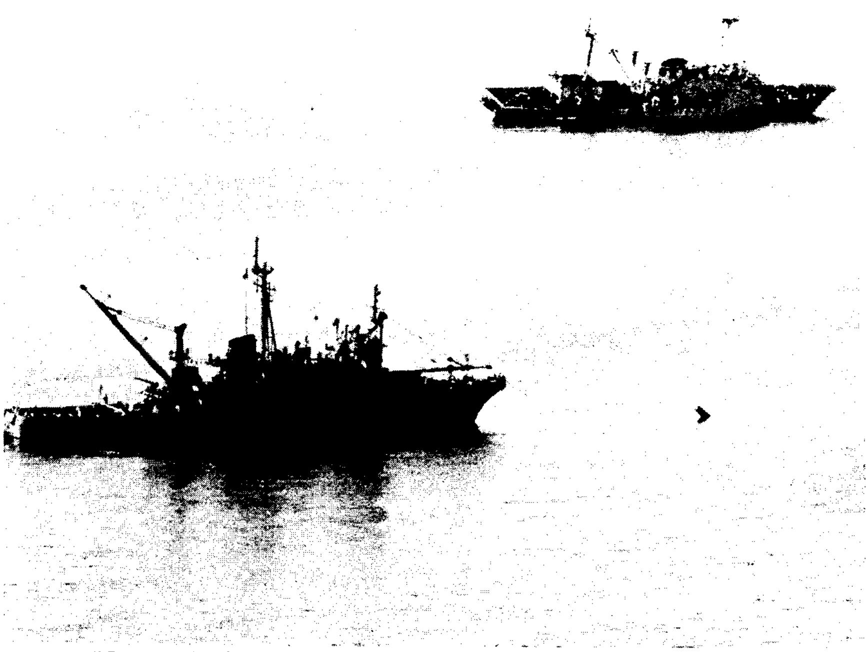
One day after leaving Subic Bay, BRUNSWICK arrived on-scene. Divers donned scuba gear and conducted bottom surveys of the surrounding area to determine the presence of any obstacles the salvors might come up against.

Sixty-Foot Gash

CHAUVENET rested on a coral reef that glistened a bright aqua below the warm seas giving way to a deep blue where the reef shelf dropped from 12 to 600 feet.

"The drop-off was too deep for our regular anchor, so the beach gear was ruled out," said ENS Paul

Photos by PH1 John Kristoffersen, USN



BRUNSWICK remained on station for 19 days to refloat the stranded, badly holed CHAUVENET (background).

Currivan, BRUNSWICK's deck officer.

Divers continued to assess the situation. Among miscellaneous damage, they discovered a 60-foot-long gash in the vessel's port side caused by large coral heads.

The biggest problem CHAUVENET faced was instability because she was badly "holed," BRUNSWICK's Commanding Officer CDR John Drucker explained. "We had to maintain her stability so she wouldn't roll over and plunge 600 feet."

Two eight-inch-circumference nylon lines were tied to the ship's stern and attached to anchors set under the reef, like a bow string holding an arrow in place, to keep CHAUVENET from shifting.

Every available man from BRUNSWICK boarded CHAUVENET to shift cargo in order to rebalance the listing ship while hull technicians fashioned metal sheets to patch CHAUVENET's damaged hull.

Meanwhile, the ocean-going tug USNS NARRAGANSETT (T-ATF 167) sailed from Subic Bay with the rest of BRUNSWICK's crew to assist in the operation. A helicopter from Fleet Composite Squadron FIVE, Cubi Point, flew in much-needed water pumps to dewater CHAUVENET's flooded spaces. The combat stores ship USS SAN JOSE (AFS 7) transported oceanographic scientists and Navy personnel from the distressed ship back to Subic Bay, CHAUVENET's home port.

Everyone was doing more than his share of work to save the stricken vessel. "It was an around-the-clock job," CDR Drucker said. "We ate and slept when we could."

Tropical Storm Hits

Work was slowed when 35-knot winds and 10-foot seas, generated by tropical storm Pat, caused CHAUVENET to shift from her initial port list to a 20-degree starboard list.

Once the storm subsided, BRUNSWICK's crew again boarded CHAUVENET to move scattered

BRUNSWICK divers patching CHAUVENET's damaged hull, which was ripped open by reef's 15-foot-diameter coral heads.

gear and cargo. The days wore on. "There was no holiday routine; it didn't exist," said ENS Currivan.

Gunnery personnel and divers from BRUNSWICK planted explosives to break up the huge coral heads, some measuring 15 feet in diameter, which gripped CHAUVENET. Working parties offloaded CHAUVENET's three anchors and survey boats to help lighten the ship.

The ammunition ship USS KISKA (AE 35) arrived to replenish food and fuel supplies of BRUNSWICK and NARRAGANSETT while they worked on station, then transported CHAUVENET's crew to Subic Bay when their help was no longer needed.

After the huge hull gash was patched and the water pumped out, the 282-foot BRUNSWICK lived up to her nickname "Supertug" as two propellers, turned by four powerful engines, churned the water for nearly an hour until the 3,700-ton CHAUVENET was off the reef with the high tide.

The operation required 19 days on the job and another three days towing CHAUVENET to drydock in Subic Bay. Some 51,000 man-hours of work were amassed, according to CDR Drucker. "That's 18 hours a day per man," he said, noting that the figure did not include man-hours from the additional help provided by other Seventh Fleet units.

Salvaging CHAUVENET was the highlight of BRUNSWICK's recent Western Pacific deployment. Also during her tour with the Seventh Fleet, she exercised more of her capabilities when parts of a U.S. Marine jet aircraft were recovered from the chilly waters off Iwakuni, Japan.

"To Pull Them Out"

BRUNSWICK divers also worked with their counterparts from the Republic of Korea when the ship participated in Team Spirit '82, a joint training exercise.

"We had the opportunity to demonstrate our mission capability and utilize many phases of salvage, and fortunately we were successful," CDR Drucker said.

Many Navy ship's missions revolve directly around defense. BRUNSWICK is there to pull them out of a jam. Her supportive role includes conducting deep dive operations, lifting submerged objects, and fighting shipboard fires.

BRUNSWICK is now in her home port of Pearl Harbor, Hawaii, where her crew is enjoying a well-earned rest. But when the crew goes on liberty, they know that the call for the next big job may be just around the corner.

A "DOT" on the Map

Off Tiny Roi-Namur, at the Remote Kwajalein Missile Range, UDT-11 Paradivers Support "Project DOT" Test Launches

CDR Clancy Hatleberg, USN, (PhD)
Naval Ocean Systems Center
San Diego, California

U.S. Navy Underwater Demolition Team (UDT) specialists have a long history of recovering space vehicles and payloads.

Beginning with Project Mercury, through the Gemini and Apollo missions, and up to today's space shuttle operations, UDT divers have been called upon to recover just about everything returning to the ocean from space (see "Apollo Recoveries: A Flashback on UDT-11 Tradition" by the author, FACEPLATE, Summer 1974).

One of the most recent series of UDT ocean recoveries has involved a project with a name and location few people have ever heard of.

Roi-Namur

The location is Roi-Namur, a small, South Pacific island which is part of the Kwajalein Missile Range. Project DOT (for Designating Optical Tracker) is the name of the program, run by the U.S. Army's Ballistic Missile Defense Advanced Technology Center (BMDATC) in Huntsville, Alabama.

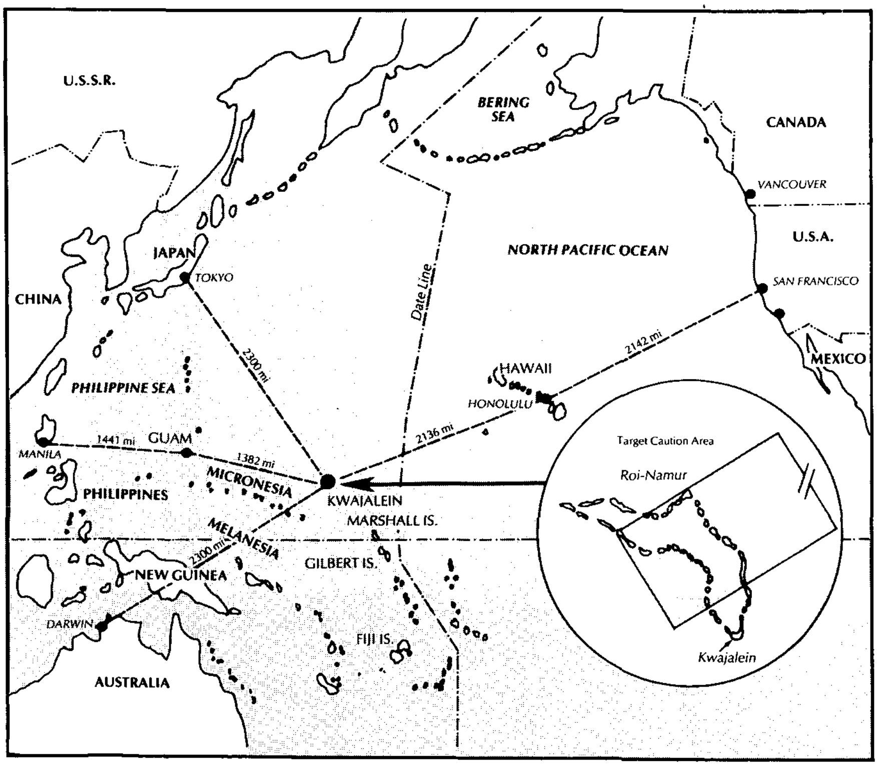
Project DOT's purpose is to measure ballistic missile target trajectory and optical signatures.

A key element to the success of the program is the recovery of a projectile-like capsule which is launched during each test. The capsule – called a sensor payload vehicle, or SPV – contains sensitive tracking equipment.

Since 1978, and through this year, UDT divers have been recovering the SPV after each Project DOT test flight for BMDATC. After splashdown and recovery, the SPV is refurbished for use in later flights, just as the space shuttle rocket boosters are reused.

The SPVs are launched from the island of Roi-Namur to impact between 100 and 200 miles downrange. Prior to splashdown, several things happen to reduce impact damage and to aid UDT personnel recovering the SPV.

First, the SPV is sealed and made water-tight. Next, a parachute reduces the SPV's descent velocity and activates a radio beacon and a flashing light. At splashdown, a flotation balloon inflates, and a saltwater switch activates ordnance to cut the main parachute shrouds, separating the parachute from the vehicle. The radio beacon and the flashing light are mounted on the flotation balloon and are visible while the balloon is floating. When UDT swimmers arrive, they must disarm a sink timer which would automatically scuttle the SPV after a certain period of time.



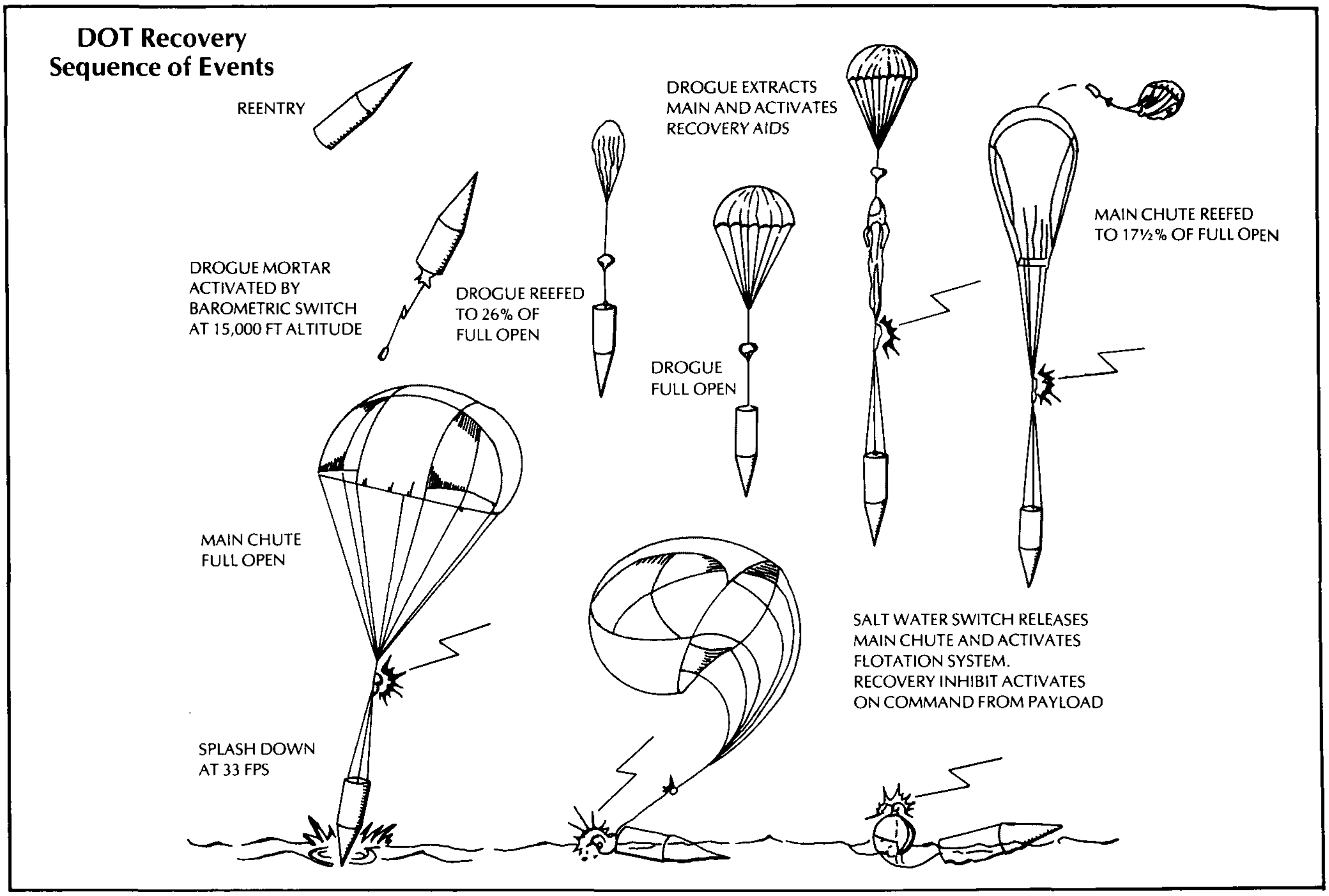
Roi-Namur is an island in the Kwajalein Atoll, part of the Kwajalein Missile Range.

Practice and First Recovery

In preparation for the first DOT flight in 1978, men from UDT-11 and their USAF counterparts practiced the recovery techniques over and over – first in San Diego, then Hawaii, and finally, more rehearsals at Kwajalein itself.

With each repetitive practice session, men and mission were molded to form a team capable of flawlessly accomplishing the recovery in as wide a variety of scenarios as possible.

In San Diego, the paradiver teams practiced disarming and securing the vehicle, first in calm water and then in open water representative of recovery area



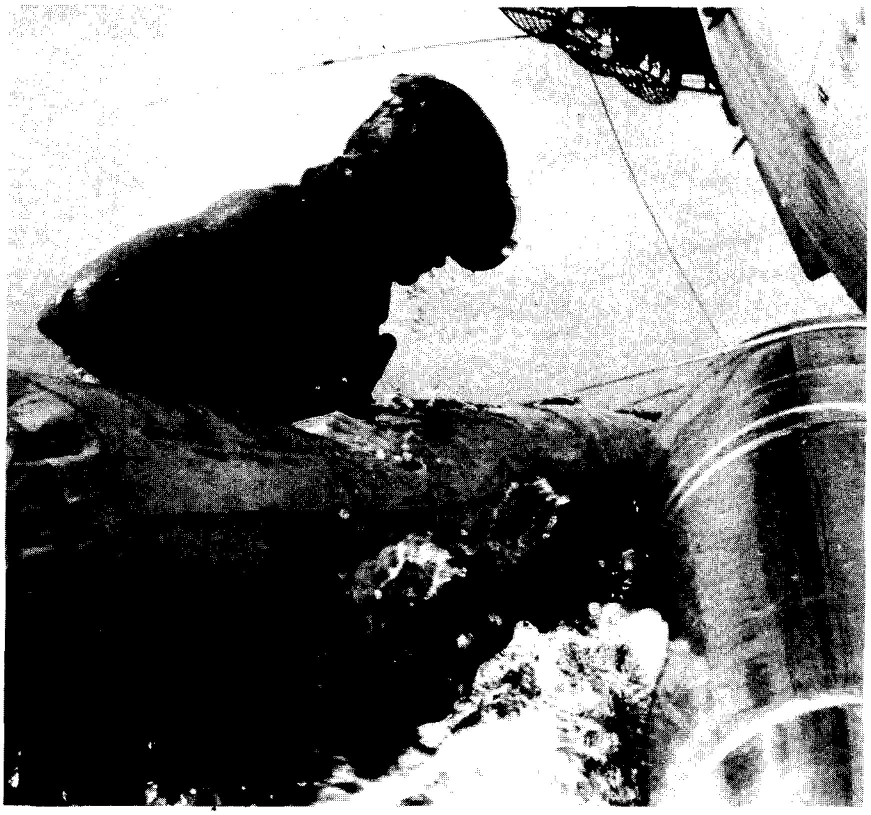
Sequence of events for recovery of Project DOT's sensor payload vehicle.

conditions. In Hawaii, the UDT parateams and equipment were integrated with the USAF C-130 flight crews and aircraft. Deployment of the teams and their equipment was practiced to precisely drop the UDT swimmers into the splashdown location. In Kwajalein, the aircraft, UDT swimmers, recovery vessels and mission control were all combined in simulated recovery exercises to perfect and coordinate the many facets of the recovery plan, from tracking and vectoring to vehicle retrieval. By early 1978, the now-seasoned SPV paradivers were ready for the first test.

LT Bill Davis was in charge of this first DOT flight recovery team. SKCS Allan Starr (alias "Mr. DOT") was not only a member of this first team, but also went on to play an integral role in all of the DOT recoveries through 1981.

For this first DOT flight, USS HAROLD E. HOLT (FF 1074) and USS MOLALA (AFT 706) were used

DOT swimmers secure sensor payload vehicle to cradle during recovery rehearsals.



DOT swimmer and SPV alongside recovery vessel at Kwajalein Missile Range.

Underwater demolition team members successfully place recovery sling on SPV.

as recovery support vessels. Two C-130 aircraft from the USAF's 6594th Test Group were used to search for the SPV after splashdown and, if needed, to parachute a back-up UDT recovery team into the splashdown location.

The primary means of recovery, however, was to cast a team of UDT swimmers from a LAMPS helo stationed aboard HOLT. MOLALA would then recover the UDT swimmers and the SPV some time later.

Despite recovery plans, however, technical problems occurred with the target missile after launch, so the DOT package was never deployed and the mission had to be aborted.

By December 1978 another DOT flight test was scheduled. This time, LT Davis and his men were able to show to good effect the results of their training and successfully recovered the first SPV off Roi-Namur. Assisted by helo cast, the recovery team even had the luck of calm seas. Unfortunately, this good fortune would not always be a member of the team.

Trouble on Third Launch

In January 1980, the third DOT sensor vehicle was launched after a near normal, but delayed, countdown. Target and sensor vehicle trajectories were successfully obtained and the SPV deployment appeared normal. All recovery ships and aircraft were on station at the edge of the projected impact area. Both C-130 aircraft had picked up the recovery beacon which had been turned on in the SPV at 15,000 feet after a barometric switch fired a motor to deploy the drogue and then the main parachute. However, the aircraft lost the beacon signal just before the SPV splashed down, and the recovery vessel estimated it needed about an hour to reach the splashdown point.

The delay meant that the backup recovery team would have to parachute into the splashdown site. At splashdown, neither C-130 immediately spotted the SPV, so they began a search pattern. After more than 30 anxious minutes, the first C-130 again picked up the beacon's signal.

By this time, the weather had worsened, and the wind and swells had increased in the waning daylight. Failing to sight the SPV, the aircraft descended to under 1,000 feet. Finally, now almost an hour after launch, a C-130 crew member spotted a reflection from the SPV approximately one nautical mile from the predicted splashdown point.

Considering the factors involved, Senior Chief Starr had reason to be concerned and anxious. As the jumpmaster, he was responsible for parachuting the parateam into a rapidly deteriorating situation. The wind and high sea states made the prospect of a successful recovery marginal. Senior Chief Starr weighed the possibilities – lose the SPV or risk the safety of the men.

Parachuting In

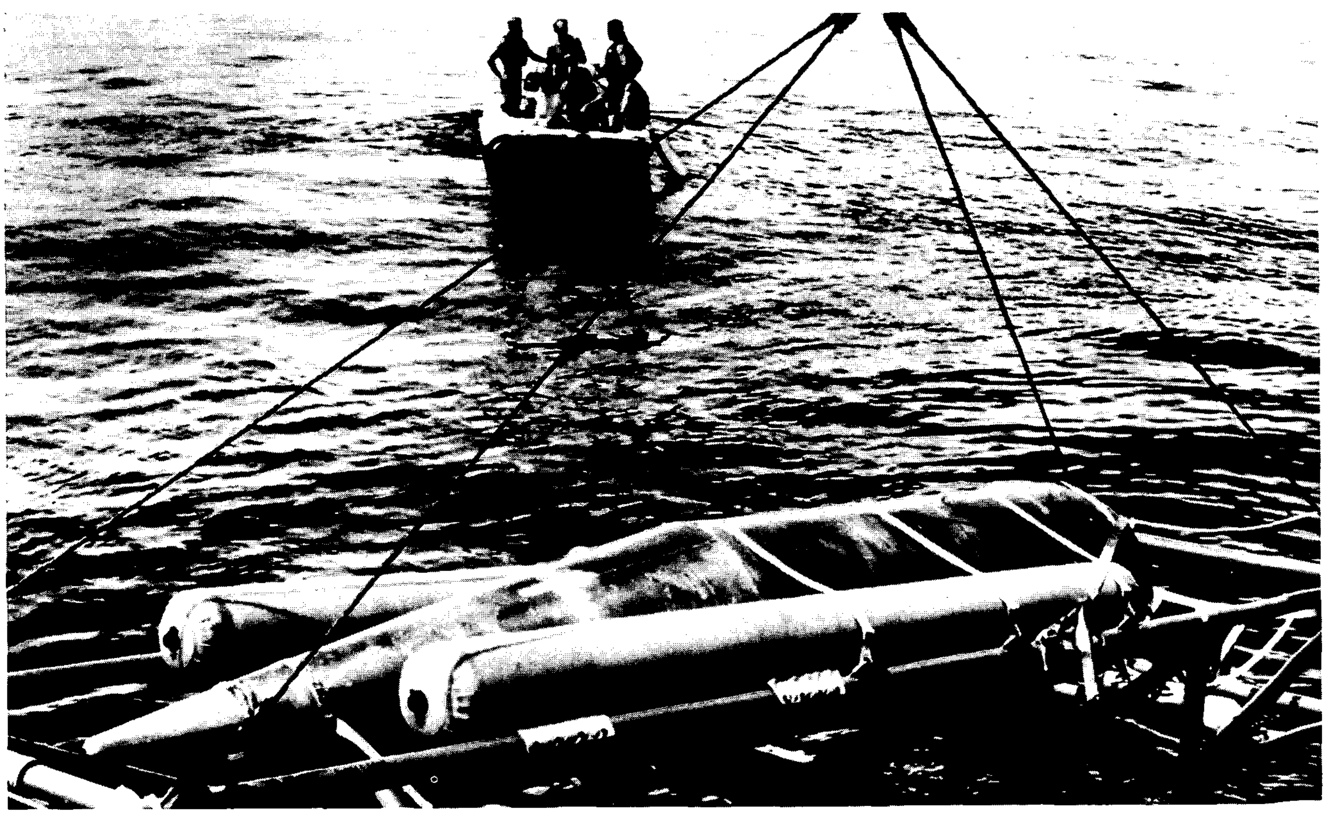
It didn't take long for him to feel the men's determination and realize the team was capable of success, even with the difficulties at hand. Moments later, four members of UDT-11 (LT Randy Large and petty officers McAdams, Worthington and Riewerts) parachuted into the water, landing some 300 yards upwind of the SPV. By now the ocean swells had increased to over six feet, obscuring the SPV from the swimmers, who had only a short time left to disarm the sink timer. Fortunately, the LAMPS helo from the primary recovery ship arrived on the scene and vectored the UDT recovery team to within 100 yards of the SPV.

At this point, Petty Officer Worthington swam into a large Portuguese man-of-war and suffered severe stings to his face and upper body that temporarily immobilized him. After assisting their stricken team mate, the UDT swimmers were finally able to sight the SPV. Shortly thereafter, they successfully disarmed the SPV sink ordnance and waited for the arrival of the recovery ship. Only now did Petty Officer Worthington reveal the full extent of his injuries. Succumbing to the effects of the man-of-war's poison and only semiconscious, he had to be rushed by helicopter for medical treatment. Yet, even with this setback, the task was completed and the rest of the team, along with the SPV, soon were recovered safely.

Continued Readiness

DOT flight tests are continuing. LT Rick Smethers led the latest UDT recovery team in May 1981. Through time and experience, recovery techniques have been honed to the point that only one recovery vessel, the EGABRAG II, is required. This oceanographic research vessel has its own helicopter platform and is accompanied by a circling U.S. Navy P-3 aircraft carrying the secondary recovery team.

When the Project DOT flight recovery program ends, the men of Underwater Demolition teams remain ready at a moment's notice to recover space vehicles and payloads anytime and anywhere in the oceans of the world.



SPV is retrieved by the recovery vessel while the UDT recovery team awaits its turn. "Mr. DOT" is at the helm.

Hydrospace Laboratory — Diving's Best-Kept Secret?

Over the Past 15 Years, This Small but Dynamic Laboratory has Quietly Become an Almost Indispensable Player in the Development of Diving Life-Support Systems for the Navy.

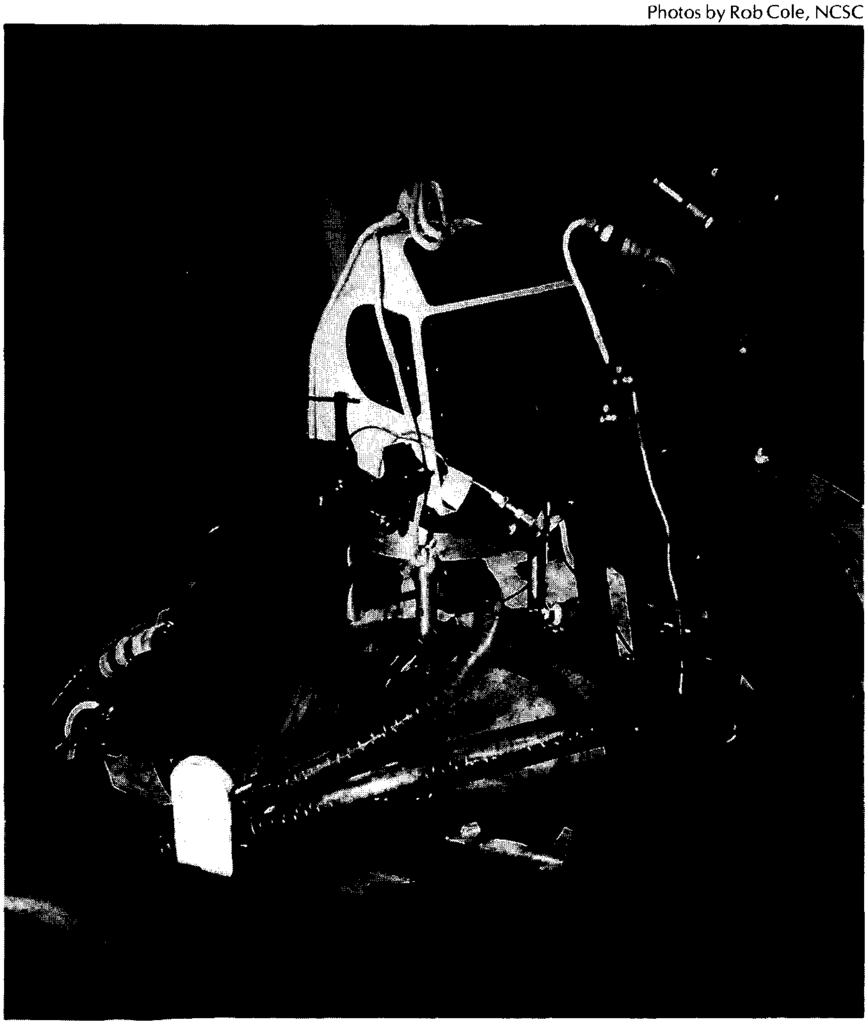
Mr. Stephen Person
Managing Editor

The Hydrospace Laboratory at the Naval Coastal Systems Center (NCSC) in Panama City, Florida, has been dedicated to Navy diving research and development since 1967. During this time, and with little or no fanfare, it has become the most advanced unmanned hyperbaric test and simulation facility of its type in the world.

Low Profile, High Yield

The Laboratory is located inside a modest, one-story structure adjacent to the Navy Experimental Diving Unit (NEDU), and is headed by G. W. "Charlie" Noble. With the assistance of technicians Vic Turner and Bob Carter, and various task team engineers and technicians, the Hydrospace Laboratory conducts an average of two hyperbaric tests daily on equipment ranging from small, life-support system components to sophisticated saturation diving systems for the Navy's deep submergence programs.

Photos by Rob Cole, NCSC



Unmanned testing by the Hydrospace Laboratory expedites the process of developing Navy equipment.

Nearly every piece of diver life-support equipment being developed for the Fleet today is first tested at the Hydrospace Laboratory. The Laboratory is unique in that computer technology is utilized to automate testing, thus removing variables induced by the human factor. This computer technology also allows dynamic analysis of the diving system, identifying problem areas for corrective action prior to manned testing and technical evaluation in the Fleet.

In addition to hyperbaric testing of diving equipment, the Laboratory's capabilities extend to engineering analysis, system development and support, and pure diving research as required.

Unique Capabilities

The Laboratory has the following hyperbaric test equipment:

- ☐ 4′ × 10′ hyperbaric chamber (1,000 psi)
- ☐ 3′ × 6′ hyperbaric chamber (1,500 psi)
- ☐ 2′ × 7′ hyperbaric chamber (1,000 psi)

☐ 18″ × 3′ hyperbaric chamber (1,000 psi)

☐ Supporting environmental control and metabolic simulation systems.

The nucleus of the Laboratory is the central control panel featuring a computer control/data acquisition system conceived and developed by Hydrospace Laboratory personnel. The system is continually upgraded as tests require, or as technical advancements can be incorporated. Analytic and data processing capabilities are centered around two Hewlett-Packard 3052 Systems. Complete, real-time data is collected on parameters such as depth, flow rates, canister pressure drop, nozzle and helmet pressures, respiratory minute volume (RMV), tidal volume, and diver work rates.

An example of computer automation is the breathing machine, a simple piston pump with adjustable speed and stroke, made "smart" by the computer. It is automatically calibrated at each depth, and when commanded to set a certain respiratory minute volume, locates and sets the proper breathing rate and tidal volume.

Interfaced to the computer are various CRT's, printers, spectrum analyzers, plotters, and a graphics tablet that enhances the Laboratory's test and data documentation capability by generating finished sketches of test set-ups, tabular data, and graphic plots. All tests are automated, stored, and can be referred to or repeated at any time in the future.

NEDU's Army Liaison Engineer has been a believer in the value of the Hydrospace Laboratory since his involvement with the early development phase of the MK 12 SSDS in the mid 1970's. "This kind of data analysis can't be found any place else – to tie down to the millisecond and look at a diving system and see what's happening around any component, a non-return valve, for instance. It's amazing, and we are developing new test techniques continuously."

G.W. "Charlie" Noble (right) and Bob Carter at the central control panel of NCSC's Hydrospace Laboratory in Panama City, Florida.

Lab's Central Role

"The computer interface is what's really valuable," notes an NCSC engineer. "The data acquisition system not only gathers data, but processes it and turns out the kinds of numbers that normally require hours and hours of crunching. It doesn't just read and record sensor voltages.

"The thing I've noticed," adds the engineer, "is that once we get to the test phase of a piece of life-support gear, everything seems to center here, around the unmanned testing. The Lab has shortened the development cycle, and we are getting ideas from the tests themselves as to what we can do in the development of new equipment."

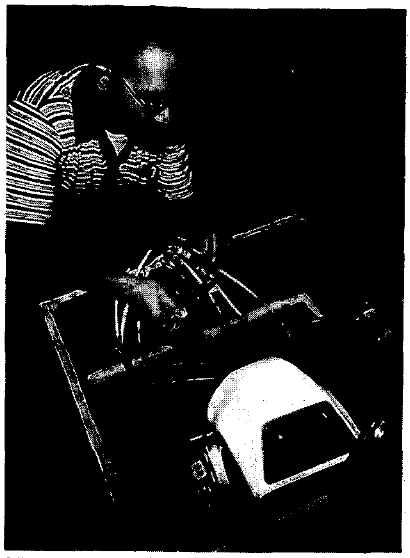
The Hydrospace Laboratory had its beginning at NCSC 15 years ago, when NCSC was tasked to undertake some Navy swimmer delivery vehicle instrumentation tests. They had a single chamber and little test equipment. Later, a requirement to test an environmental control system for a personnel transfer capsule pointed out the need for expansion and improved equipment. Soon, the Hydrospace Laboratory's growth and the growth of diving programs at NCSC were going hand-in-hand, complementing each other and dependent upon one another.

The MK 12 SSDS development program in the mid 1970's was the impetus for the Laboratory's later growth. The laboratory was soon testing everything from simple supply valves to total saturation life-support systems.

The Laboratory has had a total involvement with the MK 14 CCSDS, as well as with the Diver Thermal Protection Program, at NCSC. Although primarily involved with mixed-gas system testing, the Laboratory also takes on occasional scuba equipment tests and even physiological tests.

Fleet Divers . . . and Dollars

The Laboratory is tied to NEDU's Ocean Simulation Facility chambers, pool, and medical deck by fiber-optics cables. During manned dives, data is obtained in the same format as in unmanned testing



Vic Turner makes adjustments to helmet test set-up.

through these fiber-optic links and forms a library of manned data that is used to improve and validate unmanned simulation techniques.

"The primary beneficiary of the work being done at the Laboratory is the Fleet diver," says an NCSC project officer. "System certification for Fleet usage is a tedious process. The Lab expedites it in the development stage through complete system engineering analysis. This way, there's less redesign to do, as we can isolate and eliminate some of the problem areas before the equipment enters the manned testing phase."

Mathematical models based on inputs from unmanned and manned test data are also being developed to help identify effects of diving system modifications, and to shorten unmanned test cycles.

"The time saved in unmanned testing can't be measured in dollars any more," says the project officer. "Eight years ago, it would take two months to conduct a test that takes just two hours to run today.

"Of course, the human side has to come into our testing, as machines do not perfectly reproduce human physiological parameters. It's a dynamic process. Man is always the final loop in the testing of life-support systems."

The Laboratory gives the Navy the capability of testing life-support equipment which are in the research and development phases, as well as those systems already in the Fleet.

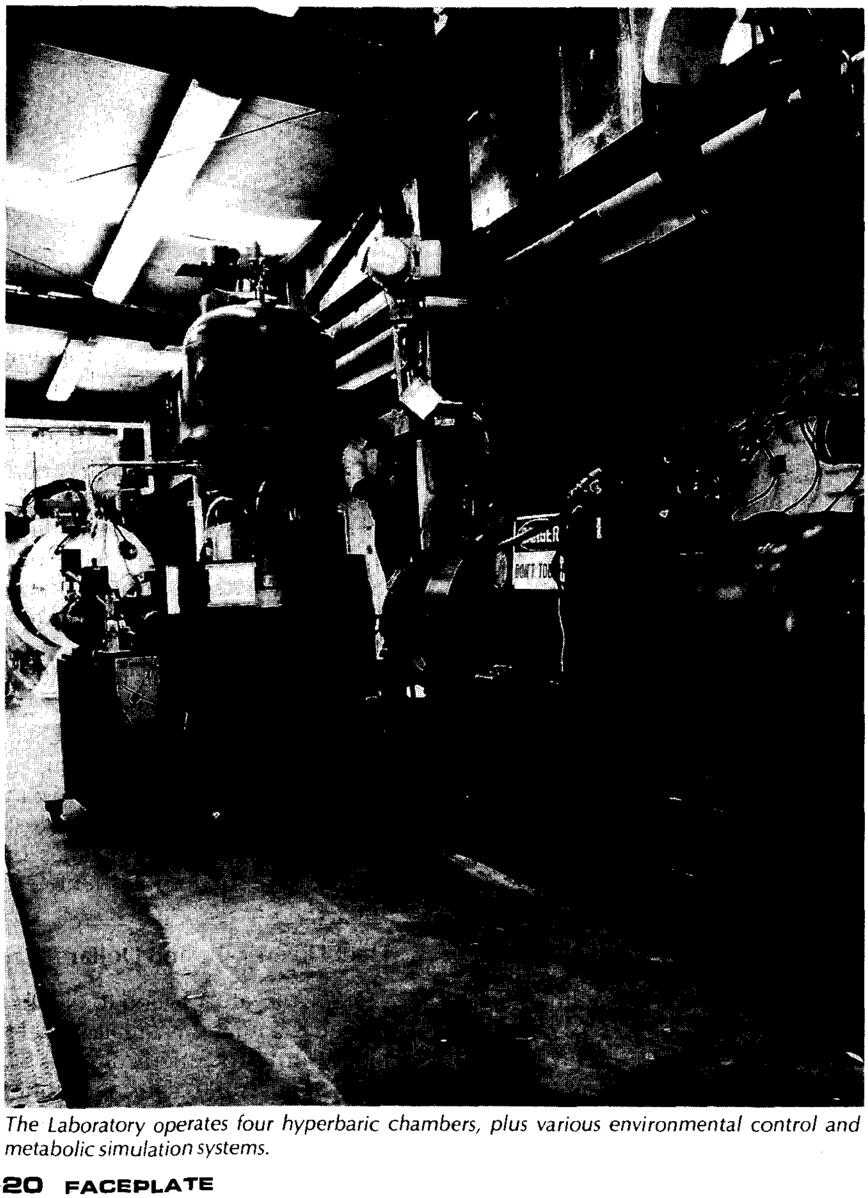
"Divers do not have to be endangered or subjected to physical discomfort for these kinds of tests," says a Hydrospace Laboratory staff member. "The Lab has sensors and instrumentation that can do it now. You don't have to spend hundreds of thousands of dollars on preliminary manned testing."

State-of-the-Art

The Laboratory staff sees their most significant achievement not in terms of a single test or equipment breakthrough, but as the development of the Hydrospace Laboratory itself.

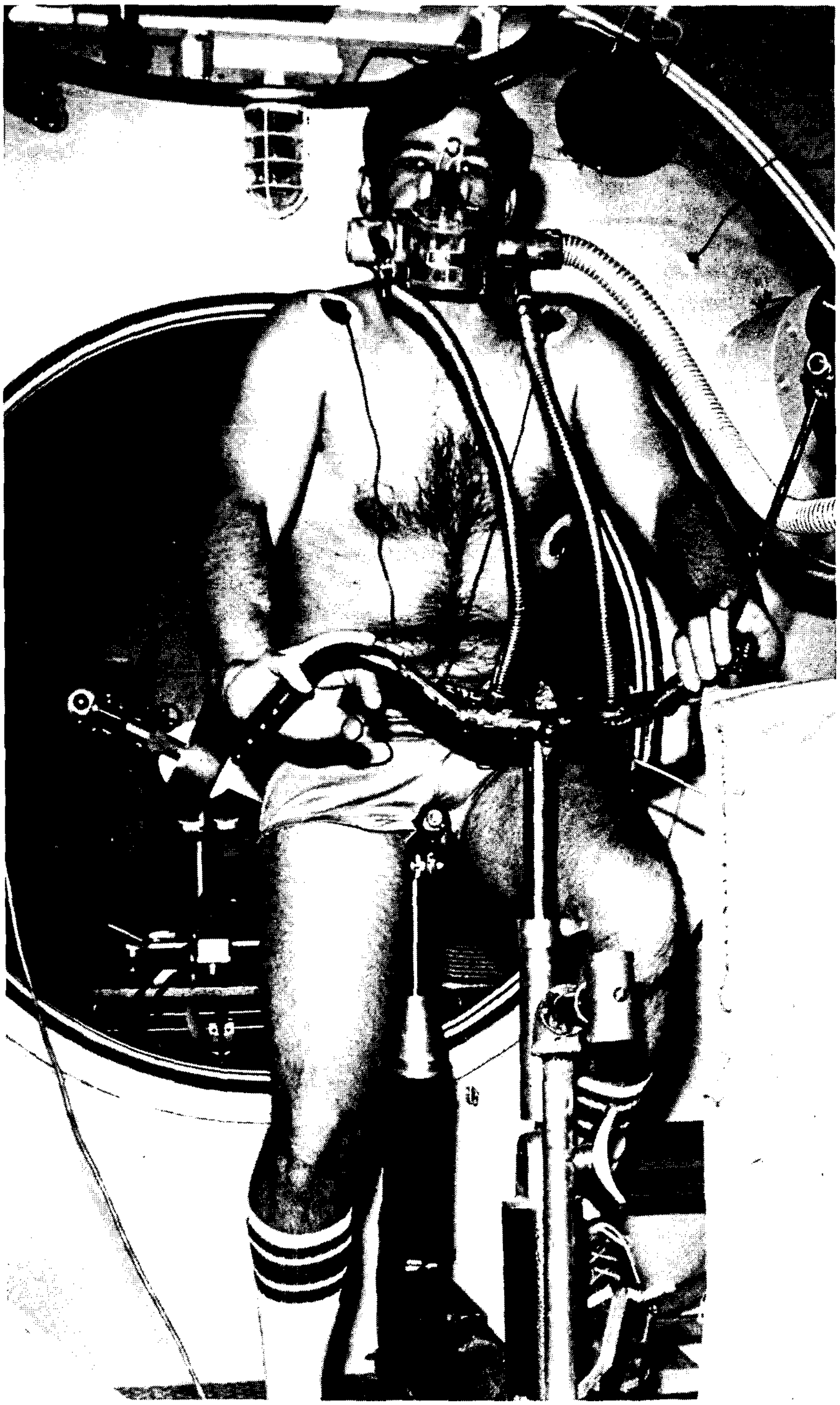
"We've had the benefit of invaluable inputs," notes another of the staff. "The engineering talent at NCSC is some of the best in the diving world and this talent has been available to advise us at any and all times.

"We strive to remain state-of-the-art in test equipment and to remain flexible in our test techniques. As new sensors and instrumentation become available that increases our capability, they are obtained. New algorithms and techniques are continuously evaluated and incorporated into our test programs."



The Laboratory operates four hyperbaric chambers, plus various environmental control and metabolic simulation systems.

Hyperbaric Research at the Naval Submarine Medical Research Laboratory



Tests of pulmonary function and exercise tolerance are an integral part of the NSMRL's saturation diving experiments.

LCDR R. G. Eckenhoff, MC, USNR
Naval Submarine Medical Research Laboratory
New London, Connecticut

From the original submarine escape studies, when the cause of air embolism was determined, to the pioneering work in saturation diving in the early sixties, the Naval Submarine Medical Research Laboratory (NSMRL) has had a long history of performing operationally relevant diving research. This tradition remains strong in the current hyperbaric research program, which is directed primarily at answering questions that exist in the submarine rescue field. Many of the conclusions reached as a result of NSMRL's studies have been incorporated directly into U.S. Navy submarine rescue procedures and equipment.

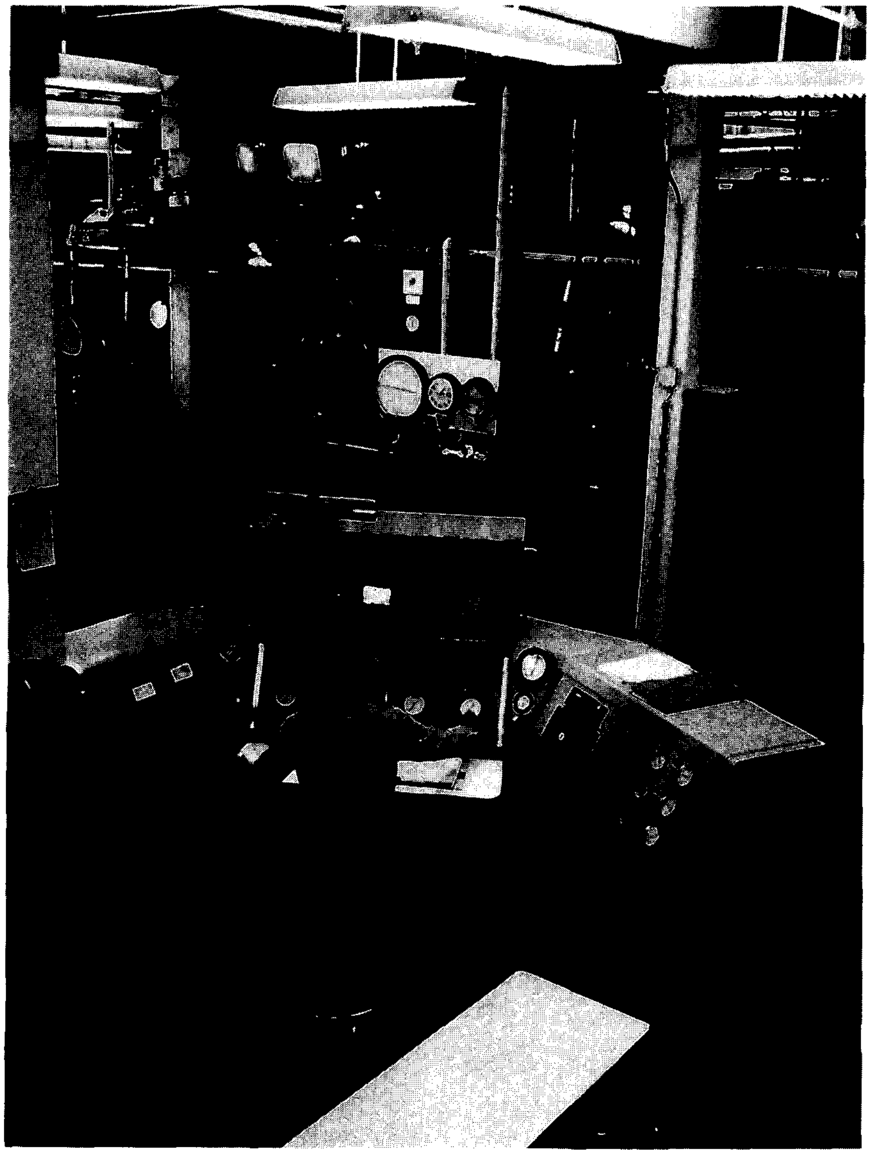
When One Sinks . . .

The connection between submarine rescue and the saturation dives performed at NSMRL may not be immediately apparent. It is simply that any casualty sufficient to sink a submarine will, in all probability, cause compression of the submarine's atmosphere (due to flooding, high-pressure air leaks, salvage air pressurization, or emergency air breathing system exhaust). This, coupled with a Deep Submergence Rescue Vehicle (DSRV) requiring at least 24 hours to arrive on the scene, would make the submariners a crew of saturation divers with air as the breathing media. It is important to realize that, although the submarine may be resting in 1,000 feet of seawater (fsw), the internal pressure could be much less, depending on the source of pressurization, the control of leaking, and the rapidity of watertight door closure.

While the DSRV can perform a successful rescue under these conditions (up to submarine internal pressures of five atmospheres absolute), several problems exist. First, the U.S. Navy has no established decompression schedules for saturation on air; second, the submarine crew may have significant medical problems as a result of the high partial pressure of oxygen in hyperbaric air, atmospheric contamination, or hypothermia: These problems are currently the subject of rigorous investigation at NSMRL.

DSRV to DDC

Another problem, should the DSRV be used for a pressurized rescue, is that a transfer of the survivors from the DSRV to the deck decompression chamber (DDC) under pressure is not possible due to mating surface incompatibility. Furthermore, the DSRV cannot perform a controlled decompression itself due to valving arrangements and life support system duration. Therefore, it became important to know if a procedure similar to surface decompression could be used to effect the transfer; i.e., direct travel to sea level pressure, a brief surface interval during which the DSRV occupants rapidly transfer from the DSRV and into the DDC, and then recompression to make up for the missed decompression.



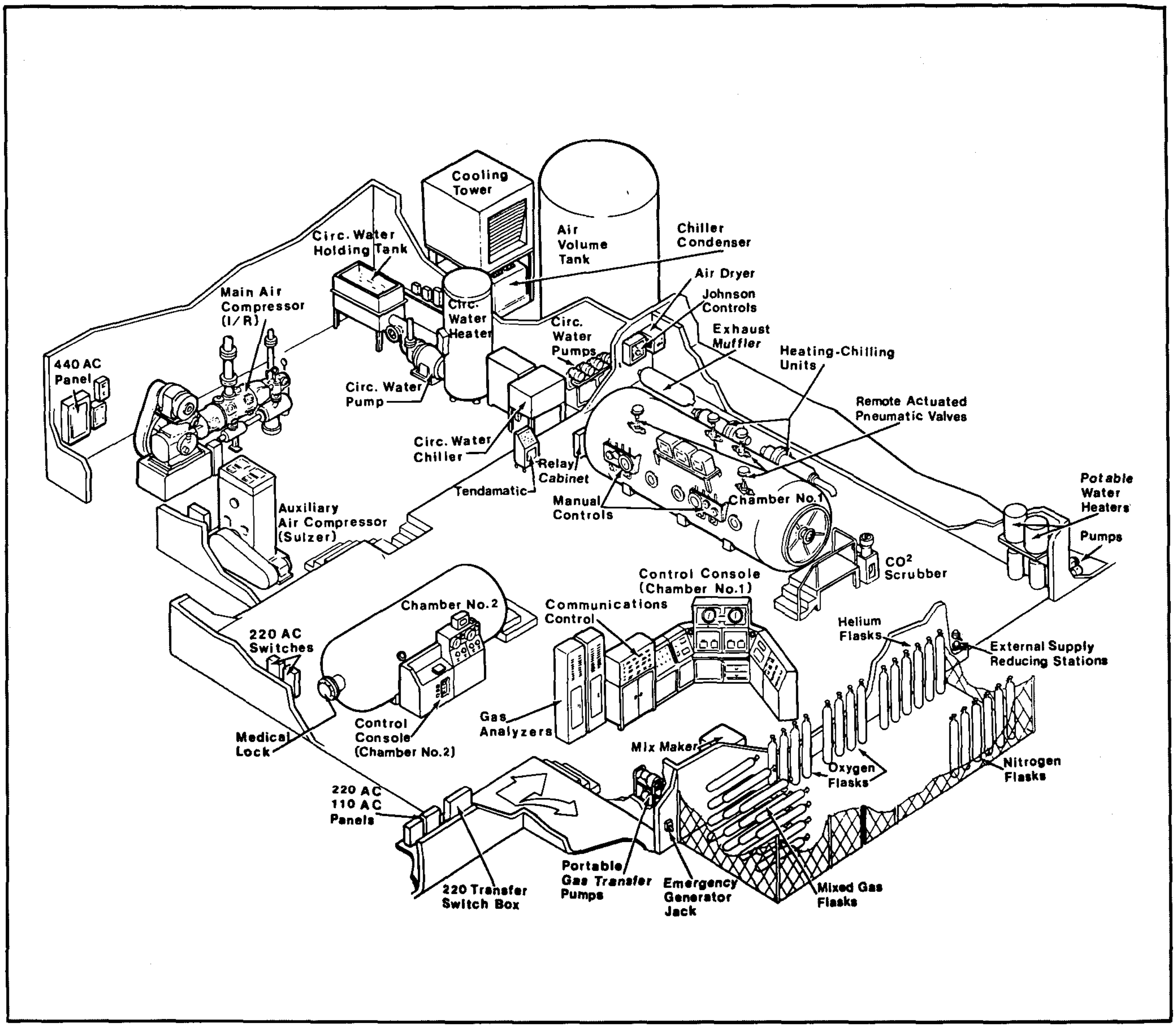
Remote monitoring and control allow complete accessibility around the NSMRL chamber.

This question was addressed at NSMRL in a series of saturation dives from May 1981 to May 1982. In these experiments, called SUREX (surface excursion), 18 active duty and reserve Navy divers were saturated on air at three different storage depths: 45, 55 and 65 fswg. A direct ascent to the surface from each depth was made for various periods of time. During these surface excursions, doppler bubble monitoring and other biomedical studies were carried out.

From these experiments, it was determined that surface decompression from air (or nitrogen/oxygen) saturation exposures is safe, and practical for use in emergency decompression procedures. But, because of the time required to transfer the design capacity of up to 24 survivors, including injured, from the DSRV to the DDC, an unpressurized transfer would only be safe when the DSRV has an internal pressure of less than about 25 psi (55 fsw equivalent). If the DSRV has an internal pressure greater than this, a capability for performing a pressurized transfer (a mating ring adaptor) would be required to prevent possible serious decompression sickness.

Environmental Simulation Facility

This and other research projects are of interest and importance to other areas of military and commercial diving as well. Decompression, oxygen toxicity, exercise tolerance, nitrogen narcosis, and the general physiological effects of hyperbaric exposures are common areas of interest and concern in all diving activities. Moreover, the study of shallow air and nitrogen-oxygen saturation/excursion diving as an operational technique may become important to the Navy in the future as helium stores are



A graphic representation of NSMRL's Environmental Simulation Facility in New London, Connecticut. NSMRL conducts an average of five saturation dives per year as part of its shallow saturation diving studies program.

depleted. This technique is already being exploited by several commercial diving companies.

The NSMRL Environmental Simulation Facility is ideally suited for these shallow saturation diving studies. The primary chamber was used by CAPT George F. Bond for the Project Genesis dives, which were the first manned helium-oxygen saturation exposures. Since then, it has been used for 27 saturation dives of varying designs. Currently, an average of five saturation dives are performed each year.

The chamber measures 9 × 25 feet and is of double-lock design. Each lock is independently operable. The chamber is large, comfortable, and extremely simple and efficient to operate, requiring only a crew of four. The depth capability is 350 fsw, and air, nitrogen-oxygen, or helium-oxygen may be used as breathing media. Oxygen, carbon dioxide, temperature, and humidity levels are monitored continuously, with automatic control of oxygen and temperature. Separate life-support loops supply each lock. Multiple penetrators for a wide array of physiological monitoring, both electrical and gas, are available. NSMRL also has a second, smaller chamber which is used as a back-up to the primary chamber for the treatment of area diving casualties, as well as for non-saturation diving research.

Although not capable of simulating and studying human tolerance to diving at very deep depths, the Naval Submarine Medical Research Laboratory is continuing to investigate the many questions and problems remaining in submarine rescue and diving to shallow or moderate depths, where 99% of all Navy diving occurs.

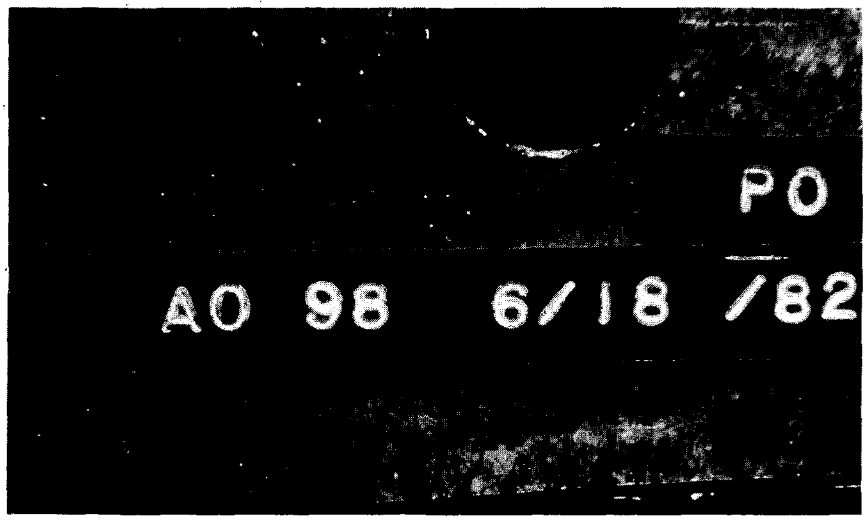
CALOOSAHATCHEE Gets Rapid Rudder Repair

Alarming Cracks in the Jumbo Oiler's Rudders Initiates an Emergency Repair in Naples, Italy

Mr. Stephen Person
Managing Editor

When the oiler USS CALOOSAHATCHEE (AO 98) was "jumbo-ized" and made 300 feet longer in the late 1960's, the ship's single rudder was replaced by huge, twin rudders, each roughly 15 feet wide and 25 feet high.

In 1976, stress-induced cracks in the rudders were noticed during a visual inspection. The cracks, four in all, were visible at the elbow of each rudder, on both the inboard and outboard sides. The cracks were repaired in 1977, and were measured and marked the following year. At that time, they ran from two to four inches in length; but, by May of 1982, they had increased to lengths of up to eight inches.



Holes were drilled at extremity of each rudder crack to halt spreading. Task team included NCSC's John Mittleman, Mike Lewis, and BUC(DV) John Bond.

NCSC Responds

As CALOOSAHATCHEE was on operational assignment with the Sixth Fleet in Naples, Italy, CTF 63 was anxious to have the rudder problem corrected. A request for immediate assistance was forwarded to the Diving and Salvage Department at the Naval Coastal Systems Center (NCSC), Panama City, Florida, on June 11.

Within two days, a three-man team was en route to Naples, having assembled a complete package of inspection and repair equipment, which included:

- ☐ An ultrasonic flaw detector
- ☐ Magnetic particle inspection equipment
- ☐ A modified UDATS light
- ☐ A ground fault interrupter
- ☐ Close-up photographic equipment
- ☐ A drill press and cobalt-steel bits
- ☐ MK 1 band masks and communications

In Naples on June 13, the team met with the Sixth Fleet Salvage Officer to plan the operation.

Magnetic Particles and Ultrasound

The NCSC team was in the water the following day for an inspection and check-out dive, despite inhospitable weather and seven-foot seas.

Over the next two days, June 15 and 16, the team methodically accomplished an array of cleaning and inspection tasks, including:

- ☐ Cosmetic grinding on the rudder surfaces at all four crack areas to allow a visual inspection
- ☐ Conducting a magnetic particle inspection and photographing all cracks to determine if branching was occurring
- ☐ Conducting an ultrasonic test to measure rudder plate thickness
- ☐ Conducting an ultrasonic angle beam inspection to measure the depth of cracking through the rudder plates.

These tests brought basically good news; i.e., the cracks had advanced only ⅛-inch beyond what was visible to the eye; there was no branching; no significant reduction in rudder plate thickness; and only one of the cracks had completely penetrated the 1¼-inch plating.

Holes Halt Spreading

The next step was therefore to drill holes at the extremity of each crack to halt further spreading.

After rigging a drill-press alignment harness around the rudder and moving it into place at a point just beyond the end of each crack, a ¼-inch diameter pilot hole was drilled, followed by a $^9/_{16}$-inch hole, and, finally, a one-inch hole. This was followed by one more magnetic particle inspection to verify the correct positioning of the holes.

The NCSC team found itself headed for home soon thereafter, just as their jet lag had begun to fade, having economically accomplished the task in just 28 man-hours of bottom time in 17 dives.

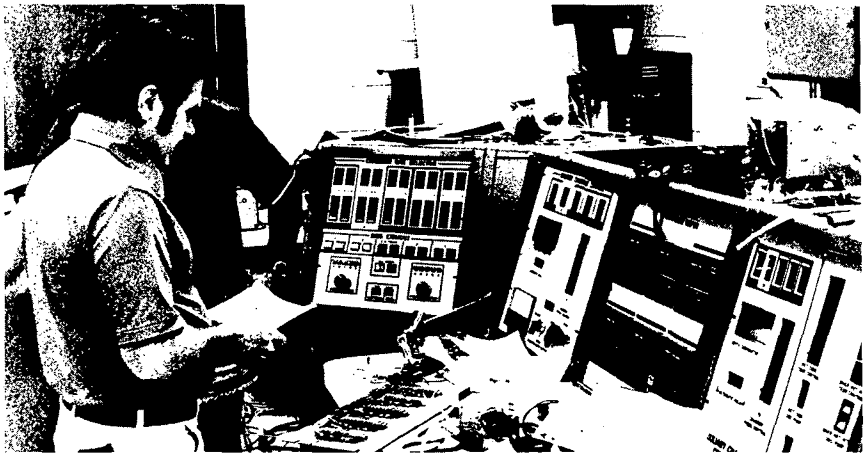
Control Room Upgraded at NEDU's Ocean Simulation Facility

Massive Reconfiguration of the Hyperbaric Nerve Center Features Human Engineering Advancements and is Accomplished Entirely by the Command's Engineers and Technicians

Mr. Stephen Person
Managing Editor

The Ocean Simulation Facility (OSF) at the Navy Experimental Diving Unit (NEDU) is recognized as the world's largest and most advanced hyperbaric facility for manned experimental diving. Since its completion in 1973, this large facility has been the site of a wide range of advanced diving equipment tests, medical tests, and numerous deep saturation dives, including the historic Deep Dive '79 to a depth pressure equivalent of 1,800 feet of seawater.

For a two-month period this past summer, however, the rigorous test schedule was quiet—the huge facility was shut down and NEDU's hyperbaric engineering staff of civilian engineers teamed with the highly skilled Navy technicians to design and complete a massive overhaul of the OSF.



Reconfiguration of the OSF control room was accomplished in just two months by an all-NEDU team.

Striking Changes

The most striking changes were made in the control room and the life support loops. The dive control console was redesignated to remove defunct systems, consolidate controls, upgrade with state-of-the-art equipment, and most importantly, incorporate human engineering in all designs. The new dive control console incorporates the key functions of the chamber operator and the life support operator in a fraction of the space of the previous console.

Primary space-saving factors were the consolidation of controls, and the use of digital depth gauges and digital temperature gauges. The respective controls for each of the chambers were color-coded, a change that will greatly simplify system operation, as well as training.

To aid the design effort and incorporate human engineering, the engineering staff built a complete mock-up of the new console and allowed everyone to provide inputs. The final design was a direct product of all the best ideas. To complement the new dive control console, improvements were also made to the supervisor's console and the gas analysis console.

The other major modification to the OSF was the installation of new life-support blowers. These magnetically coupled centrifugal blowers move 100 CFM of gas within the chambers. The maintenance required of these blowers is considerably less than that of the other blowers.

Operations Continue

In addition to the redesign efforts, other equipment received much needed overhaul and maintenance. A two-month lull in NEDU's schedule is a rare occurrence, and full advantage was taken of this period.

An effort of this magnitude could easily have taken six months. That it was accomplished in a short two months from initial start to the final test and successful recertification with the NAVFAC System Certification Authority is due to the high motivation of NEDU's technicians.

"Everyone involved had an extremely close feeling toward the entire modification because it was designed and built by the users and not by an outside agency," said NEDU Commanding Officer CDR Bob Bornholdt.

"When the last wire was soldered and the last nut was tightened, the pushbuttons were depressed and the entire hyperbaric complex worked perfectly, and that is a credit to my highly skilled staff," CDR Bornholdt said.

Despite the upheaval to the system during the actual reconfiguration process, NEDU's diving program scarcely missed a beat. Recertification of the system was granted on July 27, followed by a successful experimental dive series to validate tables for the MK 16 UBA just one week later.

NDSTC Course Offerings

– Fiscal Year 1983 –

Following is a schedule of classes to be offered by the Naval Diving and Salvage Training Center, Panama City, Florida, for those Fleet personnel considering attendance at one of the courses during the upcoming fiscal year. Some class convening dates are subject to change pending changes in course curriculum. For further information, contact: Commanding Officer, Naval Diving and Salvage Training Center, Panama City, FL 32407. Telephone: (904) 234-4651; A/V 436-4651.

ENLISTED COURSES	Class Number	Convening Date	Graduation Date	Max Per Class
Master Diver Qualification (*5 weeks*)	83001	08 OCT 82	12 NOV 82	05
	83003	14 JAN 83	18 FEB 83	05
	83005	24 MAR 83	29 APR 83	05
	83007	08 APR 83	13 MAY 83	05
	83009	03 JUN 83	08 JUL 83	05
	83011	05 AUG 83	09 SEP 83	05
	83013	23 SEP 83	28 OCT 83	05
Diver First Class (*18 weeks*)	83001	08 OCT 82	25 FEB 83	25
	83003	22 OCT 82	11 MAR 83	25
	83005	14 JAN 83	20 MAY 83	25
	83007	11 MAR 83	15 JUL 83	25
	83009	01 APR 83	05 AUG 83	25
	83011	13 MAY 83	16 SEP 83	25
	83013	01 JUL 83	04 NOV 83	25
	83015	23 SEP 83	10 FEB 84	25
Diver Second Class (*12 weeks*)	83001	01 OCT 82	07 JAN 83	25
	83009	04 FEB 83	29 APR 83	25
	83013	22 APR 83	15 JUL 83	25
	83017	29 JUL 83	21 OCT 83	25
Medical Deep Sea Diving Technician (*11 weeks*)	83001	07 JAN 83	25 MAR 83	20
	83003	29 JUL 83	14 OCT 83	20
Scuba (*4 weeks*)	83001	29 OCT 82	26 NOV 82	25
	83005	04 MAR 83	01 APR 83	25
	83009	15 JUL 83	12 AUG 83	25
	83011	09 SEP 83	07 OCT 83	25
OFFICER COURSES				
Basic Diving Officer (*13 weeks*)	83001	15 OCT 82	28 JAN 83	25
	83003	18 FEB 83	20 MAY 83	25
	83005	15 APR 83	15 JUL 83	25
	83007	10 JUN 83	09 SEP 83	25
	83009	12 AUG 83	11 NOV 83	25
Ship Salvage Diving Officer (*5 weeks*)	83001	28 JAN 83	04 MAR 83	25
	83003	20 MAY 83	24 JUN 83	25
	83005	15 JUL 83	19 AUG 83	25
	84001	11 NOV 83	16 DEC 83	25
Deep Sea/HeO_2 Diving Officer (*10 weeks*)	83001	25 FEB 83	04 MAY 83	20
	83003	12 AUG 83	19 OCT 83	20
Medical Department Diving Officer (*9 weeks*)	83001	11 MAR 83	13 MAY 83	20
	83003	09 SEP 83	11 NOV 83	20
Recognition & Treatment of Diving Casualties (*1 week*)	83001	04 FEB 83	11 FEB 83	25
	83003	15 JUL 83	22 JUL 83	25

The Old Master

Letter from NEDU

The Navy Experimental Diving Unit (NEDU) mission and its assigned diving duties are often not understood by Fleet divers.

The image of NEDU is confused by the memories of divers having undergone training at the old Naval School, Diving and Salvage in Washington, and recalling a few sailors who had engaged in some saturation dives in antiquated chambers, but certainly not conjuring a memory of action and excitement as most divers would prefer.

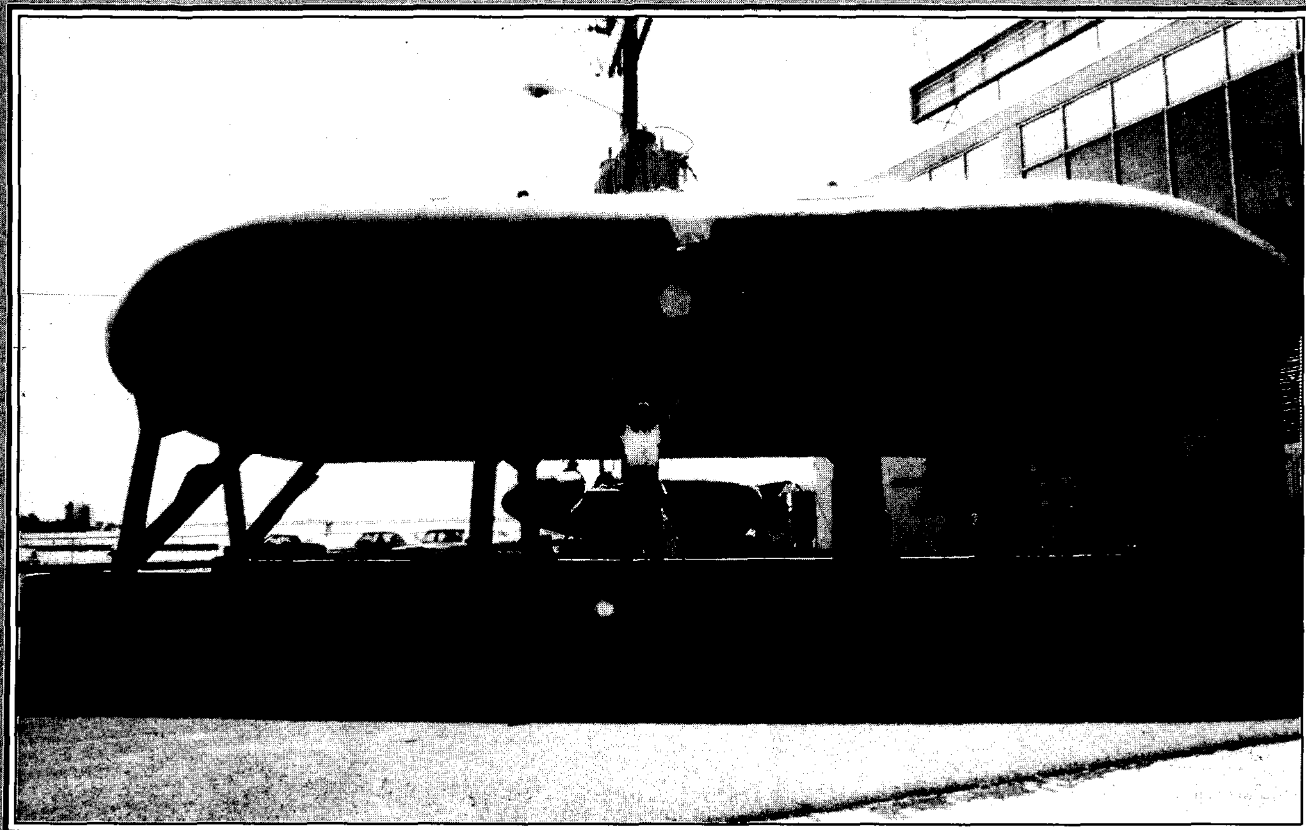
NEDU with the Ocean Simulation Facility, is the most modern hyperbaric facility in the world; operating and maintaining it is a complex matter and requires the maximum effort of all diving personnel. During the past year, we have conducted approximately 1,300 man-dives, including: 28-day saturation dives at 1,000 fsw; many five-hour-duration HeO_2 dives at 300 fsw for table validation of bounce dives; and numerous closed-circuit O_2 UBA dives to 45 fsw.

As a shore-based activity, we get plenty of in-water time. Although we are located in sunny Florida, some of our tests are conducted in 35°F water, far from the light of day.

NEDU is here to support the Fleet divers. The medical staff is available 24 hours a day, seven days a week, for consultation on any diving accident or treatment of decompression sickness. There are personnel assigned to NEDU from all areas of Navy diving who are specialists in each piece of approved equipment. If anyone has a question about a piece of diving equipment or procedure, a phone call or letter to NEDU will usually provide an answer, or we can tell you who to contact.

Working with the Naval Sea Systems Command, we perform test and evaluation on diving equipment/systems—both military equipment and units on the commercial market—that show military potential. We work hard on providing the best equipment for the Navy, and our test and evaluation standards are recognized throughout the industry.

NEDU is always looking for good divers to join the team. If you are ready to get wet and work hard, assignment to NEDU might be just what you are looking for. Check with your detailer; we may have a billet open for you. You may reach NEDU by dialing A/V 436-4351, or (904) 234-4351.



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