THE SUBMARINE REVIEW



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EDITOR'S COMMENTS

The FEATURES in this issue of <u>THE SUBMARINE</u> <u>REVIEW</u> are of very specific interest to the entire submarine community. The Chief of Naval Operations, a submarine officer of distinguished sea experience, has made his charge to the Navy for **emphasis on payload** for mission flexibility, vice reliance on building-into the core of each ship a best-bet on necessary future multi-mission capability. In his charge, carried originally in the July 2012 issue of the Naval Institute's <u>Proceedings</u>, Admiral Greenert has very nice words for the Submarine Force. He did not specifically exempt us, however, from doing better on mission/payload exploitation. All submariners and submarine builders should read and heed CNO's words.

The second FEATURE is about Nuclear Weapons issues and how they will be addressed, no matter who wins the election in November. Ambassador Linton Brooks is certainly the expert on the subject who is most attuned to the *Submarine Aspects and Interests* regarding those issues, although he does not call that out specifically. However, it is my opinion, which I feel is widely shared among senior members of the greater submarine community, that since the current Submarine Force is one of, if not the, major provider of the nation's nuclear deterrence force, every member of the submarine community should be informed about these Nuclear Weapons issues and be ready to comment on them.

The third FEATURE is the speech given by VADM Al Kosnetzni to the SubVets of WW II to mark the closing of that organization. We all join Al in saluting those gallant professionals who fought the big war and taught us all what undersea warfare is all about.

As the lead among the general ARTICLES in this issue is the Mr. Hess/RADM Holland article on the genesis of OUTLAW SHARK in the 70s and 80s. This was a complex integration of communications and intelligence capabilities to provide attack submarines with Over-the-Horizon targeting capability. The real point, of course, is that operationally knowledgeable folks

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recognized a need, saw a potential solution and then developed and tested the capability. This was innovation based on operational foresight, a wide spectrum of technological ability, and most importantly, the drive to carry through with a great concept. That kind of innovation in submarines was not new then, although it was of an admirably high level, and it is not unnecessary now. It may be very appropriate now, as VADM Mike Connor takes his place as the uniformed leader of the submarine community, for all of us to go back to the January 2011 issue of <u>THE SUBMARINE REVIEW</u>, which carried his remarks on submarine programs and the future of Undersea Dominance, and review his observations on adaption/innovation.

There are also several articles about other aspects of submarine interest. LT Haney Hong has given us an excellent overview of the many, and varied, efforts put forward by the Submarine Force Reserve Component. LT Hilger has written about Innovation at the *Deckplate Level* in submarines, with some interesting observations about the TANG Forum (Tactical Advancement for the Next Generation) as one way to generate innovation. Mr. Dick Brown has given us an article about submarines and postage stamps which will interest many more than just the philatelists among us.

In addition, CDR French Caldwell has adapted a commercial briefing which uses the methods and culture practiced in modern USN submarines as a guide to proper governance, responsibility and accountability in civilian corporate affairs. For those in, or about to join, the civilian ranks this article may well be useful in showing potential hirers just what is expected and done in our submarine world.

And there is a continuing effort in the BOOK REVIEW section to highlight the works of retired submariners in bringing our unique world and the concerns of undersea warfare to the public through interesting fiction.

> Jim Hay Editor

FROM THE PRESIDENT

The Naval Submarine League just received its audit report with a clean slate and cheers for the services of our bookkeeper, Paulette Johnson. The results will be presented at the Annual Business Meeting as part of the Annual Symposium.

The last event of calendar year 2012 is the 30th Anniversary Celebration and Annual Symposium and Submarine Force Cocktail Party that starts on Wednesday, 17 October. You should have received your email and regular mail invitations. We have initiated an on-line registration capability this year. Please let the staff know how you like this service.

The corporate sponsorship program for our major events has allowed the League to maintain the costs of these symposia. I ask that when you see a Corporate Benefactor at a League event, please join me in thanking them for their support. The 76 current benefactors are listed in the back of this issue. Mark your calendars for the Corporate Benefactor Recognition Days on 27-28 February 2013 at the Fairview Park Marriott.

The League continues to address issues of importance to the Submarine Force. Your support in establishing the build rate for VIRGINIA Class submarines at two submarines each year is a major topic of discussion in the FY 2013 budget. The OHIO Class Replacement Submarine Program remains an important item in proceeding forward with the national security issues of how many weapons are enough.

On 7 September VADM Mike Connor relieved VADM John Richardson as Commander Submarine Force and later this year ADM Richardson will relive ADM Kirk Donald as Director Naval Reactors. We are fortunate to retain his leadership within the Submarine Force and we welcome VADM Connor to his leadership of the Force. ADM John Harvey, Commander Fleet Forces Command, recently wrote in the September Naval Institute Proceedings that the role of Commander Submarine Forces is very clear in the command and control of the Submarine Force. "The

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Submarine Force is executing these responsibilities very effectively."

VADM Connor will address the Annual Symposium on 17 October following ADM Donald's opening remarks. RADM Barry Bruner will address the Submarine Program from the perspective of the resource sponsor and we are fortunate to have VADM Bill Burke as the Banquet speaker who will close the symposium with his perspective on "The Future of Submarine Programs", the symposium theme.

Now is the time to encourage your friends and colleagues to join the League. The next few years is going to require strong support from the League to continue to promote the importance of the Submarine Force in maintaining our national defense posture. Please refer them to the webpage and click on "Join NSL."

I also ask for your literary contributions to <u>THE</u> <u>SUBMARINE REVIEW</u>. CAPT Jim Hay, USN (Ret), Editor of the REVIEW, welcomes your input to maintain its quality and currency. This journal goes to all submarines, members of Congress, and industry leaders. Your experiences are valued and needed to keep the REVIEW relevant in these changing times.

Please join Bobbie and me as we continue to pray for the safety of our forces and particularly submariners deployed around the world. I am honored to represent you as President of the Naval Submarine League. I look forward to seeing you at the symposium.

> John B. Padgett III President

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FEATURES

PAYLOADS OVER PLATFORMS: CHARTING A NEW COURSE

By Admiral Jonathan W. Greenert, U.S. Navy Chief of Naval Operations

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We need to move from 'luxury-car' platforms—with their built-in capabilities—toward dependable 'trucks' that can handle a changing payload selection.

N avy platforms, particularly ships and aircraft, are large capital investments frequently designed to last for 20 to 50 years. To ensure our Navy stays relevant, these platforms have to adapt to the changing fiscal, security, and technological conditions they will encounter over their long service lives. It is unaffordable, however, to adapt a platform by replacing either it or its integral systems each time a new mission or need arises. Instead, we will need to change the modular weapon, sensor, and unmanned vehicle *payloads* a platform carries or employs. In addition to being more affordable, this decoupling of payload development from platform development will take advantage of a set of emerging trends in precision weapons, stealth, ship and aircraft construction, economics, and warfare that I will describe in this article.

One example of a payload-centric approach to adaptability is the USS ENTERPRISE (CVN-65), which celebrated her 50th birthday last year. ENTERPRISE was conceived in the 1950s to deal with a growing Soviet threat. At the time, our national strategy was to contain the Soviet Union, which required aircraft

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carriers that could quickly reposition and project power on the Soviet periphery, thereby avoiding its sizable garrisons of ground forces and land-based aircraft. A large, nuclear-powered aircraft carrier with specialized fighters and attack aircraft provided a solution to these operational requirements.

But times change, and so do trends in economics, technology, and warfare. The ENTERPRISE went from carrying a mix of A-7 Corsairs, A-6 Intruders, and F-14 Tomcats—designed predominantly to counter the Soviets—to homogeneous air wings of multimission F/A-18 Hornets to address the range of post-Cold War operations. Her command-and-control requirements and systems changed so dramatically in 50 years that the flag bridge, which once accommodated large chart tables to plan Fleet operations, is now mostly bare except for a collection of computer processors and monitors. And over time, the ENTERPRISE's defensive weapons evolved from first-generation AIM-7 Sea Sparrow missiles to an integrated complex of close-in weapon system guns, rolling airframe missiles (RAM), and electronicwarfare systems.

Why Modular Makes Sense

The evolution of the ENTERPRISE's concept of operations and systems over the past five decades offers an important insight for future ship and aircraft development. Substantial volume, reserve electrical power, and a small number of integral warfare systems were needed to address the warfighting requirements of the ENTERPRISE. Those characteristics coincidently made it easier to adapt the ENTERPRISE's capability over time. In contrast, most of today's ships and aircraft were designed in the latter days of the Cold War, with limited reserve capacity and integral systems of sensors, processors, and weapons for the entire range of high-end missions against the Soviets: antisubmarine warfare (ASW), integrated air and missile defense (IAMD), antiair warfare (AAW), surface warfare (SUW), and strike. Although those complex platforms (and our superb sailors) have adapted to new missions over the past 20-plus years, most of our ships and aircraft remain fully loaded luxury sedans, taking their full

multimission kit with them wherever they go through their whole service lives.

Navy missions since the Cold War evolved to include defeating terrorists, pirates, and illegal traffickers; preparing to counter mines and armed small boats; providing humanitarian assistance/disaster relief; and building partnership capacity to take on maritime-security missions. Those operations show one limitation of a highly integrated luxury-car platform. While the ship, aircraft, and crew might flex to new or different missions, it does so at a cost. Destroyer crews are challenged to maintain proficiency in core missions such as ASW, SUW, and IAMD when engaged in months-long counter-piracy operations. Amphibious ships are in high demand for counterterrorism and humanitarian-assistance operations and have had limited opportunity to practice amphibious assault. And P-3C crews had their ASW capabilities atrophy after a decade of high-tempo intelligence, surveillance, and reconnaissance operations over land.

To more efficiently match platform to mission in the future we will need to treat capabilities as being inherent in the payloads a platform carries and employs, rather than capabilities being inherent (integrated) in the platform itself. In Sailing Directions and Navigation Plan for 2013, I highlighted my intent to "expand the reach and effectiveness of ships and aircraft through new payloads of weapons, unmanned systems and sensors." The use of modular payloads that can be changed out over a platform's life offers an effective and affordable way to maintain our adaptability and warfighting advantage against evolving threats.

The Precision-Weapons Revolution

The predominant trend compelling us to consider a new approach for capability development is the exponential growth of information-processing power. Over the past 40 years, that growth helped fuel innovation in almost every civilian and military technology, and brought about a revolution in the precision and accuracy of sensors and weapons. In 1965, Gordon Moore, cofounder of Intel, predicted that the number of transistors per processor chip would double about every two years, thereby

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increasing overall computing speed and power. His prediction now commonly referred to as "Moore's Law"—held true. Today's commercially available chips are almost 40,000 times faster than those available in 1971.¹ Moreover, the average price of a megabyte of computer memory has gone from more than \$700,000 dollars in 1970 to around 2 cents today.²



Individually, a Tomahawk missile or joint standoff weapon is far more expensive than joint direct attack munitions such as the GBU-38 500 lb. bombs seen here. But when all the costs of delivering the latter are factored in, the author says, the Tomahawk or joint standoff weapon is far more cost effective. Here, Aviation Ordnanceman Second Class Nadezda Coe (right) and Aviation Ordnanceman Airman Aaron Melia work on bomb tail assemblies on board USS MAKIN ISLAND (LHD-8).

The precision weapons enabled by this computing power fundamentally changed modern warfare. Advances in targeting and guidance systems allow us to achieve much greater accuracy and lethality with far fewer weapons. Today, about 70–80 percent of guided munitions fall within ten yards of their targets. During World War II only 18 percent of U.S. bombs fell within 1,000 feet of their targets.³ Our commanders exploit this precision by using the smallest number and size of weapons possible. In addition to improving efficiency, this minimizes collateral damage—which can have a significant strategic impact in modern counterinsurgency operations. From World War II to the Gulf War, the number of bombs used to hit a fixed target decreased by a factor of 300, the number of aircraft assigned decreased by a factor of almost 400, and bombing accuracy improved by a factor of 17.⁴ Instead of sorties per aimpoint, we now commonly speak in terms of aimpoints per sortie.

The ability of a few very-precise standoff weapons to be more efficient and effective than a larger number of less-precise weapons leads to a surprising result. In modern warfare, precision standoff weapons such as Tomahawk or the joint standoff weapon are now more cost-effective in many situations than short-range gravity bombs such as the Joint Direct Attack Munition (JDAM). A Tomahawk missile, for example, costs about \$1.2 million, while a JDAM is about \$30,000. To strike a single target, however, the total training, maintenance, and operations cost to get a manned aircraft close enough to deliver the JDAM is several times higher than the cost of launching a Tomahawk at the same target from a destroyer, submarine or aircraft operating several hundred miles away. That is one of the trends leading us to focus more effort on improving and evolving our standoff sensor and munition payloads.

The Limits of Stealth

The rapid expansion of computing power also ushers in new sensors and methods that will make stealth and its advantages increasingly difficult to maintain above and below the water. First, though, military sensors will start to circumvent stealth of surface ships and aircraft through two main mechanisms:

- Operating at lower electromagnetic frequencies than stealth technologies are designed to negate, and
- Detecting the stealth platform from angles or aspects at which the platform has a higher signature.

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U.S. forces can take advantage of those developments by employing long-range sensor, weapon, and unmanned-vehicle payloads instead of using only stealth platforms and shorter-range systems to reach targets.

Stealth ships and aircraft are designed to have a small radar or infrared electromagnetic signature at specific frequencies. The frequency ranges at which stealth is designed to be most effective are those most commonly used by active radar or passive infrared detection systems. At lower frequencies detections do not normally provide the resolution or precision necessary for accurate targeting. Using more powerful information-processing, however, military forces will be able to develop target-quality data from these lower-frequency passive infrared signals or active-radar returns.⁵

The aspects at which stealth platforms are designed to have their smallest signature are those from which detection is most likely. For example, an aircraft or ship is designed to have a small signature or radar return when it is approaching a threat sensoror has a nose-on aspect. Improved computer processing will produce new techniques that can detect stealth platforms at target aspects from which they have higher radar returns. Multiple active radars, for instance, can combine their returns through a battlemanagement computer so radar detections from a stealth platform's less-stealthy side, underside, or rear aspect can be shared and correlated to allow the stealth platform to be detected and attacked. Similarly, passive radar receivers can capture the electromagnetic energy that comes from transmitters of opportunity-such as cell-phone or TV towers-and bounces off a stealth platform at a variety of angles. With better processing in the future, those weak, fragmented signals can be combined to create actionable target information.6

Those developments do not herald the end of stealth, but they do show the limits of stealth design in getting platforms close enough to use short-range weapons. Maintaining stealth in the face of new and diverse counterdetection methods would require significantly higher fiscal investments in our next generation of platforms. It is time to consider shifting our focus from platforms that rely solely on stealth to also include concepts for operating farther from adversaries using standoff weapons and unmanned systems—or employing electronic-warfare payloads to confuse or jam threat sensors rather than trying to hide from them.

Faster Refresh, Exploiting the Learning Curve

The average time required to research, develop, and construct a new U.S. ship or aircraft is now more than 15 years, or about eight cycles of Moore's Law. For example, the Arleigh Burke-class destroyer took 14 years from initial requirement to the lead ship's commissioning. That by itself is not necessarily a problem. Most of our ship and aircraft classes will be in service for decades. We should retain a deliberate, comprehensive, and effective process to design them from scratch.

Meanwhile, rapidly improving information-processing has sped up the technology *refresh* cycle. Consumer electronics are completing a generation every one to two years, and we tapped into that faster innovation cycle over the past decade with some of our off-the-shelf technology insertion efforts in surface-ship and submarine combat systems. Those initiatives, however, work at the *payload* scale, rather than on a whole platform.



Payloads offer the means to rapidly improve or integrate new capabilities into a time-tested platform, the author says, and notes that the Navy's patrol coastal boats in Bahrain, such as USS SIROCCO (PC-6), seen here, are being outfitted with Mk-38 gyro-stabilized guns and Griffin antiship missiles within just nine months of the decision to upgrade being made.



One of the most common Fleet-wide payload-centric approaches is the ubiquitous Mk-41 vertical launching system (VLS), seen here on the guided-missile cruiser USS SAN JACINTO (CG-56). The VLS was introduced in the Ticonderoga-class cruisers in 1986; today 8,372 VLS cells are mounted in the Navy's surface vessels.

Payloads offer a more rapid means to improve or integrate new capabilities into a proven platform. In contrast to the 15 to 20 years to design and deliver a new ship or aircraft, a prototype or demonstration weapon, sensor, or unmanned-vehicle payload has been developed, assembled, and installed on an existing platform in as little as a few months. In Bahrain, we are outfitting our patrol coastal ships with Mk-38 gyro-stabilized guns and Griffin antiship missiles within nine months of the decision to upgrade; in the Mediterranean, we integrated the Fire Scout unmanned air vehicle on frigates and used it for surveillance during Operation Unified Protector in Libya; and in the Middle East, within six months of identifying a need, we outfitted our deploying helicopters with upgraded Mk-54 torpedoes.

Payloads also offer a more cost-effective way to integrate capability into today's platforms. The cost of ships and aircraft has risen by as much as 500 percent (in constant dollars) since the mid-1960s. Much of that increase is due to the inherent complex

capabilities built into our platforms, not the hull or airframe itself. But once the requirements for a new ship or aircraft are locked down and the ship goes into production, the builders' learning curve enables each successive hull or airframe to be built for less cost than its predecessor. Some recent examples of this are the Virginia-class submarines, for which the builder reduced the number of construction man-hours by 30 percent from the first hull to the most recent, or Arleigh Burke-class destroyers, where cost dropped by more than 20 percent between the first and second flight. Keeping a proven hull or airframe in serial production for as long as possible gives us the largest (and longest) return on our research-and-development investment.

Taking advantage of that learning curve while ensuring each hull or airframe has relevant capability for its time requires that we look at platforms more as trucks. The truck will load and plug in successive generations of modular payloads as it goes through decades of serial production. To support that approach, we would increasingly employ standardized interfaces to plug in new sensors, weapons, and unmanned systems; and standardized links to communicate with them if they leave the truck. The design of future platforms also must take into account up front the volume, electrical power, cooling, speed, and survivability needed to effectively incorporate new payloads throughout their service lives.

First Steps

Focusing on payloads is not a completely new idea, and the Navy has pursued payload-centric capability development in the past. In most cases, however, those projects adapted a purposebuilt platform, as opposed to designing a ship or aircraft from the keel up to host changing payloads. In 1994, for example, the concept of a stealthy arsenal ship loaded with large numbers of land-attack cruise missiles was proposed, but after two years of analysis it was deemed unaffordable and terminated. About the same time, as a result of the 1994 Nuclear Posture Review the Navy removed four Ohio-class SSBNs from service. Seeing an

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opportunity to continue using those ships, in 2002 the Navy began converting them into guided-missile submarines—SSGNs. The adaptation allowed the SSGNs to carry new payloads of missiles (up to 154 Tomahawk land-attack cruise missiles, or TLAM) and special operations forces (SOF), effectively becoming an arsenal ship.

Today we are planning to replace the SSGNs' TLAM capacity when they retire with the Virginia payload module (VPM), integrated into Virginia-class SSNs already in serial production. VPMs will be designed to host a variety of payloads beyond TLAM to include large-displacement unmanned underwater vehicles and SOF operators and their systems. VPMs will more than triple the missile capacity of our current Virginia-class SSNs (from 12 to 40 TLAMs) and provide access from inside the submarine to service VPM payloads.

We also have taken a payload-centric approach in some aspects of surface-ship design. Armored box launchers for Tomahawk missiles were fielded in the early 1980s on battleships and nuclear-powered cruisers. This system evolved into the Mk-41 vertical launching system (VLS) introduced on Ticonderoga-class cruisers in 1986 and retrofitted on some Spruance-class destroyers. VLS is a modularized below-deck launcher with standard cell sizes and standard interfaces for power, cooling, and computing, This standardization allowed rapid integration of new weapon payloads over the ships' life. Aboard cruisers, VLS payload options expanded from TLAM in 1986 to now include the standard missile family (SM-2, SM-3, and SM-6) and ASW rockets (ASROC). VLS is the main battery of Arleigh Burke-class destroyers, and in addition to SM-family missiles and ASROC now includes the Evolved Sea Sparrow Missile for short-range air defense. Today, 8,372 VLS cells are deployed in the U.S. surface fleet, each of which can hold a growing range of payloads. VLS is also deployed in 11 allied navies, providing opportunities to pool weapons and other payloads in Europe or East Asia for all VLS users. This is a cost-effective model to integrate new payloads aboard proven platforms and well worth the upfront investment in ship power, cooling, and standard interfaces.

We also are in the early stages of incorporating unmanned payloads on our manned ships to further expand their reach on, above, and below the sea. Starting in 2005, we began equipping amphibious ships (LPDs, LSDs, and LHAs) and destroyers with the Scan Eagle UAV under a services contract for maritime and littoral intelligence, surveillance, and reconnaissance (ISR). Operating for up to 15 hours at a nominal range of 50 nautical miles from its host platform, Scan Eagle provides critical and unobtrusive day and night imagery in support of counterterrorism, counterpiracy, surface warfare, and irregular warfare missions—as well as helping to uncover other illicit activities at sea.



The next generation of the Fire Scout vertical takeoff unmanned aerial vehicle, the MQ-8C Fire-X, will be introduced next year, incorporating a helicopter airframe with greater range and capacity, allowing it to perform surveillance and strike missions. The Fire-X is seen here in its first fully autonomous flight, in December 2010 in Arizona.

The MQ-8B Fire Scout vertical take-off UAV debuted in 2009 aboard frigates to support a range of ISR missions, including service in Operation Unified Protector in Libya and in support of counterpiracy operations around Africa. We will introduce an improved MQ-8C (Fire-X) UAV next year that uses a helicopter airframe with greater range and capacity—allowing it to conduct surveillance and strike missions in support of special-operations forces. The control systems for Scan Eagle and Fire Scout can be removed and reinstalled in a relatively short time for deployment, making them an effective way to rapidly change the capability of the host platform.

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Aircraft naturally lend themselves to a payload focus, because they are designed with hard points and junctions into which a number of modular payloads can be connected. The F/A-18 Hornet, for example, can carry a wide range of weapons or sensors, from antiship Harpoon missiles and targeting pods to antiair advanced medium range air-to-air missiles. Similarly, the P-8A Poseidon maritime patrol aircraft will be able to carry torpedoes, Harpoon missiles, bombs, and sonobuoys that can evolve over time to address changing threats or incorporate new technologies.



The Navy's newest patrol aircraft, the P-8A Poseidon, is slated to carry torpedoes, Harpoon missiles, bombs, and sonobuoys—payloads, the author notes, "that can evolve over time to address changing threats or incorporate new technologies.

Those examples are certainly moving us in the right direction. We will continue to work to decouple payload development from platform development and design platforms from the start to accommodate a changing portfolio of payloads. This will allow us to build the same hulls and airframes for decades and exploit the industrial learning curve while still evolving our capabilities to keep our warfighting edge against improving adversaries. In particular, we need longer-range weapons to allow platforms to reach our foes despite their improvements in sensors. We need more capable and more numerous electronic-warfare and cyber payloads to thwart detection and targeting. We need unmanned payloads that expand the reach of today's platforms both for sensing and attack. And we need volume in our platforms to accommodate the people and equipment for new missions.



The first "keel up" application of a payload focus is the littoral combat ship, whose operational concept will be evaluated in a relevant environment next year when USS FREEDOM is sent to Singapore. Here, a rigid hull inflatable boat—one element of FREEDOM's surface warfare mission package—is recovered in her versatile mission bay.

Moving Forward

Our first *keel up* application of a payload focus is the littoral combat ship (LCS). The heart of the LCS's payload flexibility is its interface-control document (ICD). That ICD specifies how payloads plug into ship computer networks, power, and cooling, and describes the space available to host new payloads and operators. Similar to the USB port on today's personal computers, the ICD provides a common reference for payload developers seeking to design mission packages for an LCS. We are currently developing surface warfare, mine warfare, and antisubmarine warfare mission packages for the LCS. With the ICD, the payloads within these mission packages can evolve over time to take advantage of new technologies or to address new threats.

We plan to send the Freedom (LCS-1) to Singapore early next year to evaluate the LCS operational concept, including the SUW mission package, in a relevant operational environment. The adaptability of the LCS to new payloads allows us to adjust the

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systems in the mission package based on the lessons learned from this deployment and future operations. We will need to be disciplined in modifying payloads, however, to avoid introducing new cost increases through too-frequent modifications.

We will use reserve capacity and standardized interfaces to introduce a range of payloads in new platforms such as the mobile landing platform (two of which will be built to serve as an afloat forward staging base), joint high-speed vessel, and P-8A. We will also look to employ a changing set of payloads on our existing amphibious ships, destroyers, aircraft carriers, and submarines.

Affordably Keeping Our Warfighting Edge

Decoupling the development of payloads from the development of platforms is an imperative for us to take advantage of the fundamental trends shaping our operating environment. Technology, especially information-processing, will continue to evolve more quickly and become more widely available, while new ship and aircraft classes likely will continue to require more than a decade to join the Fleet. We appear to be reaching the limits of how much a platform's inherent stealth can affordably get it close enough to survey or attack adversaries. And our fiscal situation will continue to require difficult trade-offs, requiring us to look for new ways to control costs while remaining relevant.

Common hulls and airframes will decrease and stabilize shipbuilding and aircraft construction costs through the learning curve of serial production. At the same time, shifting to modular payloads as the primary source of capability enables us to more rapidly and affordably incorporate new technology. Just as Apple's fleet of platforms has provided incentives for the development of new *apps* and peripheral devices that easily plug into its operating system, the Navy can spur the development of new capabilities and payloads to plug into the Fleet. This model will help us to maintain our warfighting edge, build the Fleet capacity that keeps us forward, and improve our readiness for today's missions. We will work together with our industry partners to put this concept into action, so our Navy can continue to sustainably protect our nation's security and prosperity.

ENDNOTES

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3. Robert A. Pape, "The True Worth of Air Power," Foreign Affairs, 83.2 (2004) 116.

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5. Bill Sweetman, "Stealth Threat," Popular Science, December 2001, www.popsci. com/military-aviation-space/article/2001-12/stealth-threat. See also Arend G. Westra, "Radar versus Stealth," Joint Forces Quarterly, 55 (2009) 136– 143.

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NUCLEAR CHALLENGES FOR THE NEXT ADMINISTRATION'

AMBASSADOR LINTON BROOKS

Ambassador Brooks (Captain (ret)) is a retired submarine officer with significant duty in both SSNs and SSBNs. While on post-command active duty he had extensive nuclear policy experience in the Office of the Secretary of Defense and on the CNO's staff. After retirement from the Navy he was Chief Negotiator of the START I Treaty. He served for five years as Administrator of the National Nuclear Security Administration during the George W. Bush Administration.

The November Presidential election will be decided entirely on issues other than nuclear weapons policy. I'm willing to bet that not a single human being in the country will make his or her decision based on views about nuclear policy. And yet, the election will make a significant difference for nuclear weapons policy, not just because of who becomes president, but because of who the cabinet and sub-cabinet officers are.

Because nuclear weapons underpin American strength and pose—at least in theory—the only real challenge to America's survival, they are inherently important to security professionals, if not always to voters. So I want to walk through the nuclear issues that whoever is running the federal government on January 21st 2013 is going to face. In doing so, I will discuss which of those issues are likely to have solutions, and which aren't. One of the biggest myths in Washington is that just because you can describe a problem, that proves there's a solution. Those of you who want a really good example, should think of Iran.

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¹ Adapted from a June 28, 2012 presentation to The Peter Huessy and ROA-AFA-NDIA Congressional Breakfast Seminar Series on Nuclear Deterrence, Arms Control, Missile Defense, Defense Policy and Homeland Security.

So let me give you a thought experiment. It's January 21st and you are the national security adviser, either because you're who Governor Romney picked or because Tom Donilon decided to go do something else and the President was looking around. You're trying to answer the question, "what are the nuclear issues that I'm going to have to worry about?" What follows is a partial list.

An immediate—and significant—issue the next president will have to face is funding for the nuclear weapons complex. This administration significantly increased the funding for the Department of Energy Nuclear Security Enterprise (as we now call it) and then was strong-armed by the Senate during the New START ratification debate into increasing it still further. Subsequently, the fallout from the Budget Control Act unincreased it. The Administration responded to the fiscal challenge in a way that I wish I'd had the guts to do when I was the National Nuclear Security Administration Administrator. Rather than stretch out a whole bunch of projects, they selected one major project and deferred it for several years. That's the kind of tough choice everybody advocates making, until someone actually makes it, and then people get a little grumpy.

The first nuclear budget issue facing the new administration is whether the Chemical, Metallurgical, Radiological Replacement Facility (CMR-R) in Los Alamos, should be built. It probably should, but not for any of the reasons that people are arguing about. It's basically a facility that will help continue to keep us up to date in plutonium science. It's not a pit production facility. Los Alamos makes pits (the plutonium triggers for nuclear weapons) next door.

If built, CMR-R will enable increasing the pit production rate. Right now we've demonstrated a rate of pit production of 20 a year for a brief period and can probably produce 30 a year. Studies suggest that with CMR-R the nation could make 50 to 80 pits a year. The question is, do you care about that difference enough to increase the weapons budget? And I invite your attention to the fact that we have thousands of pits we've already made that are sitting in storage in Texas, although adapting them to current weapons may pose some challenges. Deferring CMR-R is a risk,

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but probably more to long-term scientific health than to force structure.

The other major nuclear budget issue facing the new administration, which does pose a risk to force structure, is the life extension program for the B-61 bomb. The B-61 bomb comes in a couple of variants, and the variant that has gotten all the attention is the one that's deployed in Europe. But our strategic arsenal depends, in part, on another variant of the same basic bomb.

The life extension program for the B61 is probably underfunded, widely believed to be in disarray, and requires both some real management attention, which it's now getting, and some real money, which we'll have to see whether it gets. So you're the national security adviser and you're faced with either throwing more money at an area or accepting more risk, and how do you decide which to do?

Now we get to the first of the issues where the election result clearly matters—de-alerting. De-alerting is intended to increase the time it takes to launch primarily ICBMS (although the purists want to do it for submarines as well) because requiring more time to respond to an attack on the United States will prevent an overreaction.

That may have had some logic when we had a lot of ICBMs with multiple warheads. It has no logic on the U.S. side for single re-entry vehicle ICBMs. Further, there's no evidence that the Russians will follow us in de-alerting because they are so heavily reliant on ICBMs.

De-alerting was initially a formal part of the Obama administration position, but got walked back very elegantly in the Nuclear Posture Review. It keeps popping up, however. I think dealerting is a solution looking for a problem, but there are smart people who don't and some of them keep raising the issue. So if you're the national security adviser and you come from a new administration, your problem is how do I put a stake in the heart of de-alerting so we can concentrate on other things? If you come from this administration, doing something about decision time is an IOU that you don't quite know how to deliver on.

An area that is much more important is our nuclear relation with the Russian Federation. You probably can't find very many people who worry about Russia as a military threat. But if you look at the Russian military doctrine, you will find that of their top ten threats six of them are associated with the United States and NATO. Whether that's sensible or not it appears to be the way they really think.

This is likely to pose issues for the next administration in two places. First, the Russians are fanatically paranoid about ballistic missile defense. Russians have always had a very high regard for American technology. Because they are worst-case planners, they also have a tendency to take today's view graphs and act as though those programs are already here.

So the Russians look at our Phased Adaptive Approach in Europe, which is a four-step process built around increasingly capable variants of a Navy missile called the SM-3. They look at the final phase, which we claim will arrive around 2020, although budget realities will probably push that considerably to the right. The Russians appear to have convinced themselves that this fourth phase could pose at least some threat to their ICBMs.

But then they say, we know how America works. You won't stop with phase four. There'll be a phase five. There'll be a phase six. And you will have all this momentum and all these basing agreements in place with European states and you will expand numbers and you really will threaten our deterrent.

And therefore, even though what America plans in the next five years is aimed at missiles that Russia doesn't have and we don't have—so you would think there would be no risk in cooperating—Russia is unwilling to do anything without binding, formal guarantees that American ballistic missile defense isn't aimed at them. And they say they will only believe those guarantees if America limits the performance of its defensive missiles in a legal way, particularly by limiting the interceptor speed and a few other parameters.

The current administration has absolutely no interest in doing this. The people I know who think they're going to be part of the next administration have even less interest in doing this.

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And there is no chance of the Senate ratifying any agreement to limit ballistic missile defenses in any manner.

President Putin, who is going to be the president of Russia for the next six years, has said solving ballistic missile defense is a prerequisite for doing anything else in arms control. So if you're the national security adviser in January, your problem is not "what's the next step in arms control?" You may or may not need to have a proposed next step for international and domestic political reasons, but that's not your real problem. Your real problem is, what do you do, given that there's not going to be any new arms control? Transparency is the suggestion du jour, but the Russians show little interest.

Now this does not mean arms control with Russia is dead. Russia will not want New START to expire without something replacing it. Four years from now when we're talking about the 2016 election, we can say with a straight face that whoever is elected will have to deal with a Russian arms control plan. But in the next term the odds of anything meaningful happening on the arms control front with Russia are very small.

At the same time, the odds of our going forward with NATO missile defense are pretty large. And therefore, what the next national security adviser has to do is try and prevent the impasse on arms control and missile defense from inhibiting cooperation with Russia in areas where we might be able to make some progress.

That brings us to NATO. The next national security adviser, like the current one, like the last one, will have to face the difficulty that every time NATO is asked about whether it wants U.S. nuclear weapons in Europe, NATO governments unanimously answers "yes." But influential Americans, who believe they understand *real* European attitudes better than the U.S. government does, claim that the NATO governments don't really represent the public attitude in their countries.

These individuals periodically assert that *everybody* wants U.S. nuclear weapons out of Europe, so we ought to reexamine the issue. It's not unknown in the political arena to not like the answers but to keep asking the question. But twice in the last three

years NATO nations have had the chance and have unanimously endorsed retaining nuclear weapons. And most recently at the Chicago summit, they said that the decision to change it would be a decision that had to be made by consensus, which is actually stronger than NATO has said in the past.

So what the next national security adviser will have to do is ask "how do I get the arms control community to stop focusing on this so I can pay attention to the things that actually matter for the defense of the country?" If there were a major negotiation with Russia, then there might be a real issue about whether removal of weapons would be an acceptable outcome to that negotiation. But the idea that somehow we really have to make our NATO allies happy by unilaterally removing weapons that some of them really care about a lot and all of them formally endorsed strikes me as odd.

In part, this point of view is odd because it is a failure to recognize that extended deterrence—that is the notion that our allies are in some sense protected by American military strength, including American nuclear strength—is still real for our allies. We need to take their views seriously.

There is a recent report by the organization Global Zero that got a fair amount of press because the former JCS Vice Chairman, General *Hoss* Cartwright, was one of the authors. It says that extended deterrence can be done entirely based on American conventional superiority. General Cartwright has had more thoughtful ideas driving to work than most people have in a lifetime, but I believe he is wrong on this. The French nuclear expert Bruno Tertrais has written that there are monuments to the failure of conventional deterrence in every French village. He's right. Conventional deterrence is important, but it has not got a perfect track record.

Our allies think that the nuclear component is important. They don't think that there's going to be a nuclear war with the Russian Federation. But some of them are not entirely comfortable with living next door to a great big Russia. Remember, Latvia, Estonia and Lithuania were part of the Soviet Union and have uneasy relations with their big neighbor. When they joined NATO they

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didn't just do it because they liked the meetings. They did it because they thought they wanted to be part of a collective security alliance and that collective security alliance is inherently nuclear.

Extended deterrence means convincing the Russians that we'll fight if they attack one of our allies. Conventional weapons may be enough to do this. But reassurance—convincing our allies we will defend them if they are attacked—may be difficult. We spent a huge amount of time and energy during the Cold War trying to convince our European allies that we would risk the destruction of the United States to protect them. Today, Russia could devastate the United States. We need to continue to work to convince our European allies that we would still risk that to protect them. The next national security adviser is going to have to deal with ensuring extended deterrence remains credible. It's already credible to Russia and China. How do we make it credible to our allies? Retaining U.S. nuclear weapons in Europe is one way we symbolize that credibility.

So the national security adviser designate is sitting there and says that's a pretty good list. Is there anything else? And obviously, now we get into the hard issues.

Iran. Are we going to use military force in Iran? I don't know. The press tells us 2013 is the year we're going to have to decide that question but last year some in the press told us that 2012 was the year we needed a decision.

The problem with military force is that because the Iranians have a widely dispersed program the best a military strike can do is set the program back. And the price for setting the program back could be significant. Many believe Iran has not yet made a final decision to actually deploy a nuclear weapon and that there is disagreement within the government over whether to do so. But nothing unites a people more than being attacked. An attack could make the nuclear acquisition decision easy.

So you're the national security adviser and you've got a tough problem. Washington has seen study group after study group that starts by trying to figure out what we're going to do if Iran gets a nuclear weapon. And on about day two they decide this is too hard

and they say let's figure out how to keep Iran from getting a nuclear weapon. And by day three they've degenerated to calling for doing what we're doing now but do it better. Recall my previous comment that not all problems have solutions.

You're the national security adviser and if you can't find a way to stop Iran, you're going to have to help the president decide what to do about an Iran that has a substantial capability. Can we live with that? Can we live with an Iran that can enrich uranium to—pick your level—which means it's closer to a weapon? Can we live with an Iran that continues to test ballistic missiles? The truth is, you don't care very much whether Iran has a nuclear weapon. You care a lot if Iran has a nuclear weapon it can deliver on U.S. allies or U.S. forces or the U.S. homeland.

So the national security adviser will probably hedge his or her bets by saying we've absolutely got to continue with plans for missile defense in Europe to protect our allies and forces. And then who knows what he or she will decide to do with Iran. The history of the last 10 years is whoever is in power, the people out of power say what you're doing on Iran isn't working. And then we change teams and the people who are now out say what the people who are now in are doing isn't working. And they're both right.

But the national security adviser has another hard problem, and that is Pakistan. I don't subscribe to alarmist views that Pakistan is on the verge of breaking up. But it is clear that relations between the United States and the government of Pakistan are as bad as they've been at any time since I've been paying attention. And it is clear that Pakistan is on its way to being a very substantial nuclear power. And finally, it's clear that Pakistan depends for its deterrent effect on what Thomas Schelling referred to as "the risk that leaves something to chance."

There are people in Pakistan who would not be averse to seeing nuclear weapons in the hands of all sorts of people. Those people aren't running Pakistan. Still less are they running the army. But if you're the national security adviser you'll probably want to worry about them.

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You'll also worry about North Korea. It is unlikely to use nuclear weapons but has shown a great willingness to proliferate. Would that extend to transferring nuclear weapons? Would we know? North Korea is another case where the problem is far clearer than the solution. Military action risks retaliation against our South Korean ally. China probably fears regime collapse more than it fears a nuclear North Korea and will thus limit our flexibility.

Since these are all hard problems, as national security advisor you would like to avoid similar future cases. So you look back at a theory which this administration has embraced and its predecessor did not. The theory goes like this. If the United States shows that we are serious about our commitments to disarmament under the Nuclear Nonproliferation Treaty, it will be easier to mobilize responsible states to take actions to suppress proliferation. The theory gets mischaracterized as claiming that if we disarm then Iran will not be interested in nuclear weapons. That's nonsense. Nobody believes that.

The real argument claims that if we show we're serious about making progress toward disarmament it will be easier to get states to agree that even though they make good money from selling things to Iran, Myanmar, Syria—whoever the bad guy of the day is—they will give up that business in the interest of nonproliferation. That's the argument. Unfortunately, it assumes, as the lawyers say, facts not in evidence. The argument sounds right. Smart people say it is right. But we really don't have any good empirical evidence.

In some ways the next national security adviser would face an easier time if the argument isn't right. Four years after President Obama's Prague speech the world is no closer to real progress on disarmament. There's not going to be a ratified Comprehensive Nuclear Test Ban Treaty (CTBT) in the next term, maybe the next two terms. There's not going to be a fissile material cutoff treaty for a long time. I assert there's not going to be any more East-West arms control for a few years. Advocates of building international nonproliferation cooperation on the basis of superpower restraint are not going to have an easy next few years.

And if you're the national security adviser you have to figure out what to do about that.

By now our hypothetical national security advisor is wondering why he or she took the job. But there is one more nuclear issue, one that deserves a longer discussion. That's the question of China. China has a very minimal deterrent they call *lean and effective*. They asset they only need to be able to reliably deliver a very small number—maybe a single digit number—of warheads to the United States in retaliation for an attack. Much of their modernization can be explained by a desire to preserve that capability.

They're moving to ballistic missiles at sea for survivability. The so-called Great Wall tunnel system got a lot of press in early as though it had just been discovered. It's not new; the Chinese announced it several years ago. But it's a huge investment in mobile missile protection by a long series of tunnels.

When they talk to Americans, Chinese experts often stress that their forces are aimed at the United States homeland as a deterrent, not at U.S. forces abroad or U.S. allies. Our Japanese allies are not quite as convinced of that, which is why the earlier discussion of extended deterrence, reassurance and missile defense apply to Asia as well.

China claims a no first use policy. I am skeptical of no first use policies, but in this particular case there is evidence it really is the way they think internally. They have no warning system at all. So they clearly are dependent on survivable systems that can retaliate after an attack.

They maintain very low peacetime readiness. And their attitude towards transparency—and this is where we get into tensions with them—is very clear and probably what we would have if the situation were reversed. Here's their attitude: the United States needs to be transparent because it's big and powerful and it needs to show it is not threatening. China is weak and it is unrealistic of you Americans to expect that we will reveal exactly how weak we are. So while Americans say transparency leads to predictability which in turn leads to stability, the Chinese say transparency reveals vulnerability and thus leads to instability. Besides, the

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Chinese claim that at the strategic level they're completely transparent: they have a minimal deterrent and a policy of no first use. As they say, "What else do you need to know?"

The Chinese worry a lot that we don't acknowledge the reality that they have an effective, though small, deterrent against the United States. Their buzz word for this is *accepting mutual vulnerability*. This is a problem within the United States. There is consensus between the two political parties on the value of ballistic missile defense to defend against North Korea and Iran. There is consensus in both parties (with a few dissenters) that it is not within our ability to deploy a ballistic missile defense that can prevent Russia from devastating the United States, and therefore we will have to continue to depend on deterrence.

There is not consensus on whether we should think of China as a small Russia to be deterred—that is regard mutual vulnerability as a fact of life—or a large rogue where we could defend the country if we chose to—that is, regard mutual vulnerability as a policy choice. This administration's clear belief is it's a fact of life, but they're unwilling to say so. If Republicans control the next administration, many of them may believe it is a policy choice. But it's not clear that they're going to try to give national missile defense a capability against China. The George W. Bush administration chose not to.

This will be a complex issue for the national security adviser. Some think (full disclosure, I am one of them) that the competition with China is going to dominate the 21st century, but the nuclear aspect of it is secondary. In this view, we should not focus on nuclear policy but on cyber and space and anti-access and economics. But others think that China aspires to be the new Soviet Union, that there's going to be a sprint to parity and that we really don't know how large a nuclear force is in those tunnels. The risk for the national security adviser is we'll have the rhetoric that we can't accept vulnerability, which will encourage the Chinese to build up, but we won't actually invest the money in missile defense.

The final thought that will occur to you when you're the national security adviser is this. Nuclear weapons policy has been

remarkably consistent between administrations. Specialists see a lot of change in nuances, but in fact, at any reasonable level of discussion there's a huge amount of consistency. This is not true for arms control policy. There, there are real differences. But for actual nuclear policy, there's consistency.

The biggest challenge for the new national security adviser, the biggest challenge for the next president, the biggest challenge for national security professionals, is to guard against the tendency to make issues that have been the subject of consensus split along partisan lines. It is not in our interest to have competing political party views of the fundamental nature of American power and deterrence, especially in a society that's reasonably closely divided on domestic issues so the parties are going to take turns being in power. It is crucial to rebuild the consensus that we have had historically on issues associated with nuclear policy. If you find yourself in January 2013 as national security advisor, doing so will be your most urgent and most important nuclear task.

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SUBMARINE VETERANS OF WORLD WAR II CLOSING CEREMONY

REMARKS GIVEN BY VADM AL KONETZNI, USN(RET)

7 SEPTEMBER 2012 NORFOLK, VIRGINIA

t all started on December 7th 1941, the Day of Infamy. After the Japanese attack on Pearl Harbor, many of our Navy men were left with a feeling of deep, PERSONAL loss. For several days after the attack a heavy pall of gray smoke hung like fog over the entire harbor and the Navy shipyard. And as veterans sailed slowly past Battleship Row and viewed the horrifying destruction: ARIZONA, on the bottom; OKLAHOMA, capsized and keel up; WEST VIRGINIA: CALIFORNIA. MARYLAND; PENNSYLVANIA; TENNESSEE; and others, all heavily damaged and some still burning with smoke pouring from their bowels, they just stood at the rail and did not speak. These were not ships that belonged to some remote population back in the States who just happened to have built them and paid for them with their tax money. Many felt, "This is MY Navy and these are MY ships and the Japanese have destroyed them." It left a sense of fury that for some never entirely abated.

And then the war progressed...and one by one, 52 of our submarines were sent to the bottom. And now the sense of loss became even more personal and many said, "Those were MY shipmates." This is a story that had to be told. It is a story of great suffering, a story of tremendous sacrifice, a story of heroic achievement. To that end the US Submarine Veterans of World War II was established in 1955.

There is a tiny island out in the Pacific. It's one of a small group of islands known as French Frigate Shoals. It lies about halfway between Pearl Harbor and Midway Island. Those of you who were involved with the navigation of our boats; you who were officers, quartermasters, or signal men, will them clearly
because you passed them either to port or starboard whenever you put in or out of Pearl on war patrol. On this tiny island is an abandoned Coast Guard Station. One of its former occupants was so taken by the beauty and serenity of the place that he left a note in a wooden box which was subsequently recovered and recorded. The message of this note, with some modification, is an appropriate addition to each of the submarine memorials. It would impress upon future generations your purpose in putting them there. Here is the message:

> Walk softly. Walk softly stranger. You stand on holy ground.

As you journey across this broad and beautiful land from sea to shining sea, you cannot help being moved by the wonder of the things you see:

Historic New England with its rocky coast and frothy surf, still breathing an aura of whaling ships and sailing days; the majestic mountains of the west with their towering peaks and pink spires and sun gleaming off granite cliffs rising shear for thousands of feet; the grandeur of the old south with flowering trees and scented air and golden beaches that dazzle the eye; the dynamic west coast with its cloud-piercing mountains looming over the shore and curving roads that overlook the sea.

This is the beauty that is America, the wonder that is America. It is your God-given inheritance to use and enjoy at your pleasure. But these pathways to the good life did not come free of charge. More than a million Americans down through the yellowing pages of history have sacrificed their lives for your irreplaceable legacy and your American way of life. For more than 3,500 of these who gave their lives on American submarines in World War II, there can be no rows of polished markers. Their tombs are buried in the

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silent depths of the oceans, forever rocked by the eternal tides of history.

Every country owes an enormous debt to those heroes who have given their lives to protect the freedom of its people.

You, our Submarine Veterans of World War II helped our great Nation understand the sacrifice, professionalism, and the camaraderie that come with being a Submariner in the Great War. You kept the flame burning bright by establishing the Submarine Veterans of World War II.

In September 1955, approximately 60 of you registered for the first meeting in Atlantic City, New Jersey. The actual attendance was about 25. You decided then to establish an annual reunion to perpetuate the memories of all submarine veterans who served in World War II. The organization was granted it's first incorporation papers on February 15, 1956 in the state of New Jersey. The name of the papers was *Submarine Veterans of World War II*. The title caused some initial concern as it attracted men who had served in submarines from other countries. The name was changed to include *U.S.*

At the San Diego reunion in 1960, the first application was made for a Federal Charter. After 21 years of hard work, a Federal Charter was granted in November 1981. At that time you had United States President Ronald Reagan and Vice President George Bush to thank for approving the Federal Charter. Following the sixth annual reunion, membership grew rapidly. Each state, to commemorate the loss of at least one submarine during World War II, was designated a lost-boat to represent their state in setting up a Memorial to their lost Submarine Veterans.

As a result, memorials have been erected throughout the country in various forms. There are plaques, torpedoes, WWII Submarine Conning Towers, and actual restored submarines for visitors and gravestone markers for families of deceased; all providing a wonderful history of the sacrifices of our World War II Submariners.

In closing, there is a story...a story not easy to tell. And yet one that must be told. There was no one in the entertainment field more admired and appreciated by the American G.I. than Bob Hope. Bob was once asked why he did it; why he continued to travel all over the world, giving so much of his time and energy to entertain our troops. And his answer was this: "Because you've got to be there! You can read about it in the press, or you can see it on the screen, but if you really want to know what our boys are going through, you've got to be there." And so it was with you.

World War II has been well documented; stories, books, movies but the full story of the submarine service has never been told... nor can it be. Can gut—wrenching fear be recorded by a camera? Can interminable fatigue and discomfort that goes on for days and weeks on end? And what about dedication to duty.... and the deep fraternal bond that was forged only among men who took our submarines to war? We know they can't... and this was the story of the submarine service.

And now as YOU look back on it, I suspect it's like an observer of a darkened stage; all the players are gone and the huge theater is empty. And yet, out of the emptiness, there still echoes the excitement, the laughter, and the sadness that was part of the play. But supposing our observer should leave the theater and step out onto the busy street. Would a passing stranger be able to understand his faint half-smile as he recalls some cheerful part of the story? Or would that stranger be able to hear the haunting melody of the theme that keeps echoing through the background of his mind? To understand it you had to be a part of it, you had to be there.

You, Shipmates, were there! You were in the theatre! You experienced the horror, you lost 3,500 Shipmates; you defeated the enemy!

We all owe you great homage. As you close the US Submarines Veterans of World War II Charter, please know that we who have followed you will never forget your valor, camaraderie, or professionalism. Your exploits will only grow in stature. You have taught succeeding generations well regarding patriotism and taking care of others. If it is true that you can define leadership by

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authenticity and community support-then you need to know that your organization truly invented what we call leadership.

Thanks to you Submarine Veterans of World War II, thanks to your Spouses and families for what they endured, you were there! God Bless you and God Bless America.

THE SUBMARINE REVIEW

THE SUBMARINE REVIEW is a quarterly publication of the Naval Submarine League. It is a forum for discussion of submarine matters, be they of past, present or future aspects of the ships, weapons and men who train and carry out undersea warfare. It is the intention of the REVIEW to reflect not only the views of Naval Submarine League members but of all who are interested in submarining.

Articles for this magazine will be accepted on any subject closely related to submarine matters. Article length should be no longer than 2500 to 3000 words. Subjects requiring longer treatment should be prepared in parts for sequential publication. Electronic submission is preferred with either MS Word as an acceptable system. If paper copy is submitted, an accompanying CD will be of significant assistance. Content, timing and originality of thought are of first importance in the selection of articles for the REVIEW.

A stipend of up to \$200.00 will be paid for each major article published. For shorter Reflections, Sea Stories, etc., \$100.00 is usual. Book reviewers are awarded \$52.00, which is that special figure to honor the U.S. submarines lost during World War II. Annually, three articles are selected for special recognition and an additional honorarium of up to \$400.00 will be awarded to the authors. Articles accepted for publication in the REVIEW become the property of the Naval Submarine League. The views expressed by the authors are their own and are not to be construed to be those of the Naval Submarine League. In those instances where the NSL has taken and published an official position or view, specific reference to that fact will accompany the article.

Comments on articles and brief discussion items are welcomed to make THE SUBMARINE REVIEW a dynamic reflection of the League's interest in submarines. The success of this magazine is up to those persons who have such a dedicated interest in submarines that they want to keep alive the submarine past, help with present submarine problems and be influential in guiding the future of submarines in the U.S. Navy.

Articles should be submitted to the Editor, SUBMARINE REVIEW, P.O. Box 1146, Annandale, VA 22003.

ARTICLES

BEFORE AND AFTER OUTLAW SHARK¹

by Dr. Robert L. Hess and RADM Jerry Holland, USN(Ret)

Dr. Robert L. Hess was the Navy's principal representative on the joint Secretary of Defense and Director of Central Intelligence Committee to identify operational requirements for satellites and other surveillance. He served as a naval officer and civilian in numerous positions related to the development of Over-the-Horizon Targeting.

Rear Admiral Holland is a frequent contributor to the Submarine Review. A Life Member of the Submarine League and the Naval Historical Foundation, he is presently Vice President of the NHF.

The participants in and audience members at the annual History Symposium held 24 April at the National War College added new information and included a number of observations about Over-The-Horizon Targeting that clarified and expanded on the article on this subject published in the Winter 2012 <u>SUBMARINE</u> <u>REVIEW</u>. This essay reflects that discussion.²

In the early 1970s the Navy explored how to use intelligence provided by national satellites and other third-party sources in an experiment under the auspices of the Reconnaissance, Electronic Warfare, Special Projects and Naval Intelligence Systems Support Office (REWSON) of the then Naval Material Command. The initial demonstration to deliver information from national satellites and other systems to an aircraft carrier in Project

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OUTLAW HAWK, conducted in 1972, required special communications and compartmented security clearances for every person involved. The project worked, but difficulties dimmed the results. These difficulties were both systemic and procedural; e.g. long sensor processing times, incompatible communications' interfaces, non-compatible automated data formats, security restrictions, etc... Some messages did not arrive on board due to communications interruptions and interface failures, much was stranded in the Special Intelligence compartment (*behind the green door*) never reaching operational personnel, and because the information was received in unfamiliar formats, correlating the received intelligence with the task force's organic sensors was hard. The resulting information latency, the delay between sensing and delivery to the user, was so long that the data was useless except for post-exercise analysis.

Though the results of the exercise seemed disappointing, Vice Admiral Philip A. Beshany, USN, then Deputy Chief of Naval Operations for Submarines (OP-02), pressed on to develop the potential demonstrated by this exercise. From his direction, OUTLAW SHARK was born. A team starting in Lockheed, subsequently to become the Tiburon Corporation, were the prime developers. Their design, as discussed in the previous essay, was to automatically filter and display contact reports from remote sensors (satellites, HF/DF networks, maritime patrol aircraft, and SOSUS), sorting and assembling this locating data into target tracks.

About the same time, the National Reconnaissance Office (NRO) established a Navy-directed program to develop an ocean surveillance satellite system. Highly covert, this program was managed by the Special Project Office (SPO) of the Naval Electronics Systems Command (NAVELEX). The surveillance satellites developed in this program were fielded during the 1970s and early 1980s and grew into an important source of wide-area surveillance for tactical users of all services. Information products of this system were disseminated not only to Navy and national intelligence fusion centers ashore, but also to deployed Navy

commanders, ships, and submarines. The details of the system are still classified.

Recognition that surveillance satellites could help solve the over the horizon targeting (OTH-T) problem for the Tomahawk Anti-ship Missile (TASM) evidently was universal but was resisted by various Navy factions for programmatic reasons. If a space based system to target the TASM was identified as a formal requirement, the entire cost of such a system might be assigned to the Navy, jeopardizing other acquisition. The naval aviation community feared data from such a system would argue against the justification for surveillance and maritime patrol aircraft, both land and carrier based. And finally, platform sponsors (surface and submarine) worried that the cost of a major command and control complex needed to target the weapons would be charged to these platform sponsors.

Further impetus for the space program came in 1976 when Congress gave the Navy one-year to present a plan for developing the solution for targeting TASM or risk losing all funding for that program. Such a plan was presented the next year that included using multiple sources of information, developing correlation techniques like those later tested in OUTLAW SHARK and developing a space based radar. To execute the plan, the Over the Horizon Detection, Classification and Targeting (OTH DC&T) Project Office was established under the Command and Control Division (PME 108) of the Naval Electronics System Command.

Coincidentally a joint directive from the Secretary of Defense and the Director of Central Intelligence ordered all services and agencies to identify future requirements for space based systems other than imaging. This effort gave birth to the Tactical Exploitation of National Capabilities (TENCAP) where variously managed and sponsored programs and systems were to bring intelligence information from national sensors to operational users. The operational tasks identified by the Navy in this study included ocean surveillance of ships, submarines and aircraft, anti-ship targeting, aircraft early warning, and targeting of mobile land based weapons.

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Support was not universal within the Navy. Many were concerned that becoming dependent on national systems during peace might leave naval forces without the support on which they had learned to rely and on which they had trained because of the high probability that such national sensors would likely be diverted to other purposes during crises. To alleviate this concern, the Navy insisted that any national surveillance system to be used for fleet tactical support would have to be designed in such a way that it would provide coverage continuously everywhere in the world the Navy operated without any need to task the system for specific information or geographic coverage. Additionally, the Navy wanted any future system to deliver its contact reports at security levels and in formats that not only could be used directly by tactical operators but eventually could be automatically processed by existing or programmed Navy and joint tactical data systems.³

The champions of these requirements were Vice Admiral Edward Waller, then Director for Anti-Submarine Warfare in the Office of the Chief of Naval Operations (OP 095), and David Mann, then Assistant Secretary of the Navy for Research, Engineering and Systems. Providing off-board sensor data directly to operators without the intervention of an intelligence organization was a radical departure from the methodology used throughout the intelligence community. Intelligence officers did not easily accept wide distribution of raw data from highly classified sources. The sharing of sensitive information with personnel not all of whom held compartmented clearances was seen as very poor security practice. However, according to Admiral Walter Locke, "...putting this in the hands of the tactical community vice the intelligence community was the most important decision in making an effective system." Hiding the source of the data was pioneered in the OUTLAW SHARK exercises by adapting all reporting to the format of the Navy Tactical Data System with no identifying source labels. All subsequent development of the exploitation of national surveillance assets for tactical support was based on this design.

A stand-alone transportable workstation was created and tested in USS JOSEPHUS DANIELS (CG-27) in 1977. After

successful trials, stand alone OUTLAW SHARK terminals (USQ-81(V)) together with supporting communications equipment were produced and selectively deployed to participating ships, submarines, surveillance aircraft and the shore-based Ocean Surveillance Information System (OSIS) nodes. Tests and operational exercises were then conducted to test concepts, refine tracking algorithms and identify problems. Those OUTLAW SHARK exercises proved that fleet operators, when aided by the automated filtering and track correlation afforded by OUTLAW SHARK, were not inundated by the data from satellites and other remote sources, and that they could assemble the contact reports into tracks useful for tactical applications. However, the exercises in the 1970s and early 1980s showed that then-existing systems were not adequate for over-the-horizon targeting at sea. The sensor sources did not detect and report all the background contacts in the vicinity of the target that might unintentionally decoy the missile. The communications connectivity did not deliver fast enough delivery for high-confidence targeting, typically taking about 20 minutes or more. The contact reports were not updated more than once or at most twice per hour, not often enough to permit unambiguous tracking either of the target or of other contacts in the target's vicinity.

Yet for the first time the OUTLAW SHARK equipment gave ship and submarine operators a means to use sensor data from non-organic wide-area sensors. When combined with local information from organic sensors, these contact reports yielded valuable information for situational awareness, anti-air warfare, electronic warfare, and other tactical applications. Like many pieces of successful experimental equipment, once installed individual unit commanders worked hard to prevent their removal. However cross-decking to ships and submarines about to deploy became common in spite of commanders' of initial installations efforts to keep them for their own operational use.

The Naval Electronics Systems Command (NAVELEX) and the Project Manager increased procurement of the OUTLAW SHARK terminals but conflicts with the then developmental programs for Task Force Command and Control Center (TFCC),

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the Tomahawk Weapons Control System (TWCS), and the Combat Control System (CCS) that were to incorporate the trackcorrelation function from OUTLAW SHARK, led to the halt of further acquisition of stand-alone consoles in 1980.

The OUTLAW SHARK terminals that existed remained in the fleet through the 1980s. To help fill the gap left by the end of OUTLAW SHARK procurement, the Navy Special Project Office and the NRO designed and procured a number of similar equipments to supplement the OUTLAW SHARK terminals with some also capable of performing the track-correlation function for over-the-horizon targeting. These Navy/NRO terminals included the Prototype Ocean Surveillance Terminal (POST), the Control and Alert Reporting Terminal (CART), Standard Tactical Receive Equipment Display (STRED), and GALE-Lite. Hundreds of these Navy/NRO terminals were procured and deployed in the fleet through the 1980s. Most deployable submarines and surface warships had one or more of these Navy/NRO terminals installed.

By early in the 1980's the OSIS had added the track correlation capability for processing all-source information. Similar capabilities were extended to flagships when the Prototype Ocean Surveillance Terminal (POST) deployed on USS ENTERPRISE in 1983. By 1986 POST was on all flagships. During this same period the Joint Operational Tactical Terminals, (JOTS, the *Jerry O Tuttle System*) was developed using a commercial base and software application. By 1987 COMTHIRDFLT VADM Duke Hernandez had installed JOTS on USS FORRESTAL with the capability of using all source inputs.

OUTLAW SHARK had proven the concept and operational capability of over-the-horizon targeting. But by halting the standalone equipment in favor of developing new command and control systems and incorporating their technology into indigenous fire control systems, general implementation of the sensor-to shooter concept had to await improving the computing power in those individual systems on board the ships and submarines so they could handle the track-correlation function. As improved computers were developed and installed, the OUTLAW SHARK tracking algorithms were incorporated into the command suites

and the fire control systems on board ships (TFCC and TWCS), submarines (CCS), and the Fleet Ocean Surveillance Information Centers/Facilities (FOSIC/FOSIF) and later in the AEGIS Tactical Data System.

Meanwhile a fleet OTH-T working group with representatives from the Numbered Fleets and other commands continued to wrestle the challenge of targeting the TOMAHAWK and HARPOON anti-ship missiles. At the same time, the Navy's Special Project Office and the NRO were developing a significantly improved satellite ocean surveillance system specifically to address the OTH targeting requirements. This included detecting, locating, and continually reporting all surface contacts, whether friendly, hostile, neutral or unknown, and transmitting this information directly to all Navy and other tactical users. Accomplishing this required two new equipments/systems: a tactical broadcast link and a device that would form the interface between the users' radio receiver and their display equipment.

This device, the Tactical Receive Equipment (TRE), was developed and built by the Naval Ocean Systems Center (NOSC), San Diego. The first hundred or so TREs deployed consisted of Engineering Development Models (EDMs) procured by the Navy Special Project Office from NOSC. Funding was programmed for TRE installations in more than 300 Navy ships, submarines, aircraft but ten years was required between the time these equipments were envisioned and when the equipment was fully deployed. Inexpensive manufacture of early equipments by NOSC led to erroneous conclusions about the ease of construction. Shifting to a normal acquisition contract with a civilian vendor delayed production and increased prices as the contractor shifted from the NOSC design to a new proprietary model. This shift led to problems with manufacturability and as the delay reflected in longer lead times and late deployment, competition for funding from other command and control devices limited the money available for procurement, further delaying distribution.

The communications system created to support the transmission of data from the overhead sensors was a UHF broadcast, the next stage of the Tactical Data Information Exchange (TADIXS)

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employing a format similar to those previously tested in the OUTLAW SHARK exercises. As the Initial Operating Capability (IOC) of the of the advanced satellite system approached in the mid-1980s, a series of exercises was held in each of the Numbered Fleets. The participating surface combatants, submarines, shore-based aircraft and OSIS nodes participating in these exercises were provided with an (EDM) TRE. A pseudo TADIXS-B Broadcast carried on narrow band channels of the Fleet Satellite Communications Satellites (FLTSATCOM) was provided in each theater. The results impressed the participating commanders who suggested that instead of dismantling the simulated TADIXS-B broadcast that had been set up to support the Pacific exercise, a permanent replacement be implemented.

The Navy TENCAP Office, the Navy Special Project Office, and the Naval Security Group dedicated a vacant sideband of one of the UHF channels of FLTSATCOM for the broadcast of contact reports from national surveillance systems. The architecture was quickly put in place, and the TRE and Related Applications (TRAP) Broadcast was born. Within a few weeks the TRAP Broadcast was operational supporting TRE-equipped fleet users in all theaters worldwide. The TRAP Broadcast was extended to Army, Marine Corps and Air Force using TRE-derived terminals for their respective service applications. Additional satellite surveillance systems soon made arrangements for some information to be broadcast on TRAP to tactical users and information from some non-satellite surveillance systems was also added.

The next year, at the fielding of the improved satellite surveillance system, direct broadcast became operational using the TADIXS-B format. The same radio terminals and TREs received this broadcast as had been used for the earlier TRAP and the contact reports were compatible with those on that broadcast. The IOC of the improved system marked the ultimate sensor-to-shooter capability for support of over-the-horizon targeting at sea. Directly reported contacts now included all surface contacts; friendly (*blue*), hostile (*red*), neutral (*white*) and unknown (*gray*). The time delay between contact and delivery to the shooter was now reduced to seconds, essentially real time. Contact reports

were updated often enough to support high-confidence surface tracks. This was a time of great activity by the fleet in exploiting this capability. For example, in 1987 the fleet developed a Blue Force Locator using TRAP/TRE contact reports exclusively.

By the time the full complement of these equipments were procured and deployed the Soviets had significantly reduced out of area surface warship deployments and most Tomahawk missiles had been converted to land attack weapons (TLAMs). However the march to tactical exploitation of national sensors, wide area surveillance, correlated positions, and tracking of contacts of interest was not interrupted. The era of the common operational picture was in full swing allowing Admiral Bill Owens to predict that everything on the surface of the earth would eventually be able to be seen, identified and targeted.⁴

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RESERVE SUBMARINERS: WHO WE ARE AND WHAT WE DO

By Lt. Haney D. Hong, USN

LT Haney D. Hong, USN, is a Master in Public Policy candidate at the Harvard University John F. Kennedy School of Government and recently completed the International and Global Affairs Fellowship with the Belfer Center for Science and International Affairs and the Harvard Dukakis Fellowship in the Office of the Governor of New York. He serves on the Strategic Communications Team of the Submarine Force Reserve Component and is assigned to SFRC Undersea Warfare Detachment L in Washington DC. He sits on the Commander, Navy Reserve Forces, Navy Reserve Policy Board, as well as the Ashoka U Advisory Council.

The author thanks RDML Robert Kamensky, CAPT Matt Zirkle, and the SFRC EXCOM for their support during the writing of this article.

The Submarine Force Reserve Component (SFRC) stands ready to be as stealthy as the best undersea warriors out there. Ironically, we work so hard to integrate seamlessly with our active duty counterparts that our own stealth may inadvertently mask our own value. Today, we want to *broach* only momentarily though—to make sure that our colleagues in the ranks of the active component, as well as our retirees, know how we provide strategic depth and operational capacity for the Submarine Force, without being a heavy paycheck in these times of austerity.

When I transitioned from active duty to the SFRC in Fall 2010, I did not know what I was about to do as a Reservist. I think back to my time on active duty, and I did not know that some of the submariners I encountered in my various duty stations from

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USS TOPEKA to the Headquarters of Navy Recruiting to the Office of the Secretary of the Navy were actually Reservists. I realize how little I knew about SFRC before leaving active duty, and now with about one year of Reserve service and some brief time working with the staff of Commander, Task Force 34, in Pearl Harbor, Hawaii, on theater anti-submarine warfare, I have a much better sense of how submariners in the Reserve fit into the undersea enterprise.

The Submarine Force provides our country essential capabilities needed for the future environment and set of assumptions that guide the strategic and programmatic planning for the Department of Defense. Because our geopolitical focus has shifted to the Asia-Pacific region and our need to overcome anti-access/ area denial (A2AD) capabilities,¹ the Submarine Force becomes ever more important. Essentially employed part-time by Submarine Force, the sailors of the SFRC are on-demand assets, *ready now, anytime, anywhere* as in the mission statement of the Navy Reserve. We are men and women of all different shapes, sizes, and professions, and our diversity fits critically into the framework of action called for by the Design for Undersea Warfare (DUSW).² We support DUSW, and as such, we support the Submarine Force in its evergrowing relevance in our future defense needs.

Accompanying this strategic shift in gaze towards Asia is also an unabashed and non-partisan recognition that we, as a country, must get our country's cash flow and balance sheet under control, and the Submarine Force has a history of doing so much with comparatively little against other parts of the Navy. Though the Navy is a likely winner of future budgetary fights in the Pentagon and on Capitol Hill,³ times are tough, and they are likely to get tougher. The Submarine Force itself will find itself in higher demand with fewer resources available.⁴ Fortunately, the Submarine Force is already cost-effective as about one-quarter of the major combatants in the Fleet manned by 7% of the Navy's manpower and supported with 12% of the overall budget,⁵ and the Submarine Force Reserve Component provides operational support with even higher cost-effectiveness than that.

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Capabilities of the SFRC

SFRC's cost-effective operational support and strategic depth comes in four mission areas. The fifteen hundred men and women of SFRC divide up into 64 units spread all across the country, and we consistently provide tens of thousands of man-days of operational support each year. In Fiscal Year 2011, SFRC provided 25,000 man-days of support all across the globe, and this support is the combined work of the Reserve undersea warriors who work in the four competency areas of the SFRC: undersea warfare operations, submarine escape and rescue, force protection, and expeditionary maintenance.

The largest proportion of SFRC's undersea warriors works in our undersea warfare operations competency. In a total of thirty Reserve units, these sailors tenaciously prepare for strike group operations and theater anti-submarine warfare missions. The 7,200 man-days of operational support by the undersea warfare competency in FY2011 were spent standing watch as Submarine Element Coordinators and Submarine Advisory Team Watch Officers, as Theater Anti-Submarine Warfare Battle Watch Captains or Watch Officers, and as future and current operational planners and keepers of tactical plots. Whether at the strike group or theater levels, we work water space management and prevention of mutual interference so that our tactical assets can defend against and neutralize subsurface threats.

The smallest part of the SFRC is our submarine escape and rescue competency area, yet these men and women take incredible initiative in work that makes regular international impact. Only as part of three Reserve units total, the submarine escape and rescue sailors provided nearly 1,900 man-days of support in FY2011. Whether in submarine search and rescue command and control training and tabletop exercises, called SMASHEXs, in Malaysia and Indonesia or training in the submarine rescue and diving recompression system pressurized rescue module off the coast of San Diego, these sailors perform critical work vital to the safety of not only our submariners, but also our international partners, too.

Another of our smaller segments within the SFRC, the force protection competency protects our SSNs, SSGNs, and SSBNs around the world. These self-sufficient sailors provided 2,200 man-days of support in FY11 when they provided physical security for our SSNs as they transited choke points like the Panama Canal or visited unprotected ports around the globe, and these men and women who are trained to the standards of the Navy Expeditionary Combat Command also provide SSBNs and SSGNs with added security at remote locations or during sensitive evolutions. These undersea warriors protect each other and our most highly valued assets in the Fleet.

Finally, we have our expeditionary maintenance competency, our second largest segment within the SFRC. These sailors come from twenty different units around the country and apply their technical ingenuity in submarine maintenance. They integrate with the crews of our submarine tenders, like USS FRANK CABLE in Guam, and during the last fiscal year, they provided 5,600 mandays of work in the maintenance of submarines. In fact, they are planning to provide approximately 1,700 man-days of voyage repair support to the SSGNs during this fiscal year, and they stand watch side-by-side with their shipmates on FRANK CABLE. Their 3M and quality assurance qualifications help them bring their expertise to the Submarine Force while we sail and visit ports abroad.

The SFRC offers surge capacity for the Submarine Force's planned operations, and we can provide support for the Navy's unplanned operations as well. One of the main advantages of the Navy Reserve in general is that the continuum of service allows us to retain skill sets for access by the Navy when needed. Many of the officers in SFRC, as former active duty submariners themselves, have nuclear training, and we were able to support Operation Tomodachi after a massive tsunami caused an accident at the Japanese Fukushima-Daiichi nuclear power plant. Our sailors get mobilized to provide individual augmentation, and men and women of SFRC have supported contingency operations all over the world.

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The Criticality of the SFRC

As the Design for Undersea Warfare is a call for creativity and a framework for action,⁶ Submarine Force Reserve Component sailors are well suited to add creativity and diverse talent to achieving our objective of undersea superiority. We bring to bear the swath of undersea warrior characteristics that we developed on active duty, and we also add the experiences we have had outside of the Navy to be increasingly innovative in our contributions to the undersea enterprise. Our four competency areas in the SFRC, undersea warfare operations, submarine escape and rescue, force protection, and expeditionary maintenance, support the Lines of Effort (LoE) in the Design for Undersea Warfare.

The Submarine Force focus areas in LoE #1, *Ready Forces*, include enhancing commanding officer initiative and character, sustaining warfighting readiness, and developing undersea warfare doctrine, ⁷ and SFRC supports the first two focus areas in this line of effort. We manage the submarine culture workshops to help our submarine Commanding Officers nurture character and integrity at every opportunity.⁸ The rising number of SFRC sailors getting qualified in standard qualification processes like 3M, QA Craftsman, and small arms, is how we support training—we are, by definition, getting our training through *distance support*.⁹ Our work providing better-prepared theater anti-submarine warfare watch officers through standardized training with the Naval Mine and Anti-Submarine Warfare Command ensures that at-sea training in Fleet Readiness and Training Plans is optimized.¹⁰ We are critical in providing Ready Forces.

The Submarine Force focus areas in LOE #2, *Effective Employment*, include developing coordinated theater-specific campaign plans, demonstrating warfighting capabilities, and improving operational availability of undersea forces,¹¹ and the SFRC supports the last two focus areas in this line of effort. Whether it is during JTFEXs, C2Xs, USWEXs, or coalition exercises like Key Resolve, Ulchi Freedom Guardian, or CHILEMAR III, SFRC is an integral part in theater undersea warfare teamwork and improving mission assurance.¹² Fifty expeditionary maintenance sailors stand ready to serve as sentries

and watchstanders for USS FRANK CABLE as she goes into shipyard availability, and this support increases the availability of our forward- deployed maintenance assets.¹³ We are critical in Effective Employment.

Supporting the DUSW lines of effort shows how relevant SFRC is to the Submarine Force, and understanding how SFRC aligns with guidance documents and strategies outside the Submarine Force also underscores this relevance. Our four competency areas fit hand-in-glove with the six core capability areas of our Cooperative Strategy for 21st Century Seapower, colloquially known as the Maritime Strategy. Our Expeditionary Maintenance teams provide the key maintenance support to SSNs in Guam that need to stay deployment-ready as our forward presence. They also help to ensure that our SSGNs in voyage repair periods get out to sea on time, providing continuity in our deterrence of destabilizing or otherwise aggressive behavior by other countries. Our Undersea Warfare Operations experts provide strike group and fleet commanders the sea control they need to operate freely at sea and safe from submarine threats with their anti-submarine warfare tactical training. These same undersea warfare operations experts also facilitate our continued ability to sustain our power projection ashore without fear of losing access to the littorals. Our capable force protection sailors are part of a wider and collaborative effort to keep our maritime assets safe from terrorism and other irregular and transnational threats. Also our submarine escape and rescue sailors are ready at a moment's notice to assist other countries with submarine rescue operationsour form of humanitarian aid.

The President's recently released strategic outlook for the Defense Department reinforces the importance of defeating antiaccess and area denial capabilities,¹⁴ and this dimension of the future environment is one we have been planning for since the Quadrennial Defense Review of 2010.¹⁵ The Design for Undersea Warfare was built with this understanding, and as a Submarine Force, we must "expect to operate and fight far forward, independently, behind enemy lines, for long periods of time, without support."¹⁶ The SFRC stands side-by-side supporting our

active duty partners in the Submarine Force through the Design for Undersea Warfare, and we work together to ensure that we are always prepared for battle. In the words of our RDML Bob Kamensky, head of the Submarine Force Reserve Component as the Vice Commander, Submarine Forces, "We are ready and capable for executing." [emphasis added] Just as the Submarine Force must be, we in the SFRC are *semper procinctum*.

Our Partnership Endures

The members of the Submarine Force Reserve Component support the Submarine Force writ large in our shared desire for undersea superiority as "masters of the undersea domain."¹⁷ We provide critical operational support and strategic reserve that allow us as a force to do more with less, and our partnership will endure through some of the rocky roads that are ahead of us as a Submarine Force, Navy, and Nation. Also we continue to think about "our successors...ten years from now,"¹⁸ who must guide the Submarine Force Reserve Component, as we navigate these rocky roads.

We are "one-team, one-fight," as was evoked by VADM Richardson in his note to the SFRC in January 2012.¹⁹ I, for one, am quite glad that the Reserve has afforded me an opportunity to continue my contributions to the very force that began my Navy career. And I am also quite glad that I now understand how my work in the SFRC is in the service of my country.

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16. VADM Richardson, RADM Caldwell, RADM (Sel.) Breckenridge, "Design for Undersea Warfare." 6.

17. VADM John Richardson, "COMSUBFOR Open Letter to the Submarine Community."

 Comment by Robert Kamensky at the SFRC Total Force Training Symposium in March 2012, where all the unit commanding officers and senior enlisted leaders gathered to share practices and understand our future challenges.
VADM John Richardson, "Special Note from COMSUBFOR," *Sfrc Subnote*, January 2011.

REUNION

USS WILL ROGERS (SSBN 659) in Portsmouth, New Hampshire, 4-7 April 2013. All crews invited for WILL ROGERS activities as well as support for USSV1 Thresher Base by attending Memorial Service marking 50th anniversary of tragic loss of USS THRESHER (SSN 593). More information at <u>www.usswillrogersreunion.com/</u> or contact Bruce "Frenchy" DeFrehn, Reunion Coordinator: ctsunshine11@aol.com, 860-449-1958 or Rob Fields, Association President: <u>rob@rafields.com</u>, 781-799-0139.

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EVERYTHING I KNOW ABOUT RISK I LEARNED IN DAS BOOT By French Caldwell, Vice President and Gartner Fellow Governance, Risk Management Fellow Gartner Symposium/ITxpo 2010 October 17-21, 2010 Walt Disney World Dolphin Orlando, FL

Things That Ruin a Submariner's Day



USS SAN FRANCISCO

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Source: U.S. Navy

This photo shows USS SAN FRANCISCO pulling into her new home port after four years of repairs following a collision with an uncharted seamount in the South Pacific. One sailor was killed and 24 others injured when SAN FRANCISCO slammed into the seamount at flank speed. The damage to the submarine was horrendous, yet within a few seconds, SAN FRANCISCO had blown to the surface and was recovering.

Submarine operations are inherently risky—they occur at great depths, at high speeds with a nuclear reactor and high-pressure

systems, and often in hostile territory. Yet, despite the dangers, submarine operations are conducted for the most part safely and securely. Very good risk management is an inherent part of these operations, and risk management is built into all processes and procedures, from design to the most seemingly trivial activities like cooking.

Risk management enables us to achieve objectives that would otherwise be impossible, such as operating a nuclear submarine in hostile environments in support of national security objectives.

Action Item: List your business objectives that would be unattainable without effective risk management.

Key Issues

- 1. Why does business strategy depend on effective risk management?
- 2. How does effective risk management and compliance improve governance?
- 3. What are the strategic considerations in designing Governance, Risk and Compliance (GRC) programs?



USS HOLLAND and Russian battleship RETIZAN entering the New York Navy Yard dry dock

This picture of the S-1 HOLLAND entering dry dock followed by a Russian battleship illustrates disruptive change. Did anyone at the time envision that the submarine would be the replacement for the battleship? Managing the risks of undersea operations made it possible.

The mantra for Enterprise Risk Management (ERM) is that it enables business objectives—it is an element of performance management, enabling the achievement of strategic objectives. But besides doing better than your peer competitors at similar objectives, what if you could do things differently from them? What if you could change the game and make their investments obsolete? Such strategies are called disruptive—they mean that you are not just innovating upon accepted processes, but innovating objectives. Doing this requires you to be better than them at managing the risks of change.

Business change governance is a new term that Gartner is introducing, but it's certainly not a new concept.

Action Item: Make being better at enterprise risk management a strategic initiative, to enable business change.

Risk Management 101 - # Surfacings = # Dives

All submariners know that the first key performance indicator (KPI) is that the number of surfacings must equal the number of dives. In their book, <u>IT Risk: Turning Business Threats Into</u> <u>Competitive Advantage</u>, Gartner's Richard Hunter and MIT's George Westerman set out a hierarchy of risk categories: availability, access, accuracy and agility. In other words, to enable business change, or agility, first you must establish the foundations for the other three categories, starting with availability—if systems are not available, none of the other risks really arise.

Enabling business change is the penultimate goal of risk management. It is typically not where risk management starts—in fact, it can't be. For submarines to change the practice of warfare they first had to become reliable military platforms. The first submarine to sink a warship was the confederate submarine HUNLEY, which sank USS HOUSATONIC in Charleston Harbor in 1864. After the engagement, HUNLEY sank with all hands and was not found until 1995. And before its first successful mission, HUNLEY was lost twice with all hands during sea trials. *Availability*, in other words, had not been established, and it would be another 50 years before the submarine's ability to change the practice of warfare was proved.

The lesson to learn from HUNLEY is that availability is the first consideration. Once availability is established, then it is possible to establish more direct linkages of risks to business objectives. We can also see that if a KPI becomes a key risk indicator (KRI)—if surfacings don't equal dives—then other KPIs are unachievable.

Action Item: Determine your most critical performance metric, and the risks to that metric.

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Obviously, just managing availability risks is not enough to contribute to business advantage. We need to look at the business objectives, and determine the risks to those objectives. So, let's step back to the days of the Cold War and imagine we have gotten hold of this smuggled photo. We ask ourselves "where's the propeller?" Obviously this is some new type of jet propulsor. So, as an objective, we must understand as much as we can about this new submarine, which is an addition to the Black Sea Fleet. Knowing the objective, we must understand the risks and take measures to mitigate them. And the risks are many-just to get into the Black Sea, we have to pass through the narrow and dangerous Bosphorus, which means we will be seen on the surface. We must approach the Crimean peninsula and evade Russian and Ukrainian warships, not to mention the radar installations that can detect us whenever we raise the periscope above the water's surface. So, now we are starting to link risks to the business objective. We are also starting to link the controls that mitigate those risks-most of which are already part of our operational processes-to the business objective.

It is important to anticipate risks and to build controls into operational processes. It is much too expensive and challenging to build new controls for each new objective.

Action Item: Include the steps that you take to manage risks in the operational processes that are critical to achieving your business objectives.

Risk Management Priorities and Business Priorities Are the Same

A Seawolf class nuclear submarine returns to port with a broom lashed to the bridge, indicating a "clean sweep"—that is "mission fully accomplished."

The broom lashed to the bridge as the submarine returns to its home port means the crew has fully achieved the mission objectives—a tradition that began in the Pacific War. The crew faced the risks associated with their mission and returned safely. There are a few lessons to learn in relation to this—first, that there are metrics, such as availability, that are applicable to all business objectives. If surfacings do not equal dives—that is, if the platform is unavailable—then none of the business objectives are achievable. But as we escalate up the Hunter-Westerman hierarchy of risks to accuracy and agility, we see that the risks become tied

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more closely to the specific mission objective. Ideally, we would anticipate all the objectives and associated risks when designing our platform, and we would build all the necessary controls into that platform. But in practice this is not the case—we can be sure that there will be unanticipated objectives and unanticipated risks. This takes us to our next key issue: Does this submarine example translate to the civilian world? It certainly does. In a 2010 survey of CFOs (http://www.cfo.com/article.cfm/14502409) by a group of academics, CFOs listed their top four risk priorities as preventing a large loss; meeting shareholder expectations; increasing cash flow; and increasing firm value. Notice that the first priority is similar to our core submarine priority—if losses exceed revenue, the boat doesn't float. But the other four risk categories are business objectives as much as they are risk categories.

Action Item: Sort through your most significant risks, and categorize them in terms of the "four A's." Then, to ensure alignment and that there are no gaps, start with your most important business objectives as risk categories and identify the risks to them.

Key Issues

- Why does business strategy depend on effective risk management?
- 2. How does effective risk management and compliance improve governance?
- 3. What are the strategic considerations in designing GRC programs?

Commander's Intent

"No captain can do very wrong if he places his ship alongside that of the enemy."

- Admiral Horatio Lord Nelson

The goal of managing risks effectively is to improve governance. And good governance means that our governance supports our business objectives-governance sets the goal. But no matter how much we may want to take the human out of governance, it is just not possible. We can mechanize and digitize controls and the monitoring of risks, we can automatically collect intelligence and use it to drive some automatic changes in direction, but the setting of objectives and how those objectives will be achieved is a human function. As a recent U.S. president said, "I'm the decider." But governance is not just the setting of decision rights-it also refers to the setting of objectives, the inputs and allocation of assets for the achievement of objectives, and the disposition of those assets and the characteristics of the environment once those objectives are achieved. Military leaders convey their understanding of how governance relates to objectives through intent statements. No matter how the environment changes in the course of battle, subordinates understand the end goal and can adjust their actions to achieve it. Admiral Nelson would share his intent over dinner with his captains well ahead of the battle. They understood not just the desired end state but his thinking in how it could be achieved. He also anticipated risks-knowing, for instance, that his unorthodox tactics for the Battle of Trafalgar could lead to a melee, he painted his ships in a yellow and black checker to distinguish them clearly from the enemy. But his most essential risk management technique was to ensure a shared understanding with his captains, so that unanticipated risks would not lead to defeat.

Action Item: Share not just your business objectives, but your desired end state, including the disposition of your assets and the business environment upon achieving your objectives.

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Map: Norman Einsteinhttp://commons.wikimedia.org/wiki/File.Strait_of_Sicily_map.png

While governance sets the goal, risk management determines what is good enough to ensure that objectives are achieved. If pursuit of our goal takes us through hazardous waters, we must understand our risk tolerances. In this example, the captain has taken into account the shallow waters and the intended movement along the track to establish a moving box of water in which the officer of the deck must keep the submarine—going outside the box could result in an unacceptable level of uncertainty. Yet the box itself is designed in a way that permits the officer of the deck to achieve interim objectives, such as receiving essential naval messages at periscope depth, without undue restrictions. Essentially the captain has set a policy that is guided by risk tolerance.

Action Item: Ensure that risk tolerance guides policy, and not the other way round.



You Get What You Inspect



USS Kentucky - Battle Excellence Award

Any chief petty officer in the Navy will tell you that you get what you inspect, not what you expect. Governance sets objectives, risk management establishes tolerances, and compliance sets controls to manage risks within tolerances. Therefore, good governance depends on effective controls. Effectiveness is measured through testing. Submarine crews face almost daily testing though self-assessment in drills, inspections of operations and documentation, and observations of performance. External independent testing is carried out as well through many different types of tactical and operational readiness examination. In preparation for external examination, the captain may decide to go for the highest standard possible-the Battle "E." This is an optional goal, but one that, if achieved, establishes a level of readiness that will ensure above-average performance scores in all independent tests and examinations. The lesson to learn here is that aiming for the minimum means that sometimes you may hit it. By contrast, if we aim for higher goals, such as an International Standards Organization (ISO) certification, this will prepare us for all kinds of contingency-making good performance on periodic

audits and assessments less intrusive, and sustainable performance against objectives more assured.

Action Item: Use organizational certifications as means to maintain an ongoing self-assessment and compliance regime that improves operations and preparedness for audits.

Key Issues

- 1. Why does business strategy depend on effective risk management?
- 2. How does effective risk management and compliance improve governance?
- 3. What are the strategic considerations in designing ERM programs?

Strategic Principles

A submarine can conduct coordination operations with both aircraft and surface ships. Despite the variances in military platforms, they all follow a common set of *principles of war*—a fact that makes integrated forces possible.

A common set of governance, risk management and compliance (GRC) principles can enable an integrated approach to GRC activities. This is especially important when trying to establish an ERM program in support of overall strategic business objectives. Consider the following GRC strategic principles: accountability, consistency, effectiveness, alignment and simplicity.

Action Item: Use Gartner's "Toolkit: Statement of Governance, Risk and Compliance Principles" (G00173340) to establish the guiding principles for your GRC activities in support of overall corporate governance and enterprise risk management.

Accountability Starts With the Tone at the Top

"Responsibility is a unique concept: it can only reside and inhere in a single individual. You may share it with others, but your portion is not diminished. You may delegate it, but it is still with you. Even if you do not recognize it or admit its presence, you cannot escape it. If responsibility is rightfully yours, no evasion, or ignorance or passing the blame can shift the burden to someone else.

Unless you can point your finger at the man who is responsible when something goes wrong, then you have never had anyone really responsible. — ADM H.G. Rickover

Accountability is at the core of GRC—while almost everyone wants credit for their role in achieving objectives, almost no-one wants to be held accountable for the risks associated with those objectives, and particularly for any incidents associated with those risks. The *tone at the top* will determine how well the principle of accountability can be instilled in any organization. In the nuclear submarine program, tone at the top was set very clearly by Admiral Rickover. Rickover stories are the stuff of legend—he personally selected every officer in his program, and there was nothing more important to him than ensuring accountability.

Note: Often the terms *accountability* and *responsibility* can be used interchangeably. Equally, though, it is often helpful to distinguish between who actually owns a risk (accountability) and who helps to manage that risk (responsibility). Building a RACI (Responsible, Accountable, Consulted, Informed) chart can be a useful exercise not just for establishing who is accountable for a risk and who is responsible for providing risk management services (controls), but also for communicating the need for change in how risks are considered in operational processes in support of objectives.

Action Item: Identify the critical process that support a business objective. Build a RACI chart for risks associated with that process, and fill in the "A" column first.

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Risk Management Is Everyone's Job

Submarine qualifications require a mix of operational knowledge and risk management. A submariner must not only understand systems, but also understand the controls in those systems, and what to do when those controls fail. All submariners must qualify for their *dolphins*—a grueling process that takes a year or more. But submarines are similar in design and their implementation of processes for requalification need not to be necessary when a submariner goes to another boat. This is also the case when the mission changes, as, for example, when switching from patrol to attack. Certainly to operate the systems, the submariner must learn the new boat's systems, but that should merely entail learning about the differences from systems familiar from the previous boat—the use of common principles means there is enough consistency in design, procedures and controls.

Consistency is a challenge for any organization: can you come up with a common set of principles that work across multiple business units with multiple business objectives? Many organizations have found that they can. Doing so reduces the cost of compliance and improves agility, as a common set of controls supports governance whatever the objective.

Action Item: Identify redundancies and overlaps in policies and controls, and start to rationalize them.

Policies

While a common set of core values can certainly help to establish consistency in controls, consistency also depends on policies that reflect risk tolerance (rather than risk tolerance being set by policy). Policies that are rigid and inflexible when risks are relatively low can impede the ability to meet business objectives. One submarine Admiral once said that "policy is guidance to be followed in the absence of any other intelligence, including human." He meant that policy should be guided by risks, and therefore knowing and accepting the risks is an important element of good governance.

Action Item: Ensure policies are consistent with the risks associated with the objectives. This is especially important as both the business environment and the objectives change.

Monitoring and Control

Although policies are established to meet objectives, there must be controls to ensure that policy objectives are met—and these controls must be monitored to ensure they are effective. The parameters being monitored in the propulsion spaces are actually KPIs associated with the operation of a nuclear submarine's engineering systems. If the parameters stay within set risk tolerances, the operators are assured that many hundreds of controls are working. This integration of performance monitoring, risk monitoring and control monitoring is possible because of the alignment of design, policies and objectives.

Action Item: To reduce the invasiveness of risk management and compliance to daily operations, link risks to business objectives, and controls to risks and mandates.

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A submarine sonarman

Many risks are associated within internal processes, but changes to the business environment can also have an impact on objectives. Perhaps you remember sonarman Jonesy from the film "<u>The Hunt for Red October</u>." He was skillful at scanning the environment and the enemy, and analyzing the impact on the mission. Similarly, businesses must scan the business environment, public sentiment, legal and regulatory developments, and their competitors. If the analysis concludes that objectives must change or that there must be changes in how they are pursued, then an assessment of risks and control effectiveness should also be made.

Action Item: Set up a "weather bureau" to monitor the legal and regulatory environment in the context of competition and the business climate. Ensure that controls remain effective as the environment changes.


Associated with monitoring and control is a lot of operational reporting. But if the objective of risk management and compliance is actually better governance in support of objectives, then there also need to be reports that capture opportunities for performance improvement. This photo shows the cover page of the first war patrol report of USS TANG, which was skippered by Dick O'Kane. O'Kane was known for his aggressiveness and risktaking, and he has been criticized for the loss of TANG on its third patrol.

The boat was sunk, however, due to a torpedo failure—a torpedo fired from TANG circled back and hit it. Furthermore, in his patrol report, as well as detailing TANG's operations, O'Kane includes recommendations that could improve future operations for the submarine fleet. See the patrol report at http://issuu.com/hnsa/docs/ss-306_tang?mode=a_p.

My Gartner colleague Paul Proctor has focused on this requirement to relate risks and performance in his presentations and

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research on reporting to the board (see "Eight Practical Tips to Link Risk and Security to Corporate Performance" G00173779). It is also an underlying theme of <u>The Real Business of IT</u> by Richard Hunter and George Westerman.

Action Item: When reporting on risk and compliance, make recommendations and describe actions taken to improve the ability to meet business objectives.





GRC architecture principles establish the guidance for the development of GRC architecture. These principles envision a GRC strategy that moves from a variety of disconnected compliance and risk management activities to a future state by:

- Aligning with business goals and risks.
- Meeting multiple requirements with a common set of controls and IT support.
- Establishing a common reporting infrastructure for a single version of the truth.
- Being as noninvasive as possible, using automation of controls, where possible, instead of manual testing and surveying.
- Ensuring roles, responsibilities and accountability are clear.

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Action Item: Use these reference principles as a starting point to develop a set of GRC architecture principles that relate governance, risk management and compliance for your enterprise.





POSTAGE STAMPS HONOR SUBMARINE FORCES OF THE WORLD

by ETR2(SS) Dick Brown, USN(Ret)

Dick Brown is a Cold War submarine veteran, having served aboard USS BARBERO (SSG-317) and USS LAFAYETTE (SSBN-616) in the 1960s. He is a long-time NSL member and avid collector of submarine stamps. He resides in New Mexico where he spearheaded a statewide grassroots initiative to name the 6th VA-class submarine USS NEW MEXICO (SSN-779).

Nations across the globe, whether land-locked or not, whether they have a navy or not, have issued postage stamps honoring submarines. In fact, the last eight decades have seen over 100 nations launch nearly 500 submarine stamps, not just depicting naval submarines, but also deep-sea research vessels and even Jules Verne's fictional NAUTILUS. And behind each one, there is a great story, including one dating back nearly 150 years.

The hand-cranked Confederate submarine CSS H. L. HUNLEY was the world's first successful combat submarine. After sinking the Union warship USS HOUSATONIC during the American Civil War, she vanished with the loss of all hands.



The island nation of Grenada honored HUNLEY with this stamp

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Armed with a spar torpedo, HUNLEY's mission was to break the Union naval blockade of Charleston Harbor by sinking the three-masted sloop HOUSATONIC. It was February 17, 1864 as HUNLEY with her 8-man crew made her way in the dark toward her target. She managed to attach the explosive to the sloop's hull and slip away before the explosion. As HOUSATONIC sunk, HUNLEY began her return to base. But she never arrived and was presumed lost.

For the next 13 decades, the submarine lay on the bottom, somewhere outside Charleston Harbor. In 1995, the crusty 40-foot hulk was discovered and in 2000, coincidentally as the U.S. Naval Submarine Service celebrated its centennial, HUNLEY was raised. She has since been undergoing archaeological study and restoration.

That first successful attack by a submerged submarine was just the beginning of undersea warfare. Submarines have been used in other civil wars, in two world wars and as deterrents in cold wars. And their stories have been told through commemorative postage stamps beginning in 1936 when Romania honored its DELFINUL or DOLPHIN submarine. That submarine would complete nine war patrols in the Black Sea against the Soviet Navy during WWII. Then in 1938, Spain issued six submarine stamps that were actually used as postage on *submarine mail* during the Spanish Civil War. Poland followed with two stamps, one in 1941 honoring ORP ORZEL, (ORP or Okręt Rzeczypospolitej Polskiej meaning Ship of the Republic of Poland and Orzel meaning Eagle), which was lost the previous year during her seventh patrol in the North Sea, and one in 1943 showing a Polish aircraft attacking a German U-Boat.



Germany also issued a submarine stamp in 1943 – showing one of its Type VII U-Boats, just like U-552 which torpedoed USS REUBEN JAMES (DD-245) on convoy escort duty in the North Atlantic, the first American warship lost during WWII.



This pair of Marshall Islands stamps marks the sinking of the REUBEN JAMES, just weeks before the Japanese attacked Pearl Harbor

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The experimental French leviathan, SURCOUF, named after the 18th century French pirate, Robert Surcouf, also saw service as a convoy escort during WWII. This submarine was designed for long-range commerce-raiding, and fitted with a prison capable of holding 40 captives, twin 8-inch naval guns in a single watertight turret just forward of the conning tower, and an after hangar to house a floatplane for scouting potential victims and spotting targets for her main battery. At the outbreak of WWII, she was the largest, longest, heaviest submarine in the world.



This 1962 St. Picrre et Miquelon airmail stamp celebrates the 20th anniversary of the capture of the islands by Sous-Marin Surcouf

With the fall of France in June 1940, and to avoid capture by the Nazis, SURCOUF escaped from Brest where she was being refitted. She sought refuge in Plymouth where she was seized by the Royal Navy. Then in early February 1941, she was transferred to Halifax, Nova Scotia from where she patrolled for U-Boats that terrorized Allied shipping. In May 1941, she was reassigned to Bermuda to patrol for U-Boats. Plagued with continuous mechanical failures and dismal performance, she was dispatched to Portsmouth Naval Shipyard in Kittery, Maine for repairs. SURCOUF was turned over to Charles de Gaulle's Free French Naval Forces and returned to Halifax. In December 1941, she took part in the capture of the islands of St. Pierre and Miquelon off the south coast of Newfoundland, an overseas territory of the Nazicontrolled regime of wartime France. She was then ordered to the

Pacific. While transiting the Bermuda Triangle, she was lost on February 18, 1942 under mysterious circumstances; some say she collided with an American freighter, others say she was lost by *friendly fire*, yet others say she went rogue and was destroyed. Like many mysterious pirate ships, her wreck has never been found.

While SURCOUF never made it to the Pacific, the U.S. Naval Submarine Force was there in a ferocious fight with Japan. When the Japanese bombed Pearl Harbor on December 7, 1941, they missed our submarine base. But the attack resulted in significant losses to the Pacific Fleet and immediately put the U.S. Navy on the defensive. The only weapon system available to take the war to the enemy was our Submarine Service.

Kiribati, Marshall Islands, Nauru and Palau have all honored American submarines as they were vital in recapturing various Pacific islands from the Japanese. For example, the Republic of Kiribati (Gilbert Islands) issued a stamp showing USS NAUTILUS (SS-168), with USS ARGONAUT (SS-166) in the background, both undersea troop carriers, landing 221 Marines of the 2nd Raider Battalion, known as Carlson's Raiders, at Butaritari (Makin Island) in mid-August 1942.







NAUTILUS off Tarawa Atoll in 1943



Among the most extraordinary accomplishments of American submariners is the impressive victory of our WWII fleet boats over the Japanese Navy and Merchant Marine. Our Pacific submarine campaign gutted Japanese industrial and military strength. One example is USS TAUTOG (SS-199). During the attack on Pearl Harbor, while moored at pier 2, she shot down a Japanese fighter bomber. Known as the *Terrible 'T'*, she sunk 26 enemy ships, the most of any WWII submarine, and won 14 battle stars.



Marshall Islands honors the TAUTOG

Another example is the Gato-class submarine USS PADDLE (SS-263) which won eight battle stars in the Pacific. Stationed off Nauru, she provided continuous weather reporting for the carrier task force attacking the Gilberts and the Marshalls, including the marine landings at Tarawa in late November 1943.



PADDLE on station off Nauru

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Destruction of Japanese merchant marine and naval forces significantly reduced Japan's ability to project power throughout the Pacific. Our use of the submarine enabled the Navy to take the offensive in Japanese controlled waters and inflict disproportionate losses relative to the U.S. investment in submarines.

By the numbers, 273 U.S. submarines patrolled against the enemy in WWII. Although they comprised less than 1.6% of the total U.S. Navy strength, they caused more than half (54.6%) of Japan's losses at sea. However, for all of these sinkings, we paid dearly.

Our successes aside, the Submarine Service sustained the highest mortality rate of any branch of the U.S. Armed Services. One out of seven American submariners died—a total of 374 officers and 3,131 enlisted men. And one out of five submarines was lost. Consequently, 3,505 sailors and 52 submarines remain on *Eternal Patrol*.

Of the 52 losses, two submarines, USS R-12 (SS-89), which sunk while diving in June 1943, and USS DORADO (SS-248), which mysteriously disappeared in October 1943, were lost in the Atlantic. USS S-26 (SS-131) was sunk when accidentally rammed by an American subchaser off Panama in January 1942—our first operational submarine loss of the war. Another operational loss occurred in July 1944 when USS S-28 (SS-133) disappeared during training exercises off Oahu.



One of five U.S. stamps celebrating our Submarine Centennial – this is the S-class, the first submarine class built to a U.S. Navy design – 51 were commissioned



The remaining 48 boats were lost due to enemy action in the Pacific. One was the Gato-class boat USS TULLIBEE (SS-284) when 79 sailors were lost on March 26, 1944, but not by enemy action. She was sunk by one of her own torpedoes running a circular course. One sailor, thrown from the bridge, was taken prisoner and later repatriated at the end of hostilities.



PALAU honors TULLIBEE and her lost crew members



Another U.S. stamp celebrating our Submarine Centennial – this is the thin-skinned Gato-class which made up most of our Submarine Force in the Pacific Theater

Submariners will remember the 1955 novel, <u>Run Silent, Run</u> <u>Deep</u> about a WWII submarine skipper obsessed with sinking a certain Japanese ship. In 1958 it was made into a movie starring Clark Gable and Burt Lancaster. The author was then-Commander Edward Beach who served on two of our best fighting submarines. One was the Gato-class USS TRIGGER (SS-237) which Beach immortalized in his first book <u>Submarine1</u> in 1952. The other was USS TIRANTE (SS-420) where he was Executive Officer under Commander George Street. For their gallant action in combat on their first war patrol, Street received the Congressional Medal of Honor and Beach the Navy Cross.

In early 1960, under the command of Capt. Beach, the twinreactor radar picket submarine USS TRITON (SSRN-586) journeyed to the South Atlantic, around Cape Horn, across the Pacific and Indian oceans, around Cape of Good Hope and back into the Atlantic, all the while submerged, essentially retracing Ferdinand Magellan's circumnavigation of the globe. The <u>New</u> <u>York Times</u> described TRITON's voyage as "a triumph of human prowess and engineering skill, a feat which the United States Navy can rank as one of its bright victories in man's ultimate conquest of the seas." From an operations standpoint, it demonstrated the great endurance of nuclear submarines. Both PALAU and ANTIGUA issued stamps to commemorate the historic underwater global circumnavigation.



PALAU stamp with TRITON and Capt. Beach, author of the best-seller <u>Run Silent, Run Deep</u>



ANTIGUA stamp celebrating TRITON's 84-day globe-circling voyage beneath the sea

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In the past decade, a multitude of submarine stamps have surfaced; even two popular submarine movies have been featured on stamps. Wolfgang Petersen's 1981 German epic U-Boat movie <u>Das Boot</u> based on exploits of U-96, a Type VII-class U-Boat, was featured on a stamp issued by the Republic of Tatarstan, a federal subject of Russia. Equally popular, the 1990 thriller <u>The Hunt for</u> <u>Red October</u>, based on Tom Clancy's novel, starring Sean Connery as Marko Ramius, the defecting Russian captain of a typhoon-class missile submarine, was featured on a Guinea stamp.



Tatarstan's Das Boot stamp



Guinea's Hunt for Red October stamp

There have been a number of stamps featuring submarines of friendly maritime nations participating in joint sea operations with our Navy. Such exercises show a unique spirit of cooperation among allied Submarine Forces while strengthening diplomatic relationships, fostering cooperation in keeping sea lanes open for global trade, and testing joint-force interoperability. For example, in San Diego in the Spring of 2009, the Peruvian Type 209 submarine BAP (Buque Armada Peruana) ARICA (SS-36) participated in anti-submarine warfare training operations as part of the U.S. Navy's annual Diesel Electric Submarine Initiative (DESI) program. BAP ARICA, homeported at the Peruvian Navy's Submarine Headquarters in Callao, just a few miles from Lima, is relatively small at 180 feet in length and with a crew complement of only 36. She was built in Kiel, Germany in the early 1970s and placed in service in 1975.



Submarino ARICA, featured in this 2009 stamp pair, is a diesel-electric submarine named after the Battle of Arica, an 1880 engagement between naval forces of Peru and Chile

In partnering with South American navies to employ conventional submarines in support of fleet readiness events, the DESI program serves to enhance the ability of the Navy to counter the growing threat of very quiet diesel-electric submarines. In June 2011, USS TOPEKA (SSN-754) and the Brazilian submarine TIMBIRA (S-32) operated in Peruvian waters as part of celebrations marking the Peruvian Navy's Submarine Centennial. During a port call in Lima, the crew of TOPEKA participated in a parade as a salute to Peru's 100th submarine anniversary. There is a long-lasting friendship and partnership between the submariners of Peru and the United States as they represent the two largest and oldest submarine fleets in the Western Hemisphere.

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The Peruvian Submarine Force, created on August 19, 1911, is featured on this centennial pair of submarine stamps. Peru's submarine fleet, with six German-built diesel boats, is the largest in South America

Peru's submarine story goes back to 1864, the same year that HUNLEY sank HOUSATONIC, when the country was at war with Spain. A submarine was being designed for the Peruvian Navy but the war ended before it could be built. However, that is not the end of the story. When Chile declared war on Peru in 1879 and waged the Battle of Arica, Peru had secretly resumed work on an improved submarine design. The result was the 48-foot submarine TORO, built from a riveted iron boiler. Manually propelled by eight men, just like HUNLEY, she could reach a speed of four knots and a depth of 72 feet. In July 1880, Peru planned to torpedo one of Chile's ironclads blockading the Arica stronghold. Unfortunately, news of their secret weapon leaked out and Chile moved her battleships out of range. By early 1881, with Chilean land forces surging north, Peru scuttled her ships, including TORO, to avoid capture. When new national boundaries were drawn, Arica was ceded to Chile.

Chile has always needed a strong Navy to protect her long coastline and submarines have been a part of her naval force since 1917. Currently, Chile has four diesel-electric submarines, two Type 209, CS THOMSON (SS-20) and CS SIMPSON (SS-21) and two AIP Scorpene-class, CS CARRERA (SS-22) and CS O'HIGGINS (SS-23). In October 2010, as part of DESI, THOMSON bottomed herself off San Diego at a depth of 450 feet to simulate a submarine in distress during rescue exercises.



THOMSON is featured on this 1992 stamp commemorating Chile's 75th submarine anniversary. Commissioned in 1984, this 195-ft submarine is manned by a crew of 32

Early this year, in the spirit of international cooperation, the Royal Navy's HMS ASTUTE (SSN-20) went head-to-head with USS NEW MEXICO (SSN-779) in Friendship 2012. On board these two extremely *high-tech* nuclear submarines were the Chief of Naval Operations, ADM Jonathan Greenert, and First Sea Lord, ADM Mark Stanhope, both top naval officers and submariners in their respective navies. For the eight torpedo exercises, ASTUTE scored two hits, NEW MEXICO five hits and one miss.

Great Britain celebrated the Royal Navy's submarine centennial in 2001 with the issuance of two 4-stamp mini-sheets in a souvenir booklet. Russia issued eight submarine souvenir sheets in 2005 and 2006 for her centennial. But before that, on March 27, 2000 in Groton, Connecticut, the U.S. Postal Service made history by issuing its first-ever prestige booklet containing two 5-stamp souvenir sheets in celebration of our own submarine centennial.

In recent years, souvenir mini-sheets, containing one or more postage stamps, have become extremely popular and serve as a revenue stream for small nations. Many countries have figured out a way to serve the philatelists of the world while creating some income, including 40 countries, mostly in Africa and the Caribbean, that have made submarine souvenir mini-sheets part of their export trade. Burundi, Brutan, Djibouti, Ginnea-Bissau, Liberia, Malawi, Mali, Mozambique, North Korea, Serbia, Somalia, Togo, Uganda and Zambia are among many who have issued such collectibles.



The dual island republic of Sao Tome and Principe issued this 4x5.5-inch mini-sheet featuring U-505 that was captured by the U.S. Navy in June 1944 and now rests high and dry at the Museum of Science and Industry in Chicago

While most U.S. Navy submarines are depicted on minisheets, many have surfaced on individual postage stamps. To date, in the submarine stamp world, our Silent Service is represented by ALBUQUERQUE (SSN-706), ARGONAUT (SS-166), BOWFIN (SS-287), CHEYENNE (SSN-773), DANIEL BOONE (SSBN-629), GATO (SS-212), HAWAII (SSN-776), HOLLAND (SS-1), HUNLEY, GEORGE WASHINGTON (SSBN-598), JALLAO (SS-368), LOS ANGELES (SSN-688), NAUTILUS (SS-168), NAUTILUS (SSN-571), OHIO (SSBN-726), PIKE (SS-6), PLUNGER (SS-2), PORPOISE (SS-7), PROVIDENCE (SSN-719), S-44 (SS-155), SAILFISH (SS-192), SALT LAKE CITY (SSN-716), SHARK (SS-8), SKIPJACK (SSN-585), TANG (SS-306), TEXAS (SSN-775), TRITON (SSN-586), TULLIBEE (SS-284), VIRGINIA (SSN-774) and WYOMING (SSBN-742).

With so many nations launching submarine stamps, the collective global fleet continues to grow. Such commemoratives serve as great tributes to submarine navies worldwide and the undersea warriors who take their submarines to sea. What a great way to honor submarines, past and present.

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SPURRING INNOVATION AT THE DECKPLATE LEVEL IN THE SUBMARINE FORCE

LT Ryan P. Hilger, USN Submarine Student at the Naval Postgraduate School

The phenomenal success of the Tactical Advancements for the Next Generation (TANG) Forum held last year has ignited a revolution in the naval forces. Perhaps we are nearing Malcolm Gladwell's tipping point in our quest fundamentally to alter how we design and operate our submarines. Vice Admiral Richardson happily announced after the event that some of the ideas for our sonar and fire control systems were so outstanding that they would be incorporated into the next technical insertion, slated for introduction to the fleet in 2014. Only a scant two months after the TANG Forum, "working prototypes have been built and are running with at-sea data."1 Despite the resounding success of the forum, the Submarine Force faces a significant challenge in encouraging and exploiting this fledgling culture of innovation. Reaching the tipping point will require the Submarine Force to create a system where all sailors have the ability to freely share their ideas for improvements to their systems-not just the combat systems. In doing so, not only will we benefit from the power and experiences of our junior sailors and officers, but we will begin to foster a new sense of ownership and pride that will propel us to the forefront of the naval service.

Small Problems that Elude Big Navy

While the TANG Forum focused on the next-generation combat systems, we can extend the idea of innovation to our current boats and their systems and achieve Vice Admiral Richardson's goal of returning our Force to a build-test-build mentality. I know from my own experience, and those of many of the sailors that I served with, that there are small changes that

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would make their job significantly easier, or at least less frustrating, if we had a way to make them known and implemented.

The Voyage Management System (VMS) makes a perfect case study. In my last few patrols, both of our VMS computers would take an eternity to do the simplest of tasks: load a voyage plan, pan the map, zoom out, bring up the Targets window, etc. On more than one occasion, one of them would simply crash, requiring a significant time investment to restart them and load the current voyage plan with all of its settings. On some days, we were even more unlucky and both would crash nearly simultaneously thankfully we weren't a certified for electronic navigation boat yet! Most sailors I spoke with as an officer of the deck when VMS would crash intuitively knew that the computer running the program simply needed more RAM to smoothly run this processor-intensive program. A whole new computer would have been even better.

Under the current model, it would take a long time, a year or more, perhaps, to get the drawings and contracts changed to allow us to install a few RAM chips and make our lives easier. The cheaper and easier solution: let us take ownership of our boats and execute the build-test-build model on a micro scale. I propose that we can solve the VMS problem in the following manner, which will be analogous to any other minor change that a sailor wants to propose. First, Navigation division reports a potential solution to the Navigator; we want to install RAM in VM1 to see if it improves performance. Second, the Navigator orders a message drafted outlining their proposal, the cost to complete the change with open source parts, and the testing they will perform to verify the change. Third, the message is sent to the type commander, among other recipients, who reviews it, consults with the inservice engineering agent (ISEA) for the system in question, and gives concurrence to the boat to make the alteration. Fourth, the ship completes the alteration and testing and reports the results back to the type commander. If successful, the change can be promulgated to the rest of the Submarine Force for implementation while the ISEA works to update the system schematics, parts

lists, etc. What would normally take a long time can now be done in a matter of days or weeks.

VMS is only one example. As a watch officer, I probably heard a hundred such ideas in my three years onboard. These were ideas that allowed us to make our jobs more efficient, provide better data flow, or improve watch team communications, but since the systems in question were not within our realm to change, they died with the end of the watch.

Details and Caveats

The generalized model described in the preceding section requires boundaries and caveats in order to be realistic and successful.

- Changes to programs of record, such as systems owned by Naval Reactors or the Strategic Systems Program, for example, would be off-limits for obvious reasons. Ideas for these systems should still be sent, not as a proposal for an immediate change, but as a means to keep the innovation going.
- Proposed changes must be reversible so that the designed system effectiveness can be restored should the alteration fail or prove less efficient.
- Proposed changes should be small enough to implement with open source, commercial off the shelf equipment that the boat can procure within its existing budget. Many boats do this already with the placement of additional computer monitors in control, for example.
- Recipients should not be limited to the normal addressees for messages to the type commander. Messages should also be sent directly to the top as well. While the type commander can make approvals for these alterations, tracking of proposals should be done within the staff of Commander, Naval Submarine Forces for trending, data analysis, and integration into future TANG workshops. Multiple proposals affecting the same system can provide the impetus to undertake a more rapid fix to a problem, which best can be accomplished from the top.

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Returning the Boat to Her Crew

As a division officer, I felt more driven than most of my peers to keep my boat and crew at the best level of combat readiness that I could. That drive came from the subconscious knowledge that my boat, even a ballistic missile submarine, was still a warship. Keeping our boat in the best possible condition meant improving the quality of the work we provided to the fleet, and by extension, our survival.

I had a variety of experiences with our maintenance facility and local submarine support center, but, increasingly I found that I had less control to effect changes to my boat because of current contracts-things we used to be able to do ourselves in the past. Giving sailors an easy outlet to make their ideas known for changes would return a sense of ownership to the crew by giving them a say in the quality of their at-sea home. Seeing the changes implemented and their lives improved because of their ideas would do even more. It would inspire our junior sailors and officers to leverage their previous experiences and think critically about the systems that they operate and how they can do their jobs better. These are the sailors and officers who are the next generation of Submarine Force leaders. Engaging them and empowering them to innovate will yield dividends now and in the future, with earned interest. Encouraging our present leaders to facilitate this innovation keeps with the highest principles of the Design for Undersea Warfare. The result can only be a better, more effective Submarine Force that embodies the characteristics of our predecessors who creatively carried the fight to the Japanese in World War II.

ENDNOTE

1. Richardson, John VADM. COMSUBFOR Command Blog. January 17, 2012.

(ONE OF) MY BIGGEST MISTAKE(S) by CAPT Jim Patton, USN(Ret)

Captain Patton is a retired submarine officer who is a frequent contributor to <u>THE SUBMARINE REVIEW</u>.

E arly 1978 was a busy time. As PARGO was finishing a 2year refueling overhaul, SUBLANT had thrown down the gauntlet and asked if we move right into preps for a classic North Atlantic deployment as soon as we got out. Fortunately, since it was more fun than the shipyard, PARGO had logged more time in Sub School's Attack Centers the last couple of years than any boat in SUBLANT, and had gotten pretty good at many of the necessary skills.

At the time, many boats—especially those coming out of the yards—were having some troubles getting certified on Mk 48 torpedoes at the AUTEC range, so the ship was loaded out with some 18 or so exercise units. SUBLANT had also volunteered PARGO to participate in the first *mini-war* at AUTEC, where it would be pitted against a 963 class Destroyer with MPA and helicopter support who would be escorting the IX range ship, as a simulated high value target, the length of the range while PARGO tried to attack.

All the Attack Center sessions paid off, the ship being declared *certified* after two successful runs, and I was told I could do what I wanted with the remaining exercise units, minus the ones reserved for the mini-war. That offer was a no-brainer, and all the wardroom officers, in inverse order of seniority, got to shoot one as the Approach Officer.

During the night before the mini-war, we were asked to serve as a target for a reserve squadron of P-3Bs out of Brunswick, Maine who were qualifying on Mk 46 lightweight torpedoes. When asked if any evasive maneuvers were desired or allowed, the answer was "anything you want, as long as you don't go faster than 12 knots, go below 400 feet or change course more than 30 degrees" – which was fine and understood, since these guys were

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trying to get qualified. What was decided was that once the weapons hit the water and the goodness of the delivery was established (splash inside of 500 yards from the submarine was the criteria for a successful attack) our BOS-14 under ice sonar would be lit off at the shortest range scale - 200 yards - which meant that every ¼ second there would be an FM sweep from 28-32 Khz. right through the Mk 46's operating frequency of 30 Khz. At the exercise washup later it was stated that although all of the dozen or so attacks had met attack criteria (<500 yds), all of the Mk 46s ran in an erratic fashion and failed to home. I was convinced then, and remain so today, that PARGO was countermeasuring the weapons by capturing some sidelobe of the weapons' sonar every 250 milliseconds with what the weapon evaluated as a valid return from whatever heading the torpedo was at the time. At the end of the exercise, having run out of Mk 46s, a Mk 44 was dropped which pinged at 60 Khz and was unaffected by the BOS-14. This torpedo detected and homed on PARGO and even went through its set safety ceiling to actually strike the ship-requiring an annoying surfacing and deployment of a diver to confirm that no damage was done.

During all of this it was noted that a sonobuoy barrier had been established across the mid-point of the range (for the miniwar Pargo had to stay south of mid-range until the 0800 COMEX, while the DD963 class with its escorted IX range vessel started from the northern end). This was clearly a *tripwire* for the transiting groups benefit, and it was decided that if they wanted to hear us, we would comply—but just pre-COMEX. After verifying from the Engineer that a crud burst could be cleaned up before 0800, MCPs were shifted to fast and the ship cruised back and forth just south of the barrier at a relatively shallow depth. At 0800, pumps were shifted to slow, and test depth ordered at a full bell. Running a mile or so to the eastern range boundary, we turned left to parallel this boundary, and again at the northern boundary to head towards the opposing force's *start box*, arriving 20-30 minutes after COMEX.

Having been taught to always have a plan, and insure that everyone else knew what it was, it had been decided that shooting

just at the simulated high value target was too easy, and that we would conduct a coordinated attack against both the HVT and its escort. This dual launch met range rules as long as the two weapons operated at different range pinger frequencies, and that the attacking ship was below the safety floor before either enabled. Both PKs were manned, and the first shot would be at the escort (assuming it would be the furthest away) with a high to medium speed setting, and the second, perhaps as we were going deep, against the IX with a medium to medium speed setting.

When we got to the start box, tubes were made ready in all respects, firing point procedures announced ("Ship not ready", "solutions not ready", "weapons not ready" – "OK tell me when they are") and an immediate ascent to periscope depth with a 20° bubble was conducted – spiraling up to clear baffles, and dropping bells as appropriate to curl into PD facing south at 3-4 knots. Several sweeps in low power – "nothing close, down scope" – but having noted that there were two contacts on almost the same bearing to the south with stern aspects – beautiful! "Ship ready" was reported.

Brief the fire control party—will do an observation on the high value target, drop the scope, do an observation on the escort, drop the scope. When get the expected solutions ready and weapons ready will do final observation and shoot on escort, drop the scope. When first weapon away will do final bearing and shoot on high value target—but be prepared to shoot on generated bearings if needed as we go deep and speed up to clear datum. Everything going as planned.

"Observation, number two scope, Master two, the escort—up scope". As the scope broke water, the escort went active—mind flashed yellow alert—"why now?" Find it in low, shift to high— "mark bearing, mark range—down scope—range 6000 yards". "Observation, number two scope, Master one, the high value target—up scope". Find it in low shift to high, escort still active, no apparent change in range scale "bearing mark, range mark, down scope—range 6000 yards".

"Attention in the Fire Control Party-we cannot attack both as planned since they are at the same range. We will attack the high

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value target—high to medium speed set. It may attack the escort since they are close in bearing, but we will evaluate what happens later and reattack as necessary—carry on" – "Firing point procedures, Master one, PK one" – "ship ready", "weapon ready", "solution ready" – "Match sonar bearings and shoot – all ahead standard, make your depth 400 feet, left 10⁰ rudder, steady course 120".

A very interesting melee occurred over the next hour or so with great fun for all, but it wasn't clear at all just what had gone wrong with the perfect plan. When all was sorted out later, it was pure pilot error. The escort's lighting off of its active sonar just as the scope broke for the first observation was sheer coincidence. The effect it had, however, was to distract me just enough to make me forget that I was dealing with a Type 18 scope, not a Type 15, and the whole mantra about snapping your right wrist forward for low power (1.5X) every time you initially touched or left that handle, and rolling it back for high power (6X) observations didn't strictly apply when the 6X position lay between the 1.5X and a new 12X which was all the way back where the 6X was on earlier scopes. What I had managed to do, for both lack of focus and lack of practice with a new piece of equipment, was to make one observation in 6X and the other in 12X leading me to believe that both contacts were at the same range when I actually had a perfect set up where one was at 6 Kyds and the other at 3 Kyds - shoot the escort with a final bearing and shoot and get the IX with a shoot on generated bearings as we went deep. As it turned out, the one weapon shot enabled directly under the IX, where it was visually sighted by an escorting helicopter who radioed "Tinman, tinman!" to the destroyer who was able to maneuver out of the acquisition cone before the weapon detected and homed.

There is a credible theory that states that all human skills consist of three constituents—concepts, procedures and techniques—in varying proportions depending on the skill involved. Concepts must be taught, procedures must be studied and techniques must be practiced. The concepts and procedures were nailed that day, but the periscope technique sucked. Just one of my biggest mistakes.

SOSUS VERSUS THE GERMAN TYPE XXI SS

By Mr. Bruce Rule

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Bruce Rule, for 42 years, was the lead acoustic analyst at the Office of Naval Intelligence. In 2003, he wrote the Navy position-paper on the acoustic, dynamic and temporal characteristics of submarine pressure-hull and bulkhead collapse events. In 2009 he provided the Navy with the first reanalysis of acoustic detections of the loss of USS SCORPION in 40-years, which confirmed that disaster was the result of a battery explosion.

Those interested in the Battle of the Atlantic fought during WWII against German submarines may have conjectured how the US Sound Surveillance System (SOSUS) would have performed against snorkel-equipped Type XXI submarines had SOSUS been operational during the war and had Germany been able to deploy Type XXI submarines in significant numbers. Acoustic data collected by Project BRIDGE in 1963 answers that question.

As extensively discussed by Olav Riste in Chapter 8 of THE NORWEGIAN INTELLIGENCE SERVICE, 1945-1970, Project BRIDGE was a Norwegian SOSUS site located on the island of Andoya. It became operational in 1963.

As part of the BRIDGE passive acoustic surveillance capability assessment against submarines operating in the northern Norwegian Sea, the Norwegian Navy provided the services of KNM KYA, a Type VIIC German diesel submarine (ex-U926) that had been snorkel equipped.

Between 24 and 28 June 1963, the KYA participated in Exercise HUBRO (Owl) which involved snorkel-mode operations at increasing ranges from the BRIDGE hydrophone array out to a maximum distance of 320 nautical miles (nm). Between snorkel periods, the KYA transited on the surface to the next position.

Every snorkel period was detected by Project BRIDGE with an estimated signal to noise ratio of more five dB at maximum

range. Assuming a conservative signal loss of five dB per doubling of range (4.1 dB was measured for a 3000 nm target in the Atlantic in 1962), that value is consistent with detection of the snorkeling KYA by BRIDGE at ranges as great as 600 nm. Additionally, some of the intervening surface transits at speeds of 10-12 knots were detected by BRIDGE.

The KYA snorkel mode acoustic signature consisted of multiple harmonics of cavitation blade rate produced by a single threebladed propeller at about 270 rpm.

These data can be used to estimate how SOSUS would have performed against snorkel mode operations by German Type XXI submarines in the open Atlantic.

When the increased array gain of 6 dB for the early US SOSUS arrays compared with BRIDGE are considered—and consideration also is given to higher ambient noise conditions in the Atlantic versus the northern Norwegian Sea—the KYA could still have been detected at ranges in excess of 1000 nm while snorkeling in the Atlantic.

Since the Type VIIC and the Type XXI had similar acoustic vulnerabilities when on the surface or snorkeling (strong propeller cavitation), SOSUS detection ranges against snorkeling Type XXI units would also have been on the order of 1000 nm while detection ranges against Type XXI units conducting high-speed surface transits to close allied convoys would have been in excess of 500 nm.

Conclusion: had SOSUS been operational during WWII with the same detection capabilities as the first stations in 1954, the system would have achieved notable success in detecting and localizing German Type XXI units operating in the western Atlantic Basin, especially if there had been a SOSUS station on Bermuda.

The writer directed the Exercise HUBRO acoustic analysis and data collection effort at the BRIDGE site in June 1963, analyzed the data at the Norwegian Defense Research Establishment (NDRE) Maritime Systems Division Headquarters in Horten on the Oslo Fjord in July, and wrote the Exercise HUBRO final report for NDRE.

WHEN DAVID SLEW GOLIATH A STORY FROM THE DEPTHS OF THE COLD WAR

CAPT Raimund Wallner, German Navy, (Ret.) March 2012

Captain Raimund Wallner, German Navy (Ret), completed his career in 2010. His final assignment was submarine project supervisor at the German MoD after having served as his country's Defense Attaché to Japan. Earlier in his career he had command of Submarine Squadron Three, submarines U-20 and U-30. He holds a masters degree in Computer Systems Management from the U.S. Naval Postgraduate School.



U-20 exposing sail

Photo: Royal Navy

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B all caps have been adopted as part of the working uniform aboard German ships and submarines, replacing the traditional garrison cap. Although baseball never meant anything to Germans, the ball cap is widely accepted by young and

old as their favorite leisure headwear. Consequently, no one turns and stares when I hike through the vineyards of the Ahr Valley wearing my USS IOWA—BB61 cap. That I own a handful of those caps is another story, originating at the peak of the Cold War in 1985, but the yarn reaches back much further—into the 1940s. A holy cow, floating castles, two Iroquois, a dinosaur and a banana play major roles in it. All ended up being scrapped or bobbing up and down in brackish waters. After 27 years there is no treason in sharing my insight into a U206-class submarine's tactics. References to NATO's regulations and procedures addressed in this story are readily available today through the Internet.

Exercise OCEAN SAFARI '85

Tremendous effort and resources of ships, submarines, aircraft and personnel went into NATO's major maritime exercises during the Cold War. They tested CONMAROPS¹ and carried names like TEAMWORK, NORTHERN WEDDING or OCEAN SAFARI. The latter's specific purpose was protecting the transportation of allied reinforcement and resupply across the Atlantic, the *Atlantic Lifelines Campaign*. The defense of convoys and carrier battle groups (CVBG) against ORANGE attacks or prevent them from the outset by forward operations was the major task of BLUE forces during the oceanic transit phase. OCEAN SAFARI '85, the biggest of these exercises to date, employed over 160 ships from 10 nations.



Crew U-20 in 1985

Photo: Author

In this great game, U206-class submarines U-20 and U-24, together with two Dutch and two French SSKs as well as British SSN HMS TURBULENT, stood on the side of the Evil Empire. Deployed to the Northwest of the Hebrides as ORANGE units, the German boats simulated the Soviet TANGO-class SSK and were tasked with sinking high value targets of opportunity in order to attrite the enemy. As Commanding Officer of U-20 I was eager to prove up to the task. Unfortunately, we could not employ our own German wire guided DM 2 A1 torpedoes and had to simulate attacks with a Soviet wake-homing torpedo. This meant considerably reduced attack ranges and a higher risk of detection. My boat had been in service for eleven years and was not included in those selected for a mid-life upgrade to 206A. We affectionately mocked her as the Banana, since a minor bend remained from the last exchange of the diesel-engines, when the pressure hull had to be cut and re-welded. At certain speeds we suffered from own noise, generated by resonance vibrations in the aft section, which

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could degrade reception in the sensitive rear sector sensors. Technically speaking, there were better boats in the *Ubootflottille*, but in exchange for this I had a crew second to none.

My predecessor's praise had been no exaggeration a year before at the change of command, when he congratulated me on the receipt of every single one of my 21-man crew.

On the evening of 9 September, U-20 made her submerged passage through the Pentland Firth between Scotland and the Orkneys, a challenge not only in terms of navigation, but also tactically since the Royal Air Force's Nimrod MPA maintained an annoying presence over these history-charged narrows. On our starboard side active sonars were detected, and the bearings indicated that they originated from the roadstead of Scapa Flow. We classified them as type SOS 21 and 1BV sonars and correlated them with the German LÜTJENS and HAMBURG class DDGs respectively. On the following day, shortly before midnight we reached the eastern boundary of the operations area, 58° - 59°N, 9° - 12°W, depths to 1,000 fathoms, periscope range 5 nautical miles, southerly winds Beaufort Force 3, wave height 5 feet, with swells. The speed of sound gradient was slightly negative down to 120 ft, so favorable listening conditions were not expected. But this would also hamper active sonar for surface ships, as a distinct laver between 120 and 140 feet would further reduce hull mounted sonar performance, offering U-20 good evasion prospects.

Soon we would have to take advantage of these conditions. COMSUBORANGE had informed us via broadcast in his enemy report (Form Black) that the *Scapa Convoy*, consisting of German oiler FGS RHÖN, representing the main body, escorted by destroyers FGS MÖLDERS, HESSEN and SCHLESWIG-HOLSTEIN would possibly enter our area 11 September. I expected them from the East, from Scapa Flow. This also eliminated concerns about dippers² – the submarine's worst enemy—making an easy prey of the convoy if it did not veer off prematurely. After breakfast, hunting fever spread among the crew. At daybreak the swell had increased, with whitecaps all around, ideal conditions to snorkel. Every additional amp-hour in the battery would improve our maneuverability during the havoc I intended to wreak among the convoy. The *snipes*, as we called our engineering department, responded energetically. Instead of habitually grousing with the Engineering Officer every time our snorkel broke the surface and the rush of air took its toll on their eardrums, they endured it silently. The CIC team determined the maximum detection range of our broadband passive sonar to be 25,000 yards against merchantmen; the sonar transmissions of the escorts, however, would give away the convoy at double that distance.

First Engagement

First indications of the task group were intermittent and weak radar emissions picked up by the ESM³-antenna mounted on the snorkel. When active sonar was detected an hour later, I ceased snorkeling and went deep. The parameters matched the German destroyers, and rough initial range was set at 40,000 yards. The CIC team started an LOP⁴ on the tracking table, the spark as TBP⁵ plotter stood ready with freshly-sharpened grease pencils, bearing rate ruler and curve templates. At 0940 we initiated attack procedures. Our depth was 120 feet, best listening depth just above the stable layer, and we proceeded at 4 knots, bow pointed straight at the convoy's acoustic centers. Soon its MLA⁶ was determined to be 270°, headed straight for our trap! 40 minutes later, individual propeller noises were identified and the screen disposition determined passively: the Holy Cow (MÖLDERS) was patrolling the northern sector, one HAMBURG-class destroyer the southern sector, and the second Floating Castle⁷ covered the rear, RHÖN was steaming in the center. At 1055, I set battle stations. The tactical picture was handed over at the GHA⁸ and various plots, the First Watch Officer (I WO) took charge of the CIC attack team, the Second Watch Officer (II WO)⁹ and the Torpedomen manned their fire control station and torpedo tubes; the Engineering Officer (EO) and his team controlled our depth, and, finally, the cook abandoned his pots and pans to man Tube number 910 with green flares at the ready.11

Then the tactical situation developed rapidly, at least for submarine standards. Active sonar transmissions now pounded our receivers and at 1110 we fixed the northern escort MÖLDERS at a

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range of 6,000 yards, and the southern, possibly HESSEN, at 4,000 yards, both maneuvering in their screen sectors at maximum sonar speed of about 20 knots. The predicted maximum detection range for hull mounted sonar and their behavior indicated U-20 had not been detected. I remained at 110 feet and closed at 8 knots, holding the AOB^{12} of the first target, HESSEN, steady. Suddenly the bearing shifts rapidly right and, at 1120, I ordered periscope depth. Steadied at the target bearing, the scope breaks the rough surface. I confirmed HESSEN with a course alteration to AOB 60 starboard, heading south, range 1,500 yards. A quick circular sweep showed MOELDERS, also on a southerly course, still 4,000 yards away. Down scope. At 1121, after double checking the target data, I ordered *fire 9* and a green flare rises for HESSEN at CPA.¹³ At 1129 I shifted targets and again *fire 9* at MOELDERS, also at CPA, range 2,000 yards.



Destroyer HAMBURG-Class

Periscope-Photo: Author
Now top priority became evasion, while maintaining track on the main target, RHÖN. The destroyers certainly spotted the green flares, and, although manning abandon ship stations would now be the appropriate action, a counterattack is likely to be next. Their sonars are chirping like mad, the 1BV of HESSEN in fast pulse repetition mode, but there are no attack signals¹⁴ — they still have not detected us! U-20 descends to 150 feet. The tanker was now so close we could have easily tracked it through the layer. At 1138, a fire control solution is ready for RHÖN, and I ordered the cook to fire a third flare at the 11,000-ton high value target. We allowed SCHLESWIG-HOLSTEIN to escape unharmed. Turning tail and running was the preferred tactic to evade MÖLDERS' powerful SQS 21. U-20 spirals down to 300 feet with full rudder, leaving a swirl, or knuckle in ASW jargon, that served as a false target for some time. Once below the knuckle we accelerated to flank speed of 18 knots, showing only our narrow rear aspect to MÖLDERS. Intermittently drifting and listening confirmed that the Convoy's noise is fading and MÖLDERS' sonar dominates. When back at periscope depth 30 minutes later I see the destroyer at the far edge of my visual range, abeam to the bearing. The other ships are no longer visible. U-20 rapidly descended below the layer and continued to clear the area. I was absolutely sure we were not detected. COMSUBORANGE later confirmed by message that we had eliminated the Scapa Convoy. It would, however, get a second life in the game in order to face HMS TURBULENT's torpedoes the next day farther out in the Atlantic.

From Hunter to Hunted

We had created a *flaming datum*.¹⁵ But now was not the time to engage in self-congratulations. Furthermore, the exercise artificiality of reporting the attack via HF radio five hours after the encounter offered the enemy an opportunity to locate U-20 by HF/DF,¹⁶ which was far more efficient than during World War II. The threat of a *hunter-killer group*—supported by MPA—was anticipated within the next few hours, so we took advantage of the lull to snorkel and restore the spent battery capacity. Then U20

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went deep on a northwesterly course, in search of new and greater adventures.

In this direction, 60 miles distant from U-20, two major enemy formations had been reported with a time indicator corresponding to our engagement on the Scapa Convoy: USS AMERICA CVBG with COMSTRIKFLTLANT¹⁷, Vice Admiral Mustin embarked, and USS IOWA BBBG. Since we only learned this in a Form Black around 2000, it was too late to ambush our prey, given our slow speed of advance. I pursued a different scheme. It goes without saying that the BLUE and ORANGE forces had no knowledge of the content of the other's operations order, but the White ExOpOrd¹⁸, valid for both sides, contained among other things, safety instructions. While studying the document, my I WO noted an ASMD¹⁹ window for gunnery exercises, including small caliber CIWS²⁰ systems as well as medium to large caliber guns set for the next day, 12 September, commencing at 0600 in the vicinity of 59°N - 10°W. Who, if not the surface combatants of the CVBG and BBBG should gather there-high value targets in every sense of my mission statement! A colossal target was at the top of the list: battleship USS IOWA, one of the last dinosaurs of the sea, screened by a multitude of US Navy surface combatants. To detect this ship would require luck, and to run a successful attack seemed nothing less than presumptuous.

That night our cook²¹ had fried *Flinsen* for mid rats, delicious egg pancakes, at the price of filling our boat with smoke, which only snorkeling could remedy. We thoroughly ventilated the boat and recharged the batteries with precious amp-hours. Around 0100 I had hardly written the presumptuous phrase *This is IOWA Day* into my night order book when the scope screamed *Alarm*. Snorkel flaps slammed shut, diesels stopped—in moments I was in CIC, which reported *MPA in the ESM*. Seconds later the EO reported "Ready to Dive". I ordered a rapid descent to 300 ft. Was this the just desserts for my presumption? With a 40° dive angle we went deep. No sooner had we reached an even keel than 20 KHz pings of active sonobuoys were heard astern. The British Nimrod had dropped them right where it must have detected our snorkel by radar. In his last periscope sweep the II WO thought he had

spotted the searchlight of the low-flying MPA. I altered course and went to 15 knots. Speed was the only way to get outside the limited detection range of the sonobuoys and break contact before the next pattern was dropped. The preventive snorkeling again had paid off. After 15 minutes we ascended to 120 feet beyond the layer, altered course and silently slipped away from possible passive buoys. As the exercise evaluation would prove later, these tactics worked.

But, it was far from over. No sooner had we apparently shaken off the MPA than our sonar reported an 8 KHz transmission in 360°, CW-pulse, probably type SQS 505 VDS²² carried by the Canadian IROQUOIS-class DDH23. Ten minutes later a second VDS was pinging to the East. Corresponding propeller noise confirmed the classification. The hunter-killers vectored by the MPA, were after us. I needed to use every tactic at my disposal to avoid initial detection, which would inevitably call the dangerous dippers into action-in this case Sea King helos. The allies tended to underestimate the mobility and underwater endurance of our small subs and this was, once again, proven in this encounter. I had two hours flank speed in reserve. If needed, I could get more than 30 miles away from the datum in this time span. No other conventional boat of the Alliance had a similar capacity. During that night it was enough to use two short sprints, several course alterations and to exploit the sonic layer without completely exhausting ourselves. That the dippers remained on deck was a good sign. Roughly one and a half hours later both DDHs withdrew-probably in the firm belief of having forced us away and deterred us from approaching during the ASMD-window. If so, they were misled. At 0600 I snorkeled again and U-20 slowly worked her way toward the center of the firing area.

Goliath

The IOWA-class battleships, keels laid in 1940 with a fully loaded displacement of 58,000 tons, were the American answer to the pride of the Axis powers: BISMARCK, TIRPITZ, YAMATO and MUSASHI. When the first of class joined the fleet in 1943, the war at sea in both theaters had long shown the conceptual

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obsolescence of these battlewagons. This fact notwithstanding, IOWA fulfilled a number of essential missions during her long life, starting in the fall of her commissioning year when she carried President Roosevelt to Casablanca and back. In the Pacific Theater she was mainly employed in support of carrier air strikes, and her 16-inch projectiles delivered heavy contributions to the island hopping campaign. On 17 September 1944, my Japanese father-in-law, platoon leader in the Battle of Peleliu, likely sought cover in his cave bunker when shell, after shell, of her main battery pounded the island, each round with more devastating effect than a heavy aerial bomb. When recommissioned for the third time in 1984, after 26 years in mothballs and only sixteen months before her participation in OCEAN SAFARI, modern weapon systems like Tomahawk, Harpoon and Vulcan- Phalanx CIWS had been added to her armament. Whereas it took a crew of more than 2,500 men in World War II to steam and fight the 889foot long giant, the complement was now reduced to about 1,500. Still, eight boilers could deliver 212,000 HP on four shafts, enough for a top speed of 33 knots.



IOWA's broadside, US BALTOPS 85

Photo: US Navy

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The 1015 broadcast contained a MARINTREP²⁴ from COMSUBORANGE indicating that IOWA was 40 miles west of U-20 two hours prior and would conduct gunnery exercises in the afternoon. We were dead right! The Chief Sonarman himself now manned the GHA and at best listening depth meticulously analyzed every contact. But, the only vessels to be heard are single

screw merchantmen steaming out into the Atlantic, at least 10 miles off. Then at 1040 a weak noise with at least two propellers was detected. I went to periscope depth to have a look. The sight made me shiver. What was visible with her superstructure just above the wave crests—heading our direction—was the bat-tlewagon. I confirmed AOB 20 starboard, range 10,000 yards. Down scope. A typical effect observed also with large and usually noisy merchant vessels has acoustically deceived us: the massive hull with bow pointed straight at us masked the propellers' noise in the forward direction. No escorts, no sonar transmissions to be heard—David had Goliath as if in a fishbowl.

I ordered battle stations. Target speed was quickly determined to be 18 knots. At a depth of 105 ft I closed at 9 knots on course that keeps IOWA's bearing steady. As soon as the fire control solution was available. I went to periscope depth for a final observation and saw her alter course 20° to port. "AOB 40 starboard, 18 knots, range 6,000 yards, fire 9!" Our green flare heads skyward at 1106. There was no reaction by IOWA. She remained steady on course. Was this ignorance or unawareness? Ten minutes later, range decreased to 4,000 yards, I ordered the second green flare fired, and descended to 180 ft. For 30 minutes, at flank speed, I kept the target on a steady bearing. The four grinding propellers were easy to detect acoustically, in spite of my 18 knots. IOWA was now zigzagging around a base course of 075°. The CIC team was working methodically, the snipes willingly sacrificed their amp-hours, so our Banana can be counted on. As the range shrinks to 1,000 yards I released the third flare. In response the giant ship turned almost 90° starboard, toward us and straight into the assumed torpedo bearing-a classic torpedo countermeasure. When the CPA was about to be reached, at a calculated 500 yards. I decided to execute a daring maneuver to leave no doubt about the presence of U-20: I turned to the reciprocal course of IOWA's and rushed to periscope depth. In spite of the adrenaline, caution prevailed when dealing with a ship having a draft of 36 ft! When the periscope pierced the surface I observe the computed target data to be correct. Relieved, I shot a number of photos and hoisted the integrated snorkel/ second

periscope, inviting the entire crew to take in this spectacular view for a couple of seconds. Then I exposed the sail so our NATO hull number S 199 was visible above the waterline. Aboard IOWA the port side was crowded in no time. Our magnifier made the faces under the ball caps distinguishable. The captain was among them; he was the only one wearing a khaki combination cover as he looked from the bridge wing through his binoculars at what was visible of U-20.



USS IOWA, AOB Port 85

Periscope-Photo: Author

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Aftermath

At 1200 sharp, after 80 minutes at battle stations had passed we went deep and cleared the area, running under the layer with high speed. After lunch, the sailors coming off watch did not immediately hit their racks, but rather rehashed what they had just experienced. That a new hunter-killer group would soon be after us, resulting in the *sinking of Canadian DDH ATHABASKAN*, that

we attacked IOWA again the next night, that in the follow-on exercise *ROLLING DEEP* we could again spread terror without being eliminated, was all dwarfed by the adventure of these 80 minutes.

The following day an Attack Report Summary broadcast by the exercise staff confirmed that U-20 had sunk IOWA, twice. It was official! Using my narrative notes the *sparks* then punched the exercise documentation into their typewriter—three-fold, using carbon paper for the NATO FORMEX 101. My *Conclusions and Recommendations* read: "...for a conventional submarine—of course favored by stormy seas—it was extremely easy to attack and get away unscathed. NATO should be better able to demonstrate on such a large scale that it can counter the submarine threat. We were only roughly a dozen in the NWAPPS and SWAPPS²⁵, what would have happened if... "Perhaps a little extra swagger from the current perspective of the armchair strategist, but that's how we U-boat skippers were at that time.

On 20 September, homeward bound and transiting the Devil's Hole Area of the North Sea we receive the final message from COMSUBORANGE: "U-20 has seen much action in the war. The Orange Motherland is proud of you. Well done comrades."



U-20's Delegation aboard IOWA

Photo: Author

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On 26 September I flew to Portsmouth/UK to attend the OCEAN SAFARI 85 PXD²⁶ as a member of CINCGERFLEET Vice Admiral *Jimmy* Mann's delegation and seized the opportunity to chat with Captain Gneckow, IOWA's Commanding Officer. He graciously accepted my gift, the framed periscope shot of his ship, remarking dryly: "I think I'll bury it at the bottom of my sea chest". But, he did not forget to invite the crew of U-20 to visit IOWA, in four weeks during her port of call in Kiel. On 24 October, with a small delegation, we accepted the invitation and went aboard the battle wagon anchored off *Tirpitzhafen*, Kiel's naval base. The Executive Officer gave us a warm welcome and presented each of us with an IOWA ball cap as a memento. Since I had brought along my family, I own a handful to this very day.

If there is still anything like human emotion where the soul of Lieutenant Yamaguchi is now lingering, I can only hope I brought him cause for a gentle smile over the *peaceful revenge* that the Cold War had permitted...

ENDNOTES

1. Concept of Maritime Operations: Acronym is COMMAROPS

http://www.usnwc.edu/getattachment/d9d2a3d6-3105-4229-a5b1-

3d42796554f5/Alliance-Naval-Strategies-and-Norway-in-the-Final-Years-of-the-Cold-War

2. Sonar carrying ASW helicopters not deployable from German destroyer classes Z103B (modified CHARLES F. ADAMS) and Z101A (HAMBURG)

3. Electronic Support Measures, radarwarning system with bearing device and frequency analysis

 Local Operational Plot, for semi-automatic tracking, picture compilation and to assist target motion analysis

5. Time Bearing Plot, pane of acrylic glass to plot target bearings relative to time elapsed, then compute ranges using bearing rates

6. Main Line of Advance

7. Navy jargon for classes Z103 and Z101 respectively; the 3 CHARLES F, ADAMS at that time had an almost sacred status, the HAMBURG-class had a towering silhouette

8. Gruppenhorchanlage, the boat's broadband passive sonar

9. 16 years later, LTJG G. should become the last C.O. of FGS MOELDERS before her decommissioning

10. Signal Ejector for decoys and pyrotechnics, located next to the pantry

11. Pyrotechnic signal to be ejected at depth, rises 300 ft in the air, indicates simulated torpedo attack

12. Angle on the bow

13. Closest Point of approach, i.e. ATB 90°

14. Via underwater telephone, plus possibly hand grenades

15 "Datum" signifies a possible submarine contact, turned "flaming" when the sub had made its presence known by a sinking

16. High Frequency Direction Finding

17. Commander Striking Fleet Atlantic

18. Common part of an Exercise Operations Order, printed on white paper

19 For exercises in "Anti-Surface Missile Defense"

20. Close-in Weapon System, to defend against missiles that leaked through the outer defense perimeter, Phalanx (US), Goalkeeper (UK)

21. Petty Officer H. was a real artist in his trade, former "junior cooking champion" of the state of Schleswig-Holstein

22. Variable Depth Sonar

23. Destroyer Helicopter (equipped)

24. Maritime Intelligence Report

25. Northwestern Approaches, Southwestern Approaches to the British Isles

26. Post Exercise Discussion

SUBMARINE NEWS FROM AROUND THE WORLD

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From the June 2012 Issue

UNITED KINGDOM—Successor SSBN Design Phase Contracts Issued

In May 2012, the United Kingdom's (UK) Successor nuclear powered ballistic missile submarine (SSBN) began its design phase. Three contracts worth US\$537.9M were awarded to BAE Systems Maritime – Submarines, Babcock and Rolls Royce. BAE Systems will receive the lion-share of the contract worth US\$504.1M and Babcock and Rolls Royce will split the remaining US\$33.8M.

All three companies will deliver the design phase of the Successor Program as part of the Submarine Enterprise Performance Program (SEPP). BAE will be the overall designer and builder if the program moves into the construction phase.

The team is expected to supply a mature design accompanied by a life cycle support plan in order for the Ministry of Defence (MoD) to make a go or no go decision (Main Gate) by 2016. Assuming that a go decision is made by 2016, the question will become; how many submarines will be built to replace the four existing Vanguard class SSBNs that are currently in service?

The current line of thinking expressed at Initial Gate in May 2011 was that a continuous-at-sea deterrence (CASD) would be preferred with the question being whether CASD could be maintained over the long term with three SSBNs rather than four. At that time, Main Gate was set at 2016, effectively delaying the decision to another administration and possibly another strategic defense review.

Additionally, one must also consider the budget situation which continues to evolve with cutbacks in almost every category of defense spending and more calls to do away with the nuclear arsenal altogether.

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If this program does move forward, it is estimated that each unit will cost around US\$5.7B per unit or US\$22.8B for four units or US\$17.1B if only three are procured. A Main Gate decision in 2016, which includes funding, would allow for the first unit to begin construction in 2019 and enter service in 2028.

The Successor Program now appears to be running in parallel to the US Ohio class replacement as the US program has now slipped to 2019. The UK and the US are working together on a common missile compartment (CMC) for their respective programs with General Dynamics currently doing the design work. As budgets tighten on both sides of the Atlantic, it would make sense for the UK and US to begin taking advantage of synergies as they present themselves.

MALAYSIA—Submarine Force Increase Being Planned

In late May 2012, the Royal Malaysian Navy's (RMN's) Chief Admiral Tan Sri Abdul Aziz Jaafar announced to the press that the sea service needed additional submarines to supplement the two Scorpene submarines received from DCNS in 2009. The Admiral did state that this would be a long term requirement as budget constraints would not permit procurement in the near term.

The budget constraints refer 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 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\$1.5B), 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 three 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 equipped submarines.

AMI estimates if new hulls are ordered by 2025, all three will be built at a foreign yard with the RMN taking possession by 2030, at which time the first two Scorpenes will be 21 years-old and the sea service will have to begin thinking about their replacements.

UNMANNED DEVELOPMENTS

AMI is currently tracking developments in the entire unmanned arena; including aerial, maritime and ground vehicles. The following are the highlights for the months of May and June 2012:

USN Eager to Expedite LDUUV Program: In its FY 2013 defense authorization bill, the US House Armed Services Committee stated it "is in agreement with the views of the Chief of Naval Operations that unmanned vehicles particularly UUVs, can complement and augment manned naval systems." In response to this assessment, US Navy (USN) has made increased efforts to enhance its unmanned systems capabilities, particularly in the development of technologies for the USN's Large Diameter Unmanned Underwater Vehicle (LDUUV) program. This increased emphasis comes after officials at the US Office of Naval Research (ONR) stated that in six months the ONR would award an LDUUV construction contract, and that in two years the prototype vehicle will be ready for sea trials.

The focal point of the LDUUV program lies in the development of alternative propulsion technologies that will allow a UUV to remain submerged for 30 to 60-days. Such capabilities require technologies that exceed the abilities of battery-only technology. Thus, the ONR has recently awarded two separate contracts for the development of prototype propulsion systems for use on long endurance UUVs. The first contract was worth US\$18M and was awarded to Lynntech Inc. (College Station, Texas, US). Lynntech has been asked to develop a system with a length of 2.5ft and a diameter of approximately 1.5ft; also, the system must be capable of supporting missions lasting longer than 30 hours. The second contract was given to NexTech Materials (Lewis Center, Ohio, US); according to the terms of the contract, NexTech will complete a design of an energy-dense solid oxide fuel cell system for a UUV with a diameter measuring 21 inches. The system will be fuelled by JP-10 liquid hydrocarbon fuel and liquid oxygen reactants.

As participants in the ONR LDUUV program, both Lynntech and NexTech join a core group of companies attempting to further long endurance UUV technology. Just last month ONR officials awarded Hydroid Inc. a three year, US\$5.9M contract for the development of an autonomy testing system, which would enable the LDUUV to conduct missions such as anti-submarine warfare, mine clearance, ISR and geographical mapping.

In addition to an advanced propulsion system, the ONR is considering technologies for the development of a universal launch and recovery module that does not require a dry-dock shelter. Theoretically, this method could be utilized aboard guided missile and Virginia class submarines.

DID YOU KNOW?

ISRAEL: On 03 May 2012, the Israeli Navy (IN) took delivery of its first Dolphin II submarine, INS TANNIN, at TKMS' HDW Kiel Shipyard in Germany.

UNITED STATES: On 25 May 2012, the keel was laid for the eleventh overall and first Block III Virginia class submarine, USS NORTH DAKOTA (SSN-784), at General Dynamics Electric Boat in Quonset Point, Rhode Island. On 20 May, the ninth unit of the class, USS MISSISSIPPI (SSN-782), was commissioned at the Port of Pascagoula, Mississippi.

From the July 2012 Issue

Rolls Royce for Astute SSN and Successor SSBN Reactors

On 18 June 2012, the United Kingdom Ministry of Defence (MoD) awarded Rolls Royce a US\$1.38B contract to produce new reactor cores for the Royal Navy's (RN) current and future nuclear submarines as well as upgrading the plant that the reactors are built.

The new reactor cores will be for the seventh and final Astute class SSN that will begin construction around 2014 and for the next generation of SSBNs, currently known as the Successor class. In 2010, the MoD decided to procure a seventh unit of the Astute class as the SSN force was reduced to seven units under the Strategic Defense and Security Review (SDSR) and it made sense to expand the already six unit Astute class to a seventh hull rather than build a one unit class of a new design.

In regards to the Successor SSBN program, Main Gate approval will not come until 2016. However, in May 2012, the design phase began when three contracts worth US\$537.9M were awarded to BAE Systems Maritime – Submarines, Babcock and Rolls Royce to mature the Successor design and develop a life cycle support plan.

The contract to build the last reactor for the Astute and the first reactor for the Successor enable Rolls Royce to maintain and operate its existing reactor core manufacturing facility and in effect, maintaining the United Kingdom's sovereign nuclear capability. Additionally, the nuclear reactor for the Successor program is one of the long lead items for the nuclear vessel program and is a necessary element if Main Gate turns out to be approval for the construction phase of the program.

UNITED STATES—General Dynamics Expanding in the Repair Sector

On 02 July 2012, AMI received information that General Dynamics (GD) has entered into an agreement to acquire Earl Industries' Ship Repair and Coatings Division. The three units that will be acquired are its ship repair facilities in Portsmouth, VA and Mayport, FL as well as its coatings division in Portsmouth.

On June 15, General Dynamics and Earl filed an application with the Federal Trade Commission, seeking a review of the proposed deal under a federal program that took effect in 1978, requiring parties to certain mergers and acquisitions to notify the

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commission and the Justice Department before finalizing any agreement.

The application is followed by a mandatory review period of 30 days. The review can be shortened by the granting of an *early termination* notice, which General Dynamics and Earl received Wednesday.

The three units that will include some 575 personnel will become part of the shipbuilding, maintenance and repair operations of San Diego-based General Dynamics NASSCO and is expected to be completed later this summer.

With the current reductions in new-ship construction in the US, GD is yet another shipbuilder to begin looking elsewhere for revenue. The acquisition of these divisions of Earl will help GD get a piece of the modernization and through-life support pie. Modernizations are becoming more and more important to the US Navy (USN) and US Coast Guard (USCG) in order to keep older units in service and extend their service lives since replacement units will not be procured at rates previously seen.

UNMANNED DEVELOPMENTS

In an ongoing effort to update AMI International's clients, the following information is provided regarding unmanned systems developments that occurred in May to July 2012:

Future US Navy UAV Plans: Despite recent setbacks in budget for procurements and the recent loss of a demonstrator prototype, the US Navy is moving ahead with plans to deploy new types of unmanned aerial vehicles (UAV) to the fleet over the next decade. In June 2012, the first MQ-4C Triton, the seagoing variant of the Global Hawk crashed near naval air station Patuxent River, Maryland. The mishap followed the cancellation of the Navy's medium-range UAS (MRUAS) program in February. The Navy had budgeted US\$1.2B for the program.

The Navy plans to follow the Air Force model of intelligence, surveillance and reconnaissance (ISR) *reach-back*, which means sending data collected by aerial unit sensors back to network nodes for analysis and prosecution. It will also employ the US Army model of tactical ISR by smart-pushing information forward to fighting units. AMI believes the primary components of the Navy's unmanned ISR strategy center on the MQ-4C, the unmanned carrier-launched airborne surveillance and strike (UCLASS) UAV and to a lesser degree the MQ-8B FireScout vertical take-off and landing (VTOL) UAV.

Although in the demonstration phase, the MQ-4C has performed well (despite the June crash) and Northrop-Grumman (NG) is planning for a fall 2012 first test flight, with the Navy performing flight testing and build-up to initial operational capability in 2015. Triton is designed with a 2,000nm mission radius with 80% of its flight time conducting ISR missions. In all, the Navy plans to acquire 68 MQ-4Cs and they are expected to be based at major naval air stations around the globe.

The future of UCLASS depends on the success of the unmanned combat air system demonstrator (UCAS-D). The goal is a high-altitude UAS, capable of carrier launch and recovery and mid-flight refueling, as well as conducting precision strike missions. In 2011, NG provided the airframe for UCAS-D and the top-four contractors – Boeing, General Atomics, Lockheed Martin (LM) and NG – were each awarded US\$500K contracts for design and performance studies. AMI estimates a new business association agreement (BAA) for UCLASS could be issued by late-2012. Under the Navy's US\$2.3B development funding plan, each carrier would include four to six UCLASS, with the goal of limited operational capability by 2020.

As unmanned programs go, the MQ-8B FireScout has been an expensive program. In April 2012, the Navy restricted FireScout operations until the cause of two separate crashes has been determined. This has resulted in weaponization delays for the UAS. When fully operational, the Navy plans to order 168 of the VTOL unmanned systems for deployment aboard 55-ships.

The Navy is closely watching two other programs: the Marine Corps' K-Max cargo UAV program and the small tactical UAS (STUAS). Still under testing, the LM K-Max has moved more than 400-tons in combat operations. The Navy/Marine STUAS program has selected the Insitu Integrator UAS. Although it has

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the capability of being armed, the Navy hasn't mentioned plans for doing so.

Although the Navy has always possessed the strong ability of interoperability required for successfully operating unmanned programs, AMI believes the sea service's current and future budget situation will be the determining factor on whether these programs become an operational reality. As the Navy's operating and procurement budget constricts, these experimental programs could face the same fiscal axe as the MRUAS.

From the August 2012 Issue

Norway—Submarine Request for Information (RfI) Released In late July 2012, AMI received information that the Royal Norwegian Navy (RNoN) had released a Request for Information (RfI) for the new construction submarine program to replace the existing force of six Ula class diesel-electric submarines (SSK). The Ula class submarines were commissioned in the early 1990s and are scheduled to be replaced by 2025.

The RfI release follows the November 2011 announcement by the Ministry of Defense (MoD) that the RNoN plans to maintain a submarine capability past 2020. The announcement indicates that the RNoN would replace the Ula class with new construction submarines under Project 6346 Ny Ubat (New U-boat) Program (also known as the Arctic Class Stealth Submarine).

Initial information attained by AMI in late 2011 indicated that the RNoN was leaning toward the Swedish A26 Submarine Program (Nasta Generation Ubat – NGU) for the replacement sub design as that program has a timeline that would also fit Norway's requirement. Norway and Sweden were partners under the now defunct Viking Submarine Program before it was terminated in the early 2000s.

Norway also needs a construction partner for any new build sub program as it only has the ability to build modules in country and needs a foreign location to assemble and integrate the submarines.

Although Sweden has been mentioned as a possible partner, other European suppliers such as DCNS with the Scorpene design, Navantia with the S80 and ThyssenKrupp Marine Systems (TKMS) with the Type 214 also must be considered legitimate contenders. In the end Sweden and Norway could also select one of the above mentioned designs rather than the A26 under development at Kockums.

With the Project 6346 Submarine RfI already on the street, the program is on track toward its next milestone—design selection in 2015. AMI believes that if the program comes to fruition, a Request for Proposal (RfP) for final design and construction could occur in 2016 and contract in 2017. This would allow the first boat to enter service in 2020.

With this program still in the early stages, Norway will not need to commit significant funding until around 2016. By then, the MoD will have to make decisions regarding total hull numbers (now at six) and construction timeline. Both of those decisions are likely to be affected by continuing budget pressures now affecting a wide number of naval construction programs in Europe and the United States. And like the previous Viking Program, it is possible that Project 6346 could be terminated. Norway's fall back option would be service life extension and perhaps modernization to allow the Ula class to serve beyond their projected decommissioning dates.

Assuming the program is funded at six units beginning in 2017; all six hulls could be in commission by 2025.

PERU-Submarine Capabilities Requirements Being Developed

In July 2012, AMI received information that the Peruvian Navy (MGP) was in the early stages of a new submarine program to replace the sea service's six Angamox/Islay (Type 209/1200) class submarines that were commissioned in the 1970s and 1980s. AMI's source indicates that the MGP is currently developing the submarine's capabilities requirements indicating a construction contract date is probably around three to four years away; around

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2016. AMI believes that four submarines will be built to replace the six Type 209/1200s currently in service.

This follows information in April 2012 that the Peruvian Government signed a Memorandum of Understanding (MoU) with Daewoo Shipbuilding and Marine Engineering (DSME) for submarines and amphibious ships (HHIC will build the latter) in the event that a South Korean solution is selected for these naval projects. Even though the MoU was signed with the South Koreans, the fact that the capabilities requirements has yet to be finalized leaves the window of opportunity open for other suppliers such as ThyssenKrupp Marine (Howaldtswerke-Deutsche Werft-HDW), Istanbul Naval Shipyard, DCNS, Navantia and Fincantieri to compete for the program.

With the Type 209/1200 now in service with the Peruvian Navy; TKMS, Istanbul Naval Shipyard and DSME with the Type 209 may have an edge as the MGP already has experience with these submarines. DCNS will probably offer the Scorpene, Navantia the S-80 and Finantieri the Type 212A. TKMS could also offer as an alternative, the Type 212A as it has already built these hulls for the German Navy or the Type 214.

For Peru, which has been considering a new submarine since 1998, offsets and financing will be the key in determining the winner for this program. South Korea is already aggressively pursuing this program as evidenced by the MoU very early on and did include new amphibious ships that the MGP is also in desperate need of. A combined package of submarines and amphibious vessels in combination with price, financing and offsets could set South Korea's offer apart from the others.

However, at the end of the day, any one of the above mentioned suppliers could offer a better deal which could prompt Peru to look at shifting to a new submarine supplier, as has been the case recently in Chile and Brazil. In both cases those navies opted for Scorpenes from DCNs to replace Type 209s.

SAUDI ARABIA-Submarine Program Resurfaces

In late July 2012, AMI received information that Saudi Crown Prince Salman Bin Abdulaziz (also Deputy Prime Minister and Defense Minister) has reactivated the Saudi program to acquire a medium-sized submarine capability. This follows information in February 2012 that Royal Saudi Naval Force (RSNF) still had an interest in acquiring medium-sized submarines to operate in the shallow waters of the Arabian Gulf and the deeper waters of the Red Sea.

Although the submarine program continues to be discussed in various government and naval circles, sources indicate that submarines are a low priority with the naval force compared to higher priority needs for air and surface defense capability on surface ships. When considering the naval force has historically been the lowest priority for funding among the branches of the Saudi Armed Forces, a new submarine capability program would likely lag in timing and funding. The lack of any progress on a sub acquisition for Saudi Arabia over the past three years since active discussions began on the topic is another indication that it has not progressed beyond a concept with no associated program funding.

Within the RSNF, frigates and corvettes remain a much higher priority and even those programs appear to be moving slowly. However, the Saudi Defense Ministry is continuing to review its alternatives in regard to the procurement of at least two new submarine hulls (AMI believes the program will eventually number up to four). Sources in July have revealed that the RSNF intends to hold discussions in regards to the French DCNS SMX-23 Andrasta and the ThyssenKrupp Marine (TKMS HDW) Type 212A. These are two of the latest designs on the submarine report market that the Saudi sea service intends to review, continuing a review of alternatives process that has dated back to at least 2008.

AMI believes that the RSNF is considering the procurement of two-four submarines as a result of the perceived increase naval threat from Iran as well as a requirement to add a submarine-based special forces capability to the fleet. However, as mentioned earlier, the reality is that the RSNF is the lowest priority service in the Saudi Armed Forces and the submarine program is the lowest priority within the Saudi sea service.

Add further delays on major defense programs associated with the death of Crown Prince Nayif bin Abdulaziz Al Saud and future

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Royal Family succession issues, and AMI believes that all of the RSNF's programs will continue to slip, especially the submarine program. In the near term, frigates, corvettes and enhanced patrol and fast craft capabilities are more likely to see awards.

PAKISTAN—Nuclear Submarine Planning

In July 2012, AMI received information that the Pakistani Navy (PN) is continuing to consider the third leg of a nuclear triad. Various press reporting, public statements, missile tests and the activation of the Naval Strategic Force Command (NSFC) since April 2012 indicate that the sea service is beginning to plan for a submarine (possibly nuclear powered) that will be able to fire nuclear capable missiles. Pakistan has loosely talked of a nuclear triad and nuclear submarines since 2008. However, these recent activities include some concrete steps rather than just passing remarks as in the past.

AMI believes that the PN will find it difficult to resist such a program while its neighbors, India and China, are fully developing their nuclear triad. Pakistan certainly recognizes that it needs a similar capability to act as a counterbalance for national survival. Although Pakistan may wish to develop such a capability, AMI believes that the PN may be decades away from a nuclear powered submarine hull as it will surely have to go it alone in this endeavor. Similar to Brazil and India, it could take 15-20 years in order for Pakistan to develop the technology for the construction of the hull, the miniaturization of a nuclear power plant as well the testing and fitting of missiles into a sea based vertical launch system (VLS).

Pakistan has yet to fully build an indigenous submarine from the keel up. Its Agosta 90Bs were built from kits delivered from DCNS. Unfortunately for this program, Pakistan will not receive such help from a foreign supplier.

Recent events indicating a push for the third leg of a triad began in early May 2012 when Pakistan launched a Hatf VII (Babur) indigenous cruise missile from a multi-tube Missile Launch Vehicle (MLFV), which will enhance the targeting and

employment options of the Babur Weapon System. However, the country is still a long way from an underwater capability necessary for equipping an SSBN.

On 19 May, the PN inaugurated the headquarters of the Naval Strategic Force Command (NSFC) and stated that the NSFC will perform a pivotal role in the development and employment of the Naval Strategic Force, which will give Pakistan a second strike capability.

On several occasions in April and May 2012, retired Pakistani naval flag officers have mentioned India and how its submarines INS ARIHANT and INS CHAKRA are helping the Indian Navy (IN) develop its second strike capability. The officers go on to mention that Pakistan needs an SSBN similar to the ARIHANT in order to fully realize its triad. Although the flag officers are retired, it appears that they are voicing the prevailing thought process of the active force.

When considering all of these indicators, it appears that Pakistan is intent on developing the third leg of a nuclear triad and a second strike capability. These capabilities usually reside in nuclear powered ballistic missile submarines (SSBNS) or nuclear powered cruise missile/attack submarines (SSGN/SSNs). As mentioned earlier, the PN is already in the early stages with missile testing and the formalization of the Strategic Command. The next step will be to formalize the capability requirements for the submarine hull, whether it is an SSBN, SSGN or SSN. This step will probably take upwards to three years through 2015.

In 2015, the Pakistani government will have to make a go or no go decision. Assuming a go decision, the government will surely have to make the nuclear missile capable submarine a national priority in order to get the funding and resources in place to begin what will be a long road to achieve the nuclear triad and second strike capability.

INTERNATIONAL—World Missile Developments

INDIA: On 31 July 2012, India's Defense Research and Development Organization (DRDO) received the *Technology Leadership Award* from Prime Minister Manmohan Singh for the

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successful development of the nation's first submarine-launched ballistic missile (SLBM).

Known as the K-15 or Sagarika, the 750km (466mi) range missile is being developed to be launched from the four triple-tube launchers in the hump-back of the INS ARIHANT SSBN that is scheduled to begin at-sea trials later this year.

While still in the testing phase, the K-15 will likely enter service after a considerable test and evaluation phase. The 10-ton missile is capable of carrying a 1-ton nuclear warhead payload and will probably enter operation service no earlier than 2015.

AUSTRALIA—Collins Class Submarine:

On 01 July 2012, ASC Pty Ltd signed a contract with the Defence Material Organization (DMO) for the maintenance of the six Collins class submarines. The new In Service Support Contract (ISSC) became effective on 01 July and replaces the former Through Life Support Agreement (TLSA). ASC was the builder of the Collins class and has since been responsible for all modification, repair and maintenance activities.

The agreement supports greater collaboration, cooperation and accountability to ensure that all maintenance and modernization requirements are met while delivering value for the money. Major refits are conducted at ASC North in Osborne, South Australia and shorter term maintenance activities at ASC West in Henderson, Western Australia.

UNITED KINGDOM: On 16 July 2012, the Royal Navy's (RN) Trafalgar class nuclear powered attack submarine (SSN), HMS TUBULENT (S 87), was decommissioned. TURBULENT is currently being stripped of equipment and will be dismantled in Portsmouth, England. Leading the way when the U.S. Navy's mission calls for unmatched endurance and stealth.

USS North Carolina (SSN 777)





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There are no refunds after 12 October 2012.

THE SUBMARINE COMMUNITY

A MEMORABLE SHIP REUNION: K-137 "LENINETS" – FIRST SOVIET YANKEE CLASS SUBMARINE

By CAPT Ken A. Lee, U.S. Navy (Ret) - August 2010

Visited several friends during an 18-day visit to Russia in July/August 2010. One of these friends, retired Captain First Rank Victor Ponikarovsky, invited me to join the annual reunion of the wardroom of the Soviet submarine LENINETS. I accepted without hesitation and found myself two days later embarking upon a five-hour canal cruise of St Petersburg with 22 former officers of the crews of the first Soviet YANKEE Class submarine, K-137, LENINETS. Two of these officers were former skippers, including retired Contra Admiral Dronov. Most of the officers were accompanied by their better half, so there were about 40 of us in total.



Figure 1

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A central table was set up in the enclosed portion of the canal cruise boat, and the ladies set out a delicious spread of cold cuts, fresh and pickled vegetables, cheeses and a variety of breads. A seemingly limitless supply of champagne, vodka and bottled water accompanied the food, the chatter, and eventually, the singing.



Figure 2

My friend Victor was the Torpedo Officer when he was assigned to this ship. Later he commanded a DELTA-III SSBN for six years. He was and still is a close friend of the Shturman (Navigator) who was accompanied by his lovely bride, Irina (Fig. 3). A photo of Victor and his DELTA-III has hung in my den for several years, and GATO and my photo hangs in his.



Figure 3

As is always the case it was easy to identify the *doers*, those who put in all the leg work to organize and execute the reunion. In this case it was two energetic and friendly fellows, Oleg and Yuri. They presented me with a Russian Submarine Force wall calendar, and since I had my *Sharpie Fine Point* pen handy, I have the calendar with the signatures of the day's attending officers. What a great keepsake.

During the meal, one nice lady kept adding a variety of meats and vegetables to my dinner plate, ensuring it never came close to getting empty. I appreciated her help, and during my toast I asked her to also sign my calendar. This met with great approval!

I never lacked for conversation during the cruise. Those who knew some English did their best to use it, but most of the dialog was necessarily in Russian. I did have one non-LENINETS friend along on the cruise, another retired submarine skipper (Captain Sergei Aprelev), whose English is impeccable. If ever there were stumbling blocks, he came to the rescue and facilitated our talks.

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Captain Aprelev served as technical consultant on the U.S. movie made by Director Katherine Bigelow, <u>K-19: The Widowmaker</u>, starring Harrison Ford and Liam Neeson. I visited him on the set in Toronto during the filming and had a most pleasant set of conversations with both Katherine and Liam Neeson. Mr. Ford was not on set the day I was there. I also put Captain Aprelev in touch by phone with our Captain Jim Patton who served as technical consultant on <u>Hunt for Red October</u>.

Several of the LENINETS senior officers asked me the same question at different times, "do you think the U.S. was involved in the sinking of the KURSK?" I was surprised to get this question four or five times, and easily repeated my confidence that the official Russian and international press reports correctly identified the onboard explosion of one of its exercise torpedo's as the reason for the tragic loss of KURSK.

Our reunion cruise occurred on July 31. The day before, I had visited the main KURSK Memorial at St Serafimovich Cemetery in suburban St Petersburg. It's a very impressive memorial, and I left one of my submarine business cards with appropriate note among the flowers lying on the memorial base.

Twelve days later, the Navy and the nation celebrated the 10th anniversary of the loss of KURSK; by this time I had left St Petersburg and was in Moscow.

Every hourly newscast, both Russian and BBC, contained about 10-minutes of footage of the memorial events in St Petersburg, in Murmansk, in Sevastopol and other sites. The story of KURSK sinking and eventual recovery was also told and retold. It was mentioned that several *hard liners* still insisted there was some American involvement in this event, but it was also clearly mentioned that own-ship torpedo accident was the officially accepted cause and even talked a bit about the exercise torpedo Quality Control problems that were uncovered.

Captain Igor Kurdin, Director of the St Petesburg Submariners Club, whom I had recently met with for two hours, was shown and quoted on some of the video newscasts. I know Admiral De Mars and Captain Dave Cooper have spent some time with Captain Kurdin, who has his own close ties to submarine disaster. He was for several years the Executive Officer on YANKEE K-219 that suffered an own-ship missile accident and sunk in the Central Atlantic in 1986. He was relieved as XO just a month before the ship sailed on its last patrol. He co-wrote the narrative book on this accident, <u>Hostile Waters</u>, with our Captain Peter Huchthausen.

Captain Kurdin presented me with an inscribed copy of the Russian language edition of his and Huchthausen's book, saying this version had the facts right and I should read it. He certainly overestimated my Russian language abilities, but I was honored to have received the book.

As our reunion canal cruise wound down, a couple of the impressive river hydrofoil passenger boats sped by. They are common in inter-city river traffic, and in St Petersburg they support the tourist traffic from the downtown Hermitage embankment to the beautiful Peterhof palace; this trip includes a fun 40-50 knot transit across a portion of the Bay of Finland.

Also, one of the officers broke out his guitar and the cruise finished with the usual energetic, after dinner singing by the men present. Several submarine songs, then a couple of Navy songs, and then some folk songs were sung. I know the first verse to three popular folk songs in Russian, so I sang the first verse and the assembled chorus finished with the remaining five or six verses in each case. As on other occasions, it seems that everyone knows every verse to every song. I got a lot of credit for knowing just 3 song parts.

I had a great day with two old friends, I made some new friends and am corresponding with them already, and I must have had my picture taken about 500 times. I'm glad I was wearing my USS GATO (SSN 615) shirt; it fit well with a most memorable day.

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WHAT GOES AROUND COMES AROUND

by CDR Michael McLane, USN(Ret)

Michael McLane graduated from the U.S. Naval Academy in 1958. After an "obligatory" tour in the surface navy, he attended submarine school in 1959 and subsequently served in four submarines, USS WAHOO (SS-565), USS SARGO (SSN-583), USS T. ROOSEVELT (SSBN 600)(B) and commanded USS DANIEL WEBSTER (SSBN 626)(G). Post command duties with CTF 60 and SUBDEVRON 12 rounded out his active duty.

August 1960, Pearl Harbor, Hawaii

F ive months of grueling shipyard overhaul behind them, the diesel-electric submarine USS WAHOO crew champed at the bit to take in lines and return to the briny. All that stood between WAHOO and full-up sea trials: a harbor cruise to check propulsion systems and a new battery. They'd circle Ford Island, then return to the yard for emergent tweaks.

A day earlier, the shipyard commander advised WAHOO's CO of a Japanese Navy Captain's wish to ride the harbor cruise. This officer had been sent to Hawaii to study U.S. Navy shipyard techniques.

The skipper's mother didn't raise any fools; he gave the only acceptable answer to an officer who stood on the brink of flag selection. "We'd be pleased to have the captain aboard, sir."

Bright and early the following morning, maneuvering watch set, WAHOO took in mooring lines, backed from the dock, rendered the customary, ear shattering, prolonged blast on the air horn and got underway. The skipper, OOD, two lookouts, and distinguished rider crowded onto the tiny bridge. This caused the phone talker, a combat experienced World War II torpedoman, to be stationed at an intermediate level in the sail, eight feet below but in perfect earshot. Things settled, WAHOO's CO whispered to his OOD, "Let's see if we can inspire the good captain to say nice things about us to the shipyard boss."

The young officer nodded his response.

WAHOO turned around Ford Island's northern tip and approached the wreck of USS ARIZONA.

The ARIZONA Memorial of today remained at the time a dream yet to emerge from the drawing board. In the long interim, a small wooden platform erected over ARIZONA supported a flagstaff anchored to the sunken hull. Each morning a marine detachment rowed to the platform in a small boat. Precisely at 0800, they raised the national ensign above ARIZONA. At sunset, the flag was ceremoniously lowered.

ARIZONA abeam, the CO ordered his OOD, "Render honors to starboard."

Crisp, military tones of the young officer's voice rang out to crewmen stationed topside. "On deck, attention to starboard."

The men, in anticipation of this order, had formed ranks forward and aft of the sail.

"Hand salute."

Each WAHOO crewman's hand raised smartly to his white hat brim. Those on the bridge followed suit including the obviously puzzled guest.

"Two," snapped the OOD.

"Carry on."

Line handlers and bridge crew, having properly saluted the fallen warrior, resumed their duties.

The Japanese officer asked, "To whom did we render honors, Captain? I saw no ship."

"We saluted USS ARIZONA. Her wreck lies beneath the flag and has lain there since December 7, 1941."

An awkward silence hung about the bridge, broken a moment later by the Japanese officer.

"So sorry about ARIZONA." Attempting to rationalize, he politely pointed out that his Navy too had suffered in the war. "I served aboard the IJN aircraft carrier TAIHO, sunk by your submarine USS ALBACORE."

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WAHOO's CO ruminated, So much for inspiring the good captain to say nice things about us to the shipyard boss. The next bomb dropped nearly sunk the skipper's heart out of sight.

The phone talker spoke up from his intermediate sail level station below, "I was a torpedoman seaman aboard USS ALBACORE that day." He paused, then continued, "So sorry about TAIHO."

The skipper's eyes darted between faces of the captain and torpedoman. Tension mounted but quickly dissolved into expressions of mutual respect. Both had too much in common seaman warriors, courageous and ready to give life and limb for their causes and countries—they just happened to be on opposite sides.

WAHOO's phone talker stiffened to the position of attention and saluted. The Japanese officer promptly reciprocated. Both knew the other had performed his duty well. Animosity had long since passed.

What goes around comes around went through the mind of WAHOO's skipper. He guided his ship back to dock knowing the Japanese officer would share only good things about WAHOO with the shipyard commander.

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LETTERS TO THE EDITOR

Re: THE LOSS OF SURCOUF: SOLVING AN OLD MYSTERY

APT Hallett has apparently researched diligently for information on the loss of the French submarine SURCOUF, so it is all the more regrettable that he was able to provide so few source references for his articles in <u>THE</u> <u>SUBMARINE REVIEW</u>. He seems to have made a strong case that the boat might not have been capable of reaching either of the positions where most published sources postulate that she was sunk: either rammed by the SS THOMPSON LYKES on 18 February 1942 or bombed by an airplane the next day. However, his conclusion that SURCOUF sneaked into Martinique and remained there undetected until leaving there for Nazi-occupied France under escort of the U-69 in late May seems to be based largely on speculation.

If SURCOUF in fact could not have reached the point where THOMPSON LYKES unquestionably collided with something, I would like to offer a simpler hypothesis (based on pure speculation on my part) for her loss: that Capt. Blaison, knowing that he was about to enter waters where his ungainly and ill-manned ship would be subject to attack from either enemy U-boats or *friendly* Allied ships and aircraft, decided to attempt a trim dive, lost depth control, and went to the bottom somewhere between Bermuda and Panama.

> Sincerely, John D. Alden
Re: THE PLIGHT OF USS CLAMAGORE

USS CLAMAGORE (SS 343), retired in 1975, became a static exhibit at Patriots Point Naval and Maritime Museum, Charleston Harbor, SC thirty-one years ago.

Though primarily a Cold War artifact, her inner construction has changed little since initial outfitting as a WWII fleet boat. She is an excellent venue for visitors to experience the confines endured by submariners during conduct of successful southwest Pacific campaigns, as well as her active roll in the Cold War. Consequently, CLAMAGORE is a major attraction at the museum and site of frequent submarine crew reunions.

Patriot Point staff considers CLAMAGORE a valuable asset. However concerns have arisen that the hull's deteriorating condition may result a potential environmental disaster in Charleston Harbor. This is based upon a study recently undertaken which alleges CLAMAGORE might sink and capsize alongside her dock. Consensus by a cadre of well qualified former submariners find the study results to be without merit. The deterioration is cosmetic only and principle structural integrity remains in tact.

Costs of repair are estimated at Patriots Point to be \$3 million, though Museum Director Mac Burdette admits this to be a *hip shot*. Actual costs are likely far less.

Key members of US CLAMAGORE Veteran's Association summoned by Burdette for a meeting on 8 August heard him express concerns over a CLAMAGORE possibly creating an environmental hazard. The Director presented planned actions, principally contracting with the state of Florida to sink the ship near Key West as a reef and object for scuba diver exploration. Other alternatives, considered unlikely were also revealed; none having the ship remain at Patriots Point. Burdette estimated attendant inquiries into these options to require seven months.

The Director admitted logic advanced by the submariners on the low likelihood of CLAMAGORE sinking is plausible and

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might overturn the recent study findings. These however are what he must currently confront. Burdette agreed if an analysis by credible licensed engineers invalidates his concerns over CLAMAGORE, he will present the new findings to the Museum Board of Directors, a South Carolina State appointed agency. He is confident this will buy twenty-four additional months for raising required funds, an achievable goal based on current projections.

Though established less than a month ago a *Save the Clamagore fund* returns increase exponentially and have already reached \$50 thousand.

The important near term objective; identify a suitable acknowledged expert to analyze and document CLAMAGORE's true circumstance. Help is solicited. Donation of these services would be a *shot in the arm* for CLAMAGORE Veterans Association's superb efforts.

> Capt. D.M. Ulmer, USN(Ret) CLAMAGORE Commanding Officer # 13

Re: LOSS OF USS SCORPION

aptain Jim Patton's glowing review of Bruce Rule's book <u>Why the USS Scorpion (SSN 589) was Lost</u> (Winter 2012 issue, pp. 151-152) was correct: It is an excellent and very important work. However, Patton did not tell readers of Rule's conclusion—without question, the SCORPION was lost because of a battery explosion.

Because some persons may not be able to obtain the book, two passages should be noted in <u>THE SUBMARINE REVIEW</u>:

"18:20:44Z on 22 May: hydrogen out-gassed by the 65-ton, 126-cell SCORPION TLX-53-A main battery exploded twice in one-half-second, instantly killing or functionally incapacitating the crew who never knew what happened. Acoustic signals produced by these events were detected by an underwater sensor....

"18:42:34Z on 22 May: SCORPION pressure-hull collapsed (imploded) at a depth of 1530-feet with an enormous energy release as potential energy in the form of sea pressure (680-psi) which was converted almost instantaneously to kinetic energy, the motion of the entering water-ram which destroyed the pressure-hull and all internal compartments in less than one-tenth (0.1) of a second."

This book—by the Navy's top acoustic analyst—should end the mass of unfounded speculation as the cause of the SCORPION's loss. These included a Mark 37 torpedo battery explosion, a circular run by a self-launched torpedo, a broken propeller blade, or (the most ridiculous) the SCORPION being sunk by a torpedo launched by a Soviet submarine.

Norman Polmar

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IN MEMORIAM CAPTAIN LEWIS HERMAN NEEB, USN(Ret)

Captain Lewis Herman Neeb, USN (Ret), passed away and the family is going to honor him and our family in Spring Grove Cemetery Section 144 in Cincinnati, Ohio, on October 7, 2012, at 1030AM. The cemetery calls the Neeb lot, "Captain Neeb's Corner." There are five generations of Neebs in this cemetery.

The monument shows an art deco rendering of a step sail diesel submarine, under power, surfacing from a gray ocean. The monument is laid out on compass heading 090, and the bow wave shows a one-third bell, speed 8 knots. Symbolism is important to Spring Grove Cemetery, and the Neeb Monument gives people passing by something to look at. The Monument has a base 16 feet wide, and it stands 8 feet tall.

Respectfully,

Commander John Neeb, SC, USN(Ret.)



In Memoriam: F. Neal Sever Submarine Veteran



F. Neal Sever, 86, passed away August 27, 2012 in Virginia Beach, VA following complications from a heart attack. He was a man among men, loved and respected by all who knew him.

A veteran of World War II, Neal served in the Submarine Service of the United States Navy on the USS BARB (SS-220),

commanded by Medal of Honor recipient CDR Gene Fluckey. He was particularly proud of the crew with whom he served. Neal was the signalman and last surviving member of the eight-man team from the Barb that went ashore in Japan and blew up a train—the only ground combat operation on mainland Japanese soil by American servicemen during World War II. This team format remains the standard for SEAL Teams today. For his bravery, he was awarded the Silver Star.

Born in Sioux City, Iowa, he was the only child of Mary (Gormally) and William Sever and was orphaned at the age of 12. Self-driven, he went on to graduate Summa Cum Laude from the University of South Dakota and was elected to Phi Beta Kappa. He attended George Washington University Law School in Washington, DC and graduated from the University of South Dakota Law School. As a professional he rose in the corporate ranks of Westinghouse Electric Corp. to associate general counsel. A dedicated athlete, he was an avid golfer and runner. In two decades of running he completed over 20 marathons including the likes of Boston and New York.

Still, his finest hours were as a husband, father and grandfather. Beloved by his family, he was a source of wisdom and humor. He is survived by his loving wife of 64 years, Marian, a son, Mark Sever and his wife Liz, daughter Mary Sever, four grandchildren and two great grandchildren. Memorial services were held at Zion Lutheran Church (Brentwood) 4301 Brownsville Road, Pittsburgh, PA 15236 on September 1st. Burial will be at a later date in Arlington National Cemetery, Washington, D. C. Memorials may be sent to Zion Lutheran Church Memorial Fund. Condolences may be sent to the family at 533 Wedge Dr. Virginia Beach, VA 23462.

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BOOK REVIEW

MY SUBMARINE NOVELS

by CAPT Don Ulmer, USN(Ret)

It began the summer of '49 aboard USS CLAMAGORE (SS 343). A third class petty officer as directed by the COB, reported to the Captain and stood uneasy by the one-man stateroom. The skipper, not bothering to look up from a paperwork cluttered desk, said, "Oh yes, Ulmer. Pack up. You're off to the Naval Academy Preparatory School."

Totally surprised, but elated, a twenty-year-old ego kicked in. I had to know all the great things I'd done to cause my selection over other eligible troops. "Why me, Captain?"

"Ulmer, you're not smart enough to make second class and we need the bunk space."

I knew instantly a story this good had to make it into a novel.

Later, upon graduating from the Academy and returning to submarines as a commissioned officer, the lifestyle often made me feel like a character in a book. Having been told of my flair for writing, I was inclined to get started, but day-to-day demands of the service afforded no time. I'd learn later the situation would be the same in private industry, hence the novel waited till final postretirement.

Submariners cannot totally leave behind experiences of their careers. Annually, many drop everything to assemble from across the country just to sit and share old tales with shipmates. USS CLAMAGORE (SS 343), retired in 1975, draws a hundred fifty to two hundred veterans to reunite annually. Sadly these numbers diminish as passage of time takes its inevitable grim toll. But the stories go on as long as survivors remain to tell them. These are flesh and blood of the submarine novels. Thus captured, the tales will go on forever for future generations to enjoy.

Actual major conflicts are abundant and selected from authentic scenarios germane to the novel timeframe. Mix these with vignettes similar to those heard at submarine reunions and a web is spun.

Emphasis shifted heavily to submarine nuclear propulsion in the mid-fifties thus creating a literary void; tales of diesel-electric submarines in the Cold War decreased as their numbers diminished and finally disappeared in 1975. This void is hopefully filled in a sequence of three new novels: <u>Shadows of Heroes, The Cold</u> <u>War Beneath</u> and <u>Ensure Plausible Deniability</u>. A fourth, yet untitled, is in works.

Liberties are taken with fiction to move plots along, but writing as a submariner, technical aspects must be correct and interpretable by lay readers. Operations are contrived but feasible. Weapon exchanges between U.S. and foreign units are of course total fiction. Events and conversations are based heavily on personal knowledge. Using these insures credibility that would be at risk were they contrived.

Submariner dependents and friends play major roles in all the books and add to their credibility. Men and women need and depend upon each other and to omit either would result in an incomplete and unfulfilling story.

I learned about USS COCHINO sinking while serving aboard CLAMAGORE in August 1949. Wild conjecture ensued. In the absence of hard knowledge, submariners are masters at contriving their own, and so we did. Of interest to me, had CLAMAGORE not required an electronic technician, I'd have been assigned to COCHINO the previous March and gotten my info first hand.

Shadows of Heroes is based loosely upon COCHINO events and is set in late '48 through mid '49. It opens:

Somewhere in the White Sea, near the port of Severodvinsk, Russia, a pair of Soviet destroyers rained thundering depth charges down upon an illegal and unidentified contact submerged below. The Russians bucked and rolled among waves heaved up by an early 1949 Arctic storm but remained at their tasks with dogged determination.

Hundreds of feet below, USS KOKANEE, an American diesel-electric powered submarine with nearly depleted storage

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batteries shuddered as shock waves threatened to rip apart the three-quarter inch steel pressure hull—all that stood between her terrified crew and the ruthless sea.

Silent graves seemed to beckon from the icy depths.

KOKANEE goes on to perform her mission and embarks for home having obtained information of great value to the United States Government. There is a twist, however. A vindictive Russian plots and attempts to carry out a unique plan of revenge.

En route her homeport, disaster overtakes KOKANEE off the foreboding Norwegian coast—insights provided by three officers who experienced it.

KOKANEE quickly became a steel-hulled version of the Hindenburg zeppelin disaster. Conning Officer Dan Bennett's reflexes kicked in. Don't do anything stupid! There's more time to think in a crisis if you stay calm. Respond, don't react. The right decision requires only seconds more than a wrong one.

He grasped the 1MC mike. "All compartments, open bulkhead flapper valves and report to control." Then on the 21MC, "Maneuvering ... Conn. Supply and exhaust blowers to full speed!" The edge on his voice apparent, he nonetheless maintained calm.

The chief of the watch yelled up through the lower conning tower hatch, "We got a problem. Batteries one and two indicate still in series. I've sent an electrician forward to verify the switch position."

"Good thinking, Chief. We're heading directly to the surface quick as we can. I'm not stopping at periscope depth unless the H2 concentration falls off. Have you notified the chief engineer?"

Cliff Harkins's steady voice responded over the 7MC, "I'm here in maneuvering."

Bennett demanded, "What do you make of this, Cliff?"

"One and two are linked in series and dumping into three and four paralleled. If we can't straighten that out, we're going to generate one hell of a lot of hydrogen." "Have you notified the captain?"

"Just got back here. Give him a heads up and tell him I'm working the problem."

Lieutenant Commander Hal Taylor's sixth sense told him they'd run afoul of something and he'd already reached the Conning Tower.

Main protagonist Terry Martin is flown from Norway directly to Washington, DC for debriefing. He travels to New London by train and meets his wife at the station.

Terry Martin spotted Brenda by the street exit. Her black skirt and matching jacket over an ivory silk blouse contrasted her college wardrobe days. Time and maturity had been generous to her. They moved slowly toward each other. In earlier days they'd have run into each other's arms.

Terry held her at arm's length. "I expected to meet a housewife and Lana Turner shows up. You look wonderful. Sleepy, honey?"

Brenda's upper lip curled slightly. "Is that all you have on your mind?"

"Sorry, sweetheart. I can't think of anything better right now." "I'll bet."

"You'd win. But then don't you always?"

She eyed his small suitcase. "This all you brought?"

"I meant to pack up before leaving KOKANEE, but the water got deep too soon."

"Oh God, Terry, that must have been awful."

He looked about and discreetly withheld further comments in the station. "I'll talk once we're in the car, okay?"

The year old '48 Mercury compensated Brenda for a cancelled vacation to accommodate an abrupt set of orders for Terry.

She reached for her car keys. "How 'bout if I drive? The seat's been adjusted to fit me for so long it's probably stuck there."

"No argument, Bren. God I'm tired."

"Well don't think that lets you off the hook. You still have to tell me what happened out there."

The Mercury hummed eastward across the new Thames River

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Bridge toward the Groton side. Yellow carbon lamps lit their way across the arch in mid evening. Terry looked to his left, north toward the submarine base. Nearly all the finger piers had submarines moored alongside. Their anchor lights twinkled through the clear night air.

He thought, A few short weeks ago, KOKANEE would've been berthed there. But now, never again.

Brenda broke the silence. "Well?"

"You won't give a tired old sailor a break?"

"Nope. Everything. I want the whole nine yards."

"It was ugly, Bren."

"Was it ever different?"

He recited the grim details. Brenda tried not to punctuate his story with too many gasps. Too much of their married life had passed with her knowing he might never return.

Other men before Terry pursued Brenda, most of them now with nine to five jobs paying far more than a submarine commander and enjoying hearth and home at each day's end. She wondered how she lost herself so easily to Terry. This recurring question emerged during his recent absence, but she was a Navy wife and would remain so.

The novel twists and turns from here to its surprising climax.

Returning from a day cruise during officers' submarine school, I stood on the bridge and as we passed Race Rock, well inside U.S. territorial waters, I overheard a senior officer say as he pointed to port. "Right over there. We watched a Soviet Whiskey Class submarine broach and re-submerge."

I thought, what an idea for a new novel! Turn about is fair play, and *The Cold War Beneath* tells of a Soviet Submarine visit to the U.S. coast.

Retired Navy captain and renowned oceanographer Don Walsh writes in part: "Both the United States and the Soviet Union observed each other's coastlines using submarine platforms to track military operations and collect electronic signal intelligence. It was all part of the game, and Captain Ulmer provides a fictional idea of how such operations were conducted. USS PIRATEFISH

submarine in <u>The Cold War Beneath</u> depicts one of these operations.

An encounter between PIRATEFISH and a Soviet Whiskey goes:

Soviet Whiskey class S-201's main motors stopped and Andrey Petrov ordered a slow left turn. Full rudder would slow the ship to a full stop and make depth control extremely difficult.

Halfway through the turn, Michman Nikolai Oblonskiy reported, "Sonar contact broad on the port beam, signal growing stronger, true bearing's steady."

Petrov immediately recognized the conditions that put S-201 on a collision course with the reported contact. "Classification ... quickly!"

He knew they were deep enough for a surface ship to pass well above, but a submarine would pose a completely different problem.

Commanding Officer Igor Sherensky had to make an immediate decision. Available options ran through his mind, all affected by target classification.

Coming to periscope depth is the only way to avoid collision if the contact's a submarine. Depth soundings showed insufficient room to pass below the contact, as both were likely at the same depth for optimum sonar listening. However, proceeding to periscope depth would mean certain collision should the contact prove to be a surface ship.

The captain judged the highest probability to be a submarine in trail. He ordered his ship to periscope depth, at the same time directing Petrov to ensure all watertight doors shut. With the little momentum S-201 had left, she proceeded upward.

Petrov asked, "Shall we prepare weapons, Kapitan?"

Hesitating for only an instant, Sherensky stated, "Two ASW torpedoes. Flood and pressurize the launchers, but do not open the caps unless I order it."

He believed it unlikely the Americans would attack in international waters except in self-defense, but he would take no chances.

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"Yes, Kapitan."

Now the hard part, Sherensky thought, wait to see if we guessed right.

Aboard PIRATEFISH, Chief Sonarman Jensen seized the headset and demanded of the sonar watch, "What happened?"

"He disappeared, Chief."

"Any bearing change before that?" Dan Bennett reached the torpedo room sonar station just as the captain arrived in the conning tower.

The skipper ordered condition Baker set (ready ship for collision).

Jensen maintained bearings on the Whiskey's fifty-cycle line, but had no distance except a rough estimate. Range could be determined only with active sonar, certain to alert the target and betray PIRATEFISH's presence.

The chief knew time had run out and said to Lieutenant Bennett, "Recommend coming right immediately."

Dan now confronted the same dilemma as the S-201 captain. Up or down? He based little more than an educated guess at what the Whiskey would do.

Bennett used the secure sonar-conning tower circuit. "Recommend holding this depth and stopping, Captain."

Skeptical, Warden asked, "You sure, Dan?"

Hell no I'm not sure. "Best possible move based on what we know, Captain. And slowing will reduce impact damage if we collide."

A timid man, Warden did not like hearing the word collide and fretted over what found him in this situation. *This is the hand dealt, so we'll play it.*

Jensen said in a steady voice, "Mr. Bennett, have our sixtycycle motor generators secured."

Protocol called for this to be a recommendation, but under the circumstances urgency preempted. Bennett passed orders to the maneuvering room. Intercommunications and normal lighting shut down and DC powered emergency lighting kicked in.

From the conning tower, Warden asked, "What's happening, Dan?"

Dan passed the question on to Chief Jensen who replied, "Strongest non-propulsion signals I get are from fifty-cycle motor generators. We gotta play it like they can hear us too." Bennett nodded and passed the information on to the captain.

"Oh my God," Jensen gasped. "She's coming right at us. Pray we're not at the same depth." As Bennett passed this word to the conning tower, PIRATEFISH began to roll to starboard—five degrees—ten. At thirty degrees, china slid off the crews' mess table and crashed into the passageway. At fifty degrees the men seated there followed suit. The roll reached a sickening sixty-five degrees as everything not tied down dumped onto the decks and accumulated on PIRATEFISH's starboard side.

Trent Warden knew his ship had collided with the Whiskey, but heard no sound. His first inclination: blow all main ballast and surface immediately. He had the wisdom to seek validation of his decision with Dan Bennett.

Keeping tension out of his voice with only great difficulty, Dan asked, "Any flooding reported, Captain?"

The ship righted itself; the officers dispersed to isolate personnel and equipment casualties.

In an unusual twist, a Soviet agent is put ashore to observe activities at the U.S. submarine base. Befriending a student at Connecticut College to exploit its position as an observation point ends up giving the fluent English speaking Russian more than he bargained for.

The yarn spins on to an intriguing conclusion.

<u>Ensure Plausible Deniability</u> is a mid-sixties tale of the Soviet Navy flexing its muscles throughout the world's oceans provoking head-to-head confrontations with U.S. units. Ensuing games of chicken on the surface and beneath the seas between vessels armed with nuclear weapons portended disaster. It would take only one hotheaded skipper on either side to go off half-cocked and plunge mankind into World War III.

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The saga is set in the backdrop of U.S. diesel-electric submarines' demise to make room for the higher performance nuclear powered submarines. However, the questionable nuclear power program officer selection criteria disregarded submariner performance excellence and accepted applicants solely on academic excellence. This practice may have portended disaster of its own.

The novel opening scene is based on personal experiences during the Mediterranean mid-sixties deployment of USS CORPORAL.

USS CLAMAGORE, a Guppy III diesel electric submarine, plied the eastern Mediterranean Sea on a cloudless late summer afternoon in 1965. Westbound from Athens to Naples, Italy, she passed south of the Greek Island, Kythira. Uneventful thus far, CLAMAGORE's voyage stood on the brink of an abrupt change.

Russians had begun harassing U.S. submarines running on the surface, serving notice to NATO allies they no longer dominated the Mediterranean waters.

CLAMAGORE moved ahead on four engines through a flat calm sea at seventeen knots. KOTLIN weighed anchor and approached with the bone in her teeth—a white bow wave caused by high speed.

"Captain up!" Commander (CDR) Phil Redmond mounted the tiny bridge. "What've we got, Paul?" he asked the officer of the deck.

"KOTLIN at one-six-zero, closing, Captain."

Redmond needed no binoculars to verify this. "I see him," he declared then ordered the lookouts, "Stay alert, lads. Don't get hung up on KOTLIN and miss something else."

"Aye, Captain," the men chorused, continuing to scan the horizon but frequently looking aft toward the closing Soviet—their hearts pounding. *Russians are the bad guys* went through their minds. They knew at KOTLIN's current speed, its prow could slice through CLAMAGORE's three-quarter inch pressure hull like a mess cook's cleaver opening a tin of fresh milk. Visions of floating helplessly in the sea dried their mouths. "Okay, Paul, I have the conn." Redmond took charge of maneuvering the ship. "Lay below and hang the MK-four (a camera adaptable to periscope optics) on number one. Get a shot every thirty seconds and log times."

"Aye, sir." LT. Scott hastened below.

International rules of the road require burdened vessels to maneuver and avoid privileged ships. Approaching from CLAMAGORE's stern burdened the Russian. A catch-22 in this rule put CLAMAGORE between the devil and the deep blue sea. Privileged vessels must maintain course and speed until well clear—2,000 yards.

KOTLIN approached from dead astern then veered left, overtaking CLAMAGORE to port one hundred yards. She pulled ahead, her huge bow waves tumbling over CLAMAGORE's low forward deck. Five hundred yards ahead, the Russian stopped and made a slow right turn bringing her to rest squarely on CLAMAGORE's track.

Redmond initiated evasive action. "All stop, left full rudder." CLAMAGORE barely missed the marauding KOTLIN.

Characters inherited from <u>Cold War Beneath</u> follow diverse and compelling paths that converge to a common moving climax and reaffirm the premise that novels are about people. Vignettes of crewmen spice the plot. An acknowledgement to a retired CLAMAGORE CPO reads, "George Bass for sharing his endless repertoire of after battery tales. George, you know I believe every word."

For veterans, the submarine novel writes itself. Pick an experienced major conflict, select from the endless supply of known characters, then sit back and watch the river flow.

<u>Shadows of Heroes</u>, <u>The Cold War Beneath</u> and <u>Ensure Plau-</u> <u>sible Deniability</u> are published by Patriot Media, Inc., Niceville, FL (www.patriotmediainc.com).

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Today's Submarine Force is expected to execute national and theater level tasking that may include any number of missions that require submarines to gain and maintain access to denied areas. Thus, the Navy and nation depend upon submarines developing their own organic and "beyond organic" capabilities that enhance their capacity to execute new and emerging missions with other joint warfighting systems. Technology is a key enabler that offers unparalleled opportunity for the Submarine Force to effectively balance the need for stealth with the delivery of lethal and non-lethal payloads across the Continuum of Military Operations.

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Submitters will be notified of a decision by 30 November 2012. Thank you in advance for your submissions.