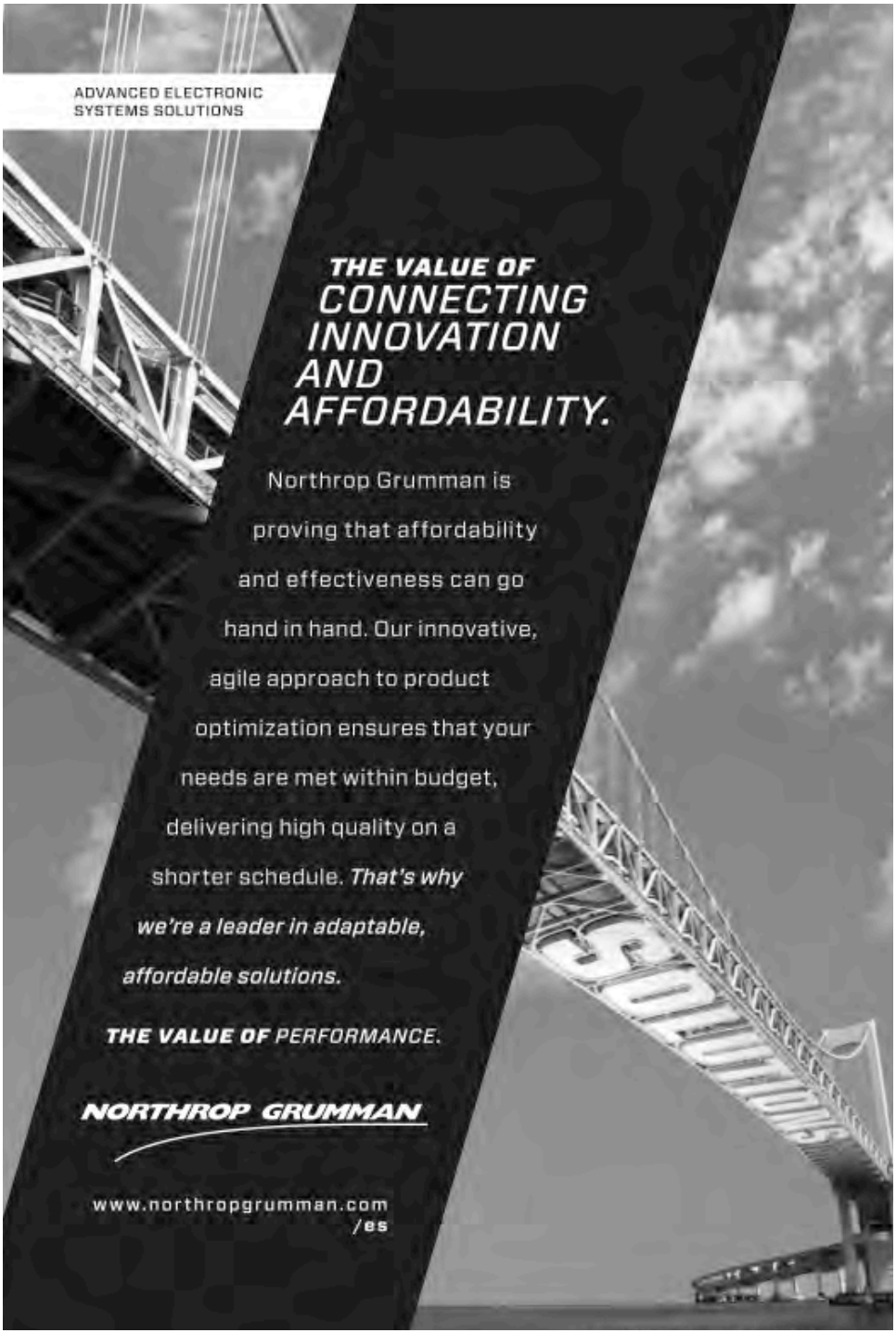
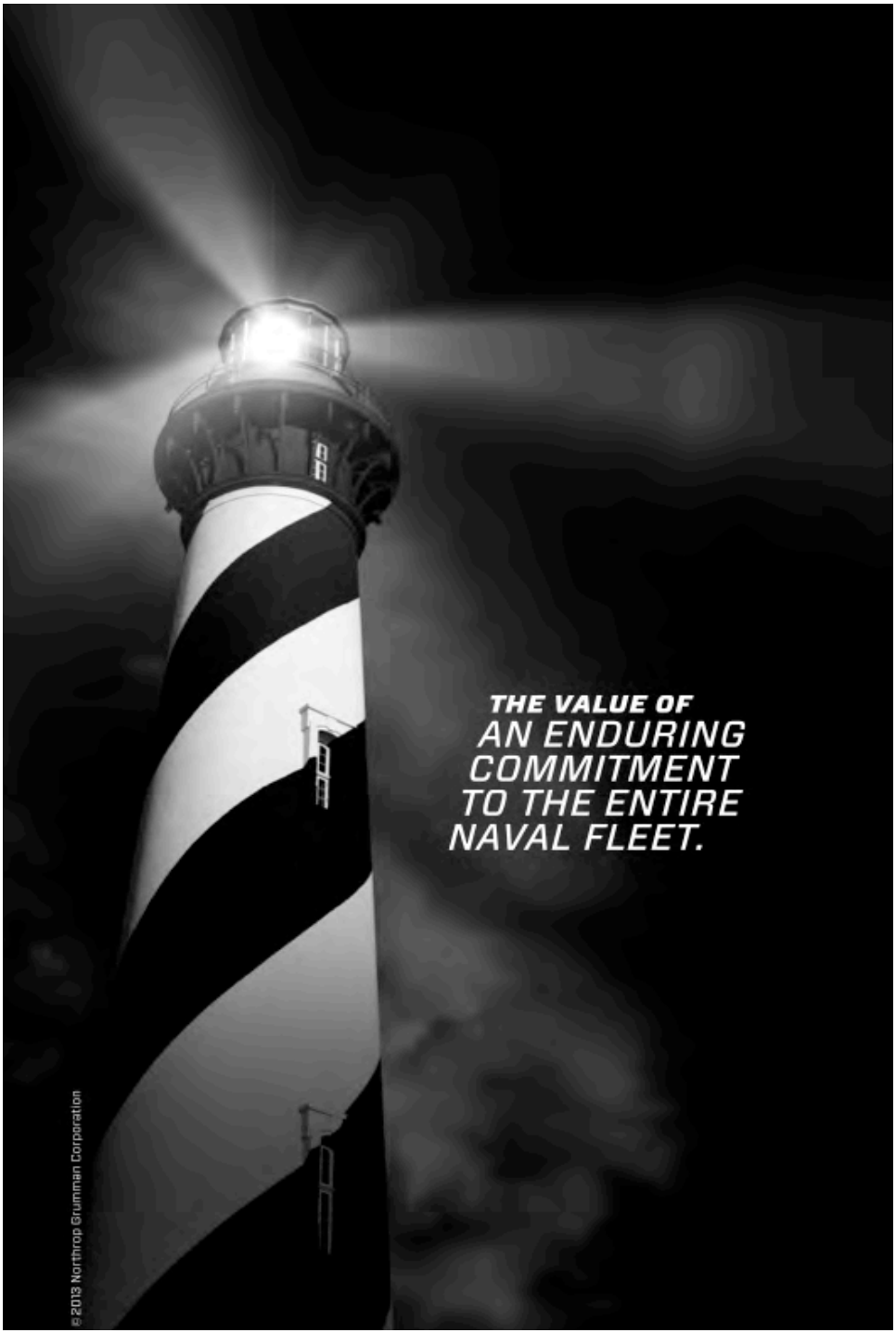
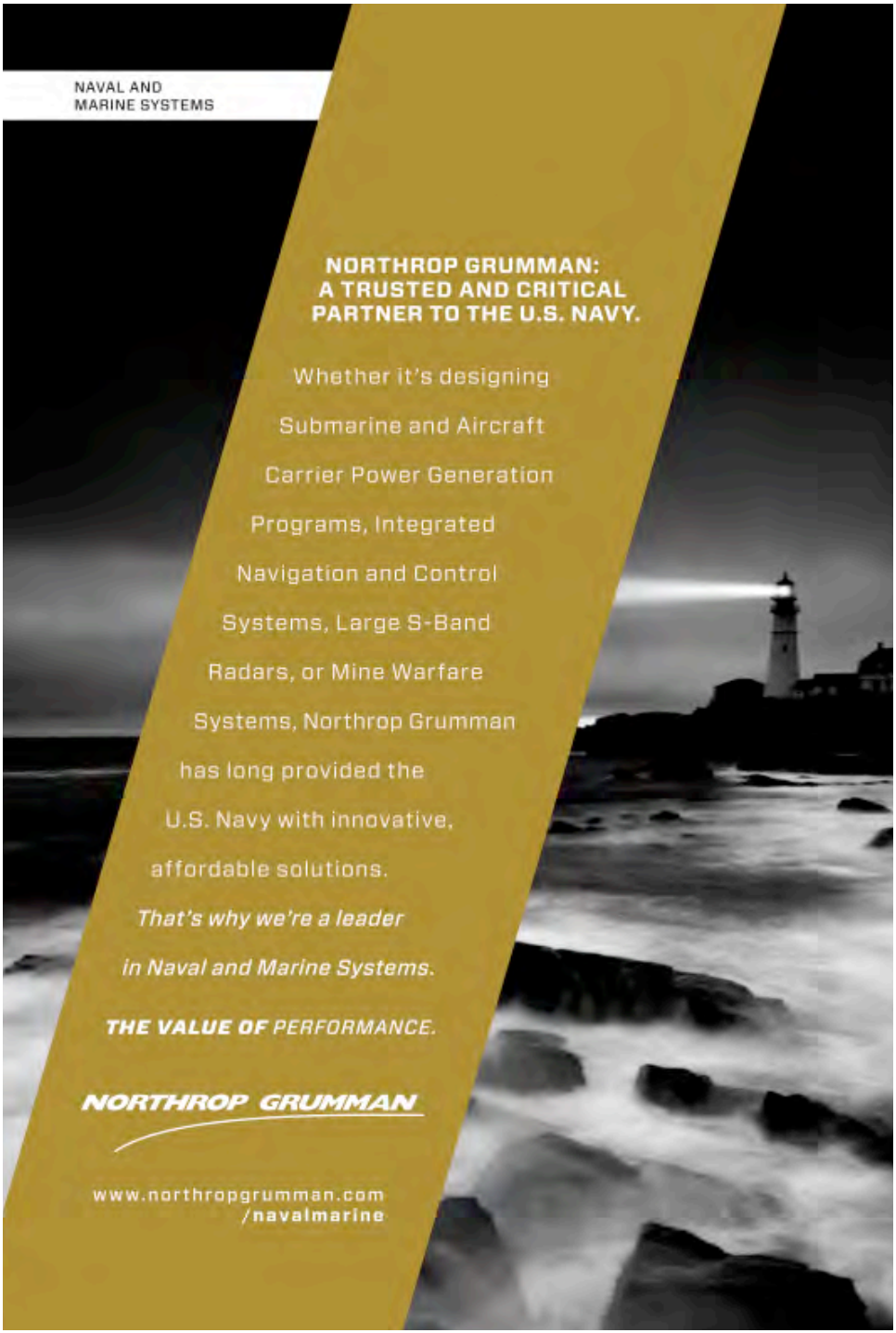
SUMMER 2013



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EDITOR'S COMMENTS

This issue of THE SUBMARINE REVIEW continues, and Features, the Naval Submarine League's efforts to keep our membership up-to-date on the USN Submarine Force's efforts to acquire sufficiently competent ships, equipment and weapons to accomplish their missions in defense of our nation. Three Admirals charged with managing the main acquisition projects recently addressed their aims and concerns. Two of those, Rear Admirals Rick Breckenridge and Dave Johnson testified before the House Armed Services Subcommittee on Seapower and Projection Forces. Their testimony covers both the arguments for, and the implementation of, the three major submarine shipbuilding programs: the new SSBN to replace the OHIO class, the VIRGINIA class SSN and the VIRGINIA class Payload Module which will help offset the loss of cruise missile capability when the four SSGNs have to retire. Please go over these testimonies and use these facts in your contacts with the public. It is imperative the American people understand what is at stake here.

The third Admiral to speak about his part is Vice Admiral Terry Benedict, Director of the Strategic Programs Office. The OHIO Replacement Program will use the current D-5 missile system and that system is being appropriately upgraded rather than developing a completely new ballistic missile system. The whole integration of the many parts of the OHIO Replacement Submarine is, of course, very complex, but the important point is that each part is very time critical. The end point of getting this class to the Fleet will determine just how well the implementation of Nuclear Deterrence by the United States is passed from the current OHIO-class SSBNs to the successor boats.

Nothing is **more** important than getting the OHIO Replacement Program done right and on time, but there are still some very big issues out there about the future of the U.S. Navy. Two new books address some of those issues and reviews of those books by very knowledgeable navalists are presented here in a place of honor just after the three Admirals. On the one hand Dr. Sam

Tangredi, a retired USN Captain, takes on categorization of the Anti-Access/Area Denial threat faced by any far-forward force trying to influence a recalcitrant power. Rear Admiral Jerry Holland has reviewed Sam Tangredi's book very favorably. This magazine concurs and recommends it for all in the submarine community. The other book noted here is the Hon. Seth Cropsey's MAYDAY: the Decline of American Naval Supremacy. This was reviewed in the Wall Street Journal by Admiral Gary Roughead, the former CNO.

The ARTICLES section hopefully provides some variety from the heft of policy issues with ongoing programmatics and serious big picture problems. Joe Buff leads the section off with an in-depth discussion of **all** we should be thinking of about the Arctic. That is a subject most will agree is not now at the top of our To-Do Lists; however, Joe does make the case that sooner is much better than later for moving that subject up on our list of concerns. Then there is Dr. Tony Well's tribute to Admiral Sandy Woodward of the Royal Navy's Falkland Islands conflict. An outstanding biographical sketch offers all serving sea officers some very cogent lessons.

Captain Jack O'Conner's article about the British use (or mal-use) of American supplied B-24s in WW II is, of course, one factor in what was once a hotly contested Anglo-American debate about the Atlantic U-Boat War. Admiral King was roundly criticized by the Brits for his naval priorities not having U-Boats at the top of his list. Admiral King, in turn, held that war could only be won by closing the *air gap*, and that meant by having sufficient long-range air. Thus the importance of Jack O'Connor's research.

And there is also the story about one man's plan to use a submarine to rescue Napoleon from his island exile.

Jim Hay
Editor

FROM THE PRESIDENT

The US Submarine Force continues to demonstrate that it is the most capable, the most ready, and the most reliable undersea force in the world. As you would expect, the Navy's call to sustain Undersea Dominance is being answered by the men and women who build, maintain, operate and sustain these exceptional combatant warships and their payloads

With the commissioning of USS MINNESOTA (SSN 783) in September, the submarine building team continues to perform with distinction, meeting or improving upon all key challenges and milestones. This outstanding performance has heightened the awareness of the importance and value of submarines and the quality and value of the men and women who work to deliver these submarines on time and on budget.

Operationally, submarines at sea continue their superb performance and those who train, maintain, and modernize our submarines keep the Submarine Force combat capable and operationally ready.

Our Strategic Deterrent Force continues to excel. In September, the Navy conducted a successful Follow-on Commander's Evaluation Test, firing four missiles in support of the Navy Strategic Systems Program, assuring the system's readiness and reliability. This marked the 145th, 146th, 147th, and 148th successful tests of this vital strategic deterrent system, a remarkable record of excellence in an area essential to ensure our nation's defense.

Our Attack Submarines are forward deployed, operating in every operational theater responding to myriad Combatant Commander taskings. Demand for Attack Submarine services continues to grow in a most demanding operational environment.

And, of note, Commander Richard N. Massie, USN, Commanding officer, USS MAINE (SSBN741)(Gold), was recently awarded the VADM James Bond Stockdale Leadership Award, reflecting his superior leadership and high standards and representing the very best of our Submarine Force.

In this most demanding fiscal environment, the Submarine Force priorities have been clearly and concisely stated and energetically pursued.

The design and engineering effort for the OHIO Replacement Program is proceeding according to schedule and the program enjoys strong support.

The VIRGINIA Class Submarine Program continues to build two ships per year and cost and schedule performance continues to improve. All ships currently under construction are forecast to deliver ahead of schedule and under budget, which is critically important as the contract for the next block of the VIRGINIA Class, Block IV, is being negotiated.

The design effort for the VIRGINIA Payload Module is maturing and the value of the increased volume provided by this module is well appreciated.

Evolving new and more capable payloads is key to the Submarine Force's ability to sustain Undersea Dominance. Substantial effort is being expended to integrate manned and unmanned off-board systems with our submarines, to include the anticipated installation of the Universal Launch and Recovery Module on an SSGN.

While the superb performance of submarines and their crews, the responsive combat capability these submarines provide, and the success of the VIRGINIA Class acquisition program are critical factors in sustaining a strong Submarine Force, your ongoing effort to educate and update elected representatives and their staffs is key to keeping our Submarine Force fully capable, well trained and properly maintained. Toward that end, the Naval Submarine League is working to increase membership and recruit members who are active duty and retired, officer and enlisted, partners in the industrial base and submarine advocates. Keeping our members of Congress and their staffs well informed and aware of the issues that are important to the Submarine Force and Submarine Industrial Base is key to sustaining the well earned support that the Submarine Force enjoys today.

The Naval Submarine League remains strong and on solid financial footing. At our Annual Symposium this Fall, we will

welcome five new members to the Board of Directors; Mr. Sandy Baker, ADM Kirk Donald, Mr. Walt Kitonis, Ms. Teri Marconi (for her first full term), Mr. Roger Sexauer, and former MCPON Rick West. We also welcome two new liaison Board members: RADM Rick Breckenridge and FORCM (SS) Wes Koshoffer.

Also, during the Annual Submarine Symposium, a distinguished group of speakers will address the fiscal challenges that our Navy and our Submarine Force are facing. Submarine Force leadership from the operational, acquisition, resource sponsor, and technical communities will speak and, in addition, we will honor the 2013 Fleet Awardees during lunch on Thursday, October 24th and honor the 2013 Distinguished Submariner and the 2013 Distinguished Civilian during the banquet on Thursday evening.

Your contributions and feedback to the Editor of THE SUBMARINE REVIEW keep it interesting and a valuable resource to stay informed on issues of the day (e.g., Congressional testimony in this issue). It is widely distributed and well received by submarine advocates and leaders in industry, government, and the Navy. Please provide the Editor your comments and articles so that we can keep THE SUBMARINE REVIEW relevant, current and interesting.

As I said last quarter, we are working to improve the quality and the value to our members of our website and of our periodic Naval Submarine League Updates. Please let us know how these resources can better serve you.

It is my privilege to serve you in the leadership of the Naval Submarine League and encourage you to recommend membership to your shipmates and friends.

Finally, as you enjoy the upcoming holiday season, I ask that you keep our nation's men and women in uniform around the world in your thoughts and prayers.

John B. Padgett, III
President

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FEATURES

TESTIMONY OF
REAR ADMIRAL RICHARD P. BRECKENRIDGE
DIRECTOR, UNDERSEA WARFARE DIVISION (N97),
DEPARTMENT OF DEFENSE

ACCOMPANIED BY:
REAR ADMIRAL DAVID C. JOHNSON
PROGRAMS EXECUTIVE OFFICER FOR SUBMARINES,
DEPARTMENT OF DEFENSE

Committee on House Armed Services Subcommittee on Seapower and Projection Forces

September 12, 2013

The formal written statements provided by Rear Admirals Breckenridge and Johnson were made available to the NSL membership by the Naval Submarine League Update of 20 September 2013.

CHAIRMAN FORBES:

I want to welcome our members and our distinguished panel of experts to today's hearing that will focus on our undersea warfare capabilities and challenges.

As to this hearing, I continue to believe that the undersea warfare capabilities provided by our United States Navy provide a preeminent role in the—control of the global commons. These capabilities provide the United States with a key, asymmetric advantage over any potential aggressor. Even in a time of declining resources, it's crucial that our nation continue to retain our strategic advantage in undersea warfare.

At the heart of our current fleet is the Los Angeles class attack submarine. To augment the Los Angeles class, this committee has been successful in the authorization of two Virginia class submarines per year. And we authorized another two boats in the

fiscal year 2014 NDAA. However, with the accelerating retirement of the Los Angeles- class submarine, our nation will drop below the 48-boat goal starting in 2025.

I believe that our attack submarines are an essential element to any of our nation's high-end warplans, and I remain committed to continuing the annual procurement of two Virginia-class submarines to retain our asymmetrical advantage.

Our Submarine Force also provides a substantial strike capability with the land attack Tomahawk cruise missile. Our Navy has four of Ohio-class guided missile submarines that can each carry 154 Tomahawk cruise missiles. Unfortunately, these four boats are scheduled to be retired. The Navy has proposed to replace this reduced strike capacity with the Virginia Payload Module. I believe that the Virginia Payload Module could provide this additional capability to the fleet. And I'll closely monitor the affordability of the Virginia Payload Module to ensure that the benefits outweigh the associated cost.

Finally, the Ohio-class replacement program is expected to provide almost 70 percent of our nation's entire strategic arsenal. Our national security rests on our ability to deliver this boat on time and within budget. Unfortunately, the cost of these 12 boats will each average $6 billion. And they crowd out other ship-building interests starting in the next five years.

I believe it's imperative that the Department of Defense allocate the correct funding towards these strategic assets and ensure that our United States Navy does not disproportionally bear the burden. The fair share division of our nation's defense resources at the Pentagon needs to come to an end to ensure that our naval forces are properly resourced for our future challenges.

Today, we are truly honored to have as our witnesses the director of the Undersea Warfare Division, Rear Admiral Richard Breckenridge, and the Program Executive Officer for Submarines, Rear Admiral David Johnson.

Gentlemen, we want to thank both of you for your service. You're the best our country has to give. We thank you both for being in the role that you're in. And we are looking forward to hearing your testimony today.

I now want to recognize my friend, the ranking member from North Carolina, Mr. McIntyre, for any remarks that he might have.

CONGRESSMAN MCINTYRE:
Thank you. Thank you, Mr. Chairman.

As we look at the Navy's plan in undersea warfare programs, we couldn't have two better witnesses. So thank you, Admiral Johnson and Admiral Breckenridge for your service and for being here today.

And thank you, Mr. Chairman, for holding this hearing. Because we do know the Navy's undersea capabilities are critical -- critical issues facing the DOD and the Congress as a whole.

Particularly, I want to thank Admiral Breckenridge, whom I've known since I first came to Congress for his leadership and character, for his integrity and—and for your service. And thank you for being a continuing example of that, from the time I knew you when you were studying for your first exam to be able to do nuclear engineering and to go on to submarines.

And to have risen today to the responsibility and rank you have, you've been steadfast in that. And thank you for that great witness of character.

As we look ahead to examining the Navy's plans in this area, there's a lot of talk about China, about other countries having asymmetric advantages over the U.S. But we know in terms of submarines, the reverse is true, and you gentlemen know that better than anybody which is, of course, why you're here today.

We know that our submarines are clearly at the forefront and clearly have the most mobility to do what needs to be done quickly, accurately and responsibly.

We know that means we can't take that advantage for granted, and it means that we can't simply standstill, or, I guess the better parallels say we shouldn't just simply stay anchored, we must get underway. And we must stay underway with the advancements in our submarine fleet and our underwater warfare capabilities.

Another reason, of course, we want to talk with you gentlemen is we're concerned about the cost of the current submarine

programs and how that's gonna impact what we do now, but obviously what we do in the future.

In the fiscal year 2014 budget alone, there's more than $5 billion in shipbuilding procurement accounts for the Virginia class attack submarine program. That is supposed to continue for many years.

There's also about $750 million in research and development for the Ohio class replacement submarines, which I know we've had some conversations about, even though we are years away from actually starting construction.

In both cases, in plain terms, that's a lot of money.

But as things stand today, it looks like the nation gets the most bang for its buck out of these investments.

With falling budgets, with sequestration, we are concerned about how the Navy will be able to keep these programs on track. It's not only a personal interest, or a professional interest for you, I know, as Navy officers, but it's an interest that I know you share in our national defense, in a concern on behalf of our nation.

Finally, I want to mention the future of unmanned, underwater vehicles. The progress in this area is raising some important questions. Will the Navy be able to expand its global undersea presence without the expense of building more and more large very expensive manned submarines? Or, alternatively, will the Navy, in the future, do more to have a balance of some type? And, if so, in what proportion of both manned and unmanned submarines working together to make our overall submarine fleet more effective?

These are the type of questions—we know that we hear a lot about unmanned aerial vehicles these days. And that's captured the public's imagination, but also been the reality in our military.

This is a new area, though, for many people. And as our citizens start asking questions, we would like to hear your answers, as we look ahead to those unmanned submarines and other ways of having unmanned, underwater vehicles and activities.

We look forward to your testimony. Thank you for your service. And, indeed, we pray God's blessings upon you and your

families, because we know they make great sacrifices in the lengthy times that you have been away and will continue to be away, as you serve our great nation.

Thank you, Mr. Chairman.

CHAIRMAN FORBES:

Gentlemen, we thank you both. And, as you know, as you look at this subcommittee, we're building a record so that we can use it for making the decisions that we need.

It's probably one of the most bipartisan subcommittees that you'll find in Congress. Mike is one of my closest friends in Congress. And Mr. Courtney is representing the Northeast up here for us today. Mike and I are carrying the southern portion. And we've got Mr. Cook bringing up our western flank over there.

So we're well represented in here.

But, Admiral, we're gonna turn it over to the two of you.

And I think, Admiral Breckenridge, are you gonna go first?

Then we'll turn it over to you. Thank you for being here.

RADM BRECKENRIDGE:

Well, Mr. Chairman, distinguished members, Rear Admiral Dave Johnson and I thank you for the opportunity to testify before the Subcommittee on Sea Power as we represent the men and women of your Navy's undersea forces.

And in both your opening statements, again, the special relationship the Navy has enjoyed with Congress since the very beginning of our country is an underpinning of our greatness as a nation.

With the permission of the subcommittee, I propose to provide a brief statement and a separate written statement for the record.

By any objective measure, the United States has the finest undersea force in the world. We enjoy a distinct military advantage in the undersea domain, unlike any other. When you

consider land, the surface of the sea, air, even space and cyber, these domains are becoming more and more heavily contested between us and our adversaries.

But in the undersea domain, we have a unique military advantage. And that advantage has been the bedrock of our greatness as a nation. A crown jewel, if you will, of our global strength and security. Strength, I might add, that is not used to add to our own national glory, but is instead given sacrificially as we stand by others who are severely oppressed as they pursue the ideals of democracy and freedom.

The outstanding reputation enjoyed by our Submarine Force is the result of sustained excellence by our shipbuilders, our maintainers, our shore staffs, our planners, and most of all, by the men and women who operate our submarines day in and day out.

This is demanding, hard, technical work that requires the best people our nation can produce. And we're very fortunate as a country to draw the members of this great team from all over the nation.

Our undersea forces have a unique role within the Navy, just as the Navy has a unique role within the joint force. Undersea forces leverage the concealment of the undersea to provide what no other part of the joint force can deliver, and that is persistent, undetected, assured access, bow forward, and the ability to deliver unique military advantages.

By leveraging stealthy concealment our undersea forces can deploy forward without being provocative, penetrate an adversary's defensive perimeter, and conduct undetected operations. These undetected operations might be precautionary ship movements, intelligence collection and surveillance missions or special forces operations.

Should it be necessary, our concealed undersea forces can exploit the element of surprise and attack at a time and place of our choosing. These attacks could include efforts specifically focused on helping ensure access into a denied area by our follow-on general- purpose forces.

Feedback from our operational commanders indicates that the demand for this capability is strong throughout the globe. In

addition, looking into the future, the threat to our ships and aircraft from cruise missiles, anti-ship ballistic missiles and integrated air defense systems is growing. This will create more military demand for undersea forces.

Against this backdrop of increasing undersea force value and continued strong demand, we must consider the trends in undersea force structure.

The Navy has worked hard to stabilize overall naval forces near or slightly above the current level. However, within the stabilized Navy, there is a Submarine Force that will decline by more than 25 percent over the next 15 years.

This decline is not the result of some recent decision, as you mentioned. It is the gradual consequence of a long list of choices made over many years.

The total Submarine Force will drop from 73 submarines to 52 ships, a cut of about 30 percent. The vertical strike payload volume of the undersea force, as our SSBNs retire and—and we reach the bottom of this trough area with our SSNs, will drop by over 60 percent.

The forward presence of our submarines around the globe will decline by over 40 percent.

This is the program of record. This is with the two-per-year Virginia construction rate, of which we've received great support from Congress.

So facing a long-term trend of increasing undersea importance and decreasing undersea forces capacity, the Navy has developed an integrated approach to provide as much undersea capability as possible, yet within realistic constraints.

This integrated approach does not solve all of the shortfalls faced by the Navy, but it makes significant progress with limited resources. I would like to discuss the top four priorities of this integrated, undersea future strategy.

First and foremost, it is mandatory that we sustain our survivable, sea-based nuclear deterrent with about the same level of at-sea presence as today. The Ohio class represents the best lessons learned from the SSBNs that proceeded it, and the Ohio replacement will likewise benefit from the Ohio class.

Although we have delayed this program for over 20 years, it is now time to make the necessary investments to support procurement of the first Ohio replacement in 2021. There is no allowance for any further delay.

Second, to prevent the attack submarine reduction from getting any worse than the 29 percent currently programmed, it is essential that we protect the Virginia-class SSN procurement plan and hold the line at two SSNs per year.

Number three, to cost effectively compensate for the retirement of the four SSGNs (ph) and the reduction in our SSN force below the required minimal level of 48 ships, we need to invest in the Virginia Payload Module. In addition to partially compensating for the lost strike volume, the Virginia Payload Module will distribute this volume over more hulls, providing greater security and military utility. This module will provide valuable payload flexibility in the future that will otherwise be unattainable.

And lastly, it is essential that we restart torpedo production to fill empty torpedo stocks to create the required reserves, and reestablish a capable producer of these highly specialized weapons. Taken together, this integrated program will provide us with the platforms, the payload volume, and the capable payloads to address emerging future needs.

The United States is fortunate to have the best undersea force in the world. At the same time, we have the greatest burden of responsibility of any nation in the world with scores of countries looking to us for nuclear security and defense in a world that is increasingly uncertain and combative.

Our undersea forces are up to the task today and will continue to be up to the task in the future, provided they are supported with the right resources.

Thank you, sir.

CHAIRMAN FORBES:

Thank you, Admiral Breckenridge.

Admiral Johnson?

RADM D. JOHNSON:
Thank you, Mr. Chairman. And good morning.

I would like to thank the Seapower Subcommittee for inviting me here today to talk to you about the Navy's undersea warfare programs. My role as Program Executive Officer for Submarines is to provide the Navy with the platforms, the weapons and the sensors required to ensure the United States maintains its unquestioned dominance in the undersea domain, done both affordably and on time.

This past Saturday, we commissioned the tenth Virginia-class submarine, USS MINNESOTA, SSN-783, which delivered 11 months early to her contract delivery date and closed out the second or Block II contract. Of the 10 Virginias now in the fleet, we've delivered seven early, including all of the six Block II submarines.

When looked at in terms of relevance to the war fighter, these submarines, from VIRGINIA to MINNESOTA, gave the fleet over four years of additional Virginia-class submarine use because of their early delivery. And the fleet has used these ships, deploying them to front-line missions at on-station rates that meet or exceed the Los Angeles-class submarines they are replacing. That kind of performance is a testament to the strong Navy industry team that is one of the strongest in all of the Department of Defense.

Not being satisfied with our past successes, we continue to reduce delivery spans and deliver ever-more capable ships. Two days ago, the 11th Virginia-class ship, the future USS NORTH DAKOTA, SSN-784, rolled out of the construction facility at General Dynamics Electric Boat in Groton, Connecticut and into dry dock in preparation for float-off this Sunday.

North Dakota is the first of the Block III ships, the ships we modified for cost reduction and designed and built with large payload tubes in the bow. NORTH DAKOTA is tracking to a January of 2014 delivery. And if that holds, she'll be seven months early and break the 60-month barrier on the lead ship of a new contract. That is truly phenomenal performance.

Now, over the course of the Virginia-class program, each ship delivered more complete and more ready for tasking. One measure I use is how each ship is graded by the Navy's independent assessor. That's the Board of Inspection and Survey, or INSURV for short.

The Huntington Ingalls Industry Newport News delivered ship, MINNESOTA, received the highest score yet from INSURV and continued a trend also seen on her predecessor, the Electric Boat delivered ship, USS MISSISSIPPI.

Beyond new construction performance, the program is focused on maximizing the operational availability. We executed a number of modifications to the design in the Block IV Virginias, the 10 ships we are in negotiations with General Dynamics Electric Boat and Huntington Ingalls Industry Newport News today. That will add one deployment to each boat and reduce to three, the number of major shipyard availabilities over the ship's 33-year life.

We intend to continue our collective work to lower cost, both construction and in service, and deliver these capable Virginia-class submarines affordably.

As Admiral Breckenridge mentioned, we have the initial research and development funds to design a payload module to accommodate up to 28 Tomahawk cruise missiles and future payloads. The Virginia Payload Module will utilize the modularity and the flexibility inherent in the Virginia-class base design and reconstitute the SSGN's payload volume in a cost-effective manner.

The Virginia class program, with its industrial partners, has proven its ability to incorporate new design concepts without disrupting a successful production program. I am confident that we will be in a position to execute the Virginia Payload Module affordably in the fiscal year 2019 Block V contract.

The experience and knowledge gained from the successful Ohio-class ballistic missile and Virginia-class fast-attack submarines are being used to design the Ohio replacement ships. Since the program's initial acquisition milestone, we have focused on delivering a ship with the right capability at the lowest possible cost.

The program is a model for Secretary Kendall's better buying power approach to defense acquisition, incorporating from the start key tenets, such as affordability targets and innovative contracting. The R&D contract with Electric Boat contains discrete incentives for reaching significant, specific, non-recurring engineering, construction and operating support costs.

This is the first time in a ship-building research and development contract we've tied substantive incentive fees to cost reduction across the entire life cycle. This is but one example of how the Ohio replacement program is reducing its cost.

And, finally, I'd like to mention our torpedo work. It has been 17 years since the last Mark 48 heavy-weight torpedo was built. Restarting that production line is, as Admiral Breckenridge said, a top Submarine Force priority.

We've demonstrated our ability to reduce cost and improve capability in this world's best torpedo using hardware upgrades with software improvements to the front-end electronic kits. We are developing our acquisition strategy to leverage our current industrial base and develop the industrial base elements to restart the build of the entire weapon using the proven Mark 48 advance capability heavy-weight torpedo design.

The restart effort is critical to replenishing our torpedo inventory, and like the Navy's other undersea programs, will be done affordably.

Thank you for your time, and I look forward to answering your questions.

CHAIRMAN FORBES:
Thank you, Admiral Johnson.

And Admiral Breckenridge, you had mentioned a couple of alarming statistics in terms of our subs reducing from 73 to 52. And can you give us that time frame again?

RADM BRECKENRIDGE:
Yes, sir, Mr. Chairman. That time frame is between now and 2030.

CHAIRMAN FORBES:
And that would be exclusive of sequestration. Isn't that correct?

RADM BRECKENRIDGE:
Yes, sir. That is correct.

CHAIRMAN FORBES:
So if you add sequestration onto that, those numbers become even more staggering.

RADM BRECKENRIDGE:
Exacerbated further, yes, sir.

CHAIRMAN FORBES:
The other thing that I'd love for you to address, if you would, is as you see the reductions that we are recognizing, with reducing our subs from 73 to 52 by 2030, our presence in subs dropping 40 percent, I think your statistics. Can you give us a little snapshot of what you see happening with some of our peer competitors, and specifically with Russia and China in terms of what they might be doing to compete with some of our capabilities?

BRECKENRIDGE:
Yes, sir. The first thing I'd like to emphasize is the Chief of Naval Operations understands the undersea asymmetric advantage very well. And one of his top priorities is making sure that we never forfeit this advantage that we have in the undersea domain. So even in the face of the budgetary pressures of things like sequestration, the Navy is committed to providing as much stable funding as we can to continue the success story that Admiral Johnson mentioned with our shipbuilding industry partners to keep rolling with the Virginia class and Ohio replacement.

So, we're going to do our best within naval service to hold the line and make sure that we don't...

CHAIRMAN FORBES:

And Admiral, I don't think any one of us on the committee question you doing your best. We just want to make sure we're doing our best. And I'm afraid we're not.

RADM BRECKENRIDGE:

Yes, sir.

CHAIRMAN FORBES:

But let us know, what do you see with our peer competitors?

RADM BRECKENRIDGE:

Yes, sir. And that's a great question. And Congressman McIntyre alluded to it in his remarks. Our adversaries are not standing still. And so, even though we have an advantage and we have a lead, we can't sit on our lead. So we have to continue to move, or we do have the potential within 20 years of losing this crown jewel, this advantage that we have in the undersea domain.

So, if I could, I would like to address three countries to just talk about how other nations use the undersea domain. And the first one I'd like to address is Iran. So if you look at Iran, they, like many other countries, use the undersea domain from a purely maritime, sea-denial, local region-type of influence, much like we did in World War II in the Pacific. We used it as an asymmetric advantage, but it was for a maritime purpose, to hold at risk predominantly surface warships.

So, Iran has a Submarine Force. It is a disruptive force, a challenging force. And one that we deal with in regard to our ability to project stabilizing influence around the globe. But—so, there's a maritime geographic use of undersea domain.

I'd like to contrast that with Russia. Russia and the United States use the undersea domain on a much, much larger level. It is a global strategic, lever of power. It is more than just a region. It is the ability to control the seas. It is the ability to do land attack from covert positions. It has a much larger utility than just a maritime sea-control, sea-denial perspective alone.

And the Russians have always maintained a very capable submarine force. I mentioned that we have an advantage. You know, they are a close second with regard to their capability and with regard to their shipbuilding industry and the capabilities they're putting into their new classes of submarines.

The Russians today have a two-line production in their major submarine shipbuilding. They are recapitalizing their SSBN force. So as their SSBN force is retiring, they have the new Borey class. The lead ship is the Dolgoruky. The first three ships are seaworthy and in testing. They intend to recapitalize with at least a class of eight. There's been talk of a higher number of SSBNs within their force. But that machine is running. Those very good quality ballistic missile submarines are being produced in Russia.

Their second line is an SSGN. And so I think they've watched us closely with our SSGNs. They see the value of large payload volume, the ability to take a large amount of strike capability to the undersea. And so they are building the Severodvinsk SSGN class. It has not four large-diameter tubes like we envision within the mid- section of the Virginia payload module, but their mid-section is an eight-pack. It's two abreast by four.

So, they—they see the importance of the concealment of the undersea to bring potency with that. They can be threatening at a strategic level. And again, we are mindful of that and we are prepared to be able to counter that.

In the middle sits China. And China is sort of a hybrid between the Iran example I gave you and the Russian example I gave you. So, China right now is predominantly a maritime, regional undersea force, certainly a larger region, with more of our allies and partners that are sort of within their bubble. But they predominantly use their undersea forces to threaten the presence of our surface ships, to be able to shoulder off the positive stabilizing influence of our naval forces in an anti-surface warfare dimension.

But China is growing towards more of a global strategic undersea force. They have the Jin SSBN class, their own ballistic missile submarine class, and the JL-2 missile that they're developing. That will put them into the stage of using the undersea for more than just maritime regional control. And they—they also

are in development of a nuclear SSGN, a large vertical launch capacity submarine.

So there's three pictures for you, sir, of the advances that our potential adversaries are making and that we have to be mindful of to make sure that we as a nation preserve this unique advantage that we have in the undersea domain.

CHAIRMAN FORBES:

Do you see the Chinese numbers increasing dramatically?

RADM BRECKENRIDGE:

Yes, sir. That's a great question. I failed to mention that. The challenge that I see with China is more of a capacity issue than necessarily a capability issue in the near term. I think the capability, the quality of their submarines will improve as we march forward a couple of decades. But right now, there is a capacity challenge that's unique to what the Chinese Navy has.

CHAIRMAN FORBES:

Help us with the Virginia payload module. I know that Admiral Johnson was at the nursery when the Virginia class was born and has lived with it most of your career that you've got. And you've been a part of that, too, Admiral.

Can you give us for the subcommittee and for our record exactly what the Virginia payload module is, what it's designed to do? And specifically, there's been a little debate about the timing of the requirements and where we are on that. And if you could delineate that for us?

RADM BRECKENRIDGE:

Yes, sir. Thank you very much.

So let's pick, for example, Operation Odyssey Dawn against Libya. When our country decided to make an attack to neutralize the defense shield around Libya, we did that predominantly with a Tomahawk cruise missile strike, the bulk of which came from undersea forces. We had three submarines that were involved in

that operation—one SSGN, USS FLORIDA, and two fast-attack, straight-stick Virginia Class submarines.

So, let's hypothetically say that you have a target requirement where you need to strike 120 targets, which is a reasonable modest level for this type of operation. One SSGN carries 105 Tomahawk cruise missiles. So, it alone carries the bulk of that service requirement. You add another 12 missiles in one Los Angeles Class submarine you're up to 117. Still doesn't make the whole 120, but pretty close just with those two submarines.

So, as the SSGNs go away, that's going to have a very significant impact for our ability to quickly mobilize a strike force, an arsenal ship of that capacity.

You know, to put it in perspective, without an SSGN and without the Virginia payload module, we would require 10 attack submarines to be able to service 120 targets. And I'm here to tell you that it's highly unexecutable for us to mobilize and surge 10 attack submarines into a domain with the ability that we were able to muster forces for Operation Odyssey Dawn. So that's problematic for us.

What the Virginia payload module does is it puts four large-diameter tubes in the center of the Virginia class that can carry seven Tomahawk cruise missiles each. So in addition to the two large- diameter tubes forward that Admiral Johnson with Block-III is building, that carry six Tomahawks each, we go from a 12-shooter SSN to a 40-shooter Tomahawk strike SSN. So three of Virginia class with the VPM could service a 120-target package.

So, just from a capacity perspective, VPM is a very cost-effective way to recapitalize. As you well know, we don't have the ability as a nation to recapitalize our SSBNs, maintain two per-year Virginia, and develop a new SSGN replacement class. So this integrated solution is a way to distribute that firepower of a larger force in a very cost-effective way. At less than 20 percent the cost of a Virginia, I can more than triple its payload volume.

But I don't want to restrict this discussion to just land attack strike, although again, that's a very asymmetric, unique advantage for a country. But there's many other things that we can do with a large capacity, large open ocean interface. And Congressman

McIntyre mentioned UUVs and supplementing our thin, manned Submarine Force with surrogates that are unmanned. And I'll have the ability to get those UUVs into theater in those vertical payload tubes and deploy them and have a network or constellation of UUVs to supplement our manned platform.

So, this payload volume is strategically important for us, and I think is a low-risk, cost-effective improvement to the Virginia class.

CHAIRMAN FORBES:

Admiral, just one more thing, and then one question for Mr. Johnson. I'm hoping Mr. McIntyre will ask some more about the new class.

But tell us about the requirements and where we are on those.

RADM BRECKENRIDGE:

Yes, sir.

When the nation made the decision to go from an 18 SSBN to a 14 SSBN force, we had the first four Ohios coming into the window to be refueled. So we had this decision as a country. Do we just decommission them at the halfway point of their life? Or do we convert them to be able to do more—something different, more from the undersea for the country?

And with great support from Congress and great wisdom, the country went ahead and converted those four SSBNs to this new SSGN platform. That was a tremendous military benefit for us. There wasn't a specific written requirement for that at that time, but we have come to grow to depend heavily on that requirement.

RADM BRECKENRIDGE:

In both the Central Command and the Pacific Command a good portion of the Tomahawk strike requirement required day to day in theater for those combatant commanders is delivered by our SSGN force. So it has become a requirement for our military that is in high demand by the COCOMs.

What we, as a Navy, have done to codify this requirement is we've developed the Capabilities Development Document—it's a

joint staff process to formalize military requirements, that has been approved by the CNO, has undergone initial joint staff review and is on its path to JROC approval later this year.

So, on our side, we felt it important to show Congress we have a certified official military requirement for this payload volume, and the CDD, that is in process of final approval, will be that pedigree of why this is as important as it is for the country.

So I expect to have that formal requirement by the end of this calendar year.

CHAIRMAN FORBES:

And, Admiral Johnson, tell us what we're doing so that we can afford this very important module? What do you see us doing to make sure we're maintaining the affordability?

RADM D. JOHNSON:

Yes sir, great question Mr. Chairman.

So, the first thing, as Admiral Breckenridge noted, is we're working on the requirements of getting those right up front.

As you said, I was in the early stages of the Virginia design. I watched us work hard with the operators and the acquisition force to get the requirements right back in the early '90s. And we have essentially not changed our operational requirements document for Virginia in 20 years. And I think that's a first order effecter on why that program has executed in such a cost effective manner.

For Virginia Payload Module we're doing the same thing, we're working hard to get the requirements set, and as Admiral Breckenridge noted, we're about done with that process through the Joint Requirements Oversight Council.

Second is to execute a carefully planned designed program where we would achieve 80 percent design completed at construction start so that we can build the Virginia payload modules cost effectively, and is really one reason why we can't sustain cuts to the Virginia Payload Module research and development funding, because we need to be going on that program by '14—early '14 so I can build and install that VPM in the 19 ships.

The third is, is to make sure that we keep the technical risk as low as possible. The payload tubes that will be in the Virginia Payload Module, two of them are about to be floated off on Sunday. Essentially they're the same as what's in the bow of the NORTH DAKOTA today. That lowers our technical risk by basically integrating instead of having to develop something new.

And fourth, keep affordability on equal footing with our technical requirements. Go forth through our design and do these cost capability trades, keep pushing on it, so that we do effectively insert a Virginia Payload Module. That thinking has already driven almost 40 percent out of the cost of our initial estimate for the Virginia Payload Module. I anticipate that will continue as we go through the design.

CHAIRMAN FORBES:
Congressman McIntyre.

CONGRESSMAN MCINTYRE:
Thank you, Mr. Chairman.
Thank you gentlemen again for your insight.

Admiral Breckenridge, at an estimated $6 billion a piece, the 12 Ohio class replacement submarines we realize won't leave much room in the budget for critical undersea priorities. If hard choices have to be made, can you help us understand, would the Ohio class replacements be such a clear priority one—the Navy would prioritize them over having a full compliment of attack subs?

RADM BRECKENRIDGE:
Yes sir, thank you.

Our ballistic missile submarines are the bedrock underlying our national nuclear deterrent. Americans are asked to invest in replacing this force only once every other generation.

The last time Congress started procurement of a new class of ballistic missile submarines was during the Nixon administration.

The next time will be in 2021 as we start to build the Ohio replacement class, almost 48 years later.

Recapitalizing this force is a solemn duty we have to the nuclear security of future Americans as well as allies. And I want to emphasize, with regard to the Ohio replacement program, we are designing it in close partnership with the U.K. as they have to replace their Vanguard class. The common missile compartment and the D5 strategic weapons systems will be common between both of our country's and both of our nations are committed to making sure that we provide this capability on time.

Because ballistic missile submarines are infrequently procured, they are not part of the Navy's stable ship building plan. Because this is episodic it's an infrequent but critical responsibility for a country that is not built into the rest of our ship building plan.

In order to maximize the stability and cost efficiency of the existing ship programs, and to avoid reducing the size of an already stressed Navy, the funding of existing programs should not be disrupted. So often we hear the debate of well you can either afford your general purpose force Navy or we're gonna have to go ahead and do this ballistic missile force investment.

And we pit two equally important strategic instruments of power against each other, which is just an inappropriate friction. So as Mr. Chairman mentioned, to best accomplish this Congress must look at a way to provide an annual supplement to the Navy during the very small margin of time that we recapitalize this submarine.

So we'll build these 12 ballistic missile submarines, two less than what we currently use to provide strategic deterrence, in a 15 year period. And these SSBNs will serve for a 42 year life. So the return on investment is sort of amortized over four decades as we go ahead and recapitalize our SSBN force.

And so for a supplemental amount of about $4 billion per year and to make that clear to the rest of the ship building industry we can provide the stability we need to do both, to build the right Navy forces—general purpose forces—as well as recapitalize our SSBN force.

That is a $60 billion total, and we've mentioned that's a lot of money. And again, we're doing everything within our power—and

believe me, we are working on affordability as one of our top priorities, higher than even some of the military capabilities of this replacement SSBN.

But, $60 Billion in the grand scheme of the Department of Defense budget represents less than 1 percent. So what we're looking at is, do we have the will as a nation to be able to identify less than 1 percent of the budget, to go ahead and commit it to this 15 year recapitalization commitment without having an adverse impact on the rest of our general ship building force?

Just to try to give some examples to make this more germane. Let's say we only are able to identify a $30 billion supplement or $2 billion a year over the 15 year period. If the Navy has to absorb that other $30 billion we would be required to cut from our other general purpose forces, four attack submarines, four large surface combatants DDGs, and another eight combatants.

So the Navy with only half of that supplement would have to compromise and build 16 less ships for the inventory. And those numbers double without any supplement to this important national strategic priority.

The last comment I'd make is—and I agree with Chairman Forbes, I do think it’s important for the country to look at this as a requirement above the Navy's, a strategic level requirement and we ought to give it the gravity of attention and focus and insulation from the pressures of sequestration.

That said, the control of those resources must remain resident within the Navy with the control of our acquisition community. We know how to build submarines, we know how to oversee the building of submarines, Electric Boat and Newport News are the best submarine ship builders in the world.

We need to be able to make sure that if we come up with a creative, you know, strategic account for this that it's still the Navy and the ship building team that has the control and authority over those moneys as we do this recapitalization to make it as affordable as possible.

CONGRESSMAN MCINTYRE:

Now, I appreciate that the thoroughness and the explanation and I agree with your analysis, and ideally would like to be able to look at it in a way that supplements and separates it from the more strategic DOD perspectives that says, as you know, in the outset of my opening comments the Submarine Force is clearly as you have said, the crown jewel, and as I was saying in my opening comments, is unmatched worldwide. And we know you're at the forefront.

With regard to the priorities when you talked about we would have 16 less ships, so in other words I guess more precisely what I'm asking if we unfortunately are put in that situation of making priorities you feel like it's so important that we have to go ahead absolutely with the Ohio Class replacement submarines. And in the unfortunate situation it is, is that it's going to make the loss of other ships if those priorities have to be shifted around.

Is that correct?

RADM BRECKENRIDGE:

Yes sir, that is exactly correct.

The CNO has stated, his number one priority as the Chief of Naval Operations, is our strategic deterrent—our nuclear strategic deterrent. That will trump all other vitally important requirements within our Navy, but if there's only one thing that we do with our ship building account, we are committed to sustaining a two ocean national strategic deterrent that protects our homeland from nuclear attack, from other major war aggression and also access and extended deterrent for our allies.

Part of the reason we've been able to avoid proliferation of nuclear weapons around the globe is the great responsibility the United States has to assure our allies that we will also provide deterrent effectiveness for them, so that they don't have to pursue their own nuclear weapons.

If we don't build these 12 SSBNs on this time line—and again it to me is mind staggering how much risk as a nation that we've taken with regard to this recapitalization timing decision—even last year the Budget Control Act, we decided to delay this program

by two years such that we're going to go down to a minimum level of 10 SSBNs during the transition between Ohio's timing out at 42 years and the Ohio replacement coming on as a new class. That's just astronomical a challenge for us to be able to maintain our vibrant and credible two ocean deterrent to deter bad behavior from powerful adversaries.

CONGRESSMAN MCINTYRE:

Thank you, that's the kind of summary that I think is well stated and succinct and that message I hope and encourage you all to get that bullet point kind of message so that our fellow colleagues can understand that clearly, that this is what will happen—you know, one, two, three—this is what our priorities are. And the way you've stated the CNO's priority and how what you gentlemen do fit into that is essential.

I have one other quick question, Mr. Chairman.

I mentioned in the opening remarks, and I don't want this to go by, because I think it is a question. The large number of unmanned underwater vehicles, will that allow the Navy to—I mean, could a large number of unmanned underwater vehicles allow the Navy to expand global undersea presence in a way that would make it more cost-effective, and that possibly could avoid building some of the larger, more expensive, manned submarines?

Or, in light of what you just clearly explained, about their importance, is there a way in which manned and unmanned submarines could work together to make the fleet more effective, obviously from a defense standpoint, but also from a cost-effective standpoint?

And how does that fit in as we do look ahead, from the cost side as well as the effectiveness side?

RADM BRECKENRIDGE

Yes, sir, the manned platform provides the country incredible influence and access from the undersea domain. And as I work on the integrated undersea future strategy, the platforms remain paramount in importance.

You know, we mentioned this minimum number of force structure analysis of a 48 red line that we are gonna go below for over a decade as we bottom out to 42 based on decisions made in then '90s. That minimum red line doesn't really represent the COCOM demand. To keep 10 attack submarines forward-deployed across the globe, in the hot spots, in the places that they are operating today, requires a force of about 50 attack submarines.

The COCOM demand for what our undersea forces provide is about double that requirement.

So each year, as we go to each of the COCOMs and say, "What do you need from an undersea presence perspective for intelligence, surveillance, reconnaissance, for Tomahawk inventory in-theater, for the other unique capabilities that submarines provide?" the combatant commanders typically request greater than double the 10 SSNs that we're able to provide.

So there's always going be a high demand for platforms, of which, we're going to have to make tough decisions and not be able to support that.

So with regard to UUVs being a solution to reducing our force structure, I don't see that as a likely utility of unmanned undersea vehicles.

That said, we have some untapped potential in the undersea domain in the advantage that we have in the undersea domain by which we can leverage even greater than our manned platforms. And I think a strategy of using unmanned vehicles, of using seabed infrastructure with energy comms and sensors, will be vitally important to maintain our advantage in the undersea domain.

So we are beginning as a Navy to do exactly as you've recommended, and that is, how do I get even more bang for the buck in that domain, given the very tight limits, even with the mobility we have with our nuclear fleet, one ship can only be in one place at one time, so what can I do to even leverage greater influence?

And it's going to come down to these large displacement UUVs.

And we're beginning to build momentum to have those—to set them in use. Now, what will they do? What they'll do is the missions that are dull, dangerous, dirty or deceptive, that the SSNs can't do. So what we'll do is we'll be able to free up those manned assets to go do our nation's bidding at that appropriate level, while these UUV surrogates are able to take care of sort of the run- of-the-mill missions where I don't have to commit a manned platform to do it.

CONGRESSMAN MCINTYRE:

Thank you, Mr. Chairman.

And thank you, gentlemen.

CHAIRMAN FORBES:

And, Admiral Breckenridge, before our next member, I just want to clarify the answer you gave to Congressman McIntyre. As I understand, you were saying right now, to have 10 forward-deployed attack submarines, we would need 50 in the fleet.

RADM BRECKENRIDGE:

Yes, sir. With a force of 50 total submarines in the Navy, we're able to keep 10 attack submarines forward-deployed 365 days of the year.

CHAIRMAN FORBES:

And our combatant commanders need, I believe you said, to meet their requirements, 20.... forward-deployed.

RADM BRECKENRIDGE:

Yes, sir.

CHAIRMAN FORBES:

Would that math equate to needing 100 to...

RADM BRECKENRIDGE:

Yes, sir.

CHAIRMAN FORBES:

I just wanted to make sure we had that clarified.

The distinguished gentleman from California, Mr. Cook, is now recognized for five minutes.

CONGRESSMAN COOK:

Thank you very much, Mr. Chairman.

And, Admirals, thank you.

This is kind of ironic. You've got an infantry officer from the Marine Corps that's gonna ask some questions.

So I do have to make a comment, and that is a few years ago, when I was a captain in the Marine Corps, I had the honor to meet Admiral Rickover. And I have to tell you, I talked to him it was at a mess night, ironically enough, and he was one of the most brilliant individuals in the world, but, I have to say, one of the most intimidating. And I don't get intimidated easily.

But I have a question—you guys went through the academy and screened through the program, and you probably know that better than I do, but I think you should talk about somebody, a long time ago, that realized how important submarines were. And what he did for the Navy, for the country and everything else.

My fear is that a lot that's happened in the past, the importance of what you do. And I went to the War College and I tried to understand—and I am one of your big supporters because it's a force multiplier in so many different ways. And I think you explained that tremendously.

I'm afraid that it is becoming the Silent Service, in terms of the slice of the pie, you know, that DOD has when all those things that you outlined so eloquently the public just doesn't understand it.

And it's almost like it's not glamorous. And yet—you mentioned it yourself about some of the other things. And the remotely piloted powered vehicles. And I can go on and on and on, all the different things.

So I would hope that we can kind of change that, because I think you're going to have some tough times in the budget battles coming up. And a lot of it is going to be on public perception, so that the people in this room I think are big supporters of it, but this

isn't going to be enough. And we've got to change that.

The big question I have is, very quickly, about the intel that the Russians and the Chinese have stolen, quite frankly, from the United States. I'm worried about this leakage. They've got the money, they've got the will to replicate what we have in your service.

And do you have any comments on that, because after what happened with the recent scandal, it just frightens me to death that this is gonna continue to happen, and you have indicated that they're gonna do something about that. They have the money, the will and the power to do that. And they're gonna pass us in terms of overall technology.

RADM BRECKENRIDGE:

Yes, sir.

A few comments before I answer your question. Dave and I are classmates from the proud class of 1982 at the Naval Academy. We were the last class to interview with Admiral Rickover. So I did have a chance to...

CONGRESSMAN COOK:

Was it fun?

RADM BRECKENRIDGE:

It was—well, we'll save that for another hearing.

(LAUGHTER)

RADM BRECKENRIDGE:

But Admiral Rickover still lives in our nuclear force today. And I'm very proud to say that. What he brought into the culture of our nuclear-trained force provides an incredible return for the greatness of our Navy in leadership, in discipline. The Rickover Method is still in force. I am proud to say that I passed the interview with Admiral Rickover.

You know, the second thing that you mentioned is, I agree with you. I think we are victims of our—of our covert nature, and there's not enough of America who understands or appreciates the

brand (ph) that is attack submarines or, especially, our ballistic missile force.

You know, these sentinels have gone for over 50 years on continuous strategic deterrent patrols in two oceans over 4,000 70-day patrols safeguarding and protecting the United States of America. And I would tell you that there's probably less than 1 percent of the American citizentry that even knows that role they play so they can sleep well at night.

We have to do a better job at getting that word out. And I thank Chairman Forbes for this opportunity. I view this as so important, to be able to get over here and lift a little bit of the veil, and discuss the paramount importance of our undersea forces.

That said, there's a lot of things that are super secret, that must remain so, but by nature of what we do. And we'll push that as far as we can, that line.

But we're more than happy to come over and give you highly classified briefings of some of the recent take around the globe of what our Submarine Force is doing.

CHAIRMAN FORBES:

Our good friend, Mr. Courtney, has a little interest in submarines, and he'll have a few questions to ask for the next five minutes.

So, Joe?

CONGRESSMAN COURTNEY:

Thank you, Mr. Chairman.

When we talk about the submarine gap, which you've done an outstanding job, I think it's important, really, also for the record, to remember that it was this subcommittee that in the spring of 2007 actually led the way in terms of an increase in submarine funding, over the objection of the prior administration, by $88 million, which kickstarted the two- sub-a-year production. Again, NORTH DAKOTA's ahead of schedule, under budget, because of the economic quantity savings.

It was an incredibly important moment in terms of addressing that submarine gap.

But last night I was walking around the Capital with the moonlight, thinking about, obviously, the anniversary of 9/11. And I was walking by Jack Murtha's maple tree, which was planted there. And he, along with Gene Taylor and Roscoe Bartlett and others were part of the group that, again, led the way to make sure that happened.

And it's a reminder that we all can make a difference here and this subcommittee can make a difference in terms of making sure that the important issues that you raised here today aren't gonna get lost.

And the good news is that the Navy's request, which came over with the administration's budget, the House Defense Authorization bill and the House Defense Spending bill all, basically, provide for two subs a year and full funding for design work, and we have to work on the Senate a little bit with the Virginia Payload.

But, I mean, there really is quite extraordinary consensus in terms of the fact that we need to protect this. And, hopefully, the bipartisan budget negotiations that are going to start today are going to get us to a point where we can, again, avoid all the negative consequences that you described here today.

One of the issues, again, which my friend, Mr. McIntyre raised, was obviously that bulge in the ship building account that we're looking at. Again, it's important to start talking about a national security funding mechanism, a la the missile defense as a way of trying to solve that problem.

That's probably a little bit off in terms of a decision point for Congress. The one thing that we can control today is obviously trying to keep the cost down by making sure that the design and engineering budget request for Ohio replacement is protected.

And the one thing I'm concerned about, even if we just do a straight C.R. without sequester using last year's budget levels, again, that leaves a short fall in terms of making sure that we're gonna get that investment in the design work.

And I was wondering, Admiral Johnson, if you could talk about that.

RADM D. JOHNSON:
Thank you, Congressman Courtney.

So under a continuing resolution, because of our starting point in F.Y. '13, which is about half of what the budget request is for F.Y. '14, a C.R. is particularly harmful to the program. Because it's research and development, the department has the latitude, if it chooses to alleviate some of the issue of that by actually putting in research and development funding to keep the program on its up ramp.

As Admiral Breckenridge noted, in 2012, that was our time to increase the designers and buying material and increasing our prototyping work to support a 2019 lead ship. That's been indexed to the right two years. So now it's 2014. Fourteen is the year that we need to significantly up scope our work so that we are ready for a 2021 build.

Continuing resolutions and sequesters hamper my ability to plan and execute the program required to tell Admiral Breckenridge that I will have a submarine ready on patrol in 2031. The time scale really does lay out that long.

So I think from a standpoint where I sit, a C.R., though, is harmful if it's not mitigated by the department. A sequester is another issue because that is an out-right cut against the line, and that will, in fact, delay me.

As Rick said, insulate is a good word. But we do have to take a step back and look at how should we continue to fund this program. Do we continue the levels that we put into the budget to support us to have the research and development, the prototyping and design products disclosed to keep the ship building done predictably?

We have a very challenging ship-building schedule on this ship. We are going to build it in 84 months. It took Virginia 86 months. That ship is about a third the size of Ohio replacement.

Now why would we think we could do that? The reason is, we have the experience of Virginias. At that time, we'll have at least contracted for over 30 Virginias by the time Ohio replacement ship one is under contract. So that alone, along with what we know now and how we—design the ship, we think we can be ready to

build an 84- month ship.

But you back up 2021, 2028 is when I have to have the ship built for 2031 deployment. That means I have to sustain the research and development in the design work now so that I'm ready in 2021.

CONGRESSMAN COURTNEY:

Great, thank you, Admiral.

CHAIRMAN FORBES:

Mr. Courtney, we thank you for your service in all of this and your hard work.

And, Admiral, as I understand what you've just responded to Mr. Courtney that delays that we're putting into effect today will impact your ability to even deliver in 2031, that far out. Is that correct assessment?

RADM D. JOHNSON:

That is correct. Yes, sir.

CHAIRMAN FORBES:

Gentleman from New Jersey, Mr. Runyan, is recognized for five minutes.

CONGRESSMAN RUNYAN:

Thank you, Mr. Chairman.

And, Admiral Johnson, you kind of touched on it with Mr. Courtney's answer. I had an opportunity to go down to Huntington Ingalls a little over a year ago and asked them the question, as we get here—and God help us that we're not in this budgetary climate 20, 30 years from now—but as we move down the road, when does the Navy start to put the crunch on the ship builders to say, "You're gonna build these in less and less time" as we try to anticipate our adversaries steps forward and actually make that—that time longer?

So just, in your thought processes in the acquisition realm on that.

RADM D. JOHNSON:

That's a great question, Congressman in that we're doing that today. We're, today, in the Navy yard, sitting across from our Huntington Ingalls and Electric Boat partners with my folks and the NavSea folks to negotiate the next 10 ships, the 19th through the 28th ship.

If you look at where we were in Virginia, it took 86 months to build that ship. We just delivered the MINNESOTA in 63 months. So we've actually taken almost two full years out of the build time.

We're approaching a point where we can't, on that level of magnitude, reduce the build span. Maybe we'll get to the mid-50s if, in fact, we continue to work this. We certainly are challenging the ship builders along those lines.

Because time is money in the ship-building programs. And if we can get these ships out quicker, it gets those to Admiral Breckenridge and Admiral Conner so they're able to be used. As I said, we've already returned four years of additional utility because of this thinking. But it also lowers the cost of these ships.

CONGRESSMAN RUNYAN:

I appreciate that. Because I think sometimes—I know we experience on the HASC Committee, sometimes I don't think the DOD thinks far enough in the future to really acquire the savings and the planning. I mean, obviously, you've said a lot of what we're doing hasn't changed in 20 years, especially in the submarine venue. And that has some cost savings to it in the long run. I have nothing else, Chairman. I yield back.

CHAIRMAN FORBES:

Thank the gentleman.

Mr. Langevin is recognized for five minutes.

CONGRESSMAN LANGEVIN:

Thank you, Mr. Chairman. And I want to thank both of our

witnesses for being here today. I appreciate your testimony, especially as we navigate the complex and challenging issues that we're facing right now.

Like Mr. Courtney, I've a side interest in submarines. And so, I want to turn to that right now. As, I'm sure you're aware, the CNO Admiral Greenert stated on September 5th that ship building will drop in fiscal 2014, and, specifically, that he envisioned the loss of a littoral combat ship and float forwarding a staging base and advance procurement for Virginia-class submarine and a carrier overhaul.

Can you elaborate on what the CNO's referring to? In particular, with respect to subs, would this be an F.Y. '15 or F.Y. '16 vote? And how would this affect the proposed Block V.

RADM D. JOHNSON:

Thank you, Congressman.

As we look at sequestration's continuing forward, that will impact my ability to, obviously, fully fund not only the full funding for the ships in those years, but the advanced procurement.

If you look at '13, '13 took out $492 million out of the Virginia program, specifically, split between those ships in '13 and the advanced procurement for the '14 and '15 ships. That same effect happens in F.Y. '14. If it happens at the levels we estimate, which is around 14 percent, that's almost $750 million out of the Virginia accounts in F.Y. '14.

And the way the department handled it in F.Y. '13 is, we have a cost to complete bills that have now moved forward by this committee. We appreciate the add of $492 million showing up in the '14 budget for overcome in the sequester in '13. That type of behavior has to continue in '14 and on if we eventually can procure 100 percent of a ship when, in fact, I've only been paid for 86 percent of a ship under the sequester.

I can't give you the specifics on what the CNO was talking about relative to which ships is it in F.Y. '15 or '16. But it will, over time, potentially impact that Block IV 10 ship procurement, '14 to '18, those ships.

Our tack right now, though, is to try to preserve that 10 ship buy, but then have the department fund cost to complete bills for the cuts that we've taken in the intervening years. It will be more challenging to sign off on a 10 ship multiyear (ph) when, in fact, the budget doesn't reflect full funding for all 10 ships going forward.

CONGRESSMAN LANGEVIN:

OK.

So let me turn also then to Ohio replacement. As I'm sure you're well aware, the Navy ship-building budget clearly comes under significant future strain as the Ohio replacement program comes online. And to quote your department's 30-year ship building plan, "The cost of the Ohio replacement SSBN is significant relative to the annual ship procurement resources available to the Navy in any given year."

At the same time, the department will have to address the Block retirement of ships procured in large numbers during the 1980s, which are reaching the end of their service lives. And the confluence of these events prevents the Department of the Navy from being able to shift resources within the ship building account to cover the cost of the Ohio replacement SSBN.

The plan further states that if the Navy has to take these costs out of hide, the effects on the Navy's battle force will be such that the fleet will not be sufficient to implement the defense strategic guidance.

So with that, can you inform the subcommittee as to the current progress of efforts to fund the Ohio replacement program as part of our deterrent and national strategic comparative outside the Navy ship building budget, akin to our military sea lift or ballistic missile defense. And, alternatively, is there talk of a supplement to the Navy ship building budget because of the strategic comparative resident in ORP?

RADM BRECKENRIDGE:

Thank you, sir.

Just a little backstep and history to talk about the two other times that we've had to, as a nation, build the strategic deterrent. So in the '60s we built 41 SSBNs; they were called the 41 For Freedom. We did that in a seven-year period, which again is just an incredible—only in America could you put out 41 ballistic missile submarines in a seven-year period.

There was an impact to other shipbuilding accounts at that time, but the priority was such for national survival that we had to make that an imperative and a priority.

There was a supplement to the Navy's top line at that time when we fielded the class, but it did cast quite a shadow over the rest of the shipbuilding in the '60s.

We recapitalized those 41 For Freedom with 18 Ohio-class SSBNs in the '80s. It was the Reagan years. There was a major naval buildup. And underneath the umbrella of that buildup we were able to afford as a nation the recapitalization of building 18 SSBNs. Again, a very great success story from a shipbuilding industry perspective—the maturity, the stability. Electric Boat punched those out and did it at a great bargain for the country. To have that capability still around today, a 30-year design submarine that's been extended a half again to a 42-year total service life is just sort of mind staggering.

Well, we're at that point right now where there is no more delay, there is no more room to absorb risk and schedule where we have to recapitalize the strategic deterrent force.

The Navy recognizes that without a supplement this is going to have a devastating impact on our other general purpose forces ships and supports and is working with OSD and with Congress to identify the funds necessary, which I mentioned earlier represent less than 1 percent of the DOD budget for a 15-year period, to provide relief and fund this separately above and beyond our traditional norms (ph) for our ship control budget.

So we are at the point where we need to really make this decision. The stability of our other industrial bases count on us at this time, as Admiral Johnson pointed out the schedule as we march toward construction in 2021, it's time to develop this plan, it's time for—as Congressman Courtney mentioned, the courage

that we have in Congress at moments like this in our nation's history with pivotal decisions with regarding shipbuilding that we go ahead and do the right thing by the wholeness of the Navy as well as recapitalizing this vital, strategic imperative.

CONGRESSMAN LANGEVIN:

Thank you, Admiral.

I yield back.

CHAIRMAN FORBES:

As we talk about those pivotal times and as Mr. Courtney said, the need to do that, one of the things that helps us is your information. And in our markup that we sent to the Senate, we requested the CNO to give us an accurate depiction of where we'll be with shipbuilding based on the numbers that we can project. And he has said he's willing to do that.

This is not a question for you, but a request: If you could perhaps ask the CNO in the department, it would help us because when we talk about 30-year shipbuilding plan we actually talk about it as if it's gonna happen. And it's been a little more than fantasy world, you know, in the past. But it would be great for us to be able to show other members and the public, 'This is our 30-year shipbuilding plan. Here are the numbers we can realistically expect based on the last 30 years.' And, you know, there's a $4 billion shortfall annually there.

It's my pleasure now to recognize the chairman of the Readiness Subcommittee, my good friend from Virginia, Rob Wittman.

CONGRESSMAN WITTMAN:

Thank you, Mr. Chairman.

Admiral Johnson, Admiral Breckenridge, thank you so much for joining us. Thanks so much for your service to our nation. It means a lot, especially in these challenging times to have your leadership there.

Admiral Breckenridge, I want to begin with you. Give me

your vision about how the Ohio class replacement program is gonna play out. And the reason I ask that is putting it in context of where we are now, with a tremendously successful program in the Virginia class, where we have a teaming agreement with Electric Boat and HII.

That is what I think is a very efficient model. Is that a good cost-effective way to look at how we pursue the Ohio class replacement program.

RADM BRECKENRIDGE:

I'll take the first swing, and then I'll turn it over to the expert, sir.

Good morning.

Thanks again for hosting that breakfast yesterday. I really appreciated the opportunity to participate in that.

Sir, for a moment like this in our nation's history we are gonna depend and rely on the best engineers, the best ship pipe fitters, the best, you know, across our submarine industrial base to make sure that we don't miss a beat and that we deliver this national imperative. So it's gonna require a whole team effort, you know, both Electric Boat and expertise from Huntington Ingalls is gonna need to be brought to bear with this challenge, make no mistake about it.

Now, you mentioned a great point, and I've talked a lot in hyperbolic terms about the risk and the compounded risk we've taken. I'm optimistic as a submariner and as the Director of Undersea Warfare that we have this incredible juggernaut that is our submarine shipbuilding industrial base that is just humming on all cylinders with the Virginia class. And we're gonna be able to leverage that to be able to pull off a pretty daunting challenge with the recapitalization of the SSBN force.

And so I'm very optimistic that we have talent in America. We have the capacity in America. We're gonna have to ramp up, as Admiral Johnson mentioned, to address that challenge.

But as far as the procurement strategy, which I think is at the base of your question, I'll turn it over to the acquisition specialist to discuss that with you.

RADM D. JOHNSON:

Thank you. Thank you, Congressman. Thank you for that question.

We have not yet determined how we will procure the build of the Ohio replacement. It's still a little bit to the right in our construct of thinking.

Virginia, obviously a success story under a teamed arrangement. Whether Ohio replacement follows on to that or actually does more of a prime/sub relationship, yet to be determined. But I think it's fair that as the acquirer I ask that we use the investments we put into the submarine industrial base to the maximum extent possible. We've built, as Admiral Breckenridge said, significant capacity, capability and confidence in our submarine industrial base, both at Groton, in Rhode Island as well as at Huntington Ingalls in Newport News.

And our intent is to leverage that to the max extent possible for Ohio replacement.

CONGRESSMAN WITTMAN:

Very good. Well, thank you.

And I think your comments reflect how important the talent is with both of those great shipbuilders. And as you know, that industrial base is an important part of the two. So to seamlessly go into that next generation of ballistic missile submarines is an important element, I think, in the decisions y'all have to make.

Let me ask this: You've talked a lot about the attack class of submarines. Putting in perspective—we've talked a little bit about sequestration—let me ask you this in another envelope of having to make decisions. We're now at a pretty significant rate of retirement of the Los Angeles class. So you take that and coupling what potentially the effects are of sequestration.

Give us your perspective about what both of those events colliding might mean for our attack class submarine fleet.

RADM D. JOHNSON:

Yes, sir, thank you. As I mentioned, beginning in 2025 we're gonna dip below the red line, the minimum agreed by all parties,

break glass if you cross this line minimum force structure. We are gonna be below that line for a period of greater than a decade. The minimum right now with our current program of record of two per year Virginia construction is 42 submarines in approximately 2030.

The depth of the trough is not as significant to me as the width of the trough. So whatever I can do to soften that. And so our integrated strategy looks at—looks at that.

There's three things I'd like to talk about to mitigate the risk when the Navy is below 48 SSNs. Number one is as I build Virginia class, you know, down at the 60-month point or less and get those to the fleet quicker, that will have an effect on that trough. That will give me more assets available during that time period. So any efficiencies that we can make with regard to the delivery schedule is a win.

The current Los Angeles class, we are carefully monitoring each hull, how much life is in their core, you know, what are their other systems health looking like to see if we can maybe get a year or two extension on the Los Angeles classes.

Again, I don't like to talk about that as part of the plan because if we suddenly have an intense period where I'm surging submarines I'm gonna eat that margin. And so I sort of keep it as an ace in the hole.

The last thing that we're at—and, you know, again it's a combination of forward-deployed assets or looking—going from three attack submarine to four in Guam. We're looking at extending deployments during that time period, from a nominal six- month deployment force to a seven-month deployment force. So there are a few other things that we can do to soften the blow of being below the minimum force structure.

But the critical things that we must do is as you mentioned, not decommission any submarines before their time. if there's some cost efficiencies that we might see there in a sequestration-like myopic view of saving money or disrupting the two per year Virginia. And those are two very important parts of the strategy to take care of that shortfall.

CONGRESSMAN WITTMAN:

Thank you, Mr. Chairman. I yield back.

CHAIRMAN FORBES:

Gentleman, thank you for being here.

And I'd like to just make sure I have given each of you any additional time you need for—wrap up anything that we've left out that you think is important to have on the record, any clarifications that you would like to make. And Admiral Breckenridge, since you started off we'll let you.

RADM BRECKENRIDGE:

Well, Mr. Chairman, again, I thank you very much for this opportunity to come this morning to showcase one of the things that is vibrant and healthy and a powerful part of our national security strategy, and that is our influence within the undersea domain.

You know, we've talked a lot about some dire things ahead as we look at risks coming up. But I want to emphasize on a positive note, as we wrap up today, that the men and women that man our nation's undersea craft, our SSBNs, SSGNs and SSNs, are just incredible warfighters. Most recently we've opened the hatches to women on board submarines, on our SSGNs and our SSBNs. These officers are performing in incredibly exemplary fashion.

We are fortunate as a nation that our sons and daughters that we're able to recruit and to bring into this very specialized field are talented and gifted as they are.

So your Submarine Force is out there doing great work, very important things. vital to the security. And undergirding that is this industrial base.

A history lesson as we sort of shut down the submarine industrial base post-Cold War, went for a period of eight years where we only built two submarines, that's a quarter of a submarine a year. You know, those were dark times for our nation.

The fact that we've come through that and we now have this vibrant shipbuilding industrial base is we sort of cheated death, and we're very fortunate that that is as healthy and moving in all

the right positive directions.

And we need to preserve and protect that with every instrument of resources that we have as a nation.

So I know that we're in tough fiscal times as a country, and we have to look at our decisions. But we're doing everything within our power to try to come up with an integrated strategy to make sure that we don't lose our grip on this advantage that we have in the undersea domain.

So, sir, I thank you very much for the opportunity to speak with you this morning.

CHAIRMAN FORBES:

Thank you, Admiral.

Admiral Johnson?

RADM D. JOHNSON:

Yes, sir. And, again, I'll echo Admiral Breckenridge on thanking you for the opportunity to talk about the Submarine Force. It's a pretty good day when we get to sit up here and talk about the programs and the progress that we're making.

I do think it's very important, as you have noted, that we sustain the drum beat we've established with Virginia. It was a bit of a climb to get in the '11 budget. As Congressman Courtney noted, we got to two a year through a good bit of the action this subcommittee took to get us in a position to be a two a year. We're there, and we're now seeing the benefits of it.

Ships are being delivered, not only earlier, but we're also turning them over to Admiral Connor and the fleet forces earlier. One of our metrics is the time it takes to take a ship from a delivery and get it into the fleet readiness training program,

It took 30 months for a Virginia. On North Dakota, it will be less than 12. So not only are we building them faster, but they're ready to go to the fleet, full up, get ready for a mission and deploy, and do the nation's bidding.

So I think that's very important, that we do not disrupt this drum beat. And that drum beat isn't just at HII or at Electric Boat, but it's also in the 4,000 suppliers across the 50 states. It's very

important as we grow this competitive industrial base that we sustain the continuity of the Virginia program.

We also have to think, I think, a bit innovatively about Ohio replacement. As we get into the build of that, in sustaining at least a two-a-year build rate to the vendor base means that we might have to think about multiyearing across both a Virginia class and an Ohio class SSBN, so that the vendor base still sees two ship sets of something coming out every year.

That will help us to keep the continuity and the cost down, as we go into the build for Ohio replacement and not disrupt the pricing that I think you expect me to deliver on those ships.

I can tell you that we are leading the charge in affordability. We are at the forefront of implementing Secretary Kendall's efforts. And every day my program offices, from the guys who do Virginias to Ohio replacements, to torpedoes, to combat systems, they think about it every day. And we hold ourselves accountable because, in the end, we are short if we deliver less capability to the fleet.

So my job is to build the products affordably that the fleet can use. And it's not just talk; we have objective quality evidence, some of which I've talked about here today.

So I, again, thank you very much for the opportunity to talk.

CHAIRMAN FORBES:

Well, once again, we want to thank both of you. You're very representative of the valuable assets we have in the United States Navy.

This subcommittee recognizes both of you as two of those valuable assets.

So thank you for giving us your time and expertise.

And with that, if there's no additional questions, we're adjourned.

NAVAL STRATEGIC MODERNICATION AND NUCLEAR DETERRENCE PERSPECTIVES

VICE ADMIRAL TERRY BENEDICT, DIRECTOR OF NAVY STRATEGIC SYSTEMS PROGRAMS AT THE CAPITOL HILL BREAKFAST FORUM

AIR FORCE ASSOCIATION RESERVE OFFICERS ASSOCIATION AND NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

I want to welcome you here. My name is Peter Huessy. I'm Senior Defense Associate at the Air Force Association.

I want to thank NDIA, AFA and ROA for their sponsorship of this event, as well as our head table sponsors that are here today. I want to thank also our friends from Russia and Great Britain that are here as our guests, as well as staff from the United States Congress; and, of course, my good friend Professor Curtis from the Naval Academy, who is here.

Today we're honored to have Vice Admiral Benedict, who I believe has gotten his third star recently, and congratulations. I want to give you a little background of the Admiral. He was assistant for Arms Control to the Director of Strategic Systems Programs, which meant he was responsible for the implementation and compliance with the START Treaty, including the Navy's coordinator for the initial Russian visits to the U.S. for the required START missile and telemetry technical exhibitions.

And he then went to the Joint Chiefs of Staff for START negotiations in Geneva, Switzerland. He was Technical Division Director at the Program Management Office of SSP in Sunnyvale, responsible for all in-factory development, production and operational support of the Navy's Trident I and II systems between 1993 and 1996. He then was Executive Assistant to the Commander of Navy Sea Systems Command in 2002 and '03.

Vice Admiral Benedict was then assigned as the Technical Director for Strategic Systems Programs in January 2004 through July 2007. He was Program Executive Officer for Integrated Warfare Systems in the Office of the Assistant Secretary of the Navy for Research Development and Acquisition. And his current command as the 13th Director of SSP, he assumed on the 7th of May 2010.

With that introduction, Admiral Benedict, I want to thank you for coming here today.

VADM TERRY BENEDICT:

Well, good morning everyone. And Peter, thank you for the introduction and thank you for the flexibility. We've had to move my speaking date around a little bit to adjust for calendars.

You know, there's been no end to interesting developments in D.C. over the last year. There's been an election. There's been talk of cliffs and devastations to capabilities and plans for furloughs. There's been sequester and gridlock and uncertainty. And just like reality TV that's so prevalent today, the new normal is anything but standard or stable.

But it's within this environment that SSP has been tasked to operate to provide a safe, a secure, and a reliable strategic weapons system. And the SSP team that's made up of military personnel from across the services, the Navy, the Marine Corps, the Coast Guard, our government civilians and our industry partners, we are all wholly focused on providing credible and affordable strategic solutions to the warfighter, General Kehler. We continue to meet the challenges of maintaining our aging strategic weapons systems while developing the strategic deterrence platform for the future.

From a security aspect, United States security is my number one priority. We are partnered with our fellow maritime forces to provide the world's premier protection for our systems. Navy masters-at-arms and the United States Marines stand watch 24 hours a day, seven days a week, day in and day out, protecting our national assets. Together with the Coast Guard's Maritime Force Protection Unit, this team ensures the protection of our assets until

they are once again underway, virtually undetectable, on our nation's 14 Ohio-class submarines.

From a technical aspect, today we are ensuring the Trident II D-5 is supported on Ohio-class submarines. We are designing and conducting life extension efforts in every one of the functional subsystems of the strategic weapons system. We are supporting Admiral Dave Johnson, PEO submarines, in the development of the Ohio-replacement SSBN.

Most notably, we remain on track with a common missile compartment in concert with the United Kingdom, despite the overall two-year shift to the Ohio-replacement program. And, we are implementing the entry into force of the New START Treaty. This will give the Navy responsibility for the majority of the authorized warheads in support of this nation's nuclear deterrent force.

Now each year in this forum there is specific interest with regards to the perspective of overarching topics of nuclear deterrence and arms control, particularly as it relates to the New START Treaty. The president's announcement of the new guidance on the United States employment strategy for the United States will certainly touch and affect SSP. However, the announcement does not alter our current path of preparing for implementation of the New START Treaty for the United States Navy.

Under current requirements, which establish limits of 1,550 warheads on deployed ICBMs, SLBMs and nuclear warheads counted against deployed heavy bombers, that must be achieved by all parties no later than 5 February 2018. Based on current strategic structure plans, the Navy will make up more than two-thirds of the deployed warheads allowed under the New START Treaty, an increase of roughly 20 percent from current requirements. I see this as a testament to the reliability and the survivability of the submarine deterrent leg of the strategic nuclear triad, and the value that the President and our nation's leadership place on our sea-based deterrent.

I also see this as a challenge, a challenge to continue to provide the assurance of the most reliable submarine-based ballistic

system that we have ever fielded. Any future changes that may occur will certainly require the SLBM force to maintain the same level of assurance. No matter what the numbers, the reliability and the survivability of the system can never be in question.

Now it's been exactly one year since the Congressional defense committees received the report and cost assessment of options for the Ohio-replacement ballistic missile submarines from the Secretary of the Navy and StratCom. In that report it stated, "The changing strategic and fiscal environment demands a renewed emphasis on thoughtful risk management across the United States nuclear weapons enterprise." This is certainly the mindset in SSP as we maintain the current system and develop the future.

So I'd like to talk here for a while about our efforts over the last year, in collaboration with the United States Air Force. As we have moved through the last few years of fiscally constrained environments, those of us who support the strategic defense of our nation, whether it be part of SSP and the Trident II D-5 system or as part of the Air Force strategic bombers and ICBMs, all of us have been required to look at how we do business and what that business should look like in the future. While we recognize there is significant cost risk to business as usual, we also recognize there is significant operational risk to complete technical integration. This cultural shift offers the opportunity to determine the intelligent use of commonality. We are moving forward in multiple areas within respective modernization efforts where Navy and Air Force collaboration have great potential.

Since initial meetings between my technical director and his Air Force counterpart, the ICBM system division director, we have signed a new MOA that documents the coordination of strategic ballistic missile R&D and future systems planning efforts between our services. Moving another step forward, we have stood up eight working groups that are focused on options within our current system sustainment efforts, as well as evaluation for commonality for future systems. While the areas of consideration are often complicated technical endeavors, the framework for the working groups is actually quite simple.

Navy and Air Force subject matter experts are joined together

in these eight groups and they are identifying ideas that (1) benefit both services, (2) mitigate significant program risks, (3) offer opportunities for return on investment and (4) leverage work already being done by either service. These principles are able to be applied to opportunities in R&D, in manufacturing, in production and in test and evaluation. We are particularly looking at areas where industry skills and sustainment are of significant importance. It provides a framework to look at resourcing component commonality where it makes sense.

Topics are not limited to R&D, but we have opened up the aperture to ensure that we consider all life cycle phases for options. And while collaboration efforts are expanding in new areas, joint work with the Air Force is not entirely new to our program. The Navy is currently on schedule refurbishing the W-88 re-entry system.

The SSP-led Mark V alteration management team continues to proceed with development of a new arming, fusing and firing circuit. It will refurb the 30 year old W-88 Mark V re-entry system. The Navy is collaborating with the Air Force to reduce costs through shared technology. The Air Force will adapt the new Navy AF&F for the Air Force Mark 12 Alpha, as well as Mark 21 re-entry systems.

We are also involved in the W-78-88-1 life extension program. This initiative is led by the Air Force. This joint warhead study, that also includes efforts by NNSA, is investigating possibilities for a warhead capable of being used on multiple platforms in order to reduce the number of warhead types. We remain committed to work with NNSA and the Air Force to manage limited resources.

As I mentioned, our Navy-Air Force working groups are considering both collaboration within future systems, as well as options within our current sustainment efforts for the Trident II D-5 and the Minuteman III programs. Life extension is the way of life for current strategic systems. The Trident II D-5 SWS has been deployed on our Ohio-class submarines for over 20 years. It is planned for a service life of more than 50 years. This is well beyond its original design life of 25 years, and more than double

the historical service life of any previous sea-based deterrent system.

We continue to demonstrate the Trident II D-5 as a credible deterrent which exceeds the operational requirements established for the system almost 30 years ago. Our system reliability remains at an all time high and we have completed 144 successful flights since the beginning of Trident II. This far exceeds our baseline requirements.

However, we can never rest on our successes. Aging and obsolescence are being addressed through an update to all Trident II D-5 sub-systems: launcher, navigation, fire control, guidance, missile and re-entry; all of them are being updated to ensure that we have a path forward for the future. Our flight hardware, missile and guidance are on track. They are designed to meet the same form, fit and function as the original system in order to control costs and ensure that the deployed systems maintain one homogenous population.

The life extension efforts are not unique to just flight hardware. Another major step is to ensure the continued sustainment of our shipboard systems through a shipboard integration effort using open architecture and commercial off the shelf hardware and software for shipboard systems. We are on track to complete this effort within this year for the first SSI increment.

In-service warhead reliability remains a key focus and SSP continues to be involved with various warhead life extension efforts. We are extending the life of the W-76 re-entry system through a refurbishment program known as the 76-1. This program now in production is being executed in partnership with the Department of Energy and NNSA. The W-76 refurbishment maintains the military capability of the original 76 for approximately an additional 30 years.

We also remain in continuous production of energetic components such as solid rocket motors. While SSP has been able to maintain solid rocket motor production to meet the demands of life extension, this remains an area of significant concern to our program. I've spoken extensively about my concern in this area, and have continued to address the issue in testimony before the

Senate and in interaction with national leadership.

The Navy cannot afford to solely carry this cost, nor can this nation afford to lose this capability over the long-term. While the efforts of our industry partners and others have created short-term cost relief, the long-term support of the solid rocket motor industry remains an issue that must be addressed at the national level. I am concerned that this effort is not proceeding quickly enough. Ongoing efforts to generate a national plan of action are falling short of anything that is actionable. This deficiency must be resolved as soon as possible. While solid rocket motor industrial base issues are a significant area that must be addressed, overall life extension efforts are in place, on schedule and within budget to meet current and future strategic weapons system requirements.

Which brings me to one of the highest Navy priorities, the Ohio-replacement program. The continued assurance of our sea-based strategic deterrent requires a credible SWS as well as the development of the next class of ballistic missile submarines. The Navy team is taking aggressive steps to ensure that the Ohio-replacement SSBN is designed, built and delivered on time, with the right capabilities, at an affordable cost.

The Ohio-replacement SSBN will enter service with the Trident II D-5 SWS and the D-5 life extended missiles onboard. This was a move designed to leverage the proven reliability of the Trident II D-5 and lower development costs. A critical component of the Ohio-replacement program is the development of the common missile compartment to support the Trident II D-5 on both the Ohio-replacement submarines as well as the successor to the United Kingdom's Vanguard-class ballistic missile submarine.

Our team: naval reactors, PEO submarines, SSP, we were able to weather the impacts of the fiscal year '13 sequestration without affecting any of the major program milestones for the CMC. However, in doing so we utilized essentially all of the program's float. Any future sequestration cuts will most certainly impact major milestones, as there is essentially no schedule reserve left for either the U.S. or the U.K. program.

SSP is fully engaged in the original program of record for the design of the common missile compartment and SWS deliverables

in order to meet our obligations to the United Kingdom. We are working jointly to prioritize risk and develop a mitigation plan under the auspices of the Polaris Sales Agreement for this effort. The United States and the United Kingdom have maintained a shared commitment to nuclear deterrence through the Polaris-Sales Agreement since April 1963, and we just recently celebrated the 50th anniversary of this agreement. We will continue to maintain a strong strategic relationship with the United Kingdom based upon the Polaris-Sales Agreement.

So these past 12 months have been significant for SSP. We have seen the future development of important dialogue between the Navy and the Air Force as both services face major program decisions and the challenges of modernizing our systems within constrained fiscal environments. We have enjoyed successful completion of milestones in our Trident II D-5 missile life extension efforts, with the second flight of the new guidance system and the first flight of one of the four missile electronics packages. But we must continue to be vigilant for unforeseen age-related issues. And we must maintain the engineering support and the critical skills of our industry and government teams to ensure that we can address the challenges with the current system and prepare for the future of strategic deterrence.

And finally, and always, SSP must maintain our focus on the custody, the safety and the security and accountability of the nuclear assets entrusted to the Navy. Our nation's sea-based strategic deterrent system remains a critical component of the triad that provides for our national security through strategic deterrence. We will continue as we have done since the 1950s, to assure our allies and deter our rivals. And as the 13th director, I remain honored to represent the unique organization that we serve in order to protect our great nation.
Thank you.

MR. HUESSY: The Admiral will take questions if you could not give speeches and let him know who you are. We have about 15 minutes of Q&A. Just let him know who you are and fire away.
I'll ask the first question. There has been a recent article by Hans

Kristensen calling for the de-alerting of our nuclear forces to avoid what they call the hair trigger. And I know you've heard that previously. Could you address that, if you can, with respect to the submarine leg?

VADM BENEDICT: So the question is—I guess the question is one of policy rather than execution. So I'll talk to you from an architecture standpoint. From an architecture standpoint certainly we could support that policy decision. But I guess I'll defer to the policymakers on whether that is a position that the United States, this United States, the national leadership, would choose to take.

Within the system itself, on the platform, there's absolutely no reason we couldn't support that type of a policy decision. But I'm going to defer to the policymakers on the policy decision.

MR. TODD JACOBSON: Todd Jacobson, Nuclear Weapons and Material Monitor. You mentioned the collaboration with Air Force. Specifically on the 78-88 interoperable warhead, what is your level of confidence in that concept going forward? And is there anything since NNSA has begun that study that has raised or decreased your level of confidence about it?

VADM BENEDICT: So, the concept of a 78-78-1 LEP is one that, from an execution standpoint, certainly makes sense. But I will tell that you my position is it's one that's going to require a significant amount of good technical analysis, good engineering work and focused effort by both services, as well as NNSA, to fit within the enterprise. We are fully committed to do the upfront work.

We're authorized to go through the 62A phase, 62A being costing phase. We're engaged with the Air Force to go execute that with NNSA. We have the full backing of the Nuclear Weapons Council to go do that. And I think we'll let the data and the information that derives from that data speak for itself.

This will be a challenge. This nation has never done anything like that, to create a body that could fly on both an ICBM as well as an SLBM. I certainly think that there's the technical expertise to

do the evaluation. We just have to see whether we can meet the demands of the requirements.

First, thank you for your leadership. We really do appreciate it. There seems to be a perception that the Trident program may have excess resources available to it, judging by one of the recent markups in the Appropriations Committee. Can you comment on whether you have margin or excess resources either in prior years or in your '14 budget that could effectively be taken away without hurting the execution of the program?

VADM BENEDICT: If Trident has excess resources I'm going to have to talk to my comptroller, because he certainly has not shown them to me in my budget line.

SSP performs what I call four national programs. The four national programs are: execution of the New START Treaty for the United States Navy; execution per presidential direction all United States nuclear weapons safety and security—and SSP is accountable for every United States nuclear weapons asset in the United States Navy—and the nuclear weapons life extension program, which today has to match up with not just the Ohio program but the Ohio-replacement program. So we are running a mission package which has a requirement to be viable through 2080. And then the fourth program is the Ohio-replacement program and the development of the common missile compartment.

So when I look at those four national programs and I look at the budget, I see very little opportunity to delete, defer, delay, in what I would judge other programs have some flexibility. I cannot delay the New START Treaty. There is a 5 February 2018 requirement.

I cannot delete, defer, delay nuclear weapons safety and security because those are very strict mandates of which I am expected to adhere. The program for the D-5 life extension program, be it flight hardware or shipboard systems, must be accomplished on time because that becomes the baseline for the

Ohio-replacement program. And the Ohio-replacement program, with its delay of two years, essentially is required in order to meet the StratCom requirements of number of boats at sea.

So there are very few dominos that can be dropped without setting off a sort of chain that breaks one or many of those four national programs. So when I look at our budget and I look at the impacts that we absorbed in fiscal year '13 as part of sequestration, and when I look at the potential sequestration marks for '14 and out, I see the opportunity to have one or more of those four national programs negatively impacted. So I do not see tremendous budget reserve, as the director, nor flexibility, cost schedule or requirements in any of those four programs. So we're a program that's, right now, fairly pressurized.

MR. JOSEPH HOLTZHEIMER: Joseph Holtzheimer with TASC. I follow a lot of NATO issues for DTRA. I hate to always point to the NGOs, but some of the NGOs have also suggested – and politicians—that by reducing the numbers of U.S. subs – and the U.K. the same suggestion—that there might be significant cost savings. To what extent is there cost savings in the production and to what extent is it R&D?

VADM BENEDICT: Well, when I look at nonrecurring engineering versus production cost, the nonrecurring engineering of whether you're going to build one submarine or 10 submarines is essentially the same. The production costs, to some extent, are tied with the number of units produced. We believe, and we've gone through years now—essentially the last four plus years, actually five—with data convincing this nation's leadership that we have the program structured with the right number not only of submarines but of tubes, which equates to missiles, in order to meet General Kehler's and StratCom's requirements in defense of the policy statements for strategic deterrence for this nation. I won't bring the U.K. program in except to say that they have gone through the same process with their national leadership. So I believe that based on the guidance we are given, the requirements that we were tasked to meet, that we have structured a program

that is the minimum number of boats with the minimum number of tubes at an affordable cost that meets the requirements as they stand today.

MR. BAKER SPRING: Baker Spring with the Heritage Foundation. It seemed to me that in your comments that you seemed to think it was a good thing about limiting the diversity of the types of warheads in the stockpile and relying on service type extension programs. It seems to me, at least my perception, is that that would increase risk and reduce reliability instead of the intended opposite. Why is that perception wrong?

VADM BENEDICT: Well, I would say that commonality certainly has cost savings potential, right? And so that's why I try and use the word *intelligent* commonality. You need to look at a program where commonality for cost savings is balanced against risk associated with everything being common. And you want to interject into that system, on purpose, at the appropriate reliability points, devices, components which are specifically not common to avoid and prevent that very feature that you're talking about.

We do it—in the old days we used to do it by buying lots of material every single year. As we've moved towards cost savings and we try and buy life of type of material in order to get efficient manufacturing runs, then it becomes how do you balance that with the implementation of that material into a component, into a package, into a subsystem? So it's a different mindset.

So saying that everything should be common and we can have one and that gives us the greatest cost savings, from a cost standpoint that may be true. From a reliability standpoint that's absolutely counter. So I think we're going at this carefully. And in the 78-88, or in the reduction of warheads, that needs to be a significant factor in the analysis on how low do we go and where is the variation to ensure that we don't run into a situation where one failure takes an entire force down.

MR. HUESSY: Could you address the issue of what are your biggest challenges in the Air Force-Navy collaboration in trying to find common elements? What are your biggest challenges down

the road that you see coming?

VADM BENEDICT: I think the largest challenge in commonality with the Air Force, just to be absolutely honest, the first one – and I think we're well past it—is culture. We're both very comfortable doing our own thing. I think we're well past that. And I think the fact that we both have stressed budgets has helped us move past that very quickly.

I think the second—the next largest hurdle that we are facing is really the architecture. And I don't want to get into a design symposium here, but if you look at the architecture of the missile electronics and the way that the functionality is distributed between various packages in either a Navy SLBM or an Air Force ICBM, the same functions don't sit in the same packages on either missile. So as we look for commonality, we're starting with components.

We're looking at resistors and capacitors and component constituents as we build up. I mean ultimately we'd like to say this flight control can be used in an ICBM. I think until we can get to a common architecture that's going to be a very difficult challenge.

I think there's great opportunity in test equipment. I think we're headed towards a direction in test equipment with common COTS hardware, common COTS software, and then we program it to test whatever device package self-component missile that we're looking at. I think, again, there's great opportunities in that. Another area that we have traded a significant amount of information with the Air Force, as we developed the new guidance system we created a database of rad-hard pieces, parts and components. We handed that over to the Air Force and I will tell you that was years in development for us. And so that gave them a significant leg up as they look at future development packages in the ICBM.

So where it makes sense and where it's government controlled, we're handing it over. And then, where there are opportunities, we're going to go explore. And then, divide and conquer between their budgets, our budgets and working with industry.

MR. SEAN SULLIVAN: Admiral, Sean Sullivan with the Defense Nuclear Facility Safety Board. What are the challenges with your human capital – facing short-term challenges with sequestration, furloughs, trying to keep your people for the long run? Could you please speak to that?

VADM BENEDICT: I think human capital right now is one that—I think we are totally underestimating the impacts of furloughs. We are breaking trust with our civilian employees.

In a program like SSP that prides itself on details, on structure, on constructive attention to always find the right answer, to walk in and hand over to my workforce the requirement to be furloughed 20 percent of the time for the remainder of this year, is actually counter-culture to us. We'll get through this. We'll lead ourselves through this. We'll come out with the same standards. But I think we are creating an environment within the civilian workforce—and they are the continuity of the success that we've had over the last 58 years—it is a significant challenge.

Within industry, I see the challenge is—I said life extension is the way today of strategic deterrence and of programs, both in the Navy and the Air Force. I worry and I deal a lot with industry leadership on how do we keep talent who comes in and they're told that their job is going to be to keep what has been designed, what has been developed, what has been manufactured, what has been deployed, alive? I think young engineers want to work on what's next. And with limited resources we have limited opportunities to challenge them in that area. So I think that the partnership that we share with our industry partners within SSP, and the continuity that we've had over the last 58 years with them, certainly helps in that area.

But I will tell you, it is a day-to-day challenge of the leadership within industry partners to try and keep that alive. We're winning today. We'll see. It's going to be a challenge.

MR. RICHARD BELSTEN: Richard Belsten from the British Embassy. I'd like to take a rare opportunity to say a public thank

you for your leadership and work with the U.K. on the Polaris Sales Agreement, and in particular you mentioned the common missile compartment, which is an unprecedented level of cooperation between the U.S. and the U.K. So thank you on behalf of the U.K. for that.

My question relates to the recent nuclear employment strategy issue. I know that this guidance will take some time to filter down. But I wonder if you have any initial thoughts of any implications for SSP of the guidance that's been issued?

VADM. BENEDICT: The answer is no, I don't. You know, I think the big question is, if we were to get to the lower number, how would the lower number be distributed? I've gotten no indication what that might be or what's the process to get to that number.

Today we are executing, as I said, progress towards the New START Treaty, which is 5 February 2018, and we're making great progress there. Our partnership with the U.K. is one that is absolutely transparent. It's more transparent today than it has ever been.

I think it's free knowledge, and I'll state it here publicly. It has gone to the extent that Mr. Tom McKane, who is the equivalent of I'll say our OSD policy—Jim Miller—had the opportunity last night, and I participated, in a brief to the Nuclear Weapons Council of the United States stating the U.K.'s requirements and desirements for the future as we move forward in a collaborative statement. That's never been done before.

The efforts that we are doing today on the common missile compartment between the U.S. and the U.K. has reached a new level of encouragement as well as confidence in that we have made a decision with the slip of the Ohio by two years that the first missile flown from the common missile compartment will be on a U.K. submarine. Those are steps that we in this partnership of over 50 years under the Polaris Sales Agreement—I mean, these are milestones, milestones in the sense that our nations would trust and work openly with each other to have that level of confidence, as well as that level of transparency in order to execute that type of

a program. So I value the work and the relationship that we have with the United Kingdom and I look forward to it being stronger in the future than it is today, if that's possible.

MR. JIM DOWN: Jim Down with Senator Tester, congratulations on your latest star. Can you tell us about, when you come to Indiana, what you're going to talk about in general?

VADM BENEDICT: So General Harencak and I had the opportunity to talk to Senator Coates, and we offered to jointly address this issue of commonality in Senator Coates' state, if he so desired to do that. And so we'll look for the opportunity to do that. I think if we were to go out there, I think we'd take the concepts that we have, the A-teams, the work that has been done, the support that we've had from Senator Coates, and we'd expand on that.

Again, I think there's opportunities here that must be explored. I think as taxpayers everyone in this room, everyone in this nation, should expect that the United States Navy and the United States Air Force deliver that. There's absolutely no reason today, in today's environment, that we can't move in that direction and do it in an intelligent fashion, saving money and ensuring the reliability of the future systems, whatever they may be for the Air Force as part of the GBSDA-Away (ph), and certainly as we extend Trident into the Ohio-replacement program. So I think the form would be to open that up and to provide more details into the opportunities for industry, as well as to educate the public.

Well, I appreciate the opportunity to address you. Thank you very much.

IMPORTANT NEW BOOKS

ANTI-ACCESS WARFARE, COUNTERING A2/AD STRATEGIES

BY DR. SAM J. TANGREDI,
US NAVAL INSTITUTE PRESS, 2013
Reviewed by RADM Jerry Holland, USN(Ret)

Admiral Holland has been a frequent contributor to THE SUBMARINE REVIEW.

This book is an absolute must for policy theorists, highly useful for planners and programmers and a fundamental resource for those interested in current strategy.

Anti-Access/Area Denial (A2/AD), the current idiom for concepts related to efforts to prevent intrusion or interference into littoral arenas, denotes defenses against power projection by the United States. Avoiding the cant found in current academic dissertations on A2/AD, Captain Tangredi reduces his arguments to simile based on walls that must be breached in order to conduct further operations. This simplification clears some of the debris presently cluttering the literature on this subject.

Like Mahan, Tangredi operates on the principle that, "History is our only true source of experimentation and knowledge of warfare." Using guidelines developed in early chapters he assesses three cases of successful anti-access campaigns: the Spanish Armada, the Dardanelles Campaign of World War I and the Battle of Britain. Then he contrasts three defeats of anti-access: Germany's Fortress Europe, Japan's Island Rings, and the Falklands Campaign. These chapters are delightful observations of well known activities; filled with cogent observations of the often over-looked. He observes for example that the English Channel not the RAF was the major factor in Hitler's defeat in the Battle of Britain.

Captain Tangredi reviews the current doctrinal tablet, DOD's Joint Operational Access Concept (JOAC), with no enthusiasm.

He finds fault with its narrow focus on military operations, failure to consider diplomatic, economic and time constraints or internal political problems of both attacker and defender and its elastic terminology. But most of all he condemns the necessity to make everything *Joint* when the primary medium and seat of conflict is maritime. Tangredi's discussion of the sources of this conventional ignorance provides a firm foundation for understanding his further critiques as he dissects Anti-Access/Area Denial strategies.

Understanding the predominance of the maritime domain as the conflict space in fashioning or countering any anti-access strategy requires one push aside current conventions and return to the view that the maritime domain includes the air and space above the oceans and the littorals as well as the water itself. Not surprisingly he states flatly that the ability to use the sea is therefore the first requirement that an interregional attacking force must possess and conversely the ability to deny an attacker's use of the maritime domain is the dominant factor in the success of any A2/AD campaign. In short, to intervene or influence militarily anywhere outside North America, the United States must rely first on its Navy. Conversely, any potential competitor or enemy must prepare to defend against that Navy.

Tangredi's careful dissection of the sources and history of AA/AD leads to a detailed examination of the mechanics that would be mind-numbing for all but the most dedicated policy students except for his frequent comments that shine like jewels. His discussion of deterrence is exceptionally good in depth and logic. "To achieve creditability and deterrence, the strategically superior power must be seen as making some investments in systems specifically designed for countering anti-access," he says. Buy submarines, satellites, communications and stealth.

Perhaps his most original and insightful elements deal with the limits of deterrence. Considering conditions necessary to create an atmosphere of deterrence on both the offensive and defensive sides of a wall, Tangredi cites the failure of deterrence when tempting targets allow skeptics to convince themselves that defeat by a superior power can be avoided (Pearl Harbor), when narrowness of mind translates into inability to recognize the

obvious (Hitler), or the temptation of one side to view a war of choice when the opponent views it as a war of commitment (Falklands). These views of conventional deterrence—as separate from those associated with nuclear weapons—offer insights on miscalculations when one side views their objectives as *limited* while the opponent's resolution is unbounded.

After building the analytical pattern in his historical descriptions, the author proceeds to analyze four future cases: East Asia (China), Southwest Asia (Iran), Northeast Asia (North Korea) and Central Asia (Russia). In these discussions, the effect of the internal politics in each of these situations, the likely causes of armed conflict, and the relative stability of present and future deterrent actions are presented in some detail. For this reviewer, the most interesting is his novel description of North Korea's cognitive anti-access and the sense of immunity so engendered that could prove to be the most significant cause of a miscalculated full scale conflict.

Finally, Tangredi works on "Breaking Great Walls", counter-anti-access strategy. Again using history as a guide and considering changes in military technology as evolutionary, he views failures to be wavering of commitments, usually concerns for events external to the military operation itself. Throughout his historical examples and discursive forays Tangredi is careful to include diplomacy, economics, and other international activities with military activities overt or covert as outside factors influencing events. In his opening example he points out that logistics limitations and political disruption in his empire defeated Xerxes, the Athenian victory at Salamis just bought the time for those other factors to work.

The bottom line: The maritime domain, including the air and space above the sea is the entryway in any counter anti-access campaign. This is a fact of geography not some desire of *addled navalists*. Tangredi makes the case that successful maritime operations are a prerequisite for joint operations—not an add-on, or another domain, not just one of a number of equal claims on resources.

HOW WE LOST THE SEAS

A review of MAYDAY by Seth Cropsey
Overlook, 336 pages

Reviewed by Admiral Gary Roughead, USN (Ret)
Formerly Chief of Naval Operations.
He is a Fellow at the Hoover Institution.
Reproduced with permission from the July 15, 2013 issue of
THE WALL STREET JOURNAL.

The American strategist Alfred Thayer Mahan (1840-1914) characterized naval power as "more silent than the clash of arms." His emphasis on the centrality of this *silent* power in world affairs captured the interest of a young visiting lecturer at the Naval War College in the late 1880s. That lecturer, Theodore Roosevelt, would go on to be President and transform the U.S. Navy into the global force that has underpinned international security and prosperity for a century.

The sort of thinking about naval power that informed Mahan's and Roosevelt's work now appears anachronistic. When the U.S. Navy is discussed today, the conversation leaps immediately over strategy to commentary on budgets and the number of ships. Those are aspects of sea power, to be sure, but the ability to command the seas is much more than comparisons with other navies and much more complexly tied to our place in the world. Sea power sets conditions for stable world trade, as some 90% of commerce moves on the oceans. The Navy's persistent presence far from our shores enables effective diplomacy and provides regional influence without the burdens and sensitivity of deploying ground troops on foreign lands.

In *Mayday: The Decline of American Naval Supremacy*, Seth Cropsey, a Former Deputy Undersecretary of the Navy, argues that the end of unchallenged U.S. supremacy at sea may be closer than American policy makers would like to think. In a well-structured narrative, Mr. Cropsey provides a concise and compelling summary of the evolution of American and other great powers' application of and dependence on sea power. He

chronicles the waxing and waning of that power and the global order that has come with our nation's ability to command the seas.

Navies aren't just a whimsical investment of national treasure. Rather, they are an outgrowth of trade and man's desire to extract resources from the sea, be they fish or natural gas. The relationship of commercial success and naval might is evident in the rise of great powers throughout history—Spain in the 16th century, Holland in the 17th, France in 18th and Great Britain in the 19th. It is likely that today Mahan finds a more devout audience among China's strategic thinkers than our own. Chinese naval deployments to areas important economically, such as the Southeast Asian sea lanes and the pirate-plagued trade routes in the vicinity of Africa, reinforce Chinese diplomatic and commercial activities. With Beijing so dependent on faraway markets and imports of natural resources, naval power weighs heavily in all its considerations.

China, Mr. Cropsey argues, is on the path to overtake U.S. naval power, with little deliberation in this country about the consequences of such a development. As Mr. Cropsey warns, reducing the number of U.S. ships “accelerates the decline of American sea power, unintentionally adding strategic weight to Beijing’s naval buildup, and more important, to China’s rise to dominance in Asia. Politicians have not faced this basic question of strategy”

The last transfer of sea power between nations was, Great Britain and the U.S., that shared political values and commercial philosophies and saw eye-to-eye on freedom of navigation in international waters. It was a seamless transition for the international order at the time. What will be the effect among our allies and like-minded partners should U.S. sea power wane, our global naval presence diminish and China replace the U.S. as the guarantor of international commerce and maritime security? As Mr. Cropsey says, “the signs point to a change in power in the western Pacific,” a region of great importance to our future prosperity”.

With its 286 ships, the U.S. Navy is now smaller than it was in 1917, when it boasted 342. The number is stuck, and the trend

spans the administrations of both parties. We have spent heavily on our wars in Iraq and Afghanistan, and the U.S. Navy, which is central to our long-term strategic interests, languishes. Navies, unlike armies, take time to build—why the framers of our Constitution wrote of the imperative to "provide and maintain a Navy," as opposed to the need to "raise and support an Army."

Mayday provides an insider's view into the many ills of the Navy's planning and budgeting system. These range from low and unsteady quantities of ship orders; to the trade-offs between building a few cutting-edge ships and more ships less technologically complex; to the ever increasing "contractual, statutory and regulatory" burdens on the Navy. The latter include a requirement for new paints that emit fewer toxins in shipbuilding; compliance adds an estimated $16 million to the price of an aircraft carrier. But Mayday doesn't address forcefully enough how diminishing procurement budgets will be further eroded by rapidly rising personnel costs and inefficiencies within the procurement process itself.

Mr. Cropsey offers some good recommendations to adjust the size and makeup of the Navy. He wisely advocates that "the most advanced technology should bow to numbers" and argues for pursuing unmanned systems to achieve decreased cost and increased surveillance and combat power." Yet some of his suggestions fall short, in that they assume a linear relationship between cost and reduced ship size. The inconvenient truth is that a ship that is half the size doesn't cost half as much. Deploying more small ships is appealing, but to get to areas of interest such as the Middle East, the Western Pacific and the Indian Ocean we must cross vast waters and remain present for extended periods. Size, speed, endurance and lethality matter greatly, especially when forward bases can't be assured at a time when foreign populations are prickly about sovereignty.

But Mayday is extremely timely, reminding us that security and prosperity are inextricably linked to sea power. As John F. Kennedy said half a century ago: "Control of the sea means security. Control of the sea means peace. Control of the sea can mean victory."

ARTICLES

ARCTIC CHANGES MEAN MORE WORK FOR U.S. SUBS

by Mr. Joe Buff

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

Introduction

Global climate change is impacting different areas of Planet Earth differently. The effects of such changes, combined with actual and potential human responses and exploitations, appear to be strongest, and very consequential, at high northern latitudes. While the Antarctic ("a continent surrounded by oceans") is by international treaty de-commercialized and de-militarized, the Arctic ("an ocean surrounded by continents") is neither. And while the Antarctic has a bare handful of long-term residents of any kind, some four million souls make their homes above the Arctic Circle.

But the melting Arctic, with its particularly vulnerable ecosystems and indigenous peoples, is rich in tempting fisheries and marine mammals, fossil fuel reserves, timber, valuable ore deposits, and developable shore front property. The Arctic also straddles what might well sooner or later become some of the busiest, most important maritime shipping, tourism, and military transit routes in the world. These routes are beset by limited satellite coverage, frequently terrible weather, a widespread lack of infrastructure, and bad polar electro-magnetic effects. They pass through straits, archipelagoes, and gaps that could in the decades to come be of significant strategic interest to competing nations, blocs or pacts, and sub- or transnational armed groups near and far.

In almost any conceivable future, for the changing Arctic within the broader world, the U.S. Submarine Force will face an

urgent demand signal for new types of missions, in new and harsh locales, that will also call for new adjuvant technologies. There are many more questions than answers now in mid-2013; the purpose of this article is mainly to draw attention to the sheer breadth, and the nature, of some of these questions. Practical suggestions and tentative solutions are offered, though, with some disguised as even more questions.

What Does the Recent Literature Say?

An extensive body of unclassified literature exists on change factors impacting the Arctic Ocean and the disparate lands and other seas near or above the Arctic Circle. (The U.S. considers the Bering Sea, which lies between the Aleutian Islands and the Bering Strait, as part of the Arctic.) While those references will not be summarized here, studying some of the articles, reports, reviews, plans, policies, appendices, and roadmaps does show two things.

First, the exact timing and magnitude of the Arctic environmental and commercial changes coming, let alone what those changes will mean to different nations, are difficult or impossible to predict. Varied constituencies will all be impacted, not necessarily to their benefit. They range from small native fishing villages to conservation advocacy groups, taxpayers and voters, elected and appointed officials, NGOs, huge transnational energy and mining corporations, wind and tide, renewable energy developers, shipbuilding and shipping companies large and small, the various participants in the Arctic Council, and worldwide signatories of the UN Convention on the Law of the Sea (UNCLOS).

Second, what conflicts will arise over ownership of resources and freedom of navigation, and how these conflicts will be resolved, cannot be known in advance. Resolution might occur anywhere on a spectrum ranging from successful diplomatic negotiations, to lawsuits decided in various courts, to brinkmanship at the UN Security Council, to less-than-lethal skirmishes between irate parties' coast guard vessels, to outright battles between opposing joint and combined task forces.

In such circumstances, it is clearly important to keep all one's options open and stay ready for anything. An overly passive approach, such as inaction by policy or by default, leads to a closing off of options and an impairment of readiness. Too much avarice and too much altruism both appear to be unwise—especially since the maturing 21st century may see humanity beyond American shores drift toward a renewed warlike phase.

The Fundamental Arctic Strategy Question Facing America

The same literature repeatedly poses a fundamental arctic strategy question, whose satisfactory answering demands a delicate team-based balancing, prioritizing, and decision-making act:

- Should further investments in safety infrastructure, coast guard and naval presence, and economic resource extraction be hastily accelerated? This would allow us to try to "win the Arctic"—but at the risk of overspending prematurely and, maybe, doing more overall damage than good; or

- Should shorter-term actions focus on analysis, planning, and consensus building, which all will benefit from promptly gathering even more information and knowledge? This would allow us to learn from the wisdom and errors of others, and fill in significant gaps in scientific data ranging from atmospheric to oceanographic to sociological. It recognizes (at least in the U.S.) prevailing severe fiscal constraints—but at the risk of missing out on some potentially lucrative *ground-floor* opportunities.

Like it or not, the clock on deciding is already ticking and will go on ticking, possibly for decades. Pundits can pontificate, lobbyists can jawbone, management consultants can recommend reorganizations. Insurance companies can price and re-price their maritime policies, and businesses can make their own human and financial capital investments in fixed and mobile platforms,

transport nodes and pathways, and patentable technologies. But only a country's national government can properly and effectively respond in full to the fundamental Arctic strategy question, via everything from annual and multi-year program appropriations, to offshore drilling lease auctions and onshore mining permit approvals, to international treaty ratifications or delays.

The U.S. Navy's Silent Service will for some time need to press forward with major, gradually intensifying Arctic duties. This is because of the Sub Force's stealthy or dramatic (as required), persistent and fast-paced, nuclear-powered capacity for delivering large payloads. These *payloads* include well-equipped human riders, embarking and disembarking for power projection, scientific research, and even Search And Rescue (SAR) ops, under, through, and around Arctic ice. The focal duty is to protect Arctic people, the environment, freedom and safety of access and navigation, and America's fair share of the valuable High North natural resources. This burden will hold true no matter when, and how, America as a whole answers the fundamental Arctic strategy question.

A Fundamental Arctic Strategy for Sub Force and SIBC?

A best estimate midpoint of a consensus among different science-based climate models is this: The entire summer/autumn Arctic Ocean will be ice-free or nearly so starting around 2030 or 2035. (Outliers among the models have predicted this for as early as 2013; others have said as late as 2050 or 2060.) The central Arctic is predicted to continue icing over in wintertime throughout the 21st century, though the ice will be thin and weak compared to in decades gone by. All the thicker, stronger *multi-year ice*, challenging even for the heaviest icebreakers, will become a thing of the past.

Unfortunately, this timing coincides with the period when the gap between actual U.S. Navy Nuclear Submarine Fleet size, and projected needs, will reach its worst shortfall. That same timeframe is likely to see a significant increase from today in the blue water naval—particularly submarine—capabilities of Russia, China, India, and other nations. Furthermore, U.S. Sub Force

readiness for the added submarine ops (and other naval ops) necessitated by Arctic melting will be hobbled by defense budgeting austerity in general, and at least in the short run by the additional funding stringencies and uncertainties (and DOD Hobson's choices) of sequestration.

My considered opinion regarding the fundamental Arctic strategy question raised in the open literature, as it specifically applies to the U.S. Sub Force and the Submarine Industrial Base, is this:

- Continue, no matter what, bringing forth the superb VIRGINIA-Class SSNs and the new SSBN(X) platforms; and

- Step up designing and testing affordable solutions for the special Arctic undersea warfare and *peacefare* capabilities that, all too soon, will be urgently needed.

The remainder of this article raises various additional questions needing attention from national and local (state, town, tribal) leaders, cabinets, legislators, courts, the Pentagon and the Sub Force, the private sector, universities and other nonprofits, and American (and world) citizenry at large. Practical suggestions, and some tentative solutions, are mixed in below, sometimes—intentionally—in the form of further questions. The final, funded solutions, the eventual cutting of metal, depend on Sub Force leaders and Submarine Industrial Base Council members and their staffs—and on all the other payers for and beneficiaries of the hard work to be done.

Civilianize Aging Nuclear Submarines?

"My kingdom for an icebreaker!" Keep in mind that the U.S. Coast Guard currently has only two (non-nuclear) polar-rated icebreakers and none on order; NOAA has one; the U.S. Navy has had none since the 1960s. (Coast Guard riverine and Great Lakes icebreakers are less capable.) Can and should USN nuclear submarines nearing the very end of their useful military service

lives be *civilianized* for shallow-depth-only ops, surfacing when needed through first-year ice, as "ersatz nuclear powered icebreakers"? They would give priority to SAR, pollution emergency response and recovery, Homeland Security related patrols and interdictions, Scientific Ice Exercises (SCICEXs), and other Coast Guard- and NOAA-like Arctic assignments. Would such a 2-year (joint?) deployment be career enhancing for the necessary Qualified Submariners in the crews? Could the dry-deck shelters and large-capacity (87" diameter) missile tubes of through-ice-capable nuclear subs, as they near normal decommissioning dates, be adapted cost-effectively for the following missions: transport scientists and their instruments, carry rescue and survival gear, materials for oil spill cleanup, navigational aid installation and maintenance, seabed equipment emplacement, iced-in base or village emergency resupply, even serving as mobile power stations responding to littoral natural or man-made disasters? How would the costs, and available SUBSAFE years of deployment of such adaptations, compare in the aggregate to the $1 billion price tag and ongoing fuel and maintenance bill of an additional oil-powered heavy polar-class Coast Guard icebreaker? (Such vessels can batter their way through 20' thick multi-year ice, but in the foreseeable future such ice will no longer exist.) Should these civilianized subs have their torpedo tubes welded shut, to save maintenance, make more room for supplies and passengers in the torpedo room, and emphasize their humanitarian purpose in old age?

"*Accessories sold separately.*" Can adjuvant vehicles such as the Long-term Mine Reconnaissance System (21" torpedo tube launched) and the Seahorse (wide vertical missile tube launched) and their successors be modularized as a *civilian version* to aid in such nuclear submarine missions? Is a dorsal-carried, shirtsleeves-environment personnel transport minisub (replacement for the ASDS?) needed for ops in waters too shallow for an SSN or friendly diesel sub, and/or to support diver and on-foot activities in extremely cold and wet weather? Since traditional methods are at critical times the best methods in the Far North, can some subs even transport Arctic sleds, sled dog teams, and their indigenous

handlers, accommodated on one deck in the vertical missile tube compartment?

"*Put Buoys on the Bottom?"* Can a network of seabed sonar beacons, emplaced and maintained by civilianized (or military) nuclear subs, provide navigational aids for sonar-equipped merchant ships, as a substitute for surface buoys that might not hold up well in the difficult Arctic climate(s)? Could the same seabed sonar network also provide data for better maritime domain awareness in the Arctic? (Undersea electronics would be *grounded* against solar storms and electromagnetic-pulse attacks.) Are commercial off the shelf (COTS) minisubs and robotic subs a relevant option for Sub Force use, bought or leased or borrowed?

Offshore Assets Raise Deep Onshore Questions

"*Go offshore, young person, go offshore!"* As Arctic ice recedes, coastal margins erode, permafrost melts into a widespread and impassable morass, onshore reserves are exhausted, and new offshore drilling/mining technologies are perfected, will it actually become safer and less costly to extract both fossil fuels, and hard minerals, at sea rather than on land in the warming Arctic?

"Remember Sealab: Sea Basing on the Seafloor?" In foreseeable future years, as nations and peoples may come into conflict over dry land, fuels, foods, drinking water, and strategic metals, will these natural resources become the object of wars? When fossil fuel reserves everywhere eventually do run out, and if renewable energy sources are not sufficient for planetary needs, will nations fight wars over the Arctic's rich uranium ore deposits, for nuclear power as they fought in the past over oil? In war or peace, will the U.S. Navy and Coast Guard be forced to, or choose to, rely more on Sea Basing in the thawing Arctic littorals, and/or in deeper waters? What surface ships and undersea hardware will be needed to do so, and how would deployment there impact other worldwide commitments? How would the Sub Force support and assist them, or use them as tenders? Will more manned and drone seaplanes become necessities for getting around the melting, sodden Arctic?

"Offshore oil fields as hostages?" What tactics and technology are best to protect America's offshore resource-extraction fixed and mobile platforms, service ships, fishing fleets, and harbor terminals from being held under threat, or even attacked, by hostile forces and their stand-off, smart munitions, or close-in suicide bombers? What tactics and technology are best used by America to dissuade, deter, destroy, and if necessary retaliate against hostile entities that attack our Arctic commercial at-sea assets, or threaten to do so? How do existing and emerging U.S. Navy undersea warfare capabilities and capacity best fit into good doctrine and strategy for such potential resource- and asset-driven conflicts? Will SSNs and SSGNs become important tools for *natural resource protective deterrence* in a dysphoric future world?

Bad Actors Could Go Deep, "Up North," Too

"Will AIP subs fly a black flag?" Drug lords in tropical climes have shown progressively increasing sophistication in building and using drug-carrying submersibles. (News reports speculate that they have been getting technical help from renegade professional submarine experts.) How much will the confluence of further Drug War law enforcement ops in the Southern Command (SOUCOM) theater, and newly opened transit routes and offloading points in Northern Command (NORTHCOM), lead drug smugglers, gun runners, human traffickers and kidnappers, money launderers, pirates, other organized criminals, and terrorists to begin to operate via the Arctic to infiltrate through northern Canada, and Alaska? (Alaska before statehood used to be a hotbed of poaching and contraband smuggling.)

"If they can buy 'em, we can sink 'em!" Export model diesel subs equipped with air independent propulsion—such as Russia's Improved Kilo Class and Germany's Type 214—have significantly longer endurance and more mobility without snorkeling compared to conventional diesel subs. Will this increase the number of under-ice contacts that the U.S. Sub Force will need to detect, identify, and if appropriate trail or interdict?

"Pull out those slide rules, sharpen your pencils!" Since thinner, melting ice also means more widespread open leads and polynyas, even in winter, how will this trend affect submarine operations? Will ASW search tactics derived from operations research mathematics need updating, as the ice cap seasonally melts to the point that even conventional diesel sub captains will spend time well under the remaining ice, in extremis or routinely? How will dynamic, unpredictable and partly cyclical, partly secular trends in ice cap thinning, shrinking, refreezing—and breaking up into brash ice and bergy bits -- affect the masking sound profiles of the marginal ice zone and other parts of the Arctic Ocean and other Arctic seas? How will this same monthly and yearly dynamism and background noise impact operations research calculations?

A "Cold" War Indeed!

"Toward Red October Redux?" Late Cold War era Soviet SSBNs were equipped for under-ice patrols, as were the Flight II and III Los Angeles-class SSNs that successfully held them at risk. As the Arctic ice cover melts away, will Russia need to abandon the historical Kremlin *bastion tactic* of SSBNs hiding under the ice cap close to home, behind minefields and their own SSNs? If so, what will Russia do instead using its latest generation SSBNs? How might this affect U.S. Sub Force operations and contingency plans—and its own SSBN deployments? As China begins to operate its new SSBNs, how (if at all) might Beijing use the Arctic as a deterrence patrol area, and what might this mean for the U.S. Sub Force?

"Send in the Marines and SEALs (and the FBI)!" Can U.S. Marine Corps LCAC air cushioned vehicles, and/or civilian Everglades skimmer swamp boats be winterized and adapted for successful use as transport platforms in the changing Arctic? They could support all sorts of environmental protection, Homeland Security, and national defense missions. Can these transportation technologies be adapted for machines that fit into submarine large-diameter missile tubes, dry deck shelters, and/or advanced-design sail hangar space? They could then be used by embarked Special

Ops forces, Coast Guard and/or medical personnel, and even Border Patrol or INS officers and FBI counter-terror special agents.

"It's Just Business!"

"*Competition is healthy!"* Will (should?) many additional pipelines be built to bypass disputed straits and to cross friendly continents inland, around the Arctic and elsewhere, for strategic dispersal and also for shipping-route price competition? How would this change the choke-point tactics and ordnance, and combat repair skills, needed for offense, defense, and international intervention in the case of war or terrorism? Can the threat or fact of such an expensive pipeline construction contest or building race versus an adversary be used to strengthen sanctions, embargoes, and other economic-based deterrence against WMD proliferators and other aggressors, such as Iran at the Strait of Hormuz—or some future bad actor in the Arctic?

"*Back to Workin' on the Railroad—for Deterrence?"* American and Canadian railroads have in recent years enjoyed considerable commercial success for their rail bulk deliveries of coal, raw petroleum, refined energy and lubricant products, and natural gas fracking liquids and special sand. This is being done via frequently scheduled, very long, point-to-point express *unit train* shuttling—no time-consuming and expensive decoupling, sorting, and recoupling involved. The trains use modern double-hulled tank cars with reinforced end caps and recessed, collision- and derailment-resistant hatches and valves. In the context of strategic dispersal, route price competition—and also extended deterrence via economic attrition—should railroads be viewed as additional potential tools of such statecraft? Can versatile and widespread national railroad grids also provide important backup against potential capacity bottlenecks and technology risks of pipelines and ships, and vice versa?

"*Comparison Shop and Caveat Emptor!"* Will Russia's Northern Sea Route, and Canada's part of the Northwest Passage, both be undercut by a route from the Bering Strait to the *Greenland-Svalbard-North Cape (Norway) Gap* straight over the

North Pole, away from either country's claims to their coastal archipelagoes as inland waterways that can charge tolls? If tolls do survive UNCLOS arbitration challenges, would they provide sufficient funding for the necessary shipping infrastructure investments to support these coastal routes? How much dredging is needed to accommodate deep-draft ships along more shallow parts of the routes, as opposed to diverting such ships onto more northerly (and costly) detours? How much dredging should be allowed given the potential serious environmental impact? Who decides this, and how? Would major bank loans, or municipal or treasury revenue-bond issues, bridge the time gap between the need for the investable cash and the receipt of the tolls?

UNCLOS and Clausewitz REDUX: Bottom Turf Worth Fighting For?

"*Is the Seabed Becoming Like More Land Terrain?"* Might increasing development of seabed acreage that is unilaterally claimed by one nation, or granted to another by UNCLOS, cause the sea to take on more characteristics of the land for national defense purposes, becoming "terrain to be held?" Might developed seabed energy fields even become a critical military "center of gravity," in the sense of General von Clausewitz? How can a country best protect its forward-exposed fixed assets, installed on or moored to its seabed for prospecting or extracting? How can it best threaten or attack an enemy's? Surely submarines will play important roles. Will torpedoes and/or hybrid homing depth charge ordnance be needed that can detonate reliably and very accurately at a depth of several miles? Could harmless noisemakers be used instead, to *send a message* to adversaries without escalating a conflict? Will militant eco-protesters enter the mix?

"*Fail-Safe Might Not Be Safe Enough!"* Certainly terrorists, and maybe rogue state regular armed forces, would not obey a hypothetical Geneva Convention forbidding attacks on offshore oil and gas platforms. Given the risk exposures involved for ecologies and societies, should international law then require all seabed drilling and extraction rigs to have multiple redundant and fail-safe emergency shutoff valves? These could be designed to

activate by the shock of a serious earthquake, close-in man-made ordnance detonation, or a collision at sea. How best might such a law be policed and enforced?

"Clean Up That Mess You (or They) Made!" How can lawmakers and advisors best assure that R&D entities—in government, academia, and private enterprise alike—expedite badly needed (and expensive) new tactics and technologies for cleaning up under- and over-ice oil spills, and other Arctic toxic pollution, regardless of proximate cause? (Such cleanup would be very difficult and good methods are little understood. Cold retards the evaporation of volatile petroleum components and the action of beneficial bacteria. Snow absorbs oil, and icebergs and floes drift, pile up, and tumble, carrying oil everywhere.) How can the Sub Force and SIBC advise and assist in designing and testing the developmental cleanup technologies, both while on the drawing board and when in the field?

"Is It Your Seabed, or My Extended Continental Shelf?" What does *similar geology* really mean, as used by UNCLOS to establish a country's claim to all economic resources above, on and under a so-called Extended Continental Shelf that lies beyond its 200-mile Exclusive Economic Zone (EEZ)? If, say, a portion of a continental shelf broke off and subsided into the depths, due to tectonic activity on a geological timeframe, the halves might be *similar* geologically now. But would the more sunken, distant portion still be part of the *same* shelf as before? Or would it no longer be a shelf at all, or could it maybe comprise part of someone else's shelf? What if a piece of an original continental shelf collapsed and rolled away, due to a succession of huge earthquakes and underwater landslides during human prehistory? What about glacial boulders continually being carried out to sea by calved icebergs, which then drift away and eventually melt, dropping the boulders to sink to the bottom far from their origin points? This could produce similar-looking seabed soils and rock formations, at least based on superficial undersea sampling, but should it count as the *same* extended continental shelf for UNCLOS? What if one country's claimed extended continental shelf intrudes into another country's 200-mile EEZ—will the

UNCLOS *split the difference* clause lead to encroaching boundaries? Will rancor over such details one day become a casus belli? In the less-than-lethal arena, will military submarines get into *playing chicken* as they grab their own geological samples in disputed waters, and drop their own encapsulated national flags or retrieve someone else's, while disputing each others' claims in a potentially chaotic seabed *land rush*?

Big War At Sea—Again?

"*New Maritime Strategy Heads North!"* Given the impending Arctic changes, how might Air-Sea Battle and Offshore Control both, as complementary tools, fit into the living development of the 21st Century Cooperative Maritime Strategy? The Aleutian Islands Chain, the Bering Strait, the Canadian Archipelago, various island groups off Russia's north coast, and the Greenland-Svalbard-North Cape Gap present opportunities and threats for both sides, and innocent bystanders, in any future major naval conflict. This conflict's lines of attack, by either side, might advance and recede in either direction as combat (or less-than-lethal maritime jousting) ebbs and flows. That suggests the need for all around air-sea offense-defense, with versatile anti-aircraft and anti-ship cruise missile and ballistic missile systems aplenty—with as much Sea Basing logistical independence as possible from nearby, vulnerable fixed land bases (*targets* to Submariners).

"*Make Friends, Not War!"* What alliances near and far—such as NATO, ASEAN, or the UN—will play roles to fight, or adjudicate, in such potential conflicts? How would different nations' joining an opponent's bloc, or remaining neutral (or abstaining), affect the correlation of forces and status of forces in the Arctic and elsewhere, and the ultimate outcome? Might the U.S. and others among the *A-8* members of the Arctic Council some day assent to amending its charter to include national security topics?

"*Oh, Canada!"* Canada has a very long Arctic coastline, plus a lengthy land border with the U.S. and a shared (and still somewhat disputed) EEZ boundary with Alaska. Canada has more polar icebreakers than does the U.S., and plans to construct a deep-

water port on the Canadian Arctic coast. The Hudson Bay port of Churchill has a railhead connecting to the North American railroad grid. Clearly, regarding the fundamental Arctic strategy question, friendship between neighboring capitals Ottawa and DC is important. The U.S. Sub Force should make the very most of opportunities to operate with the Royal Canadian Navy's Submariners in the years ahead. Is the Distant Early Warning (DEW) Line (with a combined Canadian and U.S. command) too myopic or blind on its southwest and southeast flanks? How does that affect ballistic missile defense against North Korea and Iran? Can subs, their adjuvant vehicles, and persistent leave-behind devices help cover any strategic radar blind spots or seams between existing sensor fields of view in the Arctic?

"War in or for the Arctic?" How much do U.S. Navy plans and strategies, including prepositioned materiel, need to be rethought and/or extended in the context of a major war possibly occurring in and around the Arctic some day? How might the traditional Sub Force anti-surface shipping (ASUW) campaign need to be supplemented regarding the Arctic's extreme climate, with its destabilizing icing of ships' upper works, airworthiness-destroying aircraft icing, very strong tides, interfering electromagnetic phenomenon, relatively poor satellite coverage for communications, surveillance, and positioning, and continuing summer glacial icebergs and winter ice sheets? How might the Sub Force most effectively assist to protect shipping convoys and strike groups alike, in balance with its other global taskings, in case of an Arctic war or war scare?

"Admiral Von Scheer Redux: Divide and Conquer!?" Can the concepts behind Air-Sea Battle and Offshore Control be used by hostile nations, with burgeoning 21st century navies and technologies of their own, as a strategy against America, her friends and allies, and their vital interests? The North Pacific approaches into the Arctic might be an ideal extended battlefield for such a strategy. The terrain there suits traditional *divide and conquer* tactics used by a smaller navy against a larger one. (Recall that German Admiral von Scheer used such a *Theory of Risk* against the Royal Navy at World War I's Battle of Jutland—fought in

constrained North Sea waters, at the only entrance to the Baltic Sea.) In addition to the familiar island chains of WESTPAC—some of which are the object of contention between several Asian powers right now—the Aleutian Island Chain and the Bering Strait present two other natural barriers whose control could be disputed by air-sea forces. Then, inside the Arctic, both the Canadian Archipelago on the right flank and the New Siberian Islands on the left present locales reminiscent of World War II's Battle of Leyte Gulf—except with ice and everything else the Arctic throws at naval practitioners. To attack in depth at all such choke points at once would allow an aggressor to dispute access and control of several straits and island chains simultaneously. The pro-democracy side's fleet might be lured or forced into subdividing itself into task forces that, due to distances, natural and man-made jamming, and combat engagement, cannot support each other. The aggressor would choose time of year (perpetual dark or perpetual sunlight) suiting them, and could also exploit major weather systems—including space weather conditions. In this unpleasant scenario, Pearl Harbor might be the subject of a mere feint or covering force, much as how Kiska and Attu were occupied briefly by Japan during the Battle of Midway.

"Numbers Matter!" Even in peacetime, as the number of U.S. Navy subs and cruisers in commission declines and the number of carriers might also decline, U.S. military transits of the Arctic are likely to increase, to try to cover the wide and needful world with fewer platforms to go around. While a mixed blessing for the environment, the shorter transits could save time and fuel (both fossil and nuclear). The carrier and amphibious strike group force-protection challenges might not be entirely new, but the location of such ops (by longitude if not by latitude) certainly would be.

Conclusion

The many interconnected natural and man-made changes occurring or impending in the Arctic present opportunities and dangers never before faced in such an inseparable package by the U.S. Submarine Force, the U.S. Navy, and by America as a whole. It is very important to get the timing and allocations right for the

needed plans and ongoing investments. Given the particularly vulnerable and complex ecosystems involved, there will be no do-overs for Planet Earth or for humanity. Examples of other nations, good or bad, should be studied and learned from very carefully, before they are mimicked or spurned.

Off-shore resource extraction and new shipping routes should not be pushed forward ahead of any government's ability to assure the safety, security, and stewardship of those same commercial activities. All workers, crews, passengers, and residents, not to mention people in other countries, and the delicate High North environment itself must all be protected and equitably nurtured. American sovereignty within our proper borders—including our rightful EEZ and extended continental shelf—must be maintained, and defended. So must the healthy growth of the American economy, and with it jobs and tax revenues.

Under the current burden of extreme federal budget austerity, the U.S. Submarine Force and the Submarine Industrial Base should use what time is available to prepare—and help other U.S. government and friendly forces, agencies, and civilian entities prepare—for a changing world with a rapidly changing Arctic. That changing world might well some day enjoy an abundance of efficient global shipping routes, while suffering from conflict over a global shortage of many vital goods. Whatever the future does hold, the U.S. Sub Force—and the Submarine Industrial Base which cuts and welds the metal to order—will very likely be faced with a broader scope of worldwide operations, tougher cost pressures, a ceaseless need to keep innovating, and a more grueling operational tempo than they or America have ever yet seen.

ADMIRAL JOHN "SANDY" WOODWARD: A TRIBUTE

by Dr. Anthony Wells

Dr. Wells is British by birth and a U.S. citizen. He has been the president and chief executive officer of TKC International LLC for the past 22 years. In 1982, as head of special programs in one of the United Kingdom's intelligence directorates, he was actively involved in some of the most sensitive aspects of the South Atlantic campaign.

The death of Admiral John "Sandy" Woodward, Royal Navy, at age 81 on 4 August 2013 witnessed the passing of the Royal Navy's most distinguished fighting admiral since World War II. He became the right rear admiral in the right place at the right time when Argentina invaded the Falkland Islands on 2 April 1982. His whole career had prepared him for the daunting responsibility of retaking the islands, roughly 8,000 miles from the British Isles.

His good fortune was that he had three distinguished four-star admirals overseeing his command of the South Atlantic Task Force: Admiral Terence Lewin, the Chief of the Defense Staff, who had joined the Royal Navy in 1939; Admiral John Fieldhouse, like Woodward a veteran submariner, and the Commander-in-Chief Fleet, headquartered at Northwood near London; and First Sea Lord and Chief of Naval Staff, Admiral Henry Leach. All were veterans of World War II.

Woodward was trained in the school of hard knocks at Britannia Royal Naval College Dartmouth from the age of 13, becoming a submarine specialist and commanding the submarines TIRELESS, GRAMPUS, and WARSPITE, two diesel boats and a nuclear attack submarine. Prior to that he had been the executive

officer of the nuclear submarine VALIANT. He was appointed *Teacher* of the Royal Navy Submarine command qualifying course, regarded as the most challenging of all Royal Navy sea command examinations, conducted at sea in the most stressful tactical scenarios. He was Captain Submarine Training, Director of Naval Plans, and in command of the destroyer SHEFFIELD as a captain.

Woodward demonstrated all the fine qualities of naval leadership that his many illustrious predecessors of the previous 600 years had exemplified. He also became, from the moment he was given command, the absolute master of quick and decisive thinking, anticipation, and improvisation in the challenging tactical and weather conditions that the South Atlantic campaign required. He was tough, rugged, and expected of others what he gave of himself, leading by practice rather than precept. He claimed not to be an intellectual in the mold of Admiral Herbert Richmond, but in fact he was intellectually gifted, intensely quick at grasping and implementing what naval professionals have learned from operations research and the world of mathematics. Above all he understood the threat and vulnerabilities—and how to circumvent them by optimizing his resources. He knew the limits of his assets—limited ISR, poor airborne early warning, the threat posed by the Exocet missile, and the intense risks to his force entering and landing at San Carlos Water. He measured those risks, planned accordingly and executed with great courage and daring the amphibious landings and defeat of the Argentinian air force. He executed with precision the hugely successful employment of British Special Forces—the Special Air Service and Special Boats Service. His relationship with the land force commander, Major General Jeremy Moore, Royal Marines, and the Commander of Third Commando Brigade, Brigadier Julian Thompson, Royal Marines, showed exemplary understanding of joint operations.

He inspired his fleet and when the inevitable losses occurred he maintained the focus of his mission and adapted accordingly to the changing tactical environment. He knew the risks to his fleet supply ships and oilers and key civilian vessels such as the

ATLANTIC CONVEYOR carrying vital Chinook helicopters. When the multiple attacks came, the crews he had inspired from the formation of the task force were never found wanting. He bore with courage the intense responsibility of ordering or requesting permission to attack vital Argentinian assets, such as the cruiser BELGRANO, sunk by the British nuclear sub CONQUEROR in what subsequently became controversial circumstances. He weathered the latter storm, with the Prime Minister herself providing him with the personal top cover.

Admiral Woodward performed magnificently at a time when the Royal Navy was in the process of a major force reduction at the hands of the new Conservative Minister of Defense, John Knott, who had little or no knowledge of naval strategy, and certainly not maritime expeditionary operations. It was indeed ironic that in the midst of this major defense review and reduction Sandy Woodward led the most successful naval campaign since World War II, providing the Soviet Union with a major object lesson. Woodward also recognized the extraordinary support provided by the U.S. Navy, and the direct personal involvement of Secretary of Defense Caspar Weinberger and President Ronald Reagan, the friend, admirer, and confidant of Prime Minister Margaret Thatcher.

Woodward's later career did not take him to the ultimate high office that was his due—he never became C-in-C Fleet and then First Sea Lord. He was Flag Officer Submarines, a Deputy Chief of Defense Staff, and his last appointment, C-in-C Naval Home Command, all distinguished and highly demanding appointments that he executed with his usual aplomb and rigor. Woodward was an unbridled and outspoken advocate of naval power and in particular the use of maritime expeditionary forces. He was not the naval politician who, by his reckoning, amounted to and required subservience rather than outspoken advocacy. He believed that the Queen, as Lord High Admiral, was owed the ultimate loyalty and, through her, service to the British people, not to the transitory and often wavering politicians that followed short term expedient agendas, such as John Knott. In his retirement he remained an outstanding spokesman for naval power, criticizing the reduction

of the Royal Navy to its current force levels of no aircraft carriers, no fixed-wing air power, and a Submarine Force that, while having outstanding platforms in the new ASTUTE class, lacks numerical strength.

His passing may possibly and sadly represent the end of an era—but he would not have that so. He would rather take up the fight for a return to a British maritime strategy in the next strategic defense review that recognizes one inalienable fact in the history of the British people—that it is a maritime power and that the Royal Navy is the single golden thread that runs through the fabric of Britain's defense base.

CLOSING THE NORTH ATLANTIC AIR GAP: WHERE DID ALL THE BRITISH LIBERATORS GO?

by CAPT. John F. O'Connell, USN(Ret.)

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The Battle of the Atlantic, fought primarily between Great Britain and Germany, from 1940 through May 1943, was principally won by strategic air power. The term strategic air power does not normally include antisubmarine warfare (ASW) aircraft. However, a very few ASW configured, very long range (VLR) aircraft carried out vital strategic offensive and defensive duties during the Atlantic battle.

If Great Britain lost the battle, she might be forced out of the war with unknowable consequences. However, with Great Britain eliminated and only the Eastern front to concern it, Germany might have defeated the USSR and established hegemony in Eurasia.

If Great Britain won the battle, she could serve as a huge marshalling yard for armor, artillery, and infantry formations, gathered for the invasion of France sometime in early 1944. The Atlantic battle pitted massed German submarines (U-boats) against Allied merchant convoys carrying supplies to the British Isles. The following table shows the actual losses of ships and tonnage in the North Atlantic, as well as the number of U-boats sunk each year[1]:

Year	Number of Ships sunk	Tonnage sunk	Number of U-boats sunk
1940	349	1,805, 494	23
1941	496	2,421, 700	35
1942	1,006	5,471, 222	86
1943	285	1659, 601	237
1944	31	175, 013	242
1945	19	122, 729	151

The table shows clearly that 1943 marked a significant change in ship and tonnage losses and in the number of U-boats sunk. After 1943, U-boats represented a lesser strategic threat to Great Britain. This article deals with the role of very long-range aircraft, specifically the Consolidated B–24 Liberator, which enabled the British to win the Atlantic Battle. The article also suggests that British could have won the Atlantic Battle a full year earlier—if the American B–24 Liberators delivered to the Royal Air Force had been properly allocated to the battle. Instead of 1,006 ships/5,471,222 tons being lost during 1942, those losses might have been reduced to only 28 ships/150,377 tons.

The safe arrival of convoys was necessary to the United Kingdom's survival and to the buildup in the United Kingdom of sufficient quantities of equipment and troops to conduct an invasion of occupied France, scheduled for 1944. The aviation gasoline that allowed U.S. Eighth Air Force and Royal Air Force (RAF) Bomber Command to operate from the United Kingdom against Germany and occupied Europe had to be imported into the UK by sea.[2]

The German strategy was simple: sink enough ships to fatally weaken England. The tool the German Navy used was its U-boat arm, commanded by Admiral Karl Doenitz. Doenitz saw the problem very clearly. His solution was to employ U-boats in massed formations, he called wolf packs, at night on the surface to defeat the merchant convoys. Convoys had the advantage of removing the many vulnerable independent merchant ships from the ocean and bunching them together where armed escorts could hinder a surfaced submarine from disturbing them with gun or torpedo. If a submarine attacked while submerged, it might sink a ship or two, but the escorts would harry it with depth charges, keeping it deep while the convoy sailed out of reach. Most ships in convoy would arrive safely—the whole point of the convoy scheme.

During the late 1930s, Doenitz made the massed U-boat night surface attack his signature tactic in a number of exercises in the Baltic and Atlantic. By staying on the surface, the value of Asdic (active sonar) used to detect submerged submarines was negated.[3]

The Type VII U-boat that comprised most of the German U-boat Arm was designed specifically to reduce its visibility when surfaced, and to enhance the ability of U-boat watch officers and lookouts to detect surface ships before they could spot the U-boat. Doenitz understood the basic theory behind the Observation-Orientation-Decision-Action (OODA) loop many years before Colonel John Boyd, USAF first articulated it in the 1950s.[4] In his U-Boat Commander's Handbook, Doenitz includes the exhortation "He who sees first has won."[5]

The Type VII U-boat—using its twin diesel engines—had a surface speed of about seventeen knots at a time when most convoys were limited to eight or nine knots. The speed advantage allowed the U-boat to overtake a convoy. The surfaced speed advantage was entirely dependent upon a lack of enemy air coverage in the U-boat operating area. At first sighting of an aircraft, the U-boat watch officer dived the boat to avoid attack, thus losing the ability to move rapidly on the surface. Once submerged the U-boat was limited to low speeds on the battery, perhaps three to five knots, too slow to keep up with even a slow convoy. In the presence of aircraft in daylight, or radar equipped aircraft during darkness, the U-boat was forced below the surface where it was no longer a threat to ships.

It was not possible to concentrate U-boats to form wolf packs when enemy aircraft were present. Adequate air cover ensured the safe arrival of ships even if no U-boats were sunk. This last point seemed to be difficult to comprehend for a number of prominent figures on the Allied side. To some, the defeat of the U-boat could only be measured by the number of U-boats sunk. A very few realized that the defeat of the U-boat was better measured by the number of convoys that escaped attack, or by the number of ships that made port in the UK with their cargoes—whether or not the opposing U-boats were sunk.

Winston Churchill, Prime Minister and supreme British warlord, at one time remarked that the only thing that really bothered him was the U-boat threat.[6] However, some of his actions at key points during the Battle of the Atlantic seemed to indicate that his focus got blurry from time to time, when he directed activity that

effectively hindered the extension of air cover over vital areas of the North Atlantic. The basic problem concerned the allocation of very long-range (VLR) aircraft within the RAF, and even within Coastal Command itself.

Within the RAF two commands contended for long range and very long-range aircraft. They were Bomber Command, led by Air Marshall Arthur Harris, which wanted them reserved for night area bombing attacks on German cities. The other contender was Coastal Command, tasked with supporting the Royal Navy, with air antisubmarine warfare.[7]

Coastal Command started the war with a collection of antique aircraft. The RAF acquired Lockheed Hudson patrol bombers and Consolidated Catalina flying boats from the U.S. to help stock its squadrons with modern aircraft. It also put in orders for the Consolidated B–24, a long-range aircraft. Bomber Command quickly rejected the B–24 as unsuitable for night area bombing of Germany because of the high visibility of its engine exhaust flames.[8] Those flames would have made it easy for German night fighters to intercept even without air intercept radar.

Despite rejection by Bomber Command, the British Air Ministry sent a number of B–24s to the Middle East Air Command, where they were used in attacks against enemy targets in the Mediterranean area.[9] The Air Ministry also allocated a number of B–24s to transport duties, under Air Ferry Command or British Overseas Airways Corporation (BOAC) control. A very few B–24s were allocated to 120 Squadron, Coastal Command for antisubmarine warfare (ASW).

British historian John Terraine noted that the "convoy battles of October 1940 could be fairly classed as catastrophic."[10] Thirty-eight merchant ships were sunk in three nights of surface attacks by wolf packs. These victims came from convoys SC 7 and HX 79A, bound for the UK from Canadian ports. The losses represented roughly 45 percent of the total number of ships involved. A Defense Committee meeting on October 21, 1940, approved reinforcement of Coastal Command with a third long-range squadron fitted with Air to Surface Vessel (ASV) radar. After November 1940, there was a temporary decline in ships sunk

by U-boats. Many of the boats were back in port for refit and crew rest. Furthermore, British air ASW patrolling had increased, particularly that by long range Sunderlands. As a result, Doenitz shifted his U-boat operating areas to west of 15 degrees west longitude to clear them away from Sunderland patrol areas.[11]

However, a critical air gap existed in the North Atlantic between Iceland and Newfoundland south of Cape Farewell, a stretch some 600—700 nautical miles long. Within that area U-boats were free to move around on the surface by day or night. The only protection provided each convoy were a very few escort ships. The typical convoy consisted of forty to fifty ships, and the escort was usually a mixed bag of a destroyer or two, and some corvettes, totaling five or six escort ships. Some escorts were from Allied navies, introducing language and doctrinal complications. Early in the war, escort groups were assigned at the last minute and had no workup period to learn to work together.

Doenitz's orders to his U-boat commanding officers were simple: the first U-boat to spot a convoy trailed it, while sending off radio signals to U-boat headquarters and other U-boats in the general vicinity. Each U-boat within range closed on the convoy whose position, course and speed were reported. After dark, on the first night after a wolf pack formed, the U-boats attacked. Their attacks were individual, on the surface. Their low surfaced silhouettes usually enabled them to evade the escorts in darkness and get into firing positions. After firing, they would exit the convoy and reload their tubes before closing in to re-attack.

Hitler's War Directive Number 23 of February 6, 1941, noted that the "heaviest effort of German war-operations against the English war-economy has lain in the high losses in merchant shipping inflicted by sea and air warfare." One month later Winston Churchill focused attention on the battle by issuing his Battle of the Atlantic directive. He noted that his "greatest fear was the submarine campaign against Britain's lifeline."[12]

By May 1941, some nine Catalinas had been transferred from the U.S. Navy to the RAF under the Lend Lease program. In June 1941, Air Marshal Sir Philip Joubert de la Ferte took over Coastal Command from Sir Frederick Bowhill. Consolidated Liberators

were beginning delivery from the U.S. About 50 percent of aircraft were fitted with ASV II radar. The patrol endurance and radius of action for the various ASW aircraft were as follows:

Whitley and Wellington 2 hours at 500 miles
Sunderland 2 hours at 600 miles
Catalina 2 hours at 800 miles

By August 1941, some sixty-seven Catalinas were in service with Coastal Command. However long-range Halifax bombers were reserved for Bomber Command.[13]

Joubert soon noted that ASV radar was being used almost entirely for navigation, and not to detect U-boats. He instituted a training program to correct that deficiency, but it took almost a year to accomplish his goal.

In June 1941, the first deliveries of its B–24 Liberators were made to the RAF. A few went to Coastal Command, but others were reserved for top-priority trans-Atlantic air transportation. The first Coastal Command squadron equipped with B–24s with ASW adaptations and extra fuel tanks was established in September. However, one month later, half of those aircraft were withdrawn from Coastal Command for other purposes.[14]

Coastal Command's 120 Squadron at Nutts Corner, Northern Ireland, took delivery of the first B–24s fitted with ASV radar in June 1941.[15] Operating under 15 Group, its responsibilities were to cover the Atlantic area from the UK westward to near the east coast of Canada and the U.S.

Throughout the summer of 1941, Joubert's requests for more long-range aircraft for ASW were rejected. All new bombers were reserved for Bomber Command. Bomber Command even tried to get some earlier deliveries back from Coastal Command. Winston Churchill, the Air Staff, and Air Chief Marshal Sir Charles Portal, the senior RAF officer, were all in league in supporting Bomber Command requirements for long range aircraft for strategic bombing of German cities over Coastal Command's requirements for long range ASW.

Between October 1941 and January 1942, Joubert was forced to send 166 aircrews overseas, including some complete Catalina squadrons, because of the Japanese threat. By December 1941, some sixty-five LB 30s (Mk II Liberators) were in British hands.[16] However, 120 Squadron (15 Group) of Coastal Command had only one squadron of sixteen Liberators. In February 1942 Joubert complained to the Secretary of State for Air, the head of the Air Ministry, about his lack of aircraft.[17]

During December 1941, noted surface Escort Group commander Cdr. Johnny Walker, RN, reported a Liberator arriving over convoy HG 76 (from Gibraltar to UK), some 700 miles south of the UK. It patrolled for some hours until relieved by another Liberator. Van der Vat uses this example to point out that the North Atlantic air gap could have been closed much earlier if Liberators had been in place to operate from Iceland and Newfoundland.[18] Incidentally Admiral Doenitz called off wolf pack attacks on that convoy when the first Liberator was reported overhead.[19]

Joubert noted the deterrent effect the presence of land-based aircraft had on U-boat operations. He recorded that U-boat attacks on ships had almost ceased within 300 nautical miles of Coastal Command air bases.[20] British historian Van der Vat states that Coastal Command had only one squadron (sixteen aircraft) of Liberators by May 1942.[21] That is probably incorrect. The Liberator sighted by Walker in December 1941, had to have come from 19 Group, based in southern England, whose responsibilities included convoys to and from African ports and the Mediterranean Sea.[22] Assuming a notional sixteen B–24s per squadron (twelve active and four reserves) and at least one B–24 squadron assigned to 19 Group that meant that Coastal Command had a total of twenty-four B–24s available for ASW. Whether 19 Group should have had any when 15 Group was stretched so thinly in the North Atlantic is another matter entirely.

In January 1942, Coastal Command had twenty-nine Sunderlands in the Atlantic, plus nineteen Wellingtons and seventeen Whitleys. Coastal Command had only forty-eight very long range aircraft (thirty-eight Catalinas and ten Liberators).[23] On June

23,1942, the Admiralty addressed a paper to the Chief of Air Staff, Air Chief Marshal Sir Charles Portal, noting that "we had lost a measure of control over sea communications of the world…[and that]…ships alone were unable to maintain command at sea."[24]

On July 12, 1942, Sierra Leone convoy OS 33 was attacked. U-boats sank five ships but lost one U-boat. U-202 sighted convoy OS 34, and sank two ships but also encountered Liberators operating 800 miles from their base in southern England. Doenitz was greatly disturbed by that report.[25] He knew that the ability of the U-boats to form wolf packs depended upon an absence of air cover. In mid-August SL 118 (another Sierra Leone convoy) lost three ships before a Liberator from Cornwall arrived on scene and drove the U-boats underwater.[26] Here again is clear evidence of Liberators from 19 Group operating well to the south of the North Atlantic scene, more indication of their dispersion rather than concentration in the area that mattered most. On August 21, 1942, Doenitz noted an increase in enemy flights using an excellent locating device (ASV radar). U-boat operations in the eastern Atlantic were more difficult as a result. Allied aerial reconnaissance reached almost as far west as 20 degrees west longitude, forcing U-boats into the mid-Atlantic where they could still operate freely.[27]

The TORCH landings in North Africa took place in November 1942. Support for the invasion stripped the North Atlantic convoys of most of their surface escorts. Two squadrons of U.S. Navy Liberators were soon based in Morocco to support the invasion and its shipping. Van der Vat, a British historian, states baldly "It was the second time that the obdurate Admiral King almost lost the war single-handed", referring to the USN Liberators use off North Africa rather than in the North Atlantic air gap.[28]

On December 6, 1942, convoy HX 217 was attacked by twenty-two U-boats as it entered the air gap. The next day, seven U-boats were in contact with the convoy when a Liberator from a 120 Squadron detachment at Iceland arrived, some 800 miles from its airbase. There were eight U-boat sightings by the aircraft and seven attacks with depth charges. The Liberator spent 7.5 hours with the convoy, out of a 16 hour 25 minute mission. There were

no successful U-boat attacks on ships of that convoy.[29]

The Germans had determined the frequency of the British radar locating set (ASV II) which was being used so effectively in conjunction with the Leigh-light to detect, illuminate and attack U-boats crossing the Bay of Biscay at night on the surface. They developed an ESM set, called Metox after the name of the French firm which manufactured it. The British answer was the development of 9.7 cm radar (ASV III) whose signal lay outside the Metox frequency detection range.

In December 1942, the question of which RAF command would have priority for delivery of the new airborne radar came up for decision. Coastal Command used it (as ASV III) for ASW. Bomber Command used it (as H2S) for blind bombing of targets in Germany. Churchill ruled in favor of Bomber Command. The first forty ASV III sets that arrived at Coastal Command in January 1943 were assigned to the Leigh-light equipped Wellingtons being used in the Bay of Biscay battle against transiting U-Boats. That decision reflected a bias within Coastal Command itself in favor of its use in an *offensive* battle vice a *defensive* battle over and around the convoys.

From January 1942 through January 1943, four RAF squadrons attached to the Middle East Air Command, operated Liberators in a bomber role: 108, 159, 160, and 178. Assuming the normal twelve active aircraft per squadron, that totals forty-eight Liberators used as bombers by Middle East Air Command. This was at a time when U-boats were sinking vital ships in the North Atlantic, particularly in the air gap which could only be covered by VLR aircraft.

In January 1943, U-514 sighted an all-tanker convoy headed north from Trinidad. U-514 sank one tanker and then lost contact. The convoy consisted of nine tankers headed for Gibraltar carrying fuel for U.S. forces in North Africa. On January 8, the convoy steamed into the Delphin U-boat patrol line. Its escort consisted of one destroyer and three corvettes. U-boats sank six more of the tankers. On January 23, a Combined Chiefs of Staff report of a plenary meeting noted "The defeat of the U-boat remains a first charge on the resources of the United Nations."[30]

During the Casablanca Conference in January 1943 the British stated new ASW requirements: sixty-five more surface escorts, twelve escort carriers (CVEs), and as many very long range (VLR) Liberators as possible—with some to be based in Newfoundland to close the air gap. Terraine notes that the matter of VLR aircraft priorities was still unresolved and was not advanced at Casablanca.[31]

The Coastal Command order of battle for February 1943 shows the assignment of Liberators to the following Groups and subordinate Squadrons:

15 Group (North Atlantic) - 120 Squadron
AHQ Iceland (North Atlantic) - 120 Squadron (det)
16 Group (Channel) - 86 Squadron
19 Group (Bay of Biscay) - 224 Squadron

Once again, assuming twelve active aircraft per squadron, we find perhaps twelve Liberators providing vital ASW protection to the North Atlantic convoys, while another twelve are engaged in operations over the English Channel, and a third set of twelve are pursuing the ongoing campaign against transiting U-boats in the Bay of Biscay. This misassignment lay completely on Coastal Command's own doorstep. Air Officer in Command Joubert could have had thirty-six VLR Liberators in action over the North Atlantic but apparently chose not to do so. Nesbit indicates that the Coastal Command order of battle on February 5, 1943, when Sir John Slessor took over from Joubert, included four squadrons of Liberators. If that was true then it would have been possible to have had forty-eight VLR Liberators in action over the North Atlantic.[32]

However Terraine states that there were "…still only two squadrons of Liberators in Coastal Command" in February 1943.[33] Later Terraine states that in March 1943, Coastal Command "…now had two squadrons of B–24Ds—Liberator IIIs." Conversion of the B–24D to a maritime version called for stripping out fuel tank self-sealing features, removing additional armor in the bomber version as well as the bottom power turret.

The conversion could then take off with 2,000 gallons of fuel plus a load of eight 250- pound depth charges. On March 17, one of these converted Liberators flew eight hours fifty minutes from Aldergrove in Northern Ireland to rendezvous with convoy SC 122. On return it had been in the air eighteen hours and twenty minutes. Another of these conversions carried out a twenty-hour, thirty-minute mission.[34]

In June 1943, Coastal Command had forty-eight Liberators including those engaged in convoy protection, according to Sir John Slessor, Air Officer Commanding Coastal Command. He goes on to state the USAAF (East Coast) had seventy-two Liberators and the U.S. Navy some forty-eight.[35] His words are self-damning because they reveal that not all Coastal Command Liberators were engaged in convoy protection as they should have been. We have seen earlier that a number were involved in the Bay of Biscay offensive against transiting U-boats. His remarks about USAAF and USN Liberators then implicitly shift the blame for the absence of an adequate number of Liberators over the North Atlantic to Great Britain's ally rather than his own Coastal Command and the RAF.

Great Britain purchased 139 Model LB–30 Liberators (serials AL 503 through AL 641) from the United States. These had originally been ordered by France, but after the fall of France in June 1940, the order was taken over by the British. The first aircraft, serial AL 503, crashed into San Diego Bay on June 2, 1941. Some fifty-four Liberators were retained by the U.S. Army Air Corps after the attack on Pearl Harbor. The remaining eighty-four Liberators were delivered to Great Britain.[36] What duties they were assigned makes for interesting reading. Some forty-four Liberators were assigned to duty in Middle East Air Command. Some of these wound up in the Indian Ocean Theater of Operations. Another twenty-six were assigned to British Overseas Aircraft Company (BOAC) or to Ferry Command or for transport duties.

The Admiralty Staff Review of 1943 noted that "The Germans never came so near to disrupting communications between the New World and the Old World as in the first twenty days of

March 1943." It appeared possible that we should not be able to continue convoy as an effective system of defense.[37] It referred to the fact that four convoys (SC 121, HX 228, SC 122 and HX 229) consisting of 202 ships total suffered the losses of thirty-nine ships sunk by U-boats (19.3 percent).[38]

Six Liberators (serials AM 258 through AM 263) were delivered between January and May 1941. These were purchased by the British government. They were considered Mk I Liberators. All were assigned to BOAC or the Return Ferry service. The assignment of a limited number of Liberator long-range aircraft to ferry duties is quite understandable. Ferrying of aircraft from Canada to the UK began in 1940. The ferry aircrews had to return to Canada to continue their duties. Until a return air ferry service was available they went westward by ship, taking ten to fourteen days for the return.[39]

By August 1941, delivery of the 139 Liberators originally destined for the French Air Force but taken over by the British government after the fall of France, began. By December 1941 some 65 had been delivered.[40]

Between April and August 1941, another twenty Liberators were delivered to the UK, serials AM 920-through AM 929. These were LB–30B models (B–24As). Of the twenty some fifteen were assigned to 120 Squadron in Coastal Command. However, only nine were permanently assigned. Another six were temporarily assigned to 120 Squadron for use in training their aircrews. After that four went off to transport duties elsewhere and two went to Middle East duties.

During 1942, some twenty-three USAAF Liberators were returned to British control; bringing the RAF LB–30 total to eighty-seven aircraft.[41]

Van der Vat notes that in March 1943, Coastal Command had only three squadrons of Liberators (fifty-two aircraft on paper), while all U.S. Liberators were in the Pacific, bombing Germany, or in North Africa (two squadrons). Van der Vat goes on to say "(Admiral) King was effectively subverting Casablanca and the Allied Agreement on 'Germany First' by giving priority to his Pacific front in vital VLR (aircraft) resources."[42]

Subsequently, the March 1943 Convoy Conference agreed on twenty Liberators to be provided to the Royal Canadian Air Force. President Roosevelt intervened later in the month and directed that the U.S. Navy provide sixty Liberators to the North Atlantic Theater, and the U.S. Army Air Forces seventy-five Liberators. The RAF was directed to provide 120 Liberators. The last number is fascinating to contemplate. At a time when Coastal Command's 120 Squadron had only a few VLR Liberators to contest the Battle of the Atlantic, the RAF as a whole apparently had a number of Liberators *up its sleeve* doing other things than ASW in the North Atlantic. Allied shipping losses in March were 693,000 tons, of which 627,000 tons were lost to U-boats.

During the Casablanca Conference, a study estimated requirements for eighty VLR aircraft for convoy cover in the North Atlantic. Allocation of incoming Liberators (under Lend Lease) was modified to reduce Coastal Command's allotment in order to reequip an RCAF squadron in Newfoundland with Liberators.[43]

During March 1943, some seventeen convoys were attacked and eighty-two ships were sunk. Three days of attacks, mostly in the *gap* cost convoys HS 229 and SC 122 twenty-one ships.[44]

In February 1943, Coastal Command had eighteen Liberators available for convoy protection in the Atlantic. Nine were in Iceland (120 Squadron) while another nine were attached to 19 Group, which was responsible for convoys between the UK and African ports.[45] 19 Group also ran Bay of Biscay operations against U-boats in transit to and from their French bases.

The air gap was essentially closed by VLR aircraft at the end of March 1943 according to Van der Vat. Actually it was a combination of airborne radar carried by VLR aircraft, well trained surface escort groups with HF/DF to localize U-boat radio transmissions, CVEs that were just entering effective operational service—all underlain by Bletchley Park's interception and breaking of Enigma transmissions that allowed a victory in the Battle of the Atlantic in April-May 1943. But the key element was an adequate number of VLR aircraft operating over the North Atlantic vastness. As discussed in detail earlier the key to wolf pack tactics was the ability of U-boats to operate at high speed on

the surface to close convoys. Take that ability away and convoys were relatively safe.

In April 1943, convoy ONS 4 was supported by the first escort carrier to operate in the North Atlantic, HMS Biter (BAVG-3).[46]

Perhaps the precise turning point of the Battle of the Atlantic took place on May 19-20, when convoy SC 130 was attacked by a wolf pack of thirty-three U-boats. No ships were lost and five U-boats were sunk. On May 22, 1943, USS BOGUE's (CVE-9) aircraft sank a U-boat 600 miles southeast of Greenland. On May 23 HMS Archer (BAVG-1) aircraft sank another 670 miles southeast of Greenland.[47] By the end of May 1943, some forty-one U-boats[48] had been lost. Admiral Doenitz admitted that he had lost the Battle of the Atlantic.

Sir John Slessor, Air Officer in Command of Coastal Command, appeared to understand the real point of the Atlantic Battle when he noted that "Our object in the Battle of the Atlantic was to ensure the safe and timely arrival of convoys, or, in more simple terms, to prevent our ships from being sunk." However, he then displayed rather muddled thinking when he went on to state, "the only sure way of ensuring the safe and timely arrival of shipping, was to kill U-boats at sea."[49] He seemingly missed the point that the mere presence of ASW aircraft in the air in the vicinity of the convoys drove the U-boats underwater where they were relatively harmless.

Regarding the air gap, Slessor went on to note that there was not a single VLR aircraft west of Iceland and only a handful east of it, although the U.S. Navy had taken delivery of full fifty Liberators by the end of 1942. He went on to state that some fifty Liberators defeated the U-boat campaign by mid-summer 1943. Turning once again to savage the Americans, he stated "(Admiral) King's obsession with the Pacific and the Battle of Washington cost us dear in the Battle of the Atlantic."[50]

It is clear from the information available in various source documents that the RAF actually had enough Liberators available to it to close the *air gap* sometime during 1942, rather than a year later. A careful examination of Liberator delivery dates to the RAF indicates that from June 1941 to the end of April 1942, at least 113

Liberators were handed over. The failure of the RAF to prioritize the assignment of long range (1,800 miles) and very long-range (2,400 miles) Liberators to Coastal Command is difficult to understand today. It is also difficult to comprehend why within Coastal Command, 120 Squadron and other squadrons covering the North Atlantic Theater were not afforded absolute priority in the distribution of those Liberators that were allocated to Coastal Command.

The assignment of Liberators to Middle East Air Command for bomber duty took place at a time when U-boat sinking's were threatening the UK's very existence. Although they may have played an important operational role in the Middle East Theater, the North Atlantic Theater was the only theater of operations where Great Britain could have been defeated—in a national sense. If she lost the Battle of the Atlantic she would lose the war. The Admiralty clearly recognized this point.

The Chief of the Imperial General Staff, General Lord Alanbrooke, was chairman of the British Chiefs of Staff Committee, and as such Winston Churchill's chief adviser on the conduct of the war. There is little evidence that Alanbrooke recognized the importance of the Battle of the Atlantic or tried in any way to recommend action to ensure that the *air gap* was closed in 1942 or later.

Marshall of the Royal Air Force Sir Charles Portal was Chief of the Air Staff from 1940 to 1945. He was in a position to take an overall view of the RAF and the responsibilities assigned to its major commands: Bomber, Fighter and Coastal; and the assignment of resources to support them. He bears direct responsibility for diverting a large number of Liberators to the Middle East Air Command, as well as to transport roles at a time when Coastal Command desperately needed them for the North Atlantic battle.

Another diversion of Liberators took place in mid-1942. Winston Churchill was concerned that the Eighth Army in the Western Desert lacked enough armor-piercing tracer ammunition so that every field piece could serve as an anti-tank weapon. Ferry Command of RAF was directed to lay on a massive airlift. To

meet the demand, " …fourteen Liberator bombers were taken off the delivery Line... and …delegated (for transport duties) for the emergency."[51] This is another example of Churchill's meddling in military affairs at the tactical-operational level, while neglecting the overall strategic problem of getting ships safely across the North Atlantic. Those fourteen Liberators represented almost a full squadron, which might have been of immense help in Coastal Command over the North Atlantic.

Arthur Pearcy goes on to state, "Records indicate that as late as August 1942 RAF Coastal Command was allocated just five Consolidated Liberator aircraft to protect the Atlantic convoys.[52]

Given that the Atlantic Battle was finally won in April-May 1943, with a total force of perhaps four squadrons of VLR Liberators, one can look at the number of Liberators in the RAF inventory and their delivery dates, and reasonably conjecture that the same battle might have been fought and won in April-May 1942. Chapter 6 Individual Aircraft Histories of Oughton's The Liberator in Royal Air Force and Commonwealth Service provides details about each aircraft and when it was delivered to the RAF (see pp. 97-123). By April 20, 1942, the RAF had *taken on charge* a total of 113 Liberators.

From May 1942 through April 1943, 918 ships of 5,012,571 tons were lost in the North Atlantic. Taking Terraine's data from Appendix D of Business in Great Waters, in which he lists shipping losses by month throughout the war, we can compare the actual North Atlantic losses for 1942 and 1944. They were:

Year	Ships sunk	Tonnage lost
1942	1,006	5,471,222
1944	31	175,013
Ratio 1944/1942	0.03	0.03

Since 1942 represented unrestricted U-boat operations in the *air gap* and 1944 the period in which the air gap no longer existed, we can credibly use the ratio of the relative ship and tonnage

losses to see what the losses for the period from May 1942 to April 1943 might have been if the RAF had concentrated its B-24s in the North Atlantic in 1942.

Applying that ratio shows that the notional sinkings during that lost year would have amounted to only twenty-eight ships and 150,377 tons. Failure to achieve ASW *air superiority* over the North Atlantic region cost the Allies some 890 ships and 4,862,194 tons of cargo, as well as a significant number of merchant seamen's lives.

It is clear that the RAF had more than enough B–24s available to it to have handily won the Battle of the Atlantic in early 1942. The ships, cargoes, and merchant seaman lost during the following year are a tragic monument to shortsightedness and lack of an adequate strategic grasp by a number of prominent figures in the British government and the Royal Air Force.

If an adequate number of B–24s had been made available to Coastal Command, and allocated properly to 15 Group, the Battle of the Atlantic would have ended in a British victory a full year earlier, in April-May 1942. Since escort carriers and dedicated supporting surface Escort Groups were not available until the following year, the toll of sunken U-boats would have been fewer—but the battle won nevertheless.

NOTES

1. Terraine, John, Business in Great Waters, pp. 767-69.
2. Craven, Wesley F, and James L. Cate, ed., The Army Air Forces in World War II, Vol. 2, Air Logistics in the European Theater of Operations, p. 617. In 1942, it was agreed that all aviation gasoline to be shipped to the UK would be consigned to the British, under Lend Lease, at the American port. The British Petroleum Board then allocated gasoline to American air bases in the UK, crediting the value to the reverse Lend Lease account.
3. Asdic is the British term for active sonar. Developed after World War I it seemed to offer a solution to the problem of dealing with submerged U-boats. Royal Navy trials indicated a high detection probability of submerged targets by destroyers using Asdic.
4. O'Connell, Captain John F. USN (Ret.), Submarine Operational Effectiveness in the 20th Century, Part Two (1939–1945), pp. 6-7. OODA stood for "Observe-Orient-Decision-Action. Boyd derived it from experiences in aerial combat over

North Korea between U.S. and Soviet-supplied jet fighter aircraft.
5. The Submarine Commander's Handbook, New Edition 1943, Thomas Publications, Gettysburg, Pa., 1989.
6. Much earlier, in March 1939, Churchill sent a memorandum to Prime Minister Chamberlain stating "The submarine has been mastered." See John Terraine, Business in Great Waters, p. 177.
7. Air ASW operations were also conducted by Fleet Air Arm (FAA) aircraft carried aboard RN aircraft carriers, but these operations were limited to a fairly short range from the aircraft carrier. Long range ASW air operations had to be carried out by either land based or flying boat aircraft under Coastal Command.
8. Joubert, Air Marshall Sir Philip, The Fated Sky, p.209. Joubert goes on to state that not until late 1942 did a reasonable number of B–24s reach Coastal Command.
9. German and Italian air defenses in the Middle East area were considerably less developed than those over Germany.
10. Terraine, John, Business in Great Waters, pp. 265-68. While British scientists were very innovative, British electronic production was rather backward. In 1935, British radio set productivity was less than a quarter of that in the United States in terms of output per man-hour. See Terraine, Op cit., pp. 282-84.
11. Ibid., p. 271.
12. Van der Vat, Dan, The Atlantic Campaign, pp. 177-78.
13. Terraine, Op. cit., pp. 365-66.
14. Van der Vat, Op. cit., pp. 206-27.
15. Nesbit, Roy Conyers, The Battle of the Atlantic, p. 152.
16. Oughton, The Liberator in RAF and Commonwealth Services, p. 13.
17. Terraine, Op. cit., pp. 428-29.
18. Van der Vat, Op. cit., pp. 216-19.
19. Nesbit, Op. cit., pp. 85-86.
20. Joubert, Op. cit., p. 213.
21. Van der Vat, Op. cit., pp. 272-274. The nominal strength of a bomber squadron was sixteen aircraft: twelve operational and four in reserve. The author will use that arithmetic is discussing Liberator assignments.
22. Bowyer, Chaz, The Royal Air Force 1939 – 1945, p. 48. Bowyer's Figure 3 shows the operating boundaries of Coastal Command's numbered groups.
23. Nesbit, Op. cit., p. 120.
24. Ibid., p. 442.
25. Terraine, Op. cit., pp. 460 - 61.
26. Van der Vat, Op. cit., p. 291. Cornwall was the location of several 19 Group air bases.
27. Ibid., p. 479.
28. Van der Vat, Op. cit., pp. 298-99.
29. Terraine, Op. cit., p. 506.
30. Ibid., pp. 514-15.
31. Ibid., p. 515.
32. Nesbit, Op. cit., p. 166. Nesbit lists four Liberator squadrons on charge to

Coastal Command.
33. Terraine, Op. cit., p. 523.
34. Ibid., p. 566.
35. Slessor, Sir John, The Central Blue, p. 533.
36. Oughton, Op. cit, pp. 97-115.
37. Van der Vat, Op. cit., p. 322.
38. To put these losses in perspective, Eighth Air Force losses at Schweinfurt and Regensburg in late 1943, amounted to sixty B–17s of 360 attacking, about a 17 percent loss rate. See Neillands, Op. cit., pp. 248-55. That led Eighth Air Force to cease its attacks on targets beyond the range of escort fighters.
39. Pearcy, Arthur, Lend-Lease Aircraft In World War II, p. 46.
40. Bowman, Martin W., Consolidated B–24 Liberator, p. 121.
41. Ibid., p. 12.
42. Ibid., p. 326.
43 Slessor, Op. cit, p. 523. It seems strange that RAF Coastal Command had not much earlier tried to get some VLR Liberators assigned to RCAF to help close the air gap.
44. Ibid., p. 510.
45. Terraine, Op. cit., pp. 535, and. 539-40.
46. Nesbit, Op. cit., p. 172.
47. Ibid., p. 176.
48. Terraine, Op. cit., pp. 607-08.
49. Slessor, Op. cit., p. 508.
50. Ibid., pp. 498-99.
51. Pearcy, Op. cit., p. 90.
52. Ibid., p. 21.

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USS WAHOO – THIRD WAR PATROL REPORT OF

Prologue To

Arrived BRISBANE, QUEENSLAND AUSTRALIA, December 26, 1942 after SECOND War Patrol and moored alongside USS SPERRY. On December 27, 1942, commenced refit by USS SPERRY, relief crew and ships force. Refit consisted mostly of routine items plus a few minor repairs.

On December 31, 1942 Lieut. Comdr., M.G. Kennedy was relieved as Commanding Officer by Lieut. Comdr., D. W. Morton. Ship ready for sea on January 16, 1943.

Narrative:

January 16th: 0900L Departed BRISBANE, QUEENSLAND, AUSTRALIA.
1030L Commenced sound listening tests in MORETON BAY; 1500L Completed sound tests. 1700L Transferred pilot and fell in company with our escort, USS PATTERSON. 1945L Made trim dive. 2030L Commenced night surface runs on our escort. 2306L Completed runs. Set course for area at two engine speed (80-90). Still in company with our escort.

January 17th: 0807L Dived. Commenced DD-SS run for USS PATTERSON; 1100L Made deep dive; no leaks. 1335L Dived. Commenced torpedo practice approaches on our escort. 1445L Upon surfacing and while starting #2 engine for propulsion, flooded same, and put it out of commission (SEE DERANGEMENT REPORT - Page 17). 1728L Completed runs. Escort departed. Set course for area at two engine speed (80-90).

January 18th: 1315L Exchanged recognition signals with USS GRAMPUS. COMTASK FORCE-TWO had advised us both that we would pass during the night. 1030L #2 engine back in commission. 1400L Set clocks back - 10 zone time. Conducted drills submerged and made frequent battle surfaces firing both 20mm guns and 4" gun while enroute to area.

January 19th: 2200K Speeded up to three engine speed (80-90) in order to make the passage in VITIAZ STRAITS during daylight. This will also give us an additional day to cover WEWAK and still arrive in area as directed. The additional fuel thus used is considered to be wisely expended.

January 21st: 1820K Dived on SD radar contact. Upon reaching 70 feet stern planes jammed on hard rise causing us to broach at 30 degree up angle. Fortunately SD contact was false, the pip being an internal disturbance.

PROLOGUE TO WEWAK

Our Operation Order routed us through the vicinity of WEWAK, a more or less undetermined spot located in whole degrees of latitude and longitude as 4 degrees S and 144 degrees E. Air reconnaissance had reported considerable shipping there, and dispatches received enroute indicated continued use of this area by the enemy. The position of WEWAK HARBOR was determined as behind KAIRIRU and NUSHU ISLANDS on the Northwest Coast of New Guinea through the interest of D.C. KEETER, MMIc U.S. Navy who had purchased an Australian *two-bit* school atlas of the area.

Study of the harbor on our small scale chart immediately showed deep water and unmistakable landmarks, with tempting possibilities for penetration and escape. By making an accurate tracing slide, and using camera and signal light as a projector, a large scale chart was constructed of the whole harbor. All available information was transferred from sailing directions to this chart.

With everything in readiness adjusted speed to arrive off KAIRIRU ISLAND prior to dawn.
(All times K)

January 24th: 0330 Dived two and a half miles North of KAIRIRU ISLAND and proceeded around western end to investigate VICTORIA BAY. As Dawn was breaking, sighted small tug with barge alongside and a few moments later two CHIDORI class

torpedo boats. As this patrol was underway, maneuvered to avoid, then came back for a better look into this mile deep bay. There was no other shipping.

Went around southwestern tip of KAIRIRU ISLAND to observe the strait between this and NUSHU ISLAND, a foul weather anchorage. Kept position out in, noting the set and drift, and light patches of water marking shallows. The water in general was a dirty yellowish green. With these in mind planned appropriate exit.

Saw what appeared to be tripod masts on the eastern end of KARSAU ISLAND, but either a patrol boat or tug in KAIRIRU STRAIT prevented further observation at this time. As the masts could well have been those of a ship behind KARSAU ISLAND, proceeded west hoping to round UNEI ISLAND, connected to KARSAU by a reef, and observe from between these islands and the mainland. However a reef with the seas breaking over it extended far west of UNEI frustrated this plan. Went back between KARSAU and KAIRIRU ISLANDS hoping to see further around the eastern end. The masts were not sighted again, but a photograph taken at their observation may yet disclose their presence.

At 1318 an object was sighted in the heights of NUSHU ISLAND, about five miles farther into the harbor, much resembling the bridge-structure of a ship. Commenced approach at three knots. As the range closed the aspect of the target changed from that of a tender with several small ships alongside to that of a destroyer with RO class submarines nested, the latter identified by the canvas hatch hoods and awnings shown in ONI 14. The meager observations permitted were insufficient for positive identification and the objects alongside may have been the tug and barge first sighted at dawn in VICTORIA BAY.

It was our intention to fire high speed shots from about 3000 yards, which would permit us to remain in deep water and facilitate an exit. However, on the next observation, when the generated range was 3750, our target, a PUBUKI class destroyer was underway. Angle on the bow 10 port, range 3100. Nothing else was in sight. Maneuvered for a stern tube shot, but on next

observation target had zigged left giving us a bow tube set up.

At 1441 fired spread of three torpedoes on 110 degree starboard track, range 1800 yards, using target speed fifteen since there had been insufficient time to determine speed by tracking. Observed torpedoes going aft as sound indicated 18 knots, so fired another fish with enemy speed 20. Destroyer avoided by turning away, then circled to the right and headed for us. Watched him come and kept bow pointed at him. Delayed firing our fifth torpedo until the destroyer had closed to about 1200 yards, angle on the bow 10 degrees starboard. Then to insure maximum likelihood of hitting with our last torpedo on the forward tubes, withheld fire until range was about 800 yards. This last one, fired at 1449, clipped him amidships in twenty-five seconds and broke his back. The explosion was terrific!

The topside was covered with Japs on turret tops and in the rigging. Over 100 members of the crew must have been acting as look-outs.

We took several pictures, and as her bow was settling fast we went to 150 feet and commenced the nine mile trip out of WEWAK. Heard her boilers go in between the noise of continuous shelling from somewhere plus a couple of aerial bombs. They were evidently trying to make us lie on the bottom until their patrol boats could return.

No difficulty was experienced in piloting without observation out of WEWAK using sound bearings of beach noises on reefs and beach-heads. With the aid of a one-knot set we surfaced at 1930 well clear of KAIRIRU and VALIF ISLANDS. Cleared area on four engines for 30 minutes on course 000 degrees T. Huge fires were visible in WEWAK HARBOR. We wondered if they had purposely created these fires to silhouette us in case we tried to escape out of the harbor.

Slowed to one engine speed (80-90) at 2000. 2230 As the enemy convoy route from PALAU to WEWAK was known to pass between WUVULU and AUA ISLANDS commenced search by criss-crossing base course at 30 degrees on two-hour legs. 2345 Sent report of WEWAK engagement to COMTASK FORCE FORTY-TWO.

January 25th: (All times K). 0530 Passed between AUA and WUVULU ISLANDS. Changed base course for PALAU and went to two engine speed (80-90) continuing the criss-cross search for enemy shipping. 0830 Fired Tommy gun across bow of small fishing boat and brought him alongside. Neither our Chamoro or Filipino mess boy could converse with the six Malayans in the boat, but by sign language we learned that they were originally nine in number, three having died. One of the remaining six was apparently blind, a second quite sick, and a third obviously suffering from scurvy. Gave them food and water as they had none and then continued our search for the enemy.

1000 In accordance with Operation Order, shifted from Task FORCE FORTY-TWO to SubPacFOR without dispatch. Commenced guarding SubPac radio schedules. 1645 Dived for a half-hour and held various drills. While submerged passed under the equator.

January 26th: (All times K). 0757 Sighted smoke on the horizon, swung ship towards and commenced surface tracking. Adjusted course and speed to get ahead of the enemy. After three quarters of an hour and when we had obtained a favorable position with masts of two ships just coming over the horizon, dived and commenced submerged approach.

The two freighters were tracked at 10 knots on a steady course of 095 degrees T., which was somewhat puzzling as it led neither to nor from a known port. During the approach determined that the best firing position would be 1300 yards on beam of leading ship. This would permit firing with about 15 degrees right gyro angle on approximately a 105 degree track on the leading ship, and with about 30 degrees left gyro angle and 60 degrees track on the second ship 1000 yards astern in column. However at 1030 found we were too close to the track for this two ship shot so reversed course to the right and obtained an identical set-up for a stern tube shot. At 1041 fired two torpedoes at the leading ship and

seventeen seconds later two at the second freighter.

The first two torpedoes hit their points of aim in bow and stern. There was insufficient time allowed for the gyro setting angle indicator and regulator to catch up with the new set-up cranked into the TDC for the third shot. This torpedo passed ahead of the second target. The fourth torpedo hit him.

Swung left to bring bow tubes to bear in case these ships did not sink. At 1045 took sweep around to keep the set-up at hand and observed three ships close about us. Our first target was listed badly to starboard and sinking by the stern, our second was heading directly for us, but at slow speed, and the third was a huge transport which had evidently been beyond and behind our second target.

At 1047 when the transport presented a 90-degree starboard angle on the bow at 1800 yards range fired spread of three torpedoes from forward tubes. The second and third torpedoes hit and stopped him. We then turned our attention to the second target which was last observed heading for us. He was still coming, yawing somewhat, and quite close. Fired two bow torpedoes down his throat to stop him, and as a defensive move. The second torpedo hit, but he kept coming and forced us to turn hard left, duck and go at full speed to avoid.

There followed so many explosions that it was impossible to tell just what was taking place. Eight minutes later came back to periscope depth, after reaching 80 feet, to observe that our first target had sunk, our second target still going, but slowly and with evident steering trouble, and the transport stopped but still afloat. Headed for transport and maneuvered for a killer shot. At 1133 fired a bow torpedo at 1000 yards range, 85 degrees port track, target stopped.

The torpedo wake passed directly under the middle of the ship, but the torpedo failed to explode. The transport was firing continuously at the periscope and torpedo wake with deck guns and rifles. At 1135 fired a second torpedo with the same set-up except that the transport had moved ahead a little and turned towards presenting a 65 degree angle on the bow. The torpedo wake headed right for his stack. The explosion blew her midships

section higher than a kite. Troops commenced jumping over the side like ants, off a hot plate. Her stern went up and she headed for the bottom. Took several pictures.

At 1136 swung ship and headed for the cripple, our second target, which was now going away on course 085 degrees. Tracked her at six knots, but could not close her as our battery was getting low.

At 1155 sighted tops of fourth ship to the right of the cripple. Her thick masts in line had the appearance of a light cruiser's tops. Kept heading for these ships hoping that the last one sighted would attempt to pick up survivors of the transport. When the range was about 10,000 yards, however, she turned right and joined the cripple, her masts bridge structure and engines aft identifying her as a tanker. Decided to let these two ships get over the horizon while we surfaced to charge batteries and destroy the estimated twenty troop boats now in the water. These boats were of many types, scows, motor launches, cabin cruisers and nondescript varieties. At 1135 made a battle surface and manned all guns. Fired 4" gun at largest scow loaded with troops. Although all troops in this boat apparently jumped in the water our fire was returned by small caliber machine guns. We then opened fire with everything we had. Then set course 085 degrees at flank speed to overtake the cripple and tanker.

At 1530 sighted smoke of the fleeing ships a point on the port bow. Changed course to intercept. Closed until the mast tops of both ships were in sight and tracked them on course 350 degrees. They had changed course about 90 degrees to the left apparently to give us the slip. Maneuvered to get ahead undetected, but kept mastheads in sight continuously by utilizing No. 1 periscope and locating look-out on top of periscope shears. At 1721, one half hour before sunset, with the two ship's masts in line, dived and commenced submerged approach. Target zigs necessitated very high submerged speeds to close the range. Someone said the pitometer log indicated as much as 10 knots. Decided to attack tanker first, if opportunity permitted, as she was yet undamaged. At 1829, when it was too dark to take a periscope range, fired a spread of three bow torpedoes with generated range

2300 yards, on a 110-degree port track. One good hit was observed and heard one minute, twenty-two seconds after firing. This apparently stopped him. Started swing for stern tube shot on the freighter but he had turned away.

Surfaced twelve minutes after firing and went after the freighter. Was surprised to see the tanker we had just hit still going and on the freighter's quarter. We were most fortunate to have a dark night with the moonrise not until 2132, and to have targets that persisted in staying together. Our only handicap was having only four torpedoes left, and these in the stern tubes.

Made numerous approaches on the tanker first, as he was not firing at us. Even attempted backing in at full speed, but the ship would not answer her rudder quickly enough. After an hour and a half was able to diagnose their tactics. Closed in on tanker from directly astern, when they zigged to the right we held our course and speed. When they zigged back to the left we were on parallel course at 2000 yards range. Converged a little on the tankers port beam, then twisted left with full rudder and power. He thus gave us a stern tube shot, range 1850 yards on a 90-degree port track. At 2025 fired two torpedoes at tanker the second hitting him just abaft of his midships breaking his back. He went down in the middle almost instantly.

Immediately after firing changed course to head for the freighter and went ahead full. Passed the tanker at 1250 yards by SJ radar, at which time he occupied full field in 7x50 binoculars. This fixes his length at about 500 feet. Only the bow section was afloat and its mast canted over when we left him astern.

At 2036, eleven minutes after firing on the tanker, commenced approach on our last target. It was quite evident that this freighter had a good crew aboard. They did not miss an opportunity to upset our approach by zigs, and kept up incessant gunfire to keep us away. Much of this firing was at random, but at 2043 they got our range, placed a shell directly in front of us which ricocheted over our heads and forced us to dive.

Our *gun-club* could take a lesson from their powder manufacturers. It was truly flashless, a glow about the intensity of a dimmed flashlight being the only indication that a projectile was

on its way. It is somewhat disconcerting when a splash is the first indication you are being fired upon.

We tracked the freighter by sound until the noise of shell splashes let up then surfaced at 2058, fifteen minutes after diving, and went after him. Two minutes later a large search-light commenced sweeping sharp on our port bow, its rays seemingly just clearing our periscope shears. Assumed this was from a man-of-war and that the freighter would close it for protection. Our attack obviously had to be completed in a hurry. Headed for the searchlight beam and was most fortunate to have the freighter follow suit. At 2110 when the range was 2900 yards by radar, twisted to the left for a straight stern shot, stopped and steadied. Three minutes later with angle on the bow 135 degrees port by radar tracking, fired our last two torpedoes without spread. They both hit, the explosions even jarring us on the bridge.

As the belated escort was now coming over the horizon, silhouetting the freighter in her searchlight we headed away to the east and then five minutes later to the north. Fifteen minutes after firing the freighter sank leaving only the destroyer's searchlight sweeping a clear horizon. It had required four hits from three separate attacks to sink this ship.

At 2130 set course 358 degrees for FAIS ISLAND. At 2345 sent dispatch to Comsubpac concerning new route and engagement.

Two men were injured by 20mm explosion. The cause is covered in the Report of investigation and treatment in the Health and Habitability Report, included herewith.

January 27th (All times K): 0720 Sighted smoke over the horizon, commenced tracking and changed course to intercept. At 0801 when masts of three ships were in sight, dived and continued approach. The mean course was plotted as 146 degrees with the whole convoy zigging simultaneously thirty degrees either side of base course. At 0830 the tops and stacks of two more freighters, and those of a tanker with engines aft were in sight.

It was our first intention to intercept one of the lagging freighters which did not appear to be armed, but a zig placed the

tanker closest to us. Surfaced with range about 12,000 yards and headed at full speed to cut him off. Trained gun sharp on starboard bow, then sent pointer and trainer below to standby with rest of gun crew. The convoy sighted us in about 10 minutes, commenced smoking like a Winston, and headed for a lone rain-squall. Only two of the larger freighters opened fire and their splashes were several thousand yards short. Their maneuver left the tanker trailing, just where we wanted him.

At 1000 when we had closed to 7500 yards, however, a single mast poked out from behind one of the smaller freighters. Almost immediately the upper works of a corvette or destroyer were in sight. Turned tail at full power to draw the escort as far as possible away from the convoy in case we were forced to dive, as this would greatly shorten the time he could remain behind to work us over.

Ordered contact report to be sent, but could not raise anyone.

Found that our engineers could add close to another knot to our speed when they knew we were being pursued. We actually made about 20 knots, opening the range to thirteen or fourteen thousand yards in the first twenty minutes of the chase. In fact he was smoking so profusely that we called him an *Antiquated Coal-burning Corvette*. He was just lighting off more boilers evidently, for seventeen minutes later he changed our tune by boiling over the horizon, swinging left, and letting fly a broadside at estimated range of 7000 yards. There was no doubt about his identity then, especially when the salvo whistled over our heads, the splashes landing about 500 yards directly ahead.

Dived and as we passed periscope depth felt gun splashes directly over-head. Went to 300 feet and received six depth charges fifteen minutes later. They sounded loud, but did no damage.

Lost sound contact at 1120. As the DD had some forty miles to catch up with his leading ships he evidently didn't stay around. We decided to catch our breath none-the-less, so stayed deep until 1400 when we surfaced and commenced running again for FAIS. At 2058 sent contact report of convoy to ComSubPac.

January 28th (All times K): 0830 Sighted FAIS ISLAND fifteen miles ahead. Dived twenty minutes later on ten mile circle and closed the island at 4 knots. Took soundings with single signal at 10 minute intervals, and tried echo-ranging on the reef. The soundings agreed closely with those on chart 5426. The echo-ranging was unsuccessful due to bottom reverberations. There was no evidence of a sound listening post. The trading station is just as shown on the chart.

Proceeded around the southwestern end of the island one and a half miles from the beach and located the Phosphorite Works, warehouses and refinery on and inshore of the prominent point in the middle of the northwest side of the island.

Immediately made plans to shell these works that evening at moon-rise with our few remaining 4" rounds as the large refinery, warehouses, etc., offered a splendid target. This plan was frustrated by the arrival at 1400 of an Inter-Island Steamer with efficient looking gun mounts forward and aft. She was similar to the sketch of the Q-boat, appearing in the GUDGEONS Second Patrol Report except that she was half again as long. Swung and moored to the buoy off the Refinery Point, where she would have made a nice target for one torpedo. Her tonnage was estimated at 2000.

The phosphorite is evidently loaded from the crane, visible on the point, into lighters which were observed moored well inshore, and thus transferred to the steamers. At 1600 decided to leave well enough alone, so after taking several more photographs set course to clear northern end of FAIS ISLAND.

At 1800 surfaced and went ahead on three main engines on prescribed route to PEARL HARBOR, T.H.
February 7th: (All times V-W) 0830 Arrived PEARL.

REMARKS:

The fire control party of this ship was completely reorganized prior to and during this patrol. The Executive Officer, Lieutenant R.H. O'KANE in the co-approach officer. He made all observations through the periscope and fired all torpedoes. The

Commanding Officer studies the various setups by the use of the Iswas and analyzing the T.D.C. and does the conning. A third officer assists the Commanding Officer in analyzing the problem by studying the plot and the data sheets. On the surface the Executive Officer mans the T.B.T., and makes observations and does the firing; The Commanding Officer conns.

This type of fire control party relieves the Commanding Officer of a lot of strain and it gives excellent training to all hands, especially the Executive Officer. It is recommended that other ships give it consideration and thought.

(b) The conduct and discipline of the officers and men of this ship while under fire were superb. They enjoyed nothing better than a good fight. I commend them all for a job well done, especially Lieutenant R.H. O'KANE the Executive Officer, who is cool and deliberate under fire. O'KANE is the fightingest naval officer I have ever seen and is worthy of the highest of praise. I commend Lieutenant O'KANE for being an inspiration to the ship.

Serial 0198 Care of Fleet Post Office,
San Francisco, California,
February 12, 1943

CONFIDENTIAL
COMSUBPAC PATROL REPORT NO. 138
U.S.S. WAHOO - THIRD WAR PATROL
From: The Commander Submarine Force, Pacific Fleet.
To: Submarine Force, Pacific Fleet.
Subject: U.S.S. WAHOO (SS238) - Report of Third War Patrol.
Enclosure: (A) Copy of Subject War Patrol.
(B) Comsubron 10 conf. ltr. Serial 011 of February 8, 1943

1. The Commander Submarine Force, Pacific Fleet, takes great pleasure in commending the Commanding Officer, Officers, and crew of the WAHOO on an outstanding war patrol. This patrol speaks for itself, and the judgement and decisions displayed by the Commanding Officer were sound.

2. All attacks were carried out in a most aggressive manner, and it clearly demonstrates what can be done by a submarine that

retains the initiative.

3. The WAHOO is credited with inflicting the following damage on the enemy:

SUNK

1 destroyer (ASASHIO Class)	-	1500 tons
1 freighter (DAKAR MARU Class)	-	7160 tons
1 freighter (ARIZONA MARU Class)	-	9500 tons
1 tanker (MANZYU MARU Class)	-	6520 tons
1 transport (SEIWA MARU Class)	-	7210 tons
	TOTAL:	31,890 tons

J. H. Brown, Jr.,
Acting.

PAST IMPERFECT BLOG

MARCH 8, 2013
THE SECRET PLOT TO RESCUE NAPOLEON BY SUBMARINE

by Mr. Mike Dash

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Tom Johnson, the famous smuggler, adventurer, and inventor of submarines, sketched in 1834 for the publication of Scenes and Stories by a Clergyman in Debt.

Tom Johnson was one of those extraordinary characters that history throws up in times of crisis. Born in 1772 to Irish parents, he made the most of the opportunities that presented themselves and was earning his own living as a smuggler by the age of 12. At least twice, he made incredible escapes from prison. When the Napoleonic Wars broke out, his well-deserved reputation for extreme daring saw him hired–despite his by then extensive criminal record–to pilot a pair of covert British naval expeditions.

But Johnson also has a stranger claim to fame, one that has gone unmentioned in all but the most obscure of histories. In 1820–or so he claimed–he was offered the sum of £40,000

[equivalent to $3 million now] to rescue the emperor Napoleon from bleak exile on the island of St. Helena. This escape was to be effected in an incredible way–down a sheer cliff, using a bosun's chair, to a pair of primitive submarines waiting off shore. Johnson had to design the submarines himself, since his plot was hatched decades before the invention of the first practical underwater craft.

The tale begins with the emperor himself. As the inheritor of the French Revolution—the outstanding event of the age, and the one that, more than any other, caused rich and privileged elites to sleep uneasy in their beds—the Corsican became the terror of half of Europe; as an unmatched military genius, the invader of Russia, conqueror of Italy, Germany and Spain, and architect of the Continental System, he was also (in British eyes at least) the greatest monster of his day. In the English nursery he was *Boney*, a bogeyman who hunted down naughty children and gobbled them up; in France he was a beacon of chauvinism. His legend was only burnished when, defeated, apparently conclusively, in 1814 by a grand coalition of all his enemies, he was exiled to the small Italian island of Elba—only to escape, return to France, and, in the campaign famously known as the Hundred Days, unite his whole nation behind him again. His final defeat, at Waterloo, left the British determined to take no further chances with him. Exile to St. Helena, a small island in the South Atlantic 1,200 miles from the nearest land, was intended to make further escape impossible.

The emperor Napoleon in exile on St. Helena–a depressing prison for a man who had once ruled over most of Europe.

Yet, while Napoleon lived (and he endured six increasingly morose years on St. Helena before finally succumbing to cancer–or, some say, to arsenic poisoning), there were always schemes to rescue him. Emilio Ocampo, who gives the best account of this collection of half-baked plots, writes that "Napoleon's political ambition was not subdued by his captivity. And his determined followers never abandoned hopes of setting him free." Nor did the Bonapartists lack money; Napoleon's brother, Joseph, who was at one time the King of Spain, had escaped to the United States with a fortune estimated at 20 million francs. And the emperor's popularity in the United States was such that–Ocampo says–the British squadron taking him into exile headed several hundred miles in the wrong direction to evade an American privateer, the *True Blooded Yankee*, which sailed under the flag of the revolutionary government of Buenos Aires and was determined to effect his rescue.

The greatest threat, indeed, did come from South America. Napoleonic France had been the only power to offer support when the continent sought independence from Spain, and a few patriots were willing to contemplate supporting an escape or, more ambitiously, an invasion of St. Helena. The prospect was attractive

to Napoleon as well; if there was no realistic hope of returning to Europe, he could still dream of establishing a new empire in Mexico or Venezuela.

St. Helena made an almost perfect prison for Napoleon: isolated, surrounded by thousands of square miles of sea ruled over by the Royal Navy, almost devoid of landing places, and ringed with natural defenses in the form of cliffs.

Safely landed on St. Helena, though, the emperor found himself in what was probably the most secure prison that could have been devised for him in 1815. The island is extremely isolated, almost entirely ringed with cliffs and devoid of secure anchorages; it has only a handful of possible landing places. These were guarded by a large garrison, totaling 2,800 men, armed with 500 cannon. Napoleon himself, meanwhile, was held at Longwood, a refurbished mansion with extensive grounds in the most remote and dismal portion of the interior.

Although the emperor was allowed to retain an entourage, and offered a good deal of freedom within the confines of Longwood's estate, everything else on the island was strictly controlled by St. Helena's stern and efficient governor, Sir Hudson Lowe, whose career prospects were intimately bound up with the security of his famous captive. Longwood was strongly guarded; visitors were interrogated and searched, and the estate was barred to visitors

during the hours of darkness. An entire Royal Navy squadron, consisting of 11 ships, patrolled constantly offshore.

So concerned were the British to scotch even the faintest possibility of escape that small garrisons were even established on Ascension Island and at Tristan da Cunha, 1,200 miles further out in the Atlantic, to forestall the unlikely possibility that these uninhabited volcanic pinpricks might be used as staging posts for a rescue. No single prisoner, probably, has ever been so closely guarded. "At such a distance and in such a place," the prime minister, Lord Liverpool, reported with satisfaction to his cabinet, "all intrigue would be impossible."

Longwood, in the damp center of the island, was the emperor's home for the last six years of his life.

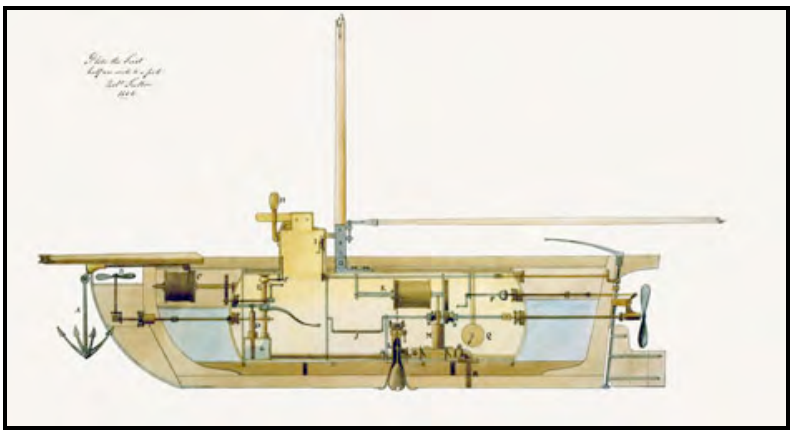
And yet—surprisingly, perhaps—the British were right to take extreme precautions. The marines sent to occupy Ascension discovered that a message had already been left on its main beach—it read: "May the Emperor Napoleon live forever!"—and Ocampo summarizes a remarkably long list of plots to liberate the emperor; they included efforts to arrange a rescue by fast yacht, newfangled steamboat and even by balloon.

Where exactly Tom Johnson fits into this murky picture is difficult to say. Although scarcely averse to publicity, Johnson has always dwelt in the margins between fact and fiction—the latter often of his own invention. Reliable records of his life are largely absent (even his name is generally misspelled Johnston or

Johnstone); the one biography of him is a farrago. The greatest literary figure of the day, the novelist Sir Walter Scott, was misled about Johnson's career—writing, wrongly, that he had piloted Admiral Nelson's flagship at the Battle of Copenhagen.

Yet there is evidence that Johnson built a submarine, and that he talked openly, after Napoleon's death, about his plan to use it. The most complete version of events, in what purport to be the smuggler's own words, can be found in an obscure memoir entitled *Scenes and Stories of a Clergyman in Debt*, which was published in 1835, during Johnson's lifetime. The author claimed to have met the smuggler in debtor's prison, where (irritated by Scott's misstatements, he suggests) Johnson agreed to put his tale in his own words. The book contains memoirs of several dramatic episodes that chime well with contemporary accounts– a remarkable escape from Fleet Prison, for example. At the very least, the correspondences lend weight to the idea that the material in *Scenes and Stories* really was written by Johnson–though of course it does not prove that the plot was anything but a flight of fancy.

The book's account begins abruptly, with a description of his submarines:



Robert Fulton's submarine of 1806 was developed from plans paid for by

the British, and was probably the inspiration for Johnson's designs. The papers were lodged with the American consulate in London and eventually published in 1920. Image: Wikicommons

The Eagle *was of burthen [displacement] of a hundred and fourteen tons, eighty-four feet in length, and eighteen-foot beam; propelled by two steam engines of 40 horsepower. The* Etna*–the smaller ship—was forty feet long, and ten feet beam; burthen, twenty-three tons. These two vessels were [crewed by] thirty well chosen seamen, with four engineers. They were also to take twenty torpedoes [mines], a number equal to the destruction of twenty ships, ready for action in case of my meeting with any opposition from the ships of war on the station.*

The narrative passes silently over the not inconsiderable difficulty of how such small vessels were to make the voyage south to St. Helena, and moves on to their appearance off the island—the ETNA so close to the shore that it would need to be *well fortified with cork fenders* to prevent being dashed to pieces on the rocks. The plan then called for Johnson to land, carrying "a mechanical chair, capable of containing one person on the seat, and a standing foot-board at the back," and equipped with the enormous quantity of 2,500 feet of "patent whale line." Leaving this equipment on the rocks, the smuggler would scale the cliffs, sink an iron bolt and a block at the summit, and make his way inland to Longwood.

> *I should then obtain my introduction to his Imperial Majesty and explain my plan… I proposed that [a] coachman should go into the house at a certain hour… and that His Majesty should be provided with a similar livery, as well as myself, the one in the character of a coachman and the other as groom…. We should then watch our opportunity to avoid the eye of the [naval patrols on] guard, who seldom looked out in the direction of highest point of the island, and upon our arriving at the spot where our blocks, &c., were deposited, I should make fast one end of my ball of twine to the ring, and heave the ball down to my confidential man…and then haul up the mechanical chair to the top. I should then place His*

Majesty in the chair, while I took my station at the back, and lowered away with a corresponding weight on the other side.

The escape would be completed at nightfall, Johnson wrote, with the emperor boarding the ETNA and then transferring to the larger EAGLE. The two submarines would then make sail–they were to be equipped, Johnson's account notes, with collapsible masts as well as engines. "I calculated," he finished, "that no hostile ship could impede our progress…as in the event of any attack I should haul our sails, and strike yards and masts (which would only occupy about 40 minutes), and then submerge. Under water we should await the approach of an enemy, and then, with the aid of the little ETNA, attaching the torpedo to her bottom, effect her destruction in 15 minutes."

Charles de Montholon, a French general who accompanied Napoleon into exile, mentioned a plot to rescue the emperor by submarine in his memoirs.

So much for Johnson's story. It does have some support from other sources—the Marquis de Montholon, a French general who went into exile with Napoleon and published an account of his time on St. Helena years later, wrote of a group of French officers who planned to rescue Napoleon *with a submarine*, and mentions elsewhere that five or six thousand *louis d'or* were spent on the vessel: about £9,000 then, $1 million now. The sober *Naval Chronicle*–writing in 1833, before the publication of *Scenes and Stories*–also mentions Johnson in connection with a submarine plot, though this time the sum involved was £40,000 [more than $4 million], payable "on the day his vessel was ready to proceed to sea." And an even earlier source, the *Historical Gallery of Criminal Portraitures (*1823), adds the vital missing link that explains why Johnson felt himself competent to build a submarine: 15 years earlier, when the Napoleonic Wars were at their height,

he had worked with the renowned Robert Fulton, an American engineer who had come to Britain to sell his own plans for an underwater boat.

It is Fulton's appearance in the tale that gives this account a semblance of verisimilitude. A competent inventor, best remembered for developing the first practical steamboat, Fulton had spent years in France peddling designs for a submarine. He had persuaded Napoleon to let him build one small experimental craft, NAUTILUS, in 1800, and it was tested with apparent success on the Seine. A few years later, Fulton designed a second, more advanced, vessel which—as his illustration shows– superficially resembled Johnson's submarines. It is also a matter of record that, when the French failed to show any interest in this second boat, Fulton defected to Britain with the plans. In July 1804, he signed a contract with the prime minister, William Pitt, to develop his "system" of submarine warfare under terms and conditions that would have yielded him £100,000 [$10 million today] in the event of success.

St. Helena, an island of only 46 square miles, made a secure prison for a dangerous prisoner–or did it?

What is much harder to establish is whether Fulton and Tom Johnson met; the association is hinted at in several places, but nothing survives to prove it. Johnson himself was probably the source of a statement that appears in the *Historical Gallery* to the effect that he encountered Fulton in Dover in 1804 and "worked himself so far into [his] secrets, that, when the latter quitted England…Johnstone conceived himself able to take up his projects." Even more worrying is the suggestion that the book at the heart of this inquiry—*Scenes and Stories of a Clergyman in Debt*—is not all that it appears to be; in 1835, a denunciation appeared in the satirical newspaper *Figaro in London*,

alleging that its real author was FWN Bayley–a hack writer, not a churchman, though he certainly spent time in jail for unpaid debts. The same article contained the worrying statement that "the most extraordinary pains have been taken by the publisher to keep…Captain Johnson from sight of this work." Why do that, if Johnson himself had penned the account that appeared under his name?

Might Johnson have been no more than a fantasist, then—or at best a man who touted extravagant claims in the hope of making money from them? The old smuggler spent the 1820s talking up a whole succession of projects involving submarines. At one point he was reported to be working for the King of Denmark; at another for the Pasha of Egypt; at yet another to be building a submarine to salvage a ship off the Dutch island of Texel, or to retrieve valuables from wrecks in the Caribbean. Perhaps this is not surprising. We know that, after emerging from debtors' prison, Johnson lived for years south of the Thames on a pension of £140 a year–a little less than $20,000 today. That was scarcely enough to allow life to be lived to its fullest.

Sir Hudson Lowe, Napoleon's jailer on St. Helena, was responsible for the security precautions Johnson sought to evade.

Yet, oddly enough, the jigsaw puzzle that is Johnson's life includes pieces that, properly assembled, hint at a much more complex picture. The most important of these scraps remain unpublished and molder in an obscure corner of Britain's National Archives–where I unearthed them after a dusty search some years ago. Together, they give credence to an odd statement that first appeared in the *Historical Gallery*–one that dates the construction of Johnson's submarine not to an 1820 approach by wealthy Bonapartists, but to as early as 1812, three years before Napoleon's imprisonment.

What makes this detail especially interesting is the context. In 1812, Britain was at war with the United States—and the U.S. was known to have employed Robert Fulton to work on a new generation of super-weapons. That probably explains how Johnson was able to arm himself with a whole series of passes from different government departments confirming that he was formally employed "on His Majesty's Secret Service on submarine, and other useful experiments, by Order." How these trials were funded is a different matter. In the confusion of wartime, the papers show, Britain's army and navy each assumed that the other would be picking up the bill. It was a situation Johnson was quick to exploit, retaining the services of a London engineer who sketched a submarine that was 27 feet long and "in shape much like a porpoise." An inner chamber, six feet square and lined with cork, protected the two-man crew.

There is no doubt that Johnson's design was primitive—the submarine was driven by sails on the surface, and relied on oars for motive power when submerged. Nor is there anything to suggest that Tom and his engineer solved the vast technical problems that prevented the development of effective subs before the 1890s—most obviously the difficulty of preventing a boat submerging in neutral buoyancy from simply plunging to the bottom and staying there. It was enough that the weapon actually existed.

The White House is burned down on the orders of Sir George Cockburn. In 1820, the British admiral would go on to write up a report on Tom Johnson's submarine.

We know it did, because the archives contain correspondence from Johnson confirming that the boat was ready and demanding payment of £100,000 for it. They also show that, early in 1820, a commission of senior officers, led by Sir George Cockburn, was sent to report on the submarine—not, apparently, to assess its new technology, but to estimate how much it cost. Cockburn was a serious player in the naval hierarchy of the day, and remains notorious as the man who burned the White House to the ground when Washington fell to British troops in 1814. His original report has vanished, but its contents can be guessed from the Royal Navy's decision to shave Johnson's six-figure demand down to £4,735 and a few pennies.

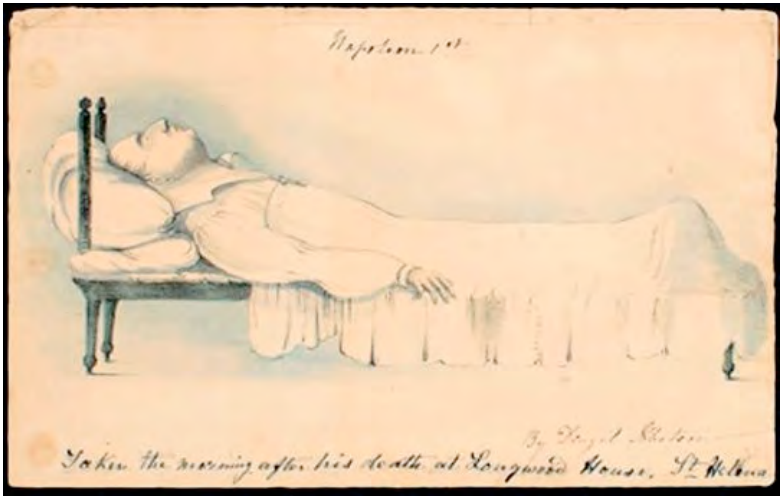
What this means is that, early in 1820, Johnson possessed a very real submarine at precisely the time that, French sources

suggest, Bonapartist officers were offering thousands of pounds for just such a vessel. And this discovery can be tied, in turn, to two other remarkable reports. The first, which appeared in the *Naval Chronicle*, describes a trial of Johnson's boat on the River Thames:

> *On one occasion, the anchor… got foul of the ship's cable…and, after having fixed the petard [mine], Johnson strove in vain to get clear. He then looked quietly at his watch, and said to the man who accompanied him, "We have but two minutes and a half to live, unless we can get clear of this cable." This man, who had been married only a few days, began to lament his fate…. "Cease your lamentations," said Johnson sternly to him, "they will avail you nought." And, seizing a hatchet, he cut the cable, and got clear off; when immediately the petard exploded, and blew up the vessel.*

The second account, in the unpublished memoirs of the London artist Walter Greaves, is a recollection by Greaves's father—a Thames boatman who recalled how "one dark night in November" [1820?], the smuggler was intercepted as he attempted to run his submarine out to sea. "Anyhow," Greaves ended,

> *she managed to get below London Bridge, the officers boarding her, Capt. Johnson in the meantime threatening to shoot them. But they paid no attention to his threats, seized her, and, taking her to Blackwall, burned her.*



Napoleon in death–a sketch by Denzil Ibbetson made on May 22, 1821. The emperor's demise ended Johnson's hopes of using a submarine paid for by the British government to free his country's greatest enemy.

Taken together, then, these documents suggest that there is something in an old, tall story. There is no need to suppose that Napoleon himself had any inkling of a plan to rescue him; the scheme Johnson laid out in 1835 is so woolly it seems likely that he planned simply to try his luck. Such evidence as survives from the French side suggests that the emperor would have refused to go with his rescuer in the unlikely event that Johnson had actually appeared at Longwood; salvation in the form of an organized invasion was one thing, Bonaparte thought; subterfuge and deeds of desperate daring quite another. "From the start," Ocampo says, Napoleon "made it very clear that he would not entertain any scheme that would require him to disguise himself or require any physical effort. He was very conscious of his own dignity and thought that being captured as a common criminal while escaping would be demeaning.… If he left St. Helena, he would do it 'with his hat on his head and his sword at his side,' as befitted his status."

The mental picture remains a vivid one, nonetheless: Napoleon, squeezed uncomfortably into footman's clothing, strapped to a bosun's chair and dangling halfway down some vertiginous cliff. Behind him stands Tom Johnson, all but six foot in his socks, lowering rapidly away toward the rocks–while offshore lurk ETNA and EAGLE, sails furled, fearsomely armed, ready to dive.

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Read more: http://blogs.smithsonianmag.com/history/2013/03/the-secret-plot-to-rescue-napoleon-by-submarine/#ixzz2N9cO5SzZ

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SUBMARINE NEWS FROM AROUND THE WORLD

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From the July 2013 Issue

INDIA—India Continues to Struggle with Domestic Submarine Programs-Vertical Launch Missile Submarine (Project 75I) Delayed Again

As of mid-June 2013, AMI continues to receive information regarding further delays to the Vertical Launch Missile Submarine (Project 75I) Program. Although this project is still valid, it appears that further delays will be experienced as the India Finance Ministry is beginning to question the estimated US$12B investment.

A Request for Proposals (RfPs) was expected to be released to international and local yards by the end of 2013. However, routine inquiries from Finance continue to slow this program with an RfP probably being delayed until 2014 at the earliest. This program was initially approved by the Defense Acquisition Council (DAC) in 2010 but has since languished at the Ministerial level rather than proceeding forward.

When the RfP is released, it will be made available to the foreign designer and builder of two units, Mazagon Dock Ltd (MDL) which will build three units and Hindustan Shipyard Ltd (HSL) for the remaining unit. The release of *Defence Procurement Procedures (DPP) 2013* may or may not change the procurement strategy for this program. *DPP 2013* states that the highest priority is for an outright purchase from India vendors. However, AMI believes that this program could follow the "Buy and Make with Technology Transfer" category (similar to Project 75) or possibly the "Buy Global" category of an outright purchase from a foreign supplier since the Indian Navy (IN) is in a very precarious position

regarding its Submarine Force levels based on its lack of success in replacing them through indigenous sources.

The IN's Submarine Force levels will continue to drop through the next decade as the Project 75 and Project 75I continue to face delays. Project 75, which began in 2002, has yet to deliver a submarine with estimates now calling for the first Mazagon Dock built submarine delivering in 2018. Project 75I has been under consideration since 2003 and the release of the RfP is now being delayed once again due to Ministerial level questions that continue to slow down the procurement process.

If and when this program moves forward, the following suppliers will receive the RfP:

- DCNS of France with its Super Scorpene variant.
- ThyssenKrupp Marine (HDW) of Germany with the new Type 216 design.
- Rubin of Russia with the Amur 1650.
- Navantia with the S 80 variant (may be dropped due to weight problems with first Spanish units).

As mentioned above, AMI believes that the IN may well have to reconsider the construction site for this program. Although professing to want two indigenous construction lines, AMI believes that with the Scorpene program slipping considerably, in conjunction with aggressive plans for other submarine programs, this new class could very well be built at a foreign yard, similar to the Fleet Replenishment Ship (AOR) program.

ASIA

Regional Update

As of mid-July 2013, the following are highlights of the Asia Region:

INDIA: Scorpene Class Submarine: On 09 June 2013, AMI received information that the first Scorpene submarine being built at Mazagon Docks (MDL) will not be launched until November 2016 further setting back the program. Assuming a late 2016 launch date, commissioning will not occur until 2018 at the earliest. The first unit began construction in April 2006.

MODERNIZATION & SHIP TRANSFER NEWSLETTER

AUSTRALIA—Collins Class Submarine: On 14 June 2013, the Australian Department of Defense (DoD) allocated the first AUD65M (US$59.7M) for the first stage of the Collins submarines Integrated Ship Control Management and Monitoring Systems (IMCS). This effort is first stage of SEA 1439 Phase 3.1 Collins Obsolescence Management, which already has Combined Pass approval.

The current IMCS was designed in the 1980s and will be replaced by ASC and Saab Systems, which are currently engineering the new system. The first will be tested ashore before being installed on the first Collins under Phase 1. The first unit has been identified as the HMAS FARNCOMB (74), which will begin in 2014.

Phase 2 will begin in 2017 and entails the installation of the IMCS on the remaining five units of the class. All IMCS will be installed through 2021.

CANADA—Victoria Class Submarines: On 20 June 2013, the Royal Canadian Navy (RCN) signed a contract (price undetermined) with Canada's Ultra Electronics Maritime Systems (UEMS) for the procurement of four Submarine Towed Array Sonar Systems (SubTASS). The new SubTASS will be fitted into the four Victoria class submarines as part of the Victoria Class Submarine Capability Life Extension (SCLE) program.

The SubTASS will replace the existing CANTASS towed array. All four units will be integrated by 2015.

RUSSIA—Kirov (Project 1144) Class Nuclear Powered Cruiser (CGN): In June 2013, a spokesman for Sevmash Pedpriyatie (Severodvinsk) Shipyard announced that the Kirov class CGN RFS ADMIRAL NAKHIMOV was being modernized and will be re-commissioned into the Russian Navy (VMFR) by 2018.

Commissioned in 1988, the ADMIRAL NAKHIMOV will undergo a five-year work package as it essentially has to be

transformed from an 80's vintage platform to meet the modern day threats. The package could include:

- Overhaul of the two KN-3 PWR nuclear reactors and replacement of the two GT3A0688 gas turbines with four new turbines. The boilers will probably be removed.
- Surface-to-surface missile systems SS-N-12 and SSN-19 will probably be replaced by the SS-N-27.
- Anti-submarine warfare (ASW) missiles SS-N-15 will probably be replaced by the SS-N-29.
- Layered surface-to-air missile (SAM) system consisting of SA-N-20, SA-N-9 and SA-N-4s will probably be replaced by a combination of S-300, S-500 and the SA-N-27 SAMs.
- All air, surface, navigation and fire control radars will be replaced.
- Sonar and ASW weapon systems will be replaced.

From the August 2013 Issue

UNITED ARAB EMIRATES—Considering a Submarine Capability

In July 2013, AMI received information that the United Arab Emirates Navy (UAEN) was again considering the procurement of submarines. This follows information received in 2012 that suggested that the sea service was already considering the procurement of an undersea force.

The UAE is now part of an emerging list of Middle Eastern and African countries that are now considering a submarine service. No doubt that the unrest in the Middle East (Arab Spring), the Iranian threat and terrorist threats in general are beginning affect the way these regional countries view their undersea territory.

Although there are no firm details available concerning a UAEN submarine procurement timeline, sources have indicated that the sea service is considering German and Italian solutions, probably the Type 214 (1700 tons) and Type 212 (1500 tons) designs. For Italian designs, the UAEN may also want to consider the S1000 which was jointly developed by Russia and Italy is

currently being updated by Rubin and Fincantieri to meet the requirements of the future.

Although the UAE is familiar with business relations and defense production from German and Italian companies, it will surely scour the rest of the market for a submarine. No doubt the UAE will consider the French Scorpene as the sea service has already worked with CMN in the Al Baynunah corvette program. It may also wish to consider the popular Type 209 (1200-1400 tons) which can be built in Germany, Turkey or South Korea. Due to the restricted waters of the Arabian Gulf and North Arabian Sea, a smaller submarine hull would probably be better suited for operations.

With the majority of the UAEN's procurement programs now underway (two corvette designs, two FAC designs and patrol vessels) or near completion, it is now considering the next step in its naval development, new frigates and possibly new submarines. A new frigate program is expected to begin in the next several years and may be followed by a new construction submarine program.

AMI estimates that the frigate will take priority and if the UAEN decides to move forward with submarines, the requirements definition phase could begin by around 2016. The sea service will probably procure up to four submarines, two based in the Arabian Gulf and two based in the North Arabian Sea near Fujairah. It is possible that the UAEN could join with Saudi Arabia and now possibly Morocco as both are considering submarine programs.

MOROCCO—Submarine Fleet Being Contemplated?

On 05 July 2013, AMI received information that Russia offered its Amur 1650 design to Morocco in early 2013. Although the offer was probably unsolicited, it could indicate that Morocco may be considered the procurement of submarines. Sitting astride the strategic Straits of Gibraltar, the Royal Moroccan Navy (RMN) may have decided to move forward with a three dimensional navy in order to better protect the waterway as well as its long Mediterranean and Atlantic Ocean coastlines.

Similar to the United Arab Emirates (UAE), the RMN is currently completing its frigate and corvette procurements and will need to fund three additional 70-Meter offshore patrol vessels (OPV) prior to moving forward with its next major naval procurement project. AMI believes that if the RMN does move forward with a submarine program, it could begin its requirements definition phase as early as 2015.

As mentioned in the UAE article, Morocco may also be part of an emerging list of Middle Eastern and African countries that are now considering a submarine service. No doubt that the unrest in the Middle East (Arab Spring), the Iranian threat and terrorist threats in general are beginning to affect the way these regional countries view their undersea territory. Morocco can also add the security of the Straits of Gibraltar as a major concern going forward.

As mentioned earlier, Russia offered the Amur 1650 and Morocco has done business with Russia in the past although primarily in ground systems. Traditionally the RMN has been supplied by Spain, France and the Netherlands.

If Morocco does indeed decide to procure a Submarine Force, it would probably need up to four hulls to protect is long sea border and the Straits of Gibraltar. In regards to suppliers, the RMN will probably take a similar stance as the UAEN with Germany (Type 212 and Type 214), Italy (Type 212), France (Scorpene or Scorpene variant), Turkey (Type 209/214) and South Korea (Type 209/214) being considered. In the case the Amur 1650, AMI believes that Russia would have to offer a very attractive pricing/financing scheme to break the RMN's decidedly Western European supply chain.

Like the UAE, Morocco could also join that country and Saudi Arabia as they both are now considering submarine programs.

ASIA—REGIONAL UPDATE:

VIETNAM: Kilo Class Submarine: In September 2013, Admiralty Shipyard will officially hand over the first two Kilo class submarines to the Vietnamese People's Navy (VPN). The submarines, HA NOI (HQ-182) and HO CHI MINH CITY (HQ-

183) will be commissioned by the end of 2013. The four remaining units will be commissioned into the VPN by 2017.

INTERNATIONAL: Shipyard Consolidation/Merger/ Reorganization Highlights

AMI is currently tracking shipyard consolidation, merger and reorganization highlights within the defense industry. The following are the highlights for the months of July and August 2013:

CATEPILLAR: On 22 July 2013, Caterpillar announced that it had signed a definitive agreement to acquire Johan Walter Berg, including its core brand of Berg Propulsion, a manufacturer of mechanically and electrically driven propulsion systems and marine controls for ships.

Headquartered in Ockero Islands, Sweden, Berg has been designing and manufacturing heavy-duty marine thrusters and controllable-pitch propellers since 1929. Its systems are employed in maritime applications throughout the world that require precise maneuvering and positioning.

The acquisition will allow Caterpillar to expand from supplying marine engines and generators to entire propulsion systems. Berg's thrusters, propellers and controllers will be rebranded as Caterpillar soon after the close of the deal, which is expected to be completed in the 3rd quarter of 2013.

Combat, Sensor and Integration System Developments

LOCKHEED MARTIN ALEX: Since Lockheed Martin (LMCO) acquired Sippican in 2004, the ALEX countermeasure system was selected to replace the Danish Soft-Kill Weapon System (SKWS) found on the first two Freedom Class Littoral Combat Ships (LCS), as well as all of the General Dynamics (GD)/Austal LCS.

Currently ALEX is the only US-built decoy launching system (DLS) and is currently being aggressively marketed to upgrade vessels in Greece, Egypt, New Zealand, the Philippines, Indonesia, Malaysia, Thailand, Taiwan and Vietnam.

ALEX provides a semi-automatic/automatic DLS with manual-override option that incorporates the launchers, system processor, master control panel (located in CIC) and the bridge control panel. The system processor receives environmental, threat and ship maneuvering data from onboard sensors in order to compute the proper decoy launching sequence and recommended course to steer to defeat a threat missile.

The system utilizes either 130mm SRBOC or 112mm RBOC launchers and is compatible with all Sippican passive decoys including RF, IR, RF-IR and anti-torpedo decoys.

HYDROGEN FUEL CELLS: AMI has been following the increasing interest world-wide in hydrogen fuel cells to power submarines as an alternative to standard batteries for electrical power.

Germany and the United States are the most prominent supporters of hydrogen fuel cells and their application in the military environment due to their high electrical output and zero noise emission. Already proven in industrial applications as well as the telecommunications industry, it seems the military will be the next logical step.

Germany already has the fuel cells on their Type 212A class submarines and is looking to expand the capability even more while within the US military, the interest remains largely in the naval realm, primarily in submarines, offering an alternative renewable energy source.

INTERNATIONAL NAVAL VESSEL DESIGN DEVELOPMENTS

AMI is currently tracking new naval design developments. The following are the highlights for the months of July and August 2013:

RUBIN/FINCANTIERI S-1000: In mid-July 2013, Russian officials stated that Rubin Design Bureau and Fincantieri have decided to upgrade the original design of the S-1000 submarine in

order to optimize its export viability to potential clients in the Middle East and Southeast Asia.

The new, modified S-1000 class will keep in line with the original missions envisioned of anti-submarine and anti-surface warfare, reconnaissance missions and transport of up to 12 special operations forces. It will remain the original size of 56.2m (184.4ft) in length with a top speed of 14 knots.

The main changes will be on the interior of the submarine, according to a Rubin spokesman, because "Countries that are actively looking for new submarines are setting some totally unexpected demands for those ships."

DID YOU KNOW?

UNITED KINGDOM: On 18 July 2013, the keel for the sixth Royal Navy (RN) Astute class nuclear powered attack submarine (SSN), HMS AGAMEMNON, was laid at BAE Systems Barrow-in-Furness.

MODERNIZATION & SHIP TRANSFER

CANADA – Victoria Class Submarines: On 04 July 2013, the Royal Canadian Navy (RCN) exercise a five-year extension option for in service support for the Victoria class submarines. Babcock Canada Inc will continue supporting the four submarines through 2018. The contract is worth US$530M and will provide long-term performance managed maintenance activities as well as technical support.

All four submarines will receive extended docking work periods on a cyclical basis with the goal of having three operational submarines at all times beginning in 2014.

USED SHIP TRANSFERS/RECEIPTS /DECOMMISSIONINGS

INDIA-Akula (Project 971) Class Nuclear Powered Attack Submarine (SSN): In early July 2013, the Indian Government announced that it was ready to begin negotiations with Russia concerning the lease of a second Akula class SSN. This follows

the commissioning of the first Akula transferred to the Indian Navy (In) in December 2011.

The first submarine, renamed INS CHAKRA III, was leased under a 10-year US$650M lease. Sources indicate that the second Akula will probably be the Russian hull Iribis, which was never completed as funding was cancelled due to the collapse of the former Soviet Union. Iribis is 60% complete and remains at the Amur Shipyard. Assuming negotiations are completed by the end of 2014; the Iribis could be completed by 2017 and delivered to India in 2018. The hull completion and subsequent 10-year lease will probably cost around US$800M.

From the September Issue

UNITED STATES—Virginia Submarine Class May Grow Past 30

In late August 2013, the US Navy (USN) formally announced that it is planning to extend the Virginia class nuclear powered attack submarine (SSN) past the current 30 ship buy. The USN intends to fund US$600M in Fiscal Year (FY) 2018 for the 31st hull that will begin construction in FY 2020.

Although the sea service has yet to flush out the new acquisition program baseline that will occur once the centerpiece of future SSNs, the Virginia Payload Module (VPM), is developed and formalized into the program. The VPM will include a four pack of large diameter tubes capable of firing Tomahawk cruise missiles as well as planned follow-on weapons. The VPM may also be used in any future submarine designs in the event that the USN moves past the Virginia class.

However, it appears that the USN plans to continue with the Virginia class well past the 30th unit as it will need to replace the remaining Los Angeles class and the four Ohio class guided missile submarines (SSGNs) while trying to stay above its 55-hull attack submarine hull. Current force levels show the force dropping to 48 units by 2023.

Although the Virginia class extension (with VPM) appears to be the logical choice, there is still a lot of head wind going forward with the most immediate being the Budget Control Act (Sequestra-

tion in FY2014 and beyond) as well as the Senate Appropriations Defense Committee markup of the FY 2014 defense budget which recommended the cancellation of the VPM due to what is termed by the committee as *high cost, risk, and a lack of a validated requirement*.

ASIA-Regional Update

INDIA—Arihant Class Ballistic Missile Submarine Demonstrator (SSBNX): On 10 August 2013, the SSBN ARIHANT's nuclear reactor was activated. ARIHANT will now commence sea trials in order to prepare for a 2015 commissioning date. Lessons learned over the next two years will determine if there will be any needed modifications for the next two SSBNs (Aridhaman class), which are already under construction and scheduled for commissioning in 2017.

SOUTH KOREA – Son Won-II (Type 214) Class Submarine: On 13 August 2013, the fourth Son Won-II class submarine, ROKS KIM JWA-JIN (SS 075), was launched from Daewoo Shipbuilding and Marine Engineering's (DSME) shipyard on Geoje Island. The submarine will be commissioned in late 2014 with first operations scheduled for 2015.

VIETNAM: Kilo (636) Class Submarine: On 12 August 2013, the third of six Kilo class submarines for the Vietnamese People's Navy (VPB), HAI PHONG (HQ-184), was launched from Russia's Admiralty Shipyard. The submarine will be delivered in 2014.

MORE SUBMARINE FICTION

HOW I BECAME TOM CLANCY

by CAPT Tom Jacobs, USN(Ret)

… well, I didn't actually *become* Tom Clancy, didn't want to *be* Tom Clancy. I just wanted to be *like* Tom Clancy. I wanted to spin submarine tales with the readability and success of *Hunt for Red October*. But with a difference. Clancy, as gifted as he is, writes about submarine and other warfare as an outsider. I wanted to write as a submariner. *Texas Bar* in Olongapo? Been there. Rig for dive? Done that.

So I did. Write submarine novels, I mean. Two of them: *Sons of God*, about the hijacking of an Ohio-class SSBN and subsequent blackmailing of the President, Israel, and the Palestinians by the hijackers (the 'Sons of God'); and *Ship Captain and Crew*, about an SSN's special operation against Iran in the 1980s.

When Jim Hay asked me, as he had asked George Wallace, Craig Etka and Don Ulmer before me, to write in THE SUBMARINE REVIEW about my adventures and lessons learned—in his words, 'about the craft of story-telling'—I was honored and motivated. The result follows.

Actually, I almost did become Tom Clancy when, through the good offices of John Byron, fabled submariner and a wonderful author in his own right, the *Naval Institute Press* accepted my novel, *Sons of God*, for publication. The *Institute Press* is, of course, the publisher of *Hunt for Red October*, which put Clancy on the map. Unfortunately, that acceptance offer was followed a week later by a new CEO of the Naval Institute who decreed, no more fiction publications.

Almost famous.

At about that same time my literary agent, who had shopped my first two novels to all the major publishers with no success, told me, 'Tom, all publishing houses are losing money. Unless

your name is, well, Tom Clancy, or Rudyard Kipling you ain't gonna get published.

So, self-publishing. Bummer. I wanted to spin yarns, not figure out how to prep manuscripts for publication, how to find printers, how to market a book. Where do you find out about all that stuff?

The answer is: you find it where you find everything else, on the internet. I found a lady who fixed manuscripts for publication, cheap. I found a printer in Hong Kong who would print, cheap, my first book, a hardbound picture-history of the little Hawaiian plantation town where we live. I found another printer on Long Island who printed, cheap, my first novel, *The Bimini Boys*, in paperback. He did such a good job that he printed *Sons of God* for me too. I was a published author with three books out there. But I was still faced with book distribution, billing, marketing … precious little time to write.

Then … along came e-books. Amazon made it really simple to upload book, book cover, and author profile onto their site. I e-published my two novels, and suddenly realized that my e-books were outselling my print books twenty-to-one. And I was selling electrons! No cost of printing and mailing, no billing, no nothing. Amazon wired money each month into my corporate checking account. When the fourth book, *Ship Captain and Crew*, was finished I simply uploaded it as an e-book without bothering with a print edition.

But hold on. So far this article only talks about the business and publishing end of the novel game. It doesn't touch on what Jim Hay asked me to write about: *the craft of story-telling*.

I'll begin by saying that for me, and I'll bet for George Wallace, Craig Etka and Don Ulmer, the delight is in the *story-telling*. Imagine cooking up a yarn about the best times of our lives—the submarine days—and reliving those days on a printed page. Then imagine getting paid for it … having folks pay real money to read what we've written. It's not the money, it's an email saying that a reader loves the story.

The great thing about fiction is that it's fiction. The author is unbounded. In *Sons of God* a boomer gets hijacked. In *Ship*

Captain and Crew an SSN inserts the son of the Shaw of Iran and some armed troops back into Iran from an SSN to start a counter-revolution. In my first novel, *The Bimini Boys*, Ponce de Leon and his soldiers actually find the Fountain of Youth. They're still alive today, 500 years later. What are they like? You can't imagine how much fun it is to leap over the bounds of reality to spin a yarn.

And, a submariner writing about submarines can live vicariously. I can induce the sub skippers in my novels to do things I couldn't do and correct mistakes I made in my command tour. Tommy Thompson, the Captain in *Ship Captain and Crew*, sets high standards for submarining that, in retrospect, I wish I had set. After a career firing exercise torpedoes I stand behind Jessie Gallagher, the attack boat skipper in *Sons of God*, as he fires Mark 48 warshots in combat.

I don't start with Page 1 and write on through to Page 356. Rather, a scene, an episode, will come to me, with some character, some story that needs telling. I write that. Often, I have no idea of where it fits into the novel currently in progress, or if it will fit at all. They all do, though, sooner or later, like sewing a crazy-quilt together. Some of the Paris, London, and Israel scenes from *Sons of God* were penned and filed away five or maybe ten years before the novel was started.

The great thing about writing is that you can do it everywhere, all the time. I'm writing on a long drive across Oahu. I'm writing while I wait for my wife to finish shopping. I'm writing in the shower.

In sum, I never really became Tom Clancy, but I know how he feels. Creating a world of submarines, or wizards, or vampires, is a kick in the pants. I recommend it for any old submariner fart with time on his hands and a rich imagination. And if I can help you get started, ask me a question at tom@mymystrynovel.com.

… and because Mrs. Jacobs didn't raise any stupid children, here's the commercial. Here's how you can buy my books or e-books. Visit my website, www.mymysterynovel.com, where you can read the first chapters of the novels and then order them in print or as an e-book; or look up *Tom Jacobs* and *Sons of God*,

Ship Captain and Crew, or *The Bimini Boys*, on Amazon (print) or Amazon Kindle (e-book).

So I didn't become Tom Clancy, but I got close. We have the same first name …

ETERNAL PATROL

LCDR Samuel A. Bradley, USN (Ret)
LCDR William J. Healey, USN (Ret)
CAPT Edward S. "Ned" Kellogg III, USN (Ret)
CAPT Joseph Collins Smith, USN (Ret)
CAPT Lawrence S. "Larry" Wigley, USN (Ret)

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 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, 5025D Backlick Road, Annandale, VA 22003.

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