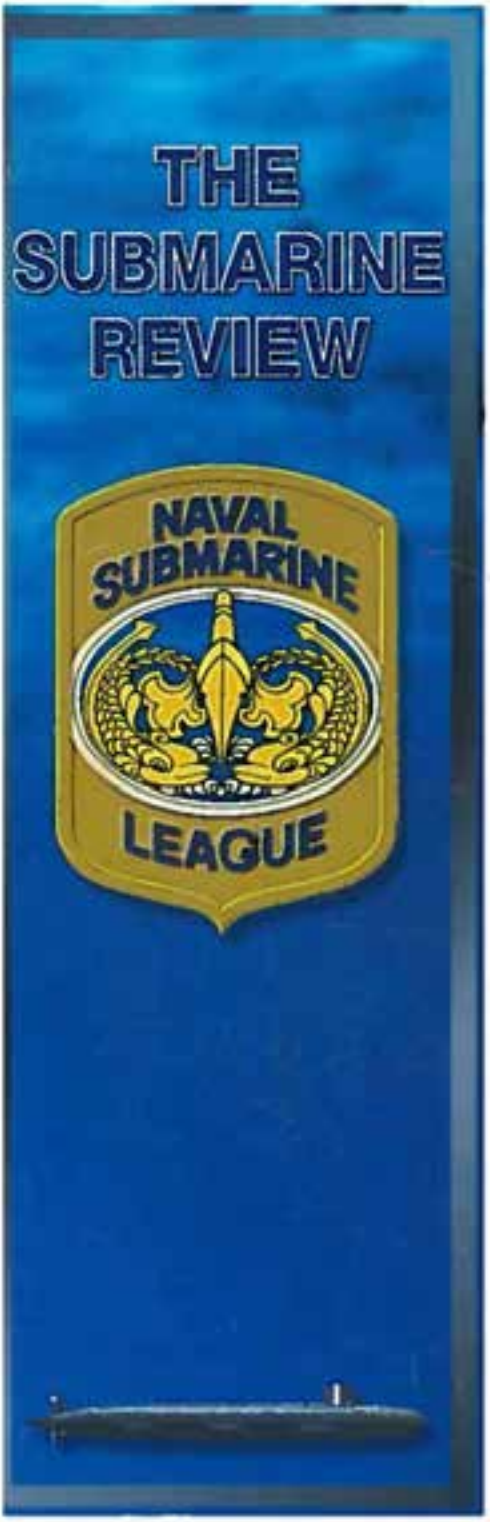

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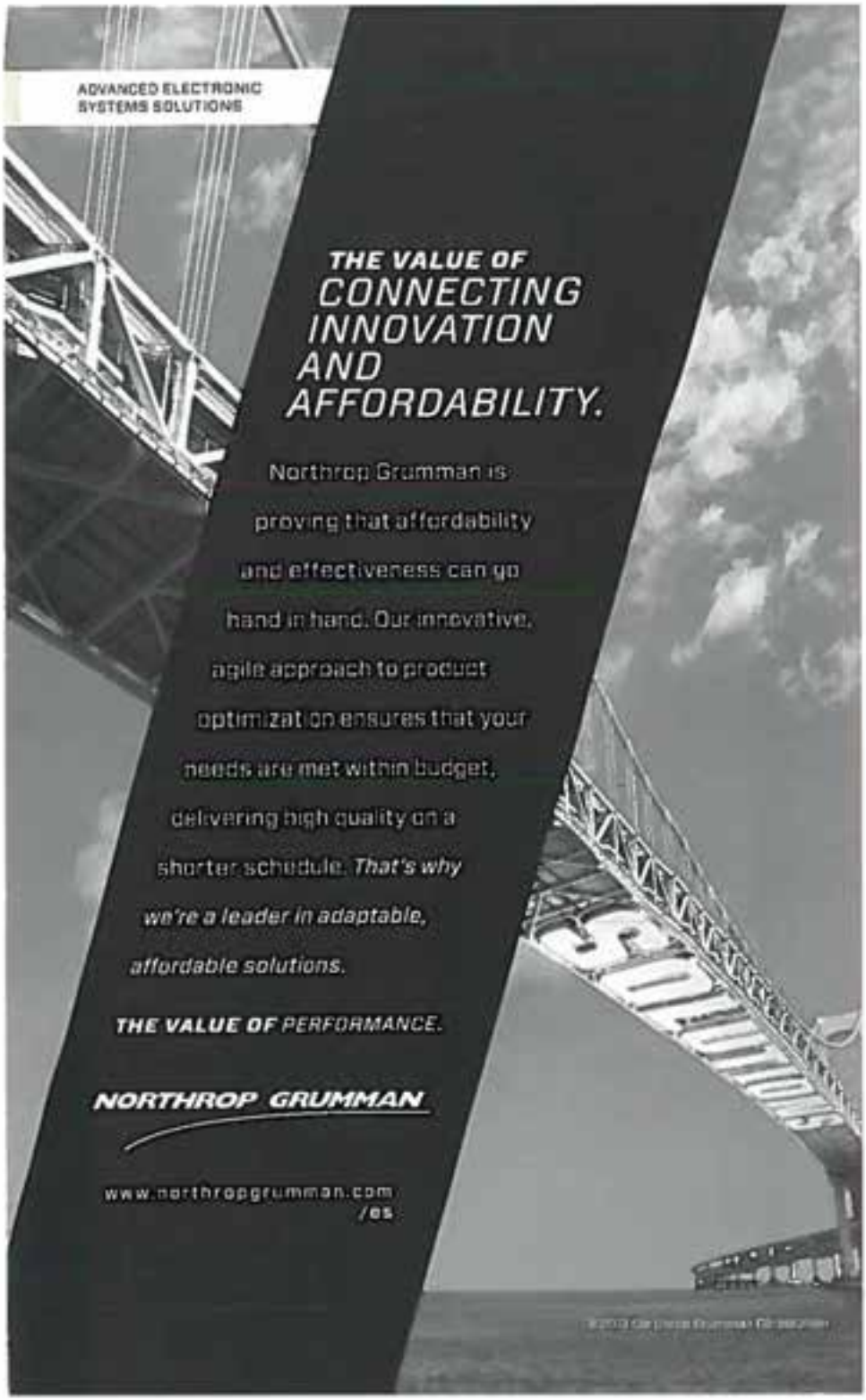
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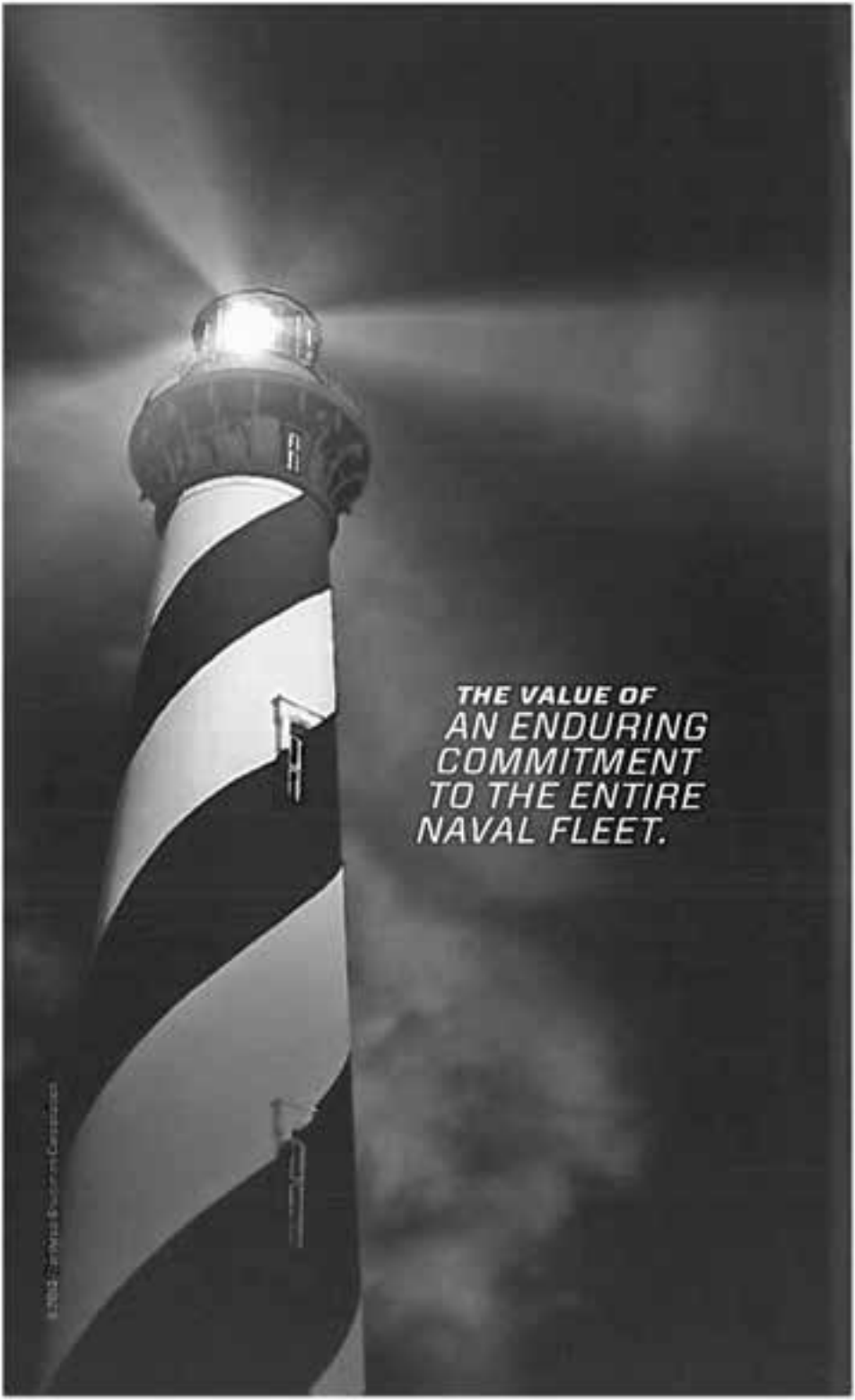
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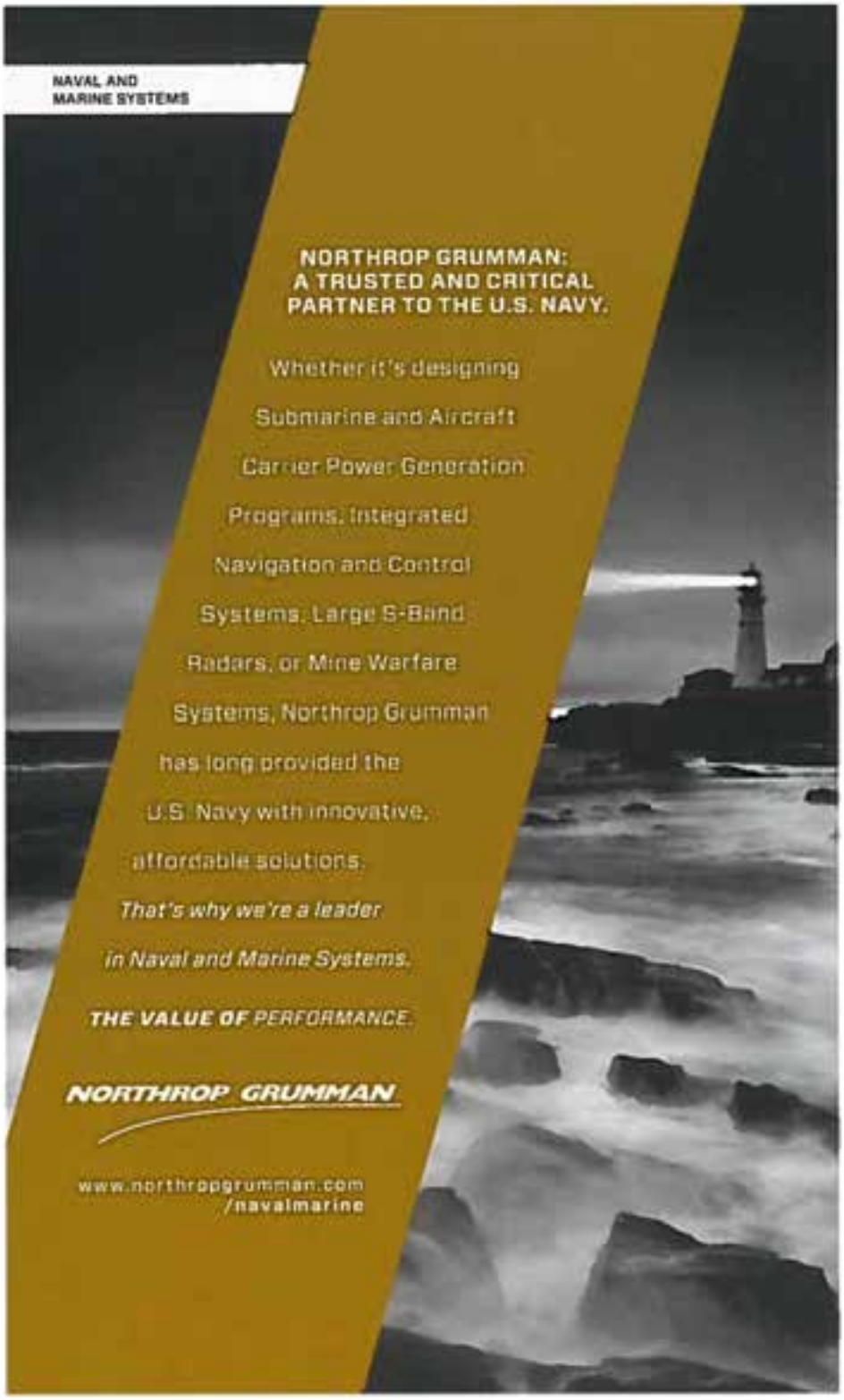
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EDITOR'S COMMENTS

The OHIO Replacement Program is the number one acquisition priority for the USN Submarine Force. It should be the number one priority acquisition program within the Defense Department, and indeed in the entire government. Perhaps enough policy level people in the complex approval chain will agree with that logic so the program can be built in the required form and strength in the time in which it is needed. It must be realized by all that this is not just another *submarine* program but the core of AMERICAN DETERRENCE against aggression for most of the 21st century. That's what is really important. This is an ongoing discussion and THE SUBMARINE REVIEW will continue to carry commentary on its progress.

The three FEATURES in this issue of the magazine address some main topics about the make-up of a successful DETERRENT POSTURE; a half-century of Cold War era discussions and subsequent proofs has convinced most knowledgeable folks the DETERRENCE has to have (1) a credible force with enough weapon effectiveness, and survivability in the face of a preemptory attack. Another indispensable factor is (2) a demonstrable national will to use that force.

In the lead FEATURE, RADM Breckinridge, the OpNav Director of Submarine Warfare, lays out the form of the ship and the structure of its force in terms of both effectiveness and survivability. In the second FEATURE, a panel of national security experts offer thoughts on the nation's NUCLEAR POSTURE, an obviously necessary factor in the effectiveness equation for a DETEERENT Force. These opinions are offered in the face of suggestions by others for a *Minimum Deterrence*, and by some for a *Zero Nuclear Posture*. The third FEATURE is an excerpt from an annual Congressional Reference Service report to the Congress about the Prompt Global Strike capability, a conventional warhead on a submarine launched ballistic missile. It is a capability which has been requested by the military for use when a nuclear strike is not appropriate and it could be introduced in the relatively near term. It has not been authorized, however,

apparently due to concerns that any SLBM launch (or any ICBM launch either for that matter) can be interpreted as the start of a nuclear attack. If the need for this weapon system is felt to be critical to a DETERRENCE POSTURE which provides both nuclear It would seem that potential for misunderstanding could be addressed by a strong US declarative DETERRENT POLICY statement addressing both national will and viable means.

Mr. Joe Buff, in his ARTICLE Submarine Deterrence in the Middle East, has suggested the *extension* of deterrence to rogue nations with small, but very dangerous, nuclear capabilities in addition to the more accepted case of peer, and near-peer, competitor states. Joe is a frequent contributor to these pages and has several submarine-related novels to his credit. Unlike the retired submarine officer novelists we have recently been presenting, who can base their stories on experience, Joe Buff uses all open published information for his source material. The basis for his *extension* suggestion is available to all.

Several other ARTICLES also warrant mention here. LT Hilger, a submarine officer at the Navy's PG School, has commented at length on a JO's view of current training practices, Captain James M. Patton, the more senior of our two Captains Jim Patton, has written of a PacFleet planning exercise meant to better understand existing capabilities and circumstances which laid the basis for a new strategy. Also about the Pacific, but in the latter part of World War II, Mr. Messner has put together a broad picture of US submarine contributions to what became known as the *Marianas Turkey Shoot* in the Philippine Sea. Major contributions in the form of individual actions.

Jim Hay
Editor

FROM THE PRESIDENT

The Submarine Force continues to demonstrate its exceptional capability in the most challenging operational and fiscal environments, meeting the highest standards of training, maintenance, and operations. Our strategic deterrent force validates its mission with every successful patrol and our attack submarines operate around the world supporting each of our Combatant Commanders.

The Submarine Force continues to take delivery of submarines ahead of schedule and below budgeted cost. MINNESOTA (SSN 783) is scheduled to be commissioned in Norfolk, VA, on 7 September 2013 and all VIRGINIA class submarines currently under construction are on track to deliver ahead of schedule and under budget.

It is anticipated that the FY 2014 DoD Budget will fund two submarines per year throughout the Five Year Defense Plan and, despite the budget challenges in the Department of Defense, the VIRGINIA Class acquisition program continues to enjoy broad support. Much of this support can be attributed to:

1) The superb performance of submarines and their crews
2) The responsiveness, versatility and combat capability that our submarines provide
3) The success of the VIRGINIA Class acquisition program

The OHIO Replacement Program continues to receive strong support as its engineering and design program moves forward. As the Submarine Force's top priority, the Submarine Force Leadership has been clear in articulating the importance of strategic deterrence and the Ohio Replacement Program as the cornerstone of our nation's security.

I appreciate your sustained efforts to update and educate your elected representatives on the importance of the VIRGINIA Class Submarine and OHIO Class Submarine Replacement Programs.

The Annual History Seminar, ***"SEAWOLF and the Maritime Strategy"***, was held on 11 April 2013 at the Cold War Gallery of

the U. S. Navy Museum at the Washington Navy Yard. Presenters included RADM Millard Firebaugh, USN (Ret.), CAPT Peter Swartz, USN (Ret.), and AMBASSADOR Linton Brooks. RADM Jerry Holland's panel provided some excellent historical facts and explanations about the SEAWOLF Class as it related to the Maritime Strategy. A transcript of the seminar has been prepared.

The final NSL event for 2013 is the Annual Symposium celebrating our 31st Anniversary. It will be held in the venue at the Fairview Park Marriott in Falls Church, Virginia on 23-24 October. The Submarine Force Fall Cocktail Party will be held on the first evening of the program. We will recognize the performance of eight fleet award winners, the Gold and Silver Dolphins for 2013 and the literary and photo award winners. We will also recognize the Distinguished Submariner and Distinguished Civilian at the Banquet. Please look for the mailing to all members this September, which will include a ballot for the election of members of the NSL Board of Directors.

I encourage your efforts to get involved with local Naval Submarine League Chapters to help them in their support of the active duty forces. We have a dedicated set of volunteer leaders in our chapters, and I am looking for ways to help you become more engaged with the active duty submariners in your areas. We are the professional organization that supports the Submarine Force. Your Naval Submarine League continues efforts to increase membership and focus on initiatives to recruit members who are active duty and retired, officer and enlisted, members of the industrial base and submarine advocates. I ask each of you to recruit a new member by asking friends and associates to join the Naval Submarine League and to participate in the League activities. We need every submariner and all who support them to be involved in sustaining and improving the superior Submarine Force that is so critical for our national defense.

THE SUBMARINE REVIEW is widely distributed throughout the Submarine Force, industry, Congress, and educational libraries. Your contributions to the Editor are the sources and information that keep it interesting to read and a trusted resource to those who are submarine advocates. I ask that you provide your

comments, articles and feedback to the Editor when you have something of interest to report. Finally, our website is being updated to make it a better resource for our members. All of our members receive an e-mail copy of the periodic NSL Update which includes articles of interest, recent obituaries and links to items of interest. Please let us know how these resources can better serve you.

Bobbie joins me in wishing you a healthy and relaxing summer.

John Padgett
President

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IN MEMORIAM

VICE ADMIRAL EUGENE P. WILKINSON OBITUARY

From the New York Times of July 15, 2013 by Paul Vitello.

Vice Admiral Eugene P. Wilkinson, who commanded the Nautilus—the United States Navy's first nuclear-powered submarine and the first machine to harness atomic fission for propulsion rather than weaponry—died on Thursday in Del Mar, Calif. He was 94.

His family confirmed the death.

As commander of the 324-foot, lead-lined, dirigible-shaped submarine, Admiral Wilkinson made headlines worldwide when he steered NAUTILUS, propelled by its onboard reactor, out of a shipyard in Groton, Conn., into Long Island Sound on Jan. 17, 1955, and uttered his first radio message: "Under way on nuclear power."

The vessel represented a historic technological achievement; a personal triumph for Admiral Wilkinson's mentor, Admiral Hyman G. Rickover, the founding father of the nuclear Navy; and a resounding if double-edged statement about war and peace and the future uses of nuclear power.

President Dwight D. Eisenhower saw in NAUTILUS the commercial potential of nuclear power, a theme of his "Atoms for Peace" initiative in the years before the first commercial nuclear power plant was built in the United States, based on technology pioneered by the NAUTILUS.

Military analysts greeted the submarine as the vanguard of a new age in warfare, a machine previously unimagined except in the fiction of Jules Verne (whose novels *20,000 Leagues Under the Sea* and *The Mysterious Island* featured a submarine called the Nautilus).

Faster and more agile than any submarine before, it was able to cruise almost indefinitely without refueling. (The half-joking rumor among the crew was that they would surface every four

years to re-enlist.) It became the prototype for the Navy's perpetually prowling fleet of strategic nuclear missile subs.

Admiral Wilkinson's career straddled the commercial and military realms of nuclear power. He went on to command the Navy's first nuclear-powered surface ship, the cruiser Long Beach, from 1959 to 1963. At his retirement from the Navy in 1974, he was the vice admiral in command of all submarine warfare operations.

From 1980 to 1985 he ran the Institute of Nuclear Power Operations, a nonprofit organization established by the nuclear power industry to improve safety standards in the aftermath of the Three Mile Island accident near Harrisburg, Pa.

Admiral Wilkinson recalled the NAUTILUS launching as the apex of a period of unqualified optimism about atomic energy. "If you were involved in nuclear," he told The San Diego Tribune in a 1989 interview, "you were a white shining knight."

Eugene Parks Wilkinson was born on Aug. 10, 1918, in Long Beach, Calif., and was orphaned shortly afterward, when his father, Dennis, died in a car accident and his mother, Daisy, succumbed to a sudden illness. He was raised by his grandparents Dennis and Lillian Wilkinson, who ran a small creamery.

Admiral Wilkinson, who was known as Dennis to family and friends, graduated from San Diego State College with a degree in physics and chemistry and was teaching chemistry there as a graduate student when World War II broke out. After he enlisted, the Navy sent him to an officer training program and assigned him to diesel-driven submarines. He received the Silver Star for valor in the Pacific.

Teaching at the Navy's submarine school after the war, he was wavering between pursuing a Navy career and returning to his postgraduate studies when Admiral Rickover, the newly appointed head of the Navy's nuclear power development agency, offered him a chance to do both.

With a corps of other handpicked officers, he was sent to study atomic physics and nuclear reactors at the Oak Ridge National Laboratory in Tennessee and the Argonne National Laboratory in Illinois. He later served as the representative of the

Bureau of Ships at Atomic Energy Commission offices in the Pittsburgh area. He is survived by three sons, Dennis, Stephen and Rod; a daughter, Marian Casazza; and four grandchildren. His wife, Janice, died in 2000.

In a 2001 biography of Admiral Rickover, Francis Duncan wrote that he chose Admiral Wilkinson, a commander at the time, to skipper NAUTILUS because he was "intelligent, imaginative, and free from the deadly embrace of tradition" — a reference to his not having graduated from the United States Naval Academy in Annapolis, Md. The two remained friends until Admiral Rickover's death in 1986.

Crusty and temperamental, Admiral Rickover also had a mischievous sense of fun, which Admiral Wilkinson recalled in an article for The Saturday Evening Post in 1955. NAUTILUS was on its maiden voyage, he wrote, when Admiral Rickover took a turn at the controls. After completing a scheduled test maneuver, he then ad-libbed orders for a nonsensical, if not dangerous, move: "Take her down and put her on the bottom," he said. "All ahead full."

"This left me in a rather embarrassing situation," Admiral Wilkinson wrote, "since I had to countermand all the Admiral's orders immediately."

FEATURES

OHIO REPLACEMENT-THE RIGHT ANSWER

by RADM Richard Breckenridge, USN
Director of Submarine Warfare, Office of the CNO

Over the last five years, the Navy—working with U.S. Strategic Command, the Joint Staff and the Office of the Secretary of Defense—has formally examined various options to replace the Ohio ballistic missile submarines as they retire beginning in 2027. This analysis included a variety of replacement platform options, including designs based on the highly successful Virginia-class attack submarine program and the current Ohio-class ballistic missile submarine. In the end, the Navy elected to pursue a new design that leverages the lessons from the Ohio, the Virginia advances in shipbuilding and improvements in cost-efficiency.

Recently, a variety of writers have speculated that the required survivable deterrence could be achieved more cost effectively with the Virginia-based option or by restarting the Ohio-class SSBN production line. Both of these ideas make sense at face value—which is why they were included among the alternatives assessed—but the devil is in the details. When we examined the particulars, each of these options came up short in both military effectiveness and cost efficiency.

Virginia-based SSBN design with a Trident II D5 missile.

An SSBN design based on a Virginia-class attack submarine with a large-diameter missile compartment was rejected due to a wide range of shortfalls. It would:

- Not meet survivability (stealth) requirements due to poor hull streamlining and lack of a drive train able to quietly propel a much larger ship
- Not meet at-sea availability requirements due to longer refit times (since equipment is packed more tightly within the hull, it requires more time to replace, repair and retest)

- Not meet availability requirements due to a longer mid-life overhaul (refueling needed)
- Require a larger number of submarines to meet the same operational requirement
- Reduce the deterrent value needed to protect the country (fewer missiles, warheads at-sea)
- Be more expensive than other alternatives due to extensive redesign of Virginia systems to work with the large missile compartment (for example, a taller sail, larger control surfaces and more robust support systems)

We would be spending more money (on more ships) to deliver less deterrence (reduced at-sea warhead presence) with less survivability (platforms that are less stealthy).

Virginia-based SSBN design with a smaller missile

Some have encouraged the development of a new, smaller missile to go with a Virginia-based SSBN. This would carry forward many of the shortfalls of a Virginia-based SSBN we just discussed, and add to it a long list of new issues. Developing a new nuclear missile from scratch with an industrial base that last produced a new design more than 20 years ago would be challenging, costly and require extensive testing. We deliberately decided to extend the life of the current missile to decouple and de-risk the complex (and costly) missile development program from the new replacement submarine program. Additionally, a smaller missile means a shorter employment range requiring longer SSBN patrol transits. This would compromise survivability, require more submarines at sea and ultimately weaken our deterrence effectiveness. With significant cost, technical and schedule risks, there is little about this option that is attractive.

Ohio-based SSBN design

Some have argued that we should re-open the Ohio production line and resume building the Ohio design SSBNs. This simply cannot be done because there is no Ohio production line. It has long since been re-tooled and modernized to build state-of-the-art

Virginia-class SSNs using computerized designs and modular, automated construction techniques. Is it desirable to redesign the Ohio so that a ship with its legacy performance could be built using the new production facilities? No, since an Ohio-based SSBN would:

- Not provide the required quieting due to Ohio design constraints and use of a propeller instead of a propulsor (which is the standard for virtually all new submarines)
- Require 14 instead of 12 SSBNs by reverting to Ohio class operational availability standards (incidentally creating other issues with the New START treaty limits)
- Suffer from reduced reliability and costs associated with the obsolescence of legacy Ohio system components

Once again, the end result would necessitate procuring more submarines (14) to provide the required at-sea presence and each of them would be less stealthy and less survivable against foreseeable 21st century threats.

The Right Answer: A new design SSBN that improves on Ohio:

What has emerged from the Navy's exhaustive analysis is an Ohio replacement submarine that starts with the foundation of the proven performance of the Ohio SSBN, its Trident II D5 strategic weapons system and its operating cycle. To this it adds:

- Enhanced stealth as necessary to pace emerging threats expected over its service life
- Systems commonality with Virginia (pumps, valves, sonars, etc.) wherever possible, enabling cost savings in design, procurement, maintenance and logistics
- Modular construction and use of COTS equipment consistent with those used in today's submarines to reduce the cost of fabrication, maintenance and modernization. Total ownership cost reduction (for example, investing in a life-of-the-ship reactor core enables providing the same at-sea presence with fewer platforms).

Although the Ohio replacement is a *new design*, it is in effect an SSBN that takes the best lessons from 50 years of undersea

deterrence, from the Ohio, from the Virginia, from advances in shipbuilding efficiency and maintenance, and from the stern realities of needing to provide survivable nuclear deterrence. The result is a low-risk, cost-effective platform capable of smoothly transitioning from the Ohio and delivering effective 21st century undersea strategic deterrence.

AN AGREEEMENT IN SUPPORT OF A SUSTAINABLE U.S. NUCLEAR POSTURE

Editor's Note: A major discussion is being conducted in national security policy circles concerning America's nuclear weapons posture. This discussion is not generating significant public notice on the order of the far more visible, and understandable, news of sequestration and potential cuts in current forces and major defense acquisitions. It is, however, more important since it will have a direct impact on US Deterrence. One side of the discussion favors a drastic reduction in nuclear weapons, some even favor a total elimination. The other side, represented in this compilation of argument seeks to maintain a useful deterrent posture. How this discussion is resolved could have major impact on the Ohio Replacement Program.

The Signers of this document:

With respect to the role and value of U.S. nuclear weapons:

- Despite differences of opinion about the nature of the current security environment, agree with the policy of the current and the previous administrations that the United States (U.S.) should maintain nuclear forces at the lowest levels necessary to meet its deterrence, assurance, and defense requirements. U.S. nuclear weapons are essential—most importantly, they deter nuclear blackmail or nuclear attack on the U.S., its deployed forces, or its allies by another nuclear weapon state. Even those who are optimistic about the current security environment agree that nuclear weapons remain an important hedge against unpredictable geopolitical and technological developments.

- While sharply divided on the desirability and feasibility of a world without nuclear weapons, agree that, should the goal be pursued, the most important steps that can be taken to move toward a world without nuclear weapons are improvements in international security conditions. Global nuclear disarmament requires resolving disputes between India and Pakistan, Israel and its neighbors, and other conflicts, while also stemming any further nuclear proliferation—objectives that are desirable in their own right.

    - Further agree that a world without nuclear weapons will not be achieved in the near- to medium-term—or, as President Obama put it, "perhaps not in my lifetime." Despite occasional pronouncements in favor of total nuclear disarmament, other nations possessing nuclear weapons have shown little inclination to reduce their stockpiles to zero.

    - Since no signatory wants the U.S. to rust its way to disarmament, agree that the U.S. should maintain a safe, secure and reliable nuclear arsenal as long as other states retain nuclear weapons.

With respect to the U.S. nuclear posture:

- Despite some disagreement about the pace of modernization, agree that, for the foreseeable future, the U.S. should sustain a strategic triad of delivery systems and dual-capable fighters; as a whole, these capabilities meet important strategic objectives and mitigate risk. Indeed, at this time, there is no overriding economic, political, or strategic advantage in eliminating any leg of the triad or nuclear-capable fighter aircraft.

- Agree the U.S. must modernize its nuclear command and control system in order to support presidential situational awareness and decision-making. The system must be secure, survivable, redundant, and integrated with new capabilities such as cyber and missile defense.

- Further agree that sizing U.S. nuclear forces must include close consideration of existing and emerging threats, the capabilities of adversaries or potential adversaries, the security concerns of allies, and the known strategic uncertainties that can be identified.
- Also agree that U.S. nuclear weapons should remain forward-deployed in Europe as long as they are required for assurance and deterrence, although a U.S.-Russian agreement on non-strategic nuclear weapons (NSNWs), particularly if it included limits on numbers and locations, would have a bearing on this requirement.

• Agree that differences about which systems to modernize and when are surmountable. The U.S. should continue to extend the life of systems such as the Minuteman (so long as this remains feasible) while replacing systems such as the Ohio-class submarine where extension is not possible. The Air Force is developing its new penetrating bomber with both a conventional and nuclear capability. Signatories agree that the bomber should be nuclear capable and that, in order to save near-term costs, the decision to equip it with nuclear weapons and to certify it for the nuclear mission can be made later.

- Agree that the U.S. should interpret the policy of not developing new nuclear weapons with new military capabilities in a way that permits sensible modifications to current weapons during the life extension process that improve safety, security, and reliability but do not result in new military capabilities.
- Agree that the U.S should pursue needed nuclear modernization efforts but recognize that, in the current fiscal climate, special emphasis must be given to cost containment.

• Agree that missile defenses can play a useful role in supporting U.S. deterrence objectives and security commitments.

- Agree that the U.S. should continue to develop and field theater ballistic missile defenses capable of dealing with

potential attacks from North Korea, Iran, and other countries on U.S. allies and U.S. forces deployed abroad.

- While continuing to support development and maintenance of national ballistic missile defense (NMD) against Iran and North Korea, agree that it is not practical to field NMD defense against attacks from Russia and is increasingly impractical to field NMD against significant attacks from China.

With respect to the U.S. nuclear weapons complex:

• While divided on the mechanics of the solution (e.g., with respect to governance of the nuclear complex and its possible consolidation), agree that the U.S. nuclear weapons complex is in significant need of both modernization and improvement in governance. The complex must be capable of reliably meeting Department of Defense requirements for Life Extension Programs in a timely and affordable manner and certifying the security, safety, and reliability of the nuclear force. A major improvement is needed in cost estimating and schedule adherence for construction of complex facilities.

With respect to the role of arms control, nonproliferation, and nuclear testing:

• While not unanimous on the need for, and utility of, formal arms control with Russia, agree that enhancing strategic stability with Russia must remain the goal of any such agreement.
Signatories also agree that that the U.S. nuclear arsenal should remain at least as capable as any other state's nuclear arsenal.

- While divided over the wisdom of U.S. unilateral reductions in its nuclear stockpile, agree that any U.S.-Russian agreement on reducing nuclear weapons should be verifiable.

• While divided on whether U.S. nuclear weapons reductions, coupled with a reduced role for U.S. nuclear weapons, encourages states to cooperate with the U.S. on nonproliferation goals, agree

that U.S. nuclear reductions have no impact on the calculus of Iran and North Korea.

• Agree that the U.S. should remain committed to sustaining a robust international regime of nonproliferation, strengthening the Nuclear Nonproliferation Treaty (NPT), and supporting the International Atomic Energy Agency (IAEA).

  - Further agree that there is insufficient evidence to indicate that further disarmament steps by the U.S. – whether negotiated or unilateral—will result in a new-found willingness by nonaligned states to embrace restrictions on enrichment or to call for the universal application of the Additional Protocol.

• While sharply divided on the political feasibility and utility of pursuing the ratification of the Comprehensive Test Ban Treaty (CTBT), agree that the U.S. should base its internal planning for sustaining the U.S. nuclear posture on a continued moratorium on nuclear testing.

With respect to the way forward:

• Agree that a credible and effective nuclear deterrent is critical to U.S. leadership as long as other states retain nuclear weapons, both for maintaining the U.S. global network of security assurances and commitments and sustaining a robust international regime of non-proliferation.

• Agree that providing safe, secure, and reliable U.S. nuclear forces – for now and for the foreseeable future – will only be possible if there is agreement on what needs to be done and constancy of purpose in actually doing it.

• Agree that the single most important factor in forging and sustaining domestic support for U.S. nuclear policy is strong, persistent presidential leadership.

• Agree that senior administration and congressional leaders must be willing to speak to the basic principles of an agreed way forward and avoid the temptation to stress only those elements which appeal to a particular support group—on both the right and the left. Now is the time to engage in a constructive dialogue on

specific, often contentious, issues with the intention of establishing a common understanding and agreement on how best to support a sustainable U.S. nuclear posture.

In alphabetical order[1]:

Barry Blechman, the Stimson Center
Linton Brooks, Former Administrator, National Nuclear Security Administration
Robert DeGrasse
Lt Gen Frank G. Klotz, USAF (Ret), Council on Foreign Relations, and former Commander, Air Force
Global Strike Command
Franklin C. Miller, the Center for Strategic and International Studies
Clark Murdock, the Center for Strategic and International Studies
George Perkovich, the Carnegie Endowment for International Peace
Steven Pifer, the Brookings Institution

[1] Those signing this statement are expressing their personal views, not those of the institutions with which they are affiliated.

AN EXCERPT FROM THE CRS REPORT FOR CONGRESS PREPARED FOR MEMBERS AND COMMITTEES OF CONGRESS

CONVENTIONAL PROMPT GLOBAL STRIKE AND LONG-RANGE BALLISTIC MISSILES: BACKGROUND AND ISSUES

Ms. Amy F. Woolf
Specialist in Nuclear Weapons Policy
April 26, 2013

Summary

Prompt global strike (PGS) would allow the United States to strike targets anywhere on Earth with conventional weapons in as little as an hour. This capability may bolster U.S. efforts to deter and defeat adversaries by allowing the United States to attack high-value targets or *fleeting targets* at the start of or during a conflict. Congress has generally supported the PGS mission, but it has restricted funding and suggested some changes in funding for specific programs.

Many analysts believe that the United States should use long-range ballistic missiles with conventional warheads for the PGS mission. These would not substitute for nuclear weapons in the U.S. war plan but would provide a *niche* capability, with a small number of weapons directed against select, critical targets. Some analysts, however, have raised concerns about the possibility that U.S. adversaries might misinterpret the launch of a missile with conventional warheads and conclude that the missiles carry nuclear weapons. DOD is considering a number of systems that might provide the United States with long-range strike capabilities.

The Air Force and Navy have both considered deploying conventional warheads on their long-range ballistic missiles. The

Navy sought to deploy conventional warheads on a small number of Trident II submarine-launched ballistic missiles. In FY2008, Congress rejected the requested funding for this program, but the Navy has continued to consider the possibility of deploying intermediate-range technologies for the prompt strike mission. The Air Force and DARPA are developing a hypersonic glide delivery vehicle that could deploy on a modified Peacekeeper land-based ballistic missile—a system known as the Conventional Strike Missile (CSM). In FY2008, Congress created a single, combined fund for the conventional prompt global strike (CPGS) mission. This fund is supporting research and development into the Air Force CSM and two possible hypersonic glide vehicles. Congress appropriated $174.8 million for CPGS capability development in FY2012. DOD requested $110.4 million in FY2013, but Congress appropriated $200 million in the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6).

When Congress reviews the budget requests for CPGS weapons, it may question DOD's rationale for the mission, reviewing whether the United States might have to attack targets promptly at the start of or during a conflict, when it could not rely on forward-based land or naval forces. It might also review whether this capability would reduce U.S. reliance on nuclear weapons or whether, as some critics have asserted, it might upset stability and possibly increase the risk of a nuclear response to a U.S. attack. This risk derives, in part, from the possibility that nations detecting the launch of a U.S. PGS weapon would not be able to determine whether the weapon carried a nuclear or conventional warhead. Congress has raised concerns about this possibility in the past.

Although the Air Force Conventional Strike Missile is a key contender for the CPGS mission, the Air Force may not be able to deploy this system until later in this decade, as the hypersonic glide vehicle has not yet had a successful test flight. Hence, Congress may review other weapons options for the PGS mission. These include not only ballistic missiles and boost-glide systems, but also bombers, cruise missiles, and possibly scramjets or other advanced technologies.

Finally, Congress is likely to question how the New START Treaty, signed by the United States and Russia in April 2010, would affect U.S. plans for the CPGS mission. Warheads deployed on boost-glide systems would not be affected by the treaty because these are new types of strategic offensive arms. But those deployed in existing types of reentry vehicles on existing types of ballistic missiles would count against the treaty limits. This report will be updated as needed.

ARTICLES

UNDERSEA STRATEGIC DETERRENCE IN THE MIDDLE EAST

by Mr. Joe Buff

Joe Buff is a novelist with several submarine-related books to his credit. He is a frequent contributor to THE SUBMARINE REVIEW.

Expansion of a Dinner Talk at the USS SILVERSIDES Reunion, Holiday Inn New London North, New London, CT, 27 July 2013

Executive Summary

Much of the public debate on how to halt the Islamic Republic of Iran's nuclear program has focused, even fixated, on whether a pre-emptive attack is appropriate if current international sanctions fail. But this leaves unanswered twin broader questions:

- How can the U.S. make the strongest possible case that Iran should not continue on an apparent track toward developing nuclear arms?
- What if diplomatic efforts, economic sanctions, and even conventional air strikes fail, and Iran A) does acquire nuclear arms but then B) does not (as some do rightly fear) immediately nuke Tel Aviv or give nukes to terrorists?

In the latter case, academic theory and defense best practices indicate that Iran needs to deploy some nukes survivably, i.e., beyond the reach of military intervention including even a preemptive nuclear strike. As the U.S. and USSR both realized in the 1950s, survivability requires a dispersed network of stealthy submarines on submerged patrol, with reliable counter-strike weapons of adequate range and destructive power, plus assured command and control.

What might be done peacefully to better contain Iran's presumed (though denied) nuclear weapons ambitions, and reeducate or oust its belligerent governing regime? This article discusses a possible solution: *Prosecute a nonviolent but determined undersea warfare campaign to inflict the economic attrition of a strategic deterrence contest on Tehran. The contest can be inspired by and modeled after the Silent Service's bloodless Cold War victory against the Soviet Union.*

Such a contest would be pressed so long as Iran did not take definitive, permanent, and verifiable actions to dismantle its technical potential to obtain nukes. Jawboning about this contest's perils to Iran would provide a stronger tool to 1) dissuade the regime in Tehran from further pursuing nuclear arms, and/or 2) if that pursuit continues anyway, help change the regime by internal popular demand to one which abandons such arms in favor of a much better economic future and a prestigious leadership position for regional peace. Declaring the contest begun now would add a potent layer to America's ongoing global strategic deterrence and non-proliferation efforts.

What is Strategic Deterrence?

In this article, strategic means pertaining to nuclear arms. Deterrence is the process of *touting with a purpose* one's military force-in-being. The purpose is to influence the behavior of an opponent, i.e. their emotions, thoughts, decisions, and actions, in a particular way. The behavior desired is that the opponent does not launch any act of violent aggression. (For a recent and thorough treatment of undersea strategic deterrence see, for instance, Captain Jim Hay's "Deterrence from the Depths – In the 21st Century" in the June 2011 issue of the U. S. Naval Institute PROCEEDINGS, reproduced in the July 2011 issue of THE SUBMARINE REVIEW.)

To be potent, a country's deterrence power, in its public presentation, must be known by all globally to be more than simply survivable. It must be perceived as 1) militarily and politically credible, and 2) in application decisive if ever required. Said application must also portend timeliness of punitive effect.

This ensures the crucial *negative reinforcement in advance* against any contemplated bad opponent conduct. Timeliness also dispels ahead of time any aggressor's imaginings about post-attack marshaling of further resources (including possible late-coming allies or supporters) to consolidate de facto gains and push forward and/or resist the inevitable American-led counterattack.

At its core, deterrence must promise to do two things at once:

- Defeat and repel any military aggression by the opponent, robbing them in advance of any anticipation of reward for their aggression, and
- Inflict damage against the opponent's own key assets or other vital interests proportional to the aggression, with such contemplated damage severe enough to dissuade in advance such aggression.

Successful deterrence guarantees to both repulse *and* punish any aggressive attack.

Another essential ingredient of a potent deterrent posture is the fact and perception of strong national will, to carry out the implied threat of proportional retaliation against any first strike, should retaliation be proven necessary by a first strike actually being committed.

Modern times have shown that successful strategic deterrence can and should go well beyond the 1960s-era concept of mutual assured destruction (MAD)—a doomsday scenario in which nobody wins (or even survives) if initial strategic nuclear deterrence does fail at all. Flexible response, including a conventional military response, by being scalable provides a dependable and plausible spectrum of tools to both dissuade, and retaliate in proportionate kind, against any opponent attack.

But even this latter approach is in an important sense incomplete. Any rational country, daring to embark on a path toward nuclear arms, as a matter of statecraft must contemplate the prohibitive expense of acquiring, and then manning and maintaining, the full needed infrastructure of its own survivable strategic deterrent force. This expense becomes a dire existential threat from within to that country, in the form of self-inflicted economic warfare—a debilitating further burden beyond any nuclear basic

R&D costs and outside economic sanctions alone. This fact broadens further the spectrum of dissuasion/deterrence dialogue available to peace-loving capitalist democracies to convince authoritarian regimes to abandon the path to nukes, or surrender said nukes if already in inventory.

Do Not Chase the Latest Middle East Headlines

American and friendly undersea warfare assets are very finite, and threaten to dwindle over the next twenty years due to program gaps and fiscal austerity. Op tempos are already grueling. The proactive application of peaceful nuclear economic dissuasion—as part of an enhanced American and allied whole of government posture of flexible response strategic deterrence—raises the question of what constitutes a sufficiently hostile regime against which to specifically direct such an expensive posture. Are any countries that refuse to sign, or withdraw from, or violate WMD non-proliferation treaties all proper candidates? Clearly, the posture can be productive and effective when projected generally on a global basis, and this obviates the question of what nations or sub-national groups are current (or future) priority targets for overlapping non-proliferation and deterrence efforts. However, the resource-intensive posture can be more effective still when the necessary public declarations and demonstrations of will and preparedness, as well as the requisite combined undersea warfare operations, can be focused in time and place while the whole world watches. One obvious good candidate is Iran.

The deterrence posture must not (and must not be seen to) waiver, hesitate, or blink in response to short-term political changes either at home or in the opponent's capital. Effective deterrence requires the broad perception of its ongoing momentum and constancy. It must not flag or falter due to budget constraints, the results of elections, or over-optimism. It is unwise to reduce the force of economic sanctions, diplomatic efforts, cyberspace delaying tactics, and strategic deterrence at the slightest indication as to who is up or down, in or out of power and influence in an unstable country.

The Islamic Republic of Iran, though heir to the proud history of the ancient Persian Empire, has shown considerable political volatility over the years. The success just this summer of a relatively moderate candidate for president of economically weakened Iran—much like the recent regime changes in Egypt, for instance—is subject to considerable uncertainty about the extent and duration of any alterations for the better in Iranian policies and foreign relations. This is particularly so since radical clerics do—so far—continue to hold the ultimate power of decision in Tehran.

Consistency with U.S. Policy and Strategy

The suggested enhanced strategic dissuasion/deterrence posture appears consistent with stated American strategy for a safe and secure world, including a stable Middle East:

- Do everything possible to prevent the historically anti-democratic, violently repressive, and terror-supporting Islamic Republic of Iran from acquiring (add *and successfully retaining*) nuclear weaponry.
- Do everything possible to support America's friend and ally Israel's national security and prosperity (add *by closer cooperation in the undersea warfare domain, for generally enhanced regional deterrence and peacekeeping*.)
- Reiterate America's firm intent to retaliate against any rogue nation's (including Iran's) first-use nuclear aggression (directly or by terrorist proxy) with a proportionate nuclear counter-strike.

Problem Context

Some commentators believe that the government of Iran is shrewdly calculating on its own terms, rather than insane; some pundits admonish America to avoid cultural mirror imaging in attempts to divine Tehran's true motivations and intentions. Rational restraint in combat use of nukes by national governments has prevailed worldwide since the end of World War II. Terrorists, who might indeed sometimes be insane, have evidently

not yet gained access to nuclear arms. But there could always be a first time for anything.

Continuing pressures apply against global nuclear anti-proliferation and disarmament:

- The breaking up of the heavily nuclear-armed Soviet Union and Warsaw Pact, leaving unsecured nuclear materials,
- The rise and spread of Islamic and other extremist violence,
- The emerging of more active, including undersea, routes for human trafficking (such as WMD experts), and contraband smuggling (such as WMD components), including potential new routes through the Arctic's diminishing ice cap,
- Economic and standard-of-living disparities, disenfranchisement of poor and minority peoples, resource shortages (from fuel to strategic metals to potable water), and environmental disruptions that increase regional and ethnic unrest and refugee flows,
- Middle East turmoil triggered by Arab Spring and Color Revolution events, not always predicted in advance by intelligence services,
- General nuclear proliferation including the former *nuclear underground* of Dr. A. Q. Khan, and
- Desire by some countries to intimidate or blackmail others, using nukes.

The ongoing challenge behind responsible nuke possession is weighty and daunting. It requires a comprehensive, enduring commitment to best practices for nuclear weapon safety, security, and surety. The U.S. has played a generous leadership role assisting other countries, of varying political and ideological persuasions, in this intricate and difficult work.

Solution Technical Framework

Risk theory has permeated naval thinking for at least the past century. It informs flexible force structure planning today. Its use is illustrated in the U.S. Navy's NEW MARITIME STRATEGY: The scenario of a next big war (with China and/or Russia?) is mentioned explicitly as one whose likelihood appears small, but whose human and financial costs would be so high that the scenario must be explicitly anticipated, and vigorously deterred, so as to best prevent it.

Historically, Imperial Germany's Admiral von Scheer used his *theory of risk* to plan the Battle of Jutland/Skagerrak. Admiral Spruance's orders at the Battle of Midway told him to use the *principle of calculated risk*. Classically, this approach identifies the scenario perceived as most likely or most (or least) desired to occur, and then prepares all-out for that particular scenario. This deterministic approach failed for Germany in World War I, yet succeeded beyond expectations for the U.S. in World War II. Thus the approach, while valuable, does not necessarily remove all major outcome uncertainties.

A more robust approach can be adapted from modern investment portfolio management and actuarial science, called risk immunization theory. It engineers a hedging strategy against a dynamic and unpredictable world, without trying to forecast the future. The key is to:

- Think at the macro level, across a whole range of possible future scenarios including good, bad, indifferent, and best-estimate alike, and then,
- Derive one posture that would minimize aggregate negative outcomes (and/or maximize positive outcomes) across that entire spectrum of scenarios.

The present requirement is to find a good course of action given that—barring immediate Armageddon—Iran might or might not actually proceed to obtain nuclear weapons, Israel might or might not intervene militarily in order to destroy them (either with or without U.S. help), and said intervention might or might not be

immediately successful—which might or might not then require a recurring pattern of more and more intense and costly Israeli (and U.S.?) strikes, which might or might not lead to World War III.

Strategy Recommendations

The U.S. State Department and Defense Department, as part of a stepped up whole-of-government effort supported by Homeland Security and Commerce, should jointly and pointedly educate Iran using the following key talking points about the harsh realities behind possessing nukes:

- Iran's acquisition of nuclear arms will destabilize or destroy the regime if it does not then very rapidly (or even simultaneously) develop a survivable strategic deterrent against a nuclear-armed rival such as Israel. The Israelis have a long, proud history of successful pre-emptive strikes against existential threats.
- Any strategic deterrence contest will require by Iran immense additional financial expenditures and sacrifices on advanced undersea forces and sophisticated command and control. Such costs will be prohibitive and punishing, even positing some foreign assistance. The costs will surely bring down from within, via national bankruptcy plus escalating domestic disillusionment and rebellion, the present rule by radical Ayatollahs and many anti-Israel/anti-America politicians.
- Any dictatorship faced with sometimes violent domestic political and ethnic minority opposition, even internal terrorism, needs to fathom that its own nuclear weapons present another existential threat from within. Dissidents could grab one or more such nukes, then detonate them in-country. This was a real concern for the USSR, and is also a concern for Pakistan.

By working more now with Israel on combined naval preparedness for a regional undersea strategic deterrence contest in the Middle East, the U.S. Joint Force (USJF) and the Israeli Defense

Force (IDF) can maintain the hardest dissuasion pressure on Tehran. Perhaps they should publicly announcing a new and exciting cooperative initiative (pilot project) related to Global Maritime Domain Awareness.

Simultaneously, they can maximize readiness to cooperatively prosecute a non-lethal submarine campaign, in case Iran does acquire nukes but any pre-emptive strikes against them either do not occur or do not fully achieve their objectives. Such USJF/IDF combined efforts could also help dissuade Israel from any destabilizing unilateral pre-emptive strike; all significant military operations run the risk of partial or complete failure, and severe international pushback.

Middle East Submarine Fleets are Small but Growing

Both Israel and Iran currently possess some half-dozen diesel-electric or diesel/air-independent submarines. Germany sells Israel customized Type 214 boats of the Dolphin Class. Iran owns some Russian Kilo-class subs. Iran claims to be making advances in domestic repair and upgrade of these subs, and in homegrown design and fabrication for new subs, including nuclear subs. Other Middle East countries are also obtaining more, and more modern naval submarines.

Israel officially maintains a policy of nuclear ambiguity, neither confirming nor denying possession of nuclear weapons and/or installation of some into their subs. But Israel has long been thought to deploy up to four nuclear-armed Tomahawk-like sub-launched cruise missiles (SLCMs) on each such vessel; they operate in deterrent patrols within range of Iran.

Iran has discussed basing some of its strategic deterrent subs in the land-locked Caspian Sea, as a bastion safe from U.S./Israel ocean-going anti-submarine warfare. But these subs would still be vulnerable to mining, UUVs, SEAL operations, distributed surveillance networks, anti-submarine platforms launched from a Caspian Sea neighbor such as Azerbaijan, and even U.S. air-dropped manned or unmanned combat mini-subs. (Over-flight rights would be needed, for instance from Azerbaijan and either Turkey or Georgia.) Since Iran has also discussed developing

more mini-subs, such as a vessel with only two torpedo tubes, Tehran might plan to arm some with at least one nuclear-armed SLCM each, deployed in range of Israel. Thus the Caspian Sea becomes an important arena for Global Maritime Domain Awareness, just like America's own Great Lakes.

This nautical situation can be viewed in one of two ways:

1. As a powder keg of undersea regional rivalries and even impending combat engagements—either during or as a trigger to any Israel/Iran war, or
2. A. As an opportunity for the U.S. to work more with Israel on enhanced undersea warfare capabilities, including possible competition by the U.S. Submarine Industrial Base for design, systems, weapons, and maintenance work, plus
   B. As an opportunity for the U.S. to work with and reassure Iran on improved regional maritime security and access for all, while discouraging Iran from pressing further with its nuclear program.

It might be wisest to view 1. as both a negative outcome to be avoided, and an incentive to aggressively exploit the twin opportunities of 2. A. and 2. B. – by working constructively with both Israel and Iran. The recent change to a reportedly more moderate and pro-West president of Iran is a good window of opportunity to try out such dialogue.

Iran's Nuclear Posture Is a Known Unknown

Recent history shows that a nation's development and possession of nuclear arms can undergo change with internal and external circumstances:

- Brazil, Libya, South Africa: Each reached some stage of nuclear weapons R&D which they gave up without external armed intervention. South Africa had a small nuke arsenal.
- India and Pakistan: These two regional rivals both developed nuclear weapons. The result is approaching a re-

gional strategic deterrence contest, through the accelerating acquisition of submarines by both nations.

- Democratic Peoples' Republic of (North) Korea: Despite best efforts of several White House administrations and concurrent work by South Korea, China, the IAEA, et al., North Korea did acquire nuclear weapons. So far, Kim Jong Un shows little interest in giving up his small nuclear arsenal, though concerted disarmament efforts continue.
- Former Soviet Union, and Peoples' Republic of China: While reducing strategic weapon-counts in concert with the U.S., partly to save money and modernize deployed warheads, Russia retains a strong nuclear arsenal; Russia has been deploying new nuclear subs with new sub-launched nuclear ballistic missiles (SLBMs). But the now-independent countries of the former Soviet Union willingly gave up the heritage nukes deployed on their soil, after the Berlin Wall fell. China is introducing more-capable submarine classes, while also expanding its inventory of SLBMs.

What can we learn from these real-world examples?

- A national government might or might not be sincere during negotiations regarding avoidance or abandonment of nuclear arms, either strategic or tactical or both. It is not always possible to avoid big surprises such as the successful nuclear weapons tests by Pakistan and by North Korea.
- A national government might or might not be willing to even consider, at least in the foreseeable near-term, any substantive nuclear arms reduction once nuclear arms have been acquired.
- Inter-regional analogies only go so far. Iran is neither geopolitically nor culturally and historically comparable to North Korea in obvious regards.
- Financial sanctions and trade embargoes tend to focus more power in a dictatorship's hands, while (at least

temporarily) increasing the will to resist of that regime's surprisingly resilient, nationalist subjects.

- A government might not know its own mind. Conflict between party sub-factions, unclear outcomes to consensus building or voting controversies, mood swings and coy conduct by supreme leaders, changing perceived circumstances, and the ebb and flow of international negotiations all make a regime's mindset a shifting target, even for itself.

These and other examples and counter-examples show it is very difficult to make deterministic predictions about either negotiations with or military strikes against Iran. Given the extremely high stakes, the strategy of enhanced strategic deterrence, derived as above from modern risk theory principles, merits thorough examination by disarmament practitioners and undersea warriors.

Conclusions

Iran's regime might become nuclear armed, any pre-emptive strike(s) to prevent this might not succeed, and Iran might not immediately commit first use of nukes. Tehran already faces a weakened economy, regional and global nuclear competitors, and at times violent internal dissent. Once nuclear armed, if ever, strategic deterrence capabilities for Iran comprise at once an existential requirement (for survivable deterrence) and an existential threat (due to their immense ongoing costs and risk of internal nuclear terrorism). By partnering with Israel more closely in submarine operations in the Middle East, the U.S. gains an immunizing strategy, and talking points are created to further dissuade Tehran from developing nuclear weapons. Simultaneous non-violent action can commence to further contain and erode Iran by an enhanced undersea strategic deterrence contest for the 21st century—an economic war of attrition in the Global Maritime Domain, updated from what once worked well against the USSR.

This strategy means greater op tempo for the U.S. Submarine Force. It also calls for greater mission capability and capacity for our current SSNs, SSGNs, and their next-generation replacements.

It impacts fleet size for SSBN(X). Given austere defense funding, Congress should take note of this important pathway to better protecting the U.S. Homeland, discouraging nuclear proliferation worldwide, and supporting our friend and ally, the State of Israel.

Such increased defense expenditures are not wasteful to society, as some argue. The jobs and spending and tax revenues they create are very real. Rather than rob funds for schools and hospitals, a strong defense in a dangerous world assures essential security and prosperity for students and patients, teachers and medical staff, and everybody else alike.

PREPARING SUBMARINE FORCE LEADERS TO EXECUTE THE DESIGN FOR UNDERSEA WARFARE

by LT Ryan Hilger, USN

Introduction*

We will be masters of the undersea domain, able to achieve undersea superiority at the time and place of our choosing. We will be the experts for all matters in undersea warfare.**

The Design for Undersea Warfare** clearly lays out the way ahead for the Submarine Force for the foreseeable future. The three lines of effort all have inherent challenges, both technical and non-technical that we as a force need to meet. All will require prudent investment of our limited fiscal resources to make the Design a reality. But one area spans all three lines of effort: human capital. Executing the Design for Undersea Warfare at the operational and tactical level will require well-trained officers and crews who understand their mandate and how to best employ their boat. But, as the recent budget discussions within the Department of Defense have alluded to, people are the most expensive resource we have. Providing additional education and training to our officers to meet the high standards of the Design for Undersea Warfare could be potentially very, very expensive.

As with many solutions in the Department of the Navy today, it will require doing more with our existing equipment and lessmoney. But providing more theoretical education and training seems diametrically opposed to conserving our limited fiscal resources. However, we can leverage our existing infrastructure, institutions, and people to provide a graduate-level education to

**The ideas contained in this article are the opinions of the author alone.*

***The Design for Undersea Warfare was fully explained in the April 2011 issue of THE SUBMARINE REVIEW in presentations by then VADM Richardson and RADM Connor as an integrated strategy-it was subsequently presented as an internal Submarine Force document with Design title.*

our officers and create better training opportunities aimed at building experience and enhancing our professional development with a modest investment.

Framing the Problem

The Experience Gap

Each Community Status Brief released by PERS-42, the Submarine Officer Community detailers, contains a few telling statements that should worry the Submarine Force leadership:

- Commanding officers are dissatisfied with the experience level of their reporting department heads
- Division officers expressed displeasure with never *operating the ship*
- Divisions officers stated that they are finally fully qualified and want to hone their submarining skills, but are at their projected rotation date[2]

As a recent division officer, I can certainly attest to the final point. Lengthening division officer sea tours has been thoroughly vetted by PERS-42 and is not a good solution for the Submarine Force. We train almost continually in a wide variety of areas. So where is the disconnect between training, operations, and acquiring sufficient experience?

Current Training Requirements

Improve the effectiveness of the officer career training pipeline, providing a more coherent, career approach towards developing a submarine Commanding Officer.[3]

I contend that the way we train and educate our officers and crews is the disconnect. The cliché of "train smarter, not harder," has fallen on deaf ears within the Submarine Force. The myriad of training requirements in the Continuing Training Software System (CTSS), the rigidity and amount of continuing training proscribed by Naval Reactors, and the mentality of simply adding more training requirements following sub-par results on an inspection or

evaluation makes it extremely difficult to produce quality, effective training for our submarine crews. To borrow a current catch phrase from the Chief of Naval Operations, it is time to undertake a 360-degree review of our officer education and training programs.

Currently, most crews struggle to meet all the training requirements, especially in CTSS, the Submarine Force's computer-based tool for tracking all training requirements onboard with the exception of the nuclear training program. Keeping CTSS *green* has become a nearly impossible task to achieve. The administrative burden of record keeping within the system is a job in itself, and one that I had to contend with, both as the Ship's Diving Officer and as the CTSS lackey for the wardroom training program. Under the present system, meeting the topical attribute involves some sort of training followed by an exam, from the Force Exam Bank, if available. But there are caveats. It is very difficult to account for the volumes of on-watch training that takes place, both fore and aft—CTSS doesn't govern the nuclear training program either. The CTSS interface is the antithesis of *user-friendly*. It is time consuming to create training plans, edit them, assign people, and correctly annotate the types and lengths of training conducted. Additionally, it will not reflect the additional training that many crews do beyond meeting the periodicity of the particular attribute.

CTSS, while a well-intentioned tool, needs significant improvement to become a useful product for achieving the required ends commensurate with the Design for Undersea Warfare. First, CTSS topical attributes lack a *complete* connection to a warfighting requirement. These knowledge areas, skill sets, and team exercises are not necessarily tied to the big picture. Many sailors balk at the amount of training we as a Force are required to do. Communicating the reason for the training will go a long way in helping to prepare crews for wartime service. Second, the system must be revised to account for all training administered within a topical area, including on-watch training. CTSS should not simply show that a crew or individual has trained on a particular topic within the required periodicity. It should and needs to reflect the trends and volume of training. Boats should be

trends and volume of training. Boats should be able to document *all* training and testing that occurs, which will help inspection teams determine the effectiveness of a boat's training program and the areas that the boat is focused on. For example, on an SSBN, I would expect this revised CTSS system to show every strategic training session that the wardroom conducted, including the applicable training points, from the weekly ship-wide exercises, officer training, and externally generated exercises. Third, the user interface must become friendlier to users. A short range training plan, say for a strategic deterrent patrol or period of overseas movement (POM) workup, should be able to be entered as a complete plan. At present, these plans must be entered into CTSS as individual training sessions for individual topics. Nowhere in the system can a user view a long-range training plan encompassing multiple topical areas.

Education: A Fundamental First Step to Mastering Our Domain

Drawing Nuclear Parallels

A nuclear-trained officer will spend a year in the nuclear power training pipeline. The Naval Nuclear Power School officer curriculum is now worth half of a master's degree at the Naval Postgraduate School, Old Dominion University, or Catholic University. Officers completing the training will have received a graduate-level education in nuclear reactor operations, and are expected to build on this theoretical expertise with operational knowledge, culminating in their qualification as prospective nuclear engineer officers (PNEO).

Given the emphasis on being the undisputed masters of the undersea domain, outsiders would probably think, given the above statements, that submarine officers also receive such focused and high-level education in topical areas critical to dominating the undersea environment. But the reality is quite the contrary; officers spend a scant ten weeks in the Submarine Officer Basic Course (SOBC). Completion of that curriculum garners the recommendation from the American Council on Education for a six lower-level undergraduate credits in military science and naval

engineering, and in upper level undergraduate, three credits in management.[4] All officers already have an undergraduate degree.

The situation does not improve after reporting aboard a boat. With the renewed emphasis on engineering qualifications during the six months and the somewhat-warranted sense of urgency to qualify as an officer of the deck, the foundation of theoretical submarine knowledge in oceanography, ocean acoustics, search theory, sonar design, and weapons design and employment never really develops unless the individual officer expends the effort to learn on their own. Once an officer qualifies in submarines, the drive to learn more generally diminishes rapidly. The Design for Undersea Warfare mandates that all officers become experts in undersea warfare. To do this, the Submarine Force must fundamentally restructure the way it trains its officers.

We, as a Force, demand perfection in nuclear operations. Our officers are held to a higher standard on their nuclear knowledge. We take pride in this, and rightly so. We should be expecting the same level of knowledge on undersea operations and warfare from these same officers. The SOBC curriculum should be revised to provide officers with the graduate-level education in our undersea warfare core competencies. At present, the curriculum teaches officers how to operate a periscope, the fundamentals of target tracking, and the basics of submarine systems, among a few other courses. What is missing is a *rigorous* treatment of the following topics: physical oceanography, acoustic propagation, weapons employment theory, sonar system design and employment, and tactical security. All officers entering SOBC have a college education. Nuclear-trained officers will have had a basic foundation in technical education in college if they have not been through nuclear power school already. Why do we hold them to such a low standard?

Officers graduating from SOBC should have the theoretical background to holistically understand submarine operations and think creatively about undersea warfare problems, not just a rudimentary understanding of how to use a periscope and track a loud, cooperative contact. Just as the nuclear power pipeline provides the basis for *understanding* plant-specific operations and

casualty procedures, so too should the SOBC curriculum provide the skills necessary to *understand* how to integrate their knowledge and employ an SSN or SSBN in a wartime environment.

Likewise, our Submarine Officer Advanced Course (SOAC) should be revised to give prospective department heads a graduate-level education in tactical oceanography, search theory, intelligence gathering, and more. These officers have proven they are capable of performing at the next level, so we should be educating them to build on their previous education and operational foundations in order to fully exploit the undersea environment.

I am not advocating that ensigns graduating from SOBC or lieutenants graduating from SOAC have short-range tactics or fire control system operations memorized. What I am advocating is that the Submarine Force thoroughly prepares its officers to understand *how* these systems generally work or get employed so that when the learning of tactics, for example, does begin, their theoretical knowledge informs and enhances their comprehension of them. This idea is not new; the nuclear navy has operated in this manner for more than half a century.

Education on the Waterfront

While this article focuses primarily on officer-level education and training, the courses in place for our sailors warrant a comprehensive review to ensure that they meet or exceed the standards set in the Design for Undersea Warfare. Mastering our undersea domain requires more than just the commitment of smart, dedicated officers. It requires subject matter experts in the rest of the tracking party as well. Continuing training for the waterfront should leverage the experience of our Direct Support Element (DSE) teams and the academic knowledge from other Navy institutions, such as the Naval Postgraduate School (NPS), to produce better-educated undersea warriors.

NPS currently offers a certificate program, available via distance learning, in anti-submarine warfare (ASW). This is an excellent first start in providing more education to our officers. However, the time and knowledge requirements of the program

make it inaccessible to, undoubtedly, a large portion of our officer corps. The time when this training would be most beneficial is when the officer has the least amount of free time: on sea duty. Qualifications take up, on average, about half of the average junior officer's sea tour. Add in the duties and responsibilities of a division officer, the ship's schedule, and the myriad of requirements that force our officers to multi-task and prioritize means that a yearlong distance education program does not sound as appealing. As these officers move to shore duty, they will likely be more focused on completing a master's degree, pushing undersea warfare education further down the list. The knowledge given in the ASW certificate program is extremely valuable for professional development, but cannot replace the value of a master's degree for promotion within the larger Navy framework. This means that we, as a Force, must find more innovative ways to educate our officers and crews.

The DSE teams, well known to many submarine crews, form the core of our corporate knowledge in many subject areas. These experts in electronic intelligence, acoustics, and more have improved the quality and education of the crews they deploy with. A highly successful program at NPS, the Regional Security Education Program (RSEP), provides an excellent model for a waterfront education effort to support the Design for Undersea Warfare when combined with the DSE teams. RSEP teams brief prior to deployment or deploy with a carrier or expeditionary strike group for approximately ten days to educate the crew on the regions they will be operating in—broad strokes for the crew and graduate-level seminars for the senior leaders. Lieutenant Jeremy Wagner, a targeting officer with Carrier Air Wing ELEVEN, commented after an RSEP program given in 2009, "Decision-makers and operators really need and appreciate this kind of research, expertise and assessment. Having a variety of perspectives and insights can help us better understand our mission."[5] A similar program would likely prove extremely beneficial for submariners as we continue to open datum from our competitors.

Undersea warfare education teams would be comprised of a professor or two from the NPS Undersea Warfare Academic

Group and a few members of a DSE team and would preferably brief a boat prior to a scheduled deployment. The NPS contingent would be able to provide the latest in research and an assessment of the undersea domain, with an emphasis on the regions that the boat or squadron operates in. The DSE team, a group of exceptionally knowledgeable chief petty officers, would be able to take time, off-mission, to help enhance the education and training of sonar shacks, fire control system operators, and electronic systems measurement personnel in a low-key environment. Programs could be delivered to an entire squadron, with adequate time to focus specifically on each wardroom and tracking party. Such a program would enable the submarine community to continually learn and improve our mastery of the undersea domain.

Validating the Process

Changing the way in which we educate our officers cannot be complete without a method to measure the success or failure of that education. While I am sure the next suggestion would result in a unanimous vote of censure and removal from the *Junior Officer Protection Association* by many of my fellow junior officers; nevertheless, it must be made. The Commander of Naval Submarine Forces (CNSF) and PERS-42 should alter the way in which we screen officers for department head. At present, the selection looks at an officer's record: fitness reports, awards, and completion of PNEO, among others. The selection should remain with PERS-42, but an additional criterion should be added: completion of a prospective department head exam.

Akin to the PNEO process, which includes a comprehensive written exam and oral interviews at Naval Reactors, the prospective department head exam would provide a clearer signal to the Submarine Force leadership about the readiness of an officer to serve at the next level. The inclusion of a *crucible* event in the submarine qualification process is a good first step, since it provides an opportunity for a senior officer other than the ship's commanding officer to evaluate a junior officer's readiness to wear the coveted gold dolphins. But these events vary widely in their content and duration in the absence of a standardized metric.

Such an examination would ensure that officers retain their theoretical knowledge, understand the various aspects of submarine warfare, and can demonstrate the advanced thinking that will be required for service as a department head.

The new qualification should be completed as an intermediate stop on the way to shore duty—most officers get their first look for department head not long after this point now anyway. It should involve both a comprehensive exam and interviews with senior submarine officers. As with the current department head process, the goal would be to select all officers who are eligible, not simply select the required number to fill department head billets in a few years; many officers opt to leave the naval service before then anyway.

Providing significantly improved education, continuing professional training, and a metric to ensure officers are ready to be department heads should help alleviate some of the concerns voiced by commanding officers around the fleet regarding the lack of experience of division officers. Additionally, it will provide junior officers the ability to better understand submarine operations and employment earlier in their qualification process, allowing them to benefit more from experiences gained during and after that time. Nothing can replace the at-sea classroom to educate officers. But in keeping with the nuclear tradition, having a theoretical understanding before going to sea greatly improves the quality and abilities of our sailors to meet the challenges ahead of them.

Refining and Defining the Officer Career Path

The formal guidance for submarine officers on career progression and development amounts to a one-page message and a checklist. The message, from Commander, Naval Submarine Forces in July 2006, needs updating to reflect the goals set forth in the Design for Undersea Warfare. The checklist—the quintessential nuclear solution—lays out all the milestones that need to be met for a career in the Navy and Submarine Force.*** So what's missing? The depth.

Commensurate with the changes proposed above and below, PERS-42 and CNSF should issue new, detailed guidance for submarine officers regarding their career path. The Design for Undersea Warfare calls for a "more deliberate emphasis on the developmental role of sea tours."[6] Published concurrently with the Design for Undersea Warfare, Undersea Warfighting provides a good portion of the traits required for submarine officers. However, it lacks the specificity needed to ensure that officers understand what they should be learning on each tour. The nexus of these three documents should be a guide for what skill sets, knowledge, and experience officers should have at each step in their career, why they need it, and the common ways we give it to them. Knowing ahead of time what evolutions or operations provide the requisite training that the Submarine Force requires will allow officers to go into that evolution with a different mindset, one that is more conducive to learning.

Training Crews for Wartime

This article, up to now, addressed education as a means to improve our ability to execute the Design for Undersea Warfare. However, education does not translate into experience, meaning that it does not solve the problem reported by PERS-42 earlier when we framed the problem. Educating our officers can lead to higher-quality experiences if we utilize the tools at our disposal correctly.

Revising the Continuing Training Requirements

As an SSBN officer, our pre-deployment training periods (PDTP) were maddeningly routine. After the first PDTP, each officer knew exactly what to expect for the next one, and the one after that, and the one after that—nothing changed. We would have the same trainers each PDTP, where basically the same problem would be given. The week spent in the attack center, for example, would mostly be an exercise in stepping through the

**These documents are available on the PERS-42 website, http://www.public.navy.mil/BUPERS-NPC/OFFICER/DETAILING/SUBMARINENUCLEAR/Pages/default.aspx

same problem over and over again. Rarely did the scenario administered challenge the tracking party beyond keeping team dynamics and communication smooth. The environment was always perfect, sensors completely operational, contact cooperative, and merchant ships rarely left a designated transit lane. Other trainers would be more of the same.

But these exercises did little more than show that we could keep ourselves safe in a peacetime environment and follow procedures. Not much in these scenarios would have prepared us for the challenges of wartime service. Indeed, Admiral King's prescient remarks in early 1941 should remind us why we train:

> If subordinates are deprived – as they now are – of that training and experience which will enable them to "act on their own" – if they do not know, by constant practice, how to exercise "initiative of the subordinates" – if they are reluctant (afraid) to act because they are accustomed to detailed orders and instructions – if they are not habituated to think, to judge, to decide and to act for themselves in their several echelons of command – we shall be in a sorry case when the time of "active operations" arrives.[7]

However, our training regimen today seems aimed at checking boxes and proving to higher echelons that we can be safe in the most basic of peacetime tasks, and, possibly, establishing a paper trail to fall back on or hide behind should something go wrong at sea. Our training regimen should be refocused to help us prepare for wartime environments, not amiable peacetime cruises. In doing so, I contend that we can simultaneously still *certify* crews to be safe when not at war and challenge our crews to think creatively to solve wartime problems, gaining valuable experience in the process.

For example, the *conscious* decision by one of my commanding officers to drive under a merchant ship (at a very safe depth) in pursuit of the contact of interest during an attack center training session sparked a heated debate between him and the training staff. Most of the training staff would have evaluated us as below

average on submerged contact management for that training session because of that decision. However, the conscious, informed decision of the commanding officer to do this really indicates that he and the tracking party had an excellent understanding of submerged contact management—we knew exactly what we were doing and where the merchant ship was.

Rethinking How We Use the Attack Center Trainers

We lose sight of the fact that warfare is a human-centric problem. Insufficient emphasis is given to developing creativity and initiative, both of which are essential to the practice of decentralized command upon which effective undersea warfare is based.[8]

I offered that anecdote with the intention of showing how we train to peacetime metrics. However, it serves a second purpose as well. Most crews that I worked with would have maneuvered to avoid the merchant ship by a *comfortable* margin, while likely opening range or even losing the contact of interest in the process. When I saw the debate between the training staff and my commanding officer begin, I was a bit taken aback—I was too junior to fully understand what was going on. In retrospect, I understand now that my commanding officer was employing his boat as he would have in war. In recalling the pyramid of safety, stealth, mission, he was thinking beyond the confines of our procedures and looking toward mission accomplishment, knowing the boat was physically safe and would remain undetected. He was executing his role in the Design for Undersea Warfare before it was written: "[emphasizing] CO ability to distinguish acceptable risk from undue risk."[9]

As a Submarine Force, we faced a hard learning curve at the beginning of World War II. Indeed, "[w]ithin three years the age of the youngest U.S. submarine commanders dropped by a decade, and younger officers boldly charged into situations that leaders would never have countenanced before the war."[10] We learned some very hard lessons at the expense of several submarines and their crews. We have the opportunity now to realistically train for war without having to jeopardize the lives of the sailors or the

watertight integrity of our boats. The attack center trainers at each submarine homeport have the necessary equipment to produce realistic wartime scenarios that can challenge our crews to take risks and operate outside what our doctrine says we should be able to do; most of our modern doctrine has been the product of Cold War experience, where shots were never fired, and peacetime exercises where we always have a tactical advantage over our adversary.

The normal week spent in the attack center trainer during a PDTP cycle should be focused mainly on presenting wardrooms and tracking parties with difficult scenarios. Spend a day or two training personnel in new positions and dusting off the cobwebs. After that, the crew should be challenged in each session with scenarios that involve contacts shooting back, close and unplanned encounters, no-win situations, battle damage, and a host of other complex problems. The often-mentioned Star Trek reference to a *Kobayashi Maru* scenario seems quite apropos here. Crews should learn to operate their ships with battle damage: sensors knocked offline, propulsion limitations, depth limitations, and more. In these scenarios, sinking should be possible, aggressive behaviors encouraged, and learning allowed. Out of these tests, I believe, will come more experience. We should be thankful that we are not trying to learn these lessons in a wartime environment as the "Greatest Generation" did. We should be trying new things in our trainers, where sinking means resetting the problem and trying something else, not casualty calls by the chaplains.

Fighting with the Whole Boat

The *nirvana* per se, of this realistic training, would be expanding the attack center proposal to all of our trainers and connecting them so that a crew can fight with the whole boat. In war, the tracking party will not be working in a vacuum in control. How would the commanding officer and tracking party respond to a hot bearing on a main engine or a sudden hot run in a torpedo tube? Incorporating casualties from other trainers into the warfighting problem centered in the attack center will help train our crews to

think about the whole boat as a warfighting platform, not simply the combat systems, and to think through them.

If it operationally feasible, this concept can even be stretched to include combining the Tactical Readiness Evaluation and Operational Reactor Safeguards Examination into a single large, short-notice inspection—to avoid the current pitfall of "cyclic and temporary excellence instead of excellence which is sustained and broad."[11] The logistics and details of implementing such an inspection need not be discussed here, as it would entail long, heated discussions that could fill volumes. However, the advantages in doing so should be apparent. Crews would now have to be ready to fight the ship across the spectrum of operations while still being charged with mission accomplishment. Propulsion casualty drills can be run, forcing the tracking party to figure out how to continue the problem. The boat could be challenged to break contact while being speed and depth limited. The possibilities are endless!

Conclusions

Our professional education as submariners should be a force multiplier against any threat that we are technically at parity with. To grasp the mandate given to us in the Design for Undersea Warfare, the submarine community should take the steps necessary to bring our undersea warfare education up to graduate-level standards and rethink how we utilize our existing trainers during the PDTP or POM workup cycle to exploit the opportunities to create new experiences.

Though speaking of the soldiers at Gettysburg, President Eisenhower wrote a statement that can easily be applied today:

> Of course, major decisions were the responsibility of a few. But their execution depended on the initiative, the fidelity, the strength of many thousands of individuals, known only to their immediate comrades in battle, their names forgotten today.[12]

Our leaders in the Submarine Force have made the decision to continue our dominance in undersea warfare and extend our reach.

The execution of that decision relies on the individual captains, and their officers and crew. But the mantle of training and development should not be completely passed to them as well; our leadership can provide a solid foundation for the captains to build on by providing better education and training opportunities. Doing so will yield a more knowledgeable force ready to seize and maintain the advantage in the undersea domain.

ENDNOTES

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AIR RAID – PETROPAVLOVSK
THE DRILL THAT BECAME A STRATEGY

CAPT James M. Patton USN (Ret)

Captain James Matthew Patton, USN (ret.), served 1956-1986. Commanded USS VOLADOR (SS-490) and Naval Ocean Systems Center, San Diego. Earned Ph.D. in International Law at the Fletcher School of Law and Diplomacy 1972 and served on the State Department Policy Planning Staff 1974-1977. Selected by Admiral Thomas B. Hayward as Head of the War Plans Branch at CINCPACFLT Headquarters 1977-1980 and subsequently served as Executive Director of the CNO Executive Panel 1980-1982.

Makalapa Crater on Oahu, Hawaii, Headquarters of the U.S. Pacific Fleet—1976, about half way between the Cuban Missile Crisis and the fall of the Berlin Wall: midnight in the long dark night of the Cold War.

The headquarters on the crater's edge had been emplaced to organize, equip and train the fleet that, through a combination of sea battles, amphibious assaults, unrestricted submarine warfare and, finally, sea-based air strikes powerfully enabled the defeat of the Japanese Empire in World War II. The same headquarters had directed the fleet—and its Marine Corps component—through the wars in Korea and Vietnam. In terms of sheer warfighting command activity, perhaps no American military headquarters could match Makalapa for similar intensity over such a long duration.

Now, in 1976, a new fleet Commander-in-Chief might hardly recognize this headquarters. By 1976, the inevitable effects of a U.S. defense strategy that was *NATO-centric* and, insofar as the U.S. Navy was concerned, entirely oriented on the security of the lines of communication across the Atlantic Ocean, had drained the

fleet headquarters of its aggressive spirit—and had drained the Pacific Fleet of its warfighting muscle. The great fuel tanks buried under Red Hill were nearly empty and the vast magazine at Lualualei contained ordnance more appropriate to the battles of World War II than combat with a modern enemy.

The Pacific Fleet itself reflected the national fixation with defending Western Europe at the expense of other places. The main striking force of the fleet, the carriers, were fewer in number than those in the Atlantic Fleet and, in disregard for the much greater sea distances in the Asia-Pacific theater, all but one were fossil-fueled. Two carriers, MIDWAY and CORAL SEA, could not support the most modern Navy fighter aircraft, the F-14. Likewise, the distribution of surface combatants and submarines favored the Atlantic Fleet by at least a 3:2 advantage.

Perhaps the most debilitating effect on the Pacific Fleet was the war plan that it was bound to implement in the event of hostilities with the Soviet Union. OPLAN 5000 mandated that the main body of the fleet would fight in the Atlantic and, in some circumstances, movement to that ocean would begin even before the actual commencement of hostilities. This strategic deployment of nearly half of the Navy was called The Swing Strategy.

Strategies and war plans have consequences. Implementation of the Swing Strategy would obviously leave the Asia-Pacific theater uncontested and cede the initiative throughout the theater to the Soviet Union. Who could deny that Japan might be intimidated into at least a neutral stance or that China might reevaluate its bellicose front with the Soviet Union—a front that tied down enough Soviet forces which, if rapidly redeployed to Europe, could certainly overwhelm NATO and might bring on the use of tactical nuclear weapons? Absent at least a spirited defense, the Aleutian chain could provide a ready access for the Soviets to Alaska, Canada and the western United States.

Strategies and war plans also have champions and the Swing Strategy enjoyed almost a *generational* respectability. NATO and the Atlantic Fleet confidently expected that early losses in the Battle for the Atlantic would be replaced by units of the Pacific Fleet. Any argument that the revered strategy might be flawed

would need powerful evidence that the Pacific Fleet could be put to better use.

How best to use the Pacific Fleet against the Soviet Union? How to remain in the Pacific and deny the Soviets a windfall initiative? How to plan combat exchanges with the Soviets that would be advantageous to the United States? In short, how, when and where to fight and how to make that fighting worthwhile? These questions perplexed the fleet's new Commander-in Chief in 1976, Admiral Thomas B. Hayward.

Being a combat-tested naval aviator in the Korean War and having commanded the U.S. SEVENTH FLEET, Admiral Hayward elected to begin his search for answers by assigning to his headquarters staff the requirement for preparing a detailed plan for striking the major Soviet base at Petropavlovsk on the Kamchatka Peninsula with conventional weapons. He reasoned that, by focusing his staff on that single mission, he would uncover the deficiencies in his fleet's warfighting capability. Armed with that knowledge, he could better weigh the fleet's contribution to a war with the Soviet Union in any theater. If the staff's ability to plan battles had not atrophied he would learn whether his fleet could provide a sensible and viable alternative to swinging into the Atlantic.

No staff can plan without certain basic guidance. Admiral Hayward emulated his World War II predecessor, Admiral Chester Nimitz, by reinvoking the latter's rule of Calculated Risk—and going beyond that to establish the analytical metric of *acceptable attrition*. Admirals Nimitz and his CNO senior, Admiral Ernest King, had *accepted* certain losses in aircraft and ships in four decisive sea battles of 1942, buying with those losses the destruction of the core of the Japanese Imperial Fleet and opening the way for the later assaults on Japan itself. Admiral Hayward reasoned that achieving the strategic goal of denying the initiative in the Asia-Pacific theater to the Soviets and, thereby, influencing decisions in Tokyo and Beijing—and, perhaps in Moscow itself—would be worth the same level of attrition endured by the Pacific Fleet's World War II commander.

The decisions that would be taken in Asia-Pacific capitols at the outset of hostilities would probably not be long in the making and, therefore, any offensive action by the Pacific Fleet must occur promptly after the initiation of combat anywhere between the U.S./NATO and the Soviet Union/Warsaw Pact. Admiral Hayward's tasking for the headquarters staff became known as *The Prompt Offensive Action Plan*. As the planning progressed it became clear that the actual Time Over Target (TOT) depended on many factors, each of which illuminated strengths and weaknesses in the Pacific Fleet's combat capabilities.

Once given the target, the approximate time frame, and the *acceptable* level of losses, the staff could determine the appropriate size of the strike: *sufficient strength to saturate the enemy's defenses while doing significant damage to the target*. The damage inflicted should preclude near-term use of the harbor and support facilities at Petropavlovsk as well as the nearby forward operating base for Soviet Naval Air at Yelizovo. Damage to ships and aircraft at those sites would be considered a *bonus*. The enemy's defenses, provided by Naval Intelligence, and the *target-rich* environment indicated that the strike must be made simultaneously by four carriers and their battle groups. The organization of the Pacific Fleet was, therefore, modified and schedules were adjusted over time so as to make that amount of combat power available within a short assembly period. Moreover, the fleet's command and control scheme needed to change to accommodate the operation of a multi-carrier strike force. At-sea exercises that tested these adjustments and changes were instituted.

Beyond the enemy's defenses in the immediate area of the target, the staff also had to consider the threat to the strike force from enemy submarines and long range bomber and missile-firing aircraft. In the mid-1970's, the number and types of Soviet surface combatants outside the Sea of Japan represented no threat to the strike force. Careful analyses were done to balance the distance that the carriers would standoff from the target against the distance over which the enemy could accumulate sufficient forces to penetrate the layered defenses around the carriers. Clearly, the closer the carriers could approach the target the greater would be

the damage that they could inflict (the main variables being bomb loads, tanking requirements and the number of sorties). Conversely, the closer to the target the greater the density of enemy submarines and aircraft (and the not-inconsequential quality and quantity of enemy reconnaissance).

There is a significant difference in the way that submarines and long-range aircraft are used in the defense of a site. Submarines move slowly relative to aircraft but they have endurance measured in weeks and months. Only submarines that have been deployed well forward before the approach of a strike force will be in positions to attack that force. Submarines, particularly Soviet Pacific Fleet submarines circa the mid-1970's, could not reposition rapidly without being detected easily. Given the Order of Battle of the submarine portion of the Soviet Pacific Fleet, deductions were made for operational availabilities and Base Loss Factors and probable densities of patrol stations were calculated at various distances from Petropavlovsk. It would be the business of U. S. submarines to validate the locations of these stations and to concentrate *prophylactic* anti-submarine warfare along the approach paths of the carriers.

Long-range aircraft, such as the bombers and missile-firing planes of Soviet Naval Air, could respond rapidly and over significant distances to cues provided by reconnaissance assets. However, once launched, the endurance of these aircraft eroded swiftly so Soviet doctrine held them on the ground until the location of targets such as the U. S. strike force was known with certainty. These aircraft were not used for search and the use of their radars made them vulnerable to attacks from F-14's equipped with PHOENIX missiles. Denying Soviet reconnaissance information about the presence in the Northwest Pacific, much less the locations of the carriers demanded a multi-layered cover and deception plan.

Finally, the withdrawal of the strike force was planned to take advantage of the U.S. facilities in the Aleutians. Prior to the Prompt Offensive Action Plan, the defense of those facilities had been delegated to organizations like the Alaska National Guard—with a mobilization and deployment schedule measured in months.

Reassignment of elements of the Marine Corps component of the Pacific Fleet remedied this situation.

All of the labors of the headquarters staff in response to Admiral Hayward's tasking might have been consigned to the *might have been's* if Senator Sam Nunn had not been searching for a U.S. national strategy that would minimize the chances that conventional weakness would encourage Soviet aggression that might degenerate into war and the likely use of at least tactical nuclear weapons. The Senator visited CINCPACFLT headquarters and Admiral Hayward exposed him to the Prompt Offensive Action Plan—by then, known to the staff as *SEASTRIKE*. On his return to Washington DC, the Senator encouraged Harold Brown, the SECDEF and Graham Claytor, the SECNAV, to listen to the plan. Surprisingly, they endorsed it and set in motion the termination of the Swing Strategy. Just as Admiral Hayward had planned, SEASTRIKE revealed the need for many improvement's to the Pacific Fleet's combat capabilities. Over time, and particularly after Admiral Hayward became the CNO, these improvements were made.

When the Reagan Administration arrived the Prompt Offensive Action Plan fit its agenda for obtaining peace through strength and the basic precepts of the plan were adapted for execution in the Atlantic as well as the Pacific. It was a short reach from that point to characterize the prompt and universal offensive employment of the U. S. Navy as a *Maritime Strategy*.

THE SUBMARINE—THE KEY TO WINNING AN ARCTIC CONFLICT

by LCDR Sean A. Stein, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Editor's Note: This paper was awarded the Naval Submarine League Prize for outstanding Submarine/ASW paper by a student at the Naval War College. It has been edited for minor condensation and removal of Endnote References in order to conserve issue space. The original paper may be requested from THE SUBMARINE REVIEW.

Introduction

Global climate change is slowly causing the Arctic to melt. With a rate of temperature change almost twice as fast as the remainder of the earth, global warming in the Arctic is causing the polar ice to melt, opening new waterways and providing access to numerous untapped resources. Research indicates that it is only a matter of time before the Arctic is ice-free.

When new territory becomes available everyone wants a piece of it. The Arctic States (Canada, Norway, Russia, Denmark, Finland, Sweden, Iceland, and the United States) are all making various claims to the Arctic territory through the United Nations Convention on the Law of the Sea (UNCLOS). While many believe and hope UNCLOS will provide a peaceful method for conflict resolution, history has shown that when the possibility of new land and resources become available the potential for conflict exists.

Like the other Arctic States, the United States has national and strategic interests in the Arctic and must protect these interests. Due to the environment of the Arctic, the most probable conflict will be fought on the sea vice on land. The United States Navy currently lacks surface ships capable of operating in the iced portions of the Arctic, meaning the Operational Commander is limited in his force capabilities for Arctic operations. Therefore, in the event of a maritime conflict in the Arctic, dominance of the undersea environment, through the use of the submarine, will be the primary tool for the Operational Commander to protect United States strategic and maritime interests within the region.

The Melting Arctic

As the snow and ice melt, due to global warming, the larger surface area of the ocean is able to absorb more solar energy during the summer months. During the winter, this heat is transferred back to the atmosphere resulting in warmer air temperatures.

In 2012, the Arctic region reached a new record low for ice coverage with an average coverage of 3.4 million square miles. Although this region has experienced gradual change over the past 50 years, the last two decades have shown a significant decrease in the extent of ice coverage averaging about 3 percent per year. Experts believe that as these trends continue, 2013 could be the first "ice-free" summer on record, with an additional 30 – 40 percent decrease in volume by 2050.

The melting Arctic has led to new uncharted territory and opened waterways to shipping that had previously never been available. In 2008, the Northwest Passage (NWP) was ice-free for a two-week period and when combined with the ice-free periods in the Northern Sea Route (NSR), the two have opened the historic Arctic transit lanes for the first time in recent history to commercial shipping. In addition to the newly opened transit lanes, the receding ice has provided access to numerous previously untapped resources which include, oil, gas, minerals, and additional opportunities for commercial fishing. As the Arctic ice melts and

provides access to previously unreachable resources, this region will soon become one of the most contested areas on the planet.

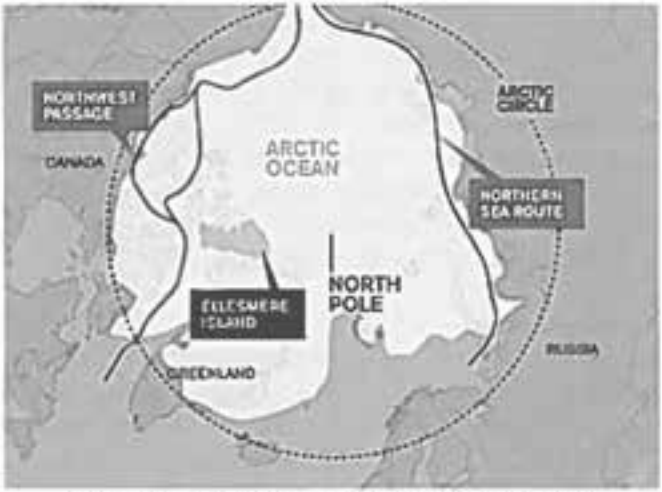

Figure 1, Northwest Passage and Northern Sea Route

The Arctic Conflict

"Only when the ice breaks will you truly know who is your friend and who is your enemy"

- Inuit Proverb

The Arctic is rich in natural resources. Researchers estimate that, in addition to gold, copper, and other minerals, the Arctic contains 30 percent of the world's remaining natural gas resources and approximately 13 percent of the world's untapped oil supplies. As the demand for oil and natural gas rises, countries will look to the resources of the Arctic region as the next supply for this demand. Likewise, as the NWP and NSR become ice-free, opening trade routes between Asia, Europe, and North America, the territorial claims and the location of these passageways within a country's territorial claim could become the subject of contention. While the reality of World War III being fought over the Arctic is unlikely, the National Intelligence Council does

suggest that the chance for smaller conflicts, centered on territorial claims, exists.

In 2007, using one of their submarines, Russia planted the Russian Flag on the ocean floor at the North Pole and made the statement "The Arctic is Ours." Since this claim, and fueled by the significant amount of resources contained within the Arctic, many of the remaining Arctic States are in the process of making or disputing claims of Arctic sovereignty. Article 76 of UNCLOS allows countries to extend their continental shelves when they can scientifically prove the land is theirs. On an economic basis, this is important because it expands a country's Exclusive Economic Zone (EEZ), providing the ability to have sole jurisdiction and the use of the natural resources located in those areas. This makes proving territory, under UNCLOS, necessary for a country to claim the land and receive the economic benefits of the Arctic. "Without a doubt, there will be more sovereignty challenges in the years to come," writes Barry Zellen, and with multiple countries submitting these claims and disputing the other claims, it could be years before decisions are made and the true ownership of the land is determined. Even if decisions are reached, the question remains, will all parties involved be satisfied with the rulings under UNCLOS?

Russia, Canada, and Norway are in the process of strengthening their military forces within the Arctic region. Compared to other Arctic States, Russia has the most Arctic capable military assets. In 2007, coincidentally around the time of the North Pole flag planting, Russia increased the frequency of their Arctic long range bomber flights, and in 2008 Russia's National Security Council drafted an Arctic policy formalizing their claimed Arctic borders. Combined with the development of new surface ships and submarines, to include the newly developed Borey class ballistic missile submarine, Russia's military advancements have forced the other Arctic States to improve their military capabilities for operating in the Arctic.

In response to Russian activities, Canada, who claims a majority of the NWP is located within internal waters, has become the most vocal about defense by force. As such, the Canadian Arctic

policy has called for increased defense funding, the development of patrol ships, and the development of new Arctic bases. Additionally, Canadian troops have expanded their northern operations focusing on operating in Arctic conditions. Canada isn't alone in improving their military capabilities. Norway, concerned about Russia's plans to improve their submarine fleet and the advancements to the Northern fleet, has begun the initial phases of exploring the replacements for Norway's outdated submarines. In addition to submarine improvements, Norway has purchased Arctic capable frigates and expanded their coastal surveillance of the Arctic region.

Despite the military buildup of the Arctic States, not everyone believes a military conflict will take place in the region. In 1996, the Arctic States (Canada, Norway, Russia, Denmark, Finland, Sweden, Iceland, and the United States) formed the Arctic Council with the mission "to promote cooperation, coordination, and interaction among the Arctic States." Experts feel that UNCLOS, combined with the Arctic council, will serve as the way to prevent armed conflict in the region. James Kraska writes, "UNCLOS serves as a key mechanism for conflict avoidance in the polar north, as it provides a widely accepted framework for resolving disagreements over marine boundary delimitation." Although many leaders see UNCLOS as a peaceful method to prevent boundary disputes on territorial claims, the value of the Arctic and the military buildup of nations geared towards Arctic capabilities cannot be denied. With the recent requests by China and Japan, who recognize the importance of the Arctic, to enter the Arctic Council one can hope that UNCLOS can prevent an armed conflict, but we must also be realistic to the fact that territory disputes could become real. As noted by Rob Huebert in his article *The Newly Emerging Arctic Security Environment* for the Canadian Defense and Foreign Affairs Institute, "the strategic value of the region is growing. As this value grows, each state will attach a greater value to their own national interests in the region. The Arctic States may be talking co-operations, but they are preparing for conflict."

Why the Arctic?

"Changes in the Arctic environment – no matter the cause – are a great national security concern"

—Rear Admiral David Gove, U.S. Navy

While the other Arctic States have worked to build their armed forces and prepare them for an Arctic conflict, the United States has lagged significantly behind, focusing on other efforts and not providing nearly as many resources to the Arctic region as the other member states. Realizing the impact of climate change and the strategic importance of the Arctic region, in 2009 President Bush signed National Security Presidential Directive (NSPD)-66/ Homeland Security Presidential Directive (HSPD)-25 *Arctic Region Policy*. This policy outlines the United States' strategic and security interests within the region and stresses the importance of freedom of navigation, maritime domain awareness to protect commerce and vital resources developing global mobility through the region, enhancing scientific research, and providing a maritime presence in the Arctic.

The United States is an Arctic nation. Our Alaskan borders are within the defined Arctic territory and, like other countries, the possibility exists that the United States could expand their EEZ by expanding the continental shelf through UNCLOS. This expansion would give the United States access to many of the untapped resources discussed earlier in this paper. However, the expansion of the EEZ, even if done through UNCLOS, could result in territorial disputes as this land is close to the borders of Canada and Russia. Regardless of the political implications of the expansion of the EEZ, the potential natural resources located within the Arctic region could be a source of additional economic security for the United States.

The Arctic region provides more than just natural resources and economic security. With the opening of the NWP and NSR for parts of the year, the Arctic has now become a center for maritime trade. Merchant shipping is able to quickly transit between Europe, North America, and Asia without having to transit

through a canal. These sea routes would save almost 5,000 nautical miles between Asia and the east coast of the United States and shorten the Europe to Asia transit by almost 40 percent. On a more strategic level, in the event of a conflict in Asia, these routes would provide a shortened and faster transit for military vessels if the United States needed to move forces from the east coast to the western Pacific theaters of operation. While other countries, in particular Canada and Russia, are looking to control these vital sea routes, the United States views these as international straits and therefore vessels are entitled to freedom of navigation through these waters. The need for freedom of navigation is identified as one of the top priorities in NSPD-66.

The Submarine and the Operational Commander

"The Navy's undersea warfighters bring a set of tools and capabilities to U.S. national security that are unique and indispensible. Enabled by stealth, surprise and boldness, undersea forces provide military impact and deterrent influence that is far out of proportion to their size and quantity."

—Commander, Submarine Forces, July 2011

With the strategic importance of the Arctic and sources of potential conflict identified, the question becomes how does the United States military fight a conflict in the Arctic? NSPD-66 notes that the Arctic is a maritime domain and requires, "the United States to assert a more active and influential national presence to protect its Arctic interests and to project sea power throughout the region," a statement well in line with the Navy's *"A Cooperative Strategy for 21st Century Sea Power"* which identifies sea control as a core capability of the Navy. With this in mind, the question now becomes how does the Operational Commander, in conjunction with the Navy, meet the strategic requirement of sea control in arguably one of the harshest operating environments on the planet? The answer to this question is through the use of the submarine.

Balancing of the operational factors of *space, time, and force* are critical for the successful victory in any armed conflict. The

Operational Commander must carefully assess all of his assets and capabilities with regard to each of these factors and ensure he has the appropriate balance between each and, as necessary, leverage one against the other when a weakness is observed. In the Arctic environment, the submarine brings the Operational Commander the balance of *space, time, and force* necessary to accomplish his objectives.

The Arctic climate is one of the harshest environments for our military to operate in. With an average North Pole winter temperature of -30° C (-22°F) and only a slightly warmer temperature of -0° C (32°F) during the summer months, the extreme weather conditions pose a safety hazard to any personnel or ship attempting to operate there. Personnel require additional protective equipment dedicated to keeping warm and protection from the elements, while ships and aircraft require additional heating elements to keep their temperature at a suitable level for operations and prevent sea spray from freezing on the ship and causing substantial ice buildup. This provides an additional challenge for the Operational Commander. While this provides a challenge for the Operational Commander, the fact that the Arctic is considered a maritime domain means he must focus on protecting his maritime units from the environment vice concentrating his protection efforts on land forces. Through the use of the submarine, the Operational Commander has a force that he could employ without undue concern for the elements.

Perhaps the greatest environmental concern for operating in the Arctic are icebergs. Masked in size by the sea, icebergs have the potential to rip holes into the side of any vessel causing significant damage or even sinking the ship. In a 2011 report to Congress, the Department of Defense identified that currently the Navy does not have any ice-strengthened surface ships capable of operating in all regions of the Arctic. The Department of Defense's statement hints that the Navy would be unable to exercise sea control in the marginal ice zone or first year ice zone due to the lack of surface combatant capabilities. However, the report goes on to state that the United States Submarine Force has been operating in the ice regions since the 1950's and that many of

today's submarines are designed for under ice operations. The under ice design of submarines ensures the Operational Commander has an asset available to transit under the ice through the NWP and NSR at all times and especially during the winter months when the passages are generally closed due to ice buildup.

Dr. Milan Vego writes, "time is one of the most precious commodities in the conduct of warfare...time lost can never be recovered." However, he further writes, "considerable time can be gained by reducing the time required for planning and preparing a campaign or major operation." The United States has lagged behind other countries in their Arctic efforts leaving the Operational Commander with a planning disadvantage and a loss of time. In order to make up for the loss of time, the Operational Commander must look to balance the lost time by increasing his preparation efforts and by incorporating the Arctic preparation already completed by the Submarine Force.

Since USS NAUTILUS (SSN 571) conducted Arctic operations in 1958, the Submarine Force has maintained an Arctic capability. Since the end of the Cold War, the submarine presence in the Arctic has dropped but through multiple Operation Ice Exercises, led by the Arctic Submarine Laboratory, the Submarine Force has been able to exercise an Arctic presence. In addition to sending the strategic message that the United States will continue to operate in the Arctic, these exercises have allowed submarines to explore the undersea environment to gain a better understanding of the waterspace, explore new technologies for operating under the ice, improve submerged operations and tactics, and more importantly maintain crew proficiency at operating in the Arctic.

Training and preparation are not the only ways time is saved by the Operational Commander. In order to successfully balance the factor of time, he must look at the physical value of time and how quickly he can maneuver and mobilize his forces as this area is a key component of warfare. When a conflict in the Arctic arises, the Operational Commander will need a maritime unit to respond quickly to the situation.

Since United States submarines are constantly deployed throughout the world and assigned to all theaters and combatant

commanders, a nuclear powered fast attack submarine provides the Operational Commander an on-scene combat ready asset without delay allowing him to plan for immediate use of the submarine's capabilities.

With the United States already behind the other Arctic nations, it will be imperative that the operational plans save time by exploiting the preparations already completed for Arctic operations. The continued preparation and training for this type of operation by the Submarine Force, combined with the ability of a submarine to rapidly respond, provides the Operational Commander the balance of time he needs to makeup for the time already lost.

The submarine's impact on the factors of space and time are enough to demonstrate why the value of the submarine far outweighs the conventional land and sea forces during an Arctic conflict, however, none of them compare to how the submarine dominates the factor of force provided to the Operational Commander for protecting our assets in the Arctic. As previously noted, the Navy's surface fleet lacks the capabilities to operate in the iced regions of the Arctic. Although aircraft, such as the HC-130 and other Maritime Patrol Craft have the capabilities to operate in the cold temperatures of the region, they lack the necessary capabilities to provide combat firepower in the event of an armed Arctic conflict.

In 2011, Commander Submarine Forces, published a document entitled "Undersea Warfighting", which discusses the military importance of the submarine and its ability to meet the goals of the cooperative maritime strategy. One of the key components of this document is the military advantage provided by undersea concealment. Stealth is one of the greatest advantages of submarines and, in addition to providing operational intelligence for planning, the submarine provides the Operational Commander the method of surprise. Unlike aircraft and ships, a submarine positioned in the Arctic provides the ability to conduct pre-fires of military targets prior to any conflict. Although operational fires through massive precision Tomahawk strikes are highly unlikely in a small Arctic conflict, the capability is

available to the planners. Perhaps the greatest advantage the stealth of the submarine brings is deterrence, as the mere presence of a submarine is sometimes enough to dissuade the enemy from using his naval forces. In a maritime conflict, where sea control is the goal, deterring the enemy by executing sea denial could be enough to win without even firing a shot.

In his article, "Arctic Sovereignty, Submarine Operations and Water Space Management," Captain Phil Webster of the Canadian Navy discusses the importance of the Canadian Submarine Force and its role in the Arctic. He writes how Canadian submarines could be used to enforce sovereignty over Canadian Arctic territory and monitor foreign submarines through Canadian waters. His article stresses what the importance of having submarines in the area could mean, and how Canada must remain a "viable and capable submarine force." This does not suggest that the United States will engage in a submarine war with Norway or Canada, two of our NATO partners, but it does provide an example of how other nations see their Submarine Forces with respect to the Arctic and suggests that if a conflict were to develop other countries would rely upon their submarines as their primary method of force. With this in mind, the Operational Commander will have to plan that the submarine will be the opposition's center of gravity.

NSPD-66 stresses that the Arctic will be a maritime domain and if other countries are looking towards their Submarine Forces to be the primary military platform in the Arctic, this region will not only be a maritime conflict but centered on submarine warfare. As the Operational Commander focuses his military efforts on the opposition's center of gravity, Anti-Submarine Warfare (ASW) will become the major portion of the operational plan. Currently the Navy lacks capable Maritime Patrol Aircraft and sufficient ASW capable surface ships to conduct Arctic operations and even if these platforms are Arctic capable prior to any conflict, the ability to conduct effective ASW and attack the opposition's center of gravity is limited.

"Advanced attack submarines are the most effective ASW platforms today," writes Dr. Vego making the submarine the ideal platform for the Operational Commander to use for attacking the

opposition's operational center of gravity and accomplishing his objective. Although other countries may attempt to counter this and engage our submarines, likely our center of gravity as well, Robert Work writes for the Center for Strategic and Budgetary Assessments that, "US submarines generally have superior quieting and combat systems, better-trained crewmen, and much more rigorous maintenance standards. As a result, the US Submarine Force has generally been confident that it could defeat any potential undersea opponent." As such, the Operational Commander could use the capabilities of the submarine for conducting operations in the maritime and undersea environments with a strong confidence of mission accomplishment.

Although other units, to include Marine Corps and Army Reserve units, have prepared to operate in the Arctic environment, the chances of a land war are extremely slim. Thus, the operational plans for any Arctic conflict will need to focus on exercising sea control. With the lack of sufficient naval surface forces to accomplish this objective, the Operational Commander must use the capabilities of the submarine to provide sea denial, exercise combat power, and most importantly provide ASW to balance the factor of force and leverage this factor in his favor to obtain his operational objective and protect our national and strategic Arctic interests.

Recommendations

As more and more countries make territorial claims in the Arctic, the United States must be prepared to conduct Arctic operations in support of defending our national and strategic interests. As other countries focus on the submarine as the tool to protect their claims and sovereignty, the United States must do the same. With the training and research already in place, through the Arctic Submarine laboratory, the Submarine Force has the basic tools available for successful Arctic operations. To maximize the effectiveness of the preparation and to ensure our forces are ready for conflict the Submarine Force should dedicate specific submarines on each coast for Arctic operations.

Although submarines have been conducting Arctic operations and exercises through the Arctic Submarine Lab for years, they have been limited to only a few submarines. This means our expertise of Arctic operations is limited to only a few commands and since these commands are not necessarily the same units each year, their experience erodes over time. All classes of submarines (LOS ANGELES, SEAWOLF, and VIRGINIA) have demonstrated their ability to operate in this region. This class flexibility allows the Submarine Force to dedicate specific submarines on each coast for Arctic operations ensuring the crews maintain proficiency and allowing for specific tailoring of the submarine's equipment to operate in the Arctic. Most importantly, dedicating specific units for Arctic operations will ensure the Operational Commander always has the appropriate number of operational units available in the Arctic theater and properly configured submarines and trained crews who could deploy in short notice as required.

Conclusion

The potential for conflict in the Arctic is becoming a reality. While many hope that UNCLOS will be the method for maintaining peace in the region, the possibility for small-scale conflicts exists. In order for the Operational Commander to successfully win in any conflict he must balance the operational factors of space, time, and force. In the Arctic, the submarine brings the necessary balance of all three factors to the Commander. Additionally, the capabilities provided to the Operational Commander by our attack submarines for attacking the opposition's center of gravity provides the leverage of force in our favor that no other Arctic nation has. Thus, when preparing for an Arctic conflict, the Operational Commander is able to use the capabilities of the submarine to protect our national and strategic interests.

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BATTLE OF THE PHILIPPINE SEA – AIRPLANES, YES, BUT SUBMARINES?

by Mr. Don Messner

Editors Note: The Battle of the Philippine Sea has usually been characterized as mainly an air-to-air fight and is popularly known as " The Great Marianas Turkey Shoot". However, a large number of ComSubPac and ComSubSoWestPac boats played an important role preceding the actual "Turkey Shoot".

Bits and pieces of the full story of submarine involvement have been widely published, but mainly as scattered individual events; such as in the story of HARDER and the destroyers. Therefore, the full impact of their importance to the big picture is not generally recognized. The author has documented here a concise chronological picture of the role the Submarine Force played in the invasions of Saipan, Guam and Tinian, and of course, in the Battle of the Philippine Sea.

"Mr. Messner has asked that his article be dedicated to VADM Patrick Hannifin, who as a Lieutenant then as a Lieutenant Commander, was his Skipper in DIODON and Qualified him in Submarines." VADM Hannifin was honored as the 2012 Naval Submarine League's Distinguished Submariner.

Historians write about the Battle of the Philippine Sea, often referred to as the Great Mariana Turkey Shoot, and inevitably focus on the overwhelming victory U.S. carrier pilots had over their Imperial Japanese Navy (IJN) counterparts. Few, however, researched the contribution Pearl Harbor submarines under the command of Admiral Charles A. Lockwood, ComSubPac, and Fremantle submarines under the command of Admiral Ralph W. Christie, ComSubSoWesPac, made to the outcome of this battle. This paper then looks at the role of the Submarine Force leading up to and during the battle when Task Force (TF) 58, under the capable leadership of Vice Admiral Marc

Mitscher, an integral part of Admiral Raymond Spruance's 5th Fleet, was having its field day during Operation Forager. It should be noted that the Battle of the Philippine Sea was not a planned event, it was kindled by Operation Forager.

OPERATION FORAGER

Operation Forager was the code name for the Mariana Campaign which consisted of the retaking of Guam and invasion and capture of Saipan and Tinian, two other islands in the Mariana chain which had been under Japanese control since 1920. American interest in the Marianas dates back to the Spanish American War of 1898. Spain having lost the war, ceded control of the Philippine Islands to the U.S. and had no further reason to maintain a presence in the Marianas. As a result, on 01 February 1898, Spain ceded control of Guam to the United States and sold their rights to the other 14 islands in the Mariana chain to Germany for $4,500,000. German at this time was also busy establishing trading colonies in the neighboring Marshall Islands and Carolines.

With Germany's defeat in World War I, control of their Pacific colonies was *mandated* to Japan by the League of Nations in 1920 greatly expanding Japan's Greater East Asia Co-Prosperity Sphere ambitions. Henceforth the Marshalls, Carolines and Marianas, less Guam, were to be collectively known as the Mandates. During this period and leading up to the on-set of World War II, Japan maintained the utmost secrecy in the Mandates. Tourism and trade were discouraged and a strong level of suspicion prevailed that Japan was establishing military bases on the islands contrary to League of Nations directives. Therefore it should have been no surprise to the Washington D.C. politicians and the military leaders that on 10 December 1941, three days after Pearl Harbor, the Japanese invaded and over ran Guam.

Under the command of Vice Admiral Shigeyoshi Inouye and the 4th Fleet, Rear Admiral Aritomo Goto in heavy cruiser AOBA led the invasion fleet consisting of four heavy cruisers which had sailed from Japan's Inland Sea via the Bonin islands, and four destroyers, nine transports, some miscellaneous auxiliary ships

and the minelayer TSUGARU which had sailed from the mandated island of Saipan. (Later Adm. Goto was to lead IJN Cruiser Division Six in the Battle of Savo Island, a disastrous defeat for the Americans). The occupation force landed an estimated 5,000 troops plus a special forces unit of about 700. Resistance by the garrison of 250 sailors and 150 marines was recognized as suicidal by the Governor and within several hours articles of surrender were signed.

Within a month the majority of military and civilian PoWs were shipped to Japan and interned for the duration. Many of the local Chamorros fed and protected the few Americans who escaped to the mountains and, in spite of intense pressure from the Japanese, remained loyal to the United States. Japan did little to militarize Guam but did use it as a small navy and air base. Saipan remained the keystone of Japanese presence in the Marianas.

For the next 2 ½ years Guam remained under Japanese control as the U.S. didn't have the where-with-all to reclaim the strategic island. It took the U.S. fully two years to amass resources strong enough to go on the offense in the Pacific. Operation Galvanic, the retaking of the Gilbert Islands in November '43, marked the beginning of reclaiming the central Pacific islands followed closely by Operation Flintlock, the invasions of the Marshalls in January/February '44. The commissioning of six new large carriers (CVAs) in '43 made this possible. The new CVAs were YORKTOWN II, INTREPID, HORNET II, LEXINGTON II, BUNKER HILL and WASP II.

RECLAIMING THE PACIFIC

The Quadrant Conference held in Quebec in August '43 established for the first time the double thrust approach in the Pacific. Admiral Chester W. Nimitz was to lead the thrust in the Central Pacific which included the Gilberts, Marshalls, Carolines, Marianas (Guam, Saipan & Tinian) and Iwo Jima leading to Japan. General Douglas A. MacArthur was to lead the thrust through southeast Asia which included New Guinea, Mindinao, Luzon, Formosa and ultimately Japan. Securing the Gilberts in November '43 got the ball rolling, and the Sextant Conference held in Cairo,

Egypt in early December '43 gave Nimitz and MacArthur the green light to proceed.

With the Sextant Conference's authorization, the Joint Chiefs of Staff (JCS) on 12 March '44 prioritized Operation Forager as next in line after the Gilbert Islands and Marshall Islands were safely secured. Reasons for proceeding with Operation Forager were three fold. First, the Navy needed advanced naval bases from which to operate – especially for ComSubPac. Guam and Saipan offered safe harbors for the Fleet and reduced the distance from Pearl Harbor to Japan by 2,000 nautical miles (Note: Pearl Harbor to Tokyo = 3,382 nautical miles, Guam to Tokyo = 1,354 nautical miles). Second, the Army Air Corp was looking for advanced bases for their new B-29 long range bomber. Saipan and Tinian had airfields constructed covertly by the Japanese which would support a round trip to Japan for a B-29. Thirdly, Guam was an American possession which had been over run by the Japanese on 10 December '41 and we had, if for no other reason, a moral obligation to free the native civilians from Japanese oppression.

OPERATION HAILSTONE

As a prelude to any invasion of the Marianas, and more near term the invasion of the Marshalls, the strongly fortified Japanese navy base on Truk in the Carolines had to be neutralized. To accomplish this, Operation Hailstone was devised. Hailstone was launched on 17 February '44 and consisted of Mitscher's TF 58 temporarily diverted from the Marshalls to raid/bomb what was left of the Combined Fleet anchored at Truk. The air squadrons from CVAs ENTERPRISE, YORKTOWN II, ESSEX, INTREPID & BUNKER HILL and light carriers (CVLs) CABOT, BELLEAU WOOD & COWPENS, bombed everything in sight, and the devastation was so complete the Japanese abandoned Truk. The flight crews didn't learn until later that Admiral Mineichi Koga, CinC Combined Fleet (Yamamoto's successor), had moved the majority of the fleet to Palau one week earlier.

BLOCKADE OF TRUK:

Eleven U.S. submarines participated in Operation Hailstone in a new tactical co-ordinated assignment – a blockade. Submarines SEAL II, SEARAVEN & DARTER served as lifeguards and were positioned off eastern approaches to Truk, the direction from which TF 58's aircraft came. Eight additional submarines, SKATE II, TANG, SUNFISH, ASPRO, BURRFISH, DACE, GATO & PERMIT, were positioned in an arc around the north and westerly sectors of the island to catch any fleeing enemy ships. Two were successful – TANG & SKATE II both sank one enemy ship.

SKATE II:

One the night of 16 February '44, SKATE, under the command of William P. Gruner sighted what she identified as a heavy cruiser. At 1743 she fired a spread of four torpedoes from the bow tubes and heard four explosions. Periscope observations confirmed fire and smoke but no sinking. SKATE tailed the target until 0200 the next morning when she disappeared from radar. Post war records indicate she sank the light cruiser AGANO of 7,000 tons fleeing north from Truk.

TANG:

From a convoy of two cargo marus and an abundance of six small escort vessels, TANG sunk her first enemy ship on 17 February '44 under the command of Richard O'Kane. It was 7,700 ton maru in the northeast sector of the Truk area. She fired a stern shot spread of four fish set at a shallow depth of six feet for the target's demise.

SEARAVEN:

Lifeguard duty for SEARAVEN rewarded three aviators from one of YORKTOWN's torpedo bombers by fishing them out of the briny.

With Truk neutralized, TF 58 set a course for Guam and the Northern Marianas. No reconnaissance missions or *fly overs* of the islands had occurred since its occupation in December '41. No information as to where the Japanese had built airfields was

available so TF 58's mission was a hunt, seek and destroy enemy airfields when and if found. Commanded by Rear Admiral Alfred Montgomery, Task Group (TG) 58.2's target areas included the islands of Guam and Saipan, and TG 58.3, commanded by Rear Admiral Frederick Sherman, focused on Tinian and Rota. This they did successfully on 23 February '44, and according to Japanese records, destroyed over 160 aircraft and sunk two 4,800 ton marus in the harbor.

BLOCKADE OF MARIANAS:

Prior to TF 58's raid on Guam, five U.S. submarines, SEARAVEN, SUNFISH, TANG, APAGON & SKIPJACK II were directed to established a blockade line west of the area to catch any ships fleeing toward friendlier havens. SUNFISH and TANG were successful in this endeavor.

SUNFISH:

SUNFISH under command of Edward Selby sank two marus around daybreak of 23 February. The first was not the carrier UNYO as originally thought but the freighter SHINYUBARI MARU of 5,300 tons. The second, just hours later, was a maru of 4,000 tons damaged with a spread of three torpedoes set at a depth of 12 feet. A second surface attack dispatched the target with a single torpedo from a stern shot set sat a depth of eight feet according to her war patrol report. She was credited with two ships sunk totaling 9,400 tons.

TANG:

TANG, as stated, was under command of Richard O'Kane who had been XO on WAHOO (SS-238) under Mush Morton. He was now exercising his authority on his first patrol as the *man in charge*. On the night of 22 February TANG crossed paths with a five ship convoy in which O'Kane was successful in destroying two of the marus, the FUKUYAMA MARU of 3,600 tons and the YAMASHIMO MARU of 6,800 tons. Two days later a three ship convoy heading west was sighted. TANG disposed of two freighters one of which O'Kane thought was a tanker but was later

identified as the ECHIZEN MARU of 2,500 tons. The next day a third convoy was sighted. TANG using her last four torpedoes was credited with sinking the freighter CHOKO MARU of 1,800 tons, but her official war patrol report indicates that on attack #6 all four torpedoes missed. However, five ships for a total of over 21,000 tons was the final tally for the Mariana patrol.

As mentioned above, the JCS on 12 March '44 prioritized Operation Forager as next in line after the Gilberts and Marshalls had been secured. Target date of 11 June '44 was set. Between the initial reconnaissance raid of the Marianas on 23 February and the first invasion landing scheduled for 15 June on Saipan, submarines assigned patrol areas between Japan and the Marianas were put on the alert to watch for massive troop ship movements bringing reinforcements to the islands. The Japanese called this Operation Matsu.

OPERATION MATSU:

TROUT:

Within a week, on 29 February, TROUT was given a heads up from CombSubPac in Pearl to watch for a convoy of four large transports escorted by three destroyers in her sector. This was Operation Matsu #1. TROUT, commanded by Alfred Clark, made contact and sunk the SAKITO MARU of 7,100 tons and damaged the 11,400 ton AKI MARU. Records show that 2,500 of 4,100 troops being moved from Manchuria to Saipan were lost with all their equipment. This proved to be a costly encounter as the destroyer escorts counterattacked and TROUT was never heard from again.

(Note: TROUT was a Portsmouth naval shipyard boat commissioned in November '41. Her crew numbered 81)

SANDLANCE:

Two weeks later, on 12 March, SANDLANCE under the command of Malcom Garrison, was alerted by Pearl regarding a large convoy which had sailed from Tokyo for the Marianas loaded with reinforcement troops – Operation Matsu #2. SANDLANCE altered course and headed south toward the

Bonins. She successfully intercepted this convoy consisting of five big freighters, several small ships, several destroyers acting as escorts and the light cruiser TATSUTA. In one set up Garrison fired four stern tubes and two bow tubes sinking the cruiser and the 4,600 ton KOKUYO MARU as well as damaging another freighter. The maru sinking took over 1,000 troops and their equipment out of the equation. Prior to this attack, SANDLANCE was positioned off the coast of Honshu an in three separate attacks between 28 February and 03 March sank three cargo marus.

POLLACK:

Assigned to the Empire waters with Bafford Lewellen at the helm, POLLACK was patrolling in the area between Honshu and the Bonin Islands. On 20 February she sunk a 5,000 ton Maru using two torpedoes set at a depth of six feet. Five days later in the same area she is credited with sinking a destroyer of 1,400 tons with a spread of six torpedoes from the bow set at six feet. Shortly thereafter two marus were sighted. Lewellen fired two bow shots at one and two stern shots at the other – both targets of 7,500 tons went down. On 03 April, POLLACK was three to four hundred miles to the northeast off the coast of Honshu when she crossed paths with Matsu #4, a seven transport convoy outbound from Tokyo and headed for Saipan and Guam with reinforcements. With her last two torpedoes POLLACK damaged a passenger/cargo maru of 4,300 tons and headed for Pearl. She was credited with sinking four ships for a total of 21,000 tons.

SEAHORSE:

SEAHORSE, a Pearl Harbor boat with Slade Cutter at the helm, proved to have a busy agenda. On 08 April in the vicinity of Saipan, SEAHORSE came across a convoy headed for Saipan – Operation Matsu #3. Cutter let loose with a spread of six torpedoes and sunk two marus. The ARATAMA MARU of 6,700 tons and the KIZUGAWA of 1,900 tons went down loaded with troops and supplies for the defense of Saipan and Guam. The next night the same convoy was overtaken with 15 to 20 ships still afloat. Cutter, with several setups foiled, was able to dispatch the BISAKU

MARU, a 4,500 ton freighter. Within the next two weeks, Cutter was credited with sinking a Japanese submarine, RO-45, and a 5,200 ton freighter, the AKIGAWA MARU. This was Cutter's third patrol on SEAHORSE. He had amassed an amazing record of sinking five ships on each of the patrols. Records show that 1500 troops were rescued from SEAHORSE's exploits, but all equipment was lost. The patrol terminated in Brisbane, Australia.

GREENLING:

GREENLING's War Patrol Log is very sketchy except to say that between 02 and 29 April '44 she was on a special reconnaissance mission of the Marianas. The CO was James D. Grent. Few ships were sighted and no attacks were made, but one can assume the photographs taken aided the planners in selection of the beaches to be stormed on Saipan, Guam and Tinian.

GUDGEON:

18 April '44 was another dark day for the U.S. Submarine Forces. Gudgeon, on her 12th war patrol was lost near Saipan. There is some confusion on the date as 07 June '44 has also been reported, but 18 April from data available is more credible. She was under the command of Robert Bonin on his 1st patrol. Exact cause of her demise is not known.

(NOTE: GUDGEON was a Mare Island Naval Shipyard boat commissioned in April '41. She is credited with sinking the first Japanese submarine in WWII. Her crew numbered 78)

TRIGGER:

TRIGGER encountered homebound Matsu #5 on 26 April after discharging troops at Palau, a Japanese stronghold west of the Marianas. The convoy consisted of four big transports escorted by a destroyer and three frigates. Fredrick Harlfinger, in command, with the venerable Ned Beach as XO, made four separate attacks firing all but one of his torpedoes. TRIGGER was given wartime credit for sinking five ships. The first attack sunk two cargo (AK) marus and damaged two more. This was done

with a spread of only four torpedoes set at six feet depth. The second and third attacks sunk the two damaged AK marus with a spread of four and six torpedoes respectively – all set at six feet. Firing three stern tubes, the fourth attack took out one of the escorts. All attacks were witnessed by periscope observations according to the war patrol reports. The five sinkings represented a loss of 33,000 tons of shipping capacity to Japan.

(Note: After this patrol, Ned Beach went on TIRANTE (SS-420) as XO with Medal of Honor recipient George Street as CO. After one patrol on TIRANTE, for which he was awarded the Navy Cross, Beach got his own command, PIPER (SS-409)).

SILVERSIDES:

SILVERSIDES left Fremantle, Australia for the Marianas on her 10th war patrol. As author Clay Blair states in *Silent Victory*, skipper John Coye "operated like a one-boat wolf pack". On 10 May she sank three ships heading for Port Arpa, Guam. This was a seven ship convoy with escorts from Operations Matsu #5. The targets included the freighter OKINAWA MARU of 2,200 tons, the transport MIKAGE MARU of 4,300 tons and the converted gunboat CHOAN MARU II of 2,600 tons. Amazingly this was done with one spread of six torpedoes from the forward room. Ten days later, a stern shot of four torpedoes added another converted gunboat, the SHOSEI MARU, of 1,000 tons to the list. Then on 29 May another convoy bringing aviation gas into Saipan yielded two ships, the SHOKEN MARU of 2,000 tons and the HORAIZAN MARU of 2,000 tons. Six more torpedoes set at a depth of eight feet did the job. Coye expended 24 torpedoes in the process of sinking six ships totaling over 15,000 tons. One source states that 1,500 troop reinforcements did, however, make it to the islands sans equipment. SILVERSIDES, out of torpedoes, headed for the barn – Pearl Harbor.

SANDLANCE:

Two months after her maiden patrol in these waters, SANDLANCE returned from Pearl for her second patrol still

under the command of Malcom Garrison. On 03 May off Saipan SANDLANCE sunk a Chicago class maru at anchor with a forward spread of three torpedoes – estimated size at 5,800 tons. On 11 May just west of Guam and Saipan an AK maru of the KYUSKU class was sighted with an escort. An attack yielding two hits succeeded in damaging the maru which apparently sank later. Three days later off the coast of Arpa, Guam, a MITAKESAN MARU class AK of 4,400 tons was sunk with two hits from the four bow tubes and the depth set at ten feet. Finally on 17 May in two separate attacks, two more AK marus, the TAIHOKU MARU of 8,300 tons and FUKKO MARU of 3,800 tons, were sunk just west of Guam and Saipan. Both were stern shots with spreads of four torpedoes. A war time credit of four ships for 22,000 tons was given for the patrol, SANDLANCE terminated the patrol in Fremantle.

SHARK II:

A member of wolf pack dubbed Blair's Busters assigned to patrol the active Mariana area, SHARK, on her maiden patrol out of Pearl Harbor, got her initiation on an out bound convoy of Operation Matsu #6 on 02 June. SHARK under command of Edward Blakely sunk the 4,700 ton CHIYO MARU, thought to be a tanker, and damaged a second maru with a forward room four tube setup. Two days later, the sinking of a troop ship could not immediately be confirmed as SHARK was driven deep. However, postwar records show that the ship indeed was sunk and 7,200 troops and 22 tanks went swimming. On the next day, 05 June, Blakely sighted two freighters and fired a spread of three torpedoes at each set at a depth of eight feet. Down went TAMAHIME MARU of 3,000 tons and TAKAIKA MARU of 7,000 tons carrying 3,300 troops and eleven tanks to Saipan. SHARK was given credit for sinking four ships totaling 32,000 tons.

PINTADO:

Also a member of Blair's Busters wolf pack, PINTADO, along with help from SILVERSIDES and SHARK, dogged a

convoy of three freighters and two escorts on 31 May soon after arriving in the Marianas. On his second attempt to penetrate the screen, CO Bernard Clarey let loose with a spread of six torpedoes to disintegrate the 4,700 ton TOHO MARU with five hits. The sixth torpedo damaged a medium size cargo maru. A week later on 06 June, Clarey found a 2,800 ton tanker loaded with gasoline, and four stern torpedoes took KASHIMASAN MARU to the bottom. Later that day a second opportunity crossed PINTADO's bow. Clarey fired a spread of six torpedoes at overlapping targets reporting that he had sunk a London type maru of 7,000 tons and a Giosyn type maru of 8,000 tons. He got a wartime credit for both.

It was estimated that Blair's Busters during the first week of June were responsible for the loss of 1,400 Japanese troops and the 5,600 that were rescued by escort vessels which did manage to land on Saipan had lost all their equipment – arms, ammunition, tanks, trucks, fuel, etc.

Operation "A-Go"

Admiral Isoroku Yamamoto, Commander in Chief (CinC) of the Imperial Japanese Navy from August 1939 until his death in April '43, developed a strategic plan called the *Z Plan* or Operation Z as it was better known. Operation Z envisioned a quick victory in a *decisive* battle early in the war. Yamamoto, like most Japanese naval leaders, admired, almost idolized, Admiral Togo's victory over the Russian Fleet at Port Arthur in '08. To continue this victory streak, he felt a decisive battle early in the war, staged somewhere to Japan's benefit, and before America could muster all her industrial strength, was the only key to victory. He was so impressed with the British victory over the Italians at Taranto in November '40 and the use of air power that he modeled his plans accordingly – i.e., the attack on Pearl Harbor. He was in the clear minority when he professed that the day of the battleship was over. It was not a popular stance.

(Note: Yamamoto learned to fly when he was a Captain in '23, and in '29 he commanded the aircraft carrier AKAGI, one of the six carriers in the Pearl Harbor raid 12 years later. No doubt he was an early enthusiast of naval aviation).

Yamamoto died when his plane, a Mitsubishi Betty, a GM4 twin engine fighter/bomber, was shot down over Bougainville, the Solomon Islands, by U.S. P-38s from Henderson field on Guadalcanal. Operation Z did not die with him as Admiral Mineichi Koga, his successor as CinC Combined Fleet, adopted it. Koga envisioned that when the *Z* Plan was launched it most likely be in the Philippine Sea area (how right he was). His plan called for all the naval strength the navy could muster plus reinforced air and ground defenses in and around the Philippine Sea. He issued the orders calling for troop reinforcement of the Marianas, and as stated above, TROUT, on 29 February '44, intercepted one of the first of such convoys sinking one troop laden maru and damaging another before she met her demise at the hands of the IJN escorts.

Koga didn't live to see the plan's execution as he died in an unexplained airplane crash in the Philippines. He was flying from Palau to Davao on the south coast of Mindanao, the Philippines southern most island, in March '44.

(Note: Steven Trent Smith's outstanding book, *The Rescue*, details how a copy of the *Z* Plan was retrieved by Philippine guerrillas from another plane crash carrying Admiral Shigeru Fukudome and eventually wound up in American hands).

Koga's successor was Admiral Soemu Toyoda, the commander of Japan's largest naval base at Yokosuka. He assumed his duties in early May, and as naval historian Samuel Eliot Morison states, "Toyoda, like his predecessors, firmly believed in joining battle with the Pacific Fleet at the earliest opportunity." He adopted the *Z* Plan, updated it, called it the *A-Go* Operation Plan and wasted little time in putting it in motion by ordering the Fleet to assemble at Tawi Tawi in anticipation of the *decisive battle*. A line was drawn from the Marianas through the Palaus south of the Vogelkop of New Guinea, and when the Americans penetrated that line, the signal for full scale execution would be given. On 20 May he issued the orders "Prepare for Operation A-Go". This put the fleet in stand-by mode.

At this time much of the Combined Fleet had been moved to Lingga Roads, across the straits from Singapore. Carrier Division (CarDiv) 1, consisting of the carriers TAIHO, SHOKAKU and

ZUIKAKU, had been home ported here for the last two months. Fuel oil was the reason. The IJN was experiencing a critical shortage of fuel oil for its ships. American submarines were playing havoc with the shipping lanes from the oil fields in Borneo to Japan. Not enough tankers were getting through to fuel the thirsty naval vessels. By moving much of the fleet to Lingga Roads, oil from the Borneo ports of Tarakan and Balikpapan was in far less in danger of being diverted to King Neptune.

In compliance with Toydoa's orders, CarDiv 1, under Admrial Jisaburo Ozawa, sailed for Tawi Tawi on 11 and 12 of May. Tawi Tawi is the western most island in the Sulu Archipelago which reaches from the southwest corner of Mindanao, P.I. to the northeast corner of Borneo. Its strategic location is on the main convoy route from Makasser Straits north to the ports of Manila, Formosa and the home land, Japan. This was considered an ideal place from which to sortie in any direction. It also put the fleet within 180 miles of Tarakan for easy access to fuel oil.

LAPON:

A Fremantle boat, LAPON was on her outbound leg when, on 13 May off the west coast of Borneo, she sighted a convoy consisting of three carriers (CVs), five heavy or light cruisers (CAs/CLs) and three destroyers (DDs). This was part of Ozawa's CarDiv 1 moving from Lingga Roads enroute to Tawi Tawi. Lowell Stone, in command, tried to close on the targets, but air cover from the carriers spotted the periscope and alerted the destroyers who promptly started a depth charge attack. The DD's were not dangerously close but kept LAPON down long enough for the convoy to move out of range. A contact report was made to Admiral Christie's command in Fremantle, and LAPON continued on to her patrol area in the South China Sea where she was credited with sinking two AKs for 15,000 tons.

BONEFISH:

Another Fremantle boat, BONEFISH in the Celebes Sea, was down to her last six torpedoes when she got word to head for Sibutu Passage to investigate enemy activity. Sibutu Passage

separates Tawi Tawi from Borneo with the Celebes Sea to the south and the Sulu Sea to the north – the main thoroughfare between the two seas. On 14 May, skipper Thomas Hogan reported seeing a convoy of three battleships (BBs), three CAs, one CL, one CV and six DDs heading for the Tawi Tawi anchorage. She tried to give chase but the swift currents of the strait prevented her from closing. This was the remaining part of Ozawa's CarDiv 1 as they had departed Lingga Roads on consecutive days, and the makeup was distinctly different from that of LAPON's. On 16 May, BONEFISH came back for a second look and, as Blair in *Silent Victory* pens it, "saw a grand sight inside the anchorage – six carriers, four or five battleships, eight heavy cruisers, light cruisers, and many destroyers". Ozawa's Fleet had indeed arrived at Tawi Tawi as well as CarDiv 2 and 3 from Japan. With this last report, BONEFISH headed for the barn. She was credited with sinking three AKs and a DD on this patrol.

CarDiv 2, under command of Rear Admiral Takaji Joshima, with carriers JUNYO, HIYO and RYUHO, was home ported at Kure, the big navy base in the Inland Sea in Japan proper. He also put to sea on the 11th of May for Tawi Tawi to join forces with Ozawa's new Mobile Fleet arriving on the 16th. Likewise, CarDiv 3, under the command of Rear Admiral Sueo Obayashi, with carriers CHITOSE, CHIYODA and ZUIHO also at Kure followed Joshima out of the Inland Sea through Bungo Suido Straits to the Pacific and headed for the Tawi Tawi rendezvous. This put nine carriers and their aircraft at Ozawa's disposal. (Note: Admiral Joshimas had been CO of the carrier SHOKAKU – one of the six carriers during the Pearl Harbor attack of 07 December.)

Another fleet commanded by Vice Admiral Matome Ugaki was located at Batjan, which is a small island in Indonesia west of New Guinea's Vogelkop, east of Celebes and lying on Molucca Passage. The fleet consisted of the two large battleships, MUSASHI and YAMATO, seven cruisers, seven or eight destroyers, a couple of minelayers and some miscellaneous other small ships. It was here in support of IJN's Operation KON, the plan to reinforce the strategic island of Biak just north of the

Vogelkop. MacArthur's troops were at the front door. Priorities, however, were soon going to change its mission.

RAY:

Davao Gulf on the south shore of Mindanao was an IJN staging area for what was to be known as Supply Force Two, Admiral Ugaki's support fleet. RAY's patrol area, assigned by ComSoWesPac, was the area just to the southeast of Mindanao. On 14 May, she sighted a convoy of one carrier, one heavy cruiser, one light cruiser and three destroyers headed into the gulf. Two days later, the same convoy exited the gulf, but RAY could not effect an attack position. The convoy headed for Tawi Tawi to rendezvous with Ozawa's Mobile Fleet, but the carrier in the convoy sighting is suspect. All nine carriers of interest are in CarDiv 1, 2 or 3. This would make a 10th carrier which is not recorded in any other records. In any event, Brooks Harral, in command, was not to be denied. RAY hung around the area and was rewarded on 22 and 23 May. She crossed paths with a 15 ship convoy and with an eight torpedo setup, sank a cargo ship, troop ship, tanker and mine layer on the 22nd. The next day she fired a ten torpedo spread at the remainder of the same convoy, and added another cargo and troop ship to her battle flag. Harral didn't believe in skimping on torpedoes. He got a war time credit for sinking six ships of 42,000 tons. The sinking of these ships put a big dent in Ugaki's and ultimately Ozawa's, supply force.

While Admirals Lockwood's and Christie's submarines were busy in the Celebes Sea and Sibutu Passage, Admiral Mitscher's TF 58 was busy in the central Pacific. TG 58.6, consisting of CVAs ESSEX, and WASP II, CVL SAN JACINTO, three heavy cruisers, two light cruisers and 14 destroyers, set sail from Majuro Island in the Marshalls and on 20 May participated in a raid on Marcus Island. This was repeated on the 23rd with Wake Island as the target before returning to Majuro. It was a diversionary raid specifically staged to keep the IJN's attention *away* from the Marianas. Admiral Toyoda still at this time believed the next target would be the Palaus, far to the southwest of Guam and

Saipan. The Mobile fleet continued at Tawi Tawi awaiting the *decisive battle* and the order to commence Operation A-Go.

PUFFER:

On 22 May, PUFFER found herself in the Celebes Sea south of Tawi Tawi after three unsuccessful attacks off the northwest coast of Borneo. A ComSubSoWesPac boat, CO Frank Selby was in charge when about 20 miles south of Tawi Tawi two aircraft carriers were sighted. Selby setup a spread of six torpedoes at a depth of 10 feet but only succeeded in damaging one carrier. Not to be denied, PUFFER, returned to the general area on 05 June and spotted a convoy of four tankers (AOs) with two escorts. Selby fired six bow shots and one stern shot and claimed seven hits. With this salvo he sank two AOs and one AK for 24,000 tons. The AOs had been busy refueling Ozawa's fleet with oil from Tarakan and Balikpapan.

GURNARD:

On 06 and 07 May, Bamboo Convoy, the reinforcement ships to Biak, was devastated by GURNARD in the area north of Molucca Passage. Two weeks of *nothing* ensued when CO Charles Andrews moved somewhat north closer to Davao Gulf. He was rewarded on 24 May when he sank a tanker with a four shot spread. Another Ozawa loss. GURNARD transiting from Pearl to Fremantle was credited with four ships sunk for 27,000 tons.

HARDER:

Sam Dealey, a name familiar to every submariner, was in command of HARDER's 5th war patrol. Her assigned area was the Celebes Sea in and around Sibutu Passage, that main thoroughfare separating Tawi Tawi from Borneo. With Ozawa's Fleet gathering here, it proved to be a hot spot of activity, and Dealey only made it hotter. On 06 June off Tarakan, HARDER intercepted a convoy of three oilers with two destroyer escorts. The opportunity to get a setup on one of the tankers didn't present itself so the target of opportunity was a DD. With a six tube bow spread one destroyer was observed to sink. Attack #2 the same day was a waste, but

attack #3 the following day got another destroyer patrolling Sibutu Passage- this time with a four torpedo *down the throat* bow shot. Two days later, 09 June, was unique. More destroyers patrolling Sibutu Passage were the targets. Dealey setup on two, and with a three tube bow spread, observed hits on both and the sinking of both. The next day brought about a sighting of a task force leaving Tawi Tawi. HARDER's periscope was sighted and the charging DD was sunk with another *down the throat* spread of three torpedoes. In five days and five attacks, the Fremantle Boat was credited with sinking five destroyers at 1,700 tons each.
(Note: the motto of HARDER from that day forth was "Hit 'em Harder". HARDER was lost on her next patrol in Philippine waters with a loss of 79 shipmates. Sam Dealey became a legend and received the Congressional Medal of Honor posthumously – one of seven given to submariners during WWII).

OPERATIONS "A-Go" a GO

Admiral Nimitz gave the authorization to initiate Operation Forager, and on 11 and 12 June in preparation for the invasion of Saipan on 15 June, Mitscher's TF 58 began to bomb strategic targets on Guam, Rota, Saipan and Tinian. Four task groups made up TF 58:

TG 58.1 – Rr. Adm. Joseph J. Clark
CVAs HORNET and YORKTOWN
CVLs BELLEAU WOOD and
BATAAN
Three CAs, one CL and nine DDs
TG 58.2 – Rr. Adm. A.E. Montgomery
CVAs BUNKER HILL and WASP II
CVLs MONTEREY and CABOT
Four CLs and nine DDs
TG 58.3 – Rr. Adm. John W. Reeves
CVAs LEXINGTON and
ENTERPRISE
CVLs PRINCETON and SAN
JACINTO
One CA, four CLs and 13 DDs
TG 58.4 – R. Adm. Wm. K. Harrill
CVA ESSEX
CVLs LANGLEY II and COWPENS
Four CLs and 13 DDS

TF 58 came from Majuro in the Marshalls with 15 carriers armed with 891 aircraft, mainly F6F Hellcats. They destroyed dozens upon dozens of aircraft on the ground. It was a complete surprise as the Japanese were expecting a raid on the Palaus not on the Marianas. Toyoda realizes immediately the situation and on 12 June initiates Operation A-Go. In parallel, he also cancels Operation KON for Biak and orders all elements of the Mobile Fleet to set course for the Marianas and rendezvous in the Philippine Sea. Ugaki's fleet leaves Batjan, transits Molucca Passage and heads for the Philippine Sea skirting the east coast of Mindanao. Ozawa takes his fleet from Tawi Tawi north through the Sulu Sea to the Philippine Sea by threading the straits between Panay and Negros, P.I. into the Visayan Sea and finally transiting the San Bernardino Straits into the Pacific.

REDFIN:

Sibutu Passage was the area in which REDFIN found herself on 13 June '44. With Marshall Auston in command, the Fremantle boat turned what appeared to be bad luck into a positive as described by Auston in his war patrol report. At 0616 a periscope observation showed a convoy of one torpedo boat (TB), two CAs with planes on catapults and four DDs leaving the anchorage at Tawi Tawi – sortie number one. REDFIN was unable to close because of the convoy's radical zig. At 0749 the TB and four DDs returned to the anchorage. At 0900 sortie number two consisting of the TB and four DDs along with two additional DDs, four BBs, five CAs with no planes on catapults but rigged for plane recovery, one CL, and six CVs with planes on deck left Tawi Tawi heading toward the Philippines – jackpot. Auston reasoned the first sortie was a decoy, and had he attacked it, the second sortie would not have occurred. This convoy was, of course, Ozawa's Striking Force complying with Toyoda's order to sail for the Marianas. At 2000 REDFIN sent a contact report which was relayed to the 5th Fleet and Spruance – he now knew Ozawa was on the move. The rest of the patrol resulted in credit for two ships of 16,100 tons sunk and one damaged.

Meanwhile, TF 58's battleships were pounding Saipan and Tinian. On 13 June Vice Admiral Willis Augustus Lee's seven new battleships (NORTH CAROLINA, WASHINGTON, SOUTH DAKOTA, INDIANA, ALABAMA, IOWA & NEW JERSEY) from TG 58.7 started the advance shelling. Reports indicate they did minor damage with the associated excuse the crews had never been trained in bombardment techniques. The next day Rear Admiral Jesse Oldendorf and Rear Admiral Waldon Ainsworth from TF 52 & 53 took their eight older battleships (MARYLAND & COLORADO with their 16 inch guns and PENNSYLVANIA, TENNESSEE, CALIFORNIA, NEW MEXICO, MISSISSIPPI & IDAHO with 14 inch guns) and had a much better accounting. To be fair, the older battleships had the help of six heavy cruisers, five light cruisers and 26 destroyers. Communication lines were totally ruptured.

Not to be out done by the surface navy, on 15 and 16 June, TG 58.1 and 58.2 bombarded Iwo Jima and Chichi Jima in the Bonins to the north. These islands were staging areas in accord with Operation A-Go and were full of planes ready to thwart any invasion of the Marianas. Approximately 80 enemy planes were destroyed, the majority caught on the ground, with a loss of four carrier planes. Although not called upon for lifeguard duty, four U.S. submarines were stationed just west of the Bonins primarily to guard against any Japanese reinforcement fleet coming from the homeland. These boats were GAR, PLAICE, PLUNGER and SWORDFISH. No fleet from the north ever materialized, but PLAICE and SWORDFISH between them sunk six ships of 21,000 tons during their stay on station.

Also on 15 June, at 0542 Vice Admiral Richmond Kelly Turner, from his flag ship AGC ROCKY MOUNT, gave the signal, "Land the Landing Force" – the invasion of Saipan was at hand. Spruance'S TF 52, the Northern Attack Force, which had been assembled in Hawaii under command of Rear Admiral Harry W. Hill, numbered no less than 320 craft including troop ships cargo ships, and LSTs, supported by BBs, CAs, CLs, escort carriers (CVEs), DDs and miscellaneous craft. The marines tasked with the invasion were from the 2nd and 4th Marine Divisions

commanded by Lt. General Holland "Howling Mad" Smith, USMC. Almost four weeks of fighting and clean up were required before Saipan was declared *secured* on 09 July.

FLYING FISH:

Hunting had been poor for FLYING FISH, with Robert Risser in command. Her assigned area was north of Palau and west of the Marianas, and on 15 June she found herself at the mouth of San Bernardino Straits, the far western end of her patrol grid. This was a major transit waterway between the China Sea and the Philippine Sea which separates the Philippine Islands of Luzon and Samar. FLYING FISH was scouting for enemy activity when at 1635 a routine periscope observation developed into an amazing sight. The range was estimated to be 25,000 yards at initial sighting, but during two hours of tracking she sighted three battleships, three carriers, several cruisers and many destroyers. Range could not be closed for an attack. At 1820 contact was lost and 5th Fleet Commander Admiral Spruance was alerted.

This was Ozawa's Striking Force.

Prior to this, FLYING FISH had only two sightings worthy of attack setups – both on 25 May. The first achieved nothing, but on the second she had two AK type marus and three escorts from which to choose. She fired four bow tubes, two at each maru, and sunk a 6,000 ton maru and damaged another 5,000 ton maru which later sank. For the patrol, however, she was credited with sinking one ship totaling 4,000 tons.

SEAHORSE:

On its way from Brisbane to Pearl, SEAHORSE, still under command of Slade Cutter, had just arrived on station. She was 200 miles east of Surigao Straits, P.I. when on 16 June at 1845 smoke on the horizon was sighted on a bearing of 337 degrees. Cutter sighted four large men-of-war and six other smoke stacks only to lose them 10 minutes later. At 1936 contact was reestablished and identified as six large ships and two smaller ones on base course of 45 degrees. A faulty motor prevented SEAHORSE from closing, but a contact report was verified as received at 0300 the next

morning. Cutter, in his war patrol report, indicated that the enemy was doing a very effective job at jamming the air waves. The sighting was Ugaki's fleet from Batjan which had been joined by Supply Force Two from Davao Gulf, P.I. they were under orders to rendezvous with Oawa's Fleet in the Philippine Sea.

SEAHORSE continued her patrol and between 27 June and 04 July she was credited with sinking three AKs, one AO and two passenger freighters for a total of 37,000 tons.

IJN MOBILE FLEET

The merged Mobile Fleet now was comprised of the following:

1st Mobile Fleet – V. Adm. Jisaburo Ozawa
Mobile Force Vanguard – V. Adm. Kurita
CVLs – CHITOSE, CHIYODA & ZUIHO –
R. Adm. Obayashi
BBs – YAMATO, MUSASHI, KONGO & HARUNA –
V. ADM. Ugaki & V. Adm. Suzuki
8 CAs – V. Adm. Kurita and 1 CL & 7 DDs –
R. Adm. Hayakawa

"A" Force – V. Adm. Jisaburo Ozawa
CVs – TAIHO, SHOKAKU & ZUIKAKU
2 CAs – R. Adm. Hashimoto and 1 CL & 7 DDs –
R. Adm. Kimura

"B" Force – R. Adm. Takaji Joshima
CVs – JUNYO, HIYO & RYUHO, BB NAGATO,
CA MOGAMI and 7 DDs
Tanker Group 1 & 2 – 6 DDs & 6 Oilers
And 24 Submarines not normally associated with the Mobile Fleet

GROWLER:

While FLYING FISH was guarding San Bernardino Straits to the north and SEAHORSE was 200 miles to the east, GROWLER,

under command of Thomas Oakley, was stationed off Surigao Straits. San Bernardino and Surigao Straits were the two possible *short cuts* through the Philippines from which Spruance expected Ozawa's fleet to emerge. North through Luzon Straits or south through the Celebes Sea were not considered viable options because of the extra distance. The invasion of Saipan was set for 15 June and for the Mobile Fleet to make a difference, they had to take the short cuts – time was critical. Hence GROWLER's assignment which she diligently patrolled from 10 June to 21 June to no avail – no contacts. Later in the patrol, on 29 June, GROWLER sank a 10,000 ton tanker and damaged a 600 ton escort in the Luzon Straits.

FINBACK:

FINBACK fresh on station from Pearl was under the command of James Jordan. She was about 550 miles west of Saipan on 18 June when at 2100 she sighted two bright search lights on the horizon. This was Ozawa's Mobile Fleet. Jordan's war patrol report indicated that FINBACK must have been on their radar as four destroyers altered course and with zero degrees angle on the bow charged ahead. FINBACK went deep and the DDs kept her there until close to midnight. When she finally surfaced to make a contact report her radio transmitter failed. It was still down at 0600 hours the next morning. When the message was finally sent, it was too late to be of much value.

THE BATTLE OF THE PHILIPPINE SEA

ALBACORE:

On 19 June, ALBACORE was patrolling about 480 miles west southwest of Guam in conjunction with three other Pearl boats, FINBACK, BANG & STINGRAY. At 0750 CO James Blanchard called up periscope and sighted a carrier, cruiser and several unidentified ships. Five minutes later a second carrier and a second cruiser plus at least six destroyers showed up. One carrier was identified as a Shokaku class and one was unidentified. Both cruisers were of the Atago class. This was Ozawa's CarDiv 1. Blanchard immediately set up on carrier number two, but the

torpedo data computer refused to give a solution. Lest the situation go for naught, Blanchard fired a spread of six torpedoes by *seaman's eye* and headed deep as three DDs were coming her way. On the way down two explosions were heard, but she was held down by the escorts and couldn't surface until shortly after 1300. Upon surfacing, the sea was now clear so Blanchard reported only damage to one carrier. He had no way of knowing that the target was the new 33,000 ton TAIHO. One torpedo had hit TAIHO on the starboard side near the forward elevator and gasoline storage area. The damage to the gasoline storage area created gas fumes which were inadvertently spread throughout the ship by the faulty setting of the ventilation system creating a volatile situation. And volatile it was when at 1530 the fumes ignited literally blowing her sides and bottom apart. Two hours later a final explosion caused TAIHO to capsize and sink taking 1,600 of her 2,150 member crew with her.

CAVALLA:

Meanwhile CAVALLA's position was about 70 miles east southeast of ALBACORE when at 1052 Commander Herman Kossler on CAVALLA's maiden war patrol saw a picture "too good to be true". He sighted a carrier of the Shokaku class with two cruisers of the Atago class on her port flank and three destroyers off her starboard bow. The carrier was taking on aircraft and her flight deck was jammed with planes. He sighted a large bed spring type radar antenna and a huge Japanese ensign flying from the main mast. This was the same fleet ALBACORE had encountered three hours earlier sans one carrier. At 1118 Kossler fired a spread of six bow tubes set at a depth of 15 feet. Tubes one through three were hits and four through six were misses. Kossler took CAVALLA deep and took a severe depth charge pounding for three hours counting 106 depth charges. He secured from battle stations at 1527 and cleared the area. The carrier was the 30,000 ton SHOKAKU, the fifth of the six Pearl Harbor Strike Force to meet her demise. She went down approximately 1500, thirty minutes before TAIHO.

(Note: Four of the six Pearl Harbor Strike Force carriers were sunk in the Battle of Midway. They were the SORYU, HIRYU, KAGA and AKAGI. The last to be sunk was ZUIKAKU in the Battle of Engano (Leyte Gulf) October '44.)

Early on that same morning of 19 June, Admiral Ozawa's CarDiv 1 and Joshima's CarDiv 2 were streaming eastward about 480 miles almost due west of Guam. Admiral Kurita's CarDiv 3 was the Van Force about 100 miles ahead of Ozawa and Joshima. Ozawa's plan was to keep his fleet about 400 miles from the American fleet to give him an edge. The IJN Zekes (Zeros) had a greater range than the American F6Fs due to their light weight sans armor plate. As a result, the Zekes could get within range of the U.S. fleet but the opposite was not true. Ergo, his carriers would be safe. Ozawa thought he had another "ace in the hole" in that he planned on using aircraft positioned at Guam's Orote Field as back ups. He also planned on shuttle bombing, i.e., the practice of carrier plans reloading on land (Orote Field) and making a second run on the return leg to the carriers. What he didn't know was that Orote Field and its associated aircraft and landing strips had been demolished by previous TF 58 attacks.

Prior to the loss of TAIHO and SHOKAKU, described above, Ozawa started to launch planes at 830. He had a good idea where the American fleet was as they were sighted by a scouting float plane the day before about 200 miles west of Saipan. CarDiv 3, the vanguard fleet of light carriers, was the first to launch. CHITOSE, CHIYODA and ZUIHO put 16 Zekes, 45 Zekes with bombs and eight torpedo Jills in the air – 69 planes. At 1023 TF 58 launched F6Fs, mainly from ESSEX. They engaged 13 minutes later and broke up the raid within 20 minutes. The count was 42 enemy planes shot down but not until one had laid a bomb on SOUTH DAKOTO, the only U.S. serious ship casualty.

Raid #2 was launched by CarDiv 1 at 0900, about the same time ALBACORE was setting up on TAIHO. The three big carriers, SHOKAKU, TAIHO and ZUIKAKU launched a combined 128 aircraft which included 53 Judy bombers, 27 Jill torpedo bombers and 48 Zeke fighters – a total of 128. Their last

sortie was on the PRINCETON three hours later. Thanks to the aggressive counter attack by TF 58 F6Fs and the poorly trained IJN pilots, the count was 97 destroyed enemy aircraft.

At about 1000, raid #3 was launched. It was almost a wash out. CarDiv 2, JUNYO, HIYO and RYUHO, launched 15 Zekes, 25 Zekes with bombs and seven Jills for a total of 47 aircraft. Seven were shot down and half of the rest never engaged.

The fourth and final raid for the day was launched about 1100. All planes available from all three CarDivs participated. 82 planes were launched which included 30 Zekes, nine Judys, 27 Vals, 10 Zekes with bombs and six Jills. 73 were shot down or damaged so badly as to render them useless.

49 additional planes were destroyed when they tried to land at Orote Field. Along with the planes that went down with TAIHO and SHOKAKU, the total loss of aircraft that thus far that day was 330. This left Ozawa with 100 serviceable aircraft. The price TF 58 paid was the loss of 31 aircraft and heavy damage to SOUTH DAKOTA.

The next evening, 20 June, Mitscher put TF 58 on the offensive. A contact report had put the IJN Fleet about 275 miles to the northwest or about 370 miles west of Rota. This was close to the maximum range from which the F6Fs could effect an attack and still have fuel enough for the return leg. At 1600 Mitscher put 216 planes in the air – 85 F6F Hellcat fighters, 77 SBD5 Dauntless / SB2C Helldiver dive bombers and 54 TBF/TBM Avenger torpedo bombers. Contact with the Mobile Fleet was made at 1840, and in the fighting that ensured TF 58 sunk two oilers, damaged the carriers ZUIKAK and JUNYO damaged the battleship HARUNA, shot down 65 more aircraft and, thanks to an Avenger pilot from the BELLEAU WOOD who laid a well aimed torpedo in the water, put the coup d' grace on the carrier HIYO. TF 58 paid a price losing 20 aircraft to enemy fire and 80 more due to ditching on empty fuel tanks or crashing on the flight deck in night landings.

The next day Spruance gave chase to what was left of Ozawa's Mobile Fleet. Reports indicated oil slicks coming from the retreating fleet, and Spruance hoped to catch some cripples.

The chase proved almost fruitless for two reasons, there were no cripples and the retreating fleet was traveling at a speed four knots faster than TF 58's force speed of 16 knots. Ozawa was pulling away heading for safe harbor at Okinawa. The slower speed, however, had its benefits in that 59 aviators were fished from the water. At 2030 Spruance ordered the chase aborted and set course for Saipan. Had Mitscher had his way, TF 58 would have launched a full scale air attack, which was his mission – search and destroy the enemy fleet. In this case Spruance's objective conflicted with Mitscher's. His orders at this time were not to chase the enemy but to protect Amphibious Task Forces 52 and 53 and the scheduled invasions of Guam and Tinian. Spruance took a lot of criticism for this decision that dogged him for years.

OPERATION FORAGER CONCLUSION

Although the Battle of the Philippine Sea was over, Operation Forager continued. Recall Saipan was invaded on 15 June and declared secured on 9 July. Less than two weeks later, on 21 July, the Marines and Army landed troops on two beaches on Guam. This time it was Spruance's TF 53, the Southern Attack Force under command of Rear Admiral Richard L. Conolly. The TF numbered 186 ships which had assembled in Guadalcanal and Tulagi and included the amphibious landing ships of APAs, AKAs, LSTs, LSDs and supported by BBs, CAs, CLs, CVEs, DDs, one AH (hospital ship) and miscellaneous other craft. The Marines were from the 3rd Marine Division and 1st Provisional Marine Bridge under command of Major General Roy S. Geiger. The Army's 77th Infantry, called in from Hawaii as reinforcements and under command of Major General Andrew D. Bruce, proved themselves worthy. Two beachheads were quickly established, one on each side of Apra Harbor and Orote Field which were the main objectives. In just shy of three weeks on intensive fighting, Guam was declared secure on 10 August.

Three days after Marines landed on Guam, 24 July, the invasion of Tinian commenced with the same Marine and naval units which had led the invasion of Saipan. TF 52, the Northern Attack Force under command of Rear Admiral Henry W. Hill, landed the

invasion troops of Lt. General Holland Smith, USMC, who later stated it was "the perfect amphibious operation in the Pacific". It was perfect for many reasons among which were adequate planning time, naval bombardment and arial bombing for once were on target, a diversionary tactic to mask the intended landing beach was successful, landings were absent of confusion and finally the Marines charged ahead and were not held back by the slower moving units of the Army (The Army and Marines differed vastly in their invasion techniques which had been demonstrated in earlier Pacific invasions). The island was declared secured on 01 Aug, nine days after landing on White Beach, the northwest corner of the island – close to Ushi Point Airfield, the debarkation point for B-29s Enola Gay on 06 August and Bock's Car on 09 August a year later.

EPILOGUE

The story about the contribution of the Submarine Force to the Battle of the Philippine Sea and Operation Forager wouldn't be complete without giving due credit to some of the boats that were in the area but due to luck-of-the-draw didn't sight or interact with Ozawa's Mobile Fleet. These included ARCHERFISH, BANG, BLUEGILL, CABRILLA, MUSKELLUNGE, PILOTFISH, PIPEFISH, SEAWOLF, STINGRAY, TUNA & TUNNY.

The final tallies were:
U.S. pre-invasion losses dating from February '44:

USS TROUT	81 shipmates
USS GRUDGEON	78 shipmates

Unknown number of aircraft during raids on islands

U.S. losses – Battle of Philippine Sea:*

19 June '44	30 aircraft	27 airman
20 June '44	100 aircraft	49 pilots & aircrew

U.S. invasion losses:*

	KIA/MIA		Total
Saipan	3,426	13,099	16,525
Guam	1,435	5,648	7,083
Tinian	389	1,816	2,205

Obviously the casualties would have been much higher had it not been for the dedication and perseverance of the men of TF 58 and the Silent Service as evidenced below:

Japanese pre-invasion losses dating from February '44:

Bombing of Truk – 17 Feb.
Bombing of Guam & Saipan 23 Feb.
Raid on Marcus & Wake Islands – 20 & 23 May
Raid on Palau, Yap & Woleai – 03 & 09 June

Bombardment of Guam and Saipan – 13 & 14 June
Bombardment of Iwo Jima & Chichi Jima – 15 & 16 June

No conclusive totals
2 Cruisers – AGANO and TATSUTA
57 Marus – AKAs, APAS, AOS & support vessels
1 Minelayer
7 Destroyers
1 Submarine
19 Marus independent of Operation Forager
No conclusive totals

IJN losses – Battle of Philippine Sea: *
3 Carriers – TAIHO and SHOKAKU 30,000 tons each & HIYO 27,000 tons
2 oilers
395 carrier planes, 31 float planes & 50 land based planes
No conclusive overall totals

Japanese invasion losses:

Saipan	estimated greater than 50,000 killed**
Guam	estimated greater than 17,800 killed
Tinian	estimated greater than 5,000 killed

*numbers from Samuel Eliot Morison's book *New Guinea and the Marianas*

**many were civilians who committed suicide

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HOLY LOCH DUTY

by CAPT Don Ulmer, USN(Ret.)

Captain Ulmer commanded CLAMAGORE. In retirement he has written several submarine novels. See his article in the Winter 2013 issue of THE SUBMARINE REVIEW.

The early sixties awakened rural Western Scotland to a Yank invasion. Sleepy villages surrounding idyllic Holy Loch came to grips with an American Polaris submarine base in their front yard. First, the tender PROTEUS, then a supply barge and finally a floating dry dock arrived. Soon, boomers slithered into the Loch for refit and crew exchanges.

Local Scots, ever hospitable, welcomed the POLARIS laddies, to say nothing of attendant good impact on the economy. Bottom line; Yanks loved being there and Scots loved having them, resulting in US Navy assignments to the Loch being termed *plum*.

Not measuring up to nuclear propulsion standards, smoke-boater officers did qualify for the lesser task of overseeing more destructive power than all the bombs of WWII seated atop roman candles in a glitch-filled system deployed well before anyone figured out how it worked. But boomers slid down the ways faster than nuke school could produce officers to man them, hence smoke-boaters jumped into the breach. Compensation with post tour *plum* jobs seemed the right thing to do for *boaters* who'd accepted these diversions from chosen career paths. Lieutenant—we'll call him *Smokey*—landed the Squadron 14 Assistant Weapons Officer *plum*. Exhilarated, he, with wife and two daughters, would pass two delightful years in Scotland.

"We're not taking the dog, and that's final!" Smokey explained to his family—animals entering the United Kingdom must undergo six months of quarantine, so their Chesapeake Bay Retriever, HMS Sea Gypsy would remain behind in the care of a friend. Yeah, sure. Clinching the argument, daughter two asked,

"I'm an animal. Do I get quarantined too?" That resolved, Smokey air-shipped Gypsy to a kennel near Glasgow.

Travel to the *plum* job included an ocean crossing in SS UNITED STATES, a plum unto itself. Family Smokey arrived at Portsmouth, trained to London, took delivery of a new VW Beetle and embarked upon a week's leave. Much had to be seen: Buckingham Palace, changing of the guard, and Tower of London for a peek at the crown jewels.

They visited Stratford-on-Avon and saw a Shakespeare play. Next came Coventry and remains of the cathedral destroyed in WWII with a reminder cross made from huge timbers charred in the ensuing fire.

Passing through the Lake Country Smokey recited to his disinterested family some poems of Lake poets William Wordsworth, Samuel Taylor Coleridge, and Robert Southey as they drove. The Smokeys spent a magnificent couple of days in Edinburgh touring Holyrood Palace, walking *the Royal Mile* and viewing the Firth of Forth from ramparts of Edinburgh Castle. They followed the river Clyde north bank to Dunoon reaching the Royal Marine Hotel at suppertime. There they stayed a month while finding suitable digs in the community.

LT Smokey's opening day on the job is the stuff of legends. His first assignment, go ashore and break up a hail and farewell gala at the Royal Marine, announce that President J. F. Kennedy had been assassinated and say this is hardly a time to be celebrating. Thus Smokey's initial exchange with fellow officers at the Loch.

Smokey and family visited his predecessor who resided at Dunselma Lodge on nearby Strone Point. The property built in 1890 by the Coats family of Paisley, famous thread makers, the house served as a gate lodge for Dunselma Castle that sat upon Benmore Hill to the north. The Lodge stood on good-sized grounds with fantastic sea views east to Loch Long, across the Clyde to the cities of Gourock and Greenock and south down the Clyde estuary towards Arran Isle. Mrs. Smokey liked what we saw and that was that. LT Smokey did not object because on a clear day, the view included one of Ballantine distillery at Dumbarton.

A week later, Smokey tucked daughter one into her new bed. With her usual happy demeanor, she threw her arms about his neck in a giant hug. "Good night, Daddy."

"Good night, sweetheart." Beams from distant Cloch Point Lighthouse pulsed softly into the room every three seconds.

"If this bothers you, I'll close the blinds, sweetie."

"No, Daddy. It's my special friend coming to visit."

Central heating consisted of a bucket of soft coal, paper logs (fire starters made from rolled up newspaper) and fireplace in each room. Every week or so, the collier came and filled an outside bin. Many Yanks mail ordered kerosene (paraffin the preferred Scots term) burners from Sears. These were portable and could be moved about the house room to room. Smokey's boss couldn't understand why all the coal and paraffin fuss. Electric heaters kept his house snug and for a price equivalent to what everyone else paid for the more cumbersome alternative. Then one day the power company determined his meters were lapping prior to being read each month. Only submarine pay enabled him to deal with the accumulated debt. Smokey's boss shifted to coal-paraffin on the spot.

A milkman made daily deliveries of glass quart bottles covered with metal foil caps. The Smokeys brought the milk in promptly, for ravens had a habit of pecking through the caps to draw off considerable amounts of cream.

Family dog Gypsy's quarantine ended, she rejoined the Smokeys. Turned out Chesapeake Retrievers, one of four American originated breeds recognized by the Royal Kennel Club, caused her arrival in Strone to create quite a stir. The RKC advised Smokey to be prepared for a burst of interest, his Chesapeake the only one known to be in Britain. It did not take long. A prominent citizen and dog lover called Smokey and invited him to dinner. The gentleman added in a polite voice, "And please bring along your bitch."

Smokey took a breath to say, "I beg your pardon, sir," but quickly recognized the dog lover referred to the Chesapeake. But to be certain, Smokey added, "And my wife too?"

"Of course."

Requested by its organizers to attend a game fair and dog show at Whatley, a small rural village in the south of England's county Somerset, Smokey and family jumped on the invitation. CO submarine tender, seizing upon every opportunity for good public relations, had a stack of handouts printed with Gypsy's photo and story. They went like hotcakes and toward first day's end, more than half were gone. Smokey decided he'd pass out no more and save the remainder for the next day. A bit later, in a booth provided for the occasion, Mrs. Smokey stood alone with Gypsy. A young woman and man approached, expressed interest in the Chesapeake and asked for one of the handouts. Mrs. Smokey explained the circumstance and declined. The young couple understood, said polite good-byes and left. A British newsman walked up to Mrs. S. and asked, "What did Prince Charles and Princess Anne have to say about your dog?" leaving Mrs. S. feeling like the *Ugly American* reincarnated.

The River Eachaig runs three miles between Loch Eck and the head of Holy Loch. It abounds with Sea Trout and Atlantic Salmon from early summer to late fall. Smokey, an avowed fly fisherman salivated over the idea of snagging a few. He learned the road to doing this went through the Laird, who not necessarily owned the property bordering Eachaig; only the fish that swam in it. The routine: call on the Laird at Hogmanay (New Year's Eve). Stay exactly fifteen minutes and talk of anything but fishing. Upon departure ask, "Might I wet the occasional fly in your river?"

The Laird replies, "Ach, that would please me. See m' water bailiff for particulars." This meant visit the water bailiff, in person, each time Smokey wished to fish. He'd be assigned one of the thirty-five named pools on the river. Smokey quickly learned that fishing improved immensely when he showed up at the bailiff's with a fifth of whiskey.

Daughter one came to her father twenty-four months into the Smokeys' Scotland tour. Complaining of her younger sibling, she concluded, "Ach, Daddy, she's daft."

Smokey, fearing his daughter'd become a Scot, went to his wife, "Dear, I think it's time we packed up and headed back home."

SUBMARINE NEWS FROM AROUND THE WORLD

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From the March 2013 Issue

CANADA —Victoria Class Submarines (SS)

On 21 February 2013, Ultra Electronics Maritime Systems Inc (UEMS) announced that it had been awarded a contract to provide ongoing services for the maintenance of the Royal Canadian Navy's (RCN) submarine towed array sensors. The towed arrays of the four units of the Victoria class are the principal long range underwater sensor for the submarines.

The UEMS contract has a value of around US$7M and provides for the repairing and refurbishing of the towed arrays as well as updating obsolete components and technologies.

AUSTRALIA—Collins Class Submarine Modernization

On 17 February 2013 the Nikkei Weekly, an English-language business newspaper, published an article that once again raises the possibility that Japan may be willing to transfer the design and technology for their Soryu class diesel-electric attack submarine (SSK) to Australia. Visits throughout 2012 by high-level Royal Australian Navy (RAN) and scientific personnel to Japan to inspect the Soryu class have been related to the Soryu's engineering system as a possible solution to modernize the Collins class, which have been operationally questionable at best.

A new engineering plant would also extend the service lives of the Collins class by a decade and could delay the Collins replacement (SEA 1000) which is estimated to cost upwards to US$26B. The RAN has admitted that it is reviewing the possibility of replacing the entire drive train including the diesel engines, electric motors, batteries and propellers. Any changeover in the engineering system would probably take place during each submarine's next major refit and could occur in either Australia or Japan.

Japan is relaxing its constitutional ban on exporting military equipment possibly paving the way to transfer the technology to Australia. Discussions concerning a defense technology transfer pact between Australia and Japan are currently underway. Japanese naval authorities appear to favor the transfer.

Assuming that a technology transfer agreement is reached, the RAN could begin procuring the same engineering system as found on the Japanese Soryu class, which includes two Kawasaki 12V25S diesel engines, two Kawasaki diesel generators and four Kawasaki/Mitsubishi (Kockums) Stirling V4-275R Mk 2 engines for AIP. The RAN may not utilize the AIP system.

If the RAN does in fact utilize the Soryu engineering solution and is satisfied with the results, it could very well be chosen as the engineering system for new submarines under the SEA 1000 program.

This would be the second major rework since the Collins entered service in the 1990s when the entire class had its Combat Management System (CMS) replaced. The last remaining problem with the Collins program is its engineering system.

UNITED KINGDOM

Spending Plan 2012-2022 Funds All Major Projects, Is It Enough?

In January 2013, the United Kingdom Ministry of Defence (MoD) released Defence Equipment Plan 2012. The plan was developed to bring all Armed Forces equipment programs back into balance following years of neglect and underfunding. As the force restructures for the future, the plan is to provide a stable and well managed budget to keep the programs affordable and deliverable.

More specifically, it authorizes £159B (US$240.5B) for the ten year period 01 April 2012 through 31 March 2022 and an £8.4B (US$12.7B) risk provision within individual projects. It also has a contingency provision of £4.8B (US$7.2B) and unallocated headroom totaling £8B (US$12.1B). This is expected to put all Armed Forces departments in an affordable core equipment plan

and flexibility (due to cost growth) that is required to meet Future Force 2020 objectives.

In regards to the Royal Navy (RN), all major current and future programs are expected to be funded (£17.4B – US$26.3B) and include the following projects:

Completion of the two Queen Elizabeth class aircraft carriers with Lightening II aircraft.

- Completion of the six Daring (type 45) class destroyers.
- Design and development of the Type 26 class frigate to replace the Type 23.
- Development of the Maritime Afloat Reach and Sustainability Program, which now has five AORs under contract. This will include a sixth AOR and two AOEs.

An additional investment of £35.8B (US$54.1B) will be made for the completion of the Astute class nuclear powered attack submarines (SSNs) and the development of the Successor class nuclear powered ballistic missile submarine (SSBN) (assuming Main Gate approval in 2016) and its strategic weapon system.

It appears that with DEP 2012, the MoD is once again attempting to address the persistent mismatch between shipbuilding program requirements and available funding. This issue has left the RN (and UK forces overall) with unsustainable and unaffordable force structure, leading to repeated rounds of cancellations or descoping of approved programs, and resulting in predictable increases in per unit acquisition costs. This can be witnessed by cost overruns resulting in the scaling back of major programs (Type 45 as an example, and possibly Type 26) as well as late deliveries.

The full version of the Ministry of Defence (MoD) Equipment Plan 2012 and the National Audit Office (NAO) Equipment Plan 2012 – 2022 can be found on AMI's Worldwide Naval Projections Report (WMPR) – Downloadable Documents at: http://www.amiinter.com/wnpr/download_docs/united%20kingdom/uk_docs.html.

BRAZIL—Indegenous Submarine Construction Yard Opens

On 04 March 2013, the Brazilian Government announced the completion and opening of the country's latest naval facility at Sepetiba Bay. The facility will be involved in Brazil's two submarine programs under ProSub, the submarine portion of fleet Renewal Plan 2008. Prosub encompasses the construction of indigenous Scorpene submarines as well as the first nuclear powered attack submarine (SSN) for the Brazilian Navy (MdB).

The new naval facility is a key component in the forward progress of both submarines, of which the first diesel electric Scorpene is under construction at France's DCNS and Brazil's Itagual construções navais. Following unit one, the remaining Scorpenes and the first SSN are expected to be shifted to the new facility.

Both programs were originally scheduled to deliver up to eight Scorpene diesel electric boats through 2031 and six SSNs through 2028. It now appears that both programs are beginning to slip as mentioned in AMI's Hot News in September 2012.

Information received in September 2012 indicated that the MdB was already experiencing cost overruns in the diesel electric Scorpene program and the delivery timeline would be affected. AMI believes that the Scorpenes could take up to 7-8 years per hull, which has been the historical building rate of previous submarines in country.

In regards to the SSN, it appears the Brazilian Government may have delayed this program as recent press releases indicate that the first submarine will deliver around 2025 around three years behind the anticipated 2022 commissioning date.

Although it appears that the MdB is facing some funding and construction issues early on in both of these programs, one of the key components, the new facility did open close to schedule. The naval facility was built by the DCNS/Odebrecht joint venture.

It is now a matter of whether Brazil can overcome its historical funding and slow shipbuilding rates that have affected most of the sea service's previous major indigenous construction endeavors.

VARIOUS DID YOU KNOW?

UNITED KINGDOM: On 04 March 2013, the Royal Navy (RN) commissioned its second Astute class Nuclear-Powered Attack Submarine (SSN), HMS AMBUSH (S95), at Naval Base Clyde in the United Kingdom.

From the April 2013 Issue

TAIWAN—Planning Begins for Indigenous Submarine

In March 2013, Taiwan's Ministry of National Defense (MoND) began feasibility studies for an indigenous submarine in the 1,000-2,000 ton range. The study is being conducted by the National Defense Industrial Development Foundation. It appears that in many circles within the Republic of China Navy (ROCN), MoND and Taiwanese Government, there is a growing consensus that the procurement of submarines from the US will not happen and therefore is a foregone conclusion.

Taiwan was offered up to eight diesel-electric submarines in 2011 by former President George W. Bush; a promise that has gone unfulfilled for various reasons related to design and building location issues on both sides of the Pacific.

At this time, the ROCN has authorized upwards to US$300M in its 2013 budget to fund the studies which are expected to conclude in 2015. Although this program will be indigenous, the ROCN has indicated the sea service will surely need US assistance in an indigenous program and does not realistically expect support from any other foreign suppliers.

The number of indigenous hulls has not been expressed publicly; however, one can anticipate that the requirement is also for eight hulls, similar to the 2011 requirements. When all is said and done, the ROCN will have to build its own Submarine Force and China Shipbuilding Corporation (CSBC) will be the builder. Assuming that this program moves forward in 2015, CSBC will begin the design phase by 2016 with construction on the first unit beginning around 2020.

AMI estimates that the ROCN and CSBC will request design and construction advisory services from US companies as well as the purchase of all major engineering, sensor and weapons systems

from US sources. Whether those requests would be fulfilled is questionable.

It appears that this is the last resort for the ROCN to obtain a modern Submarine Force and it faces a monumental task in building and integrating such specialized vessels for the first time. Unlike South Korea, turkey and Pakistan; Taiwan will most likely not be receiving material packages from the foreign supplier (US), essentially building the hulls from scratch.

TURKEY—Feasibility Studies for Submarine 2030

In early March 2013, an AMI source indicated that the Turkish Undersecretariat for Defense Industries (SSM) began feasibility studies for a new Indigenous Submarine that would enter service after 2030. It appears that the Turkish Naval force (TNF) is taking the next step in indigenous submarine development by designing and building its own new class independent of outside sources.

This new submarine class will be the replacement for the eight units of the Preveze (Type 209/1400) class that entered service from 1994 through 2008. The six older units of the Atilay class commissioned from 1976 through 1990 will be replaced by six Type 214s that will enter service from 2015 through 2020.

The Type 214 is now the third class of submarines to be built in Turkey with assistance from Germany's HDW. The Type 209/1400, Type 209/1200 and now the Type 214s were/are being built from kits delivered from Germany. Golcuk Naval Shipyard will be designer and builder of the new submarines as Golcuk is the only builder of submarines in Turkey.

In the very early stages of the program, technical specifications will probably be developed beginning in 2017 and Golcuk will begin the design phase in 2021. A construction contract could possibly be in place by 2026 allowing for a first-of-class submarine to enter service in 2031. It is estimated that each unit would cost around US$550M, or US$4.4B for the entire procurement of eight units.

Design and construction considerations are speculative as of this writing due to the infancy of the program. However, the new design will probably be similar to the Type 214 and will be Air

Independent Propulsion (AIP) capable. It will probably be around 70 meters (229.6ft) in length with a submerged displacement of 2,400 tons.

No doubt the majority of the weapon and sensor systems will also be built in turkey as Turkish firms are now major contractors for the Type 214 program and are gaining valuable experience for the Idigenous Submarine. Currently, Havelsan is teamed with Atlas Elektronik for the CMS and sonar systems on the Type 214 and Tubitak/Roketsan is developing the Akya indigenous torpedo that will more than likely be on the new submarine as well. Turkey may require assistance for the AIP system as the Type 214 is the first program that the sea service has utilized this type of engineering system.

RUSSIA—Studies for 5th Generation Submarine

In early March 2013, the Russian Ministry of Defense (MoD) announced that it was developing its fifth generation (5G) nuclear-powered and diesel submarine at the Rubin Central Design Bureau in conjunction with the Malakhit Design Bureau and the MoD. Preliminary work is expected to be completed by the end of 2013 with the design phase beginning in 2014.

AMI estimates that two different designs will be developed, one a diesel-electric/AIP hull (SS) at around 3,500 tons to replace the Kilo (Project 877,636 and 636.1) and St. Petersburg (Project 677) classes and the second being a nuclear powered hull (SSN) around 9,000 tons to replace the Oscar II (Project 949B), Akula (Project 971) and Victor III (Project 671RTMK) classes.

The 5G submarines will feature lower noise levels, automated control systems, reactor safety (for SSN) and longer range weapons than the submarine found in today's Submarine Force. AMI expects Rubin is studying the application of hybrid metal-matrix materials for hull or component application. Also expect more developments in Rubin's AIP solutions for the conventional SSK. The MoD is also advertising a 50-year life span so one can expect space and weight margins for a host of modernization efforts over the life of the hull. The Russian Navy (RVF) will also address information integration issues in order for the 5G

Submarine Force to share information and possibly targeting information with other surface, land and air platforms.

Currently, the RVF has stated that up to US$15B will be invested in the 5G Submarine Force although this is probably only the initial investment as the sea service has to replace 20 SSNs and up to 25 diesel boats estimated to cost closer to US$30-32B.

Assuming a 2017 start date, the first SSN will probably enter service around 2023 and the first diesel boat around 2022. The diesel electric design will probably also be made available for export.

It appears that Russia is becoming increasingly concerned about its antiquated Submarine Force and is beginning to reinvest in new construction and modernization efforts of laid up hulls as seen over the past several years. No doubt, the RVF is beginning to feel a capabilities gap as just about every nation on the Eurasian peripheral either has a modern submarine program underway or planned one within the next decade.

DID YOU KNOW?

ISRAEL: On 05 March 2013, the Israeli Navy's second Dolphin II class submarine, INS RAHAV, was rolled out of the building hall at Germany's HDW Shipyard. It is scheduled for delivery in 2014.

UNITED STATES: On 16 March 2013, the keel was laid for the 12th Virginia class nuclear-powered attack submarine, USS JOHN WARNER (SSN785), at Huntington Ingalls Industries Newport News Shipyard.

RUSSIA: In late March 2013, Russia announced that it would lay the keels for the 5th and 6th Borey (Project 955) class nuclear-powered ballistic missile submarines (SSBNs), ALEXANDER SUVOROV and MIKHAIL KUTUZOV, at Sevmash Pedpriyatie.

MODERNIZATION & SHIP TRANSFER NEWSLETTER

COLOMBIA-Pijao (Type 209/1200) Class Submarines: In early March 2013, Cassidian Optronics announced that it had

received a contract from the Colombian Navy (ARC) to provide two SERO 250 search periscopes for the Pijao class submarines. This follows an earlier order for the refurbishment of the submarine's to two attack periscopes. The SERO 250 will be delivered and installed at Colombia's COTECMAR Shipyard by the end of 2014.

RUSSIA-Sierra I (Project 945) Class Submarines: In early March 2013, AMI received information that the Russian Navy (RVF) was planning to refit its two laid up Sierra I (Project 945) class nuclear-powered attack submarines (SSNs). Information received suggests that the KARP (K 239) and KOSTROMA (K 276) will be refurbished and reenter service by 2017.

The engineering plant (single VM-5 PWR nuclear reactor, single GT3A turbine and emergency motors), sonar and navigation systems will be overhauled as an extensive dry-dock period for refurbishment of the hulls. The modernization contract was apparently signed in December 2012, however, work has yet to commence at the Zvezdochka Shipyard.

USED SHIP TRANSFER/RECEIPTS

INDIA—Akula (Project 971) Class Submarine Lease: In early March 2013, the Indian Navy (IN) expressed an interest in the lease of a second Akula (Project 971) class submarine from Russia. This follows the lease of the ex-RFS NERPA (Now INS CHAKRA) from Russia under a ten-year lease for US$970M, which arrived in India in 2012.

Sources indicate that the Indian sea service is interested in leasing the second unit, the RFS IRBIS, an incomplete Akula that is still on the building ways at Amur Shipyard. Apparently the IN is in negotiations with Amur concerning the completion of the Submarine and the subsequent ten-year lease, both of which will cost over US$1B.

This information coincides with the IN's original plans in 2005 to lease two units of the class. However, the delays and price increases for the first unit, INS CHAKRA, have precluded the finalization of the second unit. However, with INS CHAKRA now

operational in the Indian sea service, it appears that progress is being made for the second unit.

If a deal for the second unit is completed, the RFS IRBIS will probably take two more years to complete and transfer to the IN at a cost of over US$1B for completion and ten-year lease. It could enter service by 2015.

From the May 2013 Issue

AUSTRALIA—Whitepaper 2013 Highlights

On 03 May 2013, the Australian Department of Defence released *Defence White Paper 2013*. The new document was developed as a result of significant international and domestic developments since *Defence White Paper 2009* was released four years ago. *Defence White Paper 2013* compliments the *Australia in the Asian Century White Paper* released on 28 October 2012 and can be found in its entirety on AMI's website at http://www.amiinter.com/wnpr/download_docs/Australia/australia_docs.html.

Defence White Paper 2013 addresses the new international setting which influence Australia's national security and defense environment including their impact on force posture, future force structure and defense budget. These include the ongoing economic shift to the Indian Ocean/Pacific region and Australia's operational drawdown from Afghanistan, Timor-Leste and Solomon Islands.

The document also outlines the capabilities that the Australian Defence Force will need in the coming years to address the strategic challenges. These capabilities will require a budget of at least 2% of Gross Domestic Product (GDP); which is the preferred target of the Austrlian government (around 1.8% today).

Highlights of the white paper that pertain to the Royal Australian Navy (RAN) include the following programs:

- Commitment to replace the six Collins class with an expanded fleet of 12 new diesel-electric submarines (SEA 1000) (nuclear power ruled out). The submarines will be built at ASC, of a modified Collins class design or wholly new design developed in country. This decision has ruled

out any chances for an off the shelf solution that had been under consideration since the program began. The first unit is scheduled to be ordered in 2017.

The latest defense white paper indicates that the RAN will replace its fleet with similar numbers and on a similar time schedule (give or take a few years) as *Defence White Paper 2009* and *DCP 2012*. The two biggest changes are that all speculation concerning a fourth Hobart class destroyer (SEA 4000) have been put to rest as the new *Defence White Paper 2013* does not mention any further investment in the programs and the Collins replacement continues to be solidified as a home grown/home built investment.

The key to the success of the recapitalization obviously rests with the Australian Government's long term commitment to maintain a defense budget at 2% of GDP. And, this is based on the premise that economic growth will be sustained with no major downturns over the recapitalization period. It also assumes that the next government retains the same security priorities and recapitalization efforts (no new white paper).

FRANCE—Repercussions from Whitepaper 2013

In late April 2013, AMI received a copy of the latest French White Paper on defense, *Livre Blanc Defense et Securite National 2013 (LB-2013)*. A copy of the white Paper can be found on the internet at: http://www.defense.gouv.fr/actualities/articles/livre-blanc-2013 (French language only).

Naval focused highlights include the following:

- Confirmation that there will be no second aircraft carrier to join FS CHARLES DE GAULLE. This officially ends the joint program with the UK that resulted in two British Queen Elizabeth class aircraft carriers being built.
- The Submarine Force will remain as is; four nuclear-powered ballistic missile submarines (SSBN) and six Barracuda class nuclear-powered attack submarines (SSN).

Although cuts will be made in ship numbers, additional savings will be made in reducing the number of at sea days as well as reducing the number of personnel through attrition rather than outright cuts, resulting in the reduction of nearly 34,000 defense ministry jobs.

This strategy will allow the current budget of €179.2B (US$233.44B) for the period of 2014 to 2019 to remain stable and avoid any major cuts in defense capability. AMI will continue to follow these planned changes and provide updates as we receive them.

VARIOUS DID YOU KNOW?

RUSSIA: On 02 April 2013, the Russian Ministry of Defense announced contracts for the resumption of the St Petersburg class (Project 677) submarine. Units two (Kronshtadt) and three (Sevastopol) stopped construction in late 2012 when the program was terminated. However, the MoD has overturned its decision and will continue with the class.

From the June 2013 Issue

PERU—Frigate and Submarine Programs Progressing

In May 2013, AMI received information that the Peruvian Navy (Marina de Guerra del Peru-MGP) was moving forward with its Future Frigate and Future Submarine projects. AMI's source indicates that the MGP is in discussions with South Korea and Turkey in regards to both programs.

For the submarine program, it was anticipated that the program would start around 2016 and the initial submarine requirements development had begun in 2012. AMI's latest information indicates that Peru is looking at Daewoo Shipbuilding and Marine Engineering (DSME) design options, which include the Type 209 and the Type 214. As a reminder, the MGP signed a Memorandum of Understanding (MoU) with DSME for submarines in April 2012 in the event that a South Korean solution was selected for the program.

Source also indicated that Turkey was being considered a candidate for the program with the Type 209 being the primary

design being offered. The Turkish Type 214 program is just now beginning and it would be a difficult sell for Istanbul Naval Shipyard (INS) to offer that design as it has yet to assemble its first unit, where South Korea has already built several Type 214 hulls. The MGP already operates six Type 209s built in the 1970s and 1980s and is familiar with the German designed boats.

The MGP will surely consider all international offers for both of these programs, it appears that Peru is beginning to narrow its supplier options to Turkey and South Korea. Both have had recent wins, Turkey with its Fleet Replenishment Ship (AOR) to Pakistan and South Korea with its DW3000H frigate to Thailand and the MARS Tanker Program to the Royal Navy (RN). DSME will also build the Makassar class LPDs for the MGP beginning next year.

With Peru's economy now growing at around 5% annually, there appears to be a window of opportunity for the MGP to move forward with these two long anticipated programs, although cost and financing initiatives by the prospective suppliers will still be the most important aspect. South Korea may be in the best position due to their lower cost labor rates in the ship construction industry while at the same time delivering a high quality product; a pattern increasingly seen at Turkish shipyards.

MALAYSIA—Submarine Force Desires

In late May 2013, AMI received information that the Royal Malaysian Navy (RMN) has a desire for a force level of six total submarines to effectively perform its missions. This follows the RMN's Chief, Admiral Tan Sri Abdul Aziz Jaafar, May 2012 announcement to the press that the sea service needed additional submarines to supplement the two Scorpene submarines received from DCNS in 2009. Although five submarines were mentioned at the time, it appears that six would be required to have three operational at any given time.

The Admiral did state that in May 2012 this would be a long term requirement as budget constraints would not permit procurement in the near term and those conditions have not changed, the procurement of four additional submarines is still considered a long term requirement.

The budget constraints are due to other higher priority programs such as the Second Generation Patrol Vessel (SGPV) that will probably start in 2013 and other anticipated projects such as new amphibious transport docks (LPDs), mine countermeasures vessels (MCMVs) and new support ships. These programs will probably run through the mid-2020s indicating that a new submarine program will probably not begin until around 2025.

The original submarine requirement was for five units (increased to six) but eventually the program delivered only two hulls. Then, as is the case now, funding curtailed the program. Assuming funding is available in 2025 (around US$2B), the RMN will probably move ahead with additional submarines. The big question will be who will supply the new submarines to the RMN?

The first two units are the French DCNS Scorpene and if the RMN orders four additional units it would make sense to procure either additional Scorpenes, Modified Scorpenes or the Marlin since the RMN already has the infrastructure and training regimen in place for French-built and quipped submarines.

As an alternative, the RMN could choose other foreign designs such as the German Type 213 or Type 212 or a myriad of other new designs that are being considered for future submarine programs in Norway, the Netherlands and Sweden. And finally, South Korea and Turkey now produce the Type 209 and the Type 214s, and could be considered viable candidates for this program.

If new hulls are ordered by 2025, all four will be built at a foreign yard with the RMN taking possession by 2033.

REGIONAL UPDATE

INDIA-Arihant Class Nuclear Powered Ballistic Missile Submarine (SSBN): Press reporting in early May indicated that the nuclear reactor on board INS ARIHANT was activated.

VARIOUS DID YOU KNOW?

GERMANY: On 15 May 2013, the German Navy named its sixth and final Type 212A class submarine, U36. It will be commissioned in 2014.

THE SUBMARINE COMMUNITY

POST-COMMISSIONING SUPPORT OF NAMESAKE SUBMARINES

by Mr. Dick Brown, Former ETR2(SS)

About the Author: Dick Brown is a long-time NSL member and Cold War submarine veteran, having served aboard USS BARBERO (SSG-317) and USS LAFAYETTE (SSBN-616 Blue) in the 1960s. He played a lead role in the effort to have SSN 779 named for New Mexico, his adopted state, and chairs the USS New Mexico Committee.

Submarines used to be named after fish and other denizens of the deep, that is, until the advent of Los Angeles-class boats when most were named after great American cities. Then, with the Ohio and Virginia-class boats, the Navy started honoring our great states as it used to do with battleships. Such honors have provided great opportunities for citizens and organizations across the nation to establish and maintain long-term sister relationships with their namesake submarines. And in fact, over 40 percent of our submarines are currently enjoying strong bonds with their namesakes.

The bonding often starts with the submarine's commissioning committee. It is there where strong relationships between the submarine and the city or state namesake can begin. However, some commissioning committees disband a year or so after commissioning rather than continue to support their namesake submarine. Our undersea warriors deserve non-stop support for the life of the ship. Considering the design life of today's nuclear submarines is on the order of 30-35 years from initial reactor startup, long-term support can be a huge commitment and a lot of volunteer work, but also very rewarding. As for getting started, past commissioning committees are encouraged to help fledging new committees for VA-class boats as they roll out of the shipyards.

Because connections can be lost with changes in command, crew or homeport, skippers are encouraged to reach out to their submarine's namesake and re-connect with home support teams. By the same token, city and state officials are encouraged to stay connected to *their* submarines.

Our submariners, and their families, make countless sacrifices protecting the American way of life and guarding the freedoms we so deeply cherish. Our boats are the *Tip of the Spear* and strong relationships with namesakes help Americans understand their Submarine Force's mission, capabilities and relevance to national security. Our undersea warriors truly appreciate home team support such as offered to USS TUCSON (SSN 770) by its "770 Club", a Navy League Tucson Council-sponsored committee of concerned citizens and support organizations. The 770 Club hosts visits by the CO and select crewmen to Tucson every year or two. In return, the boat hosts 20-25 club members who have the privilege of spending a day at sea aboard TUCSON.

For USS CHICAGO (SSN 721), there is the "721 Club", the successor to the boat's commissioning committee, which has adopted the crew and supported the families, even providing gifts to the crew's children at Christmas, and donating Chicago artifacts to the ship. In return, it has entertained several distinguished visitor (DV) cruises in the past few years.

Crew visits, such as a recent trip by USS TOLEDO (SSN 769) representatives, often include presentations by the CO to NROTC units and grade schools, crew participation in local community relations (COMREL) projects such as Habitat for Humanity, and media exposure on radio, TV and in newspapers. Last year, our oldest submarine, USS BREMERTON (SSN-698), was adopted by the Navy League Bremerton-Olympic Peninsula Council. Visiting its namesake city, BREMERTON crew was honored for its service to our country. On Veterans Day last year in Texas, the CO, COB and four other crewmen of USS DALLAS (SSN 700), our third oldest submarine, visited their namesake.

Support committees raise funds through merchandise sales, raffles, auctions, special events and donations in order to sponsor various programs for *their* boats. These programs may include

contributions to the ship's MWR fund, providing exercise equipment or namesake artifacts that the Navy cannot provide, representing the boat's namesake at change of command ceremonies, and hosting crew visits to the namesake city or state. For example, crewmen of USS PASADENA (SSN 752) have enjoyed support of the USS Pasadena Foundation which has allowed crew participation in the Tournament of Roses Parade and the Rose Bowl.

Many support committees, like the one sponsored by the Navy League Palm Beach Council for USS FLORIDA (SSGN 728), provide engraved plaques and cash awards to Sailors of the Year, and invite the ship's leaders to the Council's annual Navy Birthday Ball.

Being forward-deployed in Guam did not stretch the City bond to the breaking point for USS KEY WEST (SSN 722). Despite the 8,200-mile distance, some crewmen visited their namesake city, participated in a Veterans Day parade with a replica of their boat —a float built by the Key West Military Affairs Committee—and took back some Key West memorabilia to include in the ship's interior upgrades so that locker doors could reflect scenes from the island city.

Known for the strong bond they hold with the City of Boise, crewmen of USS BOISE (SSN 764) often don Boise State University blue and orange colors in support of the Bronco football team. The USS Boise Committee is a group of community members and veterans dedicated to supporting the mission of their namesake submarine.

USS SPRINGFIELD (SSN 761) is named for both Springfield, Illinois and Springfield, Massachusetts. USS SPRINGFIELD Bluejackets, a reunion organization for its former cruisers and its submarine, fosters communications and maintains camaraderie. Hanging from the overhead of the submarine crew's mess is a Model 1863 Springfield musket manufactured at the historic Springfield Armory in Massachusetts. The crew refers to its mess hall as the "Springfield Armory", a patriotic link between those who fought to protect the early republic and the submariners who help protect our nation today.

USS CHARLOTTE (SSN 766) has taken crew's mess décor a step further. Its "Hornet's Nest Café" has a Nascar racing mural with tributes to Dale Earnhardt painted by a disabled veteran, the late Ron Artis. Five other subs have Artis murals, including PASADENA's mural depicting the Rose Bowl, USS ASHEVILLE (SSN 758) with its *SubRock Café* mural and USS GREENEVILLE (SSN-772) with its *Davy Crockett Café* mural. Such enhancements to crew's mess décors can help win Ney Awards.

USS NEW MEXICO (SSN 779) has taken enhancements of onboard living quarters yet another step further. The Navy League New Mexico Council has a USS New Mexico Committee that petitioned for the name New Mexico, then sponsored all the commissioning week events, and is now in its 13th year of operation. It successfully requested and received three state appropriations which not only helped finance commissioning events and public outreach programs, but also the purchase of 120 bunk curtains and 11 passageway curtains to replace the blue shipyard-provided curtains. The crew selected fabric with a Southwest design that met standard military specifications. The committee also provided five special tabletops, four in the design of the state flag and one as a tribute to battleship NEW MEXICO, for the crew's mess plus photo panels on 15 double-door lockers displaying panoramic views of New Mexico landscapes and hot air balloons for which the state is so well known.

Southwest-style bunk curtains, fabricated in Las Cruces, NM. Photo by Rick Carver.

The Greater Albuquerque Chamber of Commerce made USS ALBUQUERQUE (SSN 706) an honorary Chamber member. It has long supported the boat by hosting crew visits to the Duke City and of course many Albuquerque DVs have had lunch at the *Roadrunner Grill* aboard the boat. The New Mexico Council also supports ALBUQUERQUE as well as the Pearl Harbor-based USS SANTA FE (SSN 763). The USS Santa Fe Committee recently hosted two crew visits to the *City Different* within the span of two months! Besides the support provided by the USS New Mexico Committee, the restaurant La Posta de Mesilla near Las Cruces, which recently made *USA Today's* list of top ten Mexican restaurants in the nation, has adopted NEW MEXICO's galley, known as *La Posta Abajo Del Mar* or *La Posta Beneath the Sea*. The ship's culinary specialists have been trained in New Mexico cuisine at the famous restaurant.

NEW MEXICO crew's mess with photos representing New Mexico and a tabletop tribute to WWII sailors killed in two kamikaze attacks on USS NEW MEXICO (BB-40). Photo by Rick Carver.

The culinary specialists aboard USS BUFFALO (SSN 715) have also been trained by professionals. Executive Chef Rick Scott of the world-famous Tokyo American Club spent two days at sea aboard the boat working in the galley with the mess team. Another restaurant chef has shared some signature Mississippi recipes with the galley crew of USS MISSISSIPPI (SSN 782) and in fact trained them in making gumbo, crab bisque and white chocolate bread pudding.

Charlotte Boy Scouts, for a number of years, have been building strong relationships with CHARLOTTE's crew through letters and emails, and during a tour of the boat, presented prints of Charlotte's skyline for bulkhead-mounting. Several scouts corresponded with the XO as part of the requirements for earning their Communications Merit Badge.

Kentucky submarine namesakes are in very good hands. With unbridled spirit, the USSVI Louisville Base established the "Thoroughbred Sub Club" dedicated to supporting the USS LOUISVILLE (SSN 724) and USS KENTUCKY (SSBN 737). The Club is a statewide network of Navy and submarine veterans, reservists, parents, educators and citizens-at-large. The Club coordinates crew visits and works closely with local and state governments, schools and civic leaders. While under construction, KENTUCKY was adopted by Worthington Elementary School in northeastern Kentucky! This long-standing relationship between 4th graders and crewmen continues with care packages and letters, and school memorabilia decorating the boat's bulkheads. Over the years, the blue and gold crews have built a gazebo and picnic pavilion at the school, wired the school for Ethernet and held Q&A sessions with the students. And for families who have hosted crewmen in their private homes, pride runs very deep.

The blue and gold crews of another boomer, USS NEBRASKA (SSBN 739), have had the support of the *Big Red Sub Club*. These sailors are considered honorary Nebraskans when they visit schools and civic groups in the Cornhusker state.

In Missouri's capital city, the citizens take great pride in *their* submarine. The Submarine Committee for USS JEFFERSON CITY (SSN 759) has hosted a website and many crew visits. The

community loves to demonstrate its gratitude, respect and admiration for the crew's daily sacrifices in defending our freedoms. Folks in the *Show Me* state sleep well at night knowing that men wearing silver and gold dolphins are ever-vigilant, ever-strong and ever-ready. Incidentally, as is often the case for the Navy League, the St. Louis Council served as the commissioning committee for USS MISSOURI (SSN 780).

There is a USS Oklahoma City Association with a top-rated website about its WWII and Vietnam warships as well as USS OKLAHOMA (SSN 723). The website has been ranked No. 1 of the top 25 military websites. The Association is known for its generous support such as donations to the boat's MWR fund and gift cards for Sailors of the Year.

The Navy League Pittsburgh Council's support team for USS PITTSBURGH (SSN 720) is called the *Relief Crew*. It is beginning its 28th year of outstanding support for the submarine's crew and families. With PITTSBURGH's motto *Heart of Steel*, visiting crewmen have been seen twirling the *Terrible Towel* at Steeler games. That goes both ways — when the boat returns from deployments, the *Terrible Towel* is flown from the bridge. And having the crew recognized before thousands of Steeler fans means a lot to these undersea warriors. Last October, PITTSBURGH's skipper and seven crewmen visited the city, and in December, Joe Montana's Ringgold High School—another football connection—adopted the boat. The *Relief Crew* provides college scholarships to dependents of current and former crewmen, SSN 720 hats to new sailors reporting aboard, and Steeler-autographed footballs for the crew's mess. Also, it recognizes Sailors of the Year with savings bonds and hosts Christmas parties for the crew's children.

On Pearl Harbor Day last year, at the Texas State Capitol, the Navy League Greater Austin Council and the University of Texas NROTC unit went to great lengths to present a set of 7-foot Texas longhorns to Pearl Harbor-based USS TEXAS (SSN 775). The horns replaced a smaller set that TEXAS had been displaying on the bridge when she enters or leaves port. All support for TEXAS

does not emanate from Austin alone—the Navy League Greater Houston Council has formally adopted the boat.

Greater Austin Council and UT NROTC representatives at December 7, 2012 presentation of Texas longhorns. Photo Courtesy of Greater Austin Council.

In Virginia, USSVI's USS Virginia Base and the Navy League Hampton Roads Council, support the crew and families of USS VIRGINIA (SSN 774). The Liaison Committee for USS NEWPORT NEWS (SSN 750), originally created by the City Council and comprised of the city manager and citizens-at-large as the submarine's commissioning committee, serves as that crew's home support team, managing homecomings, picnics, scholarship programs and holiday parties. USS ALEXANDRIA (SSN 757) also has a liaison committee which maintains strong ties between the submarine crew, families and citizens of Alexandria. Support includes monetary assistance for crewmen and families, travel sponsorship for namesake visits, and award programs.

Our submarines are key sea power resources that execute the Navy's missions to deter those who seek to engage us in war, to safeguard our democratic freedoms, and to ensure our nation's economic well-being by protecting our interests throughout the world. At the same time, our submarines are sea-going goodwill ambassadors carrying our city and state names worldwide while our home support teams instill a sense of pride among citizens citywide, statewide and nationwide. There is no doubt about it—in the submarine community, pride runs deep.

PATRON

ADM Bruce DeMars, USN (Ret)
VADM Patrick V. Hannifin, USN (Ret)
RADM Joseph G. Henry, USN (Ret)
Mr. John A. Johnson
VADM Al Konetzni Jr, USN (Ret)
LCDR David Lyman, USN (Ret)
VADM George P. Steele, USN (Ret)

SPONSOR

VADM Daniel Cooper, USN (Ret)
Mr. Jack S. Flowers
Mr. James R. Hupton
RADM John B. Padgett III, USN (Ret)
VADM Paul S. Stanley, USN (Ret)
VADM George Sterner, USN (Ret)
CDR John L. Welch, USN (Ret)

COMMODORE

Mr. Lorie Allen
CAPT John C. Brandes, USN (Ret)
Mr. Joseph J. Beff
RADM Michael T. Coyle, USN (Ret)
Rev. Melvin Dornak
RADM George F. Ellis Jr, USN (Ret)
ADM Thomas Fargo, USN (Ret)
CDR John Gluck, USN (Ret)
LT T. Morris Hackney, USN (Ret)
CAPT James C. Hay, USN (Ret)
ADM Thomas Hayward, USN (Ret)
CAPT Kenneth A. Lee, USN (Ret)
Mr. Stuart A. Nelson
LCDR Jules V, Steinhauer, USN (Ret)
RADM Edward K. Walker Jr, USN (Ret)
Mr. Richard W. Wallace
VADM Melvin Williams, USN (Ret)
RMCM (SS) James T. Wright, USN (Ret)

SKIPPER

CAPT Sherman G. Alexander, USN (Ret)
CDR William Arata, USN (Ret)
LCDR Daniel J. Archer, USN (Ret)
CAPT William P. Bancroft, USN (Ret)
MOMM2 (SS) Robert W. Bell, USN (Ret)
Mr. Richard E. Biancardi
CAPT Homer R. Bivin, USN (Ret)
Mr. Larry B. Blair
CAPT Peter Boyle, USN (Ret)
CAPT Daniel B. Branch, USN (Ret)
Mr. Ansel C. Braseth
CDR William L. Breed, USN (Ret)
LCDR Kenneth S. Brown Jr, USN (Ret)
CAPT David H. Boyd, USN (Ret)
RADM Stalney E. Bump, USN (Ret)
RADM John D. Butler, USN (Ret)
CAPT Richard N. Charles, USN (Ret)
ADM Henry G. Chiles, USN (Ret)
LCDR Richard Chwaszczewski, USN (Ret)
CDR Carl C. Clausen, USN (Ret)
Mr. Stanley G. Coates
ETCS (SS) Robert M. Conner, USN (Ret)
CAPT Blake L. Converse, USN (Ret)
CAPT Howard S. Crosby, USN (Ret)
CDR Robert S. Day, USN (Ret)
SKCM (SS) L.V. Denson, USN (Ret)
ADM Kirkland H. Donald, USN (Ret)
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ADMIRAL THOMAS FARGO
SUBMARINE BIRTHDAY BALL
NAVAL POST GRADUATE SCHOOL
20 APRIL 2013

Thanks Jerry, for your kind introduction. I once had a wonderful boss—great submariner named ADM Bob Long who used to say—behind every successful person is a truly surprised spouse. So let me thank the spouses, all the spouses, and especially Nikki Hunt and the Ball Committee. This really is a fabulous gathering.

We have a number of distinguished guests here and although they have been recognized I do want to thank:

Adm Hank and Peggy Mauz
Admiral Jan Tighe
Bill Warner
Civilian and Academic leaders of this prestigious school

Guest Speaker Admiral Fargo

And we have three generations of submariners and their families here with us tonight.

WWII Generation represented by Harold Mulnix. Harold qualified in May of 1943 on board USS STURGEON. Harold also has his WWII patrol pin on and I highly recommend you take the time to say hello. I believe it is the only one in this room.

Cake Cutting - ADM Fargo (Guest Speaker), Ships Cook 2nd Class Harold Mulnix (age 92, longest qualified Submariner - qualified on USS STURGEON (SS187) in 1943), and LT Greg Syme, most recently qualified Submariner who qualified in March, 2012 on board USS VIRGINIA (SSN 774)

Now how many of you have spent some time at Pearl Harbor? My favorite place in all of Hawaii to take a distinguished visitor—and I have done it countless times—is the Skipper's Lounge in Clean Sweep Bar at Lockwood Hall. It doesn't take long as you view the pictures of those who served on submarines in World War II to gain an appreciation for the full measure of devotion and sacrifice a generation contributed to winning that war. As Admiral Nimitz said:

> It was the Submarine Force that I looked to carry the load until our great industrial activity could produce the weapons we so sorely needed to carry the war to the enemy. It is to the everlasting honor and glory of our submarine personnel that they never failed us in our days of peril

Then there is the Cold War Generation. I guess I should count myself in that group along with many friends here tonight—like Adm Jerry Ellis who commanded both ULYSSES S. GRANT and CITY OF CORPUS CHRISTI. ADM Joe Ekelund of Ekelund Range fame, who commanded GRAYBACK. Gordon Eubanks my shipmate on GUNARD and many more. Joe, I want you to know that Gordon and I lost a lot of money to a GRAYBACK wardroom playing poker while deployed to the western pacific. As a matter of fact the term pirates comes to mind.

Make no mistake, this was a generation of submariners that protected American interests worldwide...that gained the knowledge and understanding of the Soviet Union, which allowed us to prevail. And without question, led the American effort to win the Cold War. CORPUS CHRISTI and GURNARD, ships of their time whether SKATE & SKIPJACK, 594/637 or the Los Angeles class... each rode to the sound of the guns, kept the Soviets at bay, and developed a reputation for readiness and an ability to deploy on short notice, that is simply unmatched in our history.

And then there is the Current Generation. That's all of the rest of you. And it is different once again. Despite the common heritage and the manner in which we sailed fearlessly into the perils of the Cold War, everytime I took a debrief from a returning Commanding Officer or talked to our current force leadership, I have marveled at your management of literally hundreds of contacts in very shallow water. You have different set of problems but it is pretty clear to me that the level of stress and excitement and the demands for an exceptionally well-trained crew and superior platform hasn't changed one bit.

Over the last few years I have had the great fortune of riding both the LOUISVILLE and NORTH CAROLINA.

The lesson to me was that in the 20 years since I had left command, we had added tremendous capability to collect, process and disseminate information to deal with a newer, more complex environment—and on the Virginia class, we had designed in a clear leap in both technology and arrangement to meet this challenge from day one.

One of the folks that we invited to sea with us on LOUISVILLE was Eric Schmidt, who was at the time, the CEO of Google and now the Chairman. Now here is a guy whose principal objective is to figure out how to share all that is known with all who want to know it.

— It is the world we live in today. —

He had a great time and of course was hugely complimentary of all whom he met and the importance of our mission.

I dropped him off at his plane at 6:00 p.m. When I woke up 12 hours later, he had posted a blog, edited a video which was available on You-Tube and sent me a Google Picasso Galley of 50 photos.

— It is the world we live in today. And it is different and demanding. —

So we are going to have to title this new and equally fearless generation of Submariners. My sense is you will define yourselves. But for starters, I'll just call you the Generation of the Pacific Century. There is a lot of discussion about the Pivot to the Asia or Rebalancing. But the Submarine Force figured this out and led this movement almost a decade ago when shifted ships to the Pacific and initiated attack submarine home porting in Guam.

Since we were talking about social media a moment ago, there is one item I would like to clear up. It is the term *Bubble Head* You may have been called one...I certainly have. But in 40 years as a qualified submariner, I have never understood where it came from. But in the current day and age we can find that out. We go to Google and then Wikipedia…and here it is:

Bubble Head: a member of a unique tribe populated by exceptional warriors known to be bright, engaging and fearless of adversity; Uncommonly attractive…compassion when appropri-

ate; Derives from always bubbles to the top... a.k.a The Submariner.

I gave a speech not so long ago to the Aloha Section of the Professional Golfers of America including the National CEO of the PGA. How many folks watched the Masters last weekend? Just a show of hands. OK, then I think I can proceed.

Now that was a different audience for me. Not about Asia-Pacific or building submarines. These guys Teach Golf, Run Golf Courses and are the Course Superintendents. After giving it some thought, I titled it "Pride Runs Deep." —What I learned from golf and growing up in the Submarine Force. Now that may seem a little strange and I certainly didn't clear the title through Naval Reactors, but the more I thought about it, the better I liked it. Because fundamentally, I have found that the key principles you learn growing up in the Submarine Force will make you successful in almost any organization or aspect of life.

I told the golfers we have a lot in common, but above all else, when we get up in the morning we can't wait to get to work. That doesn't mean every day is a great day. I have some for the record books.

—I made, maybe, the Navy's only 63 bell landing. The good news was the damage to SKATE's port propeller was relatively minor.

—And I tried to pump the entire Atlantic Ocean into the Forward Trim Tank of a submarine. By the way it didn't fit...we started to sink...and I finally got control of my depth about 200' later. But like depth control it is how you recover that is especially important.

But day in day out, we could not have a better job.

- It is exciting.
- The people are the best you will ever work with.
- And you have a job that is important and hugely meaningful to your country.

Now I am not going to give you the whole speech that I gave to PGA but here are the take aways: I told them what we have learned:

- First, you can't lead an organization well—unless you really understand it. That means crawling over every inch of a submarine in our case or the golf course cart barn in theirs. All this business about a great leader can take over any organization and quickly achieve success is frankly hogwash. You have to understand how it works. It is not lost on me that this lesson must be why the TV show "*Undercover Boss*" got started.
- Above all else, the people who work for you respect more than anything else, competence. And knowing that, will save you the price of a dozen books on leadership.
- I mentioned you can learn more working out with troops or sitting in a lower level engine room with the watch than at any management meeting. IBM used to call it Management by Walking Around.
- Of course the corollary—you fail to listen at your own Peril.
- One of the principal responsibilities of every leader is to set standards (my choice is high standards) or said another way if you walk by something that isn't right and fail to ACT—you have just set the new low standard. And for sure there is nothing inconsistent with high standards and having fun.
-

So if you see a few golf pros walking around Pebble Beach that act like they are nuclear trained, you will know where they got it from.

My own experiences have been equally exhilarating:

> In 35 years, I climbed Mount Fuji, walked the Great Wall of China, scaled Machu Picchu in Peru, toured the Pyramids and the Valley of Kings and Queens in Egypt and visited and enjoyed the beaches of Ipanema and Copacabana. The person who penned the phrase "Join the Navy

and See the World" was certainly right on. But of course, those were just the sidelights.

Nothing has compared to the opportunity to lead a cross-section of our Nation's citizens, from those early days as a division officer on board GURNARD, through to the various commands in Asia, the Pacific and the Middle East. Of taking of a billion dollar submarine (now we would say two billion) and 130 souls and sailing into the most demanding days of the Cold War.

You know it is funny how our Naval service works. You start out in your first assignment as a Division Officer, you work hard to learn your job and gain operational competence. And when you look at the person you are working for—in my case the Engineer— you probably feel that he or she has the toughest job on the planet. But at some point along the way, while you are intently focused on your current responsibilities you have this revelation—that you could handle that next assignment—in fact you recognize you could do it very well. That is where you are right now. That doesn't mean there isn't some trepidation—if there isn't—you may not understand the stakes. But that progression is as true in moving from a Division Officer to a Department Head as it is from a Strike Group to a Fleet Commander. And in reflection, I believe ADM Kin McKee, a former Director of Naval Reactors had it right when he convinced me 30 years ago that the three most respected components of leadership were competence, as I mentioned earlier, integrity and endurance. Yes, endurance. Because you have to make good judgments when you are tired. Kind of like making that foul shot after running the court for 38 minutes.

Through it all, I have had great fortune to work for a number of magnificent leaders—really too many to name. Some visionary, some courageous, others compassionate and a few were really tough. But each felt a responsibility to develop me personally and professionally and ensure I had every opportunity for success.

Which brings me to this equally great opportunity that you all have before you. In my experience, in both the military and private

sectors, there is no place in our society where at this point in a career you assume greater responsibility or exercise more immediate leadership. Whether you stay in our military for a career or move down a different path, you will find yourself tremendously well served, by not only your initial training and sea tours and your time here, but each experience in the immediate years ahead.

Of course, with opportunity comes obligation. Your solemn obligation to train and develop and impart what you have learned to each sailor placed in your charge. It may also mean later in your career trying to sleep, maybe with one eye or ear open—so to speak—as you allow a newly qualified Officer of the Deck to stand the watch in the dark at night.

Not everybody walks on board a superstar. Such was the case of a shipmate on SALT LAKE CITY named Seaman Beauprez, a 19 year-old sailor who walked aboard from Illinois in 1987. Now I'm sure Seaman Beauprez would have been the first to admit that there had not been a lot of discipline in his life up until this point (maybe not one iota) and as you can imagine, he got off to a rocky start. Within weeks, the Navigator was in my stateroom pleading to allow Beauprez to take a fast train back to Chicago. "Bottom blow this guy" was the expression used then. But I believed strongly, as I think most Commanding Officers do, that we have an obligation to train and develop each sailor on board. Play the hand you're dealt so to speak and besides there was a spark I saw in Beauprez that I really liked. Things didn't get particularly better and one day we were up in the great Pacific Northwest shooting torpedoes by day and pulling into a small Canadian Port at night called Nanimo. It was our last night—Nanimo is what I would call a two disco town—and so the Executive Officer and I decided to take a lap around the town to see how the crew was doing.

- Sure enough—Beauprez was dancing the night away with a woman who had to be a Madonna clone (white T-shirt—black bra over the top).
- Are we going to get him back—XO—My responsibility.

- 0900—lines singled—no Beauprez—Chief of Boat—Go find him. Came off Bridge—I was hot.
- XO—You will have the duty the night before every underway for the rest of your life.
- Beauprez woke up, got the message—QMOW

Six years later.

- Great Lakes—reviewing grad. Walking barracks. Beauprez is pushing boots.

I followed his career pretty closely over the years. So where is SN Beauprez today? A year or so ago at a Submarine School Graduation I had great pleasure to introduce Electronic Technician Master Chief Chris Beauprez. A clear success by any standard. COB on Pittsburg.

So we recognize we have sailors from all walks of life and very different backgrounds—each of which has a tremendous amount to contribute to our Navy and our Nation.

WRAP UP

Early I talked to the term Generation of the Pacific which I very much believe to be the case. There is no doubt that our submariners have performed magnificently in the Persian Gulf, the North Arabian Sea, on Strategic Patrols both East and West, even the Mediterranean conducting hugely successful strikes from both USS FLORIDA our SSGN which fired 100 missiles along with PROVIDENCE and SCRANTON against Libya. It is a record of capability and contribution that is universally admired.

One additional point you should understand clearly about your profession. There is no warship better able to operate in the contested littoral regions of the world today than the submarine. And that really is where our future security concerns are at in this globalized world. Every time we sit down with a clean sheet of paper and start to design a ship, we ask for one that is fast and stealthy and survivable, with of course, unlimited endurance and

the ability to absorb and manage huge amounts of information. It is the submarine we have today.

To sum up, I can't think of a place I would rather be than at sea, on the front line with today's Submarine Force and each of you.

GOD BLESS YOU, GOOD LUCK AND HAPPY BIRTHDAY

Ships Cook 2nd Class Harold Mulnix, his son Doug Mulnix, along with LT Steven Hunt and his wife Nikki

WASHINGTON D.C. SUBMARINE BIRTHDAY BALL
ADMIRAL JOHN M. RICHARDSON, U.S. NAVY
DIRECTOR, NAVAL REACTORS
12 APRIL 2013

Thank you Admiral Bruner—it is indeed a privilege and I am grateful to be here tonight at one of the premiere Submarine Balls in the world. (In fact I am grateful to be invited to any party these days. I will tell you CNO, this is the part of the job I did not see coming into this, I keep getting calls such as "hey about that invitation I sent you, I forgot…I have to wash my hair that night…the party is off".)

I'd like to thank the event organizers who worked so hard to put this event together—specifically, the event organizer LCDR Matthew Sweeney and his wife Amy. Matt and Amy please stand up, and let's give them a round of applause. And the bagpiper who I thought was terrific, let's give the piper a hand. We'll also hear later on from the Navy band—"The Cruisers" under Chief Musician Leon Alexander. They are terrific so after dinner be sure to come on out and do some dancing. And lastly, the hotel and catering staff of the Crystal Gateway Marriot, just a terrific job tonight, thanks for having us back again this year. All of this, under the watchful eye of RADM Barry Bruner and team at OPNAV N97. Thank you.

Tonight there is no place a submariner would rather be—on station here deep inside the beltway, exercising the full range of our arsenal. We are not so much about *power* projection as we are about withering *powerpoint* slides, not so much about many multi-torpedo *spreads* like in WWII, but we do have our *spreadsheets*, salvos of them, many of them with command-enabled pivot tables. And we are not so much about submarine *tracking*, but just watch us enable *track changes*. That is humbling.

Ok, maybe not so much…but this is one of the very best Sub Balls in all the constellation of Sub Balls, that happen world-wide each April, and this is the greatest one. And it's because of all of you—the terrific people in the D.C. area who come together tonight to celebrate. We come from all over the place and I'd like

to take a little bit of time to recognize some of the tribes we have here in the room—truly spectacular.

I'd like to ask you, as I call your group, to raise your hands and maybe give a shout when I call you out…and let's lead off with the team that will not let us down, all current and former Dolphin wearers—the nucleus of the community. Lets hear it for all current and former Dolphin wearers. You are the nucleus of the community. And CNO and Darleen you are the nucleus of the nucleus—it is so wonderful to have you here tonight.

And the rest of the Navy—NAVSEA, Installations Command, Fleet Cyber Command, Office of Naval Intelligence, Strategic Systems Program, the Chief of Chaplains joined us tonight to keep everything legit. Let's give them a round.

Shipbuilders—I wish everyone in America could tour a shipyard to see what a spectacular thing this nation can do when it puts its mind to it. Please join me in welcoming our shipbuilders from Electric Boat and Newport News.

We also have a lot of private industry here tonight—many great supporters from our industrial base. Let's give them a round of applause.

The next group is academics. They are so important to what we do. Johns Hopkins, Naval Academy, Penn State and all the academics. Lets hear it for them.

Along with that there are also a number of "Submariners to be" – midshipmen from USNA and Penn State. I'd like to see what kind of noise this group can make on their own. So let's hear it from them.

I'd also like to welcome our friends and allies from foreign navies—all of the attachés—they were previously introduced and I thank you for joining us tonight.

Lastly and most important: I'd like to recognize our spouses and families. Suffice it to say, they deserve the loudest round of applause. Is there anyone I missed – raise your hand?

I probably missed some folks and I hereby designate you as *friends and fans of the Submarine Force*—the groupies of the Submarine Force. Tonight they have a back stage pass to celebrate with us.

So you can see that we are a great and diverse group. It is this diversity that makes us so strong. We come from everywhere. It's a great strength—and indeed our strongest asymmetric advantage. And tonight, this special night, we are all submariners.

I called down to Norfolk and cleared what I am about to do with VADM Connor, and he has delegated authority to me to designate you all honorary submariners for one-night…you will find on your table under your coffee cup saucer your membership badge/warfare device for this evening. Go ahead and give yourself a round of applause.

Now there is a vicious rumor, a vicious rumor, that if you present this devise at the bar…. that ADM Bowman will pick up your tab—sir can you confirm? No.

How can I take the bold step of designating you all submariners for the night—that is not something I do lightly—it takes great confidence. I have that confidence. As diverse as we are, we are bound by common experiences and principles. We are dedicated, hardworking, and your contribution to our nation is duly recognized. Even though our AOR is here inside the beltway, we have a lot in common with the fleet:

For instance, anybody who has ridden the blue or yellow line during rush hour. The doors open and you take that running start and dive into the mosh pit—can barely move, in that tube that is going to truck around underground, sweat, smells, heavy breathing, an announcing system constantly in the background—you know it's there but can't understand a word—that's like department training in the crew's mess. So we share that.

And the other day I walked in on a sea story in our building where a young officer was talking about trailing a diesel—saw them shifting back and forth from the battery to engines, speeding up, slowing, zigging—he was staying right on them. I asked how long where you in trail? He said, "Hours!" I asked was it on WESTPAC or in the Atlantic? "Oh, sorry admiral, you came in late I was just telling about how I got stuck behind a VW hybrid on the way home last night to Woodbridge." I kid you not, some days driving home from work, it feels just like a watch during

patrol. Or as long as the director's cut of Das Boot. So we share that.

We share other things too. Our proud history—formed by outstanding people. Submariners enjoy a legacy of excellence and sacrifice that dates to 1900. Just for some perspective, that's three years before the Wright brothers 1st flight in Kitty Hawk in 1903 and eight years before Henry Ford's model T began production in 1908.

Our submarine history was made carved out by bold individuals. Our first generation: pioneers like John P. Holland—whose imagination and hard work led to the purchase of the Navy's first submarine in 1900, and we advanced our technology so fast—she was obsolete by 1910, and sold for scrap in 1913.

Our second generation: the Submarine Forces' World War II heroes—Charles Lockwood, Dick O'Kane, "Mush" Morton, Slade Cutter, George Street, Gene Fluckey, John Cromwell and many more—they altered the course of our country and firmly established submarines as a powerful lever of our national security. And you all know that with less than 2% of the U.S. naval personnel, our WWII submariners accounted for 55% of all enemy ships sunk.

Our Third generation: our Cold War heroes—Dennis Wilkinson, the first CO of NAUTILUS, James Osborne, the first CO of USS GEORGE WASHINGTON, Ned Beach, who sailed around the world on TRITON, "Whitey" Mack, Yogi Kaufman, Rocky English, Roger Bacon, Bruce DeMars, John Grossenbacher, Archie Clemins, Kin McKee, Gus Gustavson,—their legendary patrols and poise forever changed the world and our role in strategic nuclear defense and tipped the scales in the Cold War.

Our fourth generation is here in this room—pioneers forging new ways of operating in a new, uncertain and very challenging environment—and it's been a busy year. Our Strategic Submarine Forces was awarded a Meritorious Unit Commendation in July, presented on the 52nd anniversary of the Navy's first submerged ballistic missile launch, made by USS GEORGE WASHINGTON (SSBN 598) in 1960.

Cmdr. Brian Sittlow, Commanding Officer of the Los Angeles-class attack submarine USS BOISE (SSN 764) received the Stockdale leadership award. And Captain Jerry Miranda, who won the Stockdale award last year is here with us tonight.

The first qualified female submarine officers received dolphins in December. LTJG Marquette Leveque, of Fort Collins, Colo., assigned WYOMING (SSBN 742). LTJG Amber Cowan and LTJG Jennifer Noonan of MAINE (SSBN 741).

We were deployed, and on station. In 2012, the Submarine Forces deployed over twenty of our SSNs, our SSGNs, and as always, our SSBNs on vigilant patrol—100% of the time since that first patrol.

We made history with our allies and partners: RIMPAC—largest and most robust to date. Three U.S. submarines along with allies, HMAS FARNCOMB (SSG 74) from Australia, HMCS VICTORIA (SSK 876) from Canada, ROKs NAE DYONG (SS 069) from South Korea.

We put our people in the best submarines in the world—armed with amazing technology from a world-premiere industrial base. Again, it's been very busy this past year. USS MISSISSIPPI (SSN 782) was commissioned as the ninth ship of the Virginia-class in Pascagoula a full year ahead of schedule—and even more amazing she was combat ready—surge ready—one month after delivery. USS MINNESOTA (SSN 783) was christened in October and we will take her on sea trials in just a few weeks and commission her later this year. Ohio-Replacement Class R&D contract was awarded, and RADM Dave Johnson's team is working hard to deliver this credible deterrent to the fleet in 2031—at the lowest possible cost while meeting all requirements.

We currently have six Virginia-class submarines under construction with two more starting this year. North Dakota (SSN 784) pressure hull is complete and in total she is about 80% complete. I had the privilege of attending the keel laying for PCU JOHN WARNER (SSN 785). That was an amazing experience and she is over 60% complete. PCU SOUTH DAKOTA (SSN 790) and PCU DELAWARE (SSN 791) will begin construction later this year.

We are bound by a strong common culture—our principles. Responsibility, technical competence and credibility, ownership, boldness and accountability. Finally, I would add our sense of humor. No matter how tough it gets, and it does get tough, we can lighten the mood.

Now it is not by any means human nature to put to sea in a steel boat of several thousand tons, loaded with weapons and other sources of tremendous potential energy, submerge that boat, propel it for months continuously around the globe, possibly release our weapons to destroy an enemy, and return home safely. And throughout to focus not on our successes, but to focus on our problems and fix them.

And we will always be asked, particularly in the next decade "do you really need to… make it that reliable? ...be that quiet? ...test it that much? ...train that hard? ...build that many? ...go to sea that far forward? On the 50th anniversary of the loss of the USS THRESHER—129 souls on eternal patrol—reminds us that we must answer those questions with: **"yes, and yes, and yes, and yes, and yes, and yes."**

So I feel like I'm on solid ground tonight calling us all submariners. I'm confident in our people—talented, dedicated, and motivated. I'm confident in our ships—which so many of us have a stake in building and operating. I'm confident in our principles, our culture, and shared experiences—they bind us together.

You make the U.S. Submarine Force the most powerful maritime force ever to sail on or under the ocean. Our boats are on constant patrol forward around the world—where the action happens—a constant comfort to our friends and allies, and a nagging nightmare to our enemies. So that if you oppose the United States and what we stand for in the world, your worst day is when you are designated as a target of the U.S. Submarine Force.

So let's wrap it up here. I cleared this last part theologically with Chaplain Tidd, so this is real… this really happened. A submariner, a Chaplain and Paul Harvey go into a bar, and they're discussing the finer points of the Dead Sea scrolls... And the conversation went something like this…

And on the sixth day God saw everything that he had made, and, behold, it was very good. And we all know on the seventh day God rested. But on the eight day, God looked down on the world and noted something missing.

God said he needed people smart enough to know a lot, but wise enough to realize they don't know it all. Somebody who can startup, shutdown, dive, rise, blow, shift, clean, inspect, fix, mend, lap, groom, critique and be better the next time.

He needed people of humility and integrity, strong enough to mess up, fess up, get up, move on, and then share their faults with their shipmates across the pier to make that boat better.

He needed people who could stand a tough mid-watch, come to breakfast hungry but wait for the skipper to finish talking to a new sailor about where he grew up, his family, and how things are going on his first underway

God needed somebody with a strong family with the soft, strong bonds of sharing, with a spouse who can cry, sigh and then smile as the boat pulls away from the pier—again. Who can condense months of life into a 45 word family gram. And who pump their fists in the air with joy when their sons and daughters say—Mom and Dad, I want to grow up and do what you do.

So God made the submariner.

Fellow submariners—enjoy the night, be safe. God bless those on patrol, our Submarine Force, our Navy and our nation. Thank you very much.

BOOK REVIEW

BLACKETT'S WAR
by Stephen Budiansky

Published by Alfred A. Knopf, February 2013

Reviewed by Dr. Brian McCue

Brian McCue is a civilian naval analyst with experience on both coasts, most of it pertaining to the analysis of Anti-Submarine Warfare exercises and operations. He is the author of U-Boats in the Bay of Biscay: An Essay in Operations Analysis (National Defense University Press 1990; Alidade Press 2008) as well as numerous mathematical papers and articles regarding the Second World War campaign against German submarines. He holds a Ph.D. and a Master's degree from the Massachusetts Institute of Technology, and a Bachelor's degree from Hamilton College.

BLACKETT'S WAR is aptly titled, since it not exactly a biography of Patrick Maynard Stuart Blackett. Rather, it is a history of the part of the Second World War over which he held sway: the creation in Britain of *operations analysis*, the scientific study and improvement of military operations themselves, as distinct from the weapons with which they were waged. Blackett, an outstanding experimental physicist who—unlike many other "men of the professor type" recruited for the more esoteric aspects of the British war effort—was a combat veteran of the First World War and had seen action at Jutland, conceived of operational analysis early in the war, took part in its application to defending London against the Luftwaffe, and was then drawn into the war against the U-boats.

Budiansky gives an excellent feel for the style and substance of Blackett's work in operations research against the U-boats by presenting three important problems in some detail.

The first of these was the matter of the correct depth settings for air-dropped depth charges. The U-boats as yet lacked snorkels, and could be sighted by airplanes while running on the surface, but were likely to counter-detect the airplane and be submerged by the time the airplane came overhead. For this reason, the airplanes became equipped with depth charges in place of bombs. Initially, the depth setting was 100-150', based on an estimate of how much a U-boat could submerge during the average time—50 seconds—that elapsed between its disappearance beneath the waves and the arrival of the attacking bomber. In that time, of course, the U-boat could (and would) also move horizontally in unknown ways, and a considerable dispersion of the depth charges was therefore advised.

Few U-boats were damaged in these attacks.

E.J. Williams, a physicist working with Blackett, realized that to attack the average U-boat was so difficult that doing so should not be attempted. Accurate drops would only be had on boats whose submergence had been tardy, so the depth setting should be reduced, and the pattern more tightly concentrated. Williams's recommendations were adopted, and brought about a major increase in the proportion of successful attacks.

The second, and longest-running, was the question of how the available heavy bombers could best be employed—in the bombing of Europe for which they had been built, or in the emergent task of fighting the U-boats. When American production began to provide bombers in profusion, there arose a follow-on question: assuming that bombers were to fight U-boats, how would they best do so? The candidate assignments were bombing the U-boat pens in occupied France, searching for U-boats transiting the Bay of Biscay, flying in direct protection of Atlantic convoys, or bombing the German shipyards in which U-boat were built. While Blackett's statistical analysis, and some experimental raids, showed that to bomb the U-boat pens would be almost exactly fruitless, the questions of if and how bombers were to be used against U-boats were inextricably tied up with organizational,

intra-service, inter-service, international, doctrinal, and even moral questions, amid which Blackett's analyses could gain no traction. Something approximating the right answer—protection of convoys and offensive search in the Bay—came only through US insistence as to how American-built bombers (including Navy's purpose-built B-24 Liberator variant, the PB4Y Privateer) were to be used.

The third was the question of the correct number of merchant vessels in a convoy. Blackett examined data from convoys of various sizes and concluded that the number of vessels lost per convoy was nearly independent of the convoy's size, a finding that meant large convoys were better because a smaller proportion of ships would be lost. This finding contradicted Royal Navy doctrine, and perhaps also some residue of the eggs-in-one-basket thinking that had incorrectly opposed convoys in the first place. Blackett himself, recognizing the drastic nature and great importance of the change, did not finalize his recommendation until he had subjected it to the mental test of asking himself what size convoy would he prefer his children to be in, were they to have to voyage to America. He made his recommendation, his advice was taken, and a dramatic reduction in the losses of convoyed ships ensued.

Budiansky's wide-ranging narrative includes some of the story of American antisubmarine operations research as well, particularly the work of Philip Morse and William Shockley, who worked in a decidedly different manner from that of Blackett.

Blackett's work on the question of convoy size had begun with his assignment to perform a *statistical analysis* of the effectiveness of the ships and airplanes that protected convoys, and even when he had realized the importance of the question of convoys' size, he addressed it in a statistical fashion, using available data on convoys of various sizes, and tested it by thinking of how he would his children to cross the Atlantic. Only afterward did another analyst provide the reasoning: the convoy's ships filled its interior whereas its escorts populated its perimeter, so the number of convoyed ships was proportional to the square of the number of escorts.

Morse's task was presented to him similarly: "... we were shown a room full of reports of all actions against submarines, real or imagined," wrote Morse later. "We looked at a few reports and talked to some of the officers who had participated in U-boat sightings and attacks. And we said we wanted to think about the problem before we started to read."[1] "Morse's team," continues Budiansky, " went into a one-week huddle' while they worked out, from first principles, a mathematical theory of submarine search." Without explicit comment, Budiansky has hit upon a key trans-Atlantic difference in how operations research tended to be performed: Blackett and the other British workers acted as strict empiricists, working with numerical data to find important regularities, such as the fact that the number of ships sunk was independent of convoy size. A theory came later, if at all. The Americans, in contrast, began with a theory, and then turned to data to fill in the numerical details.[2]

On the other hand, the work on each side of the Atlantic was similar in a surprising way: the best questions were not those handed down by the Services, but those that the civilian analysts found for themselves.

In the case of convoy-sizing, Budiansky cites Blackett's observation that "As in most of the important cases ... the really vital problems were found by the operations research groups themselves rather than given to them to solve by the Service operational staffs." Indeed, this observation would seem to apply to the depth-charge problem and the bomber-allocation problem as well, and it stands in stark contrast to the Services' view that the scientists should speak only when spoken to: "...they must stick to their lasts," wrote Air Marshal John Slessor later, when describing his opposition to the recommendation of Blackett and Williams that the bombers be assigned to patrolling for U-boats in the Bay of Biscay. "Statistics are invaluable in war if they are properly used—in fact, you can't fight a modern war without them. But the Bay offensive was a battle, and a bitterly contested one, and nothing could be more dangerously misleading than to imagine that you can forecast the result of a battle or decide the weapons necessary to use in it, by doing sums."[3]

And yet a correct forecast was exactly what Williams and Blackett had provided in the cases of the depth charges and convoy-sizing, and events were to prove that their predictions regarding the Bay were more correct than not.

ENDNOTES

1. Budiansky, page 226, gives a fuller version of the quotation.
2. This British-v.-American split in operations research working styles is noted by Philip Mirowski in Machine Dreams: Economics Becomes a Cyborg Science, 2002.
3. From a longer quotation given by Budiansky, page 235.

THE SUBMARINE REVIEW

THE SUBMARINE REVIEW is a quarterly publication of the Naval Submarine League. It is a forum for discussion of submarine matters. Not only are the ideas of its members to be reflected in the **REVIEW**, but those of others as well, who are interested in submarines and submarining.

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