

UNDERSEA WARFARE

U.S. Submarines ... Because Stealth Matters

Summer 2001



3rd **ANNUAL** **UNDERSEA** **WARFARE** **photo contest**

**ONR Reveals Future
Naval Capabilities**

**Photo Feature:
Submarines From
a SEAL's Perspective**

**USS Tennessee Joins
Foreign Navies in
Celebrating 100 Years
of Royal Navy
Submarine History**



3rd ANNUAL UNDERSEA WARFARE photo contest

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On The Cover

The First Place winner of the 3rd Annual Undersea Warfare Photo Contest features USS *Buffalo* (SSN-715) moored in Pearl Harbor, Hawaii on July 4th, 2000, during the Centennial year of the United States Submarine Force. Photo by LT Roger Koopman, Communications Officer aboard *Buffalo*. To see more prize-winning photographs, go to page 16!

UNDERSEA WARFARE

THE OFFICIAL MAGAZINE OF THE
U.S. SUBMARINE FORCE

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UNDERSEA WARFARE is the professional magazine of the undersea warfare community. Its purpose is to educate its readers on undersea warfare missions and programs, with a particular focus on U.S. submarines. This journal will also draw upon the Submarine Force's rich historical legacy to instill a sense of pride and professionalism among community members and to enhance reader awareness of the increasing relevance of undersea warfare for our nation's defense.

The opinions and assertions herein are the personal ones of the authors and do not necessarily reflect the official views of the U.S. Government, the Department of Defense, or the Department of the Navy.

Contributions and Feedback Welcome

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Dear Readers,

Welcome to the 12th issue of UNDERSEA WARFARE Magazine. My first order of business is to offer congratulations to the winners of our 3rd Annual Photo Contest. Thanks to everyone who shared their valuable perspective on the Submarine Force with their photo submissions – they all were first rate! I also want to encourage you to continue to submit new photos and articles to my staff for possible inclusion in future issues of UNDERSEA WARFARE.

Our Submarine Force has certainly been busy around the world in support of our national security objectives. We continued to maintain our superiority in the Arctic with three different boats conducting training under the polar ice. We participated in the British Submarine Centenary. We worked with the Australians in coordinated Prospective Commanding Officer operational training. We also marked the end of an era with the decommissioning of the USS *Kamehameha*, while seeing the dawn of a new one by moving forward on TRIDENT SSGN conversion.

Looking north, I was impressed with USS *Scranton's* operations, because they reminded me that our Submarine Force dominates *all* the oceans of the world. USS *Oklahoma City*, USS *Scranton*, and USS *Connecticut*, each of different classes (SSN 688/688I/21), conducted independent testing and training, as well as some sub-on-sub exercises, to hone our skills to operate and fight in the most hostile ocean environment.

In this issue of UNDERSEA WARFARE, we join the British Submarine Force in celebrating their 100th anniversary. The articles and pictures included here tell only part of the story. Attending the festivities at the submarine base in Faslane, Scotland, along with CDR Ken Swan and his crew aboard USS *Tennessee*, I participated in many events with Admiral Skip Bowman and Vice Admiral John Grossenbacher, including a tour of a Russian *Kilo*-class submarine, where we joined in a toast to all submariners. This was truly a rare event that brought together submarines from ten nations and showed that the camaraderie of submariners transcends political borders.

Now that we've got a start on our next 100 years, the U.S. Submarine Force is working hard to make sure we know what has to be done to continue our super record generations from now. While most of you in the fleet probably consider looking one or two years into the future as looking *far* ahead, did you know there are others who are looking *way* ahead – 20 or more years into the future – to

get technologies into the fleet? The Office of Naval Research is one organization that has folks working with industry, the academic community, and laboratories such as the Naval Research Laboratory, to do just that. We all know that in some areas, technology is advancing so rapidly that if you aren't ahead, you're behind. In this issue of UNDERSEA WARFARE, you will see how ONR is working to shift some efforts to address the issues of today to *get ahead* and *stay ahead*.

On the Washington, D.C. front, the conversion of our *Ohio*-class SSBNs has been an important development. As you may have heard, funding was included in the president's Fiscal Year 2002 Budget (PB-02) to support advanced procurement and research and development for SSGN conversion. While this is only a start and doesn't necessarily guarantee money in the future, it takes SSGN out of the "good idea" stage and makes it a real program. Although much work remains before the first SSGN departs on its maiden patrol, I am optimistic about a successful outcome.

Another component of the Submarine Force that plays a major operational role in dominating the world's oceans, and whose mission was declassified only ten years ago, is the Integrated Undersea Surveillance System (IUSS). With vast fixed acoustic monitoring fields and rapidly deployable arrays for the littorals and ever-changing "hot spots," they provide the real-time cueing necessary to protect our forces from hostile submarines. In this issue we begin to tell the IUSS story with an interview of CAPT Neil Rondorf, recent Commander, Undersea Surveillance.

We know our success in the future will always be built on the successes of the past. For an historical perspective, I would like to draw your attention to Part II of the two-part series on World War II submarine operations. In contrast to Part I, this tells the tale of great victories in the Pacific, as the effectiveness of our weapons and our tactical and basic submarining skills came together through relentless perseverance, self-sacrifice, and hard work. One lesson learned is still true: your labors may not receive recognition immediately, but they will have a lasting impact on your ship's readiness. Take pride in a job well done – our forefathers did, and it definitely paid off.

RADM Paul F. Sullivan, USN
Director, Submarine Warfare



At the Office of Naval Research (ONR), we are working on answers to these and many other fleet problems. ONR funds all basic research for the Navy and Marine Corps. Traditionally, our focus has been on the “Navy and Marine Corps After Next” – new capabilities for the fleet ten or more years down the road. That’s still an absolutely vital part of our mission. But with technology today changing so rapidly, especially in the computer and information fields, we are shifting from our former long view to the needs of the “Next Navy” – perhaps five years out – and even to “Today’s Navy.”

The Chief of Naval Research, RADM Jay Cohen, has established fleet-oriented priorities for ONR, including technologies for all-electric ships within the next ten years, producing electric-powered high energy laser and microwave weapons – literally the “killer app” for those electric ships, enabling the CNO’s revolution in training, building intuitive tactical displays that turn data into knowledge, and overhauling the maintenance system. Here, I’d like to give the readers of UNDERSEA WARFARE a quick sense of why we believe we’re worth the Navy’s investment.

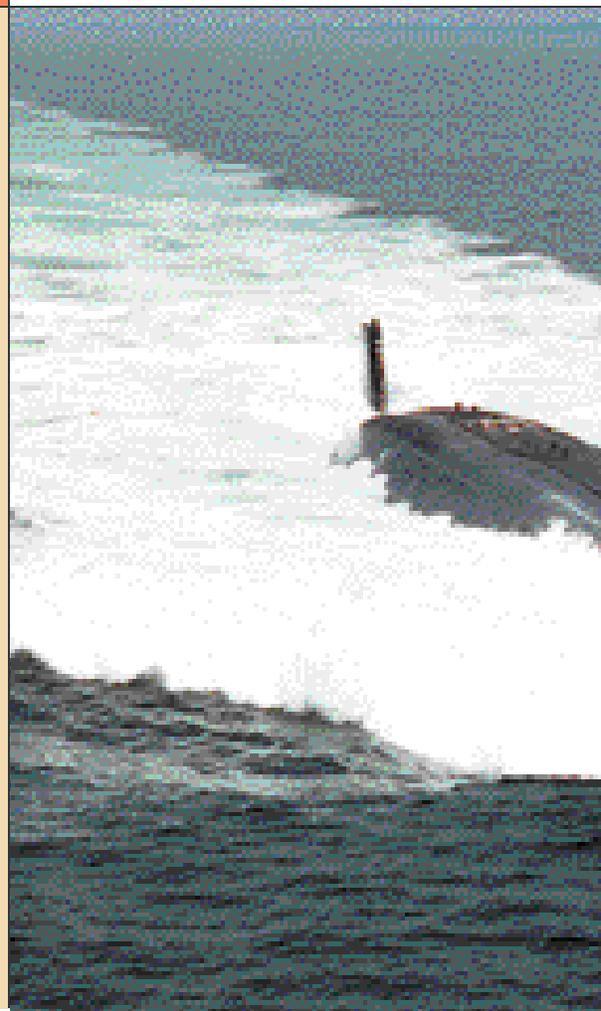
Photo by PH2 Alan D. Moryelle

SCIENCE & TECHNOLOGY:

NAVAL RESEARCH INVESTS IN FUTURE WARFIGHTING

by CAPT David Schubert, USN

Why do periscopes still make you feel as if you’re looking at life through a keyhole? If a ten-year-old can figure out a computer game like **688 Attack Sub** in twenty minutes, why is the real fire control system so non-intuitive? Isn’t there some type of paint that would relieve us from replacing the non-skid topside every maintenance availability? Why isn’t someone taking all the data we’ve been filling in on material history cards, 2 Kilos, and 1250s, and then using it to make the supply system easier? Isn’t there a better way to do training than having the chief read to the division out of the Ship’s Systems Manual? And most importantly, why doesn’t anyone seem to be working on making submarine life easier?



WHY ALL ELECTRIC?

Navy ships and submarines can use 80-90 percent of their power-generating capacity for one purpose only – propulsion. Yet how often do our ships operate at flank speed? If all of that surplus power were converted to electricity, it would be available for high-powered sensors and weapons. There are other advantages to moving to an all-electric architecture as well. Replacing our current hydraulic and pneumatic systems with electric controls and actuators will eliminate some of the biggest maintenance burdens on our ships. And removing those big piping infrastructures will allow future modernization to be done in a more “plug-and-play” manner. [Editor's note: See “An Integrated Power System: The Next Step” in the Fall 2000 issue of *UNDERSEA WARFARE*.]

Getting to the electric ship of 2010 requires investment in four major areas: high power-density electric motors and generators, perhaps using super-conducting technology; high power electronics and switching for self-healing power distribution and heavy lifting; wide band-gap semiconductors for high-power radar; and research on “beam weapons,” such as high-power lasers and microwaves.

To demonstrate these innovations, ONR is developing a revolutionary surface vessel called the Littoral Surface Craft (Experimental) – LSC(X). The goal is to produce an experimental platform large and fast enough to operate with the fleet, so that new doctrine and new tactics, techniques, and procedures (TTP) can be evolved along with new technology. LSC(X)'s initial purpose will be to support experimentation on the range of capabilities required in contested littorals. The initial design probably won't be all-electric, but this craft will ultimately be an electric-technology demonstrator.

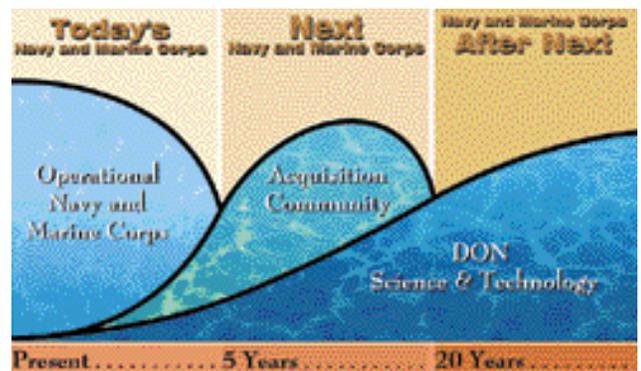
The littorals are not nice places to operate. Shallow, crowded, difficult acoustic conditions – they are a tough challenge for ships and submarines. In wartime, enemy mines, submarines, swarming surface craft, shore-based ballistic and cruise missiles, and other threats complicate and compound that challenge. To survive there, ships will need to be operated with a fighter-aircraft mentality. We expect an F/A-18 to be able to withstand a certain amount of damage and continue to fight. Why not design a surface craft with the same approach? A ship, like an F/A-18, needs to be able to

withstand a hit and continue to operate. It will need chaff and other countermeasures to deflect incoming ordnance. Why not give it an ejection system for its small crew, so they have a better chance of surviving loss of their ship? And if we give it an ejection system, we'll want to support it with the same kind of search-and-rescue systems and concepts we use for pilots.

The LSC(X) is being designed with a top speed of about 50 knots using podded propulsors and a mission payload of small affordable missiles that will carry a 200-pound warhead 500 nautical miles. The ship will be designed with built-in stability to allow operations in high sea states, a landing pad for a helicopter or Vertical Take-off Unmanned Aerial Vehicles (VTUAVs), and undersea sensors that can detect mines and submarines even when the LSC(X) is moving at high speed. ONR plans to deliver the baseline craft in late calendar year 2003.

A REVOLUTION IN TRAINING

Interactive software and miniaturization, coupled with a dramatically improved understanding of human cognitive func-



Looking Ahead. Navy Department science and technology resources support all three “navies,” but focus largely on the problems of the “Navy and Marine Corps After Next.”

Serving Today's Navy... Despite its emphasis on future capabilities, many of the Navy's research efforts are focused on solving some of the tough challenges facing “Today's Navy,” such as providing better protection to submarines entering a foreign port. USS *Los Angeles* (SSN-688), pictured on the opposite page, and other submarines in its class are good examples of existing platforms that will benefit from near-term “Swamp Works” projects.

...and the Navy After Next. Twenty years or more from now, ships like USS *Seawolf* (SSN-21), pictured left, could benefit from technologies not yet conceived of by naval scientists.

tioning, have the potential to change fundamentally the manner in which training is implemented. We are working on a way to train battle groups without live fire. In the past months, we have demonstrated a system that allows a surface ship to fire at a specified target area on the sea surface and use an array of acoustic buoys to determine the fall of shot on a "virtual island" at that location. This highly-portable system can be used anywhere in the open ocean, and a similar system is being developed for air-dropped ordnance. Related "virtual reality" technology can be applied to other tactical missions, damage control, navigation, and maintenance.

RELIEVING THE MAINTENANCE BURDEN

The current preventive maintenance system requires Sailors to open and inspect equipment primarily on the basis of elapsed time. We have all known occasions where routine maintenance errors have put critical equipment out of commission, necessitating extensive repairs and causing a loss of significant capability. If equipment were properly instrumented and monitored, maintenance could be substantially reduced. We are working on monitoring systems that will signal impending failures in a piece of equipment so that we only need open it up when there is really a problem. We are also building devices that can record equipment operating data and send it ashore for analysis, rather than taking up Sailors' time with continuous watches and data logging. By having technical experts ashore do the monitoring, we can provide ships the most expert troubleshooting advice available.

FUTURE NAVAL CAPABILITIES

This year, we kick off a program called Future Naval Capabilities (FNCs). Aimed at the "Next Navy" – acquisition programs planned for delivery in the next three to seven years – the first FNCs were approved by a board composed of the Vice Chief of Naval Operations, the Assistant Commandant of the Marine Corps, and the Assistant Secretary of the Navy (Research, Development, and Acquisition). Twelve critical areas have been chosen for emphasis (see the accompanying sidebar). In these twelve disciplines, ONR and the CNO's science and technology resource sponsor (N091) are partnered with members of the warfighting requirements offices in the Pentagon, the acquisition community at the Systems Commands, and the fleet to develop new capabilities for programs like the *Virginia*-class submarine that will be delivered to Sailors in the next few years.

Here are a few examples:

Littoral Anti-submarine Warfare. Tomorrow's littoral anti-submarine warfare (ASW) task is more complex than what we encountered in the open ocean during the Cold War. Expeditionary forces in the littorals today will face small, quiet, non-nuclear submarines, and our ASW forces must handle this more probable threat while still maintaining their blue-water capabilities. We need an effective and affordable capability to detect, track, classify, and neutralize not only submarines, but also unmanned underwater vehicles and mining or surveillance systems that seek to deny our access for projecting power ashore. Some of the technologies we're pursuing to give us new capabilities in the

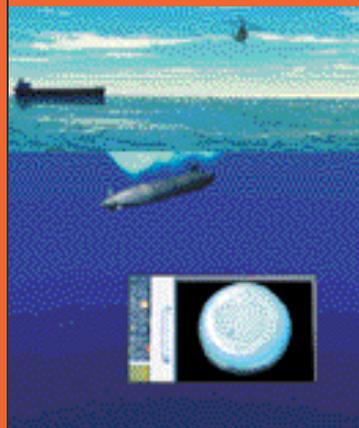
littorals include: acoustic communication devices for undersea sensor networks, advanced fiber optic towed sonar arrays, multi-static active sonar systems, and the information technologies needed to build an undersea common tactical picture.

Autonomous Operations. We think that, wherever possible, we should let robots do the dangerous work. Naval forces can enhance their capabilities with technologies that increase the autonomy, performance, and affordability of their organic, uninhabited vehicle systems. Autonomous systems greatly extend the reach and capability of naval forces while substantially reducing the risk to Sailors and Marines. They promise us significantly increased access to areas the enemy would deny us and also give us the means to deny areas to our enemies. Some of the specific technologies we're pursuing to give us new capabilities here include: intelligence, surveillance, and reconnaissance (ISR) and ASW sensors for mission-configurable Unmanned Undersea Vehicles, small Unmanned Aerial Vehicles, high power-density batteries to extend the life of autonomous vehicles, and autonomous ground vehicles.

Knowledge Superiority and Assurance. This FNC lies at the heart of network-centric warfare. Our goal is to provide Sailors and Marines with rapid, accurate, and consistent situational awareness. We're giving them tools to turn situational understanding quickly into plans and actions coordinated across organizations and echelons in all naval operating environments. Decision-support systems help warfighters find the best solutions to rapidly changing problems. Information distribution and management over reliable,

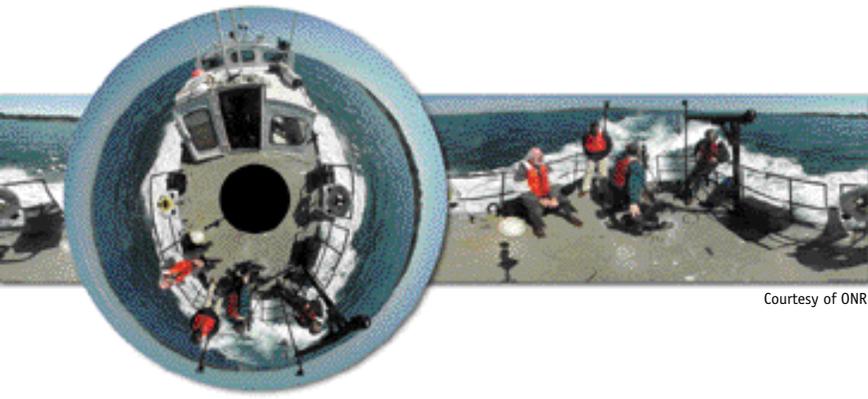
FUTURE NAVAL CAPABILITIES

AUTONOMOUS OPERATIONS
 CAPABLE MANPOWER
 ELECTRIC WARSHIPS AND COMBAT VEHICLES
 KNOWLEDGE SUPERIORITY AND ASSURANCE
 LITTORAL ANTI-SUBMARINE WARFARE
 LITTORAL COMBAT AND POWER PROJECTION
 MISSILE DEFENSE
 ORGANIC MINE COUNTERMEASURES
 PLATFORM PROTECTION
 TIME CRITICAL STRIKE
 TOTAL OWNERSHIP
 COST REDUCTION
 WARFIGHTER PROTECTION

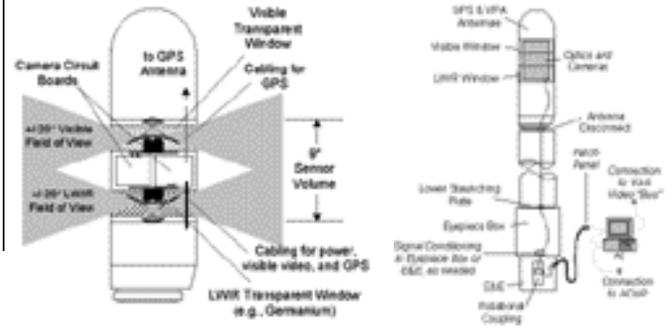


Courtesy of ONR

Virtual Periscope. The "virtual periscope," one of the many concepts being developed by ONR's Swamp Works team, is essentially a camera that views the sea surface from underwater. Image processing removes water interface distortion to yield a surface picture when the sail is still 30 to 50 feet down.



Courtesy of ONR



360-Degree Periscope. Another project the ONR Swamp Works team is working on is the development of an omni-directional periscope. By combining a sensor capable of seeing 360 degrees with an imagery discrimination system for distinguishing objects, we will be able to track surface contacts passively on a bearing-versus-time display whenever the scope is up.

high data-rate, networked, wireless communications provide responsive, integrated, over-the-horizon command and control. These advances are being made possible by new wide-aperture antennas to deliver high data-rate connectivity, buoyant antennas for submarine communications below periscope depth, and intuitive computer displays for tactical systems.

Capable Manpower. Sailors and Marines must be fully prepared to fight and win in an information-rich, distributed battlespace. We can give them the edge with affordable human-centered hardware and systems developed from a thorough knowledge of human capabilities, limitations, and needs. Our operational doctrine expects far more of the individual Sailor and Marine than ever before, and we cannot operate 21st century forces with a manpower approach rooted in the 19th century. Attracting talented volunteers, training them, retaining them, and enabling them to work up to their potential is one of the Navy's and Marine Corps' greatest challenges. We will meet that challenge only if we provide Sailors and Marines with the best possible quality of service. The Submarine Force is among the first beneficiaries of these new capabilities, with advanced distributed-learning systems to bring classroom training from the schoolhouse to the ship and visualization-based training tools like the Interactive Multimedia ASW Trainer (IMAT).

Time Critical Strike. Warfighters need the ability to strike time-critical tactical, operational, and strategic targets at the right moment. At ONR, we are supporting the ability to destroy, neutralize, or suppress targets of immediate importance. We are developing technologies that enable striking

targets in joint operations during brief vulnerability windows in any environment, under all conditions. We don't want enemy forces to be able to hide, or flee, or get in the first blow. Adversaries will be mobile, they will do their best to hide in clutter, and they will be uncomfortably close to friends and neutrals. Our forces will need to deliver strikes with unprecedented accuracy, flexibility, and speed. We're working to provide these enhanced capabilities through new technologies, such as in-flight control and targeting of missiles, imagery analysis tools for faster target recognition, and high-speed strike-weapon technology.

TECHNOLOGY FOR TODAY'S FLEET

In addition to executing the FNCs, which will deliver between 2002 and 2008, ONR will be more responsive to today's fleet problems. We have commissioned a "Swamp Works" group at ONR to concentrate on high risk, high payoff items responsive to current needs. The Swamp Works team is looking at tough challenges, like technologies to safeguard a ship or submarine entering a foreign port in the face of a terrorist threat. One current project is an omni-directional periscope. By combining a sensor capable of seeing 360 degrees with an imagery discrimination system for distinguishing objects, we will be able to track surface contacts passively on a bearing-versus-time display whenever the scope is up. This work emerged from discussions with operators at SUBPAC, who graphically described the impossibility of keeping track of dozens of littoral surface contacts with our current periscope search procedures.

We also are working on something we call the "virtual periscope." This is a camera that

views the sea surface from underwater, with image processing that removes water interface distortion, to yield a surface picture when the sail is still 30 to 50 feet down. If this works out, we can eliminate the perceptual "no man's land" between 150 feet and periscope depth, and really assure ourselves that we won't hit something coming up.

So how can you influence our investment? We are initiating an on-line fleet support line, "Tech Solutions," at <http://techsolutions.navy.mil/nre/techsol.nsf>. Working closely with the Naval Research Science Advisors, who serve on the staff of all the type commanders and fleet commanders, we have set aside resources to provide rapid response solutions to fleet problems. This system will be fully operational by September 2001. If you have a great idea on how to make things better, or a nagging problem you want a technology solution for, you can post it to our website. We are committed to getting answers back to the fleet within weeks of a submission. If you want more information on this topic, please contact your science advisors, Dennis Freeman at SUBLANT (cslsta@nosc.mil, 757-836-1360), or Steve Basile at SUBPAC (cspsta@nosc.mil, 808-473-5651).

We in the Submarine Force have always had the reputation of being progressive and technically-minded. The match between submariners and the scientists of the Naval Research Enterprise has traditionally been very fruitful. Our continuing partnership will deliver the technologies we need for undersea warfare in the 21st century.

A submariner since 1979, CAPT Schubert has commanded USS *Chicago* (SSN-721) and served on both the OPNAV and COMSUBLANT staffs. He is currently the Assistant Chief of Naval Research.

REFLECTIONS ON THE PAST- VISION FOR THE FUTURE

An Interview with the Commander, Undersea Surveillance

by LT Kecia Dilday, USN

Commander, Undersea Surveillance CAPT Neil Rondorf's official biography reads like that of many other submariners: requisite sea and shore tours; command of USS *Gurnard* (SSN-662) and USS *Minneapolis-St. Paul* (SSN-708); then a submarine squadron. In 1996, Captain Rondorf became Head, Undersea Surveillance in the Submarine Warfare Division at OPNAV. Then in August 1999, he took command of the worldwide operating forces of the Integrated Undersea Surveillance System (IUSS). This five-year detour has been a change that Rondorf has welcomed, embraced, and made his own. Even his automobile's license plate reads "IUSS 00," and he himself has said, "I'm not just a submariner anymore, I'm the IUSS guy – ask me about that." Consequently, Captain Rondorf has practically circumnavigated the globe, spreading the word of IUSS's unique current and future capabilities to fleet and task force commanders.

Since its inception, IUSS has been at the forefront of acoustic sensor and processing technology. Naval historians credit IUSS, which includes the undersea Sound Surveillance System (SOSUS), with significant success in monitoring Soviet submarines during the Cold War. From its shore surveillance sites today in Washington State, Virginia, and the United Kingdom, IUSS monitors thousands of ocean floor hydrophones, as well as mobile Surveillance Towed-Array Sensor System (SURTASS) ships. Down from 15 shore sites in the 1990s, IUSS nonetheless continues to detect, classify, and provide timely reporting on submarines and other undersea contacts of interest, while gathering long-term acoustic, oceanographic, and hydrographic information. In fact, IUSS claims more contact holding hours since 1997 than all other anti-submarine warfare (ASW) platforms combined.

Captain Rondorf's experience encompasses the whole problem of ASW cueing, and he has had a unique opportunity to influence the future of the IUSS from both sides of the Beltway. In a recent interview, the IUSS "Commodore" was vocal about his priorities, his hopes for IUSS, and what he will miss as he retires after 27 years in the Navy.

Q: We in the ASW business talk about cueing being

IUSS's job one. How do we maintain acoustic analysis proficiency on the watch floor while playing a long-term waiting game?

A: Just like onboard ships, we run drills, and we try to bring the drill mentality onto the watch floor. But I don't think today's technology has adequately supported the insertion of target signals into the data flow so they look real. So that's an area we have been working on and studying how other communities – like the Acoustic Rapid COTS Insertion program – are doing that. I think we have a tendency to resurrect older archived targets and develop training based on those. What I want to see is the next generation of targets, too – what do the future threat signatures look like? There is some combination of historical "knowns" and current "unknowns" that we ought to be working on... because I think the future of acoustic analysis is going to depend on mastering both what we know and what we don't know.

Q: Hasn't acoustic analysis always been that?

A: Well, I think we got pretty used to using textbook analysis on a classic set of acoustic targets over the past 15 years, and we probably became complacent. When we send MILDETS out on SURTASS ships, and they encounter diesel submarines, there's often nobody there who has seen that kind of submarine before. And that's a bit revealing – it shows us how hard we have to look for new targets. Not only do we have to go find them, but we may have to create some on our own for training. Our folks aren't as good as they need to be on some of the basics, and we may not know what we think we do.

Q: While we are talking about textbook targets, what about the people who think that IUSS is a Cold War asset that has outlived its utility?

A: Well, I think we need to maintain a certain sense of reality in the Navy. Practically, there will never be enough tactical assets to go around, unless we are opposing a very minimal adversary. It's really not a deep water-shallow water/Cold War-New World issue, but in the littoral, as in deep water, we just don't have enough tactical resources to search the world's oceans adequately in a time of crisis. The forces out there will be busy doing all their other missions just when we need them to find the submarine. Then we need a shooter. The problems of 20 years ago and the problems of today are exactly the same: limited tactical assets need cueing, and that's our job.



The real challenge is to figure how to do that cueing in the future. There are several persistent strategic areas in the world where fixed systems make sense. Putting in a mobile surveillance platform for exercises or short-term crises – that makes sense, too. In an area where we have interests that come and go with the political situation, we can put the Advanced Deployable System (ADS) down for months at a time. We don't always require the long-term investment of a 20-year system. The future is uncertain, but not everything is going to require long-term surveillance.

Q: How have recent rating mergers in the operations specialist and sonar technician ratings affected IUSS operations?

A: We're finding that the combination of air, submarine, and surface experience provides an excellent understanding of what the ASW operator is looking for or trying to do. In the past we had the IUSS facility guessing what tactical ASW units needed to know and how to help them. Now with that insight right there on the watch floor, the watch officers know how platforms actually prosecute contacts, so we know exactly what the tactical units need and how to give it to them. Another thing that's become fairly obvious is

I have attempted to get our leadership to understand the potential of IUSS in future warfare. We were mired for decades in the idea that IUSS was a Cold War asset, that it was a deep water/blue water issue. Navy leadership needs to see that this is a threat response issue, not one of deep or shallow water.

My number-two priority has been trying to influence technology development for a leap forward. We're using commercial off-the-shelf (COTS) items for fixed surveillance, developing ADS with the best sensors and the best processing we can find, and transforming SURTASS into a twin-line, littoral sensor. But now we need to look 10 to 15 years down the road. What's going to be the target then? Is it the AIP [air-independent propulsion] diesel? A mini-sub? Something we haven't thought of yet? Trying to shape the technology in the face of those unknowns is very challenging.

The last issue I've worked on was mentioned earlier... to ensure we have the people necessary for the future. We have needed to make "the system" understand that promotions and advancement are as important in the IUSS community as anywhere else. Putting in place a sustainable process for continuing to man the IUSS infrastructure has been paramount.



The problems of 20 years ago and the problems of today are exactly the same: limited tactical assets need cueing, and that's our job.



that when a person leaves an IUSS facility, he or she really knows how theater ASW is conducted, how it is coordinated, and how information is passed. There's a force-multiplier there I've never seen before, and perhaps it's the real embryo of a network-centric ASW capability.

Q: What are the challenges on the officer side?

A: That has become a very difficult issue with ASW/IUSS no longer a core competency of the Fleet Support community. As we begin to have fleet LDOs [Limited Duty Officers] fill in behind the Fleet Support Officers, however, we are seeing a wealth of operational skills that we didn't have at our disposal before. I think the LDO option is an ideal fit, because it gives the LDO's a career-enhancing shore duty opportunity and us the combination of fleet and IUSS experience we need to build an officer corps that can lead the IUSS community into the future.

Q: What have been your top priorities since you took command?

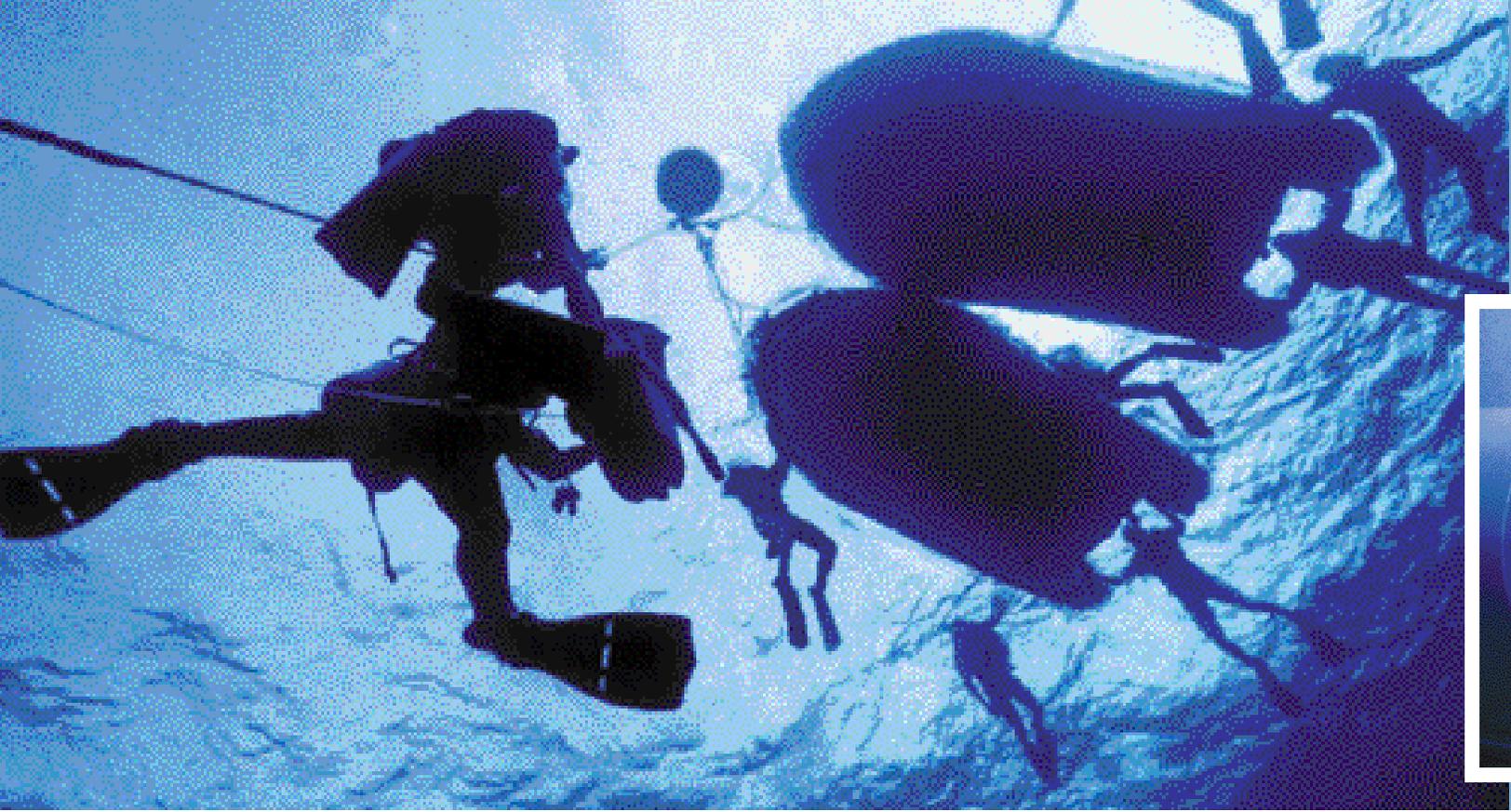
A: Now, these are not necessarily in order of importance... but a lot of effort has gone into them. First, we need to shape a vision for cueing in future ASW. We need to get our operators to think futuristically, not only about today's business, but how we're going to handle the new SURTASS technology and the new fixed technology that comes with ADS. We need to learn how to optimize our information collection to best contribute to warfare capabilities. Also,

Q: Where do you see the IUSS in 20 years? What will you miss as you retire?

A: Well, we don't know what the world will be like in 20 years... but I think we'll continue to require ASW cueing over the long term. I see an infusion of new sensor technology and a closer cooperation with other warfare communities, particularly air ASW – in whatever form it assumes. I think we're also going to be dealing with a lot of non-submarine and non-traditional targets, but acoustics will always be needed as a discriminator. I see us on a worldwide information network that enables us to bring experts on-line to help the forward-deployed operators make that target identification.

What I'll miss most is being surrounded by consummate professionals who are passionate about their work. We are trying to mold a future that none of us understands, and one thing that has made these last five years so much fun is that people have been willing to entertain "way-out-of-the-box" thinking. I think among SPAWAR, OPNAV N774, and my own staff, we have the closest claimant-sponsor-operator relationship that exists in the Navy today. It's that close teamwork that gave us the fiscal support we needed to develop technologies that really made an impact over the past couple of years. I couldn't have done it without this team. It isn't a personal accomplishment – it's been an organizational success.

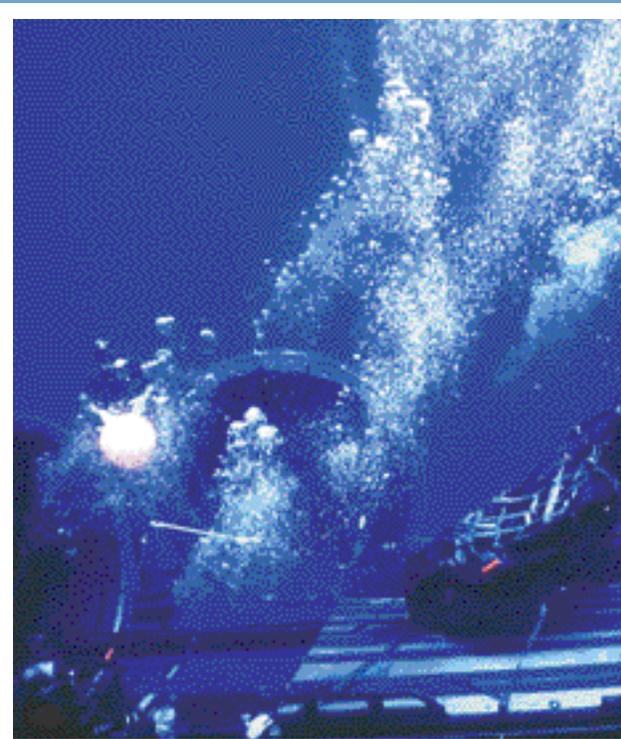
LT Dilday is the Director, Future Systems Requirements (N8), and staff Public Affairs Officer for COMUNDERSEASURV.



MASTERS of the DEEP

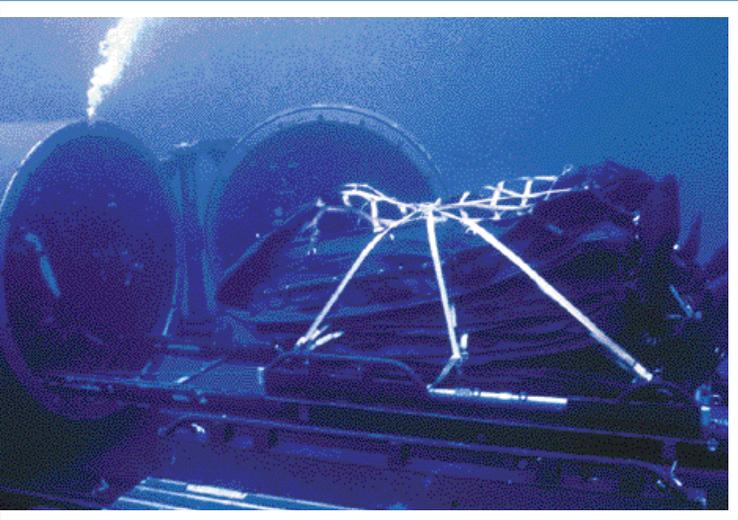
Article and photos by
CDR Michael Wood, USN

Submarines From a SEAL's Perspective

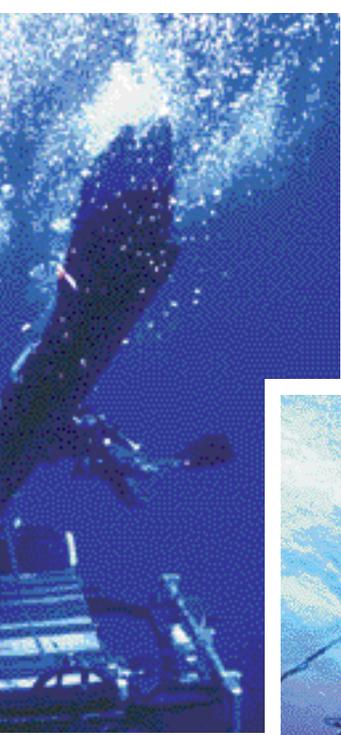


(above) **Inflating the CRRC.** The DDS deck crewmen have removed the CRRC cargo straps, and one crewman has inflated the CRRC. As the stern begins to rise to the surface, the other deck crewman is readying and releasing the buoy line. Notice the cargo web inside the CRRC – that is where the SEAL squad combat equipment and OBM are stored for the ride to the surface. This is the last of four CRRCs to be surfaced. Then the DDS deck crew will winch the DDS track and cradle back into the DDS and the nine-foot DDS door will be shut.

(near right) **SEAL Insertion.** The SEAL squad, in desert camouflage, maintain a low profile position in the Combat Rubber Raiding Craft as they prepare to insert and land on the shore. The CRRC coxswain may take the CRRC back to sea and wait, or the squad may camouflage the CRRC ashore while performing their mission. This is a daylight photo of what would normally be conducted under the cover of darkness. (far right) SEAL fire team transitions from underwater to shore in an alert status. Each is using a Draeger LAR-V underwater breathing apparatus (UBA) rebreather to remain clandestine.



(left) **Releasing the CRRC.** Four Combat Rubber Raiding Craft (CRRCs) are lashed to the Dry Deck Shelter (DDS) track and cradle. Each CRRC has the SEAL squad combat equipment and the outboard motor (OBM) already pre-staged. As the CRRC is released from the DDS cradle, it will rise to the surface on a guide line and the SEALs will then surface and inflate the CRRC, reposition all the gear, and start the OBM to wait for the word to get underway.



(below) **Mass Swimmer Lock-in.** The DDS Deck Captain monitors as a combat swimmer returns back down the buoy line to the DDS. Meanwhile, two CRRCs and other combat swimmers wait their turn on the surface. This is referred to as Mass Swimmer Lock-in (MSLI).



Life aboard a submarine is an interesting experience for a Naval Special Warfare (NSW) operator – and especially for a SEAL doing SUBOPS for the first time. And conversely, I’m sure it’s an equally enlightening experience for submariners exposed initially to an exuberant SEAL team that invades every nook and cranny of their boat and eats all their food. For a SEAL, that first onboard can be confining, claustrophobic, over-regimented, and confusing. And Heaven forbid a new SEAL should flush the head while the boat is blowing sanitariums! We already have a proud record of Golden Flapper Awards earned by SEALs young and old alike! To the submariner, it seems like the SEALs are everywhere and that all they care about is their 3M system – movies, meals and mattresses. They never secure anything for sea – they make a mess out of the forward torpedo room – and the greatest offense of all is that because they’re onboard, the young submariners now have to hot-rack all the time.

And yet despite these initial impressions and the obvious differences in SEAL and submarine “style,” before the cruise is over we’ll form up to become one of most potent fighting teams in the nation’s arsenal.

Greetings! I’m CDR Mike Wood and I’m the Information Operations Officer at Naval Special Warfare Command in Coronado, California. I’ve deployed aboard many a submarine as a combat swimmer for escape-trunk lock-in/lock-out ops, as a Dry Deck Shelter (DDS) Platoon Commander, SEAL Delivery Vehicle (SDV) Platoon Commander, and Naval Special Warfare Task Unit Commander. I’ve had the privilege to serve aboard the USS *Cavalla* (SSN-684), USS *Sam Houston* (SSBN-609), and USS *Kamehameha* (SSBN-642) for full six-month deployments and also conducted SSN/NSW operations from many other submarines, including the USS *William H. Bates* (SSN-680), USS *John Marshall* (SSBN-611), and USS *Tunny* (SSN-682).

I’ve been around the barn a few times.

MASTERS of the DEEP

The SSN/NSW team is an incredible warfighting asset that will see increasing use in both traditional warfare and future non-traditional missions – such as Information Warfare, countering WMD (Weapons of Mass Destruction), or establishing the new Expeditionary Sensor Grids. In any event, I believe SEALs and submariners will be working together more than ever, which suggested the need for this photo feature. From our SEAL perspective, the submarine crew makes a significant sacrifice when we come onboard, but except for a few at the conn who get to watch through the periscope, they don't generally see what goes on outside the boat to justify our being there.

So these photos are for you! They show how the SDV is launched and recovered and what it does when it leaves your boat. You'll see how the SEALs steal away in little rubber boats and a little of what they do when they're outside. And it's my hope that these photos will give you a view of underway SSN/DDS/SDV/SEAL operations you may not have experienced and convince you that we SEALs really do more than 3M onboard.

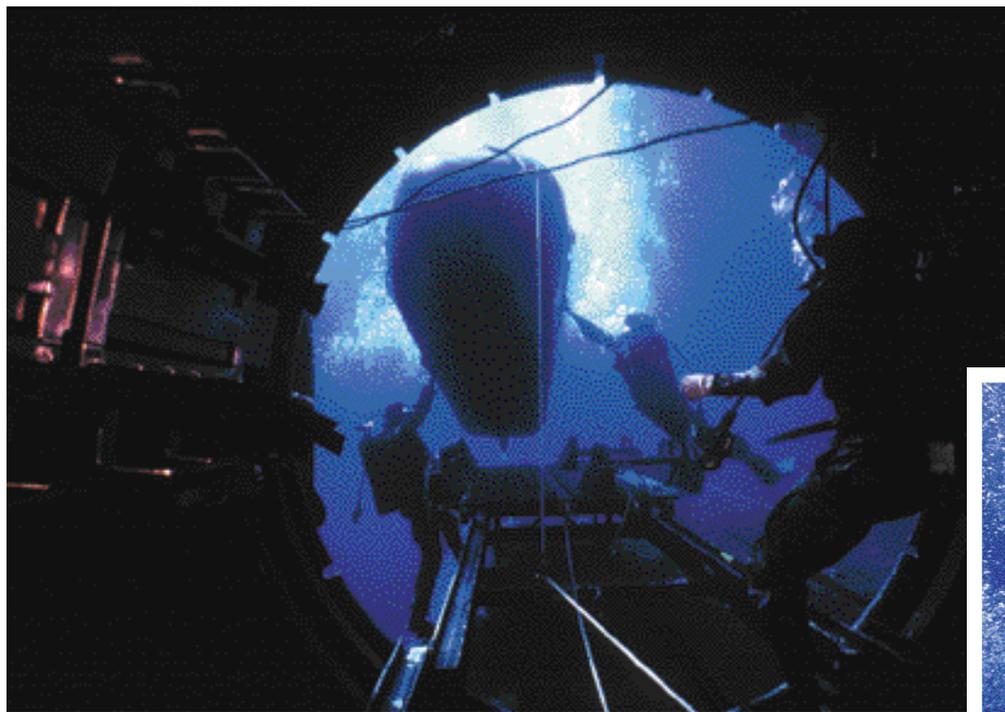
CDR Wood, a SEAL for 31 years, has served as a SEAL point-man in Vietnam, a SEAL Delivery Vehicle Task Element Commander during Operations DESERT SHIELD/STORM, and Amphibious Ready Group NSW Task Unit Commander in the early phase of U.S. involvement in Somalia. In addition to the biographical information provided in the text, he also served as a UDT Assistant Platoon Commander, and OIC of SDV Team ONE DET Hawaii. He has extensive experience operating from SSNs and SSBNs at sea, including two WESTPAC submarine deployments.

SDV Launch. The DDS Hangar Supervisor closely monitors as the DDS Deck Captain and Deck Crewman launch the SDV from the DDS track and cradle – this view is from inside the DDS looking out. Silhouetted lines are the hangar open-circuit "hooka" stations the DDS crew and SEAL personnel breath off of while inside the DDS.



(above) **Placing the LAM.** In the foreground, SDV is "bottomed-up" under the ship, with the SDV pilot and navigator placing a MK-V Limpet Assembly Module (LAM) in the background. This is a two-module LAM with over 100 lbs. of high explosive. *(right)* The SDV pilot and navigator place the explosive device, which will time-detonate in either a "contact" or "standoff" mode. The SDV and her crew will be miles away when the explosive actually detonates. *(top right)* Here is the result of the 100-pound explosive in "contact" mode on a Yard Oiler (YO) ship in open ocean off Waikiki, Oahu. Photo by Bernie Campoli.

(right) **Out of the Slipstream.** The DDS deck crew pushes the SDV out of the SSN/DDS slipstream and into the underway one-knot flow of current. The SDV pilot ensures the bowline is connected to the buoy line as he stands by for the launch signal.



(right) **Stern View.** This is an overall stern view of the DDS deck crew launching an SDV.

USS *Kamehameha* inactivates, leaves behind a regal legacy

by COMSUBPAC Public Affairs

The USS *Kamehameha* (SSN-642) was recently inactivated in a ceremony held at the Pearl Harbor Naval Station. Senator Daniel Inouye (D-HI), who spoke at the ship's launching three decades ago, was the principal speaker. "President Kennedy asked for my input in the naming of a new submarine in 1963," said the Senator, "so I told him it would be appropriate to name it after King Kamehameha the Great. He accepted my suggestion and several months later announced that the boat would indeed bear the name USS *Kamehameha*."

Over nearly 36 years, *Kamehameha* created a legacy of excellence in a diverse array of mission assignments. The Hawaii-based submarine was the namesake of a fearless leader who united the Hawaiian kingdom and then ensured relative peace under his reign. He thus changed forever the spiritual, social, and economic destiny of Hawaii and its people. Legend has it that he was born during the appearance of Halley's comet and that this was a sign that he would rise to greatness. The name *Kamehameha* (pronounced kuh-MAY-ha-MAY-ha) means "the one set apart."

In much the same way, the submarine's richly unique history, which stretched across four decades, mirrored that of the great king – set apart. The ship, the 30th of America's "41 for Freedom" fleet ballistic missile submarines, was originally built to serve as a strategic deterrent at the height of the Cold War. Subsequently, *Kamehameha* had her strategic missiles removed and was converted to accommodate special forces.

The submarine's last Commanding Officer, CDR Ed Seal, felt strongly about the unique capabilities of his submarine and her crew. "The submarine fulfilled an excellent mission, and the crew was well-trained and able to execute whenever directed by the National Command Authority. Despite her age, this ship was able to go anywhere in the world and conduct any mission with which she was tasked," Seal said.

Contrary to popular belief, the end of the Cold War brought an increase to submarine tasking, despite a decrease in available assets. Responsibilities have increasingly shifted to data collection, Tomahawk strike warfare contingencies, intelligence, surveillance, indications and warning, counter-drug operations, and engagement with allies. **The unlimited range, mobility, stealth and firepower of submarines have become crucial to the nation's defense inventory.** *Kamehameha's* conversion was, in retrospect, a prophetic decision for a transformational Navy.

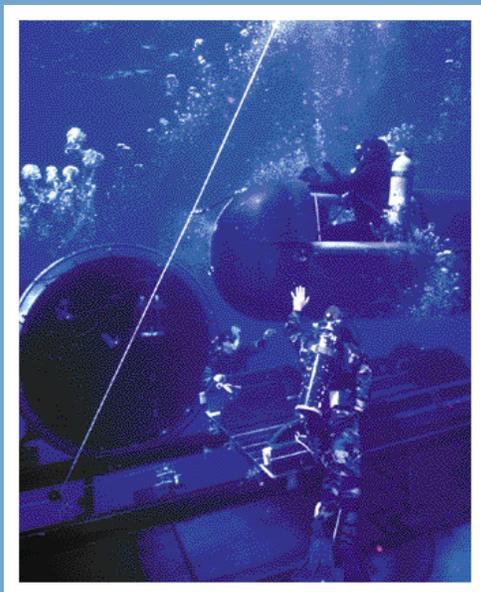
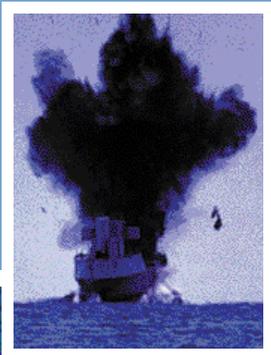
The "Kam," as the submarine was affectionately known, was built at the Mare Island Naval Shipyard, Vallejo, Calif., and was commissioned December 10, 1965. Her first two commanding officers were CDR Roth S. Leddick (BLUE crew) and then CDR Robert Dickieson (GOLD crew).

"I was certainly excited to be a part of the commissioning crew," said now-retired Navy CAPT Dickieson. "I was primarily a fast-attack boat Sailor, so I had to learn a great deal to come up to speed."

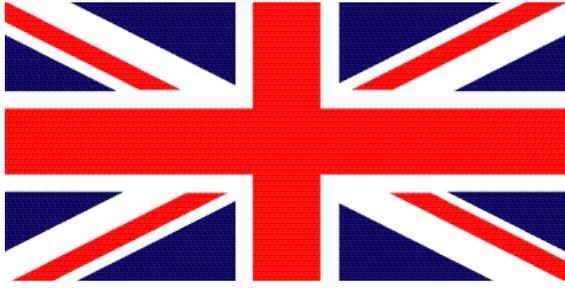
Kamehameha's final Chief of the Boat, CMDMC David "Chuck" Minnich, had served aboard the *Kamehameha* for more than three years. "I think our ship really carried through in every aspect of our tour and life here. Much like the original *Kamehameha*, we too can say that we allowed children to live safely. The guys were really proud to go downtown into Honolulu and say 'I'm from the *Kamehameha*.' It always generated interest with the people they were talking to," said Minnich.

USS *Kamehameha* was sponsored by Mrs. Samuel Wilder King at the launching.

(continued on page 30)



USS *Kamehameha* (SSN-642) returns to Pearl Harbor, completing the final deployment of her 36-year career.



ROYAL NAVY

CELEBRATES SUBMARINE SERVICE CENTENARY

By CDR Michael Davis-Marks, RN

The Royal Navy Submarine Service is 100 years old this year, just one year after the U.S. Submarine Force celebrated its own Centennial. As in the United States, the Royal Navy will mark this special event with a year-long program, celebrating the achievements of those who designed, built, supported, and operated RN submarines since *Holland 1* appeared in 1901 – as well as commemorating the extraordinary sacrifice of those who died in submarines during both peace and war.



(above) Pictured is ADM "Skip" Bowman, Director, Naval Nuclear Propulsion, and R Adm Rob Stevens, the Royal Navy's Flag Officer, Submarines (FOSM), and Commodore Nick Harris, Naval Attache (Washington) hosted by CDR Ken Swan, CO of USS Tennessee.

(right) The mighty HMS *Vanguard* was the first of the Royal Navy's latest class of Nuclear-powered Ballistic Missile Submarines (SSBNs).



Photo courtesy of the Royal Navy



CENTENARY EVENTS

The RN Submarine Centenary year has been celebrated in a large number of events up and down the United Kingdom, including the following:

FEBRUARY

Premier of a new military march, "The Jolly Roger," at the Mountbatten Festival of Music at the Albert Hall, London.

APRIL

Issuance of a special commemorative set of stamps by the Royal Mail featuring RN submarines through the ages.

Submarine Centenary Race Day at Devon and Exeter Race Course.



MAY

Submarine Centenary Celebrations at Barrow in Furness, home of the main submarine ship-builder in the United Kingdom. ▶

Today's Royal Navy Submarine Service

Although 708 submarines have flown the White Ensign during the last hundred years, there are a total of 16 in service today: four *Vanguard*-class SSBNs armed with TRIDENT D5 ICBMs; and 12 SSNs (five *Swiftsure*-class and seven *Trafalgar*-class). The SSN fleet is active in the following roles:

Coordinated High Intensity Strike

The Tomahawk Land Attack Missile (TLAM) is in service in the RN and was fired from HMS *Splendid* in the Kosovo conflict in 1999. This weapon allows submarines to influence the land battle by posing a threat in the period prior to hostilities and, after hostilities commence, directing highly accurate and lethal warheads against important targets, which may otherwise be relatively invulnerable.

Anti-submarine and Surface Unit Warfare

In what is arguably its most important role, the SSN has an unrivalled capability to seek out and destroy other submarines that may pose a threat to friendly forces. The SSN also has a well-proven capability to detect and attack surface ships. The Spearfish torpedo can be used against other submarines or surface ships, whilst RN submarine Harpoon missiles are effective against surface ships out to a range in excess of 50 miles. These capabilities can be used when the SSN is acting independently – as in the Falklands conflict – or in support of a task force. The SSN is used to great effect when it is deployed in advance of friendly forces in order to reduce the flexibility of an adversary by denying him the use of an area or region. This is known as regional sea denial.

Surveillance

The ability to close opposition forces and monitor their operations and movements whilst remaining undetected is a classic capability of the submarine. This surveillance can include underwater photography, sometimes of surface warships, which will almost certainly never be aware of the submarine's presence.

Inshore and Beach Reconnaissance

Able to approach a hostile coastline in shallow water, and using modern video technology or digital photography, a submarine can make a significant contribution to intelligence collection efforts prior to any subsequent maritime or land action.

And into the Future...

The laying of the keel for the HMS *Astute* in January of 2001 takes the Royal Navy into its second century of submarine operations. HMS *Astute* is the biggest and most powerful attack submarine to be built for the RN and, under the Smart Acquisition Program, is being built roughly one fifth more quickly than earlier boats, and with lower running costs and a much smaller ship's company. Although the *Astute* will be about 30 percent larger than the *Trafalgar* class, the larger hull means that she will be much easier and cheaper to build and maintain.



(above) USS *Tennessee* (SSBN-734) and her crew traveled to HM Naval Base Clyde in Faslane, Scotland to participate in the Centenary Celebration of the Royal Navy's Submarine Force. (below) *Tennessee* pictured with HMS *Vanguard*.



Submarines from 10 different nations – including the United States – gathered to join in the RN Submarine Service's 100th anniversary celebration.



MAY

Submarine Centennial Week at HM Naval Base Clyde (Faslane). 12 Countries accepted invitations and sent submarines and submarine delegations for a week-long event, culminating in a Royal Parade before Her Royal Highness, the Princess Royal. The U.S. Navy was represented by the USS *Tennessee* (SSBN-734) and several flag officers, including ADM "Skip" Bowman, VADM John Grossenbacher, and RADM Paul Sullivan.

Opening of the display of *Holland 1*, the RN's first submarine at the RN Submarine Museum at Gosport, Hampshire.

JULY

Submarine Centenary Celebrations at HM Naval Base Devonport, Plymouth, Devon.

Submarine Centenary Ball at the Dorchester Hotel, London.

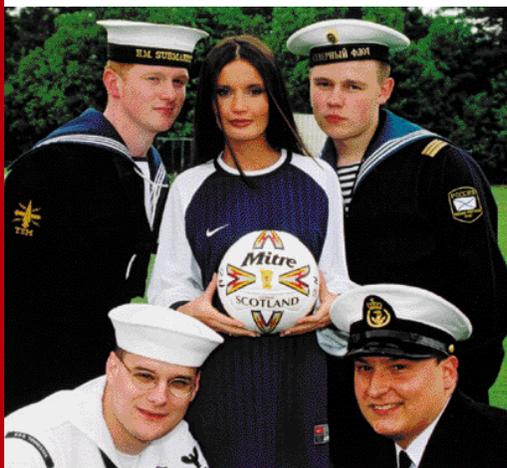
And still to come:

SEPTEMBER

Hosted lunch by the Lord Mayor and the Corporation of the City of London at Mansion House.

NOVEMBER

Submarine Centenary Thanksgiving Service at Westminster Abbey, London.



During the Centenary celebration at Faslane, *Tennessee* Sailors participated in a number of events with foreign submarine crews, including a Royal Parade, lead by ENS Dan Patrick, and a soccer game where they had the opportunity to meet Miss Scotland, Michelle Watson.



HMS *Astute* will displace 7,200 tonnes submerged and is 97 meters long. She will have six weapons tubes, massively increased firepower compared to predecessors, and will be equipped from day-one to operate Tomahawk cruise missiles. Construction on the second submarine of the class, HMS *Ambush*, is due to start later in 2001, with the third, HMS *Artful*, following subsequently. The Ministry of Defense is considering plans for a second batch of up to three more of these potent boats, though the final decision will not be taken until the end of 2002.

As Rear Admiral Rob Stevens, Flag Officer Submarines (FOSM), explained recently, the role of the submarine in the Royal Navy is changing. "The service's SSN community has made a decisive break away from its Cold War emphasis on anti-submarine warfare to embrace the Navy's new operational concept of 'Maritime Contributions to Joint Operations.' The challenge now is to realize the full potential of the SSN across its wider range of tasks. Operations in direct support of surface forces are becoming a far more important part of

the submarine service's operations."

The introduction of new secure communication links will provide the improved connectivity essential for operating in conjunction with other task force units. Advances in the technological areas of digitization, miniaturization, and information processing will enable the submarine to become an increasingly valuable asset in covert intelligence-gathering operations.

UK/U.S. Submarine Cooperation

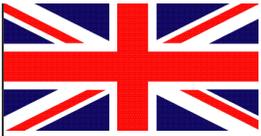
Whilst the RN and U.S. submarine forces had been allies throughout their history, the close and special co-operation we see today did not really take off until the 1950s with the advent of nuclear power. In the landmark Mutual Defence Agreement of 1958, the United Kingdom and the United States undertook to share the nuclear information that facilitated construction of the first British nuclear-powered submarine, HMS *Dreadnought*, in 1963, and the Polaris Sales Agreement followed that same year. It was modified for TRIDENT in 1982. Since then, the two submarine forces have operated very closely together – sometimes closer than their parent services in general – and continue to learn from each other day to day.

CDR Davis-Marks is the Staff Officer, Submarines, on the British Defence Staff in Washington. A submariner since 1982, he had previously commanded the nuclear-powered SSN HMS *Turbulent*.



Photo courtesy of the Royal Navy.

The HMS *Turbulent* is one of the Royal Navy's *Trafalgar*-class Nuclear-powered Attack Submarines (SSNs). *Turbulent* is pictured here while under the command of CDR Davis-Marks.



A CENTURY OF ROYAL NAVY SUBMARINE OPERATIONS

Holland 1 to Vanguard

by CDR Jeff Tall, OBE, RN

In 1900, when the then-Controller of the Navy declared that submarines were “underhand, underwater, and damned un-English,” he was not alone in his vehement condemnation of the platform as a means of waging war. At that point in history, Britain was the only major maritime power not to have at least an embryonic submarine flotilla, but to find out what all the fuss was about, *Holland 1*, built under licence from the United States, was launched in Barrow in 1901, and the Royal Navy Submarine Service was born.



Holland 1, the Royal Navy's first submarine, was launched in 1901.

During those pioneering days, our early submariners were in fact struggling with what was little more than an animated mine – a defensive weapon of position to be used to protect our

own bases. Equipment was crude, and to put that problem into perspective, the rudimentary optics in our periscopes imaged a target horizontally if it was right ahead, vertically if on the beam, and upside down if astern. This must have made the estimation of target course and speed a most interesting procedure!

It was not long however before increased range and endurance and greater firepower turned submarines into offensive weapons and formidable opponents. During the 1914-18 war, German submarines, against which there was little protection other than to convoy, sank 11 million tons of Allied merchant shipping. The RN Submarine Service, first out and last in, quickly made its mark as well. Equipped in the main with the excellent E class, and operating in confined and distinctly unhealthy areas of the North Sea, the Baltic, and the Dardanelles, they sank 54 warships, including 19 submarines. Names emerged such as Max Horton of *E9*, the first CO ever to fly the Jolly Roger, Norman Holbrook of *B11*, the first of our fourteen Victoria Cross (VC) winners, and Martin Nasmith of *E11*, whose exploits were the stuff of legend. The Service was also beginning to learn that its preparedness to go where others could not exacted a heavy toll of submariners' lives.

Despite technical improvements, submarines were still weapons of position – slower than their quarry – so experiments were put in hand to seek higher speeds, more powerful armament, and better sensors.

Experience with the steam-driven K and big-gun and aircraft-equipped M classes showed that technical capability lagged tactical thinking, so between the wars, submarine design hardened into a diesel-electric boat, with torpedoes and a small-bore gun for armament. These had a good range, but to achieve tactical mobility and charge their batteries, they had to surface, and it was with this type of submarine that the warring factions entered World War II.

Unlike German and American submarines that mainly fought a wide-ocean campaign, our submarines operated regularly in shallow water, densely populated with mines and defended by strong anti-submarine forces. The nature of these operations extracted a heavy price, and one in three submariners were killed. Despite these losses, the Service never lacked for volunteers, and stories of submarine exploits are legendary. Malcolm Wanklyn in *Upholder*, Tony Miers in *Torbay*, and Tubby Linton in *Turbulent* were VC winners and personified the skill and courage of all the crews. Clandestine operations figured largely in the tapestry of operations, with Alistair Mars in *Unbroken* being a leading exponent. Baldy Hezlet's “five out of eight” in *Trenchant* when he sank *Ashigara* will remain forever a world record. By the end of the war RN submarines had sunk or damaged by torpedo and gun two million tons of shipping, including 78 warships, 38 of which were submarines. In addition to the destruction of the enemy, submarines were tasked with surveillance and reconnaissance; cargo and troop carrying; mining; harbour penetration; air/sea rescue; and finally the vital task of training our own anti-submarine forces.

In 1948 the primary task of the post-war Submarine Service was anti-submarine warfare, and with that came the development of the excellent P and O classes that eventually took over from the faithful T and A classes of the war. However, for the RN to counter the growing Soviet submarine threat, it was essential that nuclear propulsion be embraced in order. HMS *Dreadnought* went to sea in 1963, and she was followed by the excellent *Valiant* and *Churchill* classes that became the workhorses of the Cold War. With their even better *Swiftsure*- and *Trafalgar*-class sisters, the “fighters” harried the threat at every possible opportunity. Deterrence was of course at the heart of the national defence strategy,

(continued on page 26)

2011

3^rd ANNUAL UNDERSEA WARFARE PHOTO CONTEST

Congratulations are in order to everyone who submitted entries for our 3rd Annual UNDERSEA WARFARE Photo Contest – thanks to all of you; this has been our best competition ever! Not only did the number of entries increase dramatically this year, but there was also a significant improvement in the quality of the work submitted. While we still received a number of perennial favorites like sunset photos taken topside and traditional shots of a sub pulling into port, many of this year's entries also showed genuine artistic vision, as well as technical expertise. From capturing the excitement of a once-in-a-lifetime fireworks burst during the U.S. Submarine Centennial year, to the brooding solitude of a sub passing under a foggy bridge, it's clear that many of our contributing photographers have a talent for knowing what looks good on film.

Another notable aspect of this year's contest is that more than ever, our entries have focused on the most important element of the Submarine Force – the men and women who make it all possible. The old adage of a picture being worth a thousand words was proven time and again as we saw submariners going above and beyond, whether they were at sea or in port, at home, or on liberty. Ultimately, the great support we received from photographers throughout the submarine community have given us a unique, and often beautiful, look at what many of you do every day.



Special thanks are also in order to the Naval Submarine League, which has sponsored the contest since its inception. With their continued backing, as well as the support of budding photographers throughout the fleet, next year is bound to be even better than this one! ▶



First Place

(left) This year's First Place winner features USS *Buffalo* (SSN-715) moored in Pearl Harbor, Hawaii on July 4th, 2000, during the Centennial year of the United States Submarine Force. Photo by **LT Roger Koopman**, Communications Officer aboard *Buffalo*.

Second Place

(below) Our Second Place photo features USS *Springfield* (SSN-761) as it snorkels during a stern-first docking. The tugboats *Paul* and *Sea Tractor* assist her as she moves toward the drydock *Shippingport* (ARDM-4). Photo by **CMDMC(SS/SW) William R. Stoller**, Command Master Chief, USS *Shippingport*, Groton, CT.

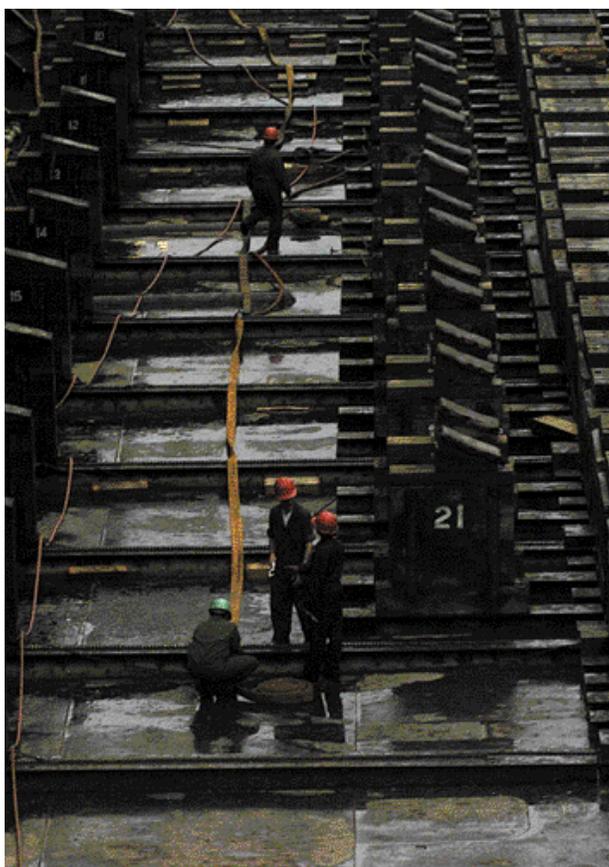


Third Place

(right) Our Third Place photo features a crewmember aboard USS *Philadelphia* (SSN-690) photographed from the sail. Photo by **Atalie F. Baker**, an Illustrator with Fisher-Cal Industries, Inc. who works at U.S. Submarine Base, Groton, CT.

Honorable Mention

(below) This year's Honorable Mention features ET3 Curtis Harvey from Sheboygan, WI and LCDR Matthew Kosnar from Chicago, IL as they prepare to get underway aboard USS *Louisville* (SSN-724). Photo by **PH3 Jennifer Y. Bell**, Fleet Imaging Center Pacific, Yokosuka, Japan.



(above) Shippingport crewmembers SR Martin and SA Wimberly hydroblast USS *Dallas* (SSN-700) while in drydock. Photo by **CMDMC(SS/SW) William R. Stoller**, Command Master Chief, Shippingport, Groton, CT.

(left) Shippingport crewmembers FN Muhica, BT2 Newcom, FN Garcia, and FN House work in the basin of the drydock *Oak Ridge* (ARDM-1). Photo by **Jarrod M. Needle** from Fisher-Cal Industries, Inc., who works at U.S. Submarine Base, Groton, CT.



(above) USS *Springfield*, departing for a 6-month deployment, passes under the New London Bridge at Groton, CT. Photo by **Amy Birdsall Harrington**.



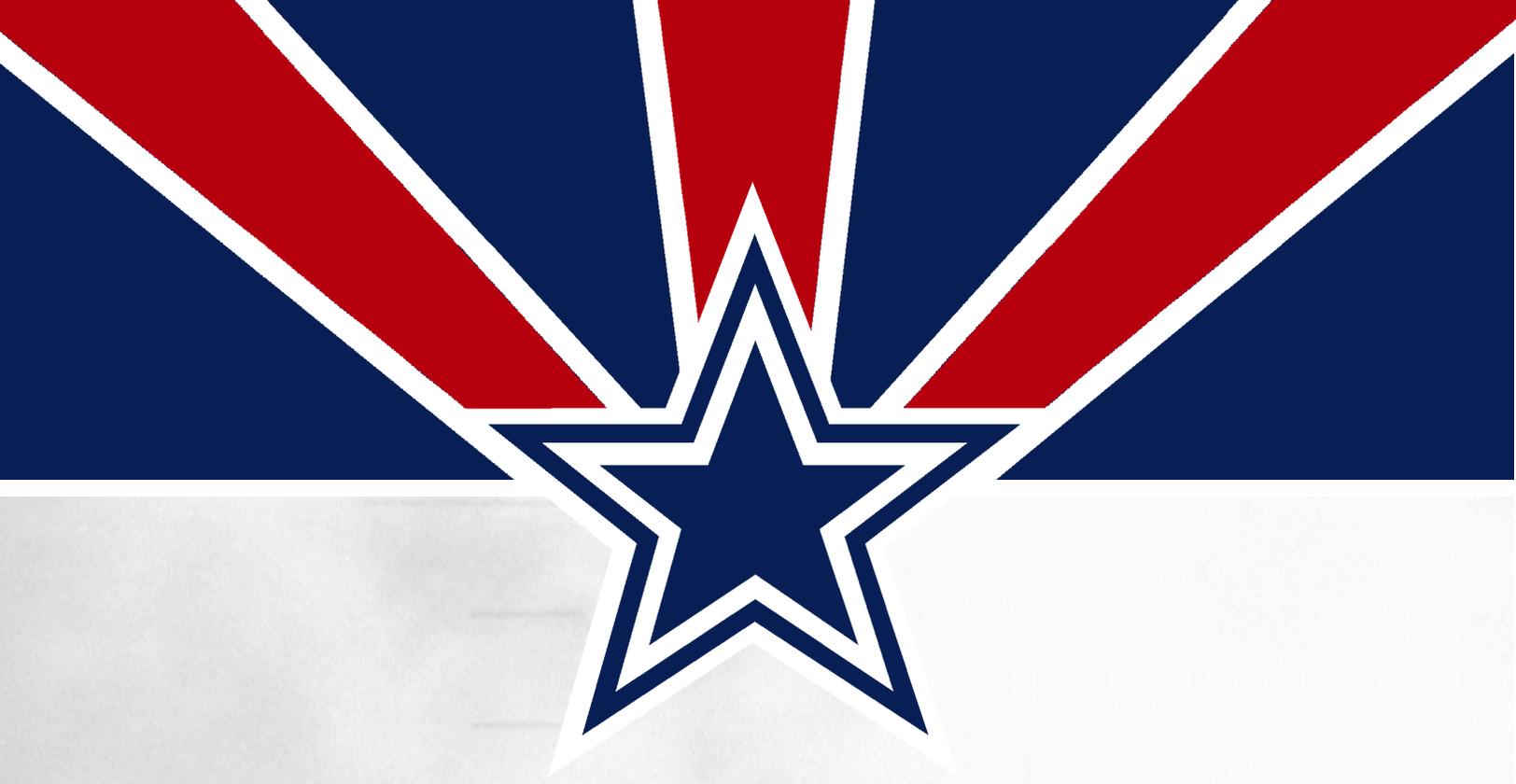
(left) USS *Pennsylvania* (SSBN-735) changes berthing from Waterfront Refit Wharf #1 to Refit Wharf #3 at Kings Bay. Photo by **Fred Madeja**, Trident Refit Facility at Submarine Base, Kings Bay, GA.



(bottom left) The crew of the Visual Information Service Center used flash photography to capture this photo of submarine *NR-1* in the drydock *Oak Ridge*. Photo by **VISC Photo Lab**, U.S. Submarine Base, New London, CT.

(below) STS2 (SS) *Bivens* and FT3 (SS) *Benavides* discuss procedures for getting underway aboard USS *Connecticut* (SSN-22). Photo by **Atalie F. Baker**, an Illustrator with Fisher-Cal Industries, Inc. who works at U.S. Submarine Base, Groton, CT.





RISING TO VICTORY

The Pacific Submarine Strategy in World War II

by Edward C. Whitman

photos courtesy of the Naval Historical Center

Part II: Winning Through

The Man of the Hour

Although he was born in Virginia in 1890, Charles Andrews Lockwood, Jr. was raised in Missouri. He entered the United States Naval Academy in 1908, joined the Submarine Force two years after graduation, and rose to command the old gasoline-powered *A-2* (SS-3) and *B-1* (SS-10) in the Philippines during World War I. Later, he led the First Asiatic Submarine Squadron and served as the Assistant Naval Attaché in Tokyo. Subsequently, he commanded the Simon Lake boats *G-1* (SS-19-1/2) and *N-5* (SS-57), took the ex-German submarine minelayer *UC-97* into the Great Lakes on a Victory Bond drive, and commissioned

R-25 (SS-102), *S-14* (SS-119), and *V-3* (SS-165). In his varied career, Lockwood also commanded the venerable monitor *USS Monadnock* (BM-3) and two gunboats on the Yangtze Patrol, served on the U.S. Naval Mission to Brazil, held down both headquarters and naval shipyard jobs, and headed SUBDIV THIRTEEN at San Diego from 1935 to 1937. Before his assignment as COMSUBSOWESPAC at Fremantle, he had been the U.S. Naval Attaché in London from January 1941 until May 1942. Thus, Lockwood's accomplishments were extraordinary even before the untimely death of RADM English brought him to COMSUBPAC in February 1943.

Fremantle and Brisbane - Early 1943

Two months before Lockwood took up his new position at Pearl Harbor, CAPT James Fife, then a Navy liaison officer at GEN MacArthur's new headquarters at Port Moresby, was ordered to replace the recently-reassigned Ralph Christie at Brisbane. In the aftermath of RADM English's death, however, Christie – now a rear admiral – was hurriedly brought back from the Newport Torpedo Station to replace Lockwood at COMSUBSOWESPAC in Fremantle.

In response to the demands of the Solomons campaign in late 1942, Brisbane was by then home to three submarine



squadrons – some 20 boats and their associated tenders and support facilities. Between the build-up to the invasion of Guadalcanal in August 1942 and its final pacification in February 1943, the Brisbane boats mounted nearly 60 war patrols, including forays into the Solomon Islands and inter-force transfers to Pearl Harbor by way of Truk and Rabaul. This offensive – largely steered by ULTRA cues into heavily-defended areas – accounted for only two-dozen enemy ships, nearly half of those near Truk. Moreover, three of the five boats that left Brisbane in February were lost to enemy action, leading to an internal investigation of Fife’s leadership. In any event, with the Solomons campaign winding down and the war moving north and westward, Fife’s command would be reduced to only one squadron by mid-1943.

During their last several months under Lockwood, the small Fremantle force mounted just over 15 war patrols, but a third of these had been devoted to minelaying off Siam and Indochina, and another third had been associated with transits to Pearl Harbor. Postwar analysis credited 16 enemy ships to this effort, but as the only submarines well positioned to interdict the flow of petroleum – only lightly protected – from the Dutch East Indies to the Japanese operating bases and home islands, the Fremantle boats lost a significant opportunity. With Christie, in the first half of 1943, this pattern began to change, and half of the Fremantle sorties targeted Japanese convoy routes to the north and west. 23 sinkings were eventually confirmed – about one per patrol – but two more boats were lost to the enemy.

Seizing the Initiative from Pearl Harbor

With their failure to retake the eastern Solomons in late 1942, the Japanese turned in 1943 to defending what remained of their earlier conquests. Thus, with new war materiel arriving daily from the United States, the Allies quickly regained the initiative, took back Attu and Kiska in May and August and – under GEN MacArthur – attacked the northern Solomons and “leap-frogged” westerly along the coast of northern New Guinea while isolating and bypassing Rabaul. Late in the year, ADM Nimitz’s island-hopping campaign across the central Pacific got under way in earnest

with the invasion of Tarawa and Makin in the Gilbert Islands in November.

Accordingly, during 1943 the COMSUBPAC submarine force at Pearl Harbor – now under RADM Lockwood – gradually



Chosen as COMSUBPAC after the death of RADM English in January 1943, VADM Charles Lockwood – “Uncle Charlie” – formulated the strategy that won the U.S. Submarine Force their unprecedented undersea victory in the Pacific. Lockwood’s extraordinary submarine career had begun with command of A-2 (SS-3) in the Philippines during World War I.



In April 1942, RADM Ralph Christie (left) was the first commander of the U.S. Submarine Force at Brisbane, Australia and became COMSUBSOWESPAC at Fremantle in early 1943. RADM James Fife (right) relieved Christie at Brisbane in December 1942 and remained there until March 1944. Then, following an assignment in Washington, Fife relieved RADM Christie again – as COMSUBSOWESPAC in December 1944.

came to predominate over their counterparts in Australia. Because the Solomons action had drawn so many submarines to SOWESPAC, SUBPAC could only muster 28 war patrols for the first three months of 1943, and over half were sent to Truk, Palau, and the Marianas. A notable exception was the first penetration of the Yellow Sea in March by USS *Wahoo* (SS-238)

under “Mush” Morton, with a total bag of nine enemy ships. Unfortunately the other Pearl Harbor patrols for that same period saw only limited success, at least partially because of the high priority placed on hard-to-target enemy capital ships. By mid-spring 1943, however, Lockwood’s force had grown to 50 submarines. Between April and August, he was able to send an average of 18 to sea each month for war patrols of 40-50 days, with over half targeted at enemy shipping in Empire waters and the East China Sea.

A significant innovation occurred in July, when Lockwood and his brilliant Operations Officer CAPT (later RADM) Richard Voge sent three submarines into the Sea of Japan, entering from the north through the La Pérouse Strait. The three boats only managed to sink three small freighters in four days before withdrawing, and two subsequent patrols the next month – one under “Mush” Morton – did little better. In September, however, Morton returned to the Sea of Japan a second time and apparently sank four ships before *Wahoo* was lost to a Japanese anti-submarine aircraft in early October while attempting to come back out.

Tackling the Torpedo Problem

Much of Lockwood’s command attention during 1943 was consumed by several nagging materiel problems that had crippled U.S. submarine effectiveness early in the war. Foremost among these was torpedoes – not only a shortage of numbers, but continuing evidence of the design defects the admiral had already encountered during his tenure as COMSUBSOWESPAC.

Lockwood’s earlier investigations at Fremantle had established that U.S. torpedoes were running too deeply, but even when this deficiency was corrected, torpedo performance continued to be suspect. Following an increasing number of attacks foiled by premature warhead explosions apparently due to a too-sensitive magnetic influence exploder, Lockwood prevailed on ADM Nimitz in June 1943 to order the magnetic “pistol” disabled on COMSUBPAC torpedoes and to rely solely on the contact exploder. But even with the magnetic feature disabled, Pearl Harbor submarines continued to experience a significant percentage of “duds,” and it soon emerged that there were also major



defects in the contact exploder. This led Lockwood to a series of careful experiments in Hawaii in which torpedoes were fired against underwater cliffs to determine potential causes of failure. These revealed that the firing pin was too slender to withstand the shock of a 90-degree encounter without buckling and “dudding” the torpedo. When this last piece of the puzzle fell into place in September 1943, performance of the Mark XIV submarine torpedo finally reached acceptability, but it had taken literally half the war to get there. That

to Mare Island for new Winton engines, but it was nearly a year until all had been returned to duty and the H.O.R. maintenance problems eliminated.

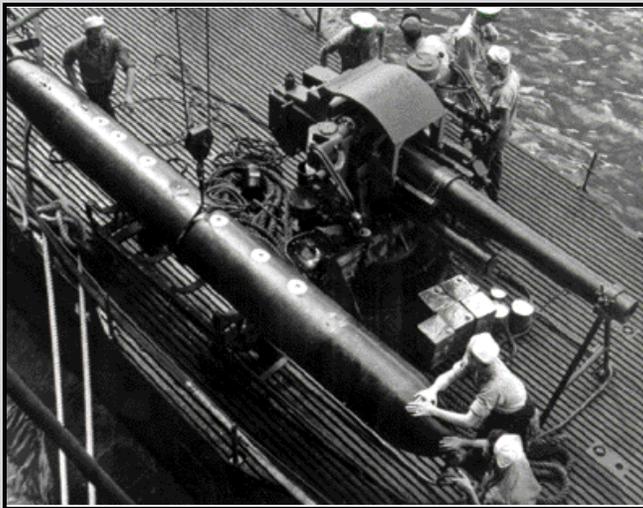
Japanese Supply Lines – a New Focus

For the bloody, but successful, invasion of the Gilbert Islands in November, a dozen submarines provided direct support: conducting reconnaissance, landing commandos, performing “lifeguard” duty to pick up downed U.S. pilots, and blockading Truk. During this same period, however, Lockwood and Voge introduced two additional tactical innovations: deploying small, coordinated submarine “wolf-packs” as tactical units; and concentrating more anti-shiping efforts in the Luzon Strait between the northern Philippines and Formosa, where several Japanese north-south convoy routes from the conquered territories converged. The first three three-boat wolf-packs departed Pearl Harbor in September, October, and December – the first for the East China Sea; the others for the Marianas.

number of submarines stationed in Australia had been fixed at 20, nominally with 12 at Brisbane under CAPT Fife and eight at Fremantle under RADM Christie. As the war moved up the Solomons chain and westward into New Guinea, the boats were reapportioned in favor of Fremantle, and when the total number of Australia-based submarines was increased to 30 late in the year, Fremantle was allocated 22 and Brisbane the rest. Fife made the best of this disparity by establishing an advance base at Milne Bay, New Guinea, 1,200 miles closer to his operating areas off Truk, Rabaul, and Palau. In the latter half of the year, his 33 war patrols resulted in 29 confirmed sinkings along the supply lines linking the three Japanese bases. During that same period, after Japanese tankers were moved up the priority list, Christie’s growing force at Fremantle turned aggressively to attacking the oil traffic from Borneo and Sumatra. Nearly 50 enemy ships were sunk by the Fremantle force between June and December, and a dozen of these were oil tankers.

1943 – the Year of Transition

For all of 1943, the Submarine Force was credited with sinking 335 Japanese targets – or 1.5 million tons of shipping – essentially twice the corresponding figures for 1942. More importantly, after diminishing only slightly in 1942, the total tonnage of the Japanese merchant marine (including oil tankers), dropped 16 percent in 1943, despite a vigorous shipbuilding program not yet disrupted by Allied air attacks. Correspondingly, the importation of bulk commodities (not including petroleum products) into Japan had diminished by the end of 1943 to 81 percent of the pre-war level. Surprisingly, though, Japanese tanker



The Mark XVIII electric torpedo shown here during loading was slower than the troublesome Mark XIV but left no wake and could be produced in greater quantities. By mid-1944, three-quarters of the standard patrol load-out consisted of Mark XVIIIs.

the problem had to be solved in the field by the operators themselves – and in spite of a technical community that only wanted to minimize the deficiencies – still evokes bitter memories.

Moreover, the dubious reliability of the H.O.R. main-propulsion engines – apparent from the beginning of the war – became even more critical in May 1943 when the twelve boats of SUBRON TWELVE arrived at Pearl Harbor, all fitted with H.O.R. diesels. In both shakedown cruises and their European service with the Atlantic Fleet, all of the SUBRON TWELVE submarines revealed engine problems. These only became worse under combat conditions in the Pacific, where virtually all the H.O.R. boats were handicapped by catastrophic breakdowns that often required curtailing war patrols and returning to base for repairs. One by one, the H.O.R. submarines were shuttled back

Results were mixed. The first Marianas effort sank seven ships, but the total score for the other two was only four. Even as tactics and techniques improved, communications and coordination among wolf-pack members at sea remained difficult, and “blue-on-blue” engagements were a worrisome possibility. Nonetheless, in 1944,

“The Submarine Force played a key role in the victory – not only by providing crucial sighting reports, but by sinking or heavily damaging six enemy combatants.”

wolf-packing became increasingly common, particularly for commerce-raiding north of Luzon.

Although both Fremantle and Brisbane maintained a steady level of activity throughout 1943, the latter steadily lost importance as a submarine base in the later stages of the conflict. Early that year, the

tonnage actually *increased* by nearly 30 percent over the year due to need to transport oil from the East Indies.

Starting in mid-1943, the gradual introduction of the Mark XVIII electric torpedo into the theater brought substantial relief from the persistent torpedo shortages of the early war years. Although slower than the

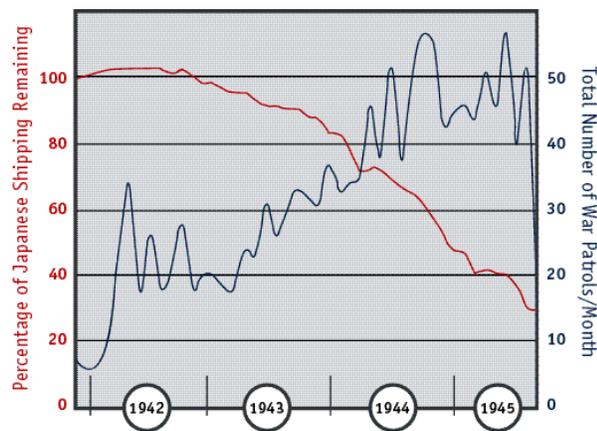


Mark XIV by 10 to 15 knots and somewhat limited in range, the Mark XVIII left no tell-tale wake that could give away a submarine's position, and it was much easier to manufacture in quantity. By the middle of 1944, when all their teething problems had been solved, Mark XVIII torpedoes constituted three-quarters of the standard patrol load-out.

Despite the large percentage of U.S. war patrols targeted specifically at major Japanese bases or cued against Japanese combatants by ULTRA information, U.S. submarines sank only one major Japanese warship in 1943 – the light aircraft carrier IJS *Chuyo*. That same year, fifteen U.S. submarines were lost in the Pacific – plus two in the Atlantic. The Japanese lost 23.

Thrusting Westward – Early 1944

By the time ADM Nimitz's cross-Pacific thrust reached the Marshall Islands at the beginning of 1944, over 60 submarines were assigned to Pearl Harbor and 36 to Australia. Moreover, in recognition of the submarine contribution to the war effort, RADM Lockwood had been promoted to vice admiral just before the turn of the year. He quickly took advantage of the capture of Kwajalein and Majuro in the Marshalls in January 1944 to establish an advance submarine base on the latter in April, which put his Pearl Harbor boats 2,000 miles closer to Japan. Even before the fall of Eniwetok in February, and with Truk coming under increasing carrier-based air attacks, Japanese commander-in-chief ADM Mineichi Koga, had ordered his heavy units to abandon Truk and fall back on the Palaus. Then, under further pressure in late March and early April, Koga ordered a further dispersal of his fleet to Davao and Tawi Tawi (in the southern Philippines), Surabaya, and Singapore.



As the number of war patrols from Pearl Harbor, Fremantle, and Brisbane mounted in 1943 and 1944, the percentage of Japanese merchant tonnage remaining afloat dropped relentlessly from its pre-war level. Of note is the peak of U.S. submarine activity in May 1942 in preparation for the Battle of Midway.

Accordingly, Lockwood's and Christie's submarines at Pearl Harbor and Fremantle were kept busy supporting both the Marshalls campaign and U.S. carrier air strikes. With ULTRA intercepts to give advanced warning of the resulting Japanese withdrawals, numerous attempts were organized to intercept both enemy men-of-war and supply ships. Although a number of Japanese freighters and auxiliaries were sunk, the only major warships destroyed during this period were three light cruisers. Simultaneously, however, Lockwood increased pressure on the Empire, East China Sea, and Kurile Island supply routes, and in March and April sent two more wolf-packs to the Luzon Strait. Only the first of these produced significant results – seven freighters confirmed for about 35,000 tons – but all told, U.S. submarines sank 183 ships or nearly three-quarters of a million tons of shipping in the first four months of 1944.

Decision in the Philippine Sea

In the SOWESPAC area, GEN MacArthur's forces continued their advance westward across New Guinea, and by June 1944 the entire northern coast of the island had been secured. Simultaneously, Nimitz

moved on toward the Mariana Islands with the intention of seizing Saipan, Guam, and Tinian as staging bases for the push toward Palau and the Philippines. To soften up those objectives, the 15 carriers of Task Force 58 under RADM Raymond Spruance mounted a series of powerful air strikes, while Lockwood sent a new wave of submarines westward to interdict any Japanese attempts to reinforce the islands and to provide life-guard services for downed airmen.

To defend the Marianas and Palaus, ADM Soemu Toyoda, replacing ADM Koga, had earlier concentrated the Japanese fleet at Tawi Tawi, and he sortied a powerful force under ADM Jisaburo Ozawa on 13 June in an attempt to thwart the gathering attack on the Marianas. The result was the Battle of the Philippine Sea a week later, pitting Spruance's 15 carriers against Ozawa's nine. Subsequently dubbed "the Great Marianas Turkey Shoot," in which Ozawa lost nearly 350 aircraft without sinking a single American ship, the encounter on 19 and 20 June also cost the Japanese three large aircraft carriers, including two – IJS *Taiho* and IJS *Shokaku* – sunk by U.S. submarines. By the time Ozawa broke off the engagement and retreated northward, Japanese naval aviation had



Present at the formal Japanese surrender in Tokyo Bay on 2 September 1945 were the submarine tender USS *Proteus* (AS-19) and 12 submarines of SUBRON 20. (Fifteen years later, *Proteus* was converted to serve as a tender for the first of the Polaris SSBNs and performed in that capacity in both Scotland and Guam until 1982. She was decommissioned less than ten years ago.)



suffered a devastating loss that would never be redressed. Instead, Japan began training kamikaze pilots. Meanwhile, Saipan had been invaded on 15 June, to be followed by Guam and Tinian later in the summer. By 10 August, the entire Marianas had been taken, and additional advance submarine bases were promptly established at Saipan and Guam.

The emphasis on attacking Japanese shipping continued to grow. An analysis of submarine patrol assignments from the beginning of 1944 until the end of the war shows a steady increase in the percentage targeted at Japanese supply lines – rising from approximately 40 percent at the beginning of that period to more than double that by August 1945. Consequently, Lockwood began sending wolf-packs into the Luzon Strait on a regular basis, redirecting a group of three boats that had participated in the Battle of the Philippine Sea, and dispatching three more wolf-packs by mid-July. All told, these four efforts netted 17 enemy ships. Additionally, COMSUBPAC increased his emphasis on the East China Sea and also established a series of so-called “polar routes” that vectored submarines northward past the Aleutians and westward to the Kurile Islands and the Sea of Okhotsk, where they could prey on Japanese fishing fleets and coastal traders before slipping southward to patrol off Hokkaido and Tokyo Bay.

With Brisbane’s importance steadily diminishing in early 1944, CAPT Fife was re-assigned to staff duty in Washington, and overall command of the Australia-based submarines devolved on RADM Christie. Meanwhile, the Fremantle operation was approaching a peak of activity in September and October, when a total of 38 boats – most in wolf-packs – joined patrols against the Japanese oil “pipeline” from Sumatra and Borneo and enemy attempts to shore up the defenses of the Philippines. These COMSUBSOWESPAC operations were facilitated by establishing two new advance

bases north of New Guinea in mid-year: at Manus in the Admiralty Islands, and at Mios Woendi, just east of Biak. In July through October alone, Christie’s boats sank nearly 100 enemy ships, joining over 150 more destroyed by their counterparts at Pearl Harbor. Exacerbated by the growing toll exacted by air attacks, the effect on the

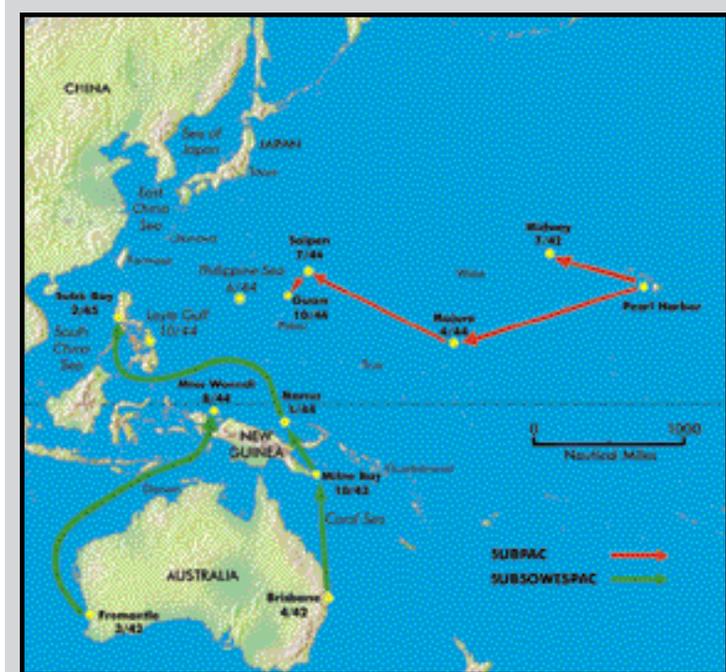
surface fleet, including the super-battleships IJS *Yamato* and IJS *Musashi*, could come up from Singapore, penetrate the San Bernardino and Surigao Straits, and catch the invasion forces at Leyte Gulf in lethal pincers. The result was the Battle of the Leyte Gulf, 23-25 October 1944, perhaps the largest naval encounter ever fought.

To support the U.S. invasion, RADM Christie positioned a dozen submarines southwest of Luzon to interdict Japanese forces coming up from the south, while VADM Lockwood deployed over twenty boats off Japan’s Inland Sea and near the Luzon Strait to counter enemy moves from the north. Christie’s submarines drew first blood early on the morning of 23 October by sinking two Japanese heavy cruisers and severely damaging two others west of Palawan. Then, on the 24th, U.S. carrier aircraft badly mauled the enemy surface forces in the San Bernardino and Surigao Straits – sinking *Musashi* – and then turned northward to find Ozawa’s carriers. In subsequent surface actions, VADM Thomas Kinkaid annihilated the Surigao Strait force, but found himself badly outmatched at the San Bernardino Strait to the north,

where the debouching Japanese battleships sank two escort carriers, two destroyers, and a destroyer-escort before withdrawing – inexplicably – without attacking the landing force.

Then, on the morning of the 25th, Halsey found the approaching Japanese carriers and sank all four of them, leaving only two hybrid carrier-battleships, IJS *Ise* and *Hyuga*, and their escorts to run a gauntlet back to Japan through several scouting lines of U.S. submarines deployed to intercept the “cripples.” Among these, the U.S. boats managed to pick off a light cruiser and a destroyer. In addition to guaranteeing the successful invasion of the Philippines, the Battle of the Leyte Gulf reduced the Japanese Navy to a mere remnant of its former self, almost entirely bereft of carrier aviation. The Submarine

(continued on page 31)



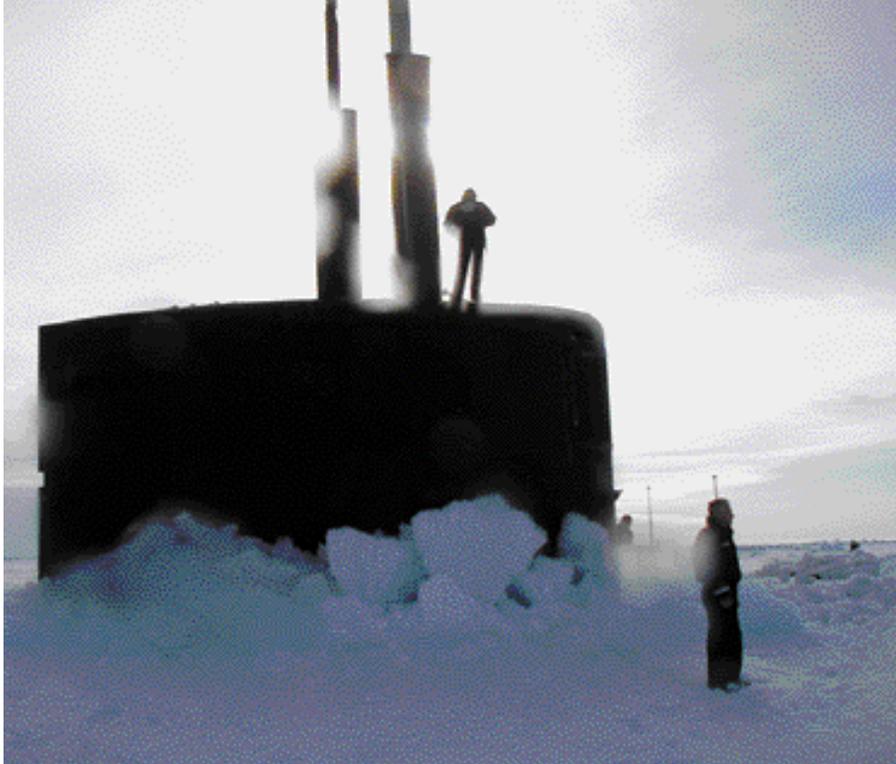
The trail of submarine advance bases established by COMSUBPAC westward from Pearl Harbor – and by COMSUBSOWESPAC northward from Australia – clearly marks the convergence of the Allied offensive on the Japanese homeland in the last years of the war. Japanese defeats in the Battles of the Philippine Sea and the Leyte Gulf marked the beginning of the end.

Graphic by Lakshia Ferebee

Japanese war effort was catastrophic. Total Japanese importation of bulk commodities for 1944 was half the pre-war level, and by the end of the year, their merchant tonnage (again including tankers) had dropped to 47 percent of the pre-war figure.

The Beginning of the End

In preparation for the ensuing invasion of the Philippine Islands, GEN MacArthur’s forces invaded the island of Morotai, northwest of New Guinea, in September 1944, and ADM Nimitz moved on Peleliu and Angaur in the Palau group. When U.S. troops came ashore on eastern Leyte on 20 October, however, ADM Toyoda had already initiated a series of countermoves. His overall plan was to bring VADM Ozawa’s carriers down from Japan to lure VADM William Halsey’s Task Force 38 away from Leyte Gulf so that a powerful



(left) Crewmembers of USS *Scranton* (SSN-756) silhouetted by the Arctic sun.

(below) *Scranton* crewmembers explore the surface of the ice. Note the rudder penetrating the ice in the foreground.



A New Era in the ARCTIC

by J. L. Gossett

This year, for the first time in a third of a century, not one, but two new classes of U.S. submarines have surfaced at the North Pole. On 5 June 2001, USS *Scranton* (SSN-756) broke through almost four feet of ice to become the first 688/688I to surface at the pole. Then, just two weeks later, USS *Connecticut* (SSN-22) conducted the first polar surfacing by a *Seawolf*-class submarine.

These events were just part of LANTSUBICEX 1-01 – a three-ship exercise conducted to demonstrate the U.S. Navy’s continuing commitment to assure access to all international waters. And, like the ice itself, there was much more to the story below the waterline than what showed above the surface.

Since the 1960s, the USS *Sturgeon* (SSN-637)-class submarine has been the “workhorse” of the Arctic. Right up to the last 637 deployment by USS *L. Mendel Rivers* (SSN-686) in late 2000, these submarines were the backbone of Arctic submarine operations. [Editor’s Note: See the *Winter 2001* issue of *UNDERSEA WARFARE*.] With the passing of the venerable *Sturgeon* class, the Submarine Force decided that to maximize its flexibility for global operations, three current

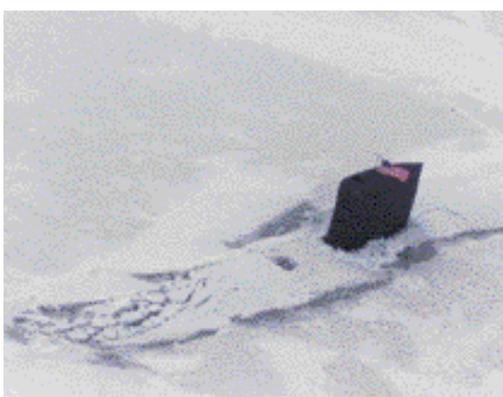
classes – 688, improved 688 (688I), and *Seawolf* – would all have their Arctic capabilities developed to the greatest extent possible. LANTSUBICEX 1-01 was the first step in this process. The theme of the exercise was to evaluate and improve the Arctic operability of all three, and USS *Oklahoma City* (SSN-723), *Scranton*, and *Connecticut* deployed this summer with that goal in mind.

LANTSUBICEX 1-01 evaluated a wide spectrum of submarine operations and systems on the three boats. At their most basic level, Arctic operations require a submarine to withstand sub-freezing (29°F) seawater temperatures, but all of the ship’s systems and components face significant challenges. Of particular interest were:

Surfacing. One of the objectives for this deployment was to conduct the first-ever test of the *Seawolf*-class submarine’s ability to surface in the Arctic. Additionally, NAVSEA had recently upgraded the vertical surfacing procedures for 688/688I-class submarines, which were tested by both *Oklahoma City* and *Scranton*.

Ice Avoidance Sonars. A key element of this

(continued on page 29)



USS *Scranton* (SSN-756) breaks through the Arctic ice at the North Pole.

Submarine Rescue Exercise Teams DSRV *Mystic* with Foreign Navies

Article and photos by LT Doug Gabos,
USNAVEUR Public Affairs

Working with the British and Swedish navies in Operation SEDGEMOOR 01, the U.S. Navy Deep Submergence Rescue Vehicle (DSRV) *Mystic* recently demonstrated its unique capabilities for providing worldwide, quick-reaction, all-weather rescue services for personnel on disabled submarines.

Under the frigid, choppy waters of Scotland's Raasay Inner Sound, just a few miles from the Isle of Skye, the DSRV's four-person crew maneuvered their 50-foot vessel from the back of the British mother submarine, HMS *Vanguard*, and mated it to the hatch of the Swedish submarine, HMSwS *Gotland*, simulating a disabled boat 450 feet below the surface. Later, *Mystic* made its way back to the mother ship and successfully re-mated. In a real-world rescue operation, *Mystic* can retrieve up to 24 submariners at a time. During the exercise, British rescue vehicle *LR-5* transferred personnel from the Swedish boat.

When a call for assistance is received, *Mystic* and its support crew can be quickly loaded onto an aircraft and sent anywhere in the world. At its destination, the DSRV is attached to the back of a mother submarine, which transports the vehicle to the vicinity of the victim. The DSRV detaches and travels to the disabled submarine, mates with a hatch, transfers the stranded submariners onboard, and brings them back safely.

Easier said than done. It's an operation that demands adaptability, creativity, and total professionalism to overcome challenges like brutal weather conditions, inter-operating with foreign navies, and achieving compatibility with rescue vessels, support ships, and submarines. Exercises such as SEDGEMOOR provide just the type of training that Sailors of the Deep Submergence Unit in San Diego, California need in the event an actual rescue is ever required.



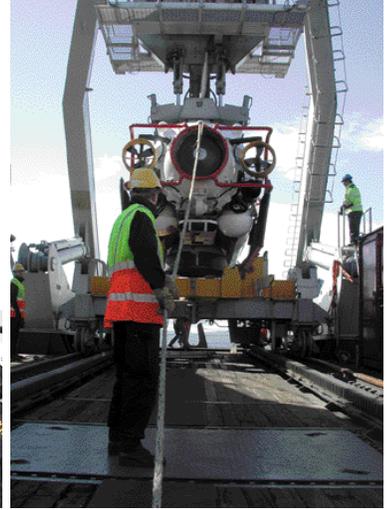
Holland 1 to Vanguard

(continued from page 15)

and that awesome responsibility fell to the RN in 1968 when HMS *Resolution* undertook the first of 229 unbroken patrols by the Polaris-armed R-class "bombers." The story of their successors, the mighty TRIDENT-armed *Vanguards*, continues.

The legacy of the pioneers is a record of sacrifice and achievement of which all British submariners through the ages can be justly proud. What remains unchanging is the men – as LT COL Bradley Gaylord, USAF, observed after three days onboard HMS *Seraph* in 1942: "You suddenly realize that here is one of the essential points about war; there is no substitute for good company. The boys in the Submarine Service convey a spirit which explains why they would sooner be in submarines than anywhere else." (*The Ship with Two Captains* - Terence Robertson)

Jeff Tall, a submariner for almost 30 years and the captain of four HM submarines, has been the Director of the Royal Navy Submarine Museum since July 1994. His proudest achievement there was getting *Holland 1* back on display in May 2001 after a six-year conservation and preservation program. More information on the museum can be found on its website, www.rnsubmus.co.uk.



(clockwise from left)

Swedish submariners travel in the Royal Navy Submergence Vessel *LR-5* back to their submarine.

Submergence Vessel *LR-5* is prepared for deployment aboard the Swedish Diving and Submarine Rescue ship HMSwS *Belos* during Exercise SEDGEMOOR 01.

The U.S. Navy Deep Submergence Rescue Vehicle *Mystic* receives a piggy-back ride aboard the British submarine HMS *Vanguard*.

SEDGEMOOR began as realistically as any real-world rescue mission. *Mystic*, the Navy's only DSRV, was delivered from San Diego to the Royal Air Force base at Prestwick on a U.S. Air Force C-5 Galaxy and then trucked to Kyle of Lochalsh, Scotland. CDR David Clopp, Commanding Officer of the Deep Submergence Unit, noted that in deploying the DSRV to such a remote location, "We can actually test the flyaway system to see if we can get the parts and equipment to the point they need to be, offload the system, and then mate it up with a submarine that we've never operated with before."

The loss of the USS *Thresher* (SSN-593) in 1963 caused the Navy to concentrate on reducing risk in submarine operations. The result was the SUBSAFE program, instituted to ensure that safety was foremost. At the same time, the submarine rescue program was initiated, and now, almost four decades later, the U.S. Navy maintains Submarine Rescue Chambers, useful down to 850 feet, and the Deep Submergence Rescue Vehicle *Mystic*, capable of operating down to 2,000 feet.

Several other rescue scenarios had been planned for SEDGEMOOR. One coupled a surface recovery operation by members of the British Submarine Parachute Assistance Group (SPAG) with a medical drill. Responding to submariners who had egressed from their boat in exposure suits, six members of the SPAG and two life rafts were parachuted from a Hercules aircraft into the vicinity, where the SPAG team transferred the submariners into the rafts. A 160-pound dummy, simulating a rescuee in need of immediate medical attention, was hoisted into a helicopter and transported to the frigate HMS *Monmouth*, where the "victims" were treated by medical personnel. Another drill addressed the complications of radiation exposure.

For Sailors with the Deep Submergence Unit, training aspects were just one benefit of the exercise. Clopp said SEDGEMOOR also facilitated a valuable exchange of ideas with other professionals in the field. "Coming out here, working with different submarines, different people – the best thing is the exchange of information with foreign navies. We learn better ways to do things from them and they learn from us."

World Records, New Technologies At International Submarine Races

Information courtesy of Naval Surface Warfare Center, Carderock Division Public Affairs

New world speed records and innovations in propulsion systems were highlights of the successful running of the 6th International Submarine Races (ISR), an engineering design competition for human-powered submarines held at the U.S. Navy's David Taylor Model Basin, Carderock, Maryland, in June 2001. Sixteen teams – including representatives from 12 colleges and universities and two high schools – participated in the trials, in which custom-designed, wet (flooded) submarines, powered by crews wearing scuba gear, competed against the clock on a 100-meter underwater course.



Photo by Maribeth Johns

Omer 4, a sleek, dolphin-like one-person submarine from the Ecole de Technologie Superieure at Montreal's University of Quebec, established a world speed record of 7.192 knots – over 8.2 miles per hour – on the final day of racing, besting the existing world record of 6.997 knots that *Omer 3* established in 1997. Additionally, an Overall Performance Award went to the team from Virginia Polytechnic University, Blacksburg, Virginia, for speed and maneuverability in the water, as well as a high-tech design of composite materials, computerized advanced power-to-propulsion conversion, and the team's response to challenging and changing circumstances during race week.

This was the third time the event was held at David Taylor. "We were very pleased to be able to host once again such an outstanding educational and engineering endeavor," said CAPT Steven Petri, Commander of Naval Surface Warfare Center's Carderock Division. "Because of the Navy Reserve divers assigned to assist, and the help provided by Carderock personnel, this has been our smoothest and most successful race ever held," added ISR Director Jerry Rovner.

The 6th ISR will be featured on *Scientific American Frontiers* television this fall. The *National Geographic Today* show also covered the event, as well as numerous other news media in the United States, Canada, and Europe.

Broward County Navy Days Honors Submarine Sailors of the Year

Photos by U.S. Air Force Tech. Sgt. Lee Roberts



Commander Naval Surface Force, U.S. Atlantic Fleet, RADM John B. Foley III, and the Mayor of Hollywood, FL, Mara Guilianti, recently presented Sailor of the Year (SOY) certificates to crewmembers from USS *Florida* (SSBN-728) and USS *Boise* (SSN-764). Petty Officer 1st Class Douglas J. Cole (left) was *Florida's* SOY for 2000, and Petty Officer 2nd Class Kevin J. Moore (center) was *Florida's* SOY for 2000 in the Junior Category. Petty Officer 1st Class Wade R. Kiger (right) was *Boise's* SOY for 2000.

Qualified For Command

LCDR Thomas Buchanan, USS *Florida* (SSBN-728)(GOLD)
 Lcdr Thomas Callender, USS *Albany* (SSN-753)
 Lcdr James Crosley, USS *Albany* (SSN-753)
 LT Eduardo Fernandez, USS *Portsmouth* (SSN-707)
 LT Brett Fillmore, USS *Florida* (SSBN-728)(GOLD)
 LT Michael Fisher, USS *Charlotte* (SSN-766)
 Lcdr Barry Gittleman, COMSUBRON THREE
 Lcdr Richard Goodwin, JR. COMSUBRON THREE
 Lcdr Diego Hernandez, USS *Toledo* (SSN-769)
 Lcdr Eric Jones, USS *Henry M. Jackson* (SSBN-730)(BLUE)
 Lcdr Oliver Lewis, USS *Pittsburgh* (SSN-720)
 Lcdr John Lund, USS *Helena* (SSN-725)
 Lcdr Mark Marty, USS *Maine* (SSBN-741)(BLUE)
 Lcdr William McKinney, USS *Albuquerque* (SSN-706)
 Lcdr Jeffrey Pearson, USS *Florida* (SSBN-728)(GOLD)
 LT Phillip Pickett, USS *Georgia* (SSBN-729)(BLUE)
 Lcdr Marshall Prouty, USS *L. Mendel Rivers* (SSN-686)
 Lcdr Michael Savageaux, USS *Toledo* (SSN-769)
 Lcdr Wesley Smith, USS *Hartford* (SSN-768)
 Lcdr Charles Taylor, USS *Alabama* (SSBN-731)(GOLD)
 Lcdr Kai Torkelsen, USS *Alabama* (SSBN-731)(BLUE)

Corrections

Corrections to the Submarine Force Organization Map from the Spring 2001 issue:



Under Commanding Officers, Atlantic Fleet:



Under SUBRON-6:



In the Spring 2001 article, "Regulus: America's First Sea-borne Nuclear Deterrent," the timeline incorrectly showed a photo of the Regulus I missile under the timeline section for "Regulus II".



This is Regulus II.

Submarine Unmanned Undersea Vehicle Detachment Relocates to Bangor

by LCDR Larry Estrada, USN, and Diane Jennings



CAPT Thom Violette, Commander, NUWC Division Keyport, presents a golden key to CAPT Joe Leidig, then-Commodore, DEVRON 5.

Commander, Submarine Development Squadron FIVE (DEVRON 5) recently relocated its Unmanned Undersea Vehicle (UUV) Detachment from San Diego, California to Naval Submarine Base Bangor, Washington. Moving the UUV Detachment, which is responsible for operation, maintenance, and tactical development of submarine UUV systems, is the first step in centrally locating UUV operators and systems.

The Submarine Force's first mine-countermeasure UUV system was initially established in San Diego in 1998. Since then, DEVRON 5 UUV operators have been used in the development and fleet integration of several intelligence, surveillance, and reconnaissance UUV programs.

The majority of submarine UUV field-testing is conducted using the underwater ranges available in the Pacific Northwest. Co-locating operators, UUV systems, and test facilities has significantly reduced personnel travel and will also support a significant mission requirement with the planned arrival of USS *Jimmy Carter* (SSN-23) in future years. While the *Jimmy Carter* will retain its full mission capabilities, it will also conduct significant research and development for the Submarine Force.

CAPT Joe Leidig, former Commodore of DEVRON 5, stated that this is the first of three important steps. The next milestone occurs with the deployment of the next generation submarine-launched UUV to the Pacific Northwest. The third milestone will occur with the arrival of *Jimmy Carter* and the establishment of a shore maintenance facility for supporting several UUV systems in the Bangor/Keyport, Washington area.

LCDR Estrada is the OIC of the UUV Detachment; Diane Jennings is the Public Affairs Officer for NUWC Division Keyport.

NAVPMOSSP to Receive Inaugural Raborn Award

The Naval Program Management Office, Strategic Systems Programs (NAVPMOSSP), in Sunnyvale, California has been selected to receive the 2001 Strategic Systems Programs Raborn Award, presented by RADM Dennis M. Dwyer, Director, Strategic Systems Programs (SSP). This award recognizes individual and command excellence at organizations within SSP's claimancy, including strategic planning and mission accomplishment, personnel achievement, and adherence to and promotion of SSP core values. NAVPMOSSP Sunnyvale has demonstrated an extraordinary level of technical knowledge, professionalism, and dedication in a team effort – the very philosophy inspired by ADM "Red" Raborn, for whom the award is named.

NAVPMOSSP Sunnyvale is responsible for program management of the Fleet Ballistic Missile (FBM) program in the field, providing on-site development, coordination, and maintenance. The command ensures conformance to assigned contracts through all phases of the program, and in addition, is responsible for configuration management, qualification, integrated testing, and other engineering management processes for the missile, launcher, and re-entry body subsystems.

The Raborn Award is designed to provide commands within the SSP claimancy an opportunity to highlight their successes and accomplishments over a year-long period. It is separate from the military-only SSP Golden Anchor Award and similar to the U.S. Strategic Command Omaha Trophy. NAVPMOSSP Sunnyvale will be presented the Raborn Award in October.

Qualified Nuclear Engineer Officer

LTJG Nicholas Blawat, USS Michigan (SSBN-727)(GOLD)
 LTJG Derrick Boom, USS Ohio (SSBN-726)(BLUE)
 LTJG Samuel Cooper, USS Maryland (SSBN-741)(BLUE)
 LTJG Kenneth M. Curtin, USS City of Corpus Christi (SSN-705)
 LTJG Sebastian Dachenhausen, USS Key West (SSN-722)
 LTJG Paul Dee, USS Bremerton (SSN-698)
 LTJG Thomas Donohue, USS Kamehameha (SSN-642)
 LTJG Joseph Dowding, USS Annapolis (SSN-760)
 LTJG Joseph Ertel, USS Pennsylvania (SSBN-735)(GOLD)
 LTJG Eric Flannery, USS Olympia (SSN-717)
 LT Stanley Freemyers, USS West Virginia (SSBN-736)(GOLD)
 LTJG Steven Garza, USS Alaska (SSBN-732)(BLUE)
 LTJG William Getchius, USS Springfield (SSN-761)
 LTJG Erik Hall, USS San Francisco (SSN-711)
 LT James Hodges III, USS Charlotte, (SSN-766)
 LTJG Scott Jackson, USS Asheville (SSN-758)
 LTJG Matthew Jeffery, USS Ohio (SSBN-726)(GOLD)
 LTJG Carl Jewett, USS Kentucky (SSBN-737)(BLUE)
 LTJG Andrew Kleeman, USS Salt Lake City (SSN-716)
 LTJG Michael Loeffler, USS Kentucky (SSBN-737)(BLUE)
 LTJG Kevin Luft, USS Henry M. Jackson (SSBN-730)(BLUE)

LTJG Stephen Lytle, USS Nevada (SSBN-733)(BLUE)
 LTJG John Marsh, USS Michigan (SSBN-727)(GOLD)
 LTJG Robert Miller III, USS Jefferson City (SSN-759)
 LTJG John Mues, USS Tucson (SSN-770)
 LTJG Rajeev Parekh, USS Albuquerque (SSN-706)
 LTJG David Parker, USS Buffalo (SSN-715)
 LTJG Eric Partin, USS Ohio (SSBN-726)(BLUE)
 LT Kamyar Pashneh-tala, USS Jefferson City (SSN-759)
 LTJG Matthew Phaneuf, USS Tennessee (SSBN-734)(BLUE)
 LTJG Christopher Polk, USS Tennessee (SSBN-734)(BLUE)
 LT Djamal Pullom, USS San Juan (SSN-751)
 LTJG Joseph Riehle, USS Georgia (SSBN-729)(BLUE)
 LTJG Davis Rogers, USS Louisiana (SSBN-743)(GOLD)
 LTJG Christopher Sammarro, USS La Jolla (SSN-701)
 LTJG Thomas Sicola, USS Los Angeles (SSN-688)
 LTJG Willie Smith, USS West Virginia (SSBN-736)(GOLD)
 LTJG Ronald Stowe, USS Hyman G. Rickover (SSN-709)
 LTJG James Talley, USS Honolulu (SSN-718)
 LTJG Jason Trichel, USS Henry M. Jackson (SSBN-730)(BLUE)
 LTJG Patrick Tummy, USS La Jolla (SSN-701)
 LTJG Keith Weseli, USS Louisiana (SSBN-743)(GOLD)
 LTJG Richard Wise, USS Topeka (SSN-754)
 LTJG Thomas Wong, USS Albany (SSN-753)
 LTJG Laurence Wrathall, USS Portsmouth (SSN-707)

Changes of Command

COMSUBGRU TEN

RADM Gerald Talbot relieved
RADM Richard Terpstra

COMSUBRON TWO

CAPT William R. Burke relieved
CAPT Douglas Johnson

COMSUBDEVRON FIVE

CAPT Dale M. Nees relieved
CAPT Charles J. Leidig

COMSUBRON SIX

CAPT Raymond Klein relieved
CAPT Frank Drennan

COMSUBRON SIXTEEN

CAPT Gregory Balzer relieved
CAPT Daniel Sigg

COMSUBRON SEVENTEEN

CAPT Timothy Giardina relieved
CAPT Michael R. Oliver

USS La Jolla (SSN-701)

CDR Phillip G. Sawyer relieved
CAPT(sel) Michael E. McLaughlin

USS City of Corpus Christi (SSN-705)

CDR Robert Schmidt relieved
CDR Leo Goff

USS Oklahoma City (SSN-723)

CDR Richard Voter relieved
CDR James G. Foggo, III

USS Florida (SSBN-728)(GOLD)

CDR Dave Duryea relieved
CDR Kevin Torcolini

USS Henry M. Jackson (SSBN-730)(BLUE)

CDR Mark Olson relieved
CDR Paul Imes

USS Alabama (SSBN-731)(GOLD)

CDR Jonathan A. Dowell relieved
CAPT Terry S. Wichert

USS Springfield (SSN-761)

CDR Dan Fourney relieved
CDR Brad Kratovil

USS Frank Cable (AS-40)

CAPT Kevin P. Ryan relieved
CAPT Scott A. Spencer

ARCO (ARDM-5)

LCDR Charles Baker relieved
LCDR Glen Little

NAVSUBTRACENPAC

CAPT Robert N. Nestlerode relieved
CAPT Carlton W. Puryear, Jr.

Naval Submarine Base, San Diego, CA

CAPT Don Boland relieved
CAPT Chris Stathos

Naval Submarine School

CAPT Bill Hanson II relieved
CAPT Arnold Lotring

USS San Juan (SSN-751)

CDR Edward Takesuye relieved
CDR John Barnhill

USS Emory S. Land (AS-39)

CAPT W. Scott Gray IV relieved
CAPT Leonard Zingarelli

We Still Need Your Feedback!

Just as a reminder, UNDERSEA WARFARE still plans to begin a "Letters to the Editor" section, and we look forward to receiving more of your valuable comments and opinions. Send your feedback to: Military Editor, Undersea Warfare CNO (N77C), 2000 Navy Pentagon, Washington, DC 20350-2000. Or E-mail us at: subwarfare_mag@hq.navy.mil.



New Era in the Arctic

(continued from page 25)

deployment was the first Arctic test of two new high frequency sonars: the AN/BSY-2 sonar on *Connecticut* and the AN/BQQ-10 (ARCI Phase-IV) sonar on *Scranton*. In addition, *Oklahoma City* conducted the second Arctic test of the AN/BQS-15A ice avoidance sonar. Sonar performance in detecting ice keels or icebergs is crucial to safe operation in polar waters.

Communications. With normal SSIXS satellites unavailable in the high Arctic, submarines in that region are often limited to communicating with their low data rate VLF floating wire antennas. As an alternative for higher data rates, *Scranton* conducted the first high-latitude test of the Navy's new constellation of Polar EHF satellites.

Navigation. Without surfacing to access GPS, submarines in the Arctic must rely on their onboard inertial navigation systems for position fixing. To improve underice navigation capabilities, *Oklahoma City* conducted the first Arctic test of the new-generation AN/WSN-7A Ring Laser Gyro Navigation (RLGN) system, and all three submarines were equipped with the AN/WSN-2A replacement for the venerable Mk-19 gyrocompass.

Additionally, having all three submarines in the Arctic at the same time provided each boat the opportunity to test its active and passive sonar arrays against real contacts. The results of these technical tests are still preliminary and will take some months to evaluate, but initial indications are that all three classes can play an important role in future Arctic operations.

While participating in the technical tests, all three of the crews experienced the thrill of an Arctic surfacing and the opportunity

to stretch their legs at the top of the world. During the second of *Scranton's* two surfacings, Commanding Officer CDR Earl Carter used an Iridium® satellite telephone to alert the media to the Navy's new presence in the Arctic, and many crewmembers used Iridium® to talk briefly with their families back home. *Scranton* was also joined at the North Pole by a P-3C Maritime Patrol Aircraft (MPA) from VP-16, which took aerial photographs of the surfaced ship and her crew. Additionally, the British Royal Navy – past partners in Arctic operations – had a representative aboard all three U.S. submarines.

During the exercise, *Scranton* spent two days gathering scientific data, similar to that collected during the six SCICEX cruises of the 1990s. This latest data – useful for constructing a profile of major oceanographic parameters across the most variable portion of the Arctic – will be declassified and placed in a civilian repository for use by all of the world's scientists.

The Arctic is too variable an environment to fully test a submarine in one brief deployment, and for 2002, we hope to send one representative from each of the three types back to the region in different seasons. Then, for 2003, we are planning another major operation that may include an ice camp. Thus, the hard work, professionalism, and sacrifice of the men aboard *Connecticut*, *Scranton*, and *Oklahoma City* during LANTSUBICEX 1-01 have inaugurated an exciting post-637 era, and their success has already re-invigorated and strengthened our force-wide Arctic capability.

Mr. Gossett, a 1972 graduate of the U.S. Naval Academy, is the Head of Operations at the Arctic Submarine Laboratory. He has participated in 24 submarine Arctic missions, most recently as Ice Pilot/Technical Director aboard USS *Scranton* during LANTSUBICEX 1-01.

USS *Kamehameha*

(continued from page 11)

Her husband was one of the first Hawaiians to graduate from the U.S. Naval Academy, served as governor of the territory of Hawaii, and strived for Hawaiian statehood.

Kamehameha served valiantly in Submarine Squadrons 1, 14, 15, 16, and 18, and deployed from diverse ports spanning the globe, from Guam, to Charleston, South Carolina, to Rota, Spain. Most recently homeported in Pearl Harbor, she was actively engaged throughout the Pacific performing in all types of exercises and operations with allies.

In addition to normal submarine missions, such as sea control, surveillance, ASW, and strike, the dual dry-deck shelter-equipped *Kamehameha* was provided the opportunity to demonstrate the tremendous flexibility and capabilities of submarine-delivered Special Operations Forces. The dual dry-deck shelters were fitted on the back of the submarine and served as “garages” for swimmer delivery vehicles and stowage of equipment such as inflatable rafts. Divers and Special Operations Forces could deploy from these shelters while the submarine remained submerged, which allowed covert forces to remain undetected in getting to

their destination. Upon return from their mission ashore, the swimmers could again rejoin the submarine while it remained submerged. This edge in stealth made *Kamehameha* the ship of choice for conducting such missions.

“*Kamehameha* very much demonstrates the ability to take a submarine and convert it from one mission (strategic deterrence) to another (special warfare). After more than 25 years of satisfying deterrence, the submarine performed outstandingly in a whole new role,” Seal said. Showcasing the inherent flexibility offered by the larger platform, *Kamehameha* has, in fact, carried as many as 200 troops for a short time, and did so without reducing its load of torpedoes, which are the ship’s primary offensive and defensive weapons.

“Now that USS *Kamehameha* has been inactivated, the nation has lost the dual dry-deck shelter capability, flexibility, and a dedicated platform for operations,” said LT Chap Godbey, the ship’s final Navigator. “The Navy does have an opportunity to re-establish this capability fully with the proposed conversion of four SSBN’s to a strike and special operations configuration (SSGN). This proposal would retain the first four TRIDENT submarines for more than 80 submarine-years of continued

service rather than decommission them before the end of their hull lives,” he added.

The four oldest TRIDENT submarines, USS *Ohio* (SSBN-726), USS *Michigan* (SSBN-727), USS *Florida* (SSBN-728), and USS *Georgia* (SSBN-729), are under active consideration for conversion from SSBN (ballistic missile submarine) to SSGN (guided missile submarine). **Carrying up to 154 Tomahawk missiles, or a large special operations force contingent (four platoons), TRIDENT SSGNs would build on the concepts proven by ships like the *Kamehameha* and USS *James K. Polk* (SSN-645) to provide our CINCs with extraordinary firepower, capability, and versatility.** Inactivation of the first four TRIDENT SSBNs begins in 2003.

Following the ceremony recently held in Pearl Harbor, the USS *Kamehameha* is scheduled to journey to Bremerton, Washington to be de-fueled, cut up, and recycled. “Decommissioning the ship and transferring off leaves an empty spot in my heart. I appreciate the work of the crew and their dedication to keep it operating. I think the accomplishments of the crew and submarine created a legacy and demonstrated what the spirit of the American people do every day,” said Minnich.

Line Officer Qualified in Submarines

LTJG Hyowon Ahn, USS Los Angeles (SSN-688)
 LTJG Jeffrey Anderson, USS Rhode Island (SSBN-740)(BLUE)
 ENS Aaron Ausbrooks, USS Ohio (SSBN-726)(BLUE)
 LTJG Jonathan Ball, USS *Kamehameha* (SSN-642)
 LTJG Steve Blazejewski, USS Maine (SSBN-741)(BLUE)
 LTJG Joseph Burneff, USS Key West (SSN-722)
 LTJG Matthew Chapman, USS Georgia (SSBN-729)(GOLD)
 LTJG Timothy Clark, USS Rhode Island (SSBN-740)(BLUE)
 LTJG Eric Cole, USS Cheyenne (SSN-773)
 LTJG Josh Cook, USS Louisville (SSN-724)
 LTJG Kristoffer Dieter, USS Alabama (SSBN-731)(BLUE)
 LTJG Ryan Erdman, USS Santa Fe (SSN-763)
 LTJG Sean Ferguson, USS Asheville (SSN-758)
 LTJG Grant Flynn, USS Los Angeles (SSN-688)
 LTJG John Frye, USS Key West (SSN-722)
 LTJG James Fuller, USS Cheyenne (SSN-773)
 LTJG Leland Gardner, USS Olympia (SSN-717)
 LTJG Shawn Gee, USS Portsmouth (SSN-707)
 LTJG Demian Gough, USS Louisville (SSN-724)
 LTJG Scott Grossman, USS Nebraska (SSBN-739)(BLUE)
 LTJG Brian Guise, USS Chicago (SSN-721)
 LTJG Brian Hogan, USS City of Corpus Christi (SSN-705)
 LTJG Steven Isomura, USS Houston (SSN-713)
 CWO2 Roy Jones, COMSUBRON EIGHT
 LCDR Kirk Kanode, USS Parche (SSN-683)
 LTJG John Kennedy, USS Nevada (SSBN-733)(BLUE)

LTJG Christopher Lee, USS Nebraska (SSBN-739)(BLUE)
 LTJG Paul Lee, USS Albuquerque (SSN-706)
 LTJG Brett Levander, USS Olympia (SSN-717)
 LT Gregory Lied, USS La Jolla (SSN-701)
 LTJG Ryan MacGregor, USS Alabama (SSBN-731)(GOLD)
 LTJG Brian Majeski, USS Albany (SSN-753)
 LTJG George Major, USS Parche (SSN-683)
 LTJG Michael Marthaler, USS Helena (SSN-725)
 LTJG Samuel McGowan, USS Topeka (SSN-754)
 LTJG Brian McQuirk, USS Cheyenne (SSN-773)
 LTJG Matthew McNamara, USS Bremerton (SSN-698)
 LT Michael Meeks, USS Cheyenne (SSN-773)
 LTJG George Miller, USS Montpelier (SSN-765)
 ENS George Moore, USS Rhode Island (SSBN-740)(BLUE)
 LTJG Thomas Neal Jr., USS Georgia (SSBN 729)(GOLD)
 LTJG Alan Nelson, USS Georgia (SSBN 729)(BLUE)
 LTJG James Newton, USS Helena (SSN-725)
 LTJG Edward Nielsen, USS Bremerton (SSN-698)
 LTJG Kamyar Pashneh-Tala, USS Jefferson City (SSN-759)
 LTJG David Ridings, USS Maine (SSBN-741)(BLUE)
 LTJG Joshua Smith, USS Honolulu (SSN-718)
 LTJG Ryan Snyder, USS Chicago (SSN-721)
 LTJG Jeffrey Sowa, USS Alaska (SSBN-732)(GOLD)
 LTJG Arnold Stankus, USS Toledo (SSN-769)
 LTJG Bradley Stevens, USS Nebraska (SSBN-739)(BLUE)
 LTJG Edward Stickle, USS Hampton (SSN-767)
 LTJG Hernesto Tellez, USS Tucson (SSN-770)
 LTJG Craig Thayer, USS Hampton (SSN-767)
 LT Carville Webb, USS Dolphin (AGSS-555)
 LTJG John Yi, USS Topeka (SSN-754)
 LTJG Brian Young, USS Parche (SSN-683)

Qualified Surface Warfare Supply Officer

LTJG Mark Cutler, USS Frank Cable (AS-40)

Qualified Surface Warfare Medical Service Corps Officer

LT Vanita Ahuja, USS Frank Cable (AS-40)
LCDR Toby Wilson, USS Frank Cable (AS-40)

Qualified Surface Warfare Dental Corps Officer

CDR Jerome McSwain, USS Frank Cable (AS-40)

Qualified Surface Warfare/Air Warfare Research Officer

LT Andrew Morton, USS Frank Cable (AS-40)

Docking Officer

LT James Barnes, Shippingport, ARDM-4

Qualified Surface Warfare Officer

ENS Jeffery Brooks, USS Frank Cable (AS-40)
LTJG Celeta Burks, USS Frank Cable (AS-40)
ENS Aubrey Hamlett, USS Frank Cable (AS-40)
ENS Calvin Hendrix, USS Frank Cable (AS-40)
ENS John Leaman, USS Frank Cable (AS-40)
ENS Jeffrey McMillan, USS Frank Cable (AS-40)
ENS Anthony Pecoraro, USS Frank Cable (AS-40)
ENS Michael Sherrod, USS Frank Cable (AS-40)
ENS Richie Taylor, USS Frank Cable (AS-40)

Supply Officer Qualified in Submarines

ENS Michael Breaux, USS Nebraska (SSBN-739)(BLUE)
LT Charles Dunphy, USS Santa Fe (SSN-763)
LT Michael O'Connell, USS Parche (SSN-683)
LT Aaron Potter, USS Tucson (SSN-770)

Rising to Victory

(continued from page 24)

Force played a key role in the victory – not only by providing crucial sighting reports, but by sinking or heavily damaging six enemy combatants.

The re-conquest of the Philippines continued with the invasions of Mindoro and Luzon in December 1944 and January 1945, leading to the recapture of Manila in early February. Meanwhile, with the remains of the enemy war fleet withdrawn into home waters, U.S. submarines were free to concentrate almost entirely on Japanese shipping. During all of 1944, more than 600 Japanese ships – or 2.7 million tons – were eventually credited to the U.S. boats, including a battleship, seven aircraft carriers, nine cruisers, and numerous smaller combatants. In the same period, the Pacific boats rescued 117 downed airmen from the sea in lifeguard missions. On the negative side, 19 U.S. submarines were lost to enemy action during 1944 – plus one sunk in a training accident – but in contrast, the Japanese sacrificed 56.

Final Victory in the Pacific

1944's anti-shipping campaign was so successful that by the beginning of 1945, virtually nothing was left to sink. Few enemy targets remained outside the Sea of Japan, the Yellow Sea, and narrow coastal lanes plied only by day. Nonetheless, U.S. submarines pursued their remaining quarry wherever it could be found, patrolling up and down the Japanese coast and often penetrating deep into their harbors, while performing lifeguard duty in support of a crescendo of air attacks on mainland targets by both carrier-based and long-range bombers. In February, the Australia-based Submarine Force – now under newly-promoted RADM James Fife – established another advance submarine base at Subic Bay north of Manila, and within a few months, VADM Lockwood had moved his own headquarters forward to Guam. By then, more than 120 U.S. submarines were operating in the Pacific.

By the time of the invasions of Iwo Jima and Okinawa in February and April 1945, Japan's war-making capacity had been virtually eliminated, and continuing air-raids on the major cities and military complexes were wreaking horrendous destruction on the civil and industrial infrastructure. Although detailed planning had begun for a massive invasion of the Japanese home

island of Kyushu in November 1945, the unleashing of atomic weapons on Hiroshima and Nagasaki in early August brought a merciful end to the conflict on the 14th of that month. The formal surrender instrument was signed on the deck of USS *Missouri* (BB-63) in Tokyo Bay on 2 September. Appropriately, VADM Lockwood participated in the ceremony, and a dozen submarines and the tender USS *Proteus* (AS-19) were anchored nearby.

Reflecting how completely the Japanese merchant marine had been swept from the seas, U.S. submarines sank only 190 enemy ships – most of them quite small – in the seven and one-half wartime months of 1945, equivalent to half the monthly average achieved in 1944. Since 1941, the Pacific Fleet Submarine Force had sunk over 1,300 enemy vessels – or 5.3 million tons of shipping – approximately 55 percent of all Japanese ships lost during the conflict. (The remainder was lost to aircraft, mines, and other causes.)

Although this destruction was wrought by less than two percent of U.S. Navy personnel, our undersea victory in the Pacific exacted a heavy toll of ships and men. A total of 52 U.S. submarines were lost in World War II, most with all hands. Over 3,500 officers and enlisted men sacrificed their lives – 22 percent of those who went on patrol – the highest casualty rate in the U.S. armed forces. *Let us forget.*

*“There is a port of no return, where ships
May ride at anchor for a little space
And then, some starless night, the cable slips,
Leaving an eddy at the mooring place...
Gulls, veer no longer. Sailor, rest your oar.
No tangled wreckage will be washed ashore.”*

- Leslie Nelson Jennings (“Lost Harbor”)

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Philadelphia To Faslane In Just Three Years

by LTJG Josh Wig, USN

Standing over a cadaver in a Philadelphia medical school three years ago, I had no idea I'd ever be writing about my experiences as a submariner. Ever since I was a child growing up in rural northwestern Pennsylvania, I had wanted to become a doctor. I wanted to save the world and keep people free from disease. Well, that was a great goal, and I started down that path, but if there's one thing my time as a submariner has taught me, it's that there's always room for improvement.

At the end my first year of medical school, I was dissatisfied, burned out, and thousands of dollars in debt. Moreover, with the radical changes in health care we've seen over the last decade, and managed care threatening to dehumanize medicine, I began to have serious doubts about pursuing a medical career. Even so, I originally approached the armed services to find a way to get my remaining medical studies paid for.

Because of my grandfather's sea stories about his time on an LST after World War II, I felt a very strong pull toward the Navy. Although I intended to explore only the medical opportunities, the recruiter I talked with convinced me to take an aptitude test for several other officer programs, and I qualified for just about all of them! But only one really sparked my interest – and for the first time, I seriously considered something other than medicine. A month later, I was in Kings Bay touring a submarine, and a month after that, standing on a hilltop in Arlington National Cemetery, I was being sworn in to active duty.

Ever since that day, there's been no time to look back. Officer Candidate School, the nuclear pipeline, and Basic Submarine School seemed to fly by, and now I'm on my first boat, USS *Tennessee* (SSBN-734)(GOLD). Despite the fact that I'm in an environment that expects and accepts nothing less than perfection, the simple fact is that submarining is fun. The camaraderie and teamwork here are like nowhere else I've known. The responsibility given to me at age 25 is very exciting. As a doctor, individual patients depend on you for their health and well being, but as an Officer of the Deck, I will have one hundred and fifty lives hanging on my every order. And then there's the role we play in keeping our strategic asset poised and ready to fight for the defense of the free world.

Moreover, *Tennessee* GOLD's officers and crew recently became international diplomats when we brought our ship to the Royal Navy Submarine Service's centennial celebration at Faslane, Scotland. To see submarines from

Portugal, Spain, the Netherlands, the United Kingdom, France, and Sweden in the fog of a sheltered loch was breathtaking. But even more startling was seeing two U-boats from a unified Germany, and Polish and Russian Kilos, in one sweep of the periscope.

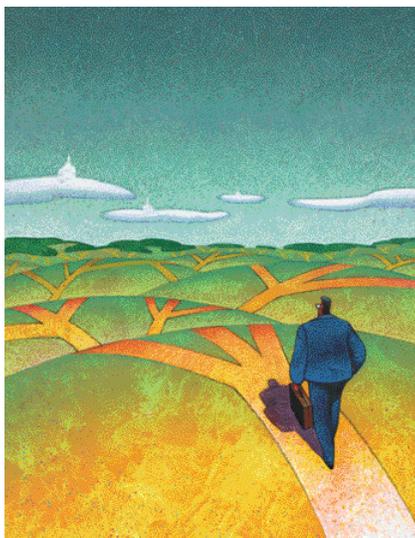
What an invaluable experience it was to find common ground among submariners from countries recently at odds with each other! Meeting Sailors from the Russian boat, hearing their stories, and trading warfare pins was testimony to the fact that the times are changing, and for the better. These fellow submariners share the same hopes and dreams that we all do – prosperity, peace, and time at home with their families. Yet, like us, they leave their people, sail the same unforgiving seas, and operate for

months without seeing the light of day. Mother Nature doesn't discriminate, and just as we all face the same dangers, basic submarining principles are universal the world over. I believe we can learn a lot from each other, both from our mistakes and our successes.

With Admiral Skip Bowman, Director of Naval Reactors, as host, we were privileged to show off the world's most powerful warship to distinguished guests from the United Kingdom, including their Flag Officer Submarines and Chief of Defense Procurement. And we not only strengthened old ties, but we made new friends as well. Overcoming cultural barriers and embracing com-

mon interests and goals can only aid progress toward finding peace and prosperity on a global scale. Significantly, before leaving Faslane, the crew took up a collection and left behind a considerable donation that will be used to bring the orphans of the *Kursk* over to Scotland for a visit. Port calls of this nature are good not only for international relations, but also for the morale and maturity of the crew. To have had those few days to roam the countryside, sample the cuisine, and enjoy the culture was the experience of my young lifetime.

Well, I guess I'm not going to be a doctor, but the profession I've chosen is just as challenging and just as gratifying. The Navy has given me the opportunity to grow beyond myself in serving a noble cause and the ability to perform confidently under the most stressful conditions – something that many spend a lifetime looking for but never find. It is a privilege to carry on the traditions of the world's greatest Submarine Force, and I'm looking forward to wearing my dolphins with pride – defending democracy, and standing tall behind the periscope wherever the Navy sends me.



Welcome to UNDERSEA WARFARE's new back-page feature section, "Operational Depth." With this new "Op-Ed" column, we hope to offer an opportunity to anyone in the Submarine Force, from seaman to admiral, to share unique experiences or personal insights that have distinguished their lives as submariners. Whether you want to write about something you do every day, or a once-in-a-lifetime happening you'll never forget, put pen to paper – or fingers to keyboard – and tell us what your work means to you, how you feel about your ship, or what a great port-call you had. Our thanks to LTJG Josh Wig of USS *Tennessee* (SSBN-734) for this first offering.



PortVisits

USS Columbia Visits the Land Down Under



While the other ships of the USS *Constellation* (CV-64) battle group were living it up in Sydney, Australia, USS *Columbia* (SSN-771) was still steaming for the opposite side of the continent, heading for the city of Stirling and her first port visit of WestPac 2001. Soon after the sub arrived, many crewmembers left for nearby Fremantle

and Perth to enjoy the sights and meet the people of Australia. Perth alone offered a remarkable 1.3 million extremely friendly Australians to get better acquainted with!

According to the crew, dining in the city was superb. Some crewmembers even had the opportunity to prepare entrees side by side with local Australian chefs. "To be able to see and experience a typical day in the life of a fellow chef had

immeasurable benefits," said Mess Specialist First Class Michael Gouin, from Charleston, South Carolina.

Many crewmembers took guided tours of Australia's outback, where they enjoyed playing with the herds of kangaroos, as well as assorted wallabies, tiger snakes, llamas, camels, emus, and of course the ever popular koala bear. "Australia was beautiful, the people were great. And the animals were... well, I never thought I'd have the opportunity to hug a camel," said Ensign Rami Musallam, a native of Houston, Texas.

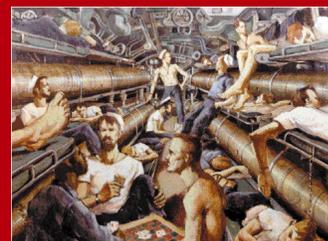
During the visit, almost half the crew also took the time to lend a helping hand in cleaning up the local War Memorial and setting the foundation for playground equipment at the School for the Disabled. The crew was also visited by several Australian Naval Submarine Officers, who were anxious to tour the *Columbia*.



On The Back

"Crew's Quarters Aboard a U.S. Submarine" by American artist Paul Starlett Sample offers an excellent depiction of off-duty life aboard a World War II submarine on patrol. Born in 1894, Sample first studied art at Dartmouth College, but left to spend the last year of World War I in the Navy. After returning to finish his degree, Sample went on to hold many respectable positions in the art world - including Artist-in-Residence back at his old alma mater. Ultimately, Sample came to be known as one of the premier American artists of his time. His unique style was grounded in Regionalism, a movement that has been described as "an affirmation of American life."

As America was preparing to enter World War II in 1941, Life Magazine decided that it was appropriate to not only have their news photographers on hand to cover the war effort, but some of the country's best artists as well. Paul Sample was first commissioned in the spring of 1941 to portray America's preparation for war at a Detroit shell factory, and was later assigned to cover naval aviation aboard aircraft carriers on wartime patrols. Later in the war, he was commissioned to paint the efforts of the U.S. Submarine Force. Throughout his tenure as a combat artist, Sample was adept at capturing the most intimate moments of military life, from the tense expressions of pilots aboard a carrier just before flight, to the animated conversations and card games of submariners off watch.



Artwork and information courtesy of U.S. Army Center of Military History.





Crew's Quarters Aboard a U.S. Submarine

by Paul Starlett Sample