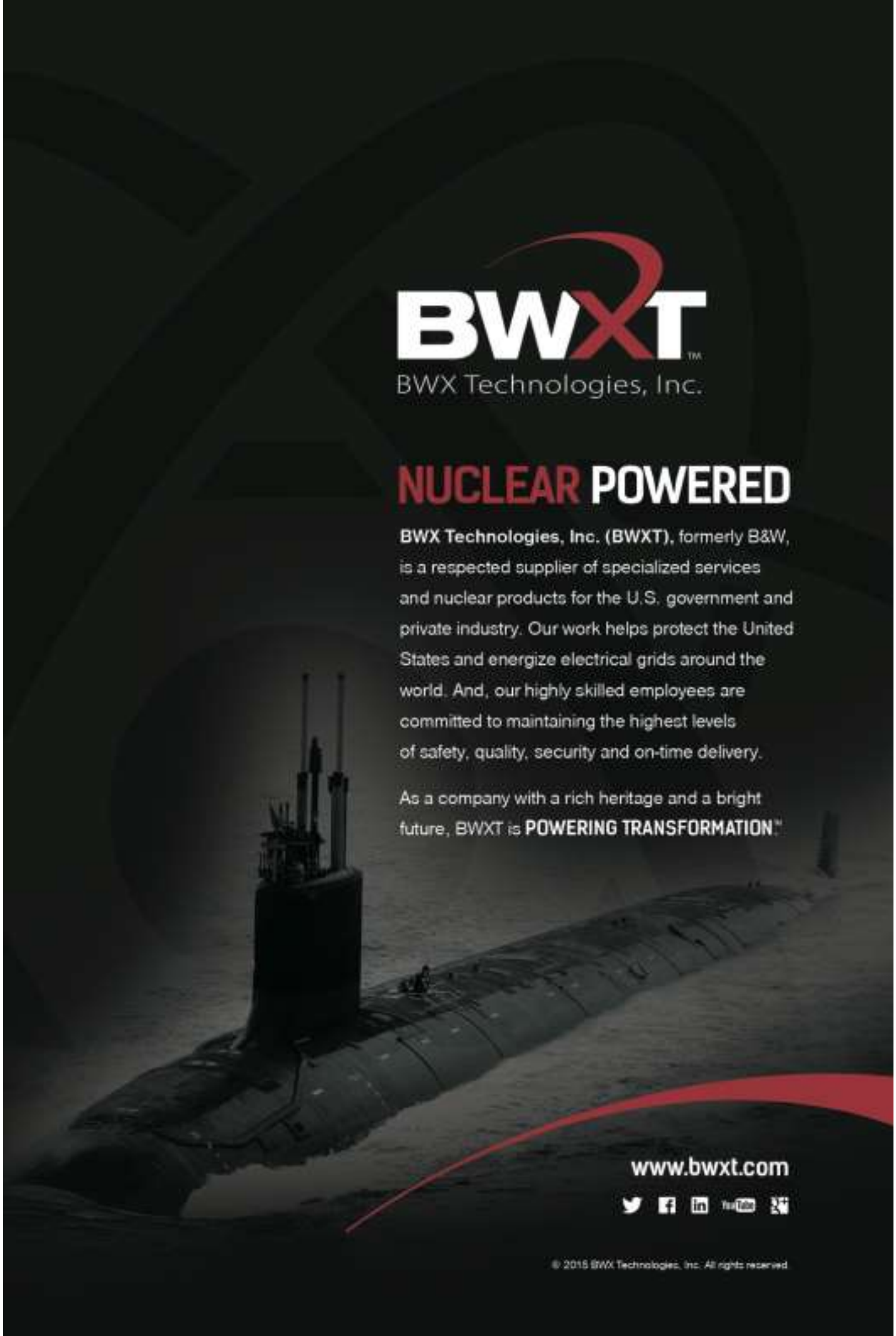
JUNE 2015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EDITOR'S COMMENTS

The main theme of this issue follows those of the recent series of THE SUBMARINE REVIEW's in highlighting the public statements of the Submarine Force leadership as they detail the status and direction of the Submarine Force in execution of National and Naval Strategy. The Chief of Naval Operations laid out his *Strategic Approach* for the Navy in his address to the Naval Submarine League last October (see The Submarine Review of December 2014, page 8).

The CNO listed his number one priority in the execution of national strategy as *Maintain Sea-Based Strategic Deterrent.* His number two priority was *Forward Presence*, which he characterized as "where it matters, when it matters." To the submarine community (the entire group of active duty, retired, industrial, academic and interested advocates in the general public) that means SSBNs, which provide all of the *first priority*, and SSNs which provide a great deal of the *second priority.* Accomplishment of those two highest priority tasks is immensely complex, very difficult and intensely demanding in time, money and personnel. It is the development and implementation of high-level technology and the creation and operation of credible, demonstrable readiness.

Those tasks are vital to national security. They are also very expensive and the final approval for spending what is required for those tasks is by no means assured. Gaining that approval will be bolstered by educating the American public as to the need for the *Sea-Based Strategic Deterrent* and the submarine component of *Forward Presence.* Giving the submarine community the facts and the logic being employed in being ready for those tasks is meant to help in generating that general education.

There is another, less obvious, matter to consider for the future of *sustaining undersea dominance.* That has to do with the coordination of undersea operations with the submarine forces of allied navies. We do well with the British and the French, each operating both SSN and SSBN forces in the open oceans, but it may be a different type of cooperation and coordination which

could be needed for operations with small-navy submarines in their own local sea areas. The USN Submarine Force fortunately has a history of working internationally, and doing so in a number of locales. There are two articles in this issue which treat past examples of submarine international integrations, and one by VADM Jamie Foggo of his visit to the Norwegian Submarine Force. All three may serve to generate some discussion about future military and diplomatic needs.

Jim Hay
Editor

FROM THE PRESIDENT

In the midst of numerous and varied challenges, the US Submarine Force sustains its superb performance in the most demanding operational environments around the world. The United States' Undersea Dominance is assured by this performance and reflects the dedicated hard work and consistently high standards of the men and women who build, maintain, operate and sustain the world's finest Submarine Force.

Submarines are excelling in the performance of tough deployments, engaging in an extremely high pace of operations, delivering eye watering results and gaining national recognition for the tremendous value these ships, and those who operate and maintain them, provide our nation.

The Submarine Force has extended deployments beyond the *normal* six months, surged submarines in response to emergent worldwide demands, and assured the essential credibility of the bedrock of our nation's defense, the Strategic Deterrent Mission. In a turbulent and rapidly changing world, the Submarine Force provides stable and persistent forward deployed presence and flexible combat capability, ready to respond to any US Combatant Commanders' emerging tactical or strategic requirements.

Supporting these remarkable men and women and their submarines, our Submarine Force leadership has maintained a steady hand on the tiller and clearly defined the way ahead. The Secretary of Defense's most recent Quadrennial Defense Review tasks the Navy to "continue to build a future Fleet that is able to deliver the required presence and capabilities and address the most important warfighting scenarios." Consistent with this guidance, the Submarine Force has maintained its priorities of supporting the OHIO Replacement Program, delivering two Virginia Class Submarines per year, developing the Virginia Payload Module for integration into the Virginia Class Submarine and evolving new and more capable payloads into the submarine's combat capability.

In line with the direction provided by the Quadrennial Defense Review, and with the myriad demands imposed by our nation's budgetary priorities and constraints, the Naval Submarine

League's ongoing efforts to educate the public about the importance of submarines have never been more important. Congress continues to recognize the value of submarines by their willingness to support funding for research, development, and design of the Ohio Replacement and Virginia Payload Module and for constructing two Virginia Class Submarines each year. That said, in the strident budgetary environment in which we find ourselves, this broad support needs to be reinforced by thoughtful and well informed advocates who understand the importance and strategic value that our Submarine Force provides. The Naval Submarine League stands ready to complement this advocacy effort.

Our Annual Submarine Symposium will be held on 21 - 22 October 2015 and will feature a distinguished group of speakers to address the fiscal challenges and operational focus of our Navy and our Submarine Force. Submarine Force leaders from the operational, acquisition, resource sponsor, and technical communities, many of them new to their assignments, will speak. In addition, we will honor our 2015 Distinguished Submariner, Distinguished Civilian and Fleet Awardees during the Symposium.

The Naval Submarine League remains strong and on solid fiscal footing. As we grow our Corporate and individual membership, we are working to improve the quality and value of League membership through improvements to our website and by sustaining the relevance of THE SUBMARINE REVIEW. As always, your feedback is valuable, so please let us know how these resources can better serve you.

It is my privilege to serve as part of the leadership team of the Naval Submarine League and I encourage you to recommend membership to your shipmates, your business colleagues and friends.

Finally, as you enjoy the summer of 2015, please keep our nation's men and women in uniform serving around the world in your thoughts and prayers.

John B. Padgett III
President

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FEATURES

REMARKS FOR THE 2015 DC AREA SUBMARINE BIRTHDAY BALL

CONGRESSMAN J. RANDY FORBES (R-VA)
Chairman, House Armed Services Committee

It is always an honor to speak to submariners anytime and anywhere. But it is especially meaningful to address you here in the capital of the nation you defend so well, the nation that serves as hope for all the world.

It is a special night and you are a special group. In 1915, Rudyard Kipling wrote that "The submarine has created its own type of officer and man with language and traditions apart from the rest of the service, and yet at the heart unchangingly of the Service." One hundred years later, that is truer than ever.

The theme of my speech tonight is Admiral Rickover and innovation. I chose that theme in large part because we are very privileged to have Mrs. Eleonore Rickover with us here tonight. Before I start talking about Admiral Rickover and his legacy, I would like to take a minute to recognize Mrs. Rickover's own legacy. Because you probably all know about Mr. Rickover, but you may not know that before becoming Mrs. Rickover, Eleanor served a full 20-year career in the United States Navy, serving as a nurse and attaining the rank of commander. And you may not know that after becoming Mrs. Rickover, she served on the board of multiple hospitals, did a great deal of charity work, and was invested as both a Dame of Malta and a Lady of the Holy Sepulcher.

Finally, I want to recognize Mrs. Rickover because, as Mrs. Rickover, she stands as a symbol for all the spouses and families of submariners. And as Mrs. Rickover said at the christening of the first submarine named for her husband: "They also serve, those who only stand and wait." The words are from a poem by John Milton, but I think they are a fitting tribute to our submarine

families that give so much. So I would like to pause here for just a moment and ask that Mrs. Rickover and the spouses and family members of our submariners, please stand if you would like and be recognized for everything you do. Thank you all for being here tonight.

Now to Mr. Rickover, the Admiral. When President Nixon awarded Rickover that rank of full, four-star Admiral in 1973, he said that "the greatness of the American military service, and particularly the greatness of the Navy, is symbolized in [this ceremony], because this man, who is controversial, this man, who comes up with unorthodox ideas, did not become submerged by the bureaucracy." Thanks to Admiral Rickover, he said, "as far as our Navy is concerned, apart from the number of ships, but from the standpoint of technology, it is the first in the world and will continue to be, because his genius was not submerged by the huge bureaucracy that could so often have that effect."

That was said in 1973. But just like Rudyard Kipling, his words ring true today, too. By any objective measure, the United States in 2015 has the finest undersea force the world has ever seen. Thanks in large part to the efforts of Admiral Rickover, that "Kindly Old Gentleman," the United States arguably enjoys a greater degree of dominance and qualitative superiority in the undersea domain than in any other.

Over the past 115 years, this nation has amassed an incredible amount of what I like to call *undersea power*. We have all heard of sea power and its influence upon history. But I am talking about undersea power. For our preponderance of undersea power affords our nation many special benefits. It provides us with the world's most credible and secure nuclear deterrent. It enables us to surreptitiously collect sensitive intelligence. It has deterred major maritime conflict for decades, and has dissuaded most of the world from even trying to compete with the United States for control of the seas. And it causes bad guys and would-be aggressors around the world to pause, look out toward the ocean, and worry.

Our undersea forces can be anywhere, anytime. Should anyone test us, they can carry out a wide range of missions at a time and place of our choosing. By leveraging their stealth and

long endurance, they can provide what no other element of the joint force can consistently deliver, and that is persistent, undetected, assured access. As the challenges to access in other domains grow, the value of that undersea access is going to increase geometrically. Whether you think the future security environment is going to be characterized by irregular challenges, high-end conflict, or Cold War competition, our freedom of maneuver and action in the undersea domain-and our ability to reach from that domain into others-is something that is going to be of incredible value to the Navy and the nation.

That is the good news. Here is the bad news, given to you straight. Looking ahead to 2025 and beyond, we face a shrinking submarine fleet and a precipitous decline in our undersea payload capacity. Today we have 53 attack submarines of the Los Angeles, Seawolf, and Virginia classes, and a requirement for 48 going forward indefinitely. Even with those 53 boats, we are only fulfilling 65% of the COCOMs' requests for SSNs-and that is today, in 2015. By 2029 our SSN fleet will have shrunk by 25% and we are going to be seven boats below the current requirement. Meanwhile, at roughly the same time, we are going to retire all four of our Ohio-class SSGNs, along with 616 Tomahawk missile tubes, or roughly 60% of our current capacity. Around that same time, we are also going to be going from 14 to 12 ballistic missile boats in our sea-based deterrent fleet.

In short, at a time when our Submarine Force is likely to be called upon to do more than ever, it is going to be smaller in size than it has been at any point since the Second World War. Our capacity is going down and, looking ahead, the demand for submarines is likely to exceed their supply by a considerable margin. And—by the way—that is if everything goes according to plan. At the same time, it does not account for any *black swans* or surprises that our competitors or adversaries might throw at us, whether those surprises be technological, tactical, operational, or strategic in nature.

So even though we are here tonight to celebrate this incredibly capable Submarine Force that has accomplished so much, we

cannot afford to rest on our laurels and lose sight of these longer-term challenges that are coming down the road.

Going back to Admiral Rickover, he said in 1982 to a group of Columbia University students that "A major flaw in our system of government, and even in industry, is the latitude allowed to do less than is necessary. Too often officials are willing to accept and adapt to situations they know to be wrong. The tendency is to downplay problems instead of actively trying to correct them." Fortunately, thanks in large part to the Admiral and many of you in this room tonight, the Submarine Force has largely avoided this problem. Whether it was regarding innovation or safety, you all saw what really needed to be done, and settled for nothing less than accomplishing it.

Today, we need to have that same clarity of vision and purpose across the whole undersea enterprise-in the Navy, in industry, and in Congress. Because that preponderance of undersea power, and that underwater edge that you have built up over many decades, are in danger of eroding. And we must take action, now, to shore them up and sustain them.

From my perspective, there are several things that we all need to work together to do:

First, we need to make sure that our submarine shortfall does not get any worse by keeping our two submarine programs on track.

One of those is the Ohio Replacement Program, the next-generation class of boomers that will carry 70% of our deployed nuclear warheads and provide the United States with a secure strategic deterrent for decades to come. The Navy has made the Ohio Replacement Program its highest priority, but the $84 billion-plus procurement cost of the program threatens to consume almost half of the Navy's shipbuilding and conversion budget for a decade.

Last year, Congress created a special account called the National Sea-Based Deterrent Fund to finance the Ohio Replacement Program procurement. But we still have not figured out how we are going to fill that piggy bank up. In the past, the

Navy has been given additional resources to procure these strategically critical platforms, but we are going to have to fight hard to get them this time. But fight we must, because if we do not get those additional resources the implications will be catastrophic—either for the Ohio Replacement Program itself or for every single other thing in the Navy's shipbuilding program.

The second big program is the Virginia-class submarine. Note that I did not say Virginia-class *attack submarine*, because, as you all know, it is truly a multi-mission platform with a growing range of incredibly valuable functions. Thanks to unprecedented teamwork among the Navy, industry, and Congress, Virginia-class procurement is proceeding smoothly at an accelerated pace of 2 boats per year and the builders have driven costs way down. Looking ahead, we need to make sure that we sustain this incredible momentum as we move into Block 5 of the program and ramp up ORP production alongside it. But even if we keep these programs on track, I fully expect demand for the capabilities that submarines provide, and the effects they achieve, to exceed the limited supply of boats.

So, secondly, we need to make sure that we field as many innovative undersea force multipliers as possible.

The first of these is the Virginia Payload Module, or VPM, which is going to be critical if we are going to fill that shortfall in undersea payload capacity caused by the retirement of the SSGNs. By incorporating the VPM into future Virginias, we are going to significantly expand the amount of stuff our submarines can bring with them into denied areas. And I am being deliberately imprecise when I say stuff, because it is not just about Tomahawk missiles anymore—although that is still definitely one of the options. Looking ahead, there are going to be a lot more things that can go in those payload tubes that will expand our submarines capability and mission set.

Some of those things are the second force multiplier I want to mention: unmanned vehicles. As aviators are fond of saying, unmanned vehicles are ideal for *dull, dirty, and dangerous* jobs. So, in other words, they are perfect for undersea work. By leveraging advances in energy and autonomy, we need to field a

family of unmanned underwater vehicles that can both augment SSNs and, in some situations, free them up for other missions. But we should not just look at the undersea domain. We also need to be thinking about how we can leverage that persistent, undetected, assured access to do things in other domains. Two years ago we launched an unmanned aerial vehicle from a submerged submarine. I have not heard much about it since, but I hope that is actually a sign that we are already moving in the right direction.

Meanwhile, the third force multiplier we need to be fielding is new and improved weapons. The Navy has decided to *restart* production of Mark 48 torpedoes. But we cannot just build more of the same. We need to make them longer-legged with greater endurance, we need to make them smarter with better processing and target discrimination, and we need to make them more flexible, with a variety of payloads or different missions. We also need to go back to the future in some other areas. We used to spend a lot of time thinking about mine warfare. It might be time for a renaissance in those capabilities. And as with unmanned vehicles, we cannot just focus on the undersea domain. We need to be thinking about cross-domain capabilities like next-generation sub-launched anti-surface weapons, land-attack weapons, and more. Like I said, there are a lot of different things that could fit in those nice big tubes that will be on the Virginias, and we need to be thinking about how we can exploit that flexibility to achieve the greatest tactical, operational, and strategic effects.

Now that is all hardware, but we also need to make sure that all this hardware is maintained, crewed, and employed as efficiently and as effectively as possible.

We need to make sure that our industrial base is kept healthy, from the big shipbuilders all the way down to the smallest suppliers of specialized parts. We also need to make sure that our shipyards are kept in good shape so our boats can come in for maintenance and get back out to the fleet as quickly as possible. And we need to make sure that all these employers can hire and retain the amazing engineers and artisans they need. Because our shipbuilding and ship repair industrial base is a strategic asset, and we need to sustain its capabilities and capacities.

We also need to make sure that our intellectual base is kept healthy. We need to make sure that our best scientists and engineers are solving the problems we face, and pushing the frontiers in fields like acoustics, energy storage, and autonomy. And as with our industrial base, we need to make sure the whole supply chain for ideas is considered, from universities conducting basic research up to our undersea warfare center doing advance tech development.

Finally, we need to make sure that the submarine service keeps attracting and retaining the best and the brightest officers and enlisted men and women. Then we need to make sure that these men and women are getting the best training and education they can get on shore and at sea. They need to know about engineering, and oceanography, and undersea tactics, but they also need to know about strategy and policy, so that they can appreciate the value of our nation's undersea power and exploit it to the very fullest.

Perhaps most importantly, we need to teach them and encourage them to be innovative thinkers that are willing to challenge the status quo. Because a lot of new things lie ahead for our Submarine Force, and as Admiral Rickover said: "Everything new endangers something old. A new machine replaces human hands; a new source of power threatens old businesses; a new trade route wipes out old ports and brings prosperity to new ones. This is the price that must be paid for progress, and it is worth it."

I do not think there is anyone here in the audience tonight who wants to stand in the way of progress. But there might be some out there wondering what all this talk of unmanned vehicles means for the actual submariner, the man or woman with the dolphins on their chest. But even with all this talk of UUVs and autonomy, I do not for a minute think that the United States Navy will ever find a replacement for the Mark 1 *Bubblehead*. Because, as the Kindly Old Gentleman once said: "Organizations don't really accomplish anything. Plans don't accomplish anything, either... Endeavors succeed or fail because of the people involved. Only by attracting the best people will you accomplish great deeds."

Looking around this room, I am confident that the Silent Service is still attracting the best people, and that these men and women will continue to do incredible things on behalf of our Nation, our Navy, and the greatest Submarine Force the world has ever seen.

Happy birthday, submariners, thank you for everything that you do, and may God continue to bless you as you defend and protect the greatest nation the world has ever known.

A VISIT TO NORWAY

VADM JAMIE FOGGO, USN
COMMANDER, U.S. SIXTH FLEET
STRIKE FORCE NATO

As a fellow submariner, I thought the readership of the *THE SUBMARINE REVIEW* might appreciate some insights on the Norwegian Navy and in particular, the Norwegian Submarine Force, during my first visit as Commander, U.S. Sixth Fleet and STRIKE FORCE NATO, to the Norwegian Fleet concentration area in Bergen, Norway earlier this month.

During my visit, Commodore Henning Amundsen, Commander of the Norwegian Fleet gave me a comprehensive overview of the capabilities that his country brings to the NATO Alliance at this most critical time in our history. On his waterfront, I saw firsthand the nautical expertise that has defined Norway since the Viking Age. I was extremely impressed with His Norwegian Majesty's Ship (HNoMS) HELGE INGSTAD, which is a state-of-the-art multi-mission Frigate that includes a deck gun, torpedoes, the Norwegian Strike Missile (NSM), and an ASW capable helicopter. I also admired the sleek and stealthy Skjold-class corvette. Also outfitted with state of the art weapons systems, this air cushioned corvette accelerates and moves like a sports car. After thirty minutes in the simulator, I was ready to go to sea!

Likewise, I saw innovations like the HUGIN, an autonomous underwater vehicle, a commercial off-the-shelf system that the Norwegian Navy has leveraged in partnership with industry to give it an autonomous underwater reconnaissance capability and mine countermeasures capability, among other things. All this next to Norway's ULA-class submarines, moored on the same pier in the same spot I brought USS OKLAHOMA CITY to 14 years ago during my command tour - a nostalgic moment... I completed my day with a tour of the Norwegian Naval Academy, which mirrors our own in terms of technical curriculum and quality of officers produced in a four year program.

The capstone event on my trip was my attendance at the annual Norwegian Submarine Birthday Ball or ***Periskopballet***, as they like to call the event. What a class act! This was the largest ***Periskopballet*** anyone could remember with over 200 attendees. That's pretty impressive for such a compact Submarine Force. It was with malice of forethought that President of the Periscope Club (and sponsor of the Ball) Sub-Leftenant and Naval Cadet Øyvind Lavoll picked the date of the Ball. It happened on the conclusion of Perisher Ops in the fjords around Bergen for the last few weeks. The British, the Dutch and the Norwegian *Teachers* were all in attendance. Australian, British, Canadian, Dutch, French, Norwegian, Portuguese, and three American Perspective Commanding Officers were all in the Perisher Course and part of the Ball. It was a splendid gathering of international submariners. RADM Jan Jæger (Ret.), former head of the Norwegian Submarine Force, and CDR Bjørn Erik Strønen, a fifty-year veteran (active and retired) of service to the Norwegian Submarine Force were the guests of honor. We were joined by an enthusiastic crowd of officers and enlisted members of the Norwegian Submarine Force. After a true Scandinavian feast and speeches, the night ended with a traditional ***Polonaise***, waltzing, and the singing of "***Kobbenvisa***," the Norwegian Submarine Force anthem.

While common values unite the NATO Alliance, the camaraderie of the submarine community makes those ties even stronger. I was honored to have been invited to give some remarks at the ***Periskopballet***, and I will share them with you in the following few paragraphs:

Thank you very much for the kind introduction. It is great to be back in Norway. I have many fond memories of my visits here, so I was delighted to receive an invitation to this year's Royal Norwegian Navy Periscope Ball. On behalf of the U.S. Chief of Naval Operations and fellow Submariner, Admiral Jonathan Greenert, and Commander of Joint Force Command Naples, Admiral Mark Ferguson, and the men and women of Naval Forces Europe, the U.S. Sixth Fleet, and the U.S. Navy Submarine Force, thank you for what you do as key supporters of our collective

efforts to increase NATO's scope of mission and military capabilities.

I know that Admiral Greenert and your Chief of Naval Operations, Rear Admiral Lars Saunes, are great friends and colleagues who have spent lots of time together over the years. Their personal friendship and our countries' close partnership are excellent examples of what cultivated relationships can bring to bear in an Alliance.

My own affection for Norway began when I was the Commanding Officer of the fast attack submarine USS OKLAHOMA CITY. We made a couple of port visits to Norway during our 1999 deployment – one to Tromsø - the Paris of the North - and also here, to Bergen. I should point out that one year earlier, I spent my country's Independence Day (July 4th) near the equator in Curacao in the Netherland Antilles - so you can imagine the stark difference when exactly one year later, I found myself in Tromsø, Norway, the northern most city in Europe. When we pulled into Tromsø, I made an office call on the one-star regional commander. Knowing how much Americans revere their 4th of July Independence Day celebrations, he graciously offered to host a barbecue for me and my crew. I thought this would be outstanding so I took him up on his offer.

As we threw back some ***Ringnes*** beer on the pier, we watched the Commodore's local chef in action, complete with an immaculate white apron and tall chef's hat, cooking on a split 50-gallon drum barbecue. Now, I have travelled a fair amount in my career, but I must admit that particular event was one of the most unique experiences I've ever had. We asked for traditional local food and we got it—reindeer, minke whale, and seal steaks between hamburger buns. You can put anything between a hamburger bun and Americans will eat it! It was absolutely amazing food, and my American submariners loved it! The day never seemed to end either—of course, that may be because we had 24-hours of summer sunlight. I quickly learned that Norwegian hospitality is second to none, and I thank you for taking care of me and my crew, and all the other crews that have been privileged to visit your great nation over the years.

Ladies and gentlemen, I believe Norway is one of our best partners in the North Atlantic Treaty Organization. Last May, I co-authored an article for the *Proceedings* magazine called "Forging a Global Network of Navies." It stressed the importance of strengthening the bonds of international maritime cooperation so that we are better postured collectively to face new and emerging challenges in the 21st century.

Here are five things that I believe are necessary to forge this Global Network:

1. **Participation.** Where there is lawlessness, we must be present; when there are crises, we must respond. There is no problem too great and no contribution too small for the Global Network of Navies. Its success requires our collective participation. By pooling our resources, together we can overcome the challenges that threaten freedom and security in the global commons.

2. **Exercise.** When there is time and resources, we must exercise together to improve interoperability. Later this year, Norway will participate in our annual ***JOINT WARRIOR*** and ***SHARK HUNT*** exercises, as you have in past years. The lessons learned and the relationships established between these maritime partners will serve to strengthen the Global Network of Navies as we face new challenges over the horizon.

3. **Talk meaningfully**. When opportunities arise, we must continue to meet together, either embarked or ashore, to share our ideas and provide innovative solutions to problems. The International Maritime Seapower Symposium, Western Pacific Naval Symposium, Indian Ocean Naval Symposium, and the International Seapower Symposium (ISS) are all excellent gatherings that enable the fulfillment of this goal.

4. **Standardize.** We must develop a common language. It is imperative to have a standardized way of interacting on the seas, where we can be clear about one another's intentions and operations. And I am not talking about English as a common language between us, I am talking about a Common Operating Picture that enables us to see and share information and intelli-

gence data. Maritime data standards help ensure consistent vocabulary and processes are used to promote safety and security.

5. **Exchange Ideas**. We must foster navy-to-navy exchanges between our officer and noncommissioned-officer corps. And we must send our best and brightest to take part in these exchanges that build relationships and foster familiarity with one another. The Combined Force Maritime Component Commander course, now expanding beyond the Naval War College to the Fleet level, and the Personnel Exchange Program are two prime examples whereby our leaders and future leaders can meet and share lessons learned and best practices with their counterparts. We will endeavor to increase enrollment and expand access to partner nations having not yet participated in this course of instruction. We are all facing similar fiscal pressure and rising challenges at sea, and no one nation has the ability to be everywhere all the time or to act alone. It is incumbent upon nations to work together in support of global maritime security. This goal is achievable-assuming we are committed to building trust and confidence. We must protect our interests around the world, we must promote and adhere to a system of international norms, and we must maintain stability worldwide by deterring potential adversaries from provoking regional conflicts.

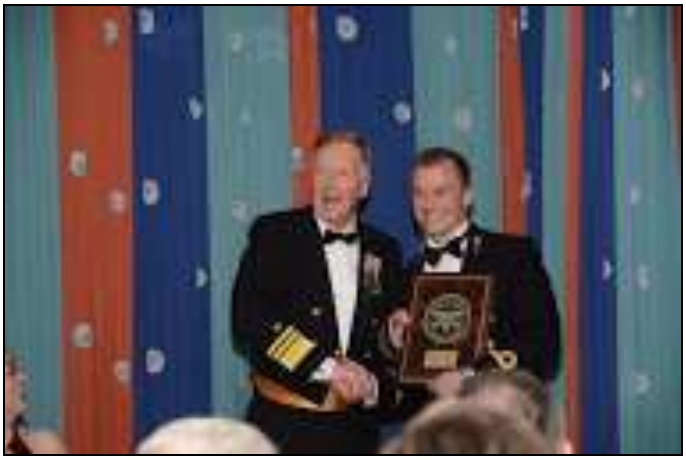
Achieving these goals won't happen overnight; it is a process that takes time and enduring commitment. It is about developing and fostering relationships with our international partners so all play a role in maintaining stability and security on the sea. As we work together to facilitate interoperability and build trust, we will all become stronger and better able to deal with the shared security challenges we face today and tomorrow.

I continue to see great examples of that maritime cooperation throughout this region. Norway regularly contributes to this network through bilateral and multilateral exercise participation, security patrols, and participation in navy-to-navy exchanges. You bring an exceptional array of maritime capabilities and capacity that includes frigates, guided missile patrol boats and combatants, mine warfare ships and P-3 aircraft, amphibious warfare ships, and ***ULA-***class submarines.

As the Sixth Fleet Commander, I am eager to continue strengthening and growing our relationship, and I'm honored to continue to work with you as an ally and a friend. I look forward to the important work we will collectively do to enhance the national security of both our nations. I also hope to see some of you at our Submarine Ball later this year in Naples, Italy.

Once again, thank you for asking me to join you. I look forward to engaging with many of you this evening.

VADM Foggo with the HUGIN in the background.



VADM Foggo presenting a plaque to the President of the Periscope Ball, Sub.Lt and Cadet: Øyvind Lavoll (Oeyvind Lavoll).

NSL CORPORATE MEMBERS DAYS 2015

NAVAL SUBMARINE LEAGUE 2015 CORPORATE MEMBER RECOGNITION DAYS

DEPUTY CNO FOR INTEGRATION OF CAPABILITIES AND RESOURCES

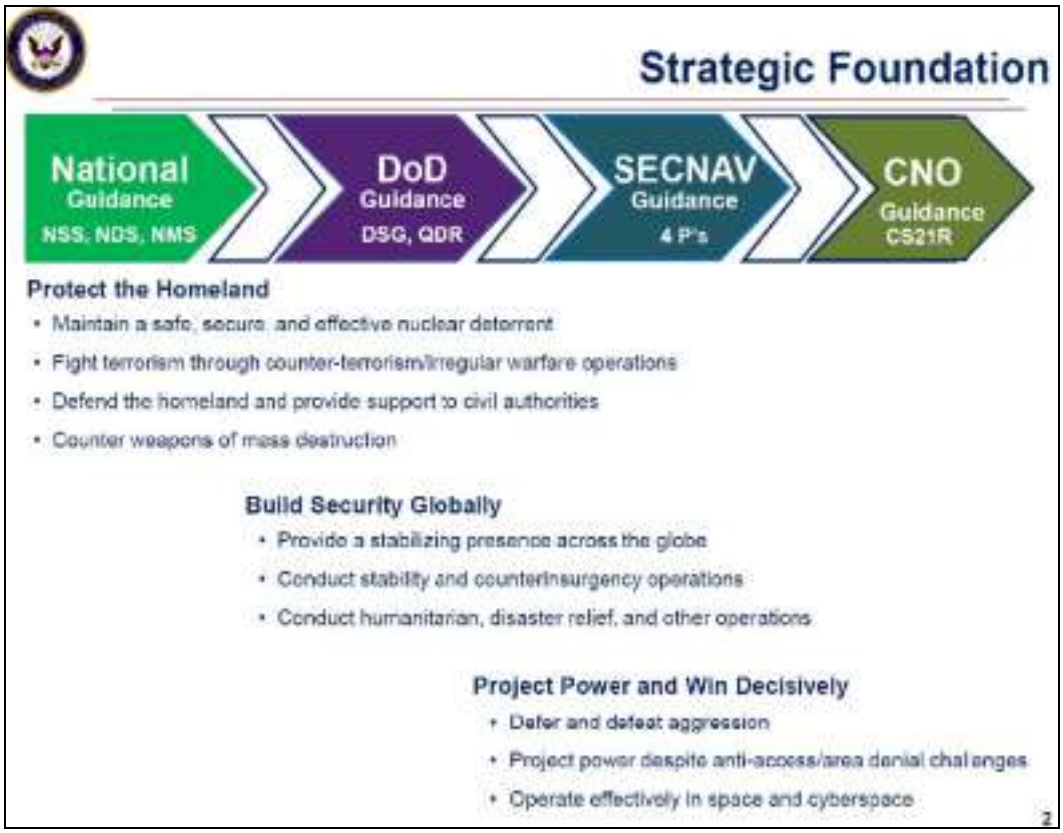
THOUGHTS ON THE FUTURE OF THE NAVAL FORCES

VADM JOE MULLOY, USN

On March 5th, I had the opportunity to speak with the members of The Naval Submarine League at Falls Church, VA. As the Deputy Chief of Naval Operations for Integration of Capabilities and Resources, I offered my perspective on the status of our naval forces, our future as a service in an increasingly complex, chaotic global environment and PB-16 budget issues.

How we design and implement our Navy is driven by the guidance we get from the President through the Department of Defense, our Secretary of the Navy, and our CNO. Everything begins with the elements of our strategic foundation. The governing document for PB-16 is the Secretary of Defense's *Quadrennial Defense Review* (QDR). The QDR's updated strategy is built on three pillars: *Protect the Homeland, Build Security Globally,* and *Project Power and Win Decisively.* In support of these, it requires the Navy to *"continue to build a future Fleet that is able to deliver the required presence and capabilities and address the most important warfighting scenarios."* The QDR calls for the Joint Force to "rebalance" in four key areas: (1) *rebalancing for a broad spectrum of conflict;* (2) *rebalancing and sustaining our presence and posture abroad;* (3) *rebalancing capability, capacity, and readiness within the Joint Force;* and, (4) *rebalancing tooth and tail.* To satisfy these mandates of the QDR

strategy, the Navy has been compelled to make tough choices between capability, capacity, and readiness across a wide range of competing priorities. We continue to view each decision through the lens of CNO's three guiding tenets: *Warfighting First, Operate Forward, Be Ready.* Our military will be smaller, but it will remain dominant in every domain. Undersea warfare, in particular, is one realm in which we, the Navy, need to carry out our unique role in the joint force. The one area we really need to be able to operate, penetrate, and be where we need to be, is in the undersea world. Undersea warfare is *THE* anti-access, area denial solution. This is why lines of operation such as maintaining the Virginia-class build rate, inserting Virginia Payload Module (VPM) into the Virginia-class build in FY19, ongoing submarine modernization, and, lastly and most importantly, developing and building the Ohio-class Replacement ballistic missile submarine are so critical.



The complexity and pace of operational realities mandates that the Navy be positioned forward, around the world, 24/7. In order to meet the demand for a credible naval presence, we are pushing the force. Today, we have almost 100 ships deployed out of 279, when ten years ago, we had 100 deployed out of 400. Supporting all of this is the 41,000 people we have forward deployed. So what does that mean? It means we are putting ships forward and subjecting them to unprecedented operational tempos. When you look at our SSNs, for example, we're getting 25 percent more presence in 2016 than we were in 2014. That is a huge difference.

The natural consequence of increased presence is that we are putting additional wear on our Sailors, systems, and platforms. The Optimized Fleet Response Plan (OFRP) is an effort to inject stability and predictability into planning and execution. More consistency assists in alleviating the strain on the Fleet resulting from higher operational tempos. OFRP was initially targeted at Carrier Strike Groups, but we are integrating all of our platforms to improve quality of life for our Sailors and Marines deployed with us, and also ensure that maintenance gets done at the right time for the right cost, ships get certified, and ships get deployed.

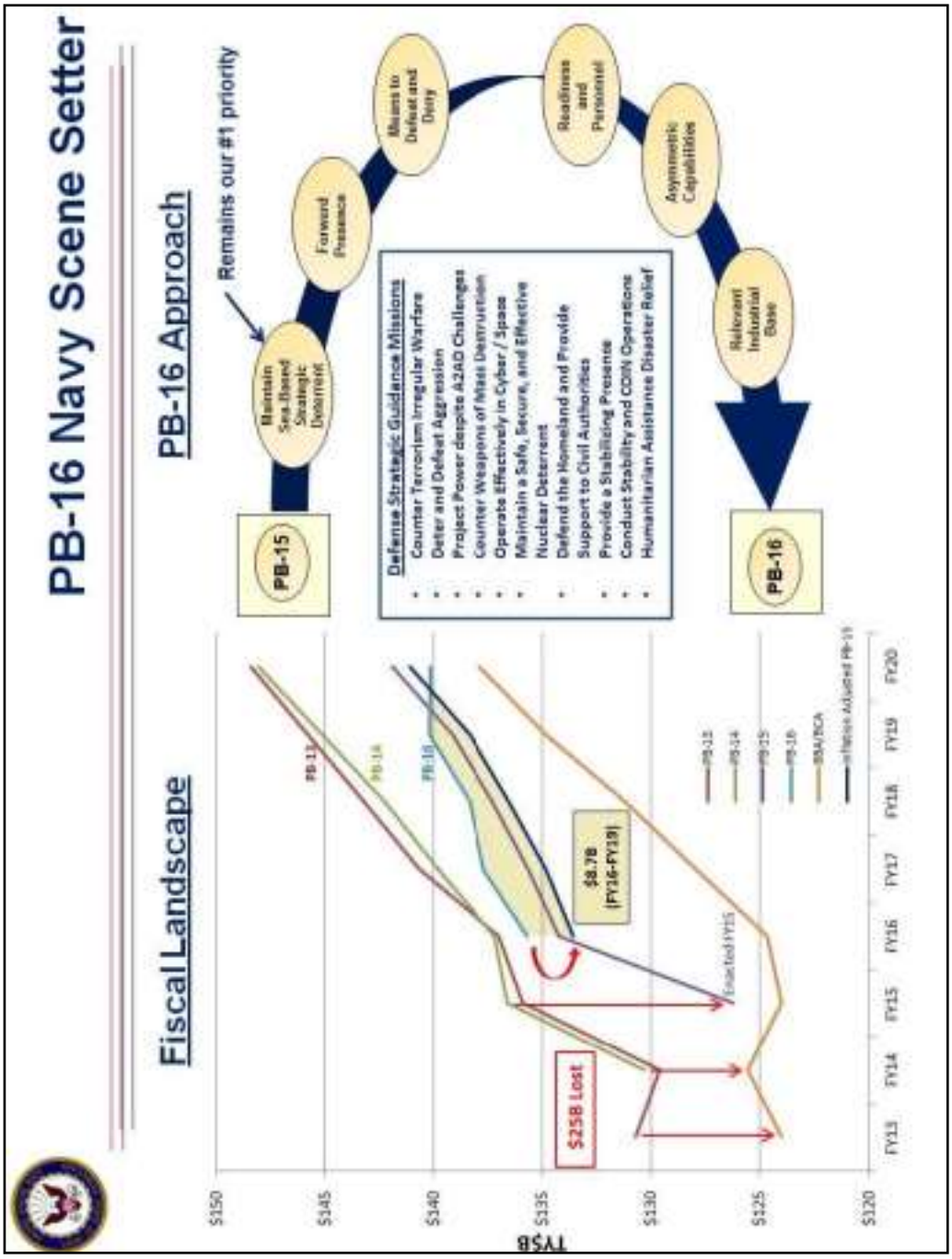
In response to global instability, our combatant commander demands continue to grow. Our Navy has consistently provided more forward presence than initially planned due to real world operations and unanticipated contingencies. It is critical to operate the Fleet at sustainable presence levels, or be resourced to provide a larger force, in order for the Navy to meet requirements while still maintaining material readiness, and allowing them to reach their expected service lives.

We are making tremendous investments to meet the demands of an evolving world where our potential adversaries remain free to develop exceptional weapons capabilities—capabilities that challenge us in the electromagnetic spectrum for example. We have to continue to defeat our adversaries in all domains. That requires readiness not just in sea, air, and land realms, but now also in cyber and electromagnetic warfare. Our PB-16 submission continues to place priority on cyber efforts to build the Navy's portion of DoD's Cyber Mission Forces. We continue our investments in recruiting, hiring, and training our cyber workforce, accessing about 80% of the 1,740 operators that will form 40 cyber mission teams by the end of 2016.

We've added two more domains in which we have to remain engaged and in which we have to be able to defend ourselves while engaged in them. We also have to focus on the readiness of personnel. We have to be ready when we get underway.

CNO has repeatedly stated that our number one priority is maintaining a credible, modern, and survivable sea-based deterrent. Under the New START Treaty, the Navy SSBN force will carry about 70% of the U.S. strategic nuclear warheads. Our PB-16 request sustains today's 14-ship SSBN force, the Trident D5 ballistic missile and support systems, and the Nuclear Command, Control, and Communications (NC3) suite. The Ohio-class SSBN will begin retiring, one per year, beginning in 2027. To continue to meet U.S. Strategic Command presence and surge requirements, our budget submission continues to support construction of the first Ohio Replacement SSBN in 2021 for delivery in 2028 and first deterrent patrol in 2031. As part of the Navy's Nuclear Enterprise Review, our submission adds approximately $2.2 billion across the FYDP to: (1) increase shipyard and Nuclear Strategic Weapons Facilities (SWF) capacity by funding required civilian end-strength; (2) accelerate investments in shipyard infrastructure; (3) fund additional manpower associated with nuclear weapons surety; and (4) fund key nuclear weapons training systems.

The success and importance of our sea-based strategic deterrent cannot be overstated. We have recently executed the 4,000th strategic deterrent submarine patrol since 1960.


PB-16 Navy Scene Setter
PB-16 Approach
Remains our #1 priority
Maintain Sea-Based Strategic Deterrent
Forward Presence
Means to Defeat and Deny
Readiness and Personnel
Asymmetric Capabilities
Relevant Industrial Base
PB-15
PB-16
Defense Strategic Guidance Missions
Counter Terrorism Irregular Warfare
Deter and Defeat Aggression
Project Power despite A2AD Challenges
Counter Weapons of Mass Destruction
Operate Effectively in Cyber / Space
Maintain a Safe, Secure, and Effective Nuclear Deterrent
Defend the Homeland and Provide Support to Civil Authorities
Provide a Stabilizing Presence
Conduct Stability and COIN Operations
Humanitarian Assistance Disaster Relief
Fiscal Landscape
$25B Lost
$8.7B (FY16-FY19)
TY$B
$150
$145
$140
$135
$130
$125
$120
FY13
FY14
FY15
FY16
FY17
FY18
FY19
FY20

Our PB-16 approach has six major tenets which prioritize our Navy resources. *First,* maintain a credible, modern and survivable, sea-based strategic deterrent. *Second,* sustain forward presence of ready forces to be where it matters, when it matters. *Third,* preserve the means (capability and capacity) to win decisively in one multi-phase contingency operation and deny the objectives of – or impose unacceptable costs on – another aggressor in another region. *Fourth,* focus on critical afloat and ashore readiness to ensure "the force" is adequately funded and ready. *Fifth,* sustain or enhance asymmetric capabilities in physical domains, cyberspace and the electromagnetic spectrum. *Sixth,* sustain a relevant industrial base, particularly shipbuilding.

Of course, all of these objectives must be discussed within the context of our current budgetary challenges. Three years of pressurized funding under the Budgetary Control Act, beginning with sequester in 2013, has left the Navy with a huge budgetary deficit. The impacts of sequester in 2013 and the subsequent Bipartisan Budget Act of 2013 (impacting 2014 / 2015) are on the order of *$25 billion lost*, severely limiting the Navy's purchasing power. While funding for Ohio Replacement will be preserved moving forward, other programs have not been so fortunate. Many aircraft have been moved outside the FYDP or cut. Weapons, modernization packages, and billions of dollars in shore facilities sustainment, restoration, modernization (FSRM) and MILCON have been lost. In short, we cannot afford to accept anything less than the President's Budget 2016 submission and still meet strategic guidance.

Moving forward, I am hopeful we can work toward compromise to ensure that our priorities as a nation and a Navy receive the funding they need. In particular, undersea warfare is a domain in which the strategic imperatives are huge compared to the investment. Ohio-Class replacement is absolutely critical, as is funding the SSBNs currently operational. Our SSGNs provide an exceptional package of capabilities, especially with the ability to embark and deploy SEALs. Meanwhile our SSNs are out operating forward with the most competent commanding officers and crews in the world.

Our current threat environment demands nothing less than the most well-trained, well-equipped, and ready naval forces. If the United States naval presence is to remain relevant within the global commons, we must ensure that we apply the right resources in a thoughtful and responsible manner.

NAVAL SUBMARINE LEAGUE 2015
CORPORATE MEMBER RECOGNITION DAYS

VADM MIKE CONNOR, USN

REMARKS, THURSDAY, MARCH 5, 2015

Thank you all here for braving the elements, and thanks to the sponsors that make this event possible. From our perspective, we use these events to align ourselves within the Submarine Force. We focus on our message. We work with you on the message. We try to give you insight into where we're going. And somewhere inside there, we get a lot of credit for our effectiveness in guiding the Congress to the right answer in order to preserve our undersea dominance.

I want you to know that we know that we really don't do that. We do that by arming you here, with the facts, and you do that in places and in ways that we can't. It's a very good coordinated team, we appreciate the extent to which you help us achieve that vision. So, let's press on. And in light with something Admiral Richardson said last night, if you like what we're saying, that's fantastic. If you don't, if you think it's wrong, please challenge us, because what we're saying, we think is right, and we're happy to explain why, and we're also happy to learn.

So just for starters, how's everybody doing out there? We're doing pretty well. I can see some faces in this audience that were the sort of the heroes that, as SSN commanders in the '70s and the '80s and the '90s were the guys that we all wanted to grow up to be, because they had more time on this target, or more time on that location, with sensors up, doing things, and that we just thought that we'd never get a chance to do. And, frankly there were some years that we didn't do so much of that.

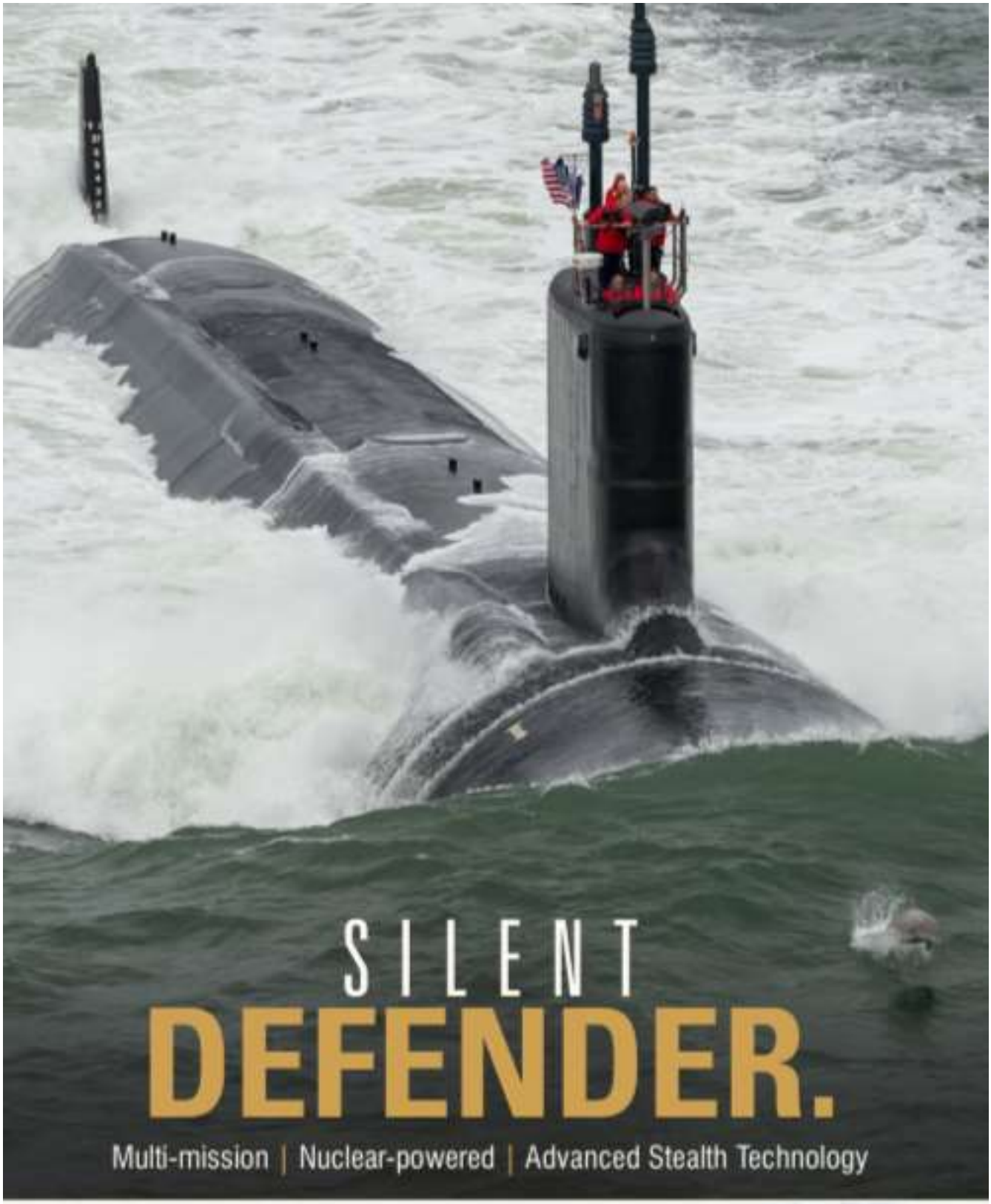
But what I'm telling you is we're growing a new generation of young guys like that who have major accomplishments under their belt, before the age of 40. With the things they have done, with the things they've been able to do with the ships and systems you've delivered and a pretty good level of confidence, a good level of risk-taking judgment. They know when to go for it, and they know when to say, "This is not the day."

The things that they're doing, range from long one-submarine-versus-one-submarine operations to learning a lot about how terrorist networks operate. You might be surprised to know

Admiral Konetzni said we should be bragging more. This is not something we brag about.

But more often than not, when one of the more dominant terrorist leaders in the world departs the planet to whatever awaits him, I get a thank you note, because that's a *find fix and finish* - is what they call the process. And more often than not, the finding and the fixing is done by people in the Submarine Force. Not intuitively obvious to all, probably very intuitively obvious to others who know some of the stuff that we do. The things that we do are getting recognition. We have a very good program to keep the Congress clued in on some of the recent accomplishments.

The President knows what we do, because many of the things that we do require his personal permission to do them. And so we're very much on his mind. And then we get to show him the results. I have a regular battle rhythm with General Clapper, the Director of National Intelligence. And he is a huge fan of our SSGN Program. To the point that he has funded a lot of the stuff we have in our Battle Watch Center with his money, because he likes the results, and the people he talks to everyday, they talk about how nice it is. It's not just the big landing platform on the SSGN, it's all the communications and planning space and that sort of thing that you have there as well. Overall pretty good. And, not to be complacent, I wrote an article for *Proceedings* last month, and the gist of it was, only the paranoid survive. And we have a lot to be paranoid about.



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But these aren't the ones to be paranoid about. These are our sailors. And I want to talk about them for a minute. I just came back from the Naval Academy last week where we recruited 138 new midshipmen into nuke subs. That's the highest number in over a decade. And 17 of them were women. That was kind of interesting. One of the women, she couldn't eat dinner with us at the celebration, because she had to weigh in at midnight for her boxing match the next weekend. And so that just shows you times change. And we had, at the other end of the spectrum, two midshipmen, great guys who were on the croquet team, and had a big match with St. Johns coming up. So there's the other end of the spectrum.

Talented sailors nonetheless. We ran these folks pretty hard in 2014. We're trying to back off just a notch in 2015. In 2014, I'd say we had probably four ships that were extended a month, at least, beyond their scheduled six-month deployment. Then we had two ships that completed a six-month deployment. In one case, after four weeks home, they went back out for another three

months. Another one was home for two and went back for another three months. That was sort of urgent operational need, and the Navy has shifted to 60/40 balance in the Pacific and it's just the world hasn't gotten the memo; and there's a lot of stuff happening in other places.

We surged some folks. And amazing to me that the ships that we ran the hardest, have incredibly high morale. They knew why they were going. They knew why it was important. And they were willing to step up. And so were their families. Despite all the vacation plans and so forth, they got adjusted.

So there's a message in there, to the troops, that's important to tell to the troops, it's important to tell the people who pay for what we do, and to the leaders of the country, and that the work that we do, is very important. The people who do it know it's important. We need to treat the people who do it as if they are important. And we needed to probably share the results, when we can, with the folks, that pay for it.

I guess I didn't mention the 4,000th SSBN patrol, really the rise in the prominence of the Strategic Deterrent Mission. This whole outside look at Strategic Deterrence, which started off with a look at the missile fields out in the central part of the country, with some of the Air Force issues there. It was a good thing, in the long run. It was good for them and it was good for us. And it really has got a lot of senior leadership to recognize that strategic mission underpins everything else that the Department of Defense does. And if we're not credible in that area, we won't be credible in any area.

I'd say the only person that has done more for the recognition of the importance of having a viable Strategic Nuclear Deterrent is Vladimir Putin. And he has with both his investment scheme and his loose talk - about "Don't forget, we have nuclear weapons." when he's trying to intimidate one of his neighbors. That makes people realize—in a way that they maybe haven't realized for a few years—that this is serious business. It does matter if we can do it properly. It does matter if your ships can get underway when they're supposed to for as long as they're supposed to.

Some of the challenges. These are exactly the same words I put before you last year where I talked about aging platforms and weapons and advancing foreign technologies. Let's get to aging platforms and weapons. The good news is that we are building two Virginias per year. The bad news is that we're decommissioning three Los Angeles class per year. So it's getting tougher.

On the SSBN side, I mentioned that we're limited by shipyard capacity, and we still are. However, since we've recognized that we are limited by shipyard capacity, and we've reinvigorated our priority of the strategic mission, a few good things have come out of that. The ships that are in overhaul, the SSBNs in overhaul, unlike last year, they're actually getting a lot of attention in the priority scheme within the Naval shipyards. And so these ships which have been running, on average, six months behind for their 27-month overhauls, the bleeding has stopped. They really can't recover time, but there's been no slippage on an SSBN in the last six months or so, so that's good thing.

We've done that by prioritizing the SSBNs, somewhat by de-emphasizing the SSNs. That was part of the cost. And as we go

forward, one of the things that comes out of that is that we're outsourcing to the private sector, three SSN availabilities. Which I think is good for a lot of reasons. Number one, it brings the shipyard workload back down within their capacity, that's good. And then I think as we look at the degree that we need to ramp up skills in the shipyards, I think we can make these things come together. We can keep skilled workers on the books, maybe hire some skilled workers as we come up in what's going to be a heavy workload for our two major shipyards; building ORP, building Virginia payload module and so forth. So I think that we can make that all work out. I won't be the guy to make it work. It'll be these guys in the front row for the most part. That's the plan, and I think this is an everybody-wins scenario.

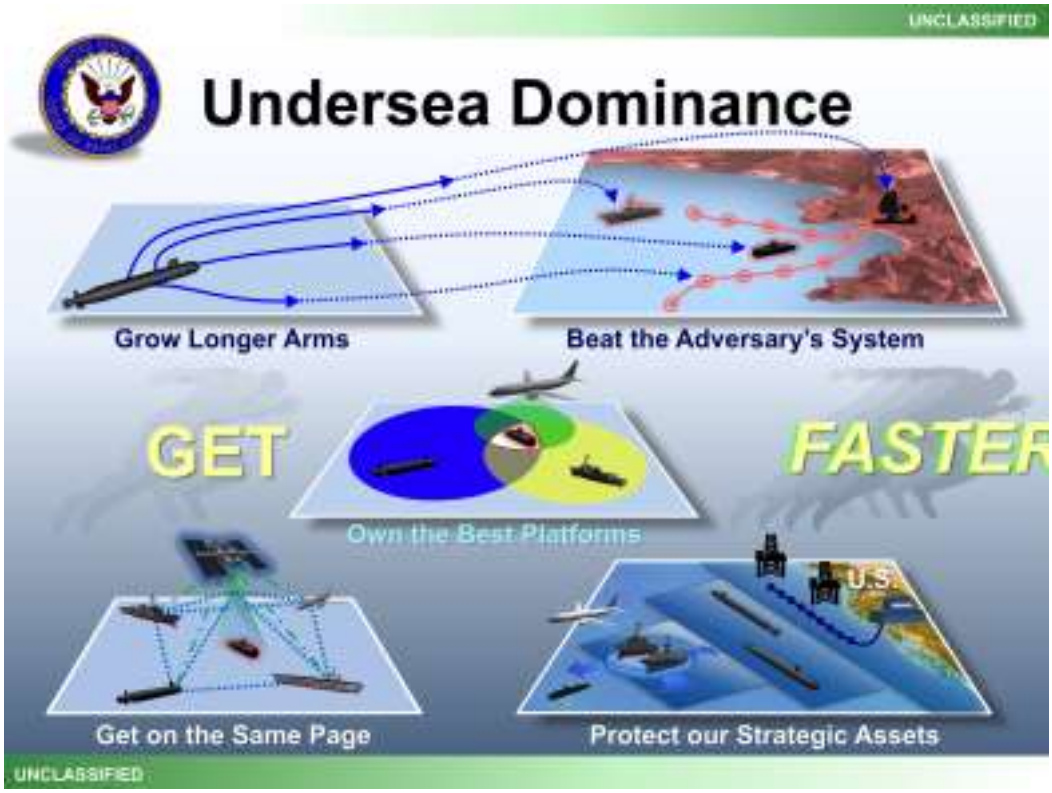
Let's look at the right-hand column of ships, where we have the Severodvinsk and the Jin. You know I told you last year these things are coming out and we just don't know much about them except they're supposed to be really good. I can say actually we know a lot more about them this year than we knew last year, so that's good. So the people that are developing the tactics, techniques, and procedures, know which of our systems, work well against them and that sort of thing and where we're challenged. We know a lot more.

And again, the best I can do is talk about this, this isn't me, this is guys who are 40 years old and younger, who are making very, very good tactical decisions about, "Is this the day that we think we can learn some more about this, or is this not the day?" And you would be proud of the way they worked through those decisions, and then the way that they execute once they make those decisions, and the way that they adapt, if reality doesn't match the plan when they're in execution. I just couldn't be prouder of these folks. They're doing just amazing work.

The fact remains we have capable adversaries who are operating over a wider and wider area, and this is gaining recognition far beyond just the Submarine Force. We have a daily conference with the commander on the state of deployed submarines around the world. And we talk to, on a daily basis, EuCom, StratCom, NorthCom, it's part of the daily rhythm.

Take that Severodvinsk for example. The belief there is that ship was developed to be a multi-purpose ship, that on the one hand would come down looking for our SSBNs to neutralize them, but more importantly, it's a nuclear cruise missile equipped submarine, that will probably be assigned to keep our national capital region at risk, in a world where the Russians believe that we are probably much better at missile defense as a country than we are. They believe that they need something that will go around a missile defense system. And this is it. So as their deployments become more frequent, we're going to be very busy, and I'm going to be asking to renegotiate that 60/40 split because we only have so many subs.

We're actually doing quite well against what's out there, around the world, RADM Sawyer will talk to you some more. We're not so naïve to think that we don't have a lot of tough challenges coming up that we have to work on. Okay, next slide.



A lot of you have seen this. But some learn by repetition. So I'm going to go through where it is we're going and once again, I'll ask you to see yourself, where you fit in this picture, where your company fits in this picture. I've been happy with the way this has gone so far, because a lot of companies have come and told me how they fit in this picture in ways that I could not have imagined. I'm going to tell you what we're trying to do. I'm going to tell you some things that we are doing. And then I will leave it to you to come back and tell us some things that we could do if only we knew what you know about your technology or capability.

But it's basically the six lines of effort. It starts first with *owning the best platforms*. And then, we get into this thing we call *grow longer arms*. And I'll explain these. Next, is *beat the adversary's system*. And then, *protect our strategic assets*, *get on the same page*, and then written through it all, *get faster*, as in get faster than the Joint Services Imagery Digitizing System [J-SIDs] acquisition process. I'll talk about these in a little bit of detail.

First and foremost, with owning the best platforms, we have to have a capable, quiet, Ohio Class submarine. And we're working to build that. We know what the requirements are. The technology development is coming along. It's funded pretty well. We can afford no gaps due to sequestration or other. And if we get the money, we get the right people working it, we'll have a successful program that will deliver on time starting in '20-'21.

And if we start building in '20-'21, we can make the aging Trident fleet hold on just about long enough to have a graceful overlap. On the two per year Virginia, we've got to keep doing that. Our demands are only increasing for the employment of the force. Even at two per year, we're going to go below the Magic 48. And we're going to have to be really careful figuring out where we send ships on deployment. If there is an opportunity to build more than two per year, or to keep building two per year when we build an Ohio Replacement, or to build perhaps three per year on years that we don't build an Ohio Replacement, those should all be considered very, very seriously, because that will help us keep up with the demand, which is huge.

My aviation and surface brothers come to me from time to time, as they do their version of how they fight. And increasingly they tell us that we can't win without you winning first. We have to be up front. We have to take out the enemy. We have to degrade the capability of the enemy at shore and at sea, in order for these folks who bring these higher volume firepower assets in, or the people who can hold territory and all that. If we're not there first to make things happen, then it's going to be a bad day.

We need Virginia, and we need it with the payload volume. We measure payload volume in units as Tomahawk capacity, which does not mean that we're limited to only thinking that they'll hold Tomahawks. The reason we do that is a little bit of a strategic communications issue. We want to get the payload volume. There's a few antibodies in Washington D.C. about what some of our potential payloads might be. *Conventional Prompt Global Strike* is the one that seems to upset people the most.

We've strategically chosen not to talk about all the things that might go in those tubes while we're building them, because that

will help us get the tubes. It might be counterintuitive, but that's the world we live in. That's why we're doing it that way.

And then of course, acoustics superiority. There's been a lot of breakthroughs in that area thanks to the science generated by folks in this room. We think we can get a few more DB out of Virginia is what we're saying, and that's how we will continue to be superior. I can't emphasize enough that everything else that I'm going to talk about, in capabilities, is built on this foundation that the adversary never really knows if he will have the ability to detect one of our submarines. Even when he has the submarine on his sensor, he doesn't know what it is because their experience working against us is so little.

What we want the end result of all this to be is that we have actual, credible capability. When the adversary looks at his worst case scenario, based on where we might be—because he doesn't know where we are—that picture looks pretty bad for him. And once we have them rocked back defensively and on their heels, then there's a lot of stuff we can do to mess with them even more, some of which I'll talk about.

But it all starts with—and you've all seen it—with the operator on a surface ship or on the airplane, looking around and saying, "I don't see anything." And then having something coming out of the water, or something explode, and he didn't see anything. And that's right where we want to be.

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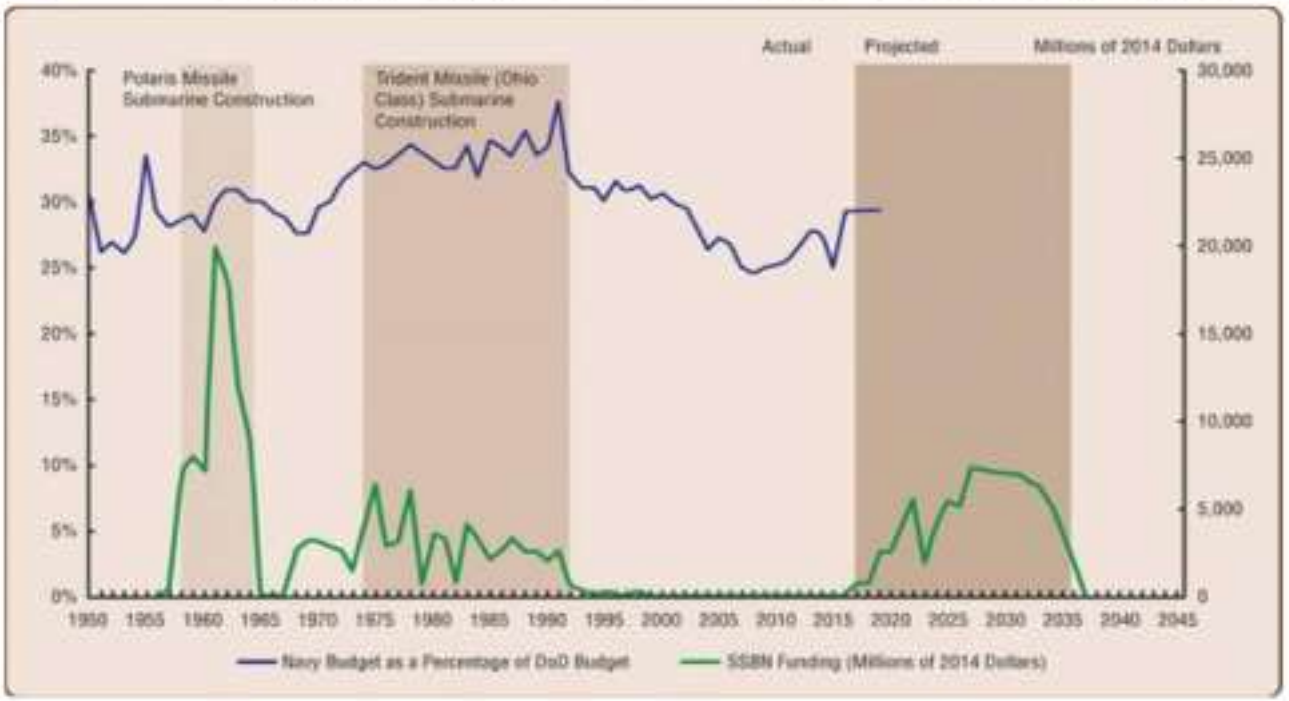
Own the Best Platforms



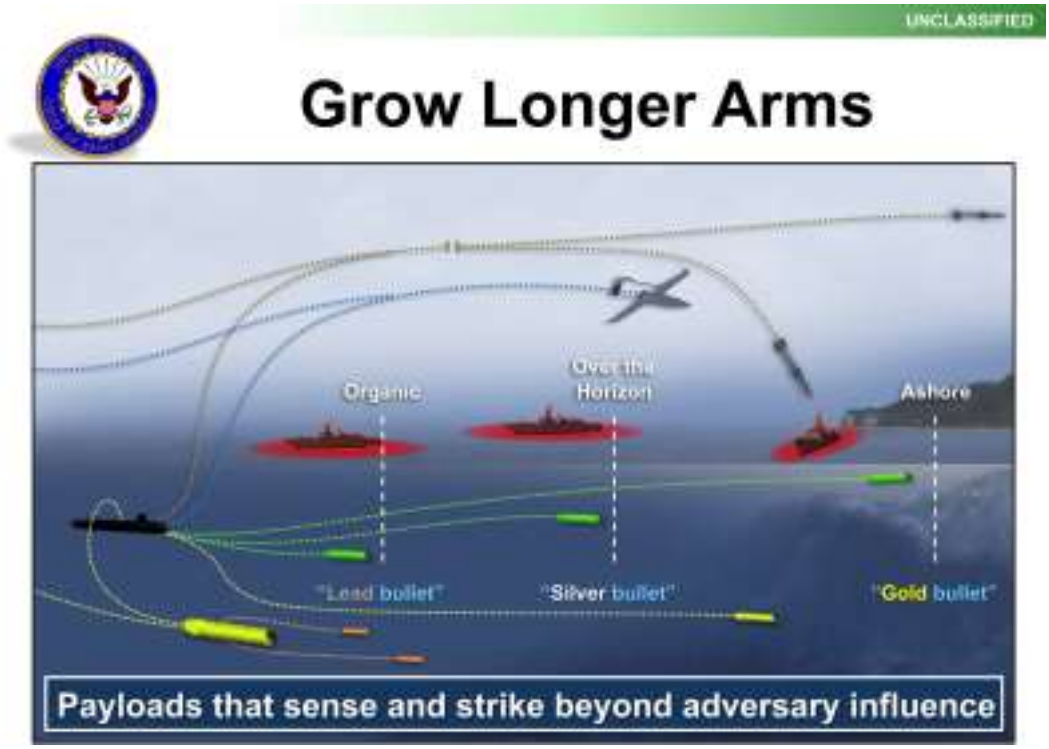
Melissa King: Peaks and Valleys of Submarine Construction Budgets
Dr. Eric J. Labs, "Finding Funding for the New Boomer," *USNI Proceedings*, February 2015

UNCLASSIFIED

7

I don't usually show graphs, and I didn't show this to my fellow briefers, but I just got my Proceedings in the mail yesterday, and I thought this graph was worth sharing with the crowd, because what it shows is the Navy budget as a percentage of the D.O.D. budget. But what it shows since 1950, is the SSBN funding per year, corrected for 2014 dollars.

The nice part about it is that it wasn't created by Joe Tofalo, Joe Mulloy, or Rick Breckenridge. It was created by a woman named Melissa King, and published in an article by Dr. Eric Labs from Congressional Budget Office. So maybe it did come from Joe, but it's tagged to Dr. Eric Labs from Congressional Budget Office—and that's important because now we can quote this source. The message it shows is this is what you pull out when people say, "Well, geez, I don't know if we can afford to recapitalize a strategic deterrent." Well, of course we can, because we're not spending—despite all the growth in GDP and all that—we're not spending any more now than we were before to develop the capability, this worldwide capability that we didn't even have before. It's just not that we're doing it with 41 submarines with short-range missiles, we're doing it with 12 long-range submarines that are alert from the time they leave their home port. And it's a much more efficient and effective system, and we have nothing to apologize for on the cost. And I think this is what Admiral Richardson was getting at last night, we have the right ship, the amount of money is when we build the ship, that is 1% of the defense budget for the year that we built it, as we do this project that comes around once every 40 years. So don't apologize, just explain. That should be our message.



So this is the theory now how it's built on top of having the best platforms, and that is to make those platforms more effective across a wider area and to keep your enemy on the extreme defense against submarines through a package of capabilities that we refer to as *grow longer arms*. So let's start with underwater, where you can see where there's a lead bullet where there's a short-range torpedo, that's basically the torpedo that we have today.

And then we want to, in the fairly near term, extend the range of that torpedo. The ability to effectively target that torpedo over the horizon using basically simple, cheap unmanned, air vehicles, we can make sure we're hitting the right target, and we can make adjustments for a guy who's maneuvering while he's over the horizon.

That'll bring us out to the sort of the 30-40 mile range. And then this thing we called a gold bullet is getting into the 100 mile+ torpedo. Easily doable from a propulsion plant capability. And then when we match it with some autonomy that exists today whether it be in the academic world, or oil and gas world, and then

even give it some communications. We can reliably take a torpedo and hit a target over 100 miles away.

We'll probably start with stationary targets. In other words, we'll take Harbor X and Pier 2, and we know what ties up there. In fact, go back to the graphic Challenges to Maintaining Superiority. It might be hard to see. Just in that lower picture, just above the rudder of that ship, there's a tunnel. That tunnel holds up to six SSBNs. So that's my poster child. I would like to drive a torpedo into that tunnel from 100 miles away. And then I'd like to make the people who own that tunnel have to defend against that type of capability.

Then when you can do something like that, this whole idea of, "Oh we'll go in the tunnel. They'll think we're all at sea, and they'll run themselves ragged trying to find us." Maybe not, maybe you don't want to be in that tunnel. So just things like that. There's a million equivalents to that. There are other tunnels in other countries, and we should give them that quandary. That's where I'm going.

Let's talk about in the air. We very much want to get back into the anti-ship missile business. We have a great Tomahawk missile right now, with a range of about 1,000 miles. We once had a TASM, a *Tomahawk Anti-Ship Missile* that had a range of 350 miles. And frankly, when we had the TASM, we knew we could hit something with it. We knew it would hit something. We just really weren't confident what it would hit.

Command and Control has come a long way since then. Whether it be our ability to get smaller areas of uncertainty with off-board sensors. Whether it's the ability to put the missile's equivalent of facial recognition software in a seeker. And what we need to get to this future point is we need to take something like the Tomahawk that we had today, we need to be able to give it an anti-ship mode. That way, you can start drawing this thousand mile circle around where any U.S. submarine might be. And if you're our adversary, then you have a need to maintain an air defense posture and be on a very short tether to react to something that might come over the horizon, and within three or four seconds after you first see it, it could hit you.

That would put your enemy in a defensive crouch, and it also allows you—because of the systems of systems he has to maintain—that allows you to do a lot in the deception in the cyber world. If only you can get him to start off by being very, very paranoid. And this is an area where we just help the overall joint effort just immensely. But we've got to be able to produce this incredible threat. Well within our technical means, as the offensive ASUW Program develops, we need to be a part of that. And if we're not written into that, in a way that looks like this, I'll be fighting whatever the plan is, tooth and nail.

I think some of you know that already, we'll be dabbling in the anti-air business as well. That's about all I can say, but it's pretty neat.

We call the next line of effort *Beat the Adversary's System*. And the basic guidance here is that A2AD, which is currently at the surface and above, is going underwater. Incredible evidence, people who worry about us are trying to build things that can keep

us out. And we should be okay with that. Okay, it's a little counterintuitive. But we should be okay with that, provided that in a fast enough timeline, we can produce the set of capabilities that makes those systems obsolete at IOC. And what I mean by that is, if it's an acoustic system, then we need to have the right package of acoustic decoys that can be deployed at a time or place of our choosing, so we can probe what their actual capabilities are, so we can make them see things that look like our submarines—maybe see things that look like their submarines—in a very coordinated way.

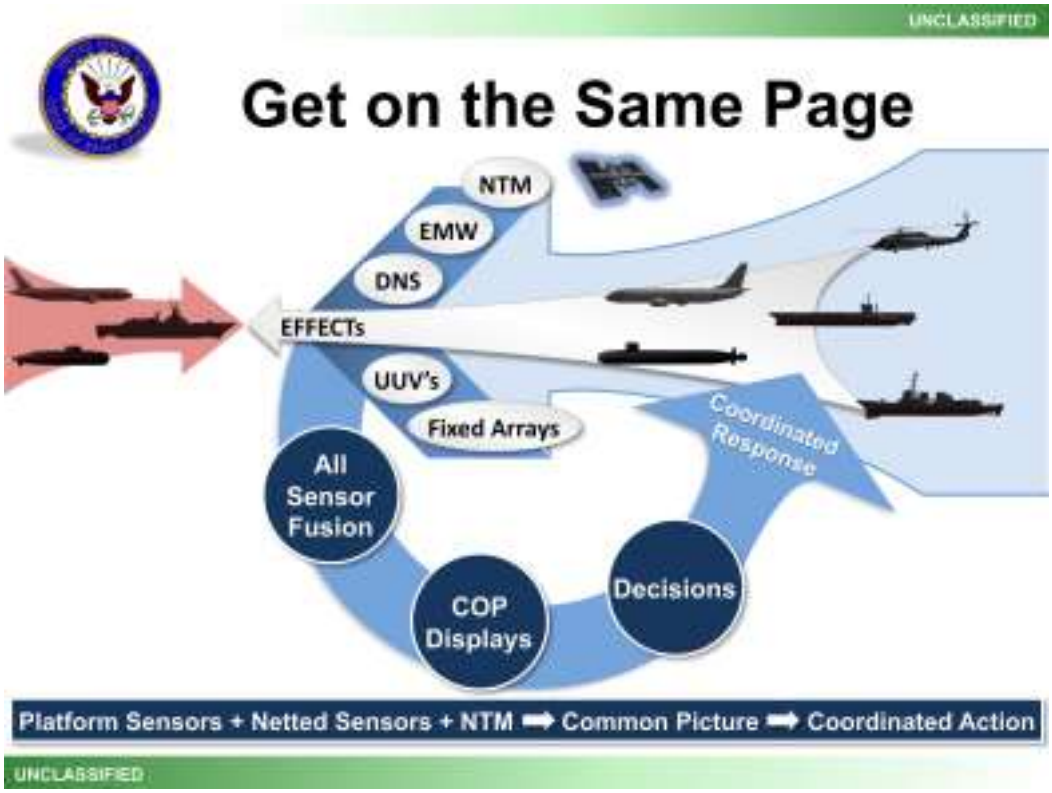
We can do that. This is engineering, this is not science. And then ditto for making them see periscopes on their radars. I think you've all heard my radar decoy story too many times. Bottom line is we can give a credible representation of a U.S. submarine periscope in a device that we can shoot out of a 3-inch launcher, and cost less than $3,000. And there will be days when we choose to pepper the ocean with those things, and watch people waste their weapons.

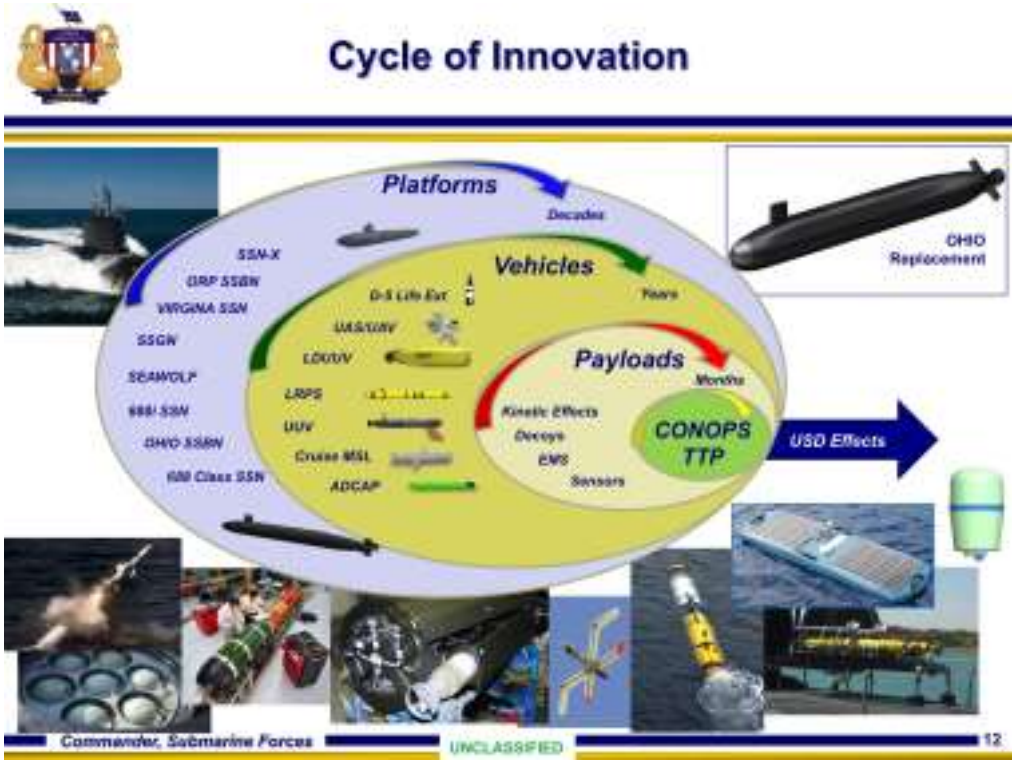
Protect Our Strategic Assets

We're looking at building systems of unmanned systems that can provide us with near perfect undersea awareness over small areas. We have a big project spinning up right now. It's basically a technology reliability level, probably a six to seven somewhere in there, but with a little cover from CNO Greenert. We're going to make a big, bold move in the next year. And, we're going to only advance the state of unmanned by doing something that needs to be done in the real world. That's about the best I can tell you there.

I've been complaining a lot about how we don't have a system that will allow us to integrate all of the information at all the different classification levels, whether it's special access this or that, whether it came from a ship or a destroyer or whatever. Or, even IUSS systems on the bottom. Well, it turns out—and I visited our good friends up at Penn State—the system that I was dreaming of already exists. It's just being used somewhere else for a different purpose. And again, they rolled this out for me because they were wondering why I wanted something that is already exists.

But this is a case where we educate each other. So now my job is, how do I take something that was made for one customer in a different area, and get this thing quickly rolled out, so we can quickly get submarines and strike groups and people in the fleet command centers having a good, reliable, agile system that can incorporate all levels of info. More to follow on that.





This is a graphic which, I wish was in all your offices, or something like this, behind your chair, on your desk, because this is a money slide. This shows how this diverse group of people here can work with each other to improve our overall capability. Just looking at that graph on the outer part of that circle, we have the platforms, the foundation of what we do. And these are things that we build on the order of decades. And once in a while, while we're building them, we get a chance to make some improvements, like VPM or acoustics superiority, or something like that. But we're basically talking decades. It has to be done right. It has to last a long time.

And then as you move into the next area, these tend to be vehicles. And these are things that we can take a little more risk on. We don't have to do as detailed testing. We can probably build them in a small number of years—single digit years from when we decide to do it, until we do it. And when we do, we can create this quickly changing face to our adversaries. And that's important.

And then inside that, there are packages and payloads that might ride on the ship, the platform, or they may ride on the vehicle. And some of that stuff, we can turn around in literally months. In fact, we do that for special missions right now. Someone has a new thing we want to look at. We design the right package. It goes on a ship. And we go exploit something somewhere in the world. We know how to do that.

But I won't name company names, because I'd probably be violating some rule, but really in the last week, I learned about a scenario with a shipbuilder. One of our shipbuilders bought a company that makes a vehicle. And they kind of figured out together that, "You guys have this neat vehicle. We're pretty good at manufacturing." They went out and found another company that was probably the state-of-the-art in unmanned vehicle batteries. So they brought them in.

I got really excited about it. I came here last night, and I went and grabbed a bunch of guys that specialize in payloads. And I said, "Hey, you got to meet these guys. You're the payload guys. These guys are really moving on the vehicle." And someone said, "Met them last week." This is the type of energy that we need to move quickly enough, that we can turn that technology cycle, in a way that is faster than our normal development process, and more importantly, faster than our adversaries. Because our adversaries don't have our normal development process, and our adversaries have plenty of money.

But we have more innovative, creative people, and your duty is to work together to build stuff, and then our duty is to buy good stuff when you build it. And I recognize our track record always hasn't always been that good in that area, but we're working on it. Lastly, I just want to do a quick cycle around the pictures to show that we are doing some real stuff.

So in the lower-right, you'll see a couple of vehicles, sticking out of a dryock shelter. What's important about that is that we're doing an unmanned vehicle mission this year. We're doing it with a brand new ship, who is going to do it in a real deployment. That's a real deployment before she goes to PSA, which is another big coup for the system. And now we don't have all the handling

stuff built, so we're going to throw those things out and retrieve them with the most agile, ocean interface that we have, which is a couple of Navy SEALs. And they'll push them out and get them back.

And then moving on, above that, there's an unmanned surface vehicle. It's a wave glider, which we're going to use as part of that system of systems I was talking about. It's a vehicle that can stay at sea for a year plus. It makes its own power. It maintains station by harnessing wave action. And it communicates with things below the water and with satellites. And it's pretty huge.

That air vehicle that you see there on the bottom, that's something that we're upgrading to get a 9-hour time of flight launched out of submarine torpedo tube. Huge demand for that from our special operations brothers. So we can help them get some better insight as they go ashore. And then, left of that, there is a device for launching acoustic decoys out of unmanned vehicles, which again, will help us in that beat the system of systems area. That's developed up at NUWC.

Moving left, you see the work on modular torpedo components. NUWC is working on Comms and Navigation components. They're working on an extended range torpedo run. And they're running neck and neck with some folks from Penn State that have come up with a very elegant way as we get back into heavyweight torpedo production to show us how we could go much further, faster, than the current plan. The current plan is a sort of a wedge to get the money in the budget. That's done. But we all know that we could do better. And they're coming to us with some good ideas. So we'll see where those go.

And then of course, up at the top, we've got, again, the two great platforms that we have right now—one we have, one we're building. And so we think we're in a pretty good spot. We're not overly optimistic, but we're out there doing pretty well. I'd say, very well. But the Navy and the Joint Forces, are counting on us to do even more going forward.

NAVAL SUBMARINE LEAGUE 2015
CORPORATE MEMBER RECOGNITION DAYS

RADM PHIL SAWYER, USN
COMSUBPAC

My brief, my discussion today will be a little bit different than the preceding ones to a degree, because I am going to focus primarily on the things in the Pacific, and I'd like to say, and I truly believe, that within the Submarine Force, between the Pacific, the Atlantic and the N97 folks in the Pentagon, we have a very, very close working relationship, and we standardize wherever we can. We're unique where it's required. But many of the issues we deal with are force-wide. And we attack them as a force-wide issue.

Admiral Connor, and certainly Joe Tofalo, have identified the big and broader issues. So I'm going to focus a little bit more on the Pacific. I'll highlight some things that may be unique to us, and how we're going about doing those. Generally speaking, I'll go back to my nuclear roots, and that is, while overall I think what we are doing in the Submarine Force is very, very positive, as a nuke, we don't really focus on the positives.

But where there is an area we can improve in, we're all focused, most of them things I think we need to continue to put effort into, and truthfully, these are areas that I will turnover these problems to my relief, because I don't think that I'm going to be able to get to the endpoint on these.

First let's just talk a little about SubPac. I did not speak last year at this forum but I did speak at the Naval Submarine League Symposium in October. Since then the changes in SubPac, there are two, primarily Force lay down, issues. One is the fourth SSN will be in Guam. Originally it was going to be in Guam a couple of days ago. It's been a bit delayed in Groton, enjoying the snow. TOPEKA exited the shipyard and will be in Guam, roughly about the first of May.

That will be the fourth SSN home-ported in Guam. If you look at it in a day-to-day basis with all the deployed units and the SSG that's doing maintenance there, on a day-to-day basis, it has about the same number of submarines as Norfolk and San Diego does. The landscape has changed in Guam with respect to submarines and what we do there. And I will address that a little bit more in the future. But with that fourth SSN there, that changes what we call the Guam Mission Cycle. We're working through those aspects of it, of how to obviously maximize the availability of the submarines there, and at the same time, make sure that we don't overcrowd Guam.

The second change took place in November of ’14, we stood up a squadron in Bahrain, Squadron 21. It works for Group 7, administratively. They wear a second hat, and that’s CTF54 Det. That’s the operational hat that they wear. We have a Commodore there. He has a staff and if you think back to the days of Squadron 22 in the Med, that really is what Squadron 21 looks like. We’re fleshing out some of the processes and the people that go there. But they will, to a very large degree, look like what we used to know as Squadron 22. The big difference is Squadron 21 there in Bahrain will also do day-to-day theater ASW for NAVCENT and the 5th Fleet Commander.

EMORY S. LAND, which has just exited her maintenance availability in Oregon, stopped by Hawaii, loaded up some stuff, and now is headed out to Guam. We’ve just put in the change request for the billets. She is going to be home ported in Guam. With four SSNs, I have to have a tender in Guam. They are my eye-level maintenance facility. And the tenders have to do their own maintenance on themselves. And often times that’s over here in CONUS.

EMORY S. LAND and FRANK CABLE will both be home ported in Guam. There’s a lot of advantages to that, particularly the manning of the tender. Right now, as you probably know, they’re all on the EMORY S. LAND. It’s an expeditionary tender home port in Diego Garcia. Those are all one-year billets. The turnover of a crew that size in a year is pretty phenomenal. We’ll now man them and detail them, assign them, just like we do FRANK CABLE. And our plan for the two tenders is one will always be underway 95% of the time.

One will be out doing forward maintenance, expeditionary maintenance, including going to 5th Fleet. The other will be there doing maintenance on the home ported SSNs in Guam, and any forward-deployed guys that need it. So we’ll always have one in Guam. They’ll come in, they’ll do a turnover, and the other guy will take off. So roughly they’ll be gone about five, five-and-a-half months every year. And they’ll rotate through who’s underway and who’s doing the maintenance in Guam.

As I travel around, Asia, this slide—or something that looks very similar to it—is often used by the countries in Asia. They use this and talk about economic prosperity and how that supports security and well-being of their folks. They focus and they tell their people that they're talking to that this is a maritime environment. And it's simply geography. As we know, throughout the world, 90% of the volume of goods is now moved over the ocean. That's true in the Atlantic and the Pacific. The difference though and what they use the slide for is to highlight the choke points that are part of Asia.

You can easily see that there are choke points in the Asia area, particularly Southeast Asia. Again it's used to highlight the fact that the Pacific is a maritime environment, something that's not lost on us, obviously. So I'm going to talk a little bit about the countries in the Pacific and what we're doing.

As I walk around the AOR, I've grouped these countries. These three first; North Korea, Russia and China, I spent a lot of time focusing on these three. First, North Korea; Admiral Locklear's testimony to Congress last year said that North Korea is the most dangerous actor we have in the Pacific. They are unpredictable. They either have—or are working toward—nuclear weapons depending on what you read in the paper.

They have demonstrated that they will use kinetic force on the South Koreans as in the sinking of the CHEONAN, and the shelling of a small island off the coast called Yeonpyeong. The unpredictability portion of that causes us to pause. We have to think about our actions, their actions and how we interact with the North Koreans. If you go to South Korea, it's very easy to figure out where north is, because as you land anywhere in South Korea, you'll see these surface-to-air missile batteries throughout the country, and they're all pointed north, right? It's your compass.

It's easy to get your bearings when you're in South Korea just by looking at where all these missiles are pointing.

You also see in the open press, that the North Koreans have developed a new submarine. The assessment right now, as you read, is that it's a ballistic missile submarine, it looks like an old Golf, that many people may be familiar with. Nevertheless, that adds another level of concern, particularly to South Korea, with a submarine that potentially could carry a ballistic missile.

Russia, as Admiral Harris, my boss of the PacFleet says, everybody focuses on Russia and what they're doing in the Ukraine, rightly so, and what they're doing in the North Sea, rightly so. He says, "Hey, but Russia has a Pacific component." And while they do all the testing and building and stuff, in the Atlantic, those units eventually flow over to the Pacific. I was down in Australia at a conference, last year, just before the G20 met in Brisbane, and, of course in the front page of the Australian Day, was the Russian SAG (Surface Action Group) that they sent down off the coast of Brisbane. As I finished, I asked if there were any questions. The first question was, "What is America doing about that Russian SAGs that's off our coast?" I just smiled and I said, "Hey, it is international water, right?"

Obviously we do see a lot of stuff happening obviously in the Atlantic and NATO and Europe, and it causes concern. There is similar stuff— not kinetic—but there are similar issues going on in the Pacific that does raise the level of concern by the Pacific countries. So we think a lot about Russia.

Lastly on this portion is China. China is developing and they are a blue water Navy. China, has a very, very robust Navy in general that we watch. As you've seen recently, they send a counter piracy task group to the Indian Ocean and the Gulf continuously. They always have one over there protecting their shipping.

The last two, again as you see in the open press, have included submarines. So they have the desire, they have the intent, and they have the wherewithal to push their units forward. While we really do desire to work with them to make sure there's as much transparency as possible, we're not yet there with the Chinese. There's a 2014 Pew Research Poll which surveyed a lot of the countries in Southeast Asia and South Asia. And the number one driver for concern amongst these countries was territorial disputes with China, and the fact that in 8 of the 11 countries surveyed, their general populace believed with a greater than 50%, value,

that the territorial disputes with China would result in military conflict.

It's even in those countries that, like Malaysia, which view China very, very favorably, they also believed that conflict would result because of what China is doing. You've seen in the paper about all of the things that are going on in the South China Sea, it's kind of gone from the paper about these Senkakus and the Japanese, Chinese issues there with Senkakus.

But in the South China Sea, it's Vietnam and oil drilling. It's the Philippines, and the Spratlys, and who owns them. I know that Senator John McCain, very recently used a slide where he showed what China was doing in the South China Sea and the reclamation projects. It is quite amazing what they have done down there across many of the Spratly Islands, and that is simply dragged up sand from the ocean and have built islands. Obviously the intent of that, is to be able to call that territorial land, and then apply the international rules that go with land masses.

I talked about the Pew Research Poll. These are the other countries that have submarines in the Southeast Asia area. While I focus a lot of time and attention on Russia, China and North Korea, I would tell you that Admiral Munsch, who is CTF-74 Sub Group 7, spends a lot of time with these countries, as they are developing their Submarine Forces. That's primarily because that water is getting much more populated with submarines. He has to work both, from a very simple submarine rescue standpoint, and a water space management standpoint to kind of get everybody on the same page, so that we don't have inadvertent problems.

In Vietnam in particular, there are Kilo submarines that they have bought and are buying from Russia. It's interesting they are operating those submarines on a very routine basis, off their coast. And, again, there are broad issues about the Vietnamese and the Chinese with oil rigs down there in the South China Sea. And if you would've taken an overhead satellite picture and taken a look at that confrontation there must have been 45 ships, from the two countries, that were nose-to-nose, surrounding this contested oil rig that's down there.

I think that these countries are procuring additional submarines primarily because of their concern with the tensions that are really China, and the territorial issues they are causing there.

I was just recently out in South Korea. They have just stood up, their structure is a fleet commander called ROK Fleet, he is a 3-star and operates all the units. He's an operational commander type of construct, what they call a Type Commander similar to SubPac or SubLant.

And it's pretty significant. They've changed the way they operate. Usually all the operating forces go to the fleet commander. That continues to be true with the exception of the Submarine Force now. So the Submarine Force, not only do they do manned-trained-equipped side of it, but they are the operating commander. So they really look like both Group 7, who's our operating commander forward, and Sub Pac. They do both sides of that equation, which is unique in South Korea.

I would also tell you, if you ever end up in South Korea, all you have to do is mention Admiral Konetzni's name. You want a free dinner, a drink, whatever it is, mention Admiral Konetzni's name and you're in. They really revere him over there.

There's a lot of changes going on in Japan. You've seen about the Constitutional issues they're going through, including the collective self-defense. When you think about that change, it's a huge change for the Japanese. And collective self-defense, before they had that, if my surface ship and their surface ship were next to each other, and somebody attacked my surface ship, the Japanese could not attack, even if it was two Japanese surface ships. It was self-defense only. So if you were not attacked, you specifically, could not protect your other surface ship right next to you. We found that quite interesting, to say the least. So they've changed that, it's collective self-defense now.

The Japanese continue to make deployments to Pearl Harbor. One of their most modern submarines, an AIP submarine, pulled into Pearl Harbor last Friday. They come there for training. It's very, very helpful for us. It's a win-win. It's beneficial for us and for them. We get to operate with diesel submarines and develop

our tactics and our procedures with them. And at the same time they get the highest level of training they can possibly get.

Australia is still trying to figure out the Collins Class replacement. There's a lot of people involved with that. We've been down there quite a bit discussing it with them. I know Dave Johnson and his team, many in our country are working with them as they go forward. They remain a very, very staunch ally of ours. We just started a PEP Program with them, and two of their junior officers are now assigned to Fast Attacks in Pearl Harbor. They're assigned for roughly six months. They go through some of our junior officer training level. Then these guys are already wearing dolphins by the way. Then they're going to go out and do part of the deployment with our submarines.

It's beneficial from two parts. One, it provides a gap filler for their lack of operational time right now. And at the same time, we are sending two of our JO's out there for a full three-year tour. And as we were working this PEP Program, I got the question that says, "Hey, how sure are you that you're going to be able to get two JO's to go over there and spend three years?" And I said, really? I guarantee you, I can probably go down to a boat, any boat, and get two JO's to go over there for three years. So it really is a pretty good deal for them. They go through their version of SOAC. And they are assigned to a submarine full time, and so they're equivalent, we call him a department head and that's the tour they'll spend. The first two guys are up on the detailer's slate now for fill in August. Again I'm fairly confident we'll be able to get two people.

I should have mentioned when I talked about Russia, China and North Korea, Admiral Richardson mentioned it last night, but in the year 2025, all three of those countries will have more submarines than the United States Navy. That does coincide with a portion of our force structure trough. It's a telling statement, because quantity does matter. It really has its own value. Won't talk about quality, I think, I'm very, very confident that we'll retain quality, but quantity matters. And it's something we do look at very, very closely as we go forward.

Now I'm going to go through some of these issues that I regret, but I am going to turn over to whoever comes in to relieve me, whenever he comes in to relieve me.

These are fairly well-known, but my perspective, particularly on the maintenance challenges issue, is it's built up over a period of time, and we're not going to get out of it in the near term. When I look at FY '14. The Submarine Force lost five years of submarine operational availability because of delays and overruns; five years. Just in CNO avails. Almost 1800 submarine days. That is twice the 10-year average prior to that. It really is unprecedented. And that is going to bow wave into '15, '16, '17, and who knows when we're going to get out of it.

Admiral Hilarides put additional people in our shipyards. We all recognize that it's going to take time for those people to get proficient at the journeyman level, or whatever it is that they're going to be trained to do. We're not going to come out of this in the near term. It is a capacity issue, in my opinion. There may be a little bit of an efficiency issue on that also. But it's primarily a capacity issue.

The question came up yesterday about the aging Submarine Force, and you see that with respect to maintenance issues. I would say it's certainly a contributor. I don't know how much of a contributor, but it's a contributor. I use SSGNs as an example. Our model has an SSGN doing four deployed operations for 14 to 15 months and then coming in. And the model has it for 100 days of maintenance, and then it gets back into the cycle. Those major maintenance periods, we call them, are running on the Pacific side about nine months now.

So what we had planned and scheduled for 100 days is now taking nine months. There's a lot of parts that, that go into taking nine months. The bottom line is, it's taken a whole lot longer than we had planned on those guys taking. And that really goes to operational availability and forward deployed presence.

There are other issues from a maintenance standpoint that we are addressing, but again, I don't think we'll get through these in the near term. I would include in that our radar systems. Our radar is fundamental to our ability to operate our submarines on the

surface. Whether it's BPS, the B-15 or the 16, we have, we've got problems that we need to work through. And I know the N-97 and the program managers are putting money to that. It remains a concern.

Towed Arrays, particularly our Thin Line Towed Array, remains a concern. It allows us to do things, that without it, we just can't do. We've done a long and very detailed look at this with Dave Johnson and his team. If you look back to what we asked of the manufacturer of the Towed Array, I think it turns out now in the way we calculate availability what we put as a requirement was 11% operational availability. That just doesn't work. There's a large effort going forward to remedy that, including, looking at the next generation of Thin Line Towed Arrays.

There are three other big ones, I want to be turned over to my relief. The first one is really an operational issue and its ocean observing sensors. As you may know, there's a lot of people who put sensors in the water nowadays. Universities, weather centers. There's a lot of folks that put systems in the water. And some of these stream real-time to the internet. In the Pacific, particularly on the North Pacific, Northwest Pacific coast, it's really becoming an issue.

The Canadians have some in there. Our universities have some sensors in there, so it's purely an operational issue. We have to work around how we mitigate this. Truthfully, what that really turns out to be is through some operations and training and things that I can't do in this area, so I have to move my guys farther out to the West, or I need to move them to the South, which is exactly what we're doing. We're working with the folks that put these things in. Again it's going to continue to be an ongoing challenge for us.

IUSS, growing demand for all things involved with IUSS. And IUSS includes both fixed systems and mobile systems. The biggest issues that I'm working through right now is the manning of IUSS. As you probably know or remember, in the late '90s, early 2000s, we somewhat disbanded the IUSS community. We had people that spent their entire lives in IUSS, both analysts and officers. That's

gone. So the manning of the IUSS now is primarily surface sonar men.

It's a challenge because the surface sonar man is a challenge to us. I get them for one tour and they're gone. So expertise, actual number of people there, is something we're working on, and we've got both fleet commanders, they are helping me with this issue, as is OPNAV N1, because I think we need to figure out a different way of doing IUSS manning. When I say manning, it's really both, it's military and civilians. I've got people that are embedded in IUSS that have been doing this stuff for 30 years. And they truly are experts at it. But I'm not producing the next one of those guys or gals, the pipeline just isn't there. They were OTs for 20 years, retired, and they just stayed in the IUSS community, now wearing a suit and tie. They're going to retire, and I just don't have the pipeline that produces those guys.

Lastly there is cyber. From a Submarine Force perspective, we started the ITS Rating, which is focused just on IT things, back in 2009. In April of this year, the projection is, we will actually be at manning in the ITS Rating, at sea. It's taken us that long to get there. And we've used a lot of carrots and a couple of sticks to try to get that there. The manning has been an issue.

The PMS, per man for the IT rating on the submarine, is 41 man hours per week. Okay, that's just PMS. I don't know of any other rating that has such a high level of PMS requirement as our IT. We are working on that very diligently in trying to figure out how we make this system easier so we can actually get all the things done that we need to get done. We have been quite successful to a degree.

If you look at the outside organizations that come in and take a look at us they give us very, very high ratings for our operational availability and the things that they look at. But nevertheless, it's an area that in my opinion, is ripe for us to take a look at and figure out how we do this better. It's also one of these areas that we don't have a lot of control over, from the Submarine Force proper.

Guam. Every time I go somewhere, I have to talk Guam, because, it really is our forward-deployed hub and it continues to expand. It continues to get better and bigger. We already talked about the fourth SSN and the second tender. The training facilities there are better. The housing's great, the gym's great. My only challenge really with Guam, is senior enlisted, to get them there on our operational units.

We're working at that to a degree, primarily it comes out to their inability to screen for overseas. It's generally kind of family issues, exceptional family members. We're actually working with the hospital and Navy medicine to bolster up the people, the specialties that they have out there so that these things are no longer disqualifying from going to Guam.

Our SSBN Force, I'm just going to briefly mention the bumper sticker there, I think it is important to recognize that we've retained a safe, secure, Submarine, Ballistic Missile Force. It is part of our national defense. Day in and day out, both Admiral Connor and I tell our team, and we believe it, that it's the most important day-in and day-out mission that we have.

Our SSBN Force, though it's aging from a unit level, they continue to do eye-watering stuff. Their retention is the highest we have in the Submarine Force. Their manning is good. We've resourced them properly. They're able to go out and continue to execute the requirements that StratCom has given us. If you do get a chance to visit Bangor. I highly recommend just going up there and taking a look at what we do up there, both from the training command side and down at the waterfront. It continues to amaze me.

People

I do want to end on people. Just last week, we had the Sub Pac Sailor of the Year competition. That top picture are the sea and the shore sailors from the Sub Pac area. And it happened to actually be with Pearl Harbor survivors. This event was down in San Diego. They actually have a Pearl Harbor Survivor museum in San Diego. It's in one of these guys' house. They had some honorary members also, to kind of keep the membership up.

It is rejuvenating and energizing when you get to rub shoulders with these folks, both Pearl Harbor survivors and our sailors. It reinforces the idea that we truly do attract the best and the brightest. And just sitting down and getting a chance to talk to these first-class Petty Officers, and their view in what they do and how they go about doing it, it really does make you proud again to be part of the Submarine Force.

Our picks this year, the SOY (Sailor of the Year) was a yeoman, of the SAN FRANCISCO, and our Shore (SOY) was a Navy Counselor. She's assigned to Pac West in Whidbey Island. We could've picked any one of the nominees. Could have thrown a

dart at a dart board and the person that got hit on that would be an ideal candidate. They really are phenomenal.

Retention across the Force is good. The only issues we really have right now that we're working on is unplanned losses. And those are broken into three big categories really. There's medical losses, there's not a lot we can do about that. Bad knee, allergies to something, whatever. That's about 40% of our losses every year. We lose about three submarines worth of people every year in unplanned losses. That means they leave before their contract is up.

About 40% of those are areas that we call psychological. Those are the areas we need to work on. For whatever reason, that person is not making it in our Submarine Force. We really do have to fix that. It's been an ongoing issue for quite a while. We continue to focus time and attention on it. But it's too high.

Last part, is both SubLant and SubPac, have an Air Force officer assigned to our staff. And we have submariners assigned to Air Force places. One's Barksdale, Louisiana, not too bad. The other is in the heartland and he's got a lot more snow than we do right now. I'm waiting to get the feedback from that fellow.

I sat down with the Air Force officer. He's a Lieutenant, assigned to my staff. And I gave him the task when he first got in to say, "Hey, I want you to come back in 90 days and I want to know the goods and the bad's from your view as you look at our staff."

So last week, it was his time. And I'll pass the one thing that he said as a positive. And he said, "Your history, your culture, your tradition in the Submarine Force, he says, we don't have anything like it in the Air Force, particularly the Missileer community." He goes, "It is amazing to me. Because I go to the gym I see people with tattoos of submarines of dolphins on their body. You'll never see that in the Air Force."

Now he said that in a positive light. I mean, that was his—and then he said—I mean, the tattoos were positive. As an example, he said, "You know, the Submarine Birthday Ball is coming up." and he says, "Once the email came out—he works in our N-9, our SSBN side." He says, once the email came out to them, he goes,

"They were all jumping on it to make sure, who had duty, who could get off?" so they could go to this thing. "A Birthday Ball? In the Air Force?" He says, "I would never go to it."" He says, the only people that go to those are the very senior folks and somebody who wants to take a date to a prom-like thing.

He is truly amazed and appreciative of what we bring, from history of culture, tradition, in the Submarine Force. And it is all driven by those obviously who have gone before us, but those who are here now carrying on those traditions. So I thought it was quite interesting listening to him talk to me about our Submarine Force. And he's a very, very sharp guy. So I'll probably give another report on the next Submarine League event I come to.

NAVAL SUBMARINE LEAGUE 2015
CORPORATE MEMBER RECOGNITION DAYS

RADM DAVE JOHNSON, USN
PEO SUBMARINES

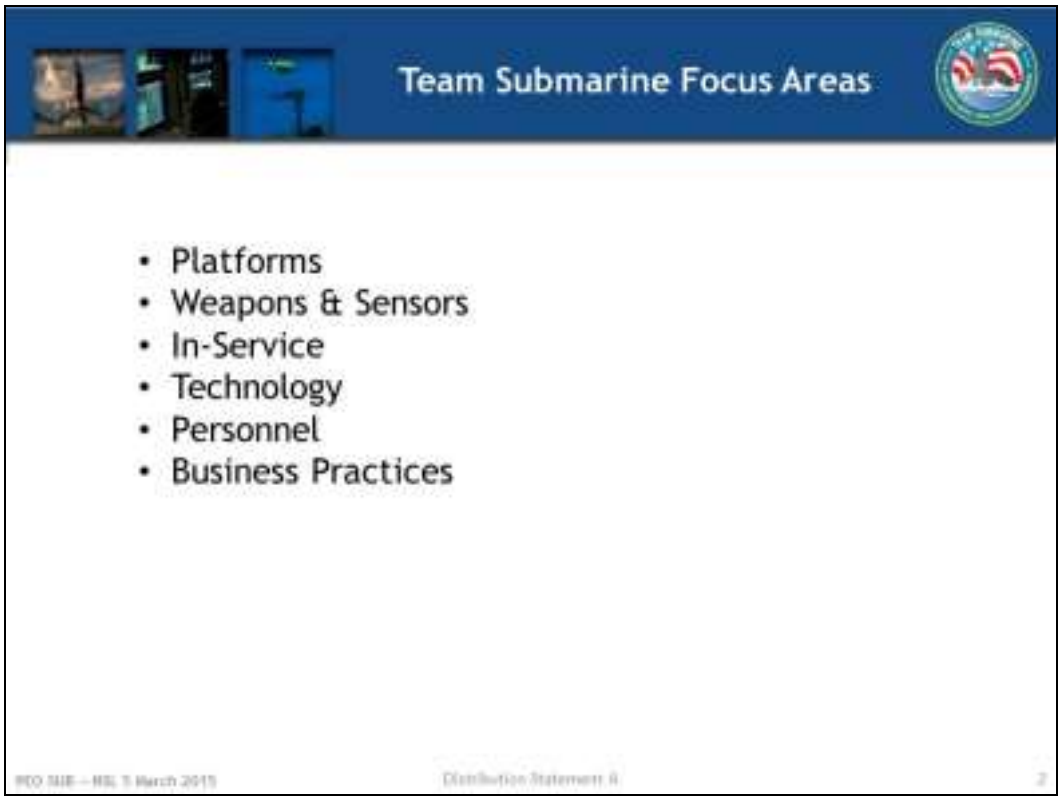
Thanks for inviting me here to speak today about what Team Submarine is doing for undersea dominance. A lot of good has happened since last year's Corporate Benefactor Days. Now, I guess it's Corporate Member recognition days. We awarded, in April, you remember, the largest ship building contract in history, the ten ship Virginia Block IV contract; $17.6 billion. $17.6 billion for the FY '14 through '18 ship, ship-building contract. We delivered the first Block III Virginia-class USS NORTH DAKOTA in August and we delivered that ahead of schedule and under cost. Virginia Payload Module, it is now in the PB '16 budget with the first installation in FY '19 Block V Virginia. The submarine fleet upgrade for acoustic superiority is moving ahead. Forward fit on Virginia Block vs and Ohio Replacement. Back fit on Virginia Block IIIs and IV's and back fit on the current Ohio-class SSBNs. The Ohio Replacement and the U.K. Successor programs are in production with the order placed in October for the first 17 missile tubes and the Ohio Replacements requirement document, CDD, and our parlance, it's moving ahead towards JROC approval this summer. These are but a few of the significant things that we've gotten done in the last 12 months.

So, understanding the significance of the change ahead for our submarine enterprise, we're doing the planning on the concurrent build, Virginia's VPM and Ohio Replacement. A Submarine Unified Build Strategy with its clever acronym of SUBS has been developing since last summer, working towards decisions this summer. When we're into full production of Ohio Replacement and Virginias with VPM, we'll have an enterprise of the production workload almost twice that of today's two per year, non-VPM Virginias. And that brings me to the thought I'd like to leave with this audience, carefully managing the change that's

ahead and working with the Navy to keep our standard of on time, under budget and high quality ship deliveries.

Starting now, we're managing two large-scale designs and a smaller scale acoustics superiority program. By FY '19 we'll be building the first VPM Virginia-class, procuring Ohio Replacements two-year advanced procurement and hopefully, buying economic order quantity material for both Virginia Block V and Ohio Replacement Block I ships one and two and inserting large vertical arrays on both classes and new coatings on Virginia's.

If you think about this program or record scenario, you'll realize we haven't been in this spot since the early 2000's, when we modified JIMMY CARTER with a 100-foot hull insert and finished the lead ship, USS VIRGINIA. So, twice the workload. The lead ship SSBN, with the additional support required for the United Kingdom's lead Successor class SSBN, and the potential for a mixed configuration Block V if we don't achieve two per year Virginia’s, VPMs that’s change and that’s a challenge that our world’s best Navy industry team must take head on. I talked last year about retaining a SEAWOLF edge and not becoming over confident and complacent in our impressive record of success. That edge is required even more. We are facing the most challenging test of our submarine industrial base in an era of highly contested resources and intolerance to cost and schedule overruns, and I think that’s a sobering thought for us all.



This is the third year of our team SUBS calendar year 2015 focus areas. It's the result of my leadership team's all day off-site. The focus areas are not representative of the entirety of our efforts, but they're just as they're titled: main focus areas for the enterprise. Since it's hard to read, I'll read a few. Obviously in the platforms number one, delivering stuff. So, delivering JOHN WARNER out at Newport News mid-May and ILLINOIS maybe by this December out of Electric Boat. Continued design work on Virginia Payload Module and completing our OSD acquisition decision point this August in setting the final length this December. Updating the Virginia class acquisition program baseline to extend the program through FY '33 Block VII for 48 ships that will match the PB '16 ship building plan. We're going to get the JROC approval of our Ohio Replacement CDD by August. We're going to release the request for proposal for Ohio Replacements SCN detail design contract this December and we

are going to establish an overarching acquisition strategy to align Virginia and Ohio Replacement. That's platforms.

In weapons and sensors, Captain Del Toro, he's still delivering surface ship torpedo defense to the fleet. Roll on roll off configurations and it's going on the CVN 71, which will deploy here this month and an engineering development model on the 75, deliver and install fixed systems, fixed surveillance systems, that's a growth market and we're frankly going to have a hard time keeping up with the demand signal. Deliver low profile photonics mast to Admiral Sawyer and SUBPAC, field 18 TB29A, we call them green arrays. Arrays with all the engineering change proposals by 30 September. That way the fleet will not go to sea without a green array hopefully by this year and all the way through '16 before we get new technology arrays to the fleet.

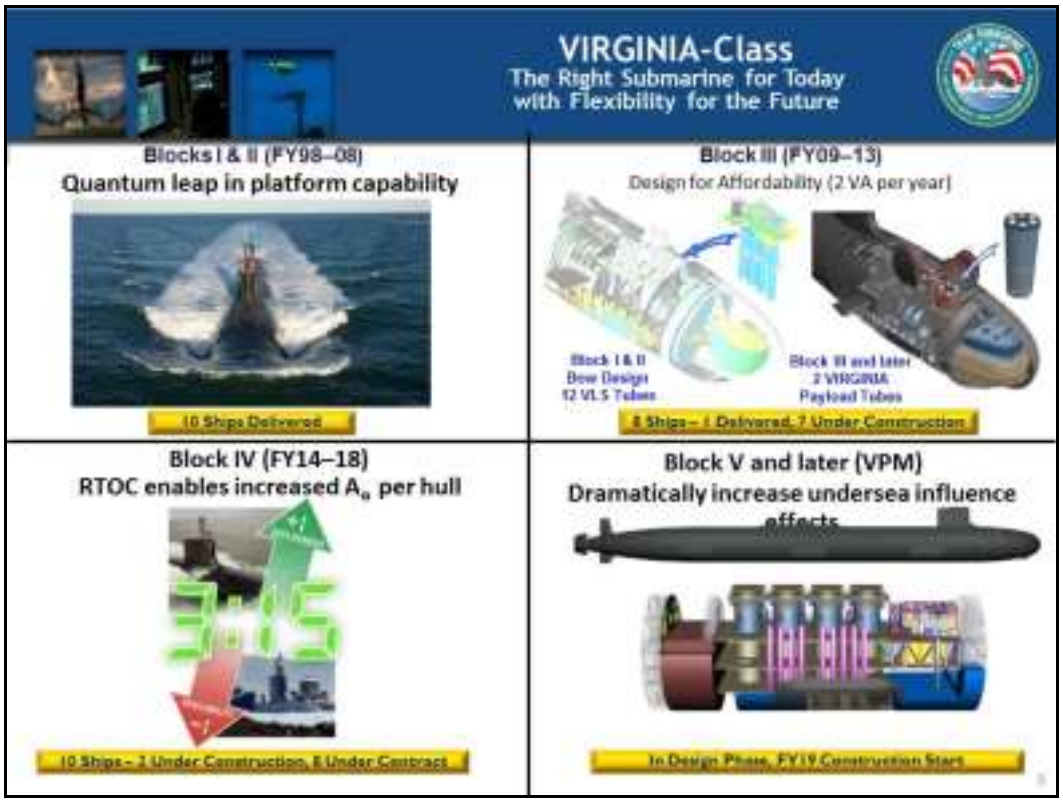
Release the Mk 48 torpedo restart for the RFP's for the after-body/tailcone and the guidance, navigation and control forebody by 30 May. We just released the draft RFP for the forward end. And now in service, develop a comprehensive SSBN modernization plan by 15 June. That is very important and it ties right in with Admiral Connor's A_o efforts in the SSBN fleet. We're going to complete contract award for the dry dock shelter mod (it's an extension of 50 inches) by this April and preliminary design by this December. Reduce our SWFTS back fit installation costs. That is something we don't talk about a lot, but we have to continue to get better. Return the submarine rescues Pressurized Rescue Module to fleet by the end of April—a long haul that Captain Tom Monroe and his crew have persevered on. And technology we can't forget.

We need to start working on SSN(X), its concept design, tool development, and science and technology planning. We need to field improved firewalls for networks on all our SSN's and all our SSGNs and we need to support SOCOM's acquisition of dry combat manned submersibles. A lot. Not everything, but quite a bit in the next year.

So, today I'm just going to talk about a few items and leave some time for questions. I know that's shocking, but usually I run over so I'll try to not run over. Platforms and payloads today.

As I noted last fall, it's been ten years since Virginia was delivered on 12 October, and we have enjoyed a decade of acquisition excellence since. Our ships are delivering with progressive schedule and quality improvements, and they're delivering within budget. We have 11 delivered, 10 under construction, the 11th starts later this September. The first Block III ship delivered two days early, under cost with 20% design change. The first three Block IV ships are all under construction. Seven ships completed one or more full-length deployments. The Block IV contract was signed on 28 April; it was the largest contract in Navy ship building history. Two boats per year. Minimal design change. I tell people the eight in Block III were prototypes for the ten we bought in Block IV. There are some

reduced cost total ownership changes, however to increase deployments and reduce availability return A_o. And it should not be forgotten that the Congressional Authorization and Appropriations Committees supported continued multi-year procurement for this class. The third time we've been able to do that. In the VPM leveraging the Block III VPT success with insertion in the Block V hulls. It's a valid requirement; we've got it validated through the JROC in December of '13. It has key performance parameters for strike capacity, cost, and schedule and it does not preclude future capability to host other missile systems in other combinations within a different MAC interface configuration.



Everyone's familiar with this slide, the Virginia-class blocks. We're in the heart of production on our Block III Virginia's, 11, ships 11 through 18. The first ship, NORTH DAKOTA, today is being fitted with a dry dock shelter. The first test of the VPT's and

Tomahawk launch scenario should happen, I think, later next year. JOHN WARNER, it's in its delivery stroke in Newport News. And alpha trials in April.

We'll be in alpha trials and we're going to deliver that thing in May. Three months early to its 66-month contract delivery. ILLINOIS, Jeff Geiger and his team, they are right behind. And it's very challenging, but if the Navy Electric Boat Team pulls it off it will be the first Virginia-class to deliver in under 60-months. That's ship number 13. Lucky 13 I guess, right? That 60-month goal is important just beyond the additional early availability to Admiral Connor and Admiral Sawyer. 60-month also lowers the acquisition cost and will enable VPM and acoustic superiority to be affordably forward fit into this class. Block IV is under construction with the first two ships in 14 in progress and the first 15 ship just starting I think this week. Block V is ahead of us, but very much a part of today's design workload with both VPM and acoustic superiority changes. When these ships start to deliver ten years from now, in 2025 they'll be a new breed of SSN (longer than our 41 for freedom SSBN's) in carrying the most capability and flexibility than the U.S. has ever fielded in a fast attack submarine.


Distribution Statement A
Ships Under Contract
Ship Name / Hull Number
Authorization Year
Contract Delivery Date
Contract Delivery Months
Actual or Target Delivery
Contract Delivery
MONTHS EARLY
MONTHS LATE
12 8 4
4 8 12
Block I (CPIF)
USS VIRGINIA (SSN 774) FY98 Jun 04 84 12 Oct 04
USS TEXAS (SSN 775) FY99 Jun 05 84 20 Jun 06
USS HAWAII (SSN 776) FY01 Dec 06 84 22 Dec 06
USS NORTH CAROLINA (SSN 777) FY02 Dec 07 84 22 Feb 08
Block II (FPIF)
USS NEW HAMPSHIRE (SSN 778) FY03 Apr 09 78 27 Aug 08
MYP Ships
USS NEW MEXICO (SSN 779) FY04 Apr 10 74 29 Dec 09
USS MISSOURI (SSN 780) FY05 Apr 11 74 29 Jul 10
USS CALIFORNIA (SSN 781) FY06 Apr 12 74 7 Aug 11
USS MISSISSIPPI (SSN 782) FY07 Apr 13 74 2 May 12
USS MINNESOTA (SSN 783) FY08 Apr 14 74 6 Jun 13
Block III (FPIF)
MYP Ships
USS NORTH DAKOTA (SSN 784) FY09 Aug 14 66 Aug 14
JOHN WARNER (SSN 785) FY10 Aug 15 66 Apr 15
ILLINOIS (SSN 786) FY11 Aug 16 66 Dec 15
WASHINGTON (SSN 787) FY11 Feb 17 66 Jun 16
COLORADO (SSN 788) FY12 Aug 17 66 Nov 16
INDIANA (SSN 789) FY12 Feb 18 66 Jun 17
SOUTH DAKOTA (SSN 790) FY12 Aug 18 66 Nov 17
DELAWARE (SSN 791) FY13 Feb 19 66 Jun 18
Block IV (FPIF)
MYP Ships
VERMONT (SSN 792) FY14 Jun 19 62
OREGON (SSN 793) FY14 Nov 19 62
UNNAMED (SSN 794) FY15 May 20 62
RICKOVER (SSN 795) FY15 Sep 20 60
UNNAMED (SSN 796) FY16 Feb 21 60
UNNAMED (SSN 797) FY16 Aug 21 60
UNNAMED (SSN 798) FY17 Feb 22 60
UNNAMED (SSN 799) FY17 Aug 22 60
UNNAMED (SSN 800) FY18 Feb 23 60
UNNAMED (SSN 801) FY18 Aug 23 60
20% Design Change
NORTH DAKOTA delivered early to contract delivery date and included 20% design change
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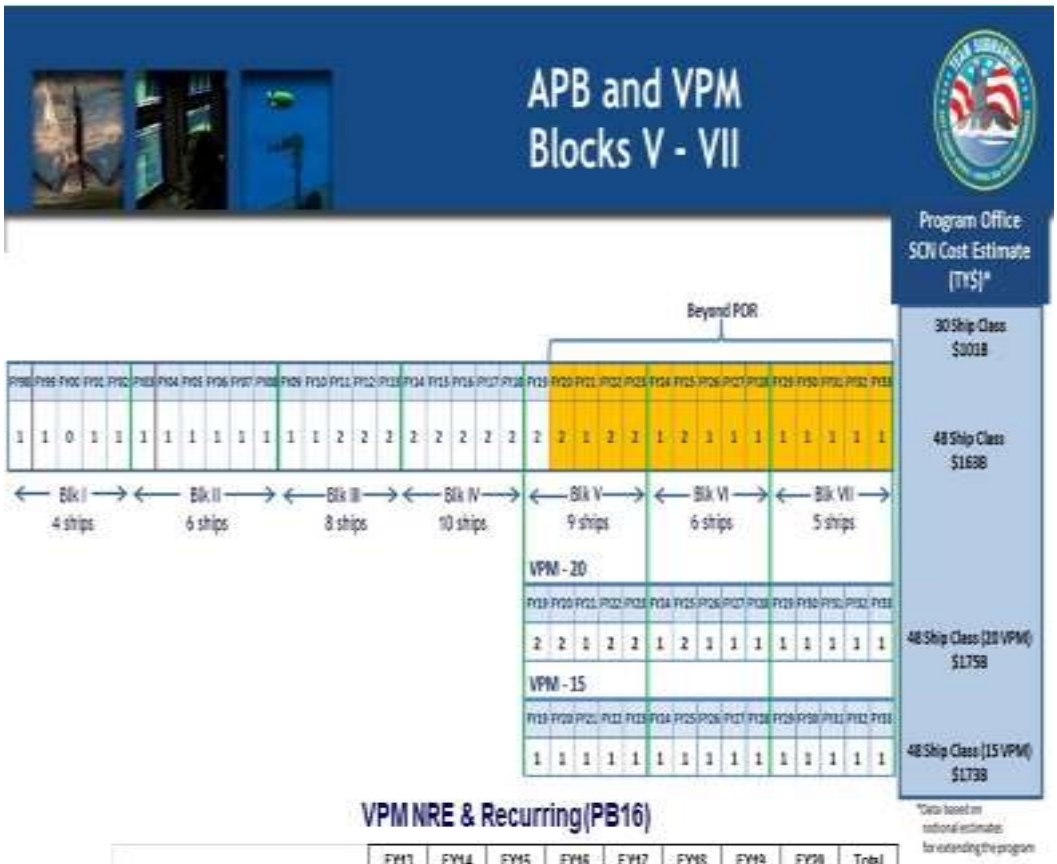
This is a great one slide in our program. We should make it available to everyone in this room. Contracts on the left, authorized year, delivery, spans, and graphic of how this team has done against a progressively harder span. This is the machine we have created. A stable, continuously improving enterprise delivering world's best capability. We'll have 18 ships worth of practice and 8 years of two per year delivery before Block V and the introduction of significant change both in configuration and build rate.

This is the year we're updating the acquisition program baseline to extend the class beyond the 30 ship program of record to 48 ships and priced to Virginia payload module. On the top, the build rate aligned to the PB16 ship building plan, yellow is the extension. On the right, the price for extending the class from a selected acquisition report view. Below that, two options; one per year build rate for 15 VPM's and another option that has an occasional two VPM build rate picking up all remaining Virginia-class through FY '33. Now, the pricing our NAVSEA cost estimate is as shown. The Virginia-class in total will grow by 75% in cost with this change and the APB extension of 48 ships. The chart on the bottom is the funding of PB16. I credit strong support in the Navy and DOD to sustain the design funding for the FY19 insertion and place the ship construction Navy funding commensurate with a 1 VPM per year rate. The build costs are just budgetary at this point. They've been priced by NAVSEA, however our expectations should be to lower the acquisition costs below the first ship's $704 million and the second ship's $577 million. Secretary Stackley, when we pre-briefed him for the Navy's Gate 6 review that approved the VPM insertion and class extension challenged Captain Dave Goggins, my program manager, to get the VPM price down such that we can buy 20 for the price of 15. Why? Because 20 is what the Navy needs to fulfill its undersea role. It is our job to work this challenge. I go back to my note on why 60 months for construction span is so darn important. We must drive down VPM's cost and the ship's cost so we can give the nation the capability it needs. It's pretty heady stuff, but I'm convinced we're up to it. Now, since we're extending this class,

some changes are necessary to pace the threat. The Block VII Virginias will be in service until 2071.



VPM NRE & Recurring(PB16)

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	Total
TOTAL VPM Funding Programmed	9.0	57.3	120.6	167.7	207.5	211.5	711.5	578.4	2,063.6
Total NRE Funding Programmed	9.0	57.3	120.6	167.7	193.9	158.5	-	-	708.0
RDT&E (PE 0604580N prj 4600)	9.0	57.3	120.6	167.7	100.2	69.0	-	-	523.8
Detailed Design					93.7	90.5			184.2
Total Recurring Funding Programmed	-	-	-	-	13.6	52.0	711.5	578.4	1,355.5
FY15 VPM SSN					13.6	38.2	652.3		704.1
FY20 VPM SSN					-	13.8	35.0	523.2	577.0
FY21 VPM SSN					-	-	19.2	35.7	54.9
FY22 VPM SSN					-	-	-	19.6	19.6

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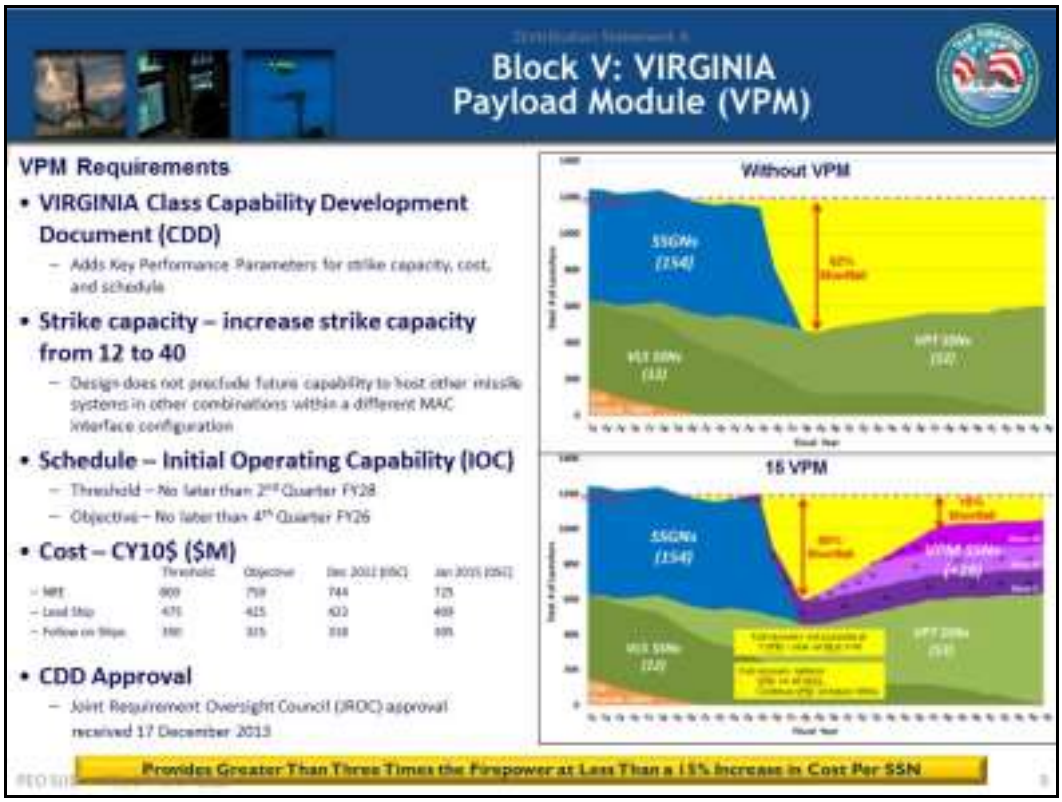
The PB16 budget supports the installation of significant changes to the last EB delivered ship in Block III, the FY 13-1 SOUTH DAKOTA. That ship will deliver in 2017, begin a one year post shakedown availability in 2018 and be at sea with the acoustic superiority package in 2019. That timing allows sufficient at sea experience to influence the form fit design for Block V. Why make these changes and why now? The Navy hasn't made significant investment in new hull array technology really since the Virginia's lightweight aperture rays and the high-frequency chin array in the '90s. The same is true for hull coating. Virginia's coating was developed in the '80s and the '90s. SOUTH DAKOTA insertion program will demonstrate the requisite changes necessary for the Virginia class to maintain its undersea dominance throughout the mid-century. A number of modest changes to machinery internal to the ship. Looking ahead, portions of the package will be back fit on Virginia's and Ohio's and forward fit on Virginia and Ohio replacements. This is a very important change and along with VPM and Ohio Replacement design prototyping and build must be carefully managed to ensure on cost, on schedule, and on quality performance.

I will finish my Virginia-class section here talking about Virginia Payload Module. With any cost effectively inserted change, the requirement must be clear, thoughtful, and stable. On the left, the requirements document, the CDD has been approved by the JROC. The need for VPM's capability, unquestioned. We are the first program, however to have key cost and key schedule parameters inserted into the CDD; something we gladly took on.

Congress has recognized the value that a Block V with VPM value brings to the fight and has asked the Navy to assess if the VPM can be installed in a Block IV Virginia. You can read it in Secretary Stackley's testimony to the House last week. We'll have an answer in April.



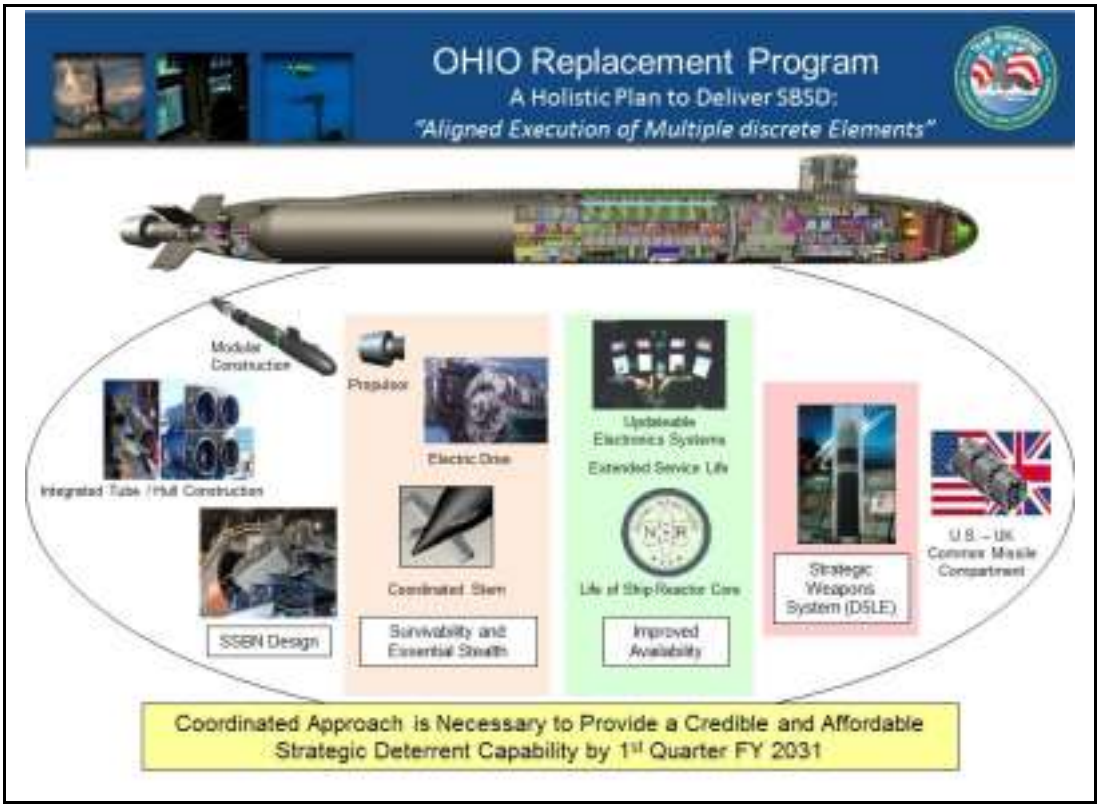
Significant progress since our last Corporate Benefactors meeting. The design is progressing on schedule with a design force of up to over 300 personnel at Electric Boat. The VPM's general location and arrangement are set, the concept just forward of the reactor compartment bulkhead and incorporating an internal

ballast tank. There's work ahead in understanding just how an internal ballast tank works. It is very different than any tank we have put on a modern SSN. There are 38 key decisions to get to final ship length by 30 September and ship specs complete by the end of December. Now we've looked ahead and developed a payload strategy. Numerous payloads are accommodated by the baseline payload module. Space and weight has been reserved for key capabilities identified by a 2014 payload study. Specific features will be included in the VPM including upper level access doors to affordably accommodate likely future payloads such as the Universal Launch and Recovery Mechanism and the large diameter UUV. We're also reserving topside space for the 50 inch extended dry dock shelter. Affordability, flexibility, and low technical risks all very important aspects of the Virginia payload module.

Now, from an acquisition perspective the Navy's gate is progressing as a paper gate, so effective was Dave Goggin's pre-brief leading to an in-progress review in August with Secretary Kendall. There's no doubt that the next decade of work in Virginia is our most challenging. The last year of work has positioned the program well for this work ahead. All right, that's Virginia.

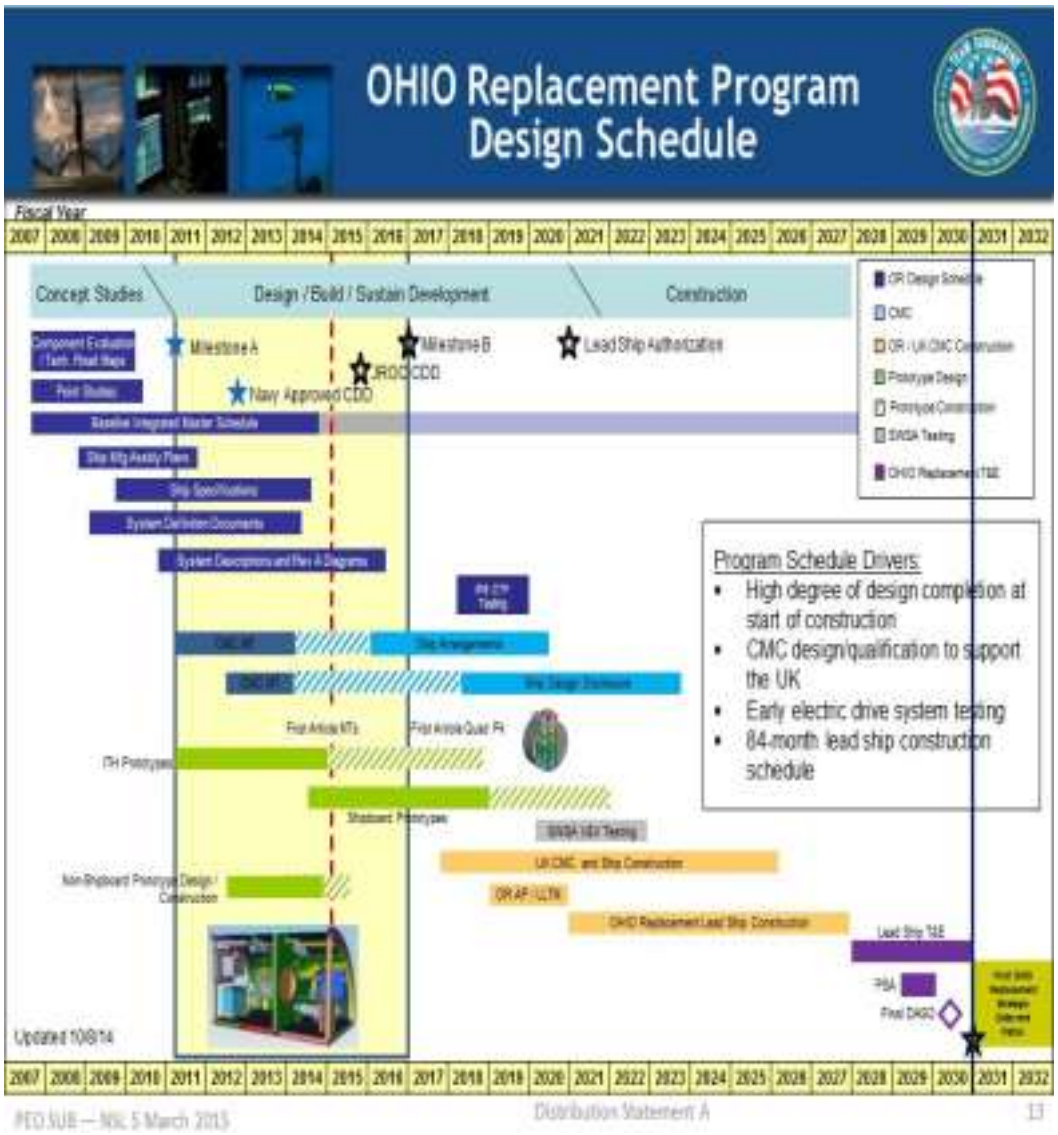
On to Ohio Replacement. We all know this is strictly replacement for the Ohio-class SSBN. The Ohio Replacement is the most important program in the nation and a generational investment that is a responsibility versus a burden it is often portrayed as. 70% of our nation's operationally deployed nuclear warheads will reside on this platform. We are producing a national capability that should be funded with national investment. Where the program funds are managed, that's not an issue. The Navy ship construction

Navy account or National Sea Based Deterrence Fund. The issue augmenting the nation's shipbuilding budget. Secretary Ray Mabus noted that the U.S. either needs to fund the Ohio Replacement Program as a national asset or increase the amount of money the Navy gets to build other ships in the coming decades. As he eloquently put it at the Navy Surface Association, "The Navy should not fund one ship with another ship." Our CNO, Admiral Greenert reaffirmed sea-based deterrence as the service's number one priority because of its homeland security implications. He stated, "I would propose no reductions" during his 26 February testimony before the House Appropriations Committee. "We are committed to it," he says, "it has to be done." To me, that's pretty clear direction.



We're delivering a capability. The capability entails all the platforms supporting elements: reactor, electric drive, strategic weapons, requisite developments like the missile compartment prototyping. The Navy has aligned the budget lines for each element to ensure we have all aspects and development at the rate necessary to meet our lead ship dates and our U.K. partners Successor Class. As I noted previously, Ohio's Replacement funding is the Navy's number one priority. That means the funding across all these lines must be maintained at the PB16 levels to keep the development on track. We are beyond the harvesting of any more near term savings form deferring lead ship

construction. The bumper sticker is our theme. There is no margin for delay and you'll see why in the next slide.



Most here are very familiar with this schedule. The markers haven't changed. First patrol 2031. Delivery 2028. Start build 2021. Seven-year span. Start a design greater than 80% complete at construction start. First article quad-pack. Start building it in 2017. SCN design contract FY '17, milestone B FY '16. The heart of technical product development is here. System descriptions, system diagrams, arrangements for the missile compartment, and for the missile compartment design, disclosure, and construction. The non-ship work prototype is both being built in the U.S. and is being disclosed across our electronic bridge to the U.K.'s design yard BAE.

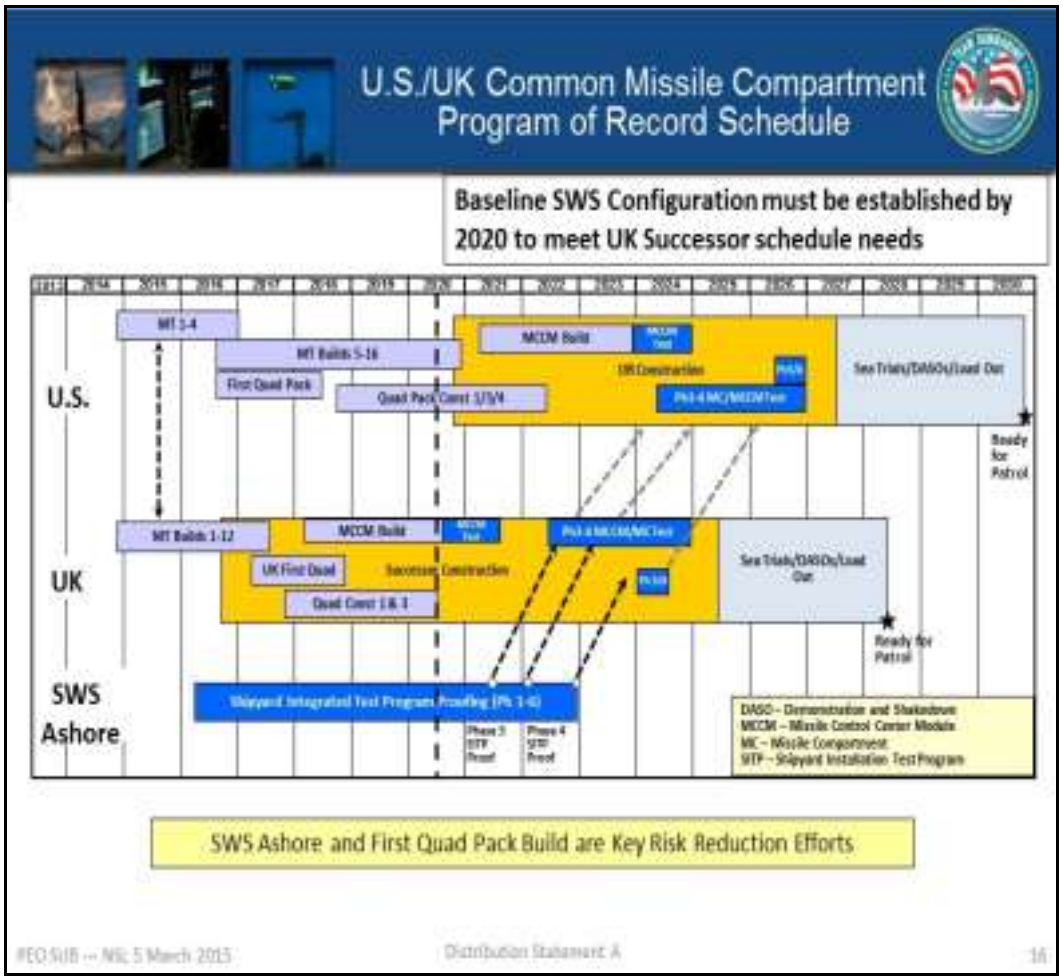
There are over 2,500 designers at Electric Boat and Newport News as well as hundreds of subcontractors and Navy personnel working on Ohio replacement design right now. The pace is increasing, prototyping is progressing, the design is maturing, all critical to making Ohio Replacement's lead ship construction happen on cost and on schedule. I've given my Ohio Replacement team a challenge, break the paradigm that lead ships grow in cost by as much as 30% after milestone B and are late some up to two years. Our mantra is this lead ship will be on cost and will be on schedule and will be ready for its first patrol in 2031. $17.2 billion for design and prototyping over a 20-year span, a 14-year lead angle to lead ship construction start. The most extensive and well thought out prototyping and risk reduction strategy ever employed. Three major test facilities, the relentless drive to keep on schedule and on quality without R&D and design in the extremely successful Virginia-class foundation.

At ship 33, when Ohio's lead ship is authorized, that will make this a reality. What everyone associated with this program, government or industry, should be laser-like focused on. If you don't believe it, you probably shouldn't be on the team. What can or should we be doing now to make this paradigm-breaking goal our reality? It is that important and it can be done.

Now we're much more than paper or digits. It's moving and fast. Tina Wujick showed some of you on Tuesday the significant progress as did Brian Wilson. Since Corporate Benefactors last year we have finished the large scale vehicle testing at Lake Pend Oreille. Some large scale vehicle testing. We've completed the Virginia Payload to shock testing. That's a cost saving measure to lower this cross class test. We've awarded the construction contract for the first 17 missile tubes and completed another ship control system concept of operations. We've awarded development of the first article contracts for the major electric drive components and we've broken ground on Electric Boat's Quonset Point facility for the quad pack manufacturing. There's more ahead. Continue propulsor testing, full scale signature testing on a

full scale Virginia-class, missile tube construction, our first review of non-propulsion electronics and HM&E component prototyping; diesels, air conditioning plants, RO units. A lot going on.

Now Will showed you these curves to those of you who attended the Submarine Industrial Base Council briefing. Major program milestones at the top, time on the bottom through 2023, curves representing the propulsion plant, missile compartment and the rest of the ship all aggregated for the total program. This is the design work at the heart of Ohio Replacement's technology development phase. Will showed you 2015. This is what we accomplished in 2014; both the design yard and Navy are maturing their teams to match the schedule rate and meet the tough throughput ahead 2015. Getting to 100% in descriptions, 96% in diagrams, 83% in component specs, and 36% in arrangements and even 5% in disclosures. This is hard, hard work. Not shown is the work to support the U.K.'s Common Missile Department. That relationship is next.



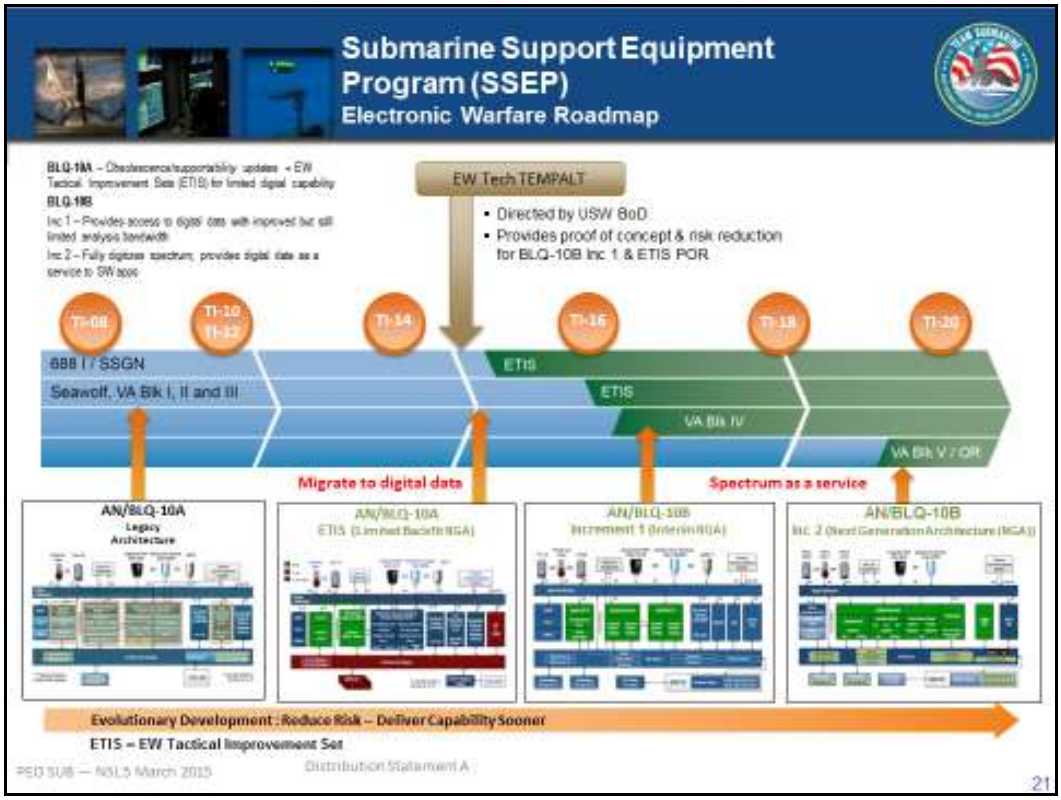
U.K. Successor SSBN has its lead ship milestone in 2016. They call it Main Gate. From there, they will press ahead with ship construction leading to a 2025 delivery and a patrol 2028. Two-and-a-half to three years before the U.S. That does put both the U.K. and the U.S. in an unprecedented position of having the U.K. be first of firing a D5 missile from a new U.S. designed missile

compartment makes one think how we meet the Polaris sales agreement intent. The middle word is sales of an existing system. Vice Admiral Terry Benedict and I have committed our collective resources to making this work. Strategic Systems Programs, they're about one-third done constructing a strategic weapons systems ashore facility in Cape Canaveral, Florida, which is the bottom line in this chart. And let the contract for the China Lake launch test facility. These two major test facilities are critical aspects of de-risking the U.K.'s program. The U.S. will run tests before the U.K.'s need and is shown here.

The U.S. is also building the first quad pack in Quonset Point before the U.K. does it in Barrow. Our commitments are codified in a technical agreement TA80 to the PSA, signed by the U.K. project officers. EB is disclosing the design to the BAE on a daily basis with literally thousands of model transfers taking place to meet the U.K.'s lead ship design schedule. An impressive achievement worked through an Integrated Collaborative Environment, ICE, set up for this specific task. Just another challenge for this unprecedented program. The U.S. is strongly committed to keeping the U.K. program on track for sustaining their continuous at sea deterrence capability.

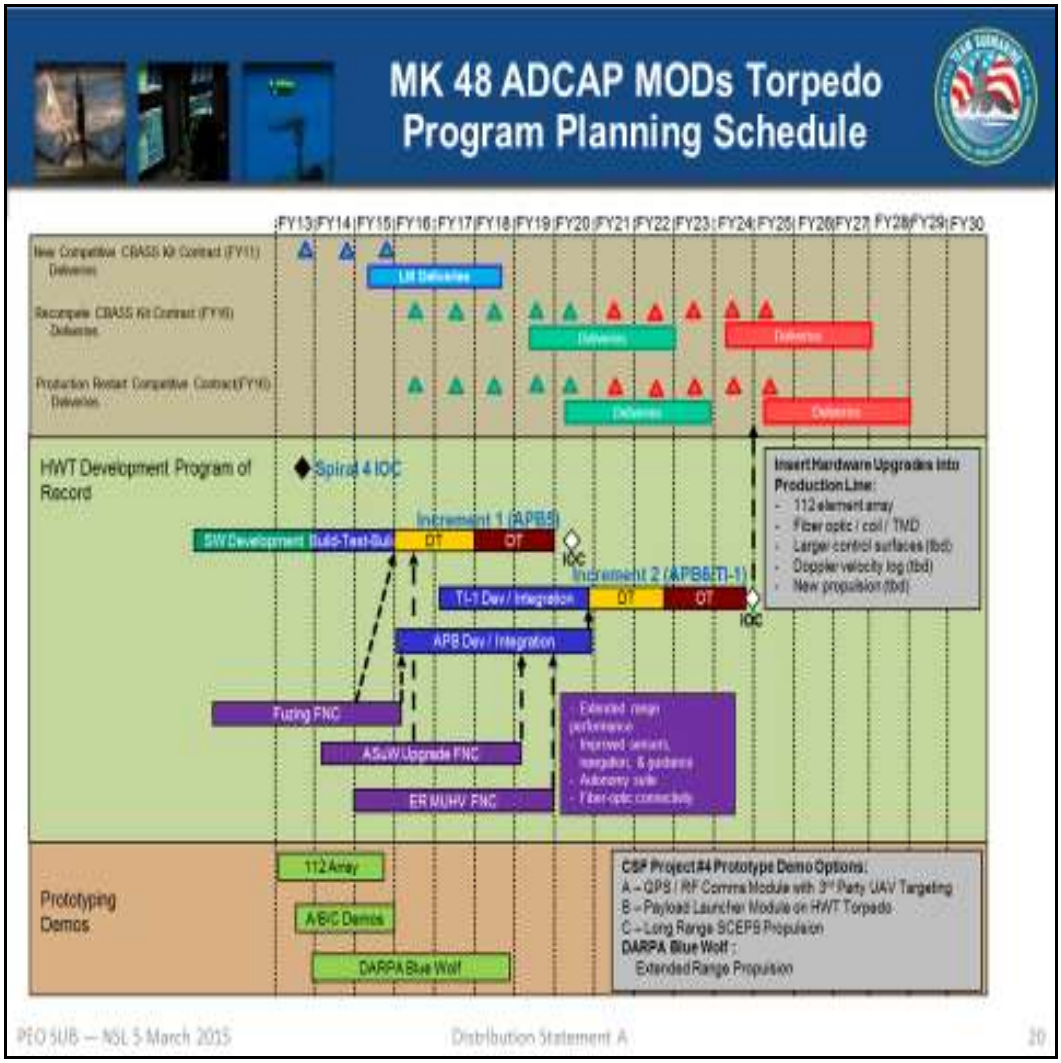
Now the affordability. The director for Ohio replacement, Jack Evans, is very focused, as is his team, on driving down costs in all areas: in engineering and design, in construction, and in life cycle. Our philosophy, credible capability at the lowest possible cost, it still stands. There's been progress. Non-recurring engineering, we're really down over a billion dollars from where we started at 18-and-a-half. The difference from what you see there for Jack's estimate and what the NAVSEA shows is accounting for the Missile Tube Module. I prefer to keep the MTM in the cost of the ship, because it actually is a part of the ship, but we're doing it in prototyping so it's already funded. Lead ship, that 6.2 is really more reflective of the Missile Two Module moving out into the R&D. In real dollars, that's $8.8 billion. You'll hear the CNO talk about the lead ship's about 9, that's what that number equates to. 6.2 in $10. Follow ship, we're only $300 million from the affordability target. That's $9.8 billion in then year dollars all the way through FY '34 so, 4, 5.2 that equals almost 10 in real dollars

through the build of Ohio Replacement. In O&S, we're already under the target, but believe me we are not done.



So, finishing the Ohio Replacement section, we're heading for milestone B in August. Two key intermediate points. August of '16 that is. A JROC approves CDD in August, and an RFP release this December with an in-progress review with Secretary Kendall just before that. We are in the heart of developing an acquisition strategy. There are significant strands, the SUBS effort I talked about we just received the ship order input on how we should jointly build Ohio replacements. Contracts, continuous production, multi-program material buys all have to be resolved and this summer is the time when we bring that together. Obviously extremely important work.

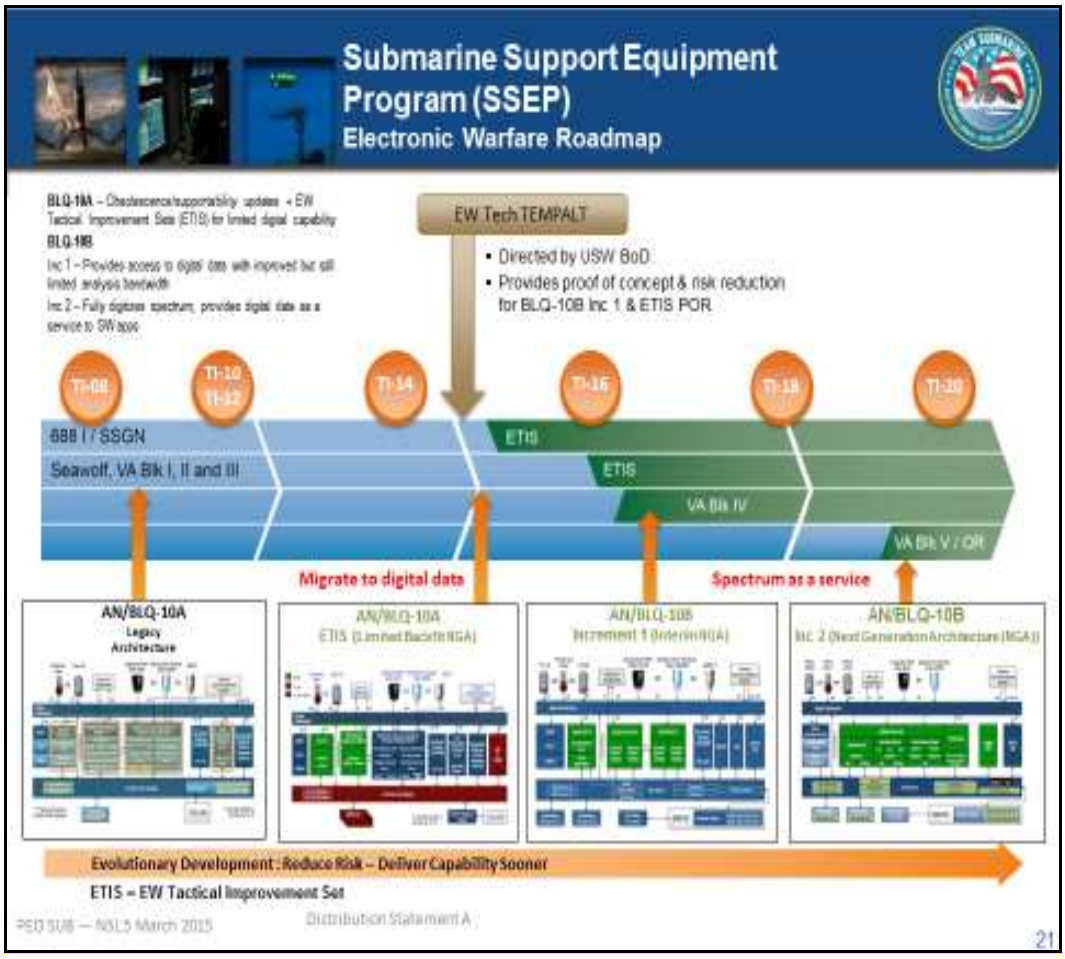
I'm going to breeze through an unimportant topic like torpedo research. Next slide.



All right, at the top, this is how we're trying to manage current CBASS kit production with my friend Michelle and her Lockheed Martin team and torpedo restart. Our next two program of record

updates APB 5 and APB 6/ technology insertion 1. So, the chart on the top shows the next kit contract. Lockheed Martin is our current prime here. Production restart, we just released the draft request for proposal for the guidance control with a CLIN for the CBASS kits. The afterbody tailcone, draft RFP will soon follow. The next on development, APB 5. Look, we can go faster on APB 5. Look how long the OT line is, two years. Almost two hundred weapons shot. It is a software only upgrade. Ridiculous. So, we recognize that and we're working with my acquisition leadership, and DOT&E to try to work a much better strategy of effectively using an environmentally friendly weapons analysis facility do about 1,500 simulation runs with far more representative targets. Then shoot the weapons in the water that help do some of the points to validate the model and do some of the things that you can't frankly get captured adequately in a model especially end to end testing all the way ahead and it's one way to try to get the capability to the fleet much faster.

Now we're threading in future naval capabilities and prototyping that you see on the bottom there. APB 6 TI 1 is where I think we have a logical landing pad for injecting phase changes in the torpedo's architecture and modularity upgrades and forward build. The modular torpedo work, it does continue; we have not ignored what Admiral Davis and his Restart Review Panel told us. Joe Tofalo in N97 is working a requirement study with SPA. Penn State really championed by guys like Admiral (retired) Paul Sullivan and PMS404 are standing up a heavy weight torpedo working group to put programs and plans behind moving towards a more modular and a more capable Mark 48. There's significant attention in this area. Probably the most in the torpedo business in the last two decades.



And I'm going to close on my systems piece with one about electronic warfare. Steve Debus has done some pioneering work in trying to bring us into the modern age in the electronic warfare biz doing it much like we do ARCI and how it revolutionized the submarine's approach to SONAR. The rest of this decade we will see a dramatic shift in submarine electronic warfare as we recapitalize this critical mission capability. While our existing

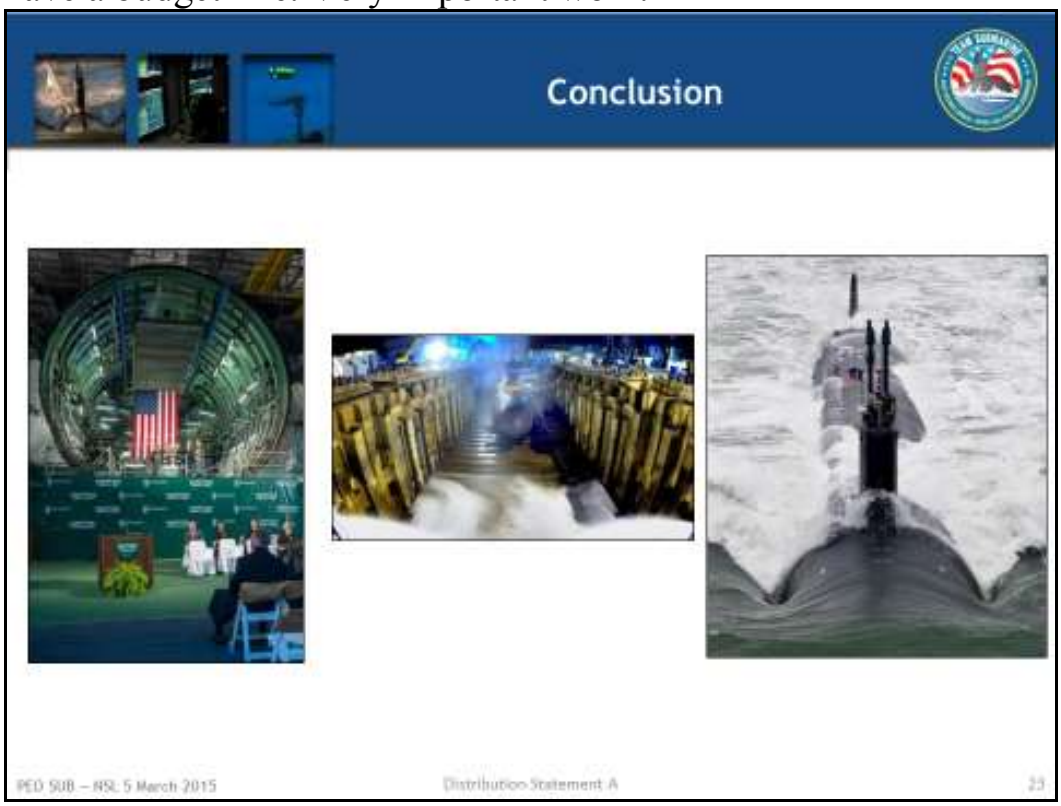
BLQ-10 EW system remains extremely capable as an intelligence collection system its ability to rapidly adapt to the changing EW threat environment, an environment driven mostly by the proliferation of mobile data service and low power commercial radars, has to be improved. To address this we're undertaking an accelerated fielding of the electronic warfare next generation architecture. EW NGA and its BLQ-10 system look first to digitize the EW environment and provide this data to modern COTS-based processing where we can respond to the new threats more rapidly through software based solutions. The evolution of the BLQ-10 is being taken in steps to reduce the risk, but also field incremental capability as rapidly as possible.

This year we will take prototype portions of the architecture and participate in both land and sea based tests to validate the proposed digital approach. Starting in FY '17 we will begin installation of a subset of EW NGA in conjunction with our TI-16 SSN modernizations. This subset focuses on the ELINT or radar-based threats to the ship and adds a vastly increased processing suite to start utilizing the digital data that's being provided. For our TI-16 new construction ships, they'll receive a larger increment of the EW NGA to include digital based COMMIT or Communications Intelligence equipment. Both of these early efforts establish the layered architecture framework for future updates as we move EW processing into the digital software-based approach common with the rest of the SWFTS TI/APB process. Now while these efforts are underway we continue to work with ONR, industry and the rest of the S&T community to expand EW NGA into a system that can monitor the full EW spectrum simultaneously and provide the digital outputs on request to apps based solutions. This is a monumental effort mostly in signal processing and network data management, but one we are confident we can field with our TI 20 based systems. All these efforts are not being done alone. Beyond ONR we also have full partners with NAVAIR on the early EW NGA efforts and have a growing consortium participating in these proposed solutions that currently include PEO IWS5, Naval Cyber Warfare Development Group (NCWDG) and even the U.S. Army. The goal of this group

is a set of common hardware and software that can be used across multiple war fighting domains. The CNO has spoken strongly about how the Navy needs to move forcefully into the EW cyber arena and with EW NGA I think we're responding rapidly to that call.

It's important to know that next SSN is being seriously considered and we're building a plan to keep working it in the next five years. We were successful in getting the Submarine Technology Symposium of 2015 to devote an entire session dedicated to it. It looks like a government led effort, however it is government led with significant participation from our UARCS, our ship building partners, and industry as we can bring you in. Each concept design cycle in the top will have a specific theme: survivability, operational availability, etc. If you go back to 1988 and how we did the submarine technology ASTAP, Advanced Submarine Technology Program under guys like Mark Kenny, Dave Carlson, and many others, we're repeating that. As a matter

of fact, we're bringing some of those, I'll call them old dogs, they're not here, but we're bringing them back to help mentor this new group of submarine concept designers so that we build the team, the tools, the processes, identify gaps, and start working on it so when it comes time in 2024 to really get in to the concept design work, we're ready. We'll have people, tools, we'll even have a budget line. Very important work.



This crown jewel industrial base, the best in the business of delivering unmatched capability consistently meets or beats cost, schedule, and quality standards. You should feel justifiably proud of this record. I've given you a brief look at what's possible at the ship platform level and at the subsystem and component level. We can deliver when we put our collective minds to the task. Who would've thought we'd have 12 new thin line towed arrays in the fleet's hands in less than two years or new low profile imaging mast in also about two years or that we would deliver a Virginia in less than 60 months. We can meet Vice Admiral Connor's move faster undersea dominance tenant, however, as I've noted before

we can become inured by our success; confident that we can do anything.

Monday, I was in Port Hueneme, California talking to one of my young, new engineering commanders. He happened to be a reservist and he worked for NASA and he was very familiar with the Columbia accident. He actually knew some of the astronauts like Willie McCool, who was my company mate. I've been fascinated by the organizational ignorance, arrogance, and complacency in NASA that led to this tragedy. You can read it online at the Columbia accident investigation board, chapter 7, the organizational aspects of that tragedy. It's required reading, by me, for all the new engineering duty dolphin candidates. Now we are not NASA, and we were held up to a standard SUBSAFE and the Navy Nuclear Propulsion Standard, Admiral Sullivan himself testified about the SUBSAFE piece, Admiral Bowman, Naval Nuclear Propulsion Program. However, I think it's a telling example of what can happen when we let ourselves become too satisfied with our success. We have a daunting challenge ahead: carefully managing the change that's ahead and working together to keep our standard of on time, under budget, and high quality ship delivery. In my opinion, we are facing the most challenging time of our submarine industrial base in an era of highly contested resources and intolerance to cost and schedule overruns. We are exactly the right community to take on Admiral Richardson's challenge to us. What should we be doing today to prepare ourselves to push through the work ahead and do it at our standard? I am committed to the goal I've given to my Ohio Replacement team and to this industry; a lead ship that is on cost and on schedule. If you roll your eyes, you're off the island. You have to believe it. If you don't believe it's possible, why not? What should we, or can we do to make this become a reality? It's a true break from our historic chains and a standard that is entirely within our control. Take stick and rudder and make it so. I like these kinds of challenges, it gets me up in the morning and frankly, it should for you also. I thank you for the time and for the privilege of being the PEO for this outstanding undersea warfare business, and I look forward to the work ahead. Thank you.

NAVAL SUBMARINE LEAGUE 2015
CORPORATE MEMBER RECOGNITION DAYS

RADM JOE TOFALO, USN
DIRECTOR, UNDERSEA WARFARE, OPNAV

Thank you very much Admiral. Super kudos to those "594 tough" who are sticking in here today despite the weather. So, thank you for that. And more importantly, thank you for all you do in support of Submarine Industrial Base and the Submarine Force. I recognize full well that none of this would happen if it wasn't for the hard work of folks like you. I love the job I'm in. It is the best job in the Pentagon, if you have to be in the Pentagon. I'm passionate about it.

VADM Connor showed the Undersea Dominance Campaign Plan, the Six Lines of Effort, and that certainly is the overall blueprint. The strategy by which we execute that plan is the Integrated Undersea Future Strategy (IUFS), and if you attended the NDIA Fall Conference last year, I talked about it. I told you that I was going to promulgate the IUFS for Industry—because if you grabbed the IUFS off the shelf from my office, it's a 3-inch binder that's classified SECRET, and that's not very helpful to you.

So, in late October last year, I promulgated that. It's just a 3-page document and it's classified FOUO Distro D. You should have seen that. If you haven't seen it, we'll make sure you can get a copy through the appropriate electronic channels.

I speak to the submarine league three times a year and I try to come up with something different each time to keep it interesting. So, I thought this time I would essentially grade myself on the IUFS for Industry. If you've read it, you should know I'm walking right through the document.

So, the first challenge is to fully fund Ohio Replacement. That's no surprise. That's at the lead of the strategy's plan. As we sit here right now, we are fully funded. I think it speaks volumes

that during the recent continuing resolution we continued to maintain the funding. Not everybody can claim that. So, that definitely shows the resolve of the leadership to ensure that this stays on track.

We do have an affordability goal of $4.9B for the cost of each of the follow on hulls, two through twelve. Since we last met, our 2014 cost estimate is now down to $5.2B. That started up in the $6B-$7B range. We've cut a lot of things to bring down cost, and we continue to bring that cost down.

From a cutting standpoint, we're constantly guarding to ensure we don't cut too much. That said, I can look you in the eye and tell you that we are delivering the core essential military capability that is needed to ensure our strategic deterrence through the 2080s. That's not a small task. Who will our friends be in 2074? Who can we have overflight of in 2063? All those kinds of issues weigh heavily on what went into this process.

There's also a Submarine Unified Build Strategy (SUBS) effort in progress to figure out the build approach between Ohio and Virginia and kind of get at some of this cross-class efficiency. That effort's going on out of Mr. Stackley's office and RADM Johnson's shop and includes savings like using the same hydraulic pump on Virginia on Ohio Replacement. We're working hard on this.

There's still work to do on affordability. This is one where you're either getting better or you're getting worse. You're never standing still. But, we are fully funded and I think you heard VADM Mulloy say numerous times, "Despite Sequestration we fully plan on an Ohio Replacement to be funded."

Stable requirements fall squarely in my lane. The CNO signed, in August of 2012 a Service Capability Development Document (CDD) for the Ohio Replacement; not required. But, we did one to demonstrate stable requirements. Now, I'm not saying that we haven't made some changes. There's essentially two. One deals with a large vertical array and the other deals with space and weight for coating. Those things were already thought of in defining Objectives. It's just now, they're going to be Thresholds. But, that's pretty darn good for something that was formally

conceived in the 2010 time frame. I think there are some folks in the procurement business that might wish they had that level of stability. We had our Resources and Requirements Review Board (R3B) last week and the Navy has formally endorsed the Ohio Replacement requirements. I'm on track for the Joint Requirements Oversight Council (JROC) to review the requirements in May. So, that's very good news. That's actually at or ahead of PIM, to be frank.

Construction is on track, but this is another area where you're either getting better or you're getting worse. You're never standing still. We have a lot to do between now and 2031—and to be clear, it's October of 2030, Fiscal year 2031. We have a lot to do before that first patrol and we can't let up a bit. I think a lot of you are familiar with the recent big missile tube contract and lots of great work there and my hat's off to those in the audience who have been a part of that. It's huge.

My characterization of getting top-line relief is that challenges still remain. An Ohio Replacement is going to be built. It's the rest of the Navy that we have to worry about impacting.

Okay, let's talk about SSBN operational availability. Under VADM Connor's leadership we have this thing called the SSBN Employment Working Group. We have a very detailed POAM on ensuring that this asset—which is currently carrying about 55% of our nation's nuclear warheads on it, and that's going to 70% in February of 2018—has the operational availability to meet strategic requirements until relieved starting in 2031. 70% is a big number. We have a lot of eggs in this basket. That's why Ohio Replacement has to remain on time, but to make sure we can get to Ohio Replacement, we've got to make sure that the Ohio Class submarine stays on track. My piece is making sure we're fully funding all 14 of the Ohio Class SSBN's to end-of-life.

As a result of the Nuclear Deterrent Enterprise Review (NER), we're spending $2.2 billion dollars' worth of resources to restore margin in the existing sea based strategic deterrent. You've probably heard about the additional shipyard employees, three maintenance periods going to private shipyards, infrastructure and training improvements, and the director of SSP taking an oversight

role. In the end, the NER was good for not just the SSBN Force, which was a focus point, but there are second and third order effects that are helping the rest of the Submarine Force as well. A high tide floats all boats. If you're improving the availability of SSBN shipyard work, that's also helping SSNs because you've got to fix both to fix one. So, there's good news there too.

The next challenge contained in the IUFS is building two VIRGINIA class per year through 2025. From a Block III standpoint, we've delivered our first boat. Even with the 20% design change in the submarine, it was delivered ahead of schedule. Granted, it was a photo finish, but you get credit when you get credit.

Block IV, was the largest shipbuilding contract signed in the history of the United States. The contract essentially bought ten submarines for the price of nine, and saved $5.4 billion dollars. That's a tremendous return on investment. You know, nothing succeeds like success. VADM Connor calls it the secret sauce that allows us to have credibility. You combine that secret sauce with the eye-watering operations we're doing at highly classified level, that's what gives us the credibility to continue to make our case. I think I've been to the Hill a dozen times in the last month alone. Those are the two points that I'm able to lead with to make our case for other programs. So, just great work here too.

On Block V, we continue to build two per year within the Future Years Defense Plan (FYDP). The "trough" hasn't gotten any deeper. It's still a low point of 41 SSNs in 2029. The overall strategy in the current 30-year Ship Building Plan is no more than two submarines per year - total. That's SSNs and SSBNs combined at any time. The effect is building only one SSN instead of two during years we build Ohio Replacement. We never give up on Service Life Extensions (SLE) to mitigate some of the "trough", but you can only get so much out of that. As we get into the IPMP boats, that ability is gone because those boats burn more fuel as they move around. So, our ability to extend service life in any meaningful way is going to go away.

The only two levers really left are building two VIRGINIAs at the same time you build an Ohio Replacement, or building three

VIRGINIAs in a non-Ohio Replacement year. So, that's going to be the conversation for those of us trying to do more than just mitigate the "trough", but rather make it go away. That's going to be a very, very tough conversation given the fiscal environment we're in. The SUBS effort I alluded to before is taking a look at whether or not we can do this. That's about all I can really say here.

Next in the strategy is the Virginia Payload Module (VPM). I tell people all the time, it is not the Virginia Tomahawk Module. It is the Virginia Payload Module. We have lots of payloads that we are very interested in. If you read the CDD, you can see how we built in payload flexibility. You can take the Universal Launch Recovery Module (ULRM) and put it into a VPM to allow us to launch the Large Diameter UUV (LDUUV) and ultimately a Shallow Water Combat Submersible (SWCS), which is a follow on to the Seal Delivery Vehicle. There's two examples of non-kinetic payloads, if you will. There are also other payloads like the advanced missiles VADM Connor alluded to. I can't say more about it here other than we're very excited about the potential, and there's some real money being applied towards the effort, and we're working very hard to make it happen. So, it is much more than just the Tomahawk. The really good news here is that we had found the VPM outside the FYDP about a year ago and through some great work down at OSD and making our case, I'm happy to say that when you look at the this year's FYDP you'll see that it got accelerated and moved back to FY19. That helps fix the strike "trough", which is separate from the SSN force structure "trough" that occurs when we lose 60% of our strike volume when those four SSGNs retire in '26 through '28. So, gaining that back is huge.

We didn't initially have the money to pay for all of VPM. So, not only do we get it accelerated, but we got OSD to help pay for it. It's now one VPM per year. So, if you do that starting in '19 you get a total of fifteen. You get five in Block 5, five in Block 6 and five in Block 7, but full strike volume recovery following the 60% drop is not possible. What I would like to do is get VPM on the remaining 5 boats, for a total of 20, and that recovers our strike

volume to within 5%. That's what I'll be pushing, and I encourage you, when you're able to, do the same.

Next, when you think acoustic superiority program you should think three things. Well, first you think SOUTH DAKOTA. SOUTH DAKOTA is the prototype platform, if you will. And there's a three-legged stool to SOUTH DAKOTA. One is additional quieting initiatives in the engine room. There's about a dozen of them. Two is an advanced coating, and three is a large vertical array that's very similar to the arrays on DALLAS and MARYLAND today. That's the three parts. It gets classified very quickly. So, that's about all I can say here, but I can tell you that we have tremendous fleet support. From a funding standpoint I can't give you an evaluation now either, because it's a POM-17 issue and we'll be fighting for this. This is a big part of the future.

Platform upgrades; SWFTS (Submarine Warfare Federation of Tactical Systems) has been a real tough pill to swallow. In the two main budget cycles that I've done as Director of Undersea Warfare, I've take $809M (FYDP) in cuts during those two budget cycles. That's just crushed me. In fact, Congress brought it below the MSR, Minimum Sustaining Rate, which is essentially eight units and I'm going to fix that in POM-17. I'm going to put the money back into it. I've got to, but it's indicative of what I'm going to talk about later when I talk about this thing called the *last tactical mile*.

Earlier, I referred to a recent NUWC trip where myself and RADM Johnson had a great session on towed array reliability with the CNO. As I said earlier, we've got to do better. The TB-33 didn't work, for a lot of reasons that I won't get into here. We lost a generation of an array when we lost the TB33.

So, we have a four-part plan to fix the TB-29 reliability. Step one is to triage existing arrays. It primarily gets to what we call "green modules," which is a module that has all the engineering changes, that are available to it, made. Four of the fifteen total modules are high failure rate modules. Right now, the triage is to get every deployer to have those four modules green and by the end of the year to have all deployers with an entirely green array.

That's the initial triage. We're already starting to see an effect there, moving the needle.

I'd say we're probably at 40% reliability now, but we want to get to 80%. That's only going to happen with new telemetry approaches. There's a couple of rapid prototypes that are on the street that are pretty attractive and RADM Johnson is looking at them. CTA and IPEN, I'll let him talk about those. But we have to take a fundamentally different approach. Lets face it, a TB-29 is a half-mile long, it's got 14,000 connections, and we soak it in kerosene to make it neutrally buoyant. Then we wrap it around a sausage extruder to deploy it from the submarine. We pinch it and compress it and we keep it on a drum in the ballast tank. Frankly, it's a wonder the thing works at all.

Beyond triage, we're working on some rapid prototyping and then ultimately going to TB29X. That's going to be the thing that's going to get us from our current 40% kind of reliability up to the 80% level. So, the first three legs of that four-part plan are triaging with green modules, rapid prototyping, and the TB29X.

The fourth part is changing the handler. We're not going to use the pinch roller anymore, but a belt that provides more even distribution of pressure on the delicate parts, the connections. We took a page from the British on this; the MacTaggart Scott Belt Handler. It's good engineering and we've figured out how to install it during a non-dry dock availability, by divers, in just two days. So, we're working on towed array reliability.

Heavyweight Torpedo Production Restart is on track, but there are challenges. Despite the pressures I've been able to keep the funding. It's challenging because of all the stuff ADM Richardson said last night. We've got to get faster at pulling things across the science and technology gap. You know, VADM Connor's Undersea Rapid Capability Initiative Number four is the torpedo part of that. We are using a SCEPS engine along with some other things to allow us to grow longer arms from a torpedo standpoint. I just got done telling you that SWFTS has its challenges due to funding, but we've got to have a SWFTS like model for the torpedoes at some point. It's not just a TI/APB nomenclature, but the ability to adapt and feedback to the weapon at a much faster

rate. You know, we have these great platforms. We're able to build them, man them with the best Sailors, deploy, get across the ocean, get underneath the A2AD envelope, but, in the end, we will just have a ringside seat for our own ass kicking if we don't develop a weapon that can do all of what it needs to do. We're working very hard on it, and I'm funding 145 weapons in the FYDP. I tell you, I had a great conversation at breakfast with VADM Koenetzi and some other folks. I think ADM Mies actually asked me the same question VADM Koenetzi did. "Is there something fundamental about the JCIDS process you would have to do to make things better?" I tell you, the biggest thing that we could do to effect change in the acquisition and production process from my standpoint is fixing the testing process. It's absolutely crazy what we have to do. That's one of the biggest reasons why we can't afford, both in budget and time, to build a brand new weapon because of the testing requirements that would be associated with it.

APB5, which is the next software change to our next torpedo will happen in FY20. This is a software only change, no hardware. We started working on parts of that change in the 2008 time frame. The earliest the change could ever have happened was FY14. Now, I'm not getting to it until '20. That's disgraceful. That APB, even though it's just software, will require approximately 175 test shots. That's unbelievable, let alone the fact that VADM Connor can't afford to give that much bandwidth from submarines who are trying to do real missions with fewer submarines every year. So, testing is just crushing us. To that end, I'm putting $2.5 million into POM-17 to accelerate modeling and simulation development.

All right, let me talk about the “last tactical mile”, because this is powerful.

The good news is that everybody recognizes the need for strategic deterrence and shipbuilding and two per year. I get great, great support. Our story is tight. You know, we have undersea dominance. Even the President tells the CNO not to lose undersea dominance. That helps us to fence, if you will, lots of things. But,

the one thing that doesn't have that additional external pressure is all the stuff that falls into what I call the “last tactical mile”.

Here’s an example. My Total Obligation Authority (TOA) is about $20B/year. When FY17 entered the FYDP in FY13, the discretionary part of my TOA, the stuff that contributes to that “last tactical mile” (sonar systems, fire control systems, imaging systems, EW systems, torpedoes, counter-measures) was 18%. Now, as we start to work on POM-17, that’s down to 8%. I just got done talking about SWFTS. That's one of those things that gets cut. We’ve gone through all that trouble to build the submarine, get across the ocean and get under the A2AD envelope and now you have that “last tactical mile”. So, I got less to start with and it hurts more when you take it. You take one dollar from 100 it's one thing, but you take one dollar from ten dollars and it hurts a lot more. So, that's my challenge right now.

If you were looking at the “last tactical mile” for strategic deterrence it would be whole, except for torpedoes because we don't, we don't put enough torpedoes on our SSBNs. On the SSN side of the house, we are not whole and it's amazing to me that about $167 million a year is all I need to buy back all of that “last tactical mile”. In the large scheme of things, it’s really not a lot to ensure we maintain undersea dominance.

Okay, in the interest of time here I'm going to accelerate through this. LDUUV is on track for FY '22. I'm not the resource sponsor, but I care a lot about it because the synergistic effect of a UUV and a submarine together is unbeatable. Both can do things or go places where the other can't. Both can leverage off the endurance and the persistence of the other. One can do dull, dirty and dangerous and allow the manned platform to essentially be in two places at once. It's huge and it's a big part of how we're going to help mitigate that trough in the 20's.

We care a lot about this. I'm connected at the hip with the N2N6 to make sure we get those requirements right. VADM Connor mentioned a real-world mission, using a smaller UUV, a Remus type vehicle, coming out of the dry-deck shelter. That's a real-world mission in the hands of the Combatant Commander today. Very, very exciting.

Fleet Modular AUV is kind of indicative of that. It's taking a Remus-600 and launching it from a TLAM capsule. We have lots of TLAM capsules. Our Sailors know how to handle them. Every submarine can do this. You don't need a UUV cadre embarked. You don't need a dry deck shelter. Granted it's a one-way mission for the Remus, but there might be some things that are very, very high value and strategic in nature, where that's worth the cost. We've got money in it and will conduct a demonstration during SCC operations soon.

Universal Launch and Recovery Module (ULRM)… I have this tin cup in my office with ULRM written on it. Funding this has been a tough one. We keep losing ground on that. The shore demo was completed successfully, but I've had to delay the at-sea demo. Now, the at-sea demo is scheduled for the third quarter of this year. I'm frustrated by that because I have to get ULRM delivered by '21 to support the '22 delivery of LDUV. That said, PB-16 has in it, for the first time, programmed (not tin cup) funding for ULRM. We're making progress.

I already mentioned the top three priorities and they are interwoven in the larger story. A lot of the stuff, I've touched on. In the interest of time I won't repeat them here. I feel confident that our message is strong. It's the resources that are required, and we're doing our best to ensure that we keep those flowing.

Alright, well thank you for the opportunity to address you here today. More importantly, thank you for all you do to advance the U.S. Submarine Force and maintain undersea dominance.

ARTICLES

SUBMARINES OF THE REGIA MARINA AND THE AXIS ANTI-SHIPPING CAMPAIGN 1940-43: LESSONS FOR CONTEMPORARY COMBINED OPERATIONS

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

> *The Italian Fleet and submarine arm turned out to be not nearly as effective as their strength had led both friend and foe to expect.*
>
> -Kriegsmarine Admiral Karl Doenitz,
> Commander in Chief of U-Boats

Introduction

When Fascist Italy commenced hostilities in June 1940 it reinforced the German anti-shipping campaign with one of the largest Submarine Forces in the world. Kriegsmarine commanders expected that the Regia Marina's 113 submarines would significantly bridge the gap between the 55 U-boats the Germans had available and the 300 required to effectively blockade the

British Isles.[1] However, despite some spectacular but isolated successes, the Italians failed to deliver substantial operational results and by the September 1943 armistice 85 of their submarines had been destroyed.[2] Yet it would be incorrect to dismiss the Italians as ineptly led or poorly manned like other elements of the Il Duce's military machine. Instead, analysis shows that antiquated doctrine, poor integration with their German allies, and technical deficiencies combined to reduce the Italian submarine force's effectiveness. These factors continue to be critical aspects in combined maritime operations today.

The Regia Marina Submarine Force

Experiencing a substantially different style of operations during WWI in comparison to the Germans, the Italian Navy developed different submarine concepts of operations and design philosophies between the wars.[3] By the eve of WWII, Italian Submarine Force had become the orphan of an ill-defined naval strategy and had been assigned diverse roles including: coastal defense, enemy fleet interdiction, fleet scouting, mine laying, destruction of enemy shipping, and the transportation of essential war material.[4] This led the Italians to develop a diverse Submarine Force to fulfill these roles throughout the 1920s and 30s. As a result, the Italians commenced hostilities in June 1940 with 113 boats of more than two dozen designs.[5]

Contemporary analysis by Germans and Allies alike concluded that the Italian Submarine Force could have been a potentially decisive factor in the early days of the Atlantic War, but this did not eventuate. This failure to deliver was not due to cowardice or ineptitude. Like the Kriegsmarine, the Regia Marina had its celebrated heroes and some were recognized with significant German decorations in addition to Italian awards.[6] Admiral Doenitz himself noted that '[the Italians] are perfectly capable of delivering an assault with great gallantry and devotion…often display greater dash and daring than the Germans, who are less prone to be carried away by the thrill of battle.'[7] The challenging Gibraltar Straits choke point was notoriously difficult to negotiate yet the Italians managed to do so on forty occasions in both

directions losing only one submarine in the process, so a lack of mariner skills is not to blame.[8] Arguably, Italian submarines were the most widely deployed boats of any nation in WWII. In addition to the Mediterranean and the North and South Atlantic Oceans, Italian submarines operated in the Red Sea and Northern Indian Ocean as part of the naval defenses of the Italian colonies, and in later periods midget submarines were deployed into the Black Sea while fleet submarines conducted long-range supply trips of critical war materiel to the Japanese in the Far East.[9] These far-flung operations are demonstrative of a capable support network, so if logistic failures did not reduce operational effectiveness what did and what are the applicable measures of effectiveness?[10]

In the Axis anti-shipping campaign operational success was measured in merchant tonnage sunk. However, the Mediterranean and Atlantic operational environments were significantly different in this regard, particularly in regard to the level of enemy merchant activity (i.e. target availability). When employed to their strengths (solitary operations in areas of independent merchant steaming with low enemy aircraft activity), the Italians performed quite credibly. Overall their output was sound but at a rate of effort below German expectations and performance.[11] The most successful Italian submarines in terms of tonnage were the 32 submarines in the Atlantic which sank 109 vessels between 1940-43; an aggregate of almost half a millions gross tons, but with half these boats lost on operations the cost was high.[12] In considering the Italian performance; doctrine and training, integration, and technical capabilities are the critical areas in which the Italians were found wanting.

Doctrine and Training

When Italy entered the war one of the greatest challenges facing its submarine arm was a lack of suitably qualified and experienced crews.[13] Perhaps more limiting was a failure to understand the modernization of submarine warfare, which left them with antiquated doctrine based on their WWI Adriatic experience.[14] This was reinforced by incorrect lessons learned

from the Italian submarine contributions to the Spanish Civil War in 1937 where they had shown some ability to intercept independent merchant vessels in otherwise benign conditions.[15] As a result, Italian submarine tactics were significantly less advanced in comparison to German developments prior to the war. While the Germans favored surfaced night attacks using diesel engines to achieve full speed for maneuver and intercept, the Italians preferred to lie in wait submerged.[16] German Wolf Pack tactics called for a group of submarines to attack en mass to maximize confusion and overwhelm the escorts, while the Italians employed their submarines in independent patrol areas.[17] Like the Germans initially, the Italians favored surfaced gun attacks against lone merchantmen to conserve precious torpedoes but persisted with this tactic long after it became imprudent. These aspects not only made the Italians less effective in the relative dearth of merchant traffic of the Mediterranean, it hampered their integration into broader German operations in the Atlantic.[18] Having completed a detailed inspection on the Italian boats in the combined base at Bordeaux in 1940, Kriegsmarine officers reported to Admiral Doenitz that their new allies had 'a lack of tactical ideas and tactical training of the submarines' officers, though they are very dynamic and good willing.'[19] But instead of addressing these shortfalls, the Italian submarines were deployed to areas where Allied convoy procedures were absent or less robust, and where they were more likely to avoid enemy aircraft.[20] A prime opportunity to develop a militarily effective partnership was squandered, much to the advantage of the Allies.

Contemporary accounts also suggest that the Italian submariners did not enter the war with a mindset ready for unrestricted hostilities.[21] Italian commanders had a culture of prioritizing the more glamorous warship targets in preference to the merchant vessels that contributed to the enemy economy.[22] Furthermore, some Italian commanders showed great humanity and compassion, including remaining surfaced for extended periods to tow lifeboats filled with merchant sailors to safety rather than abandon them on the high seas. The Germans specifically banned such practices but Italian submariners remained quietly impressed with such bravado

and chivalry.[23] This was not the mindset of a force focused or trained for unrestricted submarine warfare.

The Regia Marina had schools and facilities to train submariner officers and crews but the diverse roles and methods of employment made their integration with the German U-boats problematic. This went deeper though, with differing methods of communication, convoy reporting, and even weather observations making the Italian contributions unappreciated by the Germans to the point where they appear to have been *written off* somewhat uncharitably by Doenitz himself by 1941 despite his desperation for more platforms at sea.[24] While there were efforts to train some Italians in the German training squadrons in the Baltic, these efforts appear haphazard and inconsistent. Further complicating the Italian efforts was their own lack of effective anti-submarine capabilities.[25] Not only did this have operational impacts for their surface fleet defenses, it hindered their own submarines from receiving effective training in avoiding and overcoming enemy anti-submarine forces, which reduced then their operational capabilities once deployed. The combination of all these factors meant that the Italian submariners commenced the war with outmoded doctrine, archaic tactics, incomplete training, and a chivalric mindset unsuited to their role in the Axis anti-shipping campaign.

Integration

While Italy pursued a parallel war strategy with distinctly separate aims to Germany, Axis Submarine Forces were quickly integrated through the establishment of a regional U-Boat headquarters in Rome.[26] In broad terms the outcomes of this arrangement were deconfliction of submarine deployment and a generic understanding of operational matters.[27] However, relations were not smooth and distrust existed to the point that German personnel were not initially allowed in the main operations room, though trust grew from necessity as Germany had substantially greater involvement in the Mediterranean.[28] German liaison officers were also appointed to the Italian submarine facility in Bordeaux, though the facilities remained separate and not

integrated to maintain clear national chains of command and logistic support. In this respect, Submarine Forces appear to have been the best aligned Axis capabilities at this stage of the war, though this was only at a broad level due to procedural incompatibility. Crucially, if liaison officers had been assigned at lower levels (such as at the Squadron level, or even assigned temporarily to individual submarines) this would likely have helped overcome some of the tactical differences that generated operational inefficiencies.

As outlined earlier, Italian submarines operated in widely dispersed theatres though this was not always coordinated effectively with the Germans. Specifically, 32 boats operated in the Atlantic, starting from declaration of hostilities and including transfers to Bordeaux after the French surrender.[29] However, by late 1941 German U-boats were being transferred to the Mediterranean to reinforce Axis naval support to the North African campaign.[30] Admiral Doenitz opposed the redeployment of German submarines away from his Atlantic *schwerpunkt*, but Hitler overruled him to support the strategic situation of his Italian allies and the beleaguered Panzerarmee Afrika.[31] The result was Italian submarines operating in the Atlantic to reinforce a German U-boat force which itself was now depleted due to transfers to the Mediterranean where the Italians had originated. This strategic confusion was not conducive to an effective interdiction and anti-commerce campaign.

Technical Issues

Unlike more iterative German U-boat designs, Italian submarine classes varied significantly, incorporating different design concepts and complicating crew training and logistical requirements. Notable differences include using two different sizes of torpedoes (the larger, more standard size for use against armored warships, and a smaller caliber torpedo for use against merchant vessels), large caliber deck guns (some classes even having dual fore and aft mounts), and a characteristically large conning tower.[32] This latter feature made the Italian boats easier to detect on the surface both visually and through greater radar signature.

Other shortcomings included shorter periscope heights in comparison to German designs,[33] a lack of diesel intake masts which impacted rough seas operations, and rudimentary fire control apparatus which reduced torpedo accuracy.[34] More critically for survival, Italian submarines were not optimized for crash dives, making them more susceptible to aircraft attack.[35]

Creditably, the Italians learned the operational lessons of these shortcomings quickly and made significant efforts to rectify them. However, industrial shortcomings and competing priorities at the national level made this problem impossible to remedy completely.[36] Technical assistance from Germany was hastily improved including the provision of electric torpedoes (which left no bubble wake like the Italian steam torpedoes, making the submarine's attack less visible by day) and radar detection equipment to help avoid Allied aircraft.[37] However, by early 1943 the Italian boats were deemed obsolete and relegated to non-combat resupply missions to Japan. The Kriegsmarine replaced them by gifting the Italians with seven modern German built U-boats along with appropriate training and while these were delivered, the Italian armistice occurred before any became operational.[38] Thus, the Italians entered the war with designs that were not effective and despite later German assistance, were unable to rectify the deficiencies during the course of the war.

Comparison to Contemporary Maritime Operations

The Italians' hard-learned lessons in a combined environment have continuing relevance for contemporary operations. In this respect, the Axis forces in 1940 were unlike modern alliances such as the North Atlantic Treaty Organization (NATO) or the Australia-New Zealand-United States Security Treaty (ANZUS), and bear greater similarity to looser organizations such as the Combined Maritime Force (CMF) in the Middle East or the Five Power Defense Agreement (FPDA).[39] Nevertheless, there is clearly a large differential between CMF's constabulary focused operations, the baseline warfare practices of FPDA exercises, and high-end war fighting such as the Axis anti-shipping campaign in WWII and for which NATO has trained for decades. Practiced

training and doctrine, effective integration, and shared technical capabilities are only possible within an environment of closely Allied nations. The US and UK managed to achieve this effectively during WWII despite not having a close alliance prior to the war, reflecting political will and strategic relationships at the highest levels. Italy and Germany did not have this relationship, and neither do many partnership arrangements today. Differences in national commitments to an alliance can be significant with the additional demands placed by contemporary legal and domestic public issues making the differences larger and harder to overcome. In the face of these complexities, it may be difficult to resolve the political aspects of integration that generated operational challenges such as those faced by Italy and Germany from 1940-43.

In general, countries conduct their own mission preparation training before assigning a platform to a multilateral operation, with integration training restricted to basic maneuvers and communications. A notable exception is the UK's Flag Officer Sea Training, which conducts training off the south coast of the UK, though this is only for NATO forces and some closely aligned nations.[40] The utility of shared training, procedures, and doctrine cannot be overstated but requires an extended period of close relations to develop. Italy and Germany did not have sufficient time prior to hostilities to do this, but neither do they appear to have prioritized a comprehensive rectification plan when these shortcomings were identified in 1940. Clearly, developing tactics, common procedures and most of all trust prior to a conflict is the optimal method for generating capability and reducing operational risk. Phase zero engagement and training exercises are, therefore, pivotal to future interoperability in a combined environment and must be prioritized accordingly.

The utility and effectiveness of placing liaison officers to enhance integration and interoperability is understood in any modern coalition or alliance model and is usually standard practice.[41] In this respect, through the combined Axis submarine HQ in Rome and shared facilities in Bordeaux, German-Italian Submarine Forces led the Axis powers in cooperation and

coordination. From 1942 onwards, technological cooperation between Italy and Germany substantially increased to include transfer of radar detection equipment, torpedo technology, and indeed entire platforms. However, such technical exchanges today are relatively rare except where a pre-existing close relationship exists.[42] Similarly, coalition support provides logistic items such as food and fuel but rarely extends to critical systems and weapons, again excepting where pre-existing alliance relationships exist. Thus, many of the challenges facing the Italians and Germans in 1940 remain pertinent today.

Finally, the German-Italian experience has enduring lessons for service pride and national chain of command outside of and sometimes despite alliance priorities. Partner nations can only be as close as the political will allows, and governments will always maintain control of their own forces, which limits cooperation to some extent. As much as Germany and Italy were formally allied, they were partners of convenience thrust together at the brink of war without adequate opportunity to coordinate force development and utilization effectively. Axis submarine force difficulties were, therefore, the operational consequences resulting from divergent political aims, policies, and strategies. This continues to be a strong consideration in contemporary operations.

Considerations

Italy's entry into the war found her operating with a new ally without the opportunity to develop the baseline enabling capabilities for combined operations. This minimized the impact of tripling the available submarine platforms for the combined offensive against Allied merchant shipping. While the Italian boats were technically less advanced and more vulnerable than the Germans, mismatched doctrine and procedures made them largely ineffective even in supporting and ancillary functions.

Integrated training and common procedures remain crucial to operational effectiveness and develop with trust over an extended period. Italy and Germany did not have this time but, more critically, they did not prioritize rectification when these

shortcomings were identified in 1940. It is contradictory that Doenitz implored his High Command for additional reconnaissance and strike assets, yet discarded the opportunity to develop the Italians' potential. Instead, he largely dismissed them after his initial disappointment and did not develop their capabilities more fully. While this would admittedly have pressured Kriegsmarine training resources, this critical error had possibly decisive results. Had the reformation of Italian submarine capabilities been prioritized, Axis naval cooperation would have been much more effective at the exact time that the U-boat offensive was at its most potent and prior to the US entering the war. While this may not have affected the material superiority that the Allies later generated, it may have had a decisive impact on strategic decision making when Britain stood alone.

In other areas, Axis naval forces showed great innovation, such as combined HQ and shared facilities. Furthermore, from 1942 onwards the submarine technological cooperation between Italy and Germany was substantial. However, by the time this began in earnest the Allies, now significantly reinforced by the US, had made substantial technical and procedural improvements. For the Axis it was a case of too little, too late.

While these shortcomings are evident in hindsight, it appears that the Germans and Italians made the best of a situation plagued with political and operational constraints. Many of those same constraints exist today in loose coalitions but less so in tighter alliances such as NATO. Contemporary operations are also likely to be fast-paced, high-intensity campaigns without the years that the Axis forces had to start addressing their shortfalls. Many of the Italian lessons therefore remain eminently applicable today and need to be addressed prior to conflict where possible. Where this is not feasible, the Germans provide a solution through their efforts to identify operational areas of reduced risk to enable the Italians to best contribute within their modest level of capability. This is a valuable lesson in enabling less able partner nations to contribute operationally and potentially deliver a much greater strategic effect through their presence and integration in the combined force.

Conclusions

The more navies operate and exercise together prior to conflict, when mistakes and errors are far less costly, the greater their capability to operate together in future operations. To achieve the integration and procedural commonality desired, close and well-practiced alliances are the only realistic option for building effective, high-end warfare capabilities. It is therefore worth considering if there are sufficiently robust training activities, underpinned by shared enabling capabilities, technologies and relationships, focused in the regions most likely to require them. The Germans and Italians operated together only as allies of convenience and paid the price in blood and defeat. Their lack of common doctrine and interoperability, coupled with a lack of focused effort to resolve these shortfalls when identified, cost lives and lost opportunities. Had the requisite effort been made in 1940, or prior, the potential strengthening of the U-Boat offensive in 1941 might have had decisive effects.

ENDNOTES

[1] 55 U-boats were available for operational deployment at this time, not including additional boats in training, repair and construction. Carruthers, Bob. *The U-boat War in the Atlantic Volume 1: 1939-1941*. Barnsley: Penn and Sword Maritime, 2013. p 108.

[2] Royal Navy Admiralty. *German, Italian and Japanese U-Boat Casualties during the War. Particulars of Destruction*. London: His Majesty's Stationary Office, 1946. pp 28-29.

[3] During WWI, the Italians employed their submarines predominantly in traditional fleet roles against enemy warships in the Adriatic. This was very different to the German commerce war in the Atlantic to blockade the British Isles.

[4] D'Adamo, Cristiano. "Italian Submarine Fleet" Regia Marina Italiana - The Italian Navy in World War II. Accessed November 28, 2014. http://www.regiamarina.net/.

[5] Greene, Jack. *Mare Nostrum. The War in the Mediterranean.* 1990. p 68.

[6] In addition to a range of lesser awards, two Italian submarine Captains were decorated with the Knight's Cross of the Iron Cross after destroying significant tonnages of enemy shipping; Karl Doenitz. *Memoirs-Ten Years and Twenty Days*. Annapolis, Md.: Naval Institute Press, 1990. pp 144-150, 155-163.

[7] *Ibid.*
[8] Cocchia, Aldo. *Submarines Attacking*. William Kimber. 1956.
[9] These missions were assigned to the Italians in 1943 when it was determined that their submarines were operationally obsolete. All seven surviving Italian submarines at Bordeaux were identified for these transfers of critical war materiel, though only five sailed before the Italian armistice. Stripped of all armament to maximize cargo and fuel capacity, three submarines completed this impressive journey and two were lost en route. The successful Italian crews were subsequently imprisoned by the Japanese after the Italian surrender. Cocchia, *op cit*.
[10] Unlike the bulk of the surface fleet, which suffered from crippling fuel restrictions, the Italian submarine fleet was given full access to the fuel reserves it required for operations.
[11] Italian and German perspectives, from Admirals Cocchia and Doenitz respectively, differ considerably on what the true effectiveness was. However, Doenitz is mathematically illustrative and calculates that during the latter half of 1940 the average German U-Boat sunk 1,115 tons per sea day, while Italian boats sunk around 20 tons of shipping per day at sea. This later figure rose significantly with deployments to the South Atlantic, Caribbean and east coast of the United States. Donitz, *op cit*.
[12] Santoni, Alberto. "18: The Italian Submarine Campaign." In *The Battle of the Atlantic 1939-1945 the 50th Anniversary International Naval Conference*, edited by Stephen Howarth and Derek Law. London: Greenhill, 1994. p. 334.
[13] This problem of course was shared by navies on both sides due to the harsh and unhealthy conditions aboard diesel submarines, though the Germans had prepared more thoroughly. D'Adamo, *op cit*.
[14] Greene and Massignan, *op cit.* pp 22-24.
[15] From late 1936 to early 1937, the Italians deployed 14 submarines off the Spanish coast, though no ships were sunk. Greene and Massignani, *op cit*.
[16] This was also the Royal Navy's preferred method for submarine attack. German Wolf Pack tactics were an uncomfortable revelation to the Royal Navy. Roskill, *op cit*, pp 354-356.
[17] Sadkovich, James J. *The Italian Navy in World War II.* Westport CT: Greenwood Press. 1994. pp 20-21.
[18] Doentiz, *op cit*.
[19] *ibid*.
[20] Including the Azores, the South Atlantic and the Central and North American coasts after December 1941. In these locations the Italians achieved moderate successes against independent merchantmen with the greatest Italian successes off the USA Coast. *ibid.*
[21]This was also the case with American submarine captains in the Pacific. Many had a difficult time transitioning to commerce war, though it appears that the US Navy was more effective in rectifying this situation. DeRose, James F. *Unrestricted Warfare: How a New Breed of Officers led the Submarine Force to Victory in World War II.* New York: John Wiley & Sons. 2000. pp 26-35.

[22] This was the historically based use of a submarine in the Italian Navy, though to be fair there was a higher ratio of warships to enemy merchant shipping in the Mediterranean than in other theatres. Successful attacks on capital warships were highly recognized by both the Kriegsmarine and the Regia Marina.
[23] Cocchia, *op cit*, pp 15, 38-40.
[24] 'The deficiencies in the Italian training could not be made good in the course of a few short weeks.' Doenitz*, op cit*, p 147.
[25] Greene, Jack. *Mare Nostrum. The War in the Mediterranean.* 1990. p 70.
[26]This German Headquarters unit was titled Fuhrer der Unterseeboote (FdU) Italy and was co-located with Maricosom (Italian Naval Headquarters), in Rome. Patterson, Lawrence. *U-boats in the Mediterranean 1941-1944*. Naval Institute Press, 2007. pp 18-20.
[27]*ibid*.
[28]De Belot, *op cit*.
[29] Including the Italian submarines transferred from the Red Sea Fleet after the fall of Eritrea to the British. Cocchia, *op cit*, p 50. Santoni, *op cit*, p 327.
[30] Establishing the 23rd (Salamis in Greece) and 29th Uboot Flotillas in Salamis (Greece) and Le Spezia respectively. Patterson, Lawrence. *U-boats in the Mediterranean 1941-1944*. Naval Institute Press, 2007. pp 30-31.
[31]'I regarded this extensive repositioning of U-boats to the Mediterranean…as a mistake', Doenitz, *op cit*, p 159.
[32] Greene, Jack. *Mare Nostrum. The War in the Mediterranean.* 1990. p 68.
[33] Resulting in which kept the conning tower closer to the surface where it was more visible in the routinely clear Mediterranean waters. De Belot, Raymond. *The Struggle for the Mediterranean 1939-1945*. New Jersey: Princeton University Press, 1951. pp 40-41.
[34] Doenitz, *op cit*.
[35] In general, Italian submarines took over a minute to submerge as opposed to the 30-40 second average for German designs; a critical and potentially fatal delay when under aerial attack. De Belot, *op cit*.
[36] *ibid.*
[37]Santoni, *op cit*. p 325.
[38] At which time the seven Type VII U-boats were seized and reinstated as Kriegsmarine U-boat force. Santoni, *op cit,* p 333. Cocchia *op cit*, p 65.
[39] CMF is a multi-national naval partnership, which exists to promote security, stability and prosperity across approximately 2.5 million square miles of international waters. Instituted in 1971, the FPDA is a loose alliance comprising Britain, Australia, New Zealand, Singapore and Malaysia.
[40] Royal Navy Media. "Operational Sea Training." Royal Navy - International Defence Training. Accessed December 22, 2014. http://www.royalnavy.mod.uk/~/media/royal navy respon-sive/documents/idt/flexible training options/ost/fto12_ost.pdf.
[41] For example, CMF has a standing staff construct comprising staff and liaison officers from many of the partner nations.

[42] As an example, Australian and UK forces operating as part of CMF can utilize other existing alliance relationships to gain support that other CMF partners cannot access.

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ETERNAL PATROL

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SUBMARINE SHORTAGE SOLVED: FRENCH AND ITALIAN SUBMARINES AS U.S. NAVY TRAINING TARGETS IN THE WESTERN ATLANTIC, 1943-1945

by Mr. Mark C. Jones

Mark C. Jones lives in Morristown, New Jersey and writes on the armed forces of the smaller European Allied countries of World War II that were operationally integrated into the British armed forces after being driven from the continent (Czechoslovakia, Poland, Norway, Netherland, Belgium, France, Yugoslavia and Greece).

Figure 1. The French submarine ARCHIMÈDE of the '1500 tonnes' class on 13 January 1944 at the Philadelphia Navy Yard. The ship sailed the next day for New London, Connecticut to work up after completion of a refit. Photo courtesy of Axel Aboulker.

The August 2008 issue of the U.S. Naval Institute's *Proceedings* contained a brief mention of the Italian submarine ITS SALVATORE TODARO (S526) visiting Naval Station Mayport in Florida the previous month, the first visit of an Italian submarine to the United States in 63 years. Surprisingly, the news item did not say anything about the last time an Italian submarine was in U.S. waters, beyond mentioning that it was during World War II. Why was a warship from an Axis power visiting the United States during wartime? Prior to the visit of TODARO, the previous occasion was in November 1945, when the GOFFREDO MAMELI departed Key West, Florida after having spent a year and a half serving as an anti-submarine training target for U.S. Navy (USN) escort vessels at Bermuda and other USN bases in the western Atlantic. MAMELI and about a dozen other Italian and French submarines comprised a significant portion of the submarines available to the USN as it trained enormous numbers of escort vessels as they went on to win the Battle of the Atlantic against German submarines. "The French and Italian submarines were excellent for training purposes. Of heavy hull construction, they could out-dive the older American R- and S-boats. And they made good substitutes for the newly commissioned fleet submarines which had formerly participated in the training program and could now be sent non-stop to the Pacific for combat duty."[1] Foreign submarines were vital to the U.S. Navy's anti-submarine training during the latter years of World War II by providing about a dozen vessels at a time when the USN faced a great shortage of modern submarines.

The Strategic Situation

When Germany declared war on the United States on 11 December 1941, the Battle of the Atlantic had been under way for over two years. The *Kriegsmarine*'s U-boats were attacking British convoys with significant results, imperiling the flow of supplies to the United Kingdom. British anti-submarine tactics gradually improved but the shortage of escort vessels seriously

handicapped Royal Navy (RN) escort group commanders. Part of the solution to overcoming the Nazi submarine threat was to build large numbers of destroyers, frigates and corvettes so that convoy escorts were no longer outnumbered by U-boat wolf packs.

The U.S. also rapidly expanded its ship building programs, launching hundreds of destroyers, destroyer escorts and frigates from 1943 onward. However, for the new vessels to be effective anti-submarine escorts, they needed realistic training in finding submerged submarines. There were many dozen older submarines of the O, R and S classes still in commission which could be used as anti-submarine training targets, but the USN's Submarine Force was also scrambling to maintain enough submarines to satisfy the increasing demands from operational commanders.

Allocating sufficient submarines to be training targets was a challenge, especially since most of the O, R and S class boats were over twenty years old and so less mechanically reliable. In addition to the maintenance problems caused by old age, these submarines had much shallower depth limits than modern war-built submarines. They therefore could not dive as deeply as the German submarines they were intended to portray in exercises, making the training of escorts less realistic.[2]

The solution to the twin problems of insufficient submarines, and diving depth limitations on older boats, was to use submarines from other countries. Once the Allies landed in North Africa in November 1942, the French armed forces outside France gradually transferred their allegiance from the Vichy government to the French Committee of National Liberation and so were available for assignment by the Allies' Combined Chiefs of Staff (CCS). Italy signed an armistice with the Allies on 3 September 1943 to avoid complete defeat, the terms of which obligated Italy to place its armed forces and merchant marine at the disposal of the Allies.[3] While most of the very large Italian submarine fleet had been lost during the war or captured by German forces upon the armistice, there were still several dozen submarines available to the Allies. Italy then declared war on Germany on 13 October 1943 making Italy a co-belligerent state though not a member of the Allies.

Since the RN was just as short of submarines as the USN, the problem arose of the division of the French and Italian submarines between the two services. Throughout 1943 and into 1944, extensive high-level negotiations took place between the RN and USN over the allocation of foreign submarines. They haggled over what ratio to use to divide the submarines between them, which nationality submarines to assign to certain theaters, and even down to which navy obtained the use of individual submarines. This protracted bargaining was exacerbated by the poor material condition of these boats, which resulted in serious mechanical breakdowns that invalidated agreements to assign specific submarines to either the RN or USN.[4]

Establishing the Anti-Submarine Training System

With ships being launched every week, the USN established a training system to ensure that newly commissioned warships were fully effective when they arrived at their commands. One of the locations used by the USN was Bermuda, access having been granted by Britain at the same time as the famous September 1940 *destroyers for bases* deal. The USN established Naval Operating Base Bermuda on 1 July 1941. One of several USN bases on Bermuda was the submarine repair facility at Ordnance Island, St. Georges Harbor which opened in mid 1941.[5]

In order to systematize the training process, the USN established the Operational Training Command Atlantic (OTCLANT) under Rear Admiral Daniel B. Beary on 10 February 1943. This handled the training of most surface ships, exceptions being major warships including cruisers, battleships and aircraft carriers, as well as landing craft. Atlantic Fleet destroyer training was handled by a single squadron at Guantanamo Bay, Cuba. This arrangement was replaced by the Destroyer/Destroyer Escort Shakedown Task Group which was established on 7 April 1943 at Bermuda under the command of Captain James L. Holloway, Jr.

To provide the shakedown task group with training targets, otherwise known to the USN as tame submarines or *clockwork mice* in British parlance, the USN moved Submarine Squadron

(SubRon) 7 under Captain Ralston B. Vanzant (later relieved by Commander Waldeman N. Christensen) to Bermuda. The older R class submarines were then augmented by foreign boats, and organized into Submarine Divisions (SubDivs) 71 and 72. Commander Christensen originally was in charge of SubDiv 72 (which contained all of the Italian submarines) before taking over the entire squadron and later promotion to captain. Division command passed to Commander Michael P. Russillo who was a former assistant naval attaché to Italy.

French Submarines as a Partial Solution

The French Navy underwent a transformation beginning in November 1942. After initially resisting the British and American landings in Morocco and Algeria, the *Marine Nationale* gradually shifted its allegiance from the Vichy government to the Allied cause. By late 1942 the large pre-war French Submarine Force had been greatly reduced in number and effectiveness due to resisting British attacks on French colonial possessions in Africa and Madagascar, as well as two and a half years of stagnation and insufficient maintenance caused by German armistice requirements and isolation of the major French naval squadrons. The submarines that remained in service were in generally poor condition and lacked modern electronics including radar and sonar.

The RN determined that some of the French submarines would be capable of conducting combat patrols in the Mediterranean after a several month refit, either in French African ports or in the United States. The remaining submarines were assigned by the CCS to anti-submarine training in North Africa, West Africa, and in the western Atlantic.

French submarines generally first received a refit at a RN dockyard in Bermuda and/or Philadelphia Navy Yard. The first two French submarines to come to a USN base, ARCHIMÈDE and AMAZONE, arrived in February and March 1943 respectively at the Philadelphia Navy Yard for a long refit. The first French submarines stationed at Bermuda were LE GLORIEUX and ARGO which arrived in August and September 1943 respectively.

Most of the largest French submarines of the 1500 ton class were selected to receive an overhaul sufficient for operational patrols, and so spent relatively little time in the western Atlantic after refitting. French submarines assigned to training duty with the USN spent most of their time with SubDiv 12 in Key West, Florida, the first of which having moved there in February 1944 upon the arrival of Italian submarines at Bermuda. The three French submarines which spent most of the rest of the war as training targets in the western Atlantic were the 600 ton boats AMAZONE and ANTIOPE and the 1500 ton ARGO. The boats which returned to the Mediterranean for combat patrols were the 1500 ton ARCHIMÈDE, LE CENTAURE and LE GLORIEUX.[6]

Italian Submarines as Reinforcements

While the armistice that Italy signed in September 1943 obliged that country to place its armed forces at the disposal of the Allies, at first there was no attempt by the Allies to make use of those forces. Much of the Italian Royal Navy (*Regia Marina*) was not needed for active operations, but eventually the CCS realized that some types of ships could be used for training, transport and escort duties. Italy had a very large submarine fleet before the war, and though wartime losses had been heavy, there were still a few dozen submarines in commission.[7] Italian submarines were assigned to anti-submarine training duties in January 1944 with the first boats assembling for this purpose at the major naval base at Taranto in February 1944.[8]

Initially five submarines (ENRICO DANDALO, TITO SPERI, GOFFREDO MAMELI, MAREA and VORTICE) were sent to Bermuda and after their arrival on 13 February 1944 operated from there as COMISBER (Comando Italiano Sommergibili Bermude) with the USN designation Italian Submarine Squadron One. Due to the continued need for submarines, additional Italian submarines were sent west as they emerged from refits with the ONICE arriving at Bermuda on 16 July 1944, GIOVANNI DA PROCIDA on 24 September and ATROPO on 20 October.[9]

A ninth Italian submarine was intended to join COMISBER. The LUIGI SETTEMBRINI was sailing from Gibraltar for Horta, Fayal Island, in the Azores Islands for onward routing to Bermuda escorted by the destroyer escort USS FRAMENT (DE-677) when it was accidentally rammed and sunk by its escort.[10] The collision happened at approximately 0221 hours GMT (Greenwich Mean Time) on 15 November 1944 at 36.11N/19.45W, about 685 miles west of Gibraltar. The FRAMENT hit the submarine just forward of the conning tower on the starboard side due to an incorrect course change by the escort's helmsman during a zigzag maneuver. Eight survivors from SETTEMBRINI, including the commanding officer, executive officer and six enlisted men, were picked up. All three USN personnel from the communications liaison unit were lost (LTJG Samuel P. Bifarella, USNR, radioman 3/c Caspar G. DiMaggio, signalman 2/c Daniel D. Esposito).[11]

Figure 2. Lieutenant (J.G.) Samuel P. Bifarella, USNR, (on left) and an unknown Italian Navy senior lieutenant. Lieutenant Bifarella was lost while serving as a liaison officer when the Italian submarine LUIGI SETTEMBRINI was rammed by the USS FRAMENT (DE-677) on 15 November 1944. Photo courtesy of Craig Chambers.

Figure 3. The destroyer escort USS FRAMENT (DE-677), photographed on 9 June 1944 off New York City while taking on ammunition from a barge. One of several hundred ships of this type built during the war for escort duty, many of which completed shakedown training at Bermuda, the FRAMENT accidentally rammed the Italian submarine LUIGI SETTEMBRINI on 15 November 1944 enroute to Bermuda. In December 1944 the FRAMENT was converted into a destroyer transport (APD-77). Photo courtesy of the U.S. Naval Institute.

While eight Italian submarines of different types and classes operated with the USN in the western Atlantic, considerable repair problems limited the number actually available for duty. This sometimes necessitated the submarines being sent for major overhaul. Italian submarines were always sent to Portsmouth Navy Yard in New Hampshire, which specialized in the building and repair of submarines. Assigning Italian submarines to Portsmouth was also done to keep French and Italian submarines refitting at different bases, given the animosity of French naval personnel toward Italy. There were usually one or two Italian submarines at Portsmouth between July 1944 and September 1945.

The Italian submarines were initially concentrated at Bermuda but as their numbers grew, individual submarines were detached for service at other USN bases including Casco Bay, Maine. Those submarines overhauled at Portsmouth then typically sailed to New London, Connecticut for several weeks of refresher training. The two most modern boats, the MAREA and VORTICE of the FLUTTO class (a medium size patrol submarine) were at different times part of the Atlantic Fleet's Anti-Submarine Development Detachment (ASDEVLANT) at Port Everglades, Florida. This may be because these two submarines were broadly similar to German Type VIID and IXA U-boats in appearance, characteristics and performance. The boats assigned to ASDEVLANT assisted in testing of new types of sonar and tactics designed to defeat German torpedoes.

Figure 4. A mixed group of U.S. and Italian naval officers at Bermuda, likely on or about 10 March 1944. Front row left to right: CDR W.N. Christensen, Commander Submarine Division 72; CDR E. Berengan, commanding officer of the Italian submarine flotilla; RADM I.C. Sowell, Commandant Naval Operating Base Bermuda; RADM F.A. Daubin, Commander Submarine Force Atlantic; an Italian lieutenant. Back row at the far right is CAPT R.B. Vanzant, Commander Submarine Squadron 7. Photo courtesy of Ufficio Storico della Marina Militare (Italian Navy History Office).

The Last Year of the War

Eventually the USN had built enough escort vessels that more were not needed, so the training operation at Bermuda could be scaled back. In March 1945 the Destroyer/Destroyer Escort Shakedown Group moved from Bermuda to Guantanamo Bay, Cuba to take advantage of better weather conditions. The next month it changed its name to simply Training Group Guantanamo Bay.

In addition to the sinking of LUIGI SETTEMBRINI, there were several other accidents involving the foreign submarines, though none involved the loss of a ship. The French AMAZONE grounded on the north coast of Long Island, New York on 14 October 1944, possibly due to a snapped anchor chain, but was towed to port. The French ARGO was hit while submerged by the frigate USS HURON (PF-19) on 28 April 1945 off Key West but was not seriously damaged. Lastly, the Italian MAMELI collided with the minesweeper USS JUBILANT (AM-255) in Casco Bay with minor damage and no casualties on 12 May 1945.

The German surrender in early May 1945 sharply reduced the need for anti-submarine training in the Atlantic. French submarines were soon returned to French operational control, sailing from several ports for North Africa in July 1945. Several Italian submarines then moved to Key West for minor repair work though most remained at Guantanamo Bay. Once Japan surrendered, there was no longer a need to use foreign submarines as training targets. Seven Italian submarines assembled again at Bermuda and departed 4 October 1945 for Taranto via Ponta Delgada and Gibraltar. The eighth and final Italian submarine, MAMELI, followed six weeks later having been delayed by major mechanical problems.

Figure 5. The Italian submarine Marea of the Flutto class on 23 September 1944 while stationed at Port Everglades, Florida with the Anti-submarine Development Unit, Atlantic Fleet (ASDEVLANT). The photo was taken by a U.S. Navy blimp. Note the unidentified accompanying ship, likely a U.S. Navy destroyer escort. Photo courtesy of the U.S. National Archives & Records Administration, item number 80-G-280455.

Given the limited documentation available at the U.S. National Archives & Records Administration about the role of the foreign submarines, it is difficult to evaluate their performance and their collective contribution to the USN's anti-submarine training. One of the officers in command of the shakedown training group, Captain Dashiell L. Madeira (November 1943-September 1944), estimated that about 300 ships received training from the group during his time in command.[12] Another estimate for the ships trained by the group from inception through 1 June 1945 totaled 571.[13] While many of those ships would have trained with a USN submarine, the number of escort ships that trained with a foreign

submarine at Bermuda was still significant since for most of 1944 there were more Italian than U.S. subs with SubDiv 72.

In addition to newly commissioned ships receiving shakedown training, specialized anti-submarine hunting groups composed of an escort carrier and several destroyers routinely called at Bermuda to practice finding Italian submarines. Several Italian submarines including SPERI and PROCIDA received dummy schnorkels in late 1944 at Bermuda so that they could imitate German schnorkel-equipped boats for the hunting groups.[14]

Madeira's successor as commander of the shakedown training group, Captain Samuel W. DuBois, referred to "the fine job which has been done by the Italians" when considering the prospect that Italian submarines might be transferred to Italy during the last days of the war in Europe.[15] In addition, the USN's Chief of Naval Operations sent a pair of letters after the war to the Italian minister of marine praising the service of the Italian submarines assigned to the USN.[16]

Conclusion

The German attempt to sever the trans-Atlantic supply lines to Britain obliged the RN and USN to build enormous numbers of escort vessels. Properly training these new ships in anti-submarine tactics in turn required both services to dedicate submarines to serve as training targets. Demands for submarines for combat patrols resulted in a temporary shortage of training targets by 1943. The CCS solved the shortage by assigning what eventually totaled about a dozen French and Italian submarines which operated from USN bases at Bermuda, Casco Bay, New London, Port Everglades, Guantanamo Bay and Key West between September 1943 and September 1945. Although using U.S. submarines would have been simpler, the foreign boats satisfactorily completed the assignments and thus made a valuable contribution to winning the Battle of the Atlantic.

The presence of foreign warships working alongside ships of the USN is important to recognize, not just for what they accomplished during the war, but for what it meant post-war. The establishment of the North Atlantic Treaty Organization (NATO)

in 1949 formalized multi-national naval cooperation among Western countries. French and Italian warships have continued to work with U.S. ships because the demands of maintaining the freedom of the seas is greater than any one navy can accomplish on its own.

ENDNOTES

[1] Theodore Roscoe and Richard G. Voge, *United States Submarine Operations in World War II* (Annapolis, MD: Naval Institute Press, 1949), 249.

[2] Erminio Bagnasco, *Submarines of World War Two*. (Annapolis, MD: Naval Institute Press, 1977). Statistics in Bagnasco show that the O, R and S class submarines could dive to 200 feet while most German submarines could reach 500 feet.

[3] The naval component of the armistice, termed the Cunningham-De Courten Agreement after the two admirals who signed it on 23 September 1943, is available through Yale University Law School's Avalon Project, http://avalon.law.yale.edu/wwii/italy02.asp, last accessed 12/10/14.

[4] For details of the negotiations, see Admiralty files (ADM) at The National Archives at Kew, England including: ADM 1/13300 "Provision of submarines for anti-submarine training: use of French and Italian vessels and withdrawal of operational vessels from Mediterranean zone"; ADM 1/13369 "French submarines in North African ports: refit and employment"; ADM 1/18153 "Italian and French submarines allocated to Britain and United States for A/S training and their subsequent release therefrom"; ADM 199/1727 "Director of A/S warfare: training submarines and French submarine situation". Many of the signals between British naval officers regarding the negotiations with the USN are contained in the Admiralty War Diary, which is one of the documents available through the subscription service www.fold3.com.

[5] United States Navy, *U.S. Naval Administrative Histories of World War II*. Vol. 167 Commandant Naval Operating Base, Bermuda. These unpublished studies are held by the Navy Department Library at the Washington Navy Yard. This series also has volumes for Atlantic Fleet destroyers, the Operational Training Command Atlantic, Guantanamo Bay, and the major submarine commands. The three volumes for submarine commands are available through Fold3.com.

[6] Details of the movements of French and Italian submarines in the western Atlantic can be found in the war diaries of the USN's Submarine Force Atlantic, Naval Operating Base Bermuda, SubRon 7, the Destroyer/Destroyer Escort Shakedown Training Group and, to a lesser extent, the Admiralty War Diary, all available through Fold3.com. Information about French submarines of the period can be found in Axel Aboulker, *Le sous-marin Archimède 1932-1952* (Rennes: Marines Edition, 2010) and Claude Huan, *Les sous-marins français 1918-1945* (Rennes: Marines Edition, 1995).

[7] For general sources about the Italian Navy during the 1930s and 1940s, see Marc'Antonio Bragadin, *The Italian Navy in World War 2*. Translated by Gale Hoffman. (Annapolis, MD: Naval Institute Press, 1957) and Maurizio Brescia, *Mussolini's Navy: A Reference Guide to the Regia Marina 1930-1945* (Annapolis, MD: Naval Institute Press, 2012).
[8] A good source about Italian submarines after the armistice is Giuliano Manzari, "I sommergibili italiani dal settembre 1943 al dicembre 1945" *Bolletino d'archivo dell Ufficio Storica della Marina Militare*, volume 25, issue 4 (2011): 1-86.
[9] Many Italian ships were named for famous Italians. While the formal name of the vessel generally used both a first and family name, more commonly the ships were known by the family name (e.g. *Goffredo Mameli* was just *Mameli*).
[10] The USS *Frament* was featured in a 1944 official USN training film. Go to www.youtube.com and enter "USS Frament" into the search function to see eight clips from the film showing *Frament* during its shakedown training at Bermuda.
[11] Alessandro Turrini, "L'inchiesta sull'affondamento del sommergibili 'Settembrini'" *Bolletino d'archivo dell Ufficio Storica della Marina Militare* volume 4, issue 1 (1990): 95-108.
[12] Letter of 24 August 1944 contained in Dashiell L. Madeira Collection, Hoover Institution, Stanford, California.
[13] United States Navy, *U.S. Naval Administrative Histories of World War II*. Vol. 143 Commander Fleet Operational Training Command (2 volumes, 1946), 301.
[14] National Archives and Records Administration, RG 38 Records of the Office of the Chief of Naval Operations, World War II War Diaries, Box 316 DD-DE Shakedown Training Group, weekly progress report of various dates in November and December 1944.
[15] Training Group Guantanamo Bay, weekly progress report of 6 May 1945, Fold3.com.
[16] Giovanni Bernardi, *La Marina, gli armistizi e il trattato di pace, settembre 1943 – dicembre 1951* (Rome: Ufficio Storico della Marina Militare, 1979), 521-522.

SUBMARINE NEWS FROM AROUND THE WORLD

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From the February 2015 Issue

NETHERLANDS—Future Submarines Linked to Sweden by Saab/Damen Agreement

In January 2015, Damen Shipyards Group of the Netherlands and Saab of Sweden signed an exclusive teaming agreement for the Walrus class submarine replacement program for the Royal Netherlands Navy (RNIN).

Information received in September 2014 indicated that the RNIN desired to join Norway (Ny Ubat) and Sweden (A26) in their submarine programs. With Damen now signing the teaming agreement with Saab, the RN1N is one step closer to joining with Sweden and it future submarine program. Saab acquired Kockums shipbuilding from ThyssenKrupp in July 2014 and as such, became Sweden's submarine builder. While Damen builds well over 100 vessels annually, they do not have experience in submarine construction and as such, teaming with a partner like Saab Kockums is essential for the program to move forward smoothly.

The teaming effort would likely see Damen producing modules for the four replacement submarines that would be shipped to Kockums in Sweden for final assembly and outfitting. Damen could also produce some of Sweden's modules and possibly Norway's (if and when they officially join) as well. It is also possible that Damen could assemble its own submarines if it intends to remain in the submarine construction business beyond the four Walrus replacements.

With the Walrus replacement program now moving ahead, a construction contract will probably move up by several years to be more in line with the Swedish program. AMI anticipates that a

final design (probably based on the A26 as it is well advanced in the design stage) could be completed by 2018 and a construction contract in place by 2020. This would allow for a commissioning date of 2025 for the first unit. The first Swedish unit could begin construction as early as 2017 or 2018 and the first Norwegian unit (if they participate) also in 2017 or 2018.

Although all three countries may share a common hull, each will probably utilize their own specific combat systems. For the Netherlands, the Dutch Underwater Knowledge Centre (DUKC) will play a guiding role in preparing for submarine construction in the Netherlands, we expect IMTECH Marine to be a major player in electrical and mechanical systems engineering and integration, and of course Thales Naval Nederland (TNN) would most likely be involved in the combat systems integration. AMI anticipates that the four Walrus class boats will be replaced on a one for one basis, decommissioning as the new boats enter service.

POLAND

Slowing of Submarine Program

In late January 2015, AMI received information that the Polish Navy (Marynarka Wojenna – MW) is planning to sign a contract for the construction and delivery of three submarines under Project ORKA, within two years. Originally expected to be signed in late 2015, the program is, as expected, slipping to the right due to decision and funding issues. One major hurdle that appears to have been dealt with at a recent meeting led by Ministry of Defense (MoD) Secretary of State, Czeslaw Mroczek, was the assumptions of offset agreements on this program were unanimously adopted-maintaining technical readiness, conducting repairs, modernizing, and manufacturing military equipment and armaments.

One major decision that is still under consideration is whether or not the submarine will be equipped with cruise missiles. In November 2014, the desire for a long-range submarine strike capability was expressed, indicating that either tomahawk or Naval Scalp, depending on the design chosen, would be part of the procurement.

The MW's desire for a strike missile on the new submarine has led to the necessity of updating the requirements documents for Project ORKA, pushing the expected contract date to as late as early 2017.

As of his writing, only France has publicly stated that it would grant Poland full autonomy regarding the use of a submarine-launched cruise missile (SLCM), with one stipulation, that it selects the DCNS Scorpene submarine design. Should Poland desire to acquire the US-made Tomahawk missile and have full autonomy in their use, approval would have to be granted from the US Congress.

Current planning has the MW receiving the three submarines from 2020 through 2025. Considering that training and testing of the vessels, in particular the SLCM system will take upwards of a year, the first unit will need to begin construction no later than 2017 in order to see the boat delivered and operational by 2021.

To make the timing situation worse, the MW intends to de-commission its four Kobben (Type 207) class submarines by the end of 2016, leaving the sea service with the ORP ORZEL (Kilo class) as their only operational subsurface vessel. Considering that the MW also intends to decommission ORP ORZEL in 2022, it will be vital to get the new boats in service as soon as possible or risk losing trained crews to man them in addition to having a major capabilities gap in undersea warfare.

REGIONAL UPDATE
ASIA —VIETNAM

Hanoi Class (Kilo 636) Diesel Electric Submarine (SS): On 30 January 2015, the third Hanoi class (Kilo 636) submarine, HAIPHONG (HQ-184) arrived in Vietnam on a special transport. On 30 December 2014, the fourth unit, DA NANG (HQ-185), was launched from Admiralty Shipyards in Russia. It will be delivered to the Vietnamese People's Navy (VPN) on schedule at the end of 2015.

The fifth and sixth units, KHAN HOA (HQ-186) and BARIA VUNG TAU (H-187) will be delivered by the end of 2016 ending the program. There are no indications at this time that the VPN will order additional units following the delivery of the final units in 2016.

REGIONAL UPDATE

AFRICA

ALGERIA-Kilo Class Submarines: On 13 January 2015, AMI received information that the Algerian National Navy's (ANN) two new construction Kilo class (636) submarines would begin by the end of 2015 at Russia's Admiralty Shipyard in St. Petersburg. A construction contract was probably in place by the end of 2014.

Both submarines will be delivered to Algeria by the end of 2018 bringing the force level to four Kilo 636s. The last two Kilo 636s will probably replace the ANN's two Kilo 877Es commissioned in the 1980s.

DID YOU KNOW?

BRAZIL-On 18 January 2015, first steel was cut on the fourth Brazilian Navy (Marinha do Brasil – MdB) Riachuelo (Scorpene) class submarine, TONELERO (S 42), at Brazil's Itaguai Construcoes Navais.

From the April 2015 Issue

POLAND – Submarine Tender to be Released in 4th QTR 2015

In late January 2015, AMI reported that the Polish Navy (Marynark Wojenna – MW) was planning to sign a contract, for the construction and delivery of three submarines under Project Orka, within two years. Then, on 14 March 2015, further information regarding the time line was received and corroborates the estimated 2017 start date.

The Polish Deputy Prime Minister tweeted on 12 March 2015 that the MW had indeed asked France and the United States (US)

about procuring cruise missiles for their submarine program and had launched negotiations with the US for Raytheon Tomahawk cruise missiles.

Originally expected to be signed in late 2015, the program is, as expected, slipping to the right due to the missile decision and funding issues. The MW's desire for a strike missile on the new submarine has led to the necessity of updating the requirements documents for Project Orka. March 2015 information has stated that a Request for Tender (RfT) will now be issued in the fourth quarter of 2015, pushing the expected contract signing to 2017.

As of this writing, only France has publicly stated that it would grant Poland full autonomy regarding the use of a submarine-launched cruise missile (SLCM), with one stipulation, that it selects the DCNS Scorpene submarine design. Should Poland desire to acquire the US-made Tomahawk missile and have full autonomy in their use, approval would have to be granted from the US Congress.

With the change in the RfT and contract signing dates, the first two submarines are to be delivered by 2022, followed by the third boat in 2023. This is more or less in line with Poland's Military Modernization Plan for 2013-2022. Under the planed deal, a service and maintenance facility is to be established in Poland.

Of note, the MW intends to decommission its four Kobben (Type 207) class submarines by the end of 2016, leaving the sea service with the OPR ORZEL (Kilo class) as their only operational sub surface vessel. Considering that the MW also intends to decommission ORP ORZEL in 2022, it is vital to get the new boats in the service as soon as possible or risk losing trained crews to man them as leaving the sea service with a vital capabilities gap in undersea warfare.

SWEDEN – Government Commitment to A26 Submarines

On 17 March 2015, Swedish Defense Minister Peter Hultqvist announced the intention to procure two A26 Submarines from Saab Kockums at a cost of US$948.5M. The proposal has already

been formally proposed to the Cabinet for review and approval. Although not a contract, the Swedish government has further solidified its intentions to procure the submarines.

AMI believes that the timing of the announcement may also be to help promote the A26 design to the Australian Government. The recent Australian announcement concerning its procurement strategy, which listed candidates for its Future Submarine Program (SEA 1000), did not include the A26 design. The reason given was that Sweden has not built new submarines in recent years.

If Sweden begins its A26 program on schedule, it would go a long way in showing that Saab has a viable design (and active construction program) and should be considered by the Australians as a potential option.

This announcement follows the June 2014 announcement of a signed Letter of Intent (LoI) by Saab and the Swedish Defence Material Administration (FMV) regarding the Swedish Armed Forces underwater capability for the period 2015 through 2024. The LoI comprises the support, development, design, and production of submarines and other underwater systems; provided that the necessary decisions are made by the Swedish Government. Forwarding the proposal to the Cabinet is the latest decision.

With the proposal now presented to the Cabinet (assuming approval), negotiations could begin by the end of 2016 with a contract in place by 2017 allowing the first unit to enter service in 2021 and the second in 2022. AMI estimates that a total of five units will be procured by the Royal Swedish Navy (RSwN) to replace the two Sodermanland (A17) class and the three Gotland (A19) class. The first two will replace the Sodermanland class with the second two being ordered by the mid-2020s to replace the three units of the Gotland class.

In addition to the five hulls that will probably be procured by the RSwN, the Royal Netherlands Navy (RN1N) also currently plans to join Norway and Sweden in the new construction submarine program. The RN1N's first submarine is scheduled for delivery by 2023.

UNITED KINGDOM

Successor SSBN Design Work Continues

On 11 March 2015, the British Government released US$422.5M to continue the design work for the Successor Nuclear Powered Ballistic Missile Submarine (SSBN) Program. The latest funding is within the US$4.8B Assessment Phase funding line. BAE Systems will continue its design work worth an estimated US$381M. US$32.6M will go to Babcock and the remaining US8.9M to Rolls Royce. BAE Systems received two previous contracts in 2012 worth an estimated US$486M and US$467M in order to work the initial design.

The latest funding will allow for the maturation of the design over the next 12 months continuing into the construction phase in 2016. Main Gate approval will be needed prior to the start of actual construction. Although official Main Gate Approval will not occur until 2016, AMI estimates that the Successor Program is now a go with first steel being cut on the first unit before the close of 2016. Simply put, the program has matured to the point that it would be too difficult to find an alternative solution or to make a decision to completely scrap the program.

Additionally, the submarine shipbuilding sector of the country's industrial base is far too critical to further delay or cancel the program. The only question remaining is how many hulls will be built, three or four depending on whether the United Kingdom desires a Continuous at Sea Deterrence (CASD) or a near-CASD. That decision will probably be made around 2020 after the third unit is already under construction.

UNITED STATES

Ford Class Carrier Construction Contract

On 17 March 2015, Rear Admiral Thomas J. More, program executive office (PEO) for carriers stated that the US Navy plans to award the construction contract for USS JOHN F. KENNEDY (CVN 79) to Huntington Ingalls Industries (HII), Newport News Shipbuilding (NNS) in the second quarter of 2015.

Due to cost cutting measures as well as critical infrastructure investments made by HII at NNS, it is estimated that KENNEDY

will be built for around US$1B less than the lead ship of the class, or US$11.5B.

One major equipment change to the KENNEDY that will also result in cost savings will be the replacement of the dual-band radar with the new Enterprise Air Surveillance Radar (EASR). This system will also be used on all new construction carriers, future amphibious assault ships (LHA/LHD), as well as being installed on current Nimitz class CVNs during their respective overhauls.

JOHN F. KENNEDY will be the second of three planned units of the Gerald R. Ford class nuclear powered aircraft carriers (CVN) that is expected to commission in 2022. The third unit of the class, Enterprise (CVN 80), is currently planned to begin construction in 2019 with commissioning in 2027.

REGIONAL UPDATE

THAILAND: Submarine Program: In March 2015, South Korea's Hyundai Heavy Industries (HHI) offered a custom design of its HDS-500RTN coastal submarine to Thailand to meet its submarine requirement. The Royal Thai Navy (RTN) continues to publicly address its desire to create a new Submarine Force.

The RTN does have a long standing requirement for submarines. However, due to funding shortfalls and political instability (leadership changes, etc.), has never been able to progress past the stage of design considerations.

DID YOU KNOW?

United States: In early March 2015, the USN revised the delivery dates of the three Zumwalt class destroyers. USS ZUMWALT (DDG 1000) will be delivered in November 2015, USS MICHAEL MONSOOR (DDG 1001) in November 2016 and the USS LYNDON B. JOHNSON (DDG 1002) in December 2018.

GERMANY: On 25 March 2015, the German Navy commissioned the fifth of six Type 212 A class submarines, U35.

FRANCE: In late March 2015, the French Navy (FN) named the fifth and sixth Barracuda class nuclear powered attack submarine (SSN) RUBIS and CASABLANCA.

From the May 2015 Issue

Pakistan: Chinese Submarine Deal Approved

On 01 April 2015, Pakistan's Prime Minister Nawaz Sharif approved a government-to-government deal to procure up to eight submarines from China. The deal is expected to be signed by both parties when China's President Xi Jinping visits Pakistan. The visit is to occur before the end of the year.

Pakistan's Prime Minister did announce that the Pakistani Navy (PN) was considering the Yuan (Type 041) and the export S20 design. The deal is expected to be worth between US$4B and US$5B. Following signature on the government-to-government agreement, the PN will begin detailed negotiations with China concerning the final design, costs and building locations for all eight units.

AMI estimates that the first four units will be made in China at either the Wuhu or Jiangnan Shipyards and the four Pakistani units at Karachi Shipbuilding and Engineering Works (KSEW) with Chinese assistance. It is possible that China could build additional units (of the remaining four) if Pakistan falls behind on its building schedule. This will be the most aggressive naval building program for KSEW to date.

This deal follows information received in June 2011 that indicated a deal with China was very close to being finalized and in February 2014 financial negotiations were already underway with the China State Shipbuilding Industrial Corporation (CSIC). Technology transfer negotiations apparently were completed in early 2014.

Assuming the final design will be chosen and the final financial package has been worked out by the end of 2015, the first four units that will be built in China could start the construction phase in early 2016 with delivery by 2022. The first Pakistani unit could

start by the end of 2016 and commission in 2021. The remaining three units of the class (assuming all Pakistani construction) could commission from 2022 through 2025.

AMI estimates that the majority of all combat and sensor systems will be of Chinese origin with some of the components being built in Pakistan. It appears that Pakistan has finally decided to move forward with the Chinese alternative rather than further pursue its western options (Type 214 and Scorpene) which have been on the table since the early 2000s.

Pakistan made it clear in 2010 that China did not have any of the end user restrictions on systems that are considered major issues with western suppliers.

The new submarines will displace around 2,300 tons and armed with YJ-82 anti-ship missiles and a combination of Yu3 and Yu-4 torpedoes. The biggest question will be if the PN wants to have an Air Independent Propulsion (AIP) capability, which was stipulated in the early days of the program. Since 2007, rumors have persisted that some of the Chinese Yuan (Type 041) class are using an AIP system developed by the No. 711 Research Institute. If this technology is available, then the PN will most likely integrate it into the program, and hence the final design selected. Pakistan could also utilize Tognum MTU diesel engines in lieu of Chinese diesels. China used MTU diesels in its Song class and builds MTU engines under license.

THAILAND

Submarine Program Request Submitted to Government

On 24 April 2015, the Royal Thai Navy (RTN) formally submitted a proposal for the acquisition of submarines to the Thai Government. The proposal came one week prior to a meeting between Thai and Chinese officials. Thai Deputy Prime Minister/Defense Minister Prawit Wongsuwan met with Chinese Defense Minister General Chang Wanquan during the last week of April.

The acquisition of submarines was one of the topics discussed during the visit. AMI believes that the RTN is simply looking at Chinese proposals to compare with others that have been received

by the sea service for the better part of five years. The RTN will also revisit some of the previously reviewed designs/finance packages as well as any new designs that have recently appeared the international market.

With the formal acquisition now submitted to the government, it appears that the RTN may have entered a new stage by reviewing (or second look) available designs/financing packages. The question is whether funding will be made available. Thailand has a requirement for at least two submarines according to its 2011-2020 naval procurement plan although it has struggled for the past decade to find adequate funding to move to the next step. Admittedly, the RTN has been able to obtain funding for two new construction South Korean frigates and a Singaporean landing platform dock (LPD) over the past several years. It is possible the funding will finally come for this program that has been talked about since the 2005 Mega Project.

The latest push for submarines started in November 2014 during the Commander-in-Chief (CINC) of the Navy turnover, a topic which occurs during every CINC turnover. The new Navy Commander, Admiral Kraisorn Chansuwanich, forwarded his proposal to the Deputy Prime Minister and Defense Minister, which apparently received a positive response prior to the proposal to the Thai Government in April. The RTN insists that a design decision will be made over the next three months (Jun-Aug).

AMI estimates that the RTN will continue reviewing its news construction alternative. Used submarines are probably not favorable in the eyes of the RTN as they turned down a used Type 206A offer from the Germans. The RTN also typically procures new naval platforms.

The following designs are either or will be considered for the two hull program:

- The Chinese Song, Type 041 and the S20 design
- South Kora's Hyundai Heavy Industries (HHI) offered a custom design of its HDS-500RTN coastal submarines to the RTN in March 2015.
- DCNS Scorpene

- TKMS Type 214
- Navantia S80
- Saab Kockums A26 design (offered in April 2015)

Although the program has been proposed to the Thai Government, funding will still be an issue and the foreign supplier will need very favorable price and financing options in order to win the RTN. Press reporting suggests that the RTN is willing to spend up to US$1.1B for the two hulls. Some within the RTN favor the Chinese solution due to their burgeoning relationship with China while others favor the traditional European solutions. As stated earlier, price and financing details will be the key issue.

If the RTN does get the formal go ahead from the Thai Government in the short term (for full Thai funding, a domestic/foreign financing package or barter agreement), a design down select could occur by the end of 2015. A contract for two foreign built submarines could be in place by 2017.

THE SUBMARINE REVIEW

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

Articles for this publication will be accepted on any subject closely related to submarine matters. Their length should be a maximum of about 2500 words. The League prepares **REVIEW** copy for publication using Word. If possible to do so, accompanying a submission with a CD is of significant assistance in that process. Editing of articles for clarity may be necessary, since important ideas should be readily understood by the readers of the **REVIEW**.

A stipend of up to $200.00 will be paid for each major article published. **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.

Comments on articles and brief discussion items are welcomed to make **THE SUBMARINE REVIEW** a dynamic reflection of the League's interest in submarines.

Articles should be submitted to the Editor, SUBMARINE REVIEW, 5025D Backlick Road, Annandale, VA 22003-6044.

BOOK REVIEWS

EMPIRE RISING

by Rick Campbell

Reviewed by CAPT George Norman, USN, Ret.

CAPT George P. Norman, USN (Ret.) served on five submarines; including Commanding Officer of USS MAINE (SSBN 741) Gold from 2005-2007 and USS OHIO (SSGN-726) from 2012-2014. He completed deployments to the Arctic, north Atlantic, Mediterranean, Western Pacific, and 7 strategic deterrent patrols. Key shore assignments include Program and Budget Chief on the Joint Staff, Executive Assistant to Commander Navy Personnel Command, and Executive Director of the CSDS12 Tactical Analysis Group. He retired in 2014 after 27 years of service and is the Director, Strategic Planning for the Finance at Prudential Retirement in Hartford, CT.

In EMPIRE RISING, Rick Campbell creates a plausible, if unlikely, scenario to challenge the U.S. Navy and military. Although some may quickly dismiss his premise, the point is not will it happen but could it happen. Viewed in that context, EMPIRE RISING is a fast-paced and thought-provoking novel that will not only entertain but should cause the reader to give some serious concern to the potential risks we must at least consider in our military strategy.

With its back against the wall, the United States military needs a miracle—enter USS MICHIGAN. Although the real protagonists are the National Security Advisor and the embarked SEAL team leader, it is the stealth, mobility, and daring-do of MICHIGAN and her crew that becomes critical to success. In spite of my personal bias toward the USS OHIO (I was CO of OHIO Blue up until July 2014), I was quickly engrossed into rooting for

MICHIGAN and her crew to overcome seemingly insurmountable odds.

Against this backdrop, the author produces a different breed of submarine adventure novel. The language and descriptors are more than enough to let the reader easily envision him/herself underway; especially those of us with submarine experience. But for the most part, the story quickly moves through long tactical scenarios and focuses more on the operational level of submarine warfare.

Being a fiction novel, I do wish there was a little bit more character development. It was difficult to feel real passion toward any of the leading figures. I found myself involved more by the story than the characters. I would also acknowledge that some of the scenario, in particular the initial U.S. response, might be a bit fanciful. I certainly consider the basic premise to be reasonable, but I would hope that our response would not be quite as dogmatic as presented.

Nonetheless, EMPIRE RISING presents an interesting strategic backdrop that we cannot and should not simply dismiss. It is an exciting and fast-paced story that should get all of us thinking about *what if*. If you enjoy submarine adventure novels, put this on your summer reading list.

SHEPPARD OF ARGONNE:

ALTERNATIVE HISTORY NAVAL BATTLES OF WWII

by G. William Weatherly

Published by iUniverse LLC, Bloomington, IN47403

ISBN 978-1-4917-3192-5 (hc)

Reviewed by CAPT. Jim Patton, USN, Ret.

Captain Patton is a frequent contributor to THE SUBMARINE REVIEW.

I was given SHEPPARD OF ARGONNE, and was greatly relieved to discover almost immediately that it was not a story about a French goat-herder. In fact, I know G. William Weatherly—the real G. William behind the *nom de plume*. He's a retired submariner, and a good one at that. No stranger to the rewards and burdens of command at sea, G. William also not only taught submarine wardrooms the arts and sciences of fighting their ships as the Director of Advanced Tactical Training at Submarine School, but also helped develop the supporting tactical doctrine at Submarine Development Squadron 12 and was involved at the global strategic level of naval power in a tour at the Naval War College. I have had the opportunity of watching G.William in action, and he is one of the kind of officers that enlisted submariners hope they always serve under, and that submarine junior officers hope they will someday be like. Above all, he was one who clearly was having fun in his assignments—an indispensible leadership trait.

But this review is not meant to be about G. William, but is about his book. The above is mentioned only because there is

much about CAPT Sheppard McCloud that reflects the same outstanding traits that the Submarine Force fosters in its COs, and there is much about USS ARGONNE, his Battle Cruiser command and its crew that will get any ex-CO of a naval vessel a little tingly. CAPT McCloud is an exceptionally competent, but complex, leader of men and fighter of ships that also fights some internal demons.

The key to the story is the clever *alternative history* twist. In supposing that the nine nation Washington Naval Conference in 1920-1921, which placed significant limits on the participants growth of naval power, had fallen through, a credible scenario was set for the Atlantic to have been a much larger arena for naval engagements than it was historically. With this supposition, G. William Weatherly crafts a real page-turner on a believable "it could have been that way" basis. Students of naval history will notice whiffs of both the Battle of Leyte Gulf and the Battle of Midway.

What keeps SHEPPARD OF THE ARGONNE from being just a shoot-em-up video game in print is the author's simply exquisite level of knowledge conveyed in the day-to-day operations of ARGONNE and other units—at the material, operational and personnel management levels. As a submariner, one would expect for him to get that part right, but the expertise extends across all warfare specialties. It isn't everyone who realizes that the landing gear of an F4F *Wildcat* had to be manually cranked up and down (pilots of these aircraft were known for their *Grumman arm*- a very strong left bicep), let alone be masters of the delicate orchestration of events within a large caliber barbette while loading and firing those naval rifles. As far as this reviewer's capability to judge, nomenclature throughout was *spot on*—even sending me to Wikipedia to determine what in the world a *batten board* was, and how did it affect the alignment of the ship's gun batteries.

There is an element of mystery in the book that I'll task readers to discover and solve for themselves. There is periodically a couple of short italicized paragraphs that seem out of place and disconnected from the story line, including the very beginning and

the very end of the story. I'm embarrassed to admit how long it took me to decipher them, but when I did, it was an *Aha* moment that largely captured the nature of naval service.

One of the missives that Admiral Rickover routinely sent to G. William, myself and all the other officers beholden to him spoke about the holy obligation one assumes when undertaking a *book review* in that you will be advising others whether or not to expend their money, and more importantly in Rickover's view, their time on the book in question. Knowing that warts must be revealed where they exist, I thought I had found one when ARGONNE's guns were described as being 18 inches in a few places, and 16 inches in another spot until, reading on, that the 16 in reference was false intelligence from a visual classification by the skipper of a German U-boat which led to far-reaching consequences. In the end I had to satisfy myself with noting that a PPI-type radar scope was explained as a *Plane Position Indicator* instead of the proper *Plan Position Indicator*. Certainly a fatal flaw!

I began to get a little nervous as I approached the end of the book, since there were many *loose ends* existing, and not apparently enough time and pages left to resolve them all. As I closed the book, however, it dawned on me that this was almost certainly by design, and (Harry Potter watch out!) that more adventures lie in the future for CAPT Sheppard McCloud and his German nemesis Vizeadmiral Klaus Schröder.

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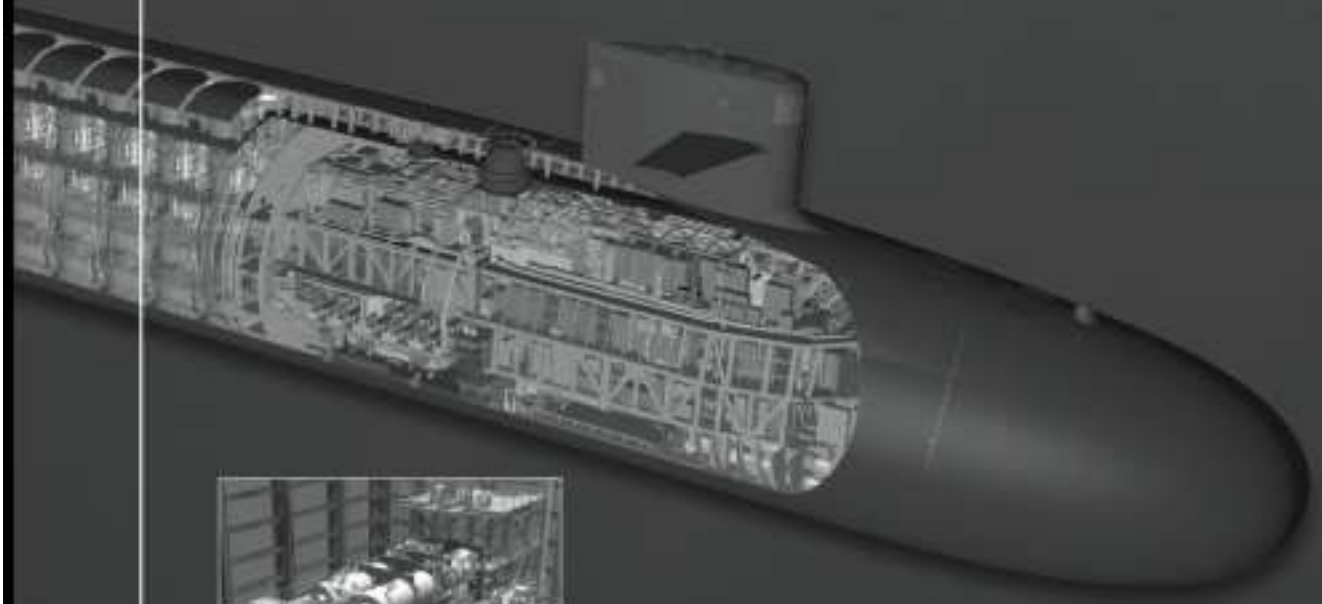

The World Demands Deterrence…The Times Demand Affordability

General Dynamics Electric Boat has demonstrated a new method of constructing the next-generation SSBN that will save millions of dollars per ship, a decade before work begins. One Navy admiral called it 'The most successful prototype program I have ever been involved with.' It's part of the Navy-EB commitment to controlling costs of a program vital to national security.

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