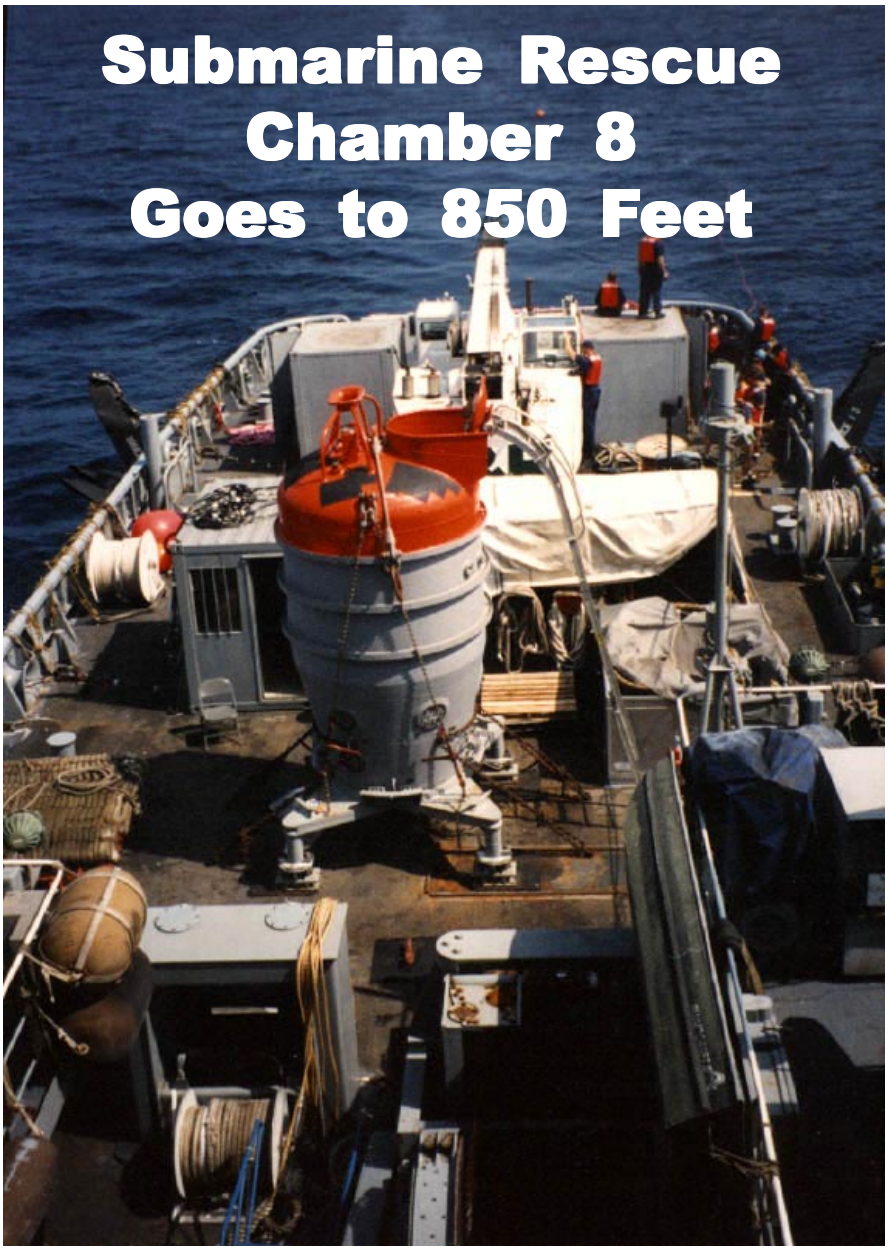
"One Man's War" (see page 14)

FACEPLATE

The Official Newsletter for the Divers and Salvors of the United States Navy
Volume 3, No. 3 / Summer 1998

Submarine Rescue Chamber 8 Goes to 850 Feet



SRC 8 on board the USNS NAVAJO awaiting the certification dive. Diving Systems Support Detachment conducted the sea trials after SRC 8 completed a major overhaul *(see full story on page 3).*

In This Issue

SUPSALV Sends

In this issue of FACEPLATE there is a common theme that is important to note. The theme central to many of the articles is the importance of properly following procedures. The procedures that we use in diving have been learned and developed through years of experience.

The requirement for a standby diver ready to deploy cannot be better highlighted than in the story on BUC Becker's heroic efforts off Fort Story. Correctly following procedures is also what MDV Sturms talks about in providing insight into what it takes to become a MDV. Core values and proper procedures guided the career and life of MDV Sheats.

Although divers need to be innovative and able to think quickly on their feet, the importance of a deep understanding in the fundamentals including following procedures cannot be overemphasized.

In the Navy and our sister services, we have enjoyed an

(continued on page 2)

FACEPLATE is published by the Supervisor of Salvage and Diving to bring the latest and most informative news available to the Navy diving and salvage community. Discussions or illustrations of commercial products do not imply endorsement by the Supervisor of Salvage and Diving or the U.S. Navy.

Articles, letters, queries and comments should be directed to the Commander, Naval Sea Systems Command, NAVSEA 00C, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160. (Attn: FACEPLATE). Visit our website at **http:/www.navsea.navy.mil/sea00c.**

Captain R. S. McCord, USN
Director of Ocean Engineering
Supervisor of Salvage and Diving
NAVSEA 00C

Jim Bladh
Head, Operations Branch, 00C22
Managing Editor

HTCM(MDV) Michael Washington, USN
Fleet Liaison Editor

Judy Kvedar
Production Editor

Phillip Coons
Graphic Designer

SUPSALV SENDS *(from page 1)*

impressive safety record over the past few years in our diving operations. These operations have included some of the most dangerous and challenging operations the Navy has ever encountered. The successful and safe diving record is due in great part to using proven procedures that minimize danger to the diver.

Remember, plan your dive and dive your plan.

CAPT R. S. McCord
Director of Ocean Engineering
Supervisor of Salvage and Diving

INTERNET: MCCORD_RAYMOND_S@hq.navsea.navy.mil

PMS Corner

"Service to the Fleet"

The Navy Experimental Diving Unit (NEDU), located in Panama City Florida, has been tasked by NAVSEA 00C3 with responsibility of processing diving-related Fleet Technical Feedback Reports (TFBR's). This encompasses over 140 line items of equipment under MIP 5921 and MIP H-012. All requests should still be processed through normal channels.

NEDU point of contact for TFBR related issues is BMCS/DV Kerry Duffey, at (850) 230-3162. NAVSEA point of contact for all diving related PMS issues is NAVSEA 00C36 BMCM(SS/MDV) Paul McMurtrie at (703) 607-2766.

Submarine Rescue Chamber 8 Goes to 850 Feet

by LT Brian Neill

After more than fifty years, the Submarine Rescue Chamber (SRC) is the Navy's oldest means of rescuing personnel from disabled submarines. Today's chambers are not all that different from the McCann-Erickson bell that rescued 33 sailors from USS *Squalus*, which became disabled at 243 feet on 25 May 1939.

Diving Systems Support Detachment (DSSD), with 30 First and Second Class Divers, maintains and operates the SRC Flyaway System. The system contains SRC-8 and SRC-21, nine air banks, three 6R80 High Pressure Air Compressors (HPACs), an air control console, two generators, 1300-foot umbilical, four-point mooring system, and 24-foot Rigid Hull Inflatable Boat (RHIB). All equipment is staged at NAS North Island for mobilization on military aircraft to anywhere in the world to rescue personnel from both U.S. and foreign submarines.

In March 1998, DSSD loaded SRC-8 on USNS *Navajo* (T-ATF 169) for certification dives. SRC had just completed a three-year, $4 million-dollar overhaul at Portsmouth Naval Shipyard. This dive was the last phase of sea trials, which included shallow dives to verify operating Procedures (OPs)/Emergency Procedures (EPs) and dives to 850 feet.

The load-out started shortly after *Navajo* moored NAS North Island and secured at 2223 as DSSD secured the last shot of anchor chain to the ship's bulwark. EN1(SW/DV) Cardenas was the man with the plan. He had a lot of gear to secure on Navajo's fantail and not a lot of time to do it. Picture removing HPACs, air banks, crane, electrical generators, air control console, work boat, rigging locker, umbilicals, four-point mooring system, and SRC from an ARS, securing it on the stern of a T-ATF, and leaving enough deck space to dive and recover a four-point moor.

Upon arriving at the dive site, approximately 4 NM east of Santa Catalina Island, DSSD surveyed the bottom, looking for a relatively flat spot 850 feet below the surface. DSSD moored the Navajo using a four-point mooring system designed at DSSD and approved by NAVSEA. The Lightweight Mooring System consists of four 3400-pound Bruce anchors, six shots

(continued on page 4)

BM2(DV) Rich Parkllan recovers a 3,400-pound Bruce Anchor and chain.

View through the SRC-8 upper hatch: EN1(SW/DV) Lou Cardenas and HT2(DV) Mike Peterson install the lower hatch.

SRC-8 going up and over. Likely, the last time any SRC will see 850 fsw. The SRC is required to dive to test depth following a major overhaul.

Submarine Rescue Chamber 8 Goes to 850 Feet

(continued from page 3)

of 1 5/8-inch stud-link chain, 32,000 feet of 1¼-inch Plasma-12 line, and required jewelry. This was the first-ever use of the system in depths greater than 400 feet.

As soon as the System Certification Authority (SCA), ISIC and Portsmouth Naval Shipyard representatives arrived, HMC(FMF/DV) Molina conducted the final dive brief. QMC(SW/DV) Schleef, EN1 (SW/DV) Cardenas and SCA Reps entered the chamber, secured the upper hatch and left surface. After a two-hour descent, the false seat was insight. QMC(SW/DV) Schleef and EN1(SW/DV) Cardenas slammed a hydraulic seal at 836 fsw, squeezing the 1¾-inch square neoprene mating gasket to half its size and clanging the monel gasket retaining ring against the false seat. SRC-8 reached surface three hours later.

GMG3(DV) Ken Simpson and EM3(DV) Will Fesner load 1,300 feet of downhaul wire on to SRC-8's downhaul reel

Until 2005, when the next generation rescue system comes on line, Navy divers shall continue to use yesterday, today and tomorrow's technology to make the Submarine Rescue Chamber Flyaway System DO ANYTHING, ANYTIME, ANYWHERE, ANYHOW.

Lt Neill assumed duties as OIC, Diving Systems Support Detachment in March 1997. Prior to this he served as OIC, EODMU 8 Det. 4 and Operations Officer on USS Beaufort (ATS 2)

Navy Diver Receives Navy and Marine Corps Medal

by CUCM(SCW/MDV) Marty Hierholzer

Just how dangerous is a Navy diver's job? A lot more dangerous than most of us would probably like to admit sometimes. Every aspect of our chosen profession is scrutinized from the standpoint of safety, for both divers in the water and topside support personnel. Hours and sometimes days are spent in planning, maintaining equipment, completing checklists, and developing SOPs. Divers all receive deckplate training at dive school and then complete specialized, tailored PQS for their particular diving subspecialty. "Safety is Paramount!" is the catch-phrase for all Master Divers and Diving Supervisors. Yet, sometimes even after all this effort, the unexpected happens.

Seebee divers prepare to submerge the Single Anchor Leg Mooring Barge for deployment

That was exactly the situation at about 2300 hours on the 14th of May 1996 when air detachment Charlie from UCT ONE and UCT TWO were installing the Single Anchor Leg Mooring (SALM) in support of Exercise PURPLE STAR off of Fort Story, Virginia in the Chesapeake Bay. The divers were working out of a Mike Eight boat diving MK 21 in about 40 to 60 feet of seawater. The boat was in a four-point moor over the SALM and the two divers were completing a valve line up on the submerged system to make it "hard on the bottom" subsequent to sinking it. The SALM is a 100-foot by 200-foot barge designed to sink and serve as a mooring and transfer point for tankers pumping fuel and other petroleum products ashore in support of an amphibious assault. It has various types of hardware and piping above the deck as well as a center moor-

(continued on page 5)

Navy Diver Receives Navy and Marine Corps Medal

(continued from page 4)

ing chain of 3-inch Di-lock which holds a 50-ton mooring buoy in place for the tankers to tie up to.

Anyone who has had the experience of diving in the Chesapeake bay is familiar with the strong currents associated with tidal ebb and flood and the black, low-visibility to no-visibility water. The divers were working a window of about three hours during slack tide when currents were manageable enough to deploy divers safely. The tide was on the way in when diving started and all was progressing according to plan. Diving operations had been underway for about one and a half hours. Once slack tide had passed and the ebb began, the trouble also started. Red and Green divers were completing the valve line up and had moved out to various locations on the submerged SALM. As the ebb current increased the dive boat began to slip in its moor. Following SOP, the diving supervisor elected to abort the dive and recalled the divers to the descent line. While the divers made their way back to the descent line the situation deteriorated, as it became apparent that the upstream mooring legs had lost all holding ability and were dragging as the dive boat was being swept out to sea with the current.

The tenders had lost line pull communications with the divers because the umbilicals had become fouled on underwater obstructions as the dive boat drifted. The tenders were paying out slack on the 300-foot umbilicals to keep from potentially damaging them at the point of fouling. Both divers eventually made it back to the descent line but could not ascend or be pulled up due to umbilical fouling.

As the dive boat continued to drift and drag anchor it became apparent that none of the anchor legs were holding and soon the tenders would run out of umbilical to give the divers. At this point the situation became a Diving Supervisor's worst nightmare—divers trapped on the bottom with the dive boat dragging anchor away from the dive site. The standby diver was quickly briefed on the situation: two divers trapped on the bottom, dive boat dragging anchor, and potential for the standby to also become fouled in the mess and thereby also become a casualty. The lives of the trapped divers depended completely on his success or failure to free them in the next few minutes before the dive boat drifted beyond the length of the 300-foot umbilicals. The rest of the story is told in the following Citation that BUC Kirk Becker received:

Decks awash as divers deploy submarine hase prior to SALM submergence. The large mooring buoy deploys for depths greater than 60 fsw. The small buoy is removed as barge sinks.

The President of the United States takes pleasure in presenting the NAVY AND MARINE CORPS MEDAL to

CHIEF BUILDER (SEABEE COMBAT WARFARE/DIVER)

KIRK J. BECKER

UNITED STATES NAVY

for service as set forth in the following CITATION:

For heroism while serving at Underwater Construction Team ONE in support of joint logistics over the shore operations during Exercise PURPLE STAR on 14 and 15 May 1996. Chief Petty Officer Becker selflessly provided the quick and decisive action required to overcome life threatening circumstances and secure the safety and the lives of two divers. Demonstrating courage as a standby diver, he responded immediately, without regard for the hazardous water conditions of his own personal safety, to a call for help from two fouled divers who were in danger of being separated from their life support system when their support vessel lost anchor and began to drift. Working quickly, Chief Petty Officer Becker found the divers and freed them before the support vessel could drift off which would have parted his line as well as the two diver's lines. By his courageous and prompt actions in the face of great personal risk, Chief Petty Officer Becker prevented the loss of two lives, thereby reflecting great credit upon himself and upholding the highest traditions of the United States Naval Service.

For the President,

Jay L. Johnson

Admiral, United States Navy

Chief of Naval Operations

CUCM (SCW/MDV) Marty Hierholzer is currently assigned to Underwater Construction Team ONE at NAB Little Creek, VA as the Command Master Diver. He graduated Second Class Dive School in 1981 and was selected as Master Diver in 1990.

Consolidated Divers Unit

CDU dive team on main deck of USS Callaghan (DDG 994).

by CWO4 Michael Spisak

Consolidated Divers Unit has long been recognized as a leader in underwater ship's husbandry and repair. As a pioneer in the development of repairs such as shaft laminations utilizing underwater habitats, Impressed Current Cathodic Protection (ICCP) repair, and CRP blade changes, CDU has become the proving ground for prototype procedures and repair techniques. With the decommissioning of area tenders, CDU's Area of responsibility has expanded to now include the entire Southwest region of the United States. In addition, CDU has deployed divers to repair jobs as far away as Central America, Europe, and Hawaii.

CDU divers briefing the Dive Supervisor.

During a recent flyaway sonar dome repair conducted in Rodman, Panama on USS *Callaghan* (DDG 994), the repair team worked non-stop to make major structural repairs to the dome in near-zero visibility. Due to the extreme turbidity of the water in the Panama Canal region, the installation of a NAVSEA-approved fresh water canvas cofferdam was essential. As ENCS (SW/MDV) Todd Rood explained, "Without the cofferdam, the underwater epoxy would not cure correctly and the video we needed for NAVSEA would have been impossible." CDU divers completed the repairs allowing *Callaghan* to continue her deployment commitments.

The rapid deployment capability of CDU was again demonstrated when USNS *Sioux* (T-ATF 166), while towing the deactivated nuclear submarine ex-USS *New York City* (SSN 696) from Pearl Harbor, suffered a towing engine casualty 14 miles off the coast of San Diego, CA. A team consisting of eight CDU personnel arrived on site within four hours of notification. Two open-ocean scuba dives to a depth of 120 feet were made to attach a retrieval line to the weak link of the towing cable via a 10-inch hawser, thus allowing *Sioux* to disconnect her tow. As BM2 (DV) Jeff Schliem commented, "At 120 feet, when your normal operating depth is never more than 50 feet, [nitrogen] narcosis is definitely a factor. After the dive I had a hard time briefing the Supervisor because I was a little unsure where I actually had connected the hawser. When we took a strain on the [retrieval] line and the hawser came up right where it was supposed to be, we all breathed easier." As the ex-USS *New York City* was on its way to port, flanked port and starboard by San Diego harbor tugs, CDU divers remained on board

(continued on page 7)

Fresh water canvas cofferdam being lowered into the water.

Consolidated Divers Unit

(continued from page 6)

Sioux in excess of 24 hours assisting the ship's crew in retrieving 1200 feet of her towing cable from the sea.

In addition to more conventional ships husbandry tasks, CDU personnel have a long proven track record as pioneers in underwater welding and have maintained the only certified underwater welding program in the Navy. Realizing the need to have East and West Coast underwater welding capabilities, CDU coordinated an innovative underwater welder training program with the SIMA, Norfolk dive locker. Prospective underwater welders from Norfolk spent an intensive six-week training cycle in which they received comprehensive instruction on the underwater welding program techniques. The training was very successful and produced two qualified welders for SIMA, Norfolk.

A recent job involving CDU welders took them to the beautiful seaside resort town of Gaeta, Italy, homeport of the Sixth Fleet Flagship, USS *La Salle* (AGF 3). *La Salle* required CDU to weld cofferdams on her sea chests in order to facilitate internal piping removal and replacement. CDU, working in conjunction with Norfolk Naval Shipyard and Ship Repair Unit Gaeta, completed the mission with contractor-avoidance savings of $250,000.

The USS *Lewis B. Puller* (FFG 23) recently discovered a crack in the bearing of her starboard fin stabilizer requiring the replacement of the entire assembly. A waterborne fin stabilizer replacement had never been done on the West Coast. Working in collaboration with NAVSEA technical representatives, CDU divers rigged, removed and reinstalled the 8000-pound stabilizer in four days.

On March 13, 1998, CDU's Commanding Officer, LCDR Troy C. Pappas, USN ended his 29-year naval career and was relieved of command by CDR Debra A. Bodenstedt, USN. The professionalism and devotion of CDU personnel was summed up by LCDR Pappas in his retirement remarks when he said, "While others are talking about what to do, CDU divers are in the process of accomplishing the task. I have the privilege of commanding the most dedicated professionals in the diving Navy. We have encountered no task they have been unable to overcome after careful analysis and planning."

CWO4 Michael Spisak is the Repair Officer at CDU. He attended 2nd Class Dive School in 1979.

Call for Articles

A reminder to our readers: this newsletter will only survive with your help. We need your stories, both successes and failures, so that we may all benefit from your experience. Some of our most valuable information is the lessons learned from our mistakes. Remember, the person who never made a mistake most likely will never make a decision. Please send us your narrative with pictures and captions, and include the byline to be used with your article. (We will return pictures.)

In Memory

Robert Dean Workman, M.D.

A pre-eminent Navy Undersea Medical Officer of the 1950s and 60s, Captain Robert D. Workman, died on April 4 at the age of 76 in Picayune, Mississippi. Doctor Workman served two tours at the Navy Experimental Diving Unit and the Deep Sea Diving School when they were co-located in Building 214 of the Washington Navy Yard in D.C. He also served as a Submarine Squadron Medical Officer in San Diego, studied post-graduate physiology with Chris Lambertsen, and with George Bond and Walt Mazzone did much of the biomedical research of the Genesis experiments, which led to the Navy's SEALAB program.

Dr. Workman was an international authority on the calculation of diving decompression schedules. A generation of Navy Undersea Medical Officers were instructed in the Workman M Value system, and our Navy's successful very deep diving decompression was largely made possible by Dr. Workman's investigations and concepts.

At the end of his second tour at NEDU Captain Workman was ordered to the Naval Medical Research Institute in Bethesda, Maryland, to lay the groundwork for the diving medical research program there which eventually became the Behnke Hyperbaric Research Facility. He was a Founder, and the second President of the Undersea Medical Society. In 1970 he retired from the Navy and went to work in New Orleans for Taylor Diving, where he continued his interest in the development of safe deep working dive procedures and equipment. He has lived for some time after final retirement on his small Mississippi farm, a short distance east of New Orleans.

USS *Grapple* (ARS 53)

LCDR Dave Davis, Commanding Officer

by LTJG Patrick Hooper

Homeported at Naval Amphibious Base Little Creek in Virginia Beach, Virginia, USS *Grapple* (ARS 53) is one of two Navy salvage ships remaining on the East Coast. With such limited salvage assets available within a large area of operation, *Grapple* finds her time and expertise in high demand. The crew of 108 sailors and 8 officers are trained professionals in conducting such evolutions as salvage and recovery, towing, off-ship fire fighting, and beach gear operations. In addition to the usual demands placed on ships throughout the fleet, *Grapple* and her crew have been called upon to complete such challenging tasks as the search and salvage of a F/A-18 off the coast of South Carolina, the tow of the Ex-*Omaha* nuclear submarine from Portsmouth, New Hampshire, to the Panama Canal, and the historic salvage and recovery of TWA Flight 800 off the coast of Long Island.

The core of *Grapple's* success is the dive locker, comprised of 15 divers. *Grapple* recently completed a six-month Meditteranean deployment from May to October 1997, where she was an active participant in numerous multinational exercises. One highlight of this deployment was the recovery of over 30 bottom-moored mines in 100 feet of water during the mine exercise ALCUDRA off the Balearic Islands. During this exercise, *Grapple* divers conducted over 50 dives, using hand-held sonar equipment to locate the mines. Off the island of Majorca, *Grapple* assisted Navy technical representatives in in recovering four Variable Exercise Mines (VEMs).

GM2 Urban and BM2 Pirtel of Grapple's Dive Locker enjoying fruits of the 1997 Meditteranean Cruise.

Grapple also conducted a torpedo—recovery exercise in conjunction with SHAREM 121. In the role as a torpedo recovery platform, *Grapple* was able to safely and professionally recover 10 MK-46 torpedoes launched from such platforms as a submarine, an S-3 aircraft, and a P-3 aircraft. In July, *Grapple* participated in the ARIADNE mine exercise, recovering 10 of 10 mines in a single day.

During *Grapple's* port visit to La Maddalena, Sardinia, our divers recovered over 3 tons of debris from the bottom of La Maddalena Bay. *Grapple* next turned south to commence SALVEX-97 in Bizerte, Tunisia. There, our divers instructed Tunisian divers in MK 21 SSDS operations and emergency procedures, as well as the use of underwater cutting tools. Together, divers from both nations used Kerri cable to remove pieces of the superstructure of a sunken World War II tugboat obstructing one of Bizerte's piers. By the end of the exercise, a plan to fully remove the scuttled vessel had been formulated and submitted for use at a later date.

Grapple's last scheduled exercise took place in Koper, Slovenia. Acting as the ready support chamber, the dive locker provided invaluable support to embarked Explosive Ordnance Disposal Units conducting render safe procedures on World War II mines.

Additionally, *Grapple* was the focal point of a multinational diving exercise with divers from the Romanian Navy and a Partnership-for-Peace Program with the Israeli Navy.

After returning from deployment for an extensive three-month overhaul, *Grapple* and her crew were called upon to recover a Marine Corps Amphibious Assault Vehicle (AAV) that sank off the coast of North Carolina. Utilizing side-scan sonar, *Grapple* located the AAV in 40 feet of water appproximately 3 miles from shore. *Grapple* divers conducted an on-site survey and rigged a bridle that allowed *Grapple's* aft boom to safely retrieve the 31-ton AAV. Operations such as this exemplify *Grapple's* motto, ***Ready to Serve.***

Grapple's latest salvage project, a USMC AAVP-7 lost off the coast of North Carolina.

LTJG Hooper is currently the Salvage Officer onboard USS Grapple.

Diving and Salvage Challenges in Guam

by ENCS(SW/MDV) Dave Davidson

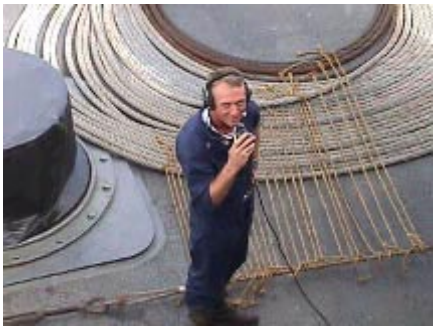
The COMNAVMARIANAS Dive Locker, formally known as the U.S. Naval Ship Repair Facility, Guam Dive Locker, is a small eight-man dive locker with large dive locker capabilities. The locker's main missions are ship husbandry, harbor salvage, and recompression therapy, with emphasis on the latter two. From 1997 to the present, the locker successfully performed over 100 recompression treatments, four major salvage operations, and numerous ship husbandry missions. Other major milestones include the 190 fsw certification of a worldwide flyaway-capable LWDS and successfully increasing the manpower to 11 enlisted billets (still waiting for bodies).

Currently under construction is a BRACON project to give the divers a new home on Navy property. The locker is presently located on Guam Shipyard. Thanks to NAVSEA and CINCPAC funding, NAVFAC is building a new RCF 6500 recompression chamber for the new dive locker. It will be fully equipped with Nitrox, HeO_2 and O_2 capabilities and comes with a 5000 PSIG air system. The locker will be ready for occupancy in August 1998 and the chamber will be installed during FY99.

COMNAVMARIANAS' worldwide flyaway—capable LWDS with 190 fsw certification.

One of the biggest undertakings of the year was the salvage following Super Typhoon Paka. The Super Typhoon hit Guam with wind gusts reported as high as 231 miles per hour. She left over a dozen craft either beached or sunk in her wake. The dive locker took the lead on the salvage and successfully salvaged all craft except one utilizing local assets. The USS *Salvor* salvaged the final beached craft during her brief visit to Guam. Team Salvor was gracious enough to allow our salvors to serve aboard her for that final salvage. HOO YAH Team Salvor!

Another notable event was the removal of 14,200 gallons of diesel fuel from a capsized cargo vessel off the coast of Saipan. Working with Shell Oil Company, the divers successfully pumped out the vessels fuel tanks without any spillage into the harbor. This job was an environmental emergency, which required rapid deployment and the use of scuba.



COMNAVMARIANAS' EN2(DV) Sanger on board USS Salvor for salvage operation.

The COMNAVMAR Dive Locker answers all salvage requests, in or out of water. After the tragic plane crash of KAL 801, divers were requested to cut open the 747 wings to allow EOD to make a demolition plan. Utilizing Keri Cable, sections of the wings were cut open to allow access to its structural design.

DC1(SW/DV) Duncan and BM2(DV) Poulin await guidance during the defueling operation off Saipan.

EN2(DV) Sanger passes the Keri Cable torch to MDV Davidson during the KAL 801 salvage.

The COMNAVMAR Dive Locker is presently engaged in the largest salvage operation this locker has ever attempted. The salvage consists of refloating the completely submerged Inductance Power Barge (YFP-14). She is 314 feet long and 51 feet wide with a 4404-long-ton displacement. This is a big undertaking, but as always, Navy Divers will prevail.

The future of the COMNAVMAR Dive Locker is very bright. If all goes as planned, the locker will be under the command of MDSU ONE in FY99. The locker's new name will be MDSU ONE Det WESTPAC. It will consist of approximately 27 personnel and will perform its current mission as well as salvage operations throughout the Pacific arena.

ENCS(SW/MDV Dave Davidson is the Commander, U.S. Naval Forces, Marianas Master Diver.

The Beginning of Underwater Photography

By Arthur J. Bachrach, Ph.D.

William Thompson, a Briton born in 1822, was a solicitor by profession and a highly skilled amateur naturalist, particularly in marine biology, by avocation. One stormy day in 1856, Thompson and a friend were stranded at the Portland Ferry Bridge House in Weymouth. While facing the bridge, Thompson pondered on how strong a force the water exerted on the bridge pilings and imagined the extensive damage such force might effect. He also wondered about the difficulties and costs of sending a diver down to inspect the bridge and assess the damage.

It occurred to Thompson that a camera might be an effective means of documenting underwater events and objects. Because of his strong interest in natural history, Thompson already owned a fine camera. He asked a carpenter to build a box for him in which to house his camera so that he might use it underwater. The front of the box was made of plate glass. On the outside was a heavily leaded wooden shutter, which could be raised or lowered by a long string attached to it. Thumbscrews were placed at the back to secure it so that the box would be watertight when the camera was placed inside. Padding against the inner surface of the box added to the waterproofing. The box was placed on an iron tripod, with a rope to lower it and raise it.

Thompson's camera took a plate measuring 5 inches by 4 inches, which he prepared using the collodion process. In correspondence to the Society of Arts, published in their *Journal* on May 9, 1856, entitled "On Taking Photographic Images Under Water," Thompson wrote:

> The first thing to be accomplished is to focus the camera… The camera is placed in the box on the shore, and a view is focussed, taking as the foreground an object ten yards distance.

Using a triangular wooden frame forced up into the legs of the tripod, tied to the top of the tripod, the camera was secured, so that it was exactly at the same height from the ground as it was when focussed, with the same focus distance. In his *Journal of the Society of Arts* correspondence, Thompson observes that, given this stability of focus and height, "… it stands to reason that, provided the optical and chemical properties are the same, we shall obtain a similarly good picture" in the sea as on the land.

Thompson's next step was to prepare the plate, which he did with collodion, then take the plate to the camera, to the box and stand, already prepared. He then threw a black cloth over the assembled parts. He writes:

> I then examine the shutter in front of the camera to see that it is tight; then, uncapping the camera under the cloth, I place it in the box, and finally draw up the slide.

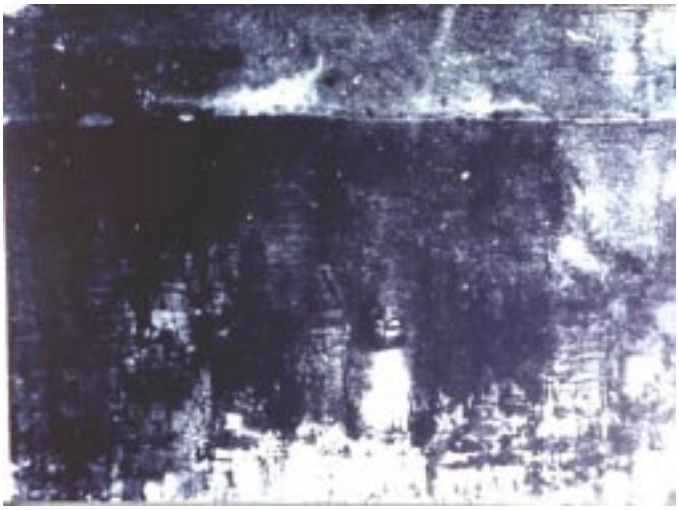
Thompson then pushed the camera completely into the box until the lens pressed tightly against the glass at the front of the box, screwing the back on tightly. All of these preparations were done on land, largely under a tent for protection. The whole assemblage of equipment was then lashed to the stern of the boat, sailed out to the point of photography, and lowered into the water. Thompson continues,

> By means of the lowering rope we can find when the camera is upright at the bottom. When satisfied on this point, we raise the shutter in front of the camera box, by means of the string attached to it and the other end of which communicates with the boat.

The camera was now ready to take its first photograph. Thompson exposed his first image for five minutes, with no results. His second trial was an exposure for ten minutes and produced the image shown on this page.

He found his camera flooded with salt water, despite all the efforts to make it watertight. He attributed the flooding to the pressure and, as he remarks, "despaired of having obtained a view." But washing the plate with fresh water and

(continued on page 11)



William Thompson's 1856 photograph of a nook in Weymouth Bay.

The Beginning of Underwater Photography

(continued from page 11)

dipping it in the silver bath for an instant proved that the salt water was not injurious to the plate. The image he took was of a nook in Weymouth Bay, with a ridge of rocks, sand and boulders, at 5.5 meters.

Thompson's communication to the *Journal* concludes with his comment that,

> This application of photography may prove of incalculable benefit to science… Should a pier require to be examined, you have but to suit your camera, and you will obtain a sketch of the pier… and the engineer will thus obtain far better information than he could obtain from any report made by a diver.

A German observer named Thompson "Die Wegbereiter," which translates into "a pathfinder, a breaker of new ground." Surely Thompson was that. His concept of using photography as a means of documenting underwater events has proven invaluable in recording underwater activities. Underwater photography is the single most relied upon method of documentation.

In point of fact, Thompson's first underwater photograph was, by current criteria, technically not an underwater photograph. It was, rather, a successful application of placing a camera in an environment that previously had not been penetrated for visual recording, without the human operating it actually being in the water. Thus, it might be called in modern terms a Remotely Operated Vehicle, a basic forerunner of current ROV photographic documentation operated from topside.

Nonetheless, William Thompson in all respects was indeed "Die Wegbereiter."

Dr. Bachrach is a former U.S. Navy diving researcher and scientist. The excellent help provided by Nick Baker in locating Thompson materials is gratefully acknowledged.

Supervisors of Salvage

Commodore Sullivan began to organize Navy Salvage Operations during World War II. Twenty men have held the title of SUPSALV. The former SUPSALVS have undertaken a variety of Navy assignments, business ventures and other activities. As they contributed to the development of valuable salvage services while SUPSALV, each has continued to demonstrate leadership, determination and ingenuity. They remain influential in ocean engineering, Naval architecture, salvage, diving, offshore oil drilling and other fields. The following is a list of officers who have held the position of SUPSALV:

Commander W.A. Sullivan - Dec 1941 - Nov 1942

Captain B.E. Manseau - Nov 1942 - Mar 1946

Commodore W.A. Sullivan - Mar 1946 - Apr 1948

Captain John Zabilsky - Apr 1948 - Aug 1950

Captain J.E. Flynn - Aug 1950 - Jan 1952

Commander W.M. Bjork - Jan 1952 - Jul 1954

Commander J.W. Greely - Jul 1954 - May 1957

Commander J.P. Lehan - May 1957 - Sep 1959

Commander W.L. Marshall - Sep 1959 - May 1961

Commander T.F. Bacheler - May 1961 - Oct 1964

Captain W.F. Searle, Jr. - Oct 1964 - May 1969

Captain E.B. Mitchell - May 1969 - Sep 1973

Captain J.H. Boyd, Jr. - Sep 1973 - May 1976

Captain R.B. Moss - May 1976 - Jun 1979

Commander W.N. Klorig - Jun 1979 - Sep 1979

Captain C.M. Jones - Sep 1979 - Apr 1982

Captain C.S. Maclin - Apr 1982 - Aug 1985

Captain C.A. Bartholomew - Aug 1985 - Nov 1990

Captain R.P. Fiske - Nov 1990 - Dec 1994

Captain R.S. McCord- Dec 1994 - Present

Disabled Submarine Rescue: New Possibilities

by LT Julie Maurer, LT, MC, USN

USS *Roughwater* (SSN 687) was surfaced and had just passed Sea Buoy 1, returning to homeport after an arduous two-week deployment work-up. Without warning, SS *Iron Mike*, an outbound coastal freighter, lost steering control, crossed the shipping channel and collided with *Roughwater*, holing her sail and a forward compartment. GQ was immediately sounded, and the well-trained crew responded nearly instantaneously. The collision with *Iron Mike* was too severe. During the initial damage control effort *Roughwater's* remaining intact pressure hull partially flooded, and she sank to the bottom with all hands trapped onboard, under pressure.

The Navy Experimental Diving Unit (NEDU) is currently working on a rescue protocol for exactly this scenario – safe recovery of the crew of a disabled submarine (DISSUB) with a pressurized atmosphere.

MK 18 MOD 1 EBA: Full face mask, breathing hoses, C control block with hose whip for gas supply.

Designing Engineer Kirk VanZandt wears the MK 18 MOD 1 EBA.

When a submarine dives, the internal pressure is kept at a constant one atmosphere (1 ATA), or 14.7 pounds per square inch (psi), the same as atmospheric pressure at sea level. If it becomes damaged, and internal systems flood the compartments with water or gas (oxygen, compressed air) the submarine can become a huge hyperbaric chamber. If the sailors stay in that environment for any length of time (days), they become saturation divers. Rescuing them directly to the surface is likely fatal because of decompression sickness (DCS), but the boat lacks the capacity to decompress.

The two Deep Submergence Rescue Vehicles (DSRVs) were developed to rescue disabled submarine victims and decompress them to a mother submarine (MOSUB). The decompression from a saturation exposure is lengthy, however. The choice is either delay rescue for the rest of the boat while the first group decompresses over 15-36 hours, or incur a high rate of DCS by bringing them to the surface faster than their decompression requirement.

NEDU is studying the effect of breathing 100 percent oxygen (O_2) on decompression following shallow saturation and its related toxicity. By breathing oxygen, the decompression can be shortened from days to hours, allowing the DSRV to rescue everyone in a timely manner without causing life-threatening DCS. This, at least, is the theory. The researchers are using oxygen "decompression modeling" to predict how much DCS will occur from the protocol.

What is a "decompression model?" Basically, it is a prediction based on past dives made and complex mathematical calculations. There is no way to verify the model until the experiment is performed, which entails some risk to the subjects involved in the study.

(continued on page 13)

HTC Pyle blows into the PFT machine.

Disabled Submarine Rescue: New Possibilities

(continued from page 12)

What is the study? NEDU is performing saturation dives to shallow depths, simulating pressurization of a submarine. After three days at a shallow depth (30 – 60 (fsw) the subjects decompress to 15 fsw on 100 percent O_2 over several hours. Once their 15 fsw stop is finished, they breathe chamber air and decompress to the surface. They are monitored for 18 hours afterward for signs and symptoms of DCS.

The dives are done in the Grand Hilton of chambers, the Ocean Simulation Facility (OSF) at NEDU. This hyperbaric complex has five "rooms" or chambers, each with the ability to seal off from the rest and change depth and atmosphere. It has eight bunks with two heads, two showers, five medical locks, and enough space for an average size person to stand upright. The divers are compressed Monday morning, and stay on the bottom for three days. Because the experimental part is the decompression and follow-on testing, the divers have no work to do on the bottom; movies, mattresses, and meals are the rule for 72 hours.

On Thursday morning they move into Bravo chamber for decompression. The MK 18 MOD 1 emergency breathing apparatus (EBA) provides greater than 95 percent humidified oxygen to the divers via the built in breathing system (BIBS). This system was originally designed for contaminated saturation environments to deliver helium-oxygen (heliox) to the divers. It has a full face mask (FFM) which seals well and protects eyes and facial skin. The subjects breathe oxygen for some hours, based on depth, and are completely inactive for the duration of decompression. There are air breaks every two hours. After the decompression the divers undergo extensive testing.

Dive team awaits medical check.

The postdive testing involves blood drawing, echocardiography, and pulmonary function testing. Blood is tested for red and white cell count and volume. Echocardiography is a technique whereby sound waves are sent to the heart with a probe and create a picture on a monitor, similar to an ultrasound of a pregnant woman. The picture of the heart can be watched for bubbles flowing in the bloodstream that grew from the decompression. This is a new technique that has replaced Doppler studies of bubbles in the blood. The pulmonary function tests (PFTs) measure how big the lungs are, how fast the diver can empty his lungs, and how well his lungs move gas into and out of the body (oxygen into the blood, carbon dioxide out).

The blood testing and PFTs are done to monitor oxygen toxicity. We know that oxygen is toxic under pressure – how much we can give is always the question, and what will be the effect? The shortest protocol – approximately 4 hours – is equivalent in oxygen dose to a USN Treatment Table 6 (TT6). If the decompression proves too toxic to balance the decompression sickness risk, the protocol fails.

The echos are a way to monitor offgassing. There is no good correlation between presence of bubbles visible on echo and DCS, at least not yet. One reason for the study is to better understand the connection between bubbles and DCS.

The decompression outcome is based on reported symptoms. The divers are deemed 'not bent' if their post-dive evaluation is normal and they report no symptoms after the dive.

Dive Team 6 outside the OSF after their dive.

What have we found? First, oxygen is not as effective a nitrogen wash-out as we thought, as evidenced by the eight cases of DCS suffered since the beginning of the study. The models predicted a much lower incidence of DCS, but we found that those models need some work. The worst case of DCS involved bilateral leg weakness, suggesting involvement of the spinal cord. All cases resolved completely after treatment, and the divers returned to duty.

The oxygen has shown some pulmonary toxicity, especially after treatment for DCS. Lung function is decreased after breathing oxygen after as little as 4 hours, but oxygen dosage does not predict severity of decrease. Further, the toxicity signs seem to resolve in time. More examining is being done though to draw more conclusions.

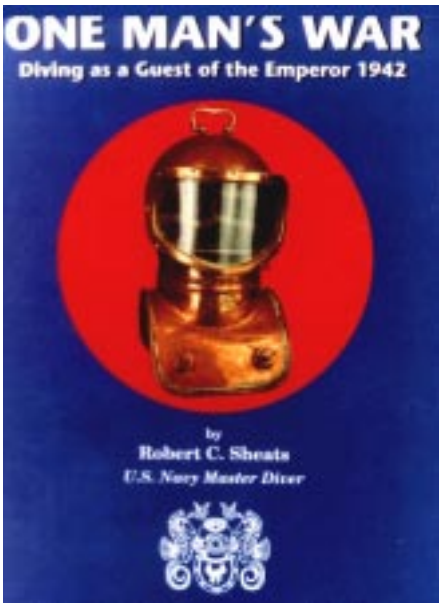
Hopefully at the end of the study there will be a working, operationally supportable safe pressurized submarine rescue protocol.

LT Maurer graduated from the Uniformed Services University, Bethesda, MD in 1994. She attended Dive School in 1996 and was assigned to NEDU as the Health Care Division Officer.

Recently Published:

One Man's War

Diving as a Guest of the Emperor 1942



Editor's Note

As Diving Officer at the Mine Defense Laboratory, Panama City, Florida, I had the privilege of diving and working with Master Diver Bob Sheats during Sea Labs One and Two. My time with Bob was relatively short compared to his many friends in the diving community, however, I do feel that I can be counted among them. Bob was a true professional and a gentleman in every sense of the word. His book, *One Man's War,* is a must read for any of you that have ever donned a diving rig. It is certainly a collector's item that would be a welcome addition to any library. The cover was designed by his wife, Margaret Sheats; the red ball with the "Morse" diving helmet signifies Bob's experiences in the Philippines as a Japanese Prisoner of War "*Diving as a Guest of the Emperor*".

— Jim Bladh

Robert Sheats survived three years and four months as a prisoner of the Japanese. During this period, he and his fellow divers developed a strategy for survival while "trying" to carry out the orders of the prison officials. Their task, which they were forced to do, was to locate and recover sunken gold and silver treasures dumped by the Navy to keep the Japanese from obtaining them.

Sheats' story of those strange and horrific days, and the dangerous "non-productive" actions taken by the Navy dive team, are based on a diary he maintained. The book is illustrated with cartoons drawn by a shipmate in the prison camp who was trying to maintain some semblance of humor.

The book details how the strategy he developed for survival instilled in him a personal code that accompanied him the rest of his life. After returning to the U.S., Sheats refused the Navy's offer of a commission and pursued his passion for diving with assignments in Washington, California, and Hawaii. During his duty at submarine escape school in Pearl Harbor, he developed a friendship with the doctor, Captain George Bond, and they became dive buddies.

It was this association that fostered the mutual respect between the two men. In 1964, Captain Bond and Cmdr. Walt Mazzone began the first of their SEALAB series of tests. As the only Master Diver assigned to the project, Sheats ran the diver's topside support system. Not one incident happened during the 200 dives he supervised.

Later, at age 50, he became a team leader on the SEALAB 2, relieving a team led by his fellow Aquanaut, Scott Carpenter. When this assignment was completed, he retired from the Navy, after serving his country for 31 distinguished years. Many of his most successful achievements as a Master Diver are also discussed in this book.

Master Diver Sheats was a respected diver and well known throughout military, scientific, and recreational diving. *Skin Diver Magazine*, America's foremost sport diving publication saluted him as "The Master of the Master Divers." His fellow Navy divers confirm this statement.

Dr. George Bond acknowledged Robert Sheats by saying "that in my opinion he is the finest man I've ever known." His fellow Aquanaut Bob Barth remembers him with a similar reverence. He has stated, "I know of no better man than my friend Bob Sheats."

Sheats fine military career and his diving ability was combined with his ethical and moral strength, and the discipline he learned early in this diving career when he witnessed first-hand the unspeakable horrors that "man can inflict on man."

He always said that his experience provided him with a deeper understanding of himself and of his relationship with his fellow man. His contributions to diving during his tenure with the Navy are said to be those of a true American diving pioneer.

From Bataan to Corregidor to Cabanatua to Hanawa Camp #3, *One Man's War* is the historic document of one of the brave Americans who kept the world from being taken over by the Japanese and the Germans.

This book, published after Robert's death by his widow, former W.A.V.E.S. Lieut., Margaret Bellerue, is available from Best Publishing Company. The cost is $14.95. Books may be ordered by fax: 520-526-0370 or phone: 800-468-1055.

The OLD MASTER

By BMCM(MDV) Dale R. Sturms

Shaping the Mold

MDV Dale R. Sturms

As divers, we are part of a unique community supporting a broad spectrum of missions throughout our Navy. How does a sailor evolve from being a freshly graduated Second Class Diver to attaining designation as a United States Navy Master Diver? Due to the missions we support, the path varies. There are, however, common traits exhibited by successful Master Diver candidates. These traits include integrity, responsibility, competence, teamwork, concern for people, patriotism, loyalty, and valor. Sound familiar? They should, because these traits comprise the most basic elements of our Navy Core Values: Honor, Courage, and Commitment.

The first and perhaps most important step for the aspiring fleet diver is to find a mentor at the first diving command. That mentor, or trusted counselor or guide, will "show you the ropes" and coach you down the road of success as an entry level diver. Your mentor will be someone you can turn to for technical, professional, or personal guidance.

As the experience base grows and competence is proven, opportunities for more challenging assignments and leadership positions will present themselves. Do not wait for the challenging jobs or demanding assignments to come to you—you must actively seek them out and make it known that YOU are the right sailor for the job. The experience, competence, and teamwork learned early in your career plays a significant role in shaping the mold for the top-of-the-line diving supervisors of tomorrow. In your quest for success within the fleet diving community, remember that you are not only a diver, but that you are a sailor and warrior first. That thought in mind should naturally guide you toward command involvement and the myriad of other qualifications essential to support the mission of your unit and our Navy.

Prerequisites for attending Master Diver Evaluation are specified in the MILPERSMAN 1410380. The Master Diver Evaluation process has undergone a significant evolution over recent years as it changed from a six-week course to a two-week evaluation. The written examination previously administered on the first day of class has been eliminated. Only one day of classroom environment exists.

As a front runner in the fleet diving community, a master diver candidate is expected to report aboard NDSTC fully qualified and prepared for evaluation. The commitment required for success truly begins years in advance of the day of reporting. Four days in the evaluation are provided as a period of time to gain familiarity with systems and a final opportunity for polish on an already brilliant leader and diving supervisor. During the final five days, candidates are evaluated on their performance through five diving scenarios. Every aspect of each scenario is weighted according to its relative criticality within the dive. Evaluation scenarios for the candidates represent real-life experiences or scenarios with a reasonable probability of occurring. Once chosen, the scenarios are carefully safeguarded against compromise. Fleet Master Divers are strongly encouraged to draft and submit proposed Master Diver Evaluation scenarios to Naval Diving and Salvage Training Center.

The Master Diver Candidate must be fully versed in all aspects of planning, operations, treatments, and execution of diving missions utilizing both air and helium-oxygen procedures. An experience base built on the foundation of integrity, responsibility, competence, teamwork, concern for people, patriotism, loyalty, and valor will yield designation as "qualified to supervise diving operations to maximum depths on board any United States Navy diving activity."

BMCM(MDV) Sturms is currently serving as Command Master Chief at Naval Diving and Salvage Training Center. Past diving assignments include SRF Guam, Submarine Development Group One, USS Sperry (AS-12), Naval Explosive Ordnance Disposal Technology Center, and USS Brunswick (ATS-3).

National Association of Fleet Tug Sailors, Inc.

Seeking former and current crew members of the Navy and Coast Guard "Workhorses" (tugs and salvage ships classified as ATF, ATA, ATR, ATO, ATS, ARS, ASR, ex-Navy WMEC, U.S. Army LT and WSA and all YT-Class ships).

National Association of Fleet Tug Sailors Ninth Annual Reunion will be held at the Hotel Galvez, Galveston, Texas November 5 thru 8 November, 1998.

Contact: George Kingston, 1611 Woodbridge Circle, East, Foley, AL 36535-2267 (334) 943-7823 for details.

DEPARTMENT OF THE NAVY
SEA 00C
NAVAL SEA SYSTEMS COMMAND
2531 JEFFERSON DAVIS HIGHWAY
ARLINGTON VA 22242-5160

Official Business