JANUARY 2009

PAGE

ANNUAL SYMPOSIUM

CNO Address to the Naval Submarine League
ADM Gary Roughead 9

Chairman's Welcome to the Symposium
ADM Rich Mies 15

Report from Commander, Submarine Forces
VADM J. J. Donnelly 20

Report from ComSubPac
RADM Doug McAneny 33

Report from Director, Submarine Warfare
RADM Cecil Haney 44

Navy Irregular Warfare
RADM(Sel) Mark Kenny 52

Perspectives of an SSGN Commanding Officer
CAPT Chris Ratliff 59

Banquet Address
FORCM Jeff Garrison 67

ARTICLES

Fitting Submarines Into the Fleet
RADM Jerry Holland 73

Perceptions/Realities: Thoughts on Quantum Physics
Mr. John Merrill 81

Where's Our Undersea Skunk Works
Capt. Jim Patton 91

Submarine News from Around the World
AMI Hot News 94

THE SUBMARINE COMMUNITY

Address to TRITON Reunion
ADM Chiles 107

Dedication of ALBACORE Memorial, Oregon
Capt Chris Ratliff 110

THE SUBMARINE INSTITUTE OF AUSTRALIA

Commander, USN Submarine Forces
VADM J. J. Donnelly 118

Parlimentary Sec'y for Defence Procurement
Hon. G. Combet MP 125

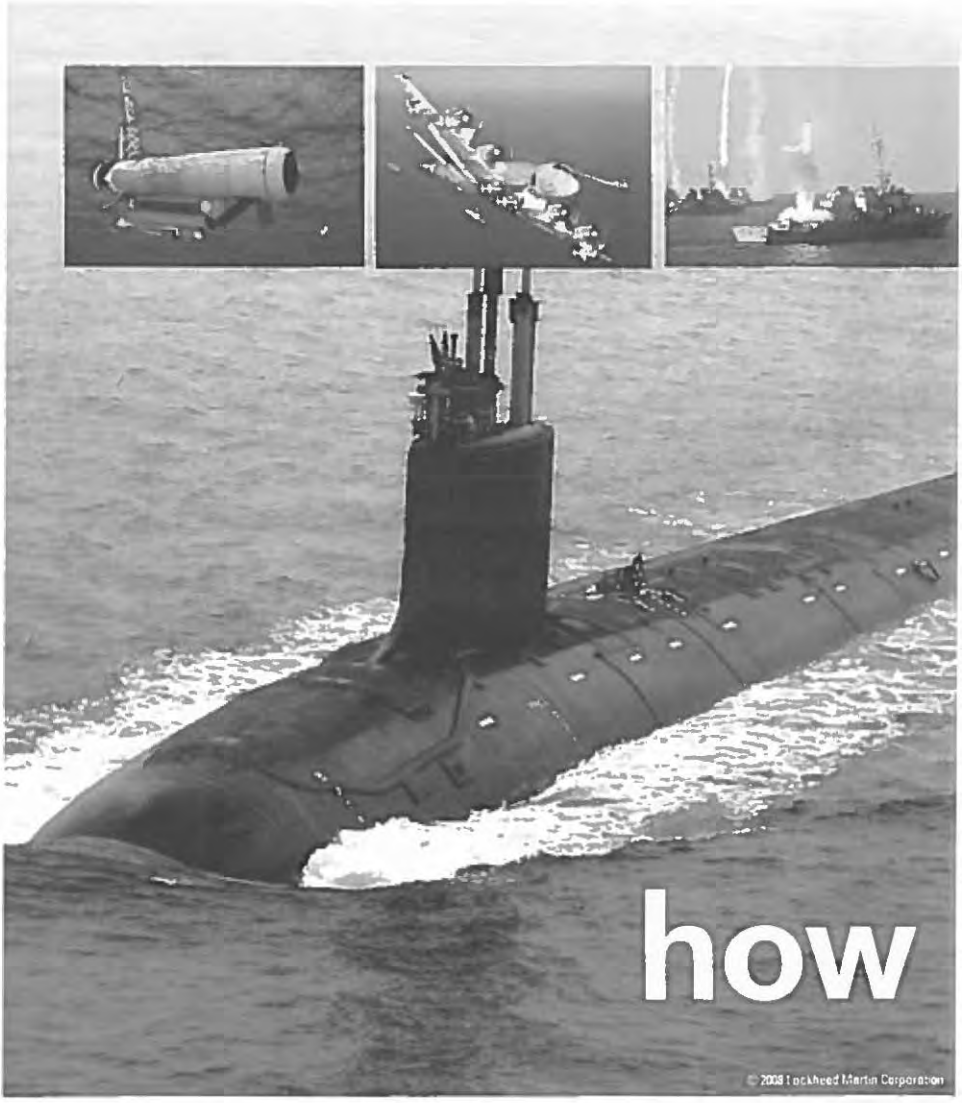
THE BATTLE OF THE ATLANTIC 1939-1945

Why the U-Boat Campaign Failed Pt I of III
VADM James A. Sagerholm 134

BOOK REVIEW

Stealth Boat *by Gannon McHale*
Mr. John Castellucci 147

Royal Navy Submarines *by Maurice Cocker*
Sub Research Center 150



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EDITOR'S COMMENTS

The theme of 2008's Submarine League Symposium in October was *SSGN–On Station Fighting the Global War on Terror* and the presentations given there have provided our FEATURES section several outstanding variations on that theme.

Firstly, the Chief of Naval Operations laid out the high level endorsement of the SSGN class initial operations as the foundation and spearhead of Navy's *Irregular Warfare effort.* That was part of his very warm and welcome message to the Submarine Force and its supporters. All should read his words to the Symposium. One interesting point he made was his desire to adapt some of the Submarine Force ways of doing business to other parts of the Navy.

Irregular Warfare itself was the subject of a presentation by RADM Mark Kenny, a submarine officer heading a new section of the CNO's staff. His explanation of their aims, their methods and their views of the future are as plain and descriptive as any of us could expect in a non-classified forum. One famous submarine admiral once complained that in the Pentagon *the imperative often takes precedence over the important*; it is, therefore, gratifying to read RADM Kenny's words about the time frame in which his office has to work and his corresponding ability to cross bureaucratic borders to achieve near-term objectives. It might be said that *Irregular Warfare* has become an important part of the submariner's business; but it might be more appropriate to phrase the new construct as the submariner's business has become an important part of *Irregular Warfare.* In either case, it is important for all in the submarine community to understand the implications in, and between, the lines of RADM Kenny's presentation.

The more specific comments about the SSGN-class, its recent operations and its huge potential were recounted by Captain Chris Ratliff, the former Commanding Officer of OHIO (Blue). Captain Ratliff's wide experience includes five tours in SSNs, an E-Ring tour in the Pentagon, a deployed Battle Group staff job during Desert Storm, five patrols in command of an SSBN and two years in command of the SSGN. That kind of background of depth and breadth in the business of naval force employment makes his report and evaluation of SSGN-class potential well worth the attention of all–the public as well as all in the submarine community.

A second variation on the Symposium theme was offered by the Submarine Force leadership. Again, Admiral Roughead, the CNO, led the way in his complementary comments on Submarine Force methods and achievements–his direction to continue in innovation and excellence in all phases of submarining nevertheless very evident. Outstanding summaries of the activities, operations, programmatics and personnel management of the Undersea Warfare Enterprise were given by Vice Admiral Jay Donnelly as ComSubFor and CEO of the USW Enterprise, Rear Admiral Doug Haney as ComSubPac and the COO and Rear Admiral Cecil Haney as Director, Submarine Warfare (CFO). Those reports, along with the Mark Kenny and Chris Ratliff comments, provide a wealth of information for League members to pass along to any public group to which they may have access.

The third variation on the theme more widely concerns the entire submarine community, particularly of the industrial and retired sectors, and their commitment to the continued excellence of the Submarine Force. Two four star officers in their addresses made very concise statements of what the Submarine Force is all about. Admiral Mies, in his welcome to the Symposium, and Admiral Chiles, in his address to the TRITON reunion, both provided words for all of us to remember.

Jim Hay
Editor

FROM THE PRESIDENT

2008 has been a great year for the Submarine Force. The Force Commanders have done a marvelous job keeping submarines on station conducting missions of great importance to the nation. The Navy and industry have made progress in delivering submarines on time and on budget. NEW HAMPSHIRE (SSN 778) was commissioned on 25 October. NEW MEXICO was christened on 12 December and is scheduled for delivery in August 2009, eight months early. By the time you read this letter the new contract for the next eight submarines in Block III may be signed. This contract will include the redesigned bow and two new launch tubes that use the OHIO Class Trident Missile launch tube with the multiple all-up-rounds canisters (MAC) developed for the SSGNs. Unfortunately submarine assets are not available to match the demand. Vice Admiral Donnelly reported that in spite of the approved funding for the second VIRGINIA Class submarine in FY10, the Force will drop below the mandated 48 attack submarines in 2020.

Changes in Submarine Force leadership included RADM McAneny relieving RADM Walsh as COMSUBPAC and RADM Walsh relieving VADM John Bird as Deputy Commander, U.S. Pacific Fleet. VADM Bird became Commander Seventh Fleet. Orders have been issued for RDML Richardson to relieve RADM Leidig as COMSUBGROUP EIGHT.

Your Naval Submarine League is on track to complete a profitable year. All services were provided within budget. NSL's Corporate Benefactors made a significant financial commitment sponsoring this year's events. Additionally, Corporate Benefactors and Guest Exhibitors supported the Annual Symposium with exhibits. Gifts in-kind from Industry members, in conjunction with the Corporate Benefactor program, support much of the League's overhead costs. This generous support allowed the League to hold attendance costs to last year's level.

The Annual Symposium was a big success. There was record attendance at the combined Submarine Force Fall Cocktail Party and the Submarine Social. CNO Admiral Gary Roughead addressed Symposium attendees and reiterated his support for the Submarine

Force. CAPT Chris Ratliff discussed his first patrol in command of USS OHIO (SSGN 726) BLUE. Other speakers highlighted the successful integration of the weapon systems and the ship conversion process. RDML Mark Kenny wrapped up a four session presentation on the SSGN with his remarks about the strategic importance of having this ship on station. If you were unable to attend the Symposium, DVDs of the presentations are available on a loan basis from the NSL office. I ask that you cover the postage. Please mark your calendars for next year's Symposium on 28-29 October 2009 at the Hilton McLean.

The NSL Board of Directors has some new faces with the election of three new members: RADM Phil Davis, Mr. John Fox, and Mr. Don McCormack. Mr. Mike Petters was elected for a second term. VADM George Emery was appointed to a one year term and will remain as the General Chairman of the Submarine Technology Symposium. I was also appointed to a one year term by the Board and will continue to serve as your President. Your Board provides strong leadership and direction for the League and supports the many initiatives that you see each year.

I am pleased to report that the major events for 2009 are progressing well. The draft agenda for the 4-5 February 2009 Corporate Benefactors Recognition Days includes Admiral Kirk Donald and VADM Steve Stanley with other speakers awaiting confirmation. Senator Jim Webb (D-VA) has been invited to speak at the Congressional Breakfast on 5 February. This event is designed to thank the Corporate Benefactors for their support of your League.

The Annual Submarine History Seminar co-sponsored by the Naval Historical Foundation and Naval Submarine League will be held 15 April 2009 at the Navy Memorial. The topic is ***"Submarine Land Attack Missiles,"*** featuring a historical review of the submarine launched missiles including Regulus and Tomahawk. Confirmed speakers include Ambassador Linton Brooks, who served in the Policy Division of the Staff of the Chief of Naval Operations and RADM Walter Locke, USN (Ret), who was the first Program Manager of the Submarine Launched Attack Missile Project and the first Director of the Joint Cruise Missile Project. Dr. John Sirmalis, former Technical Director of the Naval Undersea Weapons Center, will moderate a panel assembled by RADM Jerry Holland, USN

(Ret). Please mark your calendar for an interesting evening which will conclude with the celebration of the Submarine Force Birthday.

The Submarine Technology Symposium will be held 12-14 May 2009 at The Johns Hopkins University Applied Physics Laboratory. The theme, ***"Planning for the Future in an Uncertain World,"*** promises to be another outstanding event. The session topics will include **Communications Capability and Interoperability, Submarine Offensive Capability, Force Requirements, Full Spectrum ASW** and **US/UK Next Generation SSBN**. The last session will be a joint US/UK presentation on the common missile compartment for the new Sea Based Strategic Deterrent System. Featured speakers include Admiral Gary Roughead, CNO, Admiral Kirk Donald, Naval Reactors, VADM Van Mauney, Deputy Commander, STRATCOM, Submarine Force Commanders, and speakers from the UK.

THE SUBMARINE REVIEW provides a forum for discussing topics of interest to the Submarine Force. Jim Hay consistently publishes a quality journal each quarter with timely and relevant articles of importance to the Submarine Force. Seize the opportunity to express your views on subjects important to undersea warfare.

Jan joins me in wishing you a very Happy, Healthy, Prosperous and Joyful New Year. Join us in keeping military personnel around the world in your prayers.

J. Guy Reynolds
President

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ANNUAL SYMPOSIUM

ADMIRAL GARY ROUGHEAD
CHIEF OF NAVAL OPERATIONS

REMARKS AT NAVAL SUBMARINE LEAGUE SYMPOSIUM
OCTOBER 22, 2008

It has been a fairly busy seven days. Last Tuesday night I left and flew to Venice, Italy for a Regional Seapower Symposium of Black Sea and Mediterranean countries. They've also expanded into South Africa. We also had Brazil there, so we're seeing our regional initiatives really take root, take hold and most importantly kind of spread out. We then flew to Maine for the christening of the WAYNE E. MEYER, truly a unique opportunity to christen a ship with the ship's namesake present. And I can assure you that Wayne is as sharp as ever. It really was a great couple of days up there with him. And then I've been flying up north every night for two dinners in Philadelphia and then I was in Boston last night for the 211th birthday of USS CONSTITUTION. So from last night going from our oldest ship to being with a group of those who represent our newest ships, it really has been a busy week. I got into a little bit of trouble when I had the choice between a romantic weekend with my wife in Venice after the Regional Seapower Symposium or going to see Wayne Meyer in Bath, Maine. My judgment was called into question on that one.

But I really did want to come out and spend some time with you. Jay Donnelly will know this, that the reason I wanted to is because I love submarines. Some of my brothers and sisters in my community think I've gone over to the dark side but I'm proud of that fact and I did want to come and talk to you.

There are some I believe, clearly not in this room, but there are some who think that submarines are a thing of the past, that they're Cold War relics that have kind of gone beyond their usefulness. I will tell you that I am not in that camp. As a commander in the Pacific, you rely on submarines more than anything else. To me they were the killer arrow in the quiver that we have. And that's not to diminish the other capabilities that we have, but a submarine to

me gives a Navy commander options and capabilities that don't exist anywhere else. They are the most significant threat in my mind to any sea control mission or operation that you may have and for those reasons it is important for us to take them very seriously. And they are also key—in my mind—to our maritime strategy.

When I look out and survey the landscape or seascape as I am sure all of you do, as I hope all of you do, my count is that there are about 40 countries that are operating submarines today and those numbers of submarines are in excess of 350. As I look at projections in the next two decades there are some business projections that say 280 may come onto the world's stage and they are not, as you well know, bush-league submarines. These are pretty capable boats that we're going to have to deal with. And there are some countries that don't like us very much that are looking to either purchase or in some cases produce their own indigenous submarines and for that reason we have to take it extraordinarily seriously.

When I talked about part of our maritime strategy: for me the submarine has always—and because of the fact that we are a nuclear force—it has always been a persistent weapon that we could use. Many in the military and in the defense industry will talk about stealth at great extent, but to me there is nothing that represents the ultimate stealth more than a U.S. Navy nuclear submarine. So that gives us a quality and a capability that is absolutely extraordinary. They can also, as you well know, be used in non-provocative ways so that the submarine really is key to so many parts of our maritime strategy. Whether it's addressing the capabilities of just being forward, being a deterrent force, controlling the seas, or projecting power, it's all there to include the added capability that we have of maritime security and the things that we've been able to do with our submarines in that regard.

I consider our ballistic missile fleet to be the most survivable dimension of our triad. And so as you talk about deterrence you cannot not talk about our ballistic missile submarines. And as you all know you've ticked over some pretty significant milestones in this past year. A thousand patrols, 124 consecutive launches—successful launches. Pennsylvania just came back from its 60th patrol and it was the 500th [patrol] of the Ohio class so time marches on. Talk about sea control, I mentioned the stealth, the speed, agility, it's just all there. Power projection, used in

ways—not just in what I would call the high-end warfare—but because of the way we can tie ourselves together today and the precision of Tomahawk. The submarine also plays a significant role in some of our search parties and operations that we may be called upon to do.

I am extremely pleased with the performance that we've had with our converted submarines—the new SSGNs—and this week the third of that class begins its first deployment. So again the capability that's there is being used, and from the reports that I have received back from the first two patrols, I'm extremely pleased with the SSGN.

What's on my plate as I look to the future and as it applies to the Submarine Force? Virginia class is on all accounts a great boat and I was extremely pleased when we took delivery of NEW HAMPSHIRE. As I have told every audience in the last couple of weeks that I've been speaking to, we took delivery of the ship in August—it was to have been April—and everyone's immediate reaction is 'Ah ha! Another late ship.' Well that was April '09 so that's a very good thing. That's the first time in a long time that we have taken delivery of two submarines in one year with NORTH CAROLINA and NEW HAMPSHIRE. I think those are very positive trends. And I would submit that it is a trend that we not only want to keep going in the Submarine Force but also we need to translate that into every other ship class that we're pursuing.

As we look at the submarine programs I would tell you as I do with all of the ship classes, I believe that it is important that we who are involved with this business, who are involved in the decision making process of the business, always keep in mind the industrial base and what we are doing with regard to the industrial base. I also believe that we must continue to articulate and make clear to everyone the importance that we place in our responsibilities and the accountability that we have for the nuclear deterrent. I believe that is where our deterrent resides, it resides with the most exacting, the most competent and the most professional force that exists within our Navy and as the CNO, I like that way a lot; that I have a bunch of nuclear submariners taking care of our nuclear dimension.

I am extremely interested and Cecil Haney and I have spent a few sessions already on this—in the replacement for the SSBN. It

is [incumbent] upon us that we take it very seriously, and I'm very interested in how we move forward with that. So to me that is an area that will continue to become increasingly important as we go forward, not just for us but for our Royal Navy friends.

And another area that you will be hearing from me on in the next couple years in increasing frequency is unmanned underwater vehicles. I believe that we must move aggressively there and I will say the same thing about unmanned aerial vehicles as well. My view after having observed now for a couple of years is that our great advance in the unmanned world is hindered more by our culture than it is by technology. And we have to stretch ourselves out and we have to reach ahead and bring the unmanned capability into being in a very, very aggressive way.

The other area that I just wanted to touch on before opening it up to any questions is the area of people. And throughout my time in the Navy, there has never been any doubt in my mind that you lead the most professional and the most competent force that we have ever had. I will also tell you that as the CNO I have taken more submarine patrol debriefs than I have carrier strike group debriefs. There have been more submarine O-5s who have come in and briefed me than Admirals on deployments because of what you are doing and the information that I can glean from those operations. In every instance when that young submarine CO walks out of my office it just reaffirms the fact of the standards, specialties and competence of the Submarine Force. So paying attention to our people is extraordinarily important to me. And there is no question that at the root of our success is the leadership that's represented in this room. Jay Donnelly; when he moved to SUBFOR I could not be more pleased with the fact that he was going there and I know he's going to lead the force in an absolutely extraordinary way.

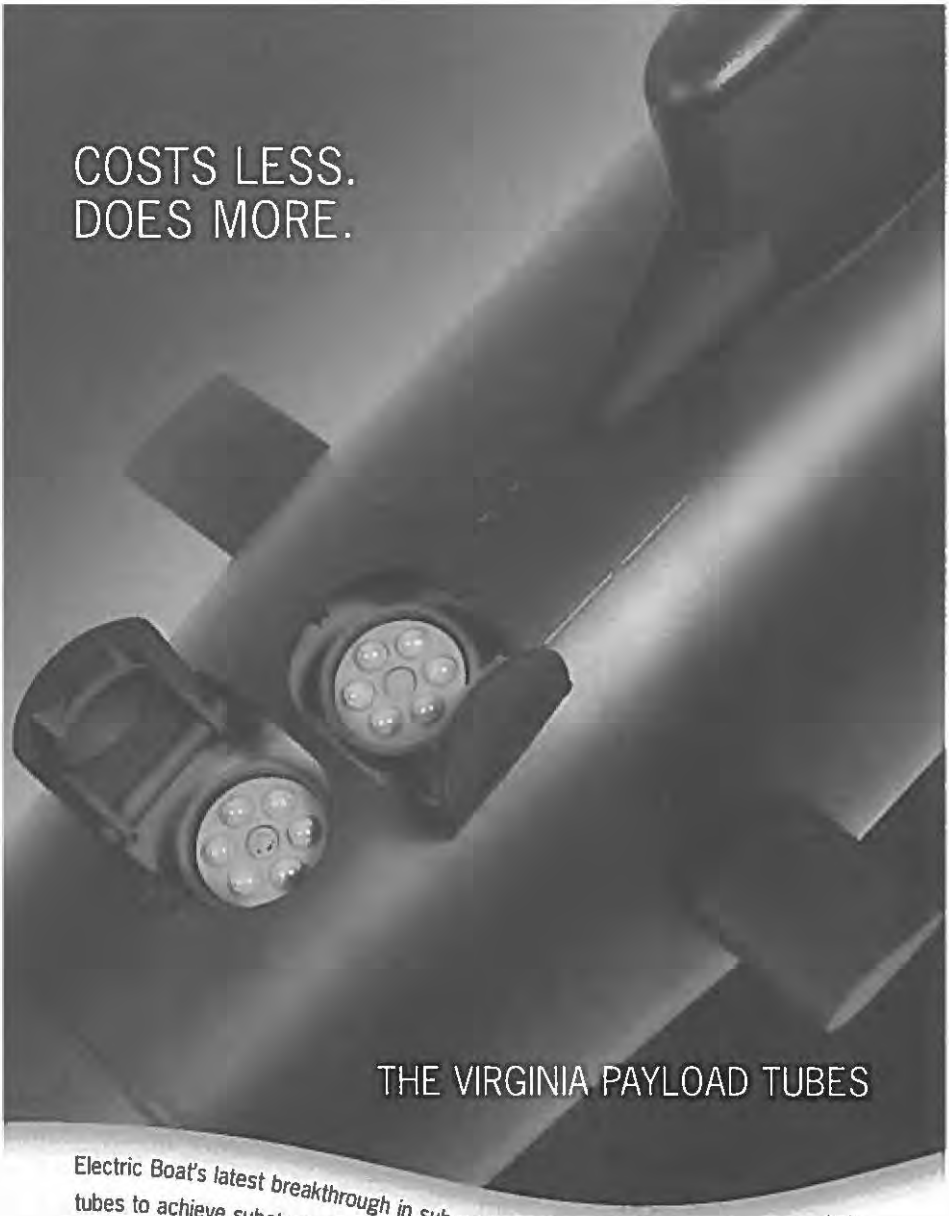
The areas in which you are devoting the attention of leaders is also key. I touched on the nuclear enterprise already. We cannot take our eye off that mark. It is so important to us, not just on the weapons side but also on our operations of the largest nuclear reactor enterprise in the world, and the professionalism has worn on time and time again and I have the greatest confidence in that.

There's some things that we're doing with our force these days that are a little different and have had some effect no doubt on issues such as retention. One of which is the individual augmentee

program, now has become the GWOT support assignment, but again the leadership of the submarine community has stepped to the fore and the way that it is being done, to me, is allowing us to take advantage of the talent, the competence and leadership of the Submarine Force and to be able to apply that leadership in areas that are so critical to the fight that we are engaged in now.

You'll also hear me talk frequently about diversity. It is not a sound bite as far as I'm concerned. I really believe that we must become a more diverse group of leaders within our Navy. If you muster the entire United States Navy up it looks like America. If you ask the officers to step forward it turns pretty white quickly. And if you ask the senior civilians to step forward it's the same thing. And if you ask the senior enlisted, command master chiefs and the COBs to stand forward it looks pretty much the same. We have to make sure that we are moving in a way that allows us to not only reflect the demographics of our Nation among our leadership, but I have long believed that you get better solutions when you have many different points of view and that's the strength of diversity so I continue to press on that.

I would like to take this opportunity once again to thank you for the opportunity to be here, to spend some time with you to take any questions that you have on your minds. I would like to commend those that will be recognized during the course of this conference and Symposium. But also for those who are here, particularly those who are in the uniform of the Navy—particularly those young officers who are wearing the uniform of the Navy and the enlisted that are here—that you can take great pride in the Force in which you serve. It is out and about every day. It is off the shore of every continent, every day and there is no force that performs its missions in the professional and competent way that you do and I thank you for that and I thank you for your service.■



Electric Boat's latest breakthrough in submarine design adds larger and less complex tubes to achieve substantial savings on Virginia-class attack submarines while increasing their capability. The boat can deploy a wider range of payloads than ever before and the cost is $40 million less per ship. That gives the Navy a fleet with the flexibility it needs for tomorrow at a price it can afford today.

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NAVAL SUBMARINE LEAGUE 2008 ANNUAL SYMPOSIUM OPENING REMARKS GIVEN BY ADMIRAL R. W. MIES, USN (RET.)

Good afternoon and welcome to the 26th Annual Naval Submarine League Symposium. I'm deeply honored to stand before you as Chairman of the Naval Submarine League. I'd like to take this moment to thank my predecessors for their leadership and stewardship in advancing and promoting the League over the past quarter century. Their initiatives are the foundation for the tremendous success and vitality of our League.

I'd also like to recognize our Naval Submarine League officers under the strong and aggressive leadership of our President, the irrepressible Admiral J Guy Reynolds and the day to day efforts of our support staff under the leadership of Captain Mickey Garverick. Without them events like this would not be possible. Please join me in thanking all of our past and present officers and staff for their leadership and support of our membership.

For those of you new to the League, we continue to promote four programs each year that are growing in terms of excellence and attendance.

First, our Corporate Benefactor Recognition Day. Last February's recognition day set a new record with 70% of our Benefactors in attendance.

Second, our Annual History seminar conducted under the co-sponsorship of the Naval Historical Center and the Naval Historical Foundation. Under the leadership of Admiral Jerry Holland, this past year's seminar featured a review of *Fifty Years Under the Ice*, commemorating the historic journey of USS NAUTILUS on the first polar transit. We had a great turnout. I want to thank Northrop Grumman for sponsoring that event for the past three years.

Third, the Annual Submarine Technology Symposium, conducted under the co-sponsorship of the Applied Physics Laboratory of Johns Hopkins University. Last May under the leadership of Vice Admiral George Emery from the League and Dan Tyler from the Applied Physics Laboratory we celebrated our 21st Submarine Technology Symposium. The Symposium focused on the theme—Assure, Dissuade, Deter through Innovative Technologies

and we had a record turnout. The 2009 program, scheduled for 12-14 May, is already underway with a call for papers posted on our webpage. The theme— Planning for the Future in an Uncertain World—will provide a classified forum for examining current, emerging, and future technologies. A highlight of the 2009 STS will be an examination of the next generation joint US/UK sea-based strategic deterrent—the replacements for the Vanguard and Trident Submarines. So please mark your calendars.

And fourth, this event—our Annual Naval Submarine League Symposium. This year's theme—SSGN-On Station Fighting the Global War on Terror—is a tribute to the highly successful conversion of four Trident Submarines to Guided Missile Submarines. Two are deployed now and two are completing their post-overhaul testing and are expected to deploy in the next six months. The word *transformational* is often thrown around loosely these days; but I can state these submarines are truly the most transformational platforms in our Navy—and most importantly they are on schedule and within budget. You'll hear a lot more about them today and tomorrow.

This year we have a chance to honor all past and present Submarine Force Master and Senior Chief Petty Officers and Chiefs of the Boat as the League's 2008 Distinguished Submariner.

Our senior enlisted leaders are the heart, the soul, and the backbone of our great Submarine Force. They play a number of critical roles. They serve:

- As technical experts—the corporate expertise, knowledge and glue that breathes life into our ships
- As leaders— not just managers but leaders of young men and women
- As role models—as living examples for those who follow in their footsteps
- And as teachers—to train and mentor not just those who work for them but often, more importantly, the officers under whom they serve. I know I was blessed with a number of chiefs who skillfully taught me how to be a better officer, without knowing I was being taught.

So we will celebrate and honor our senior enlisted at our banquet tomorrow night.

This has been another banner year for our Submarine Force. Just to mention a few significant events:

- In April, USS FLORIDA (SSGN 728) commenced her maiden SSGN deployment
- In May, USS NORTH CAROLINA (SSN 777) was commissioned.
- In August, USS NEW HAMPSHIRE (SSN 778) was delivered and USS LOUISIANA (SSBN 743) conducted the 124th consecutive successful 05 launch—an unprecedented record.
- In September, USS PENNSYLVANIA (SSBN 735) completed her 60th deterrent patrol and the 500th for the D5 Strategic Weapons System.
- In September, USS MISSOURI (SSN 780) conducted a keel laying ceremony.

And we have a few significant events ahead before we close out the year.

- This weekend, we will commission USS NEW HAMPSHIRE and for the first time in over a decade deliver 2 submarines in the same year.
- In November, we will retire NR-1 ending almost 4 decades of service to our Navy and Nation.
- In November, USS MICHIGAN (SSGN 727) will deploy marking her maiden deployment and the 3rd overall SSGN deployment.
- In December, we will christen NEW MEXICO (SSN 779).

And the Virginia Class continues to lead the way in responding to emerging requirements by increasing the investment in creating modular payloads and driving down the acquisition costs to meet the goal established for building two submarines a year. I note with pleasure that the Congress has agreed with this assessment and has approved the FY09 budget to support two VIRGINIA Class submarines per year, with an anticipated start date of 2011.

- And it has been a banner year for our Naval Submarine League as well as you will hear in greater detail from J. Guy Reynolds in our business meeting

- Our membership continues to remain strong
- We have a firm financial foundation to continue to fund the educational grant program
- And most importantly our corporate benefactors remain as the firm foundation of our League. We could not accomplish what we do without them.

Although we lost a few through consolidations, we added eight new benefactors and now have a total of 72 Corporate Benefactors. You can identify them by the navy blue ribbons on their name tags. Please thank them for their support. Twenty one Corporate Benefactors have exhibits here today. I encourage you to visit them. I would also like to draw your attention to the banner displayed behind me that recognizes 14 of our Benefactors who have generously sponsored this Symposium. I would like to take this opportunity to recognize each sponsor and their level of sponsorship:

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Systems Planning and Analysis

In closing I'd like to remind each of you that for an island nation like the U.S., the sea can be our ally or adversary depending upon what we make of it. History has taught us that lesson over and over. And today in the Global War on Terror and tomorrow in the uncertain world of a resurgent Russia or an emergent China, it's no different. America will always be an island nation, a maritime Nation.

We are witness to a profound shift in the size and character of future navies with increased emphasis on undersea warfare. A future where stealth is wealth. Our Submarine Force is a crown jewel in our Nation's defense. It is rapidly becoming capable of delivering non-nuclear firepower similar in mass and impact to that deliverable from carriers, at much less risk in warfare against our most capable adversaries; a force capable of engaging important Third World targets that threaten our interests, with much greater economy of force and with far less risk of politically embarrassing losses of forces and people; and the ability to sustain presence and to deter or counter hostile action against US or Allied interests with much lower expenditure of resources than is now possible. The submarine promises to be the capital ship of the future; but your sustained support and commitment to our Submarine Force and its people are required to make that vision a reality.

And it's important to realize that in the end, the Submarine Force isn't just about ships or nuclear power or precision weapons or technology— it's about people. It is the submarine people who have breathed life into our submarine hulls and passed down the character, spirit and personality of our predecessors to younger generations of submariners who in turn will breathe life into our future submarines. It's primarily for the people that we gather today. So please take time to meet our people in uniform and thank them for their selfless service.

Again welcome to our 26th annual symposium and thank you for your great support.■

THE SUBMARINE FORCE TODAY
BY VICE ADMIRAL JAY DONNELLY
COMMANDER SUBMARINE FORCES
AT THE NAVAL SUBMARINE LEAGUE SYMPOSIUM
OCTOBER 22, 2008

Thank you Admiral Reynolds, Admiral Mies, distinguished guests. There are so many old friends and shipmates in the audience. It is always a pleasure for me to address this forum.

When I was putting my remarks together, I was reminded of a time when Albert Einstein was asked to speak at a banquet held in his honor at the Swarthmore College. Hundreds of people from all over the nation gathered to hear this famous physicist speak. And when it came time, and he was introduced, he stepped up to the lectern, and he looked out at the crowd, and said, ladies and gentlemen, I am very sorry, but I have nothing to say, and he sat down. True story.

But I have quite a bit to say, and what I thought I would do today is give you a state of the Submarine Force address.

I have been in my current job now just over 20 months. When I relieved, the Force had suffered a series of Class A mishaps. Retention was also a concern and trending downward. We were plagued with numerous maintenance overruns in our naval shipyards. This was affecting the operational availability of the entire force, and so we began to tackle those problems, first Joe Walsh and I, now Doug McAneny and I.

So I am here today to report on the progress we have made over the last year. I think the Submarine Force is quite strong, and I am proud of some of the accomplishments, while at the same time, recognizing that we have many, many challenges ahead.

Today, we have 70 submarines in the force, 28 are underway, that is 40%. That's low; it typically ranges from 40 to 45 or 48% underway. Of those 28 underway, I have 10 SSNs forward deployed, two SSGNs forward deployed, and six SSBNs at sea in various stages of strategic deterrent alert. That totals out to over 4,000 submariners that are at-sea, on-watch, defending our freedom today.

When I put together this brief, I arranged it along the three priority areas. I focus my efforts in three main areas—Operational Excellence is first, Developing Our People is second, and Maintaining And Modernizing The Force is the third priority area.

I will start off with Operational Excellence. I always start off with SSBNs. They continue to be the mainstay of the strategic deterrent force for the nation, about 40% of our Submarine Force personnel are associated with operating our SSBN force. They are still in very high demand.

In February, we will observe our 1000th patrol of the Trident force, and we've had over 3800 strategic deterrent patrols to date.

There's been a lot of activity in this force recently. As a result of some of the Air Force challenges in the nuclear weapons business, we chartered a self-assessment that was led by Rear Admiral Tim Giardina. He assembled a group from across the Force, and did a very critical assessment of how we train, how we perform maintenance, and how we operate our strategic systems, and came out with a very long list of recommended action items that we are hard at work on today.

The Strategic Systems Program office led by Admiral Steve Johnson did his own assessment, and then his homework was graded in the Admiral Donald assessment of SSP, and there were some important findings that came from that.

But first was that the Navy's nuclear weapons programs were fundamentally sound, and that was the overall conclusion. But they did note that there has been a decreased emphasis in the nuclear weapons and strategic deterrence missions since the end of the Cold War and that was a fundamental root cause of the problems the Air Force had.

We've reduced our numbers in systems as we went from 41 to 14; fewer platforms, fewer people. Fewer people with the strategic weapons experience.

So there is clearly room for improvement in our organization and we are hard at work at doing just that. The Director of the Navy Staff, Vice Admiral John Harvey, has been stood up to lead a nuclear weapons council which is composed of Flag Officers of the OPNAV Staff primarily and they are looking at the implementation and a plan of action to take the Donald report and ensure that we are following up on the record of actions there.

Additionally, there is a Schlesinger panel that is officially titled the Secretary of Defense Task Force on Nuclear Weapons Management and they are doing a study in two phases; first phase was on the Air Force Nuclear Weapons Program.

They are now embarked on phase two which is looking at the rest of the Department of Defense. As part of that effort they've been to King's Bay and toured the Strategic Weapons Facility there and interviewed from the deck-plate all the way up to Rear Admiral Giardina level of personnel associated with our SSBN program, and in the very near future they'll visit Norfolk and talk to me and my staff, Fleet Forces Command and JFCOM, but I'm confident that they will have similar findings to our report. Our weapons programs are fundamentally sound.

Next, SSGNs. As Admiral Mies mentioned, we have two deployed today; OHIO and FLORIDA, and Captain Chris Ratliff is scheduled to speak to you tomorrow morning. He is one of the two CO's on USS OHIO and will be relieved with his change of command early next month. Chris has a very good brief to share his experiences on his first deployment.

MICHIGAN will deploy at the end of this year, very soon, and then GEORGIA next year. MICHIGAN will participate in the Talisman Saber 09 exercise and demonstrate the ability for an SSGN to control unmanned aerial vehicles, and experiment with unmanned undersea vehicles and the Battle Management Center and Joint Command and Control suite.

Rear Admiral Mark Kenny is going to be here tomorrow morning and he's going to talk to you about the Navy's Irregular Warfare Office that he leads on the OPNAV staff and how SSGN is being used in the War on Terror. So I won't preempt what they're going to tell you, but SSGN, which was conceived 12 years ago, was delivered on budget, the first patrol was on time and those ships are out doing great work and the Combatant Commanders are really appreciating the capabilities they bring.

Next SSN's. They are also in very high demand today. We are deploying to some very challenging areas across the world to gain battle-space awareness that only a submarine can get. Our SSN CO's, when they come back from their deployments, are briefing at very high levels.

We're enjoying access all the way up to the highest levels of the

Navy, the CNO is routinely taking those patrol debriefs, Chairman of the Joint Staff is receiving those briefs. We're going to Congress and Congressional Staffers to educate people on what it is that SSN's are doing for the defense of our nation.

We have a very sharp commanding officer, Commander Mark Stern who is going to speak to you tomorrow. He is the CO of USS TOPEKA, another successful mission, and he'll tell you a little bit about what his ship did on deployment.

We are also visiting some ports with the SSN that we have not been to in a long, long time—Tripoli, and we're going into Jordan. We have been to port visits in the Caribbean, India, the Philippines and we're executing the CNO's Maritime Strategy in developing partnerships and forging relationships overseas in those port visits.

You'll find that a Class A mishap is any mishap that involves loss of life, or a million dollars or more in damage to the ship. And as you can see, we've come down off the peak that I mentioned at the beginning of my remarks.

This most recent one, here, was the very unfortunate tragic death of Machinist Mate Third Class Auxiliaryman Gentile, who on USS NEBRASKA was entangled in the rudder ram and died as a result of the injuries from that.

In order to try and reduce these mishaps and bring these down, I've really tried to focus the Force on staying focused on the main thing. We've had a tremendous effort to reduce distractions to the CO and keep them focused on the safe and effective operation of their ships.

As part of that effort, I've reduced the administrative requirements that we levy on the crews. We've eliminated over 50 administrative reports; reports such as a monthly urinalysis report, or physical fitness assessment reports.

That data is all entered into spreadsheets that are available online. My staff can pull that data without having to task the ship to double the report. There have been about 50 incidents like that.

Have I reduced the workload on the ships? No. I don't think so, but what I've done is I've tried to reduce the distractions so the CO can really focus on the more important aspects of running the ships.

I clearly put international cooperation in the operational excellence category. The French SSN Amethyst deployed to the East Coast of the United States, operated with USS THEODORE

ROOSEVELT carrier strike group and the Iwo Jima expeditionary strike group.

What made her deployment different is we used her in a Blue Force role. She was one of the good guys and was fully integrated in the submarine advisory team on those platforms, and was defending the strike groups as opposed to being an orange attacker of the strike groups; fully integrated with our comms and tactics.

The Italian submarine TODARO, made another historic deployment. She sailed from Italy, operated over here for months. Made port visits in Mayport, Florida, Norfolk, Virginia, Groton, Connecticut, and in New York City. She operated also with the THEODORE ROOSEVELT Strike group and participated in a tactical development exercise with Submarine Squadron Twelve.

The last time an Italian submarine visited the U.S. was during World War II when they pulled into our ports to surrender. It's been that long. They've got a lot out of this deployment and I've got an informal verbal commitment to continue that sort of deployment in the future.

The Chilean submarine SIMPSON deployed to San Diego as part of our DESI, or Diesel Electric Submarine Initiative. We have a partnership with Submarine Forces in South America and their subs come up and operate with our surface units and provide some very valuable training vs. SSKs. While SIMPSON was up, we did an exercise with her where we used our rescue system, the SRDRS. She bottomed and we latched onto her for the first time in the history of the Chilean Submarine Force. We transferred personnel in a rescue scenario.

And finally, HMAS Waller, a Collins class submarine equipped with the newest torpedo in the world, the CBASS MK48 which stands for the Common Broadband Advanced Sonar System, a heavyweight torpedo. She fired that torpedo during RIMPAC in a warshot demonstration.

So there's the stealthy killer, hitting the final bearing of the victim. A single shot broke the ship in half and the pieces quickly sank.

That was the very first warshot test of the Mark 48 Mod-7 CBASS torpedo, carried out by our Australian colleagues.

Rear Admiral Doug McAneny is going to speak after me today. He just came from Command of Submarine Group 7 where he was

the operational commander for the forward deployed submarines in the 5th Fleet and the 7th Fleet. A lot of our operational excellence initiatives have really been born through the forward deployed operations. So he is going to give you a report on how we're meeting the various submarine challenges in the Pacific.

We'll move on to Modernizing the Force. As Admiral Mies mentioned, we've had tremendous success in the Virginia class shipbuilding program. On Saturday we are going to commission NEW HAMPSHIRE and then in December, NEW MEXICO gets christened. We, just last month, laid the keel for MISSOURI and we are marching through at a very rapid rate.

The last time we delivered two submarines in the same year was 12 year ago. When we delivered NEW HAMPSHIRE to the Navy, it was August of this year. That was supposed to happen in April. The CNO says, "there it is, another shipbuilding program delayed." I said "No, no, no, its April of 2009," that was it's scheduled delivery date. We beat it by seven months. There's no other shipbuilding program that can claim that.

We'll start two a year in 2011. We expect to award the contract for the next eight ships in the class next month and Willie Hilarides will be here tomorrow to give you more details on this well run program. I think the credit goes to him and his focus on shipbuilding excellence.

We're deploying with a lot of new capabilities. The Battle Management Center and Joint Command and Control suite on MICHIGAN and GEORGIA are installed into what was the navigation space on the Tridents. That's a very large room and it gives us tremendous flexibility to accommodate the Special Operations Forces and the operations those ships are engaged in today.

We're very happy with the photonics mast made by Kollmorgen and we're looking for improvements in reliability and improvements in the resolution, but the incorporation of those sensors have been revolutionary in our force.

We are incorporating the Buster unmanned aerial vehicle and have deployed that on ALEXANDRIA and on FLORIDA. Saber Focus is a new capability. Predator B is called an NQ-9 Reaper. It an unarmed Predator and Saber Focus has the ability onboard FLORIDA to take control of the sensor suite. We'll be testing that

in the near future in an exercise.

We're also taking a look at the way we do our advance program build process to modernize our fire control and sonar systems. What we found was that we were pushing enhancements to the ships faster than the crews could keep up with the new capabilities and training for those new systems. So we've looked to restructure that a little bit and we've gone to a biannual program where the major changes to the software will come in two year intervals.

There will be a middle year minor enhancement in which the functionality is largely unchanged. This will allow us to deploy twice with the same fire control and sonar system as opposed to every time the crews deploy, they deploy with a new configuration. I think this will pay some dividends and let us get a few more dB from the operators in their Recognition Differential.

Admiral Haney is going to speak to you this afternoon about the modernization that we have planned for our ships and his approach in that area.

NEVADA recently began a two year refueling overhaul. The plan had been that after two years of putting the ship on the sidelines to give her another 22 years of life, we would do sea trials then tie her up for another five months to do the modernization. When I questioned the rationale behind that approach, the answer was "Well, it's different colors of money. The DOH is done with SCN funds and the modernization is done with government funds." You can't mix the two funding streams, so we have to do those separately. I just kept pushing and pushing. Finally we were able to get some relief from that. So we are actually doing the modernization during the ERO. That's going to give me about three months of additional operational availability on that ship once she gets out of the shipyard period. So we hope to make that the norm from now on and we've actually moving to fund the refueling overhauls out of enrollment funding to give us much more flexibility to do what needs to be done.

Next is the Submarine Rescue Diving and Recompression System. We stood that up as the operational primary deep sea rescue asset for the United States Submarine Force on 1 October of this year. At that same time we deactivated the MYSTIC which had been serving for 37 years. So the new system now is tethered to a support ship called a VESSEL OF OPPORTUNITY and it is

lowered down on an umbilical cord. It's manned, but it is not free swimming like the MYSTIC was. It can transfer personnel into this vessel and be winched back up and brought aboard the support craft. In the future we're going to have the opportunity of transferring personnel under pressure so that when the submarine on the bottom is pressurized, which will happen over time, the crew can be rescued at pressure and transferred to the decompression chamber on the deck of the vessel of opportunity without having an uncontrolled decompression.

We've done a couple of operational tests of the SRDRS. We wanted to make sure we had a viable capability before we gave up on the DSRV.

We did an exercise Bold Monarch off Norway. We packaged it up in San Diego on a Russian Antonov aircraft and flew the SRDRS out to Norway. We did 13 dives with that system on a series of bottomed submarines and transferred over 200 personnel. A very successful evolution.

However, I wasn't completely convinced we had met all the timelines in order to rescue personnel within 72 hours. That's a specification from time to first rescue. It has to be within 72 hours. It was taking longer than planned to get all of this equipment mounted, flown to and mounted onto a vessel of opportunity. So we did another exercise as I mentioned with the Chilean sub and went through the timeline and significantly compressed it. We have great confidence in that 72 hour first rescue. With SIMPSON we did two rescue days and rescued 25 personnel in the process. So the system is viable, it's up and running and we'll continue to build the transfer under pressure capabilities in the near future.

Last section is Developing Our People. We've started a series of courses to better prepare our Petty Officers and our Chief Petty Officers and our Commanding Officers for the tasks when they're ordered into positions of higher responsibility.

The first one is the Nuclear Leading Petty Officer School. The reality now is that a nuclear First Class Petty Officer can make chief in as little as seven years. The average is about, I think, just under 12 years and that's different from when I was a young pup. The chiefs were a little older and a little more experienced, but that the reality of it today. They will report to their second sea tour as Chief Petty Officers and be in charge. What we've done is set up a

course to give them, in the pipeline before they report to their ship, the necessary training to offset that relative decrease in the experience level. We teach them what others have learned the hard way, the pitfalls to avoid and some of the recommendations for success.

We've teamed with Naval Air Forces, so this is for all nuclear trained Chief Petty Officers in the carrier force and the Submarine Force. Those courses are being taught in Norfolk and San Diego. Initial reports are that they are receiving good reviews.

For a while now we've been doing the Engineering Department Master Chief School. That's a 1 week course that's taught by the force EDMC's and again it is designed to provide them with the tools they need to succeed before they taking over in that very important responsibility.

The Submarine Command Course has gone through a lot of overhaul in recent years and prospective executive officers and commanding officers have been going through that course now for about four years. We're to the point that the PCO's that are reporting to the course have already been through it once before as perspective executive officers. We're beginning to modify their curriculum a little bit and there are certain aspects of the course that they don't need to repeat a second time. Others they do again for the experience.

We're able to tailor it a little bit for the commanding officers who go out and focus specifically in areas they need such as the configuration of their fire control and sonar system, or in the case of the SSBN crews, give them some additional training on the maintenance and operation of the strategic weapon systems which they may have not seen since they were perhaps Junior Officers. We will continue to hone the Command Course to get the most out of it that we can.

Deckplate leadership is concerned with the reenlistment rate. So reenlistment is going up and attrition is going down. If we had continued at the rates that we began, we would have almost 300 fewer people in the Submarine Force today.

I've basically retained an additional crew and a half, almost two crews worth of submariners. I credit Chief Petty Officers for that success. They issued the challenge. They revitalized our career review boards to increase retention initiatives. It is their deck-plate

leadership that has resulted in attrition going down.

Later you're going to hear from our Force Master Chief from the Pacific Fleet, Moe Pollard and my Force Master Chief from SUBFOR, Jeff Garrison. Tomorrow they're going to talk about deck-plate leadership and the type of dividends that are paying off.

We've seen an 8.5% reduction in Driving Under the Influence of alcohol cases over the last year. Illegal drug use is down 17% in the force. So, there's a lot of good news out there and again, I credit the Chief's Quarters looking out for their people and having an impact at the deck-plate.

Next is diversity. It's a major emphasis area for the Chief of Naval Operations and I've been working hard to add some energy to our diversity programs in the Submarine Force. We are working hard to bring in more diverse officers. If you look at the diversity across the enlisted force, it is reflective of our society and in some cases we actually have a higher diverse population than in the nation as a whole. So I'm focusing my efforts on our officer community which is very, very much below the national benchmarks.

The way we're doing that is through a series of outreach efforts to just sell the Submarine Force product to universities and try to influence the decisions of young people to come into the Submarine Force. We've done that through faculty outreach visits and our ROTC unit commanding officers are working hard to develop interest in the diversity groups in their universities. We've got a hub and spoke outreach program where each submarine in the force is aligned with an ROTC unit across the country and they visit two times a year. When they visit an ROTC unit, the ROTC unit is the hub, and we give them a couple extra days to make the visit. They go out on the spokes and visit other universities that aren't associated with the ROTC program but have a high percentage of minority technical majors graduating from those universities. We're making a lot more visits and getting out and talking to a lot of students.

We're trying primarily to sell them on the Nuclear Propulsion Officer Candidate program, the NUPOC program, and we've seen a fairly significant rise in the number of diverse candidates who are applying for a NUPOC scholarship. The proof will be whether we actually commission those folks or not, but there are some encour-

aging indications.

Three of our more senior individuals have recently received awards. Rear Admiral Pat Brady, my Deputy Director, Submarine Warfare Division and he's up at N87B working for Cecil Haney. He was recently honored by the Hispanic Engineer National Awards Conference, or HENAC, with the Executive Excellence in Science, Technology, Engineering and Math Award at their recent fall conference.

Next is Captain Pete Clark. He works at Naval Reactors and was honored also at that HENAC Conference as a Luminary Honoree.

Captain Jeff Trussler was our Assistant Detailer. He's now out in Naples as our Commander, Task Force Sixty-nine in major command. He will be presented the American Indian Science Engineering Society Executive Excellence Award at their upcoming national conference in Anaheim, California.

Next in the area of personnel: Individual Augmentees. (IAA) Lieutenant Kent Cook of my staff, received the Bronze Star after he got back from his IA assignment in Baghdad. We've tried to improve the process of finding Individual Augmentees, because it was creating an area of concern in the families. We were seeing that reflected in the very high resignation rate of junior officers directly from their sea tour assignments. Basically, that resignation rate doubled in the last two years.

When we pulled the thread on this, they were afraid to go ashore and get tapped to go and be an IA when they have a family left behind. We are transitioning as a Navy to an IA assignment system as part of the detailing system called a Global Support Assignment (GSA). When they negotiate orders to go ashore, part of that discussion is would you like to do an IA assignment, and there are plenty of volunteers out there who will do those very challenging and very rewarding assignments. So, now we're just trying to match those volunteers with billets and that has significantly reduced the number of unplanned calls for volunteers which were causing angst among our sailors.

The GSA support assignment position is really addressing how we're transitioning. Today about 60% of those assignments are done through that detailing process, about 40% are as a result for calls to volunteers for short fused requirements.

When the sailors and officers go to a GSA assignment, they do

receive a good deal of recognition. The enlisted promotion board gets special consideration. The promotion rates are higher among the enlisted community and we've certainly let them know we love them and care. So I'm very proud of our sailors who serve on IA and personally every one of them that I've talked to has some story, whether they were a volunteer or not. They come back and say that assignment changed my life and they are very proud of what they've accomplished over there, of what they're doing, and very happy to get back to the Submarine Force after working with the Army.

We did lose an IA. Lieutenant Jeffrey Amman was on USS ALABAMA. He had rolled off the ALABAMA to shore duty, volunteered to do an IA assignment in Afghanistan and was a victim of a roadside bombing and lost his life in May of this year. A memorial service was conducted back in Bangor, Washington where virtually every sailor participated. He had been in Afghanistan for 12 months doing provisional reconstruction team work. He was beginning to see the fruits of his labor and he asked to extend. He died at 14 months into that 12 month tour. He left behind a wife and two children. He was a prior enlisted submariner who went to Oregon State University and was commissioned and served on ALABAMA. He is a real hero and a model for us all.

Challenges ahead: you're going to hear more from Admiral Haney about Sea Based Strategic Deterrent. Front and center on our area of focus. In 2027 we will retire, or begin to retire the oldest of the 14 of the Ohio class SSBN's. In the subsequent 13 years that follow, we'll inactivate one a year, finishing in about 2040.

We need to achieve a capability with the follow on sea based deterrent subs that the new platform is fully operational and delivered in about 2025 in order for all the testing certifications to take the place before the first Trident retires in 2027. So you back up to 2025, we actually start construction in fiscal year 2019 and we need to begin the detailed design in about fiscal year 2012. We need to start the R&D in fiscal year 2010, so it's here, it's time and we're working hard on the analysis of alternatives and trying to inform that R&D effort.

That R&D effort which will feed the Sea Based Strategic Deterrent may also spin off into later blocks of the Virginia class submarine. I'll just share a couple thoughts on what might be

coming in the future. An advanced sail, Comms at Speed and Depth, Advanced Electric Drive, External Weapons. There are other things that we explored during that R&D effort which we hope will come to fruition.

Next is investing in the future: There's been a great deal of effort to engage with DARPA and ONR, and working closely with Dr. Tony Tether at DARPA and Rear Admiral Bill Landay at ONR. We tried to raise their level of awareness of the capability needs for the Submarine Force.

The Science Advisor on my staff, Mr. Eric Spigel, is a very energetic guy. He has influenced over 450 million dollars of R&D at DARPA and ONR to be redirected toward Submarine Forces priorities. The number keeps going up every time I look at it. I think clearly we have some results there.

Some of the DARPA investments have been realigned as a result of our efforts and I think DARPA is about to undertake a high bandwidth laser communications demonstration. We're looking at cost reduction technologies, corrosion control and perhaps a composite propeller with a lot of effort in human systems integration and improved decision making tools. There is clearly an investment in the future. Cecil will probably speak to you on that as well.

A challenge area: junior officer retention. There is a decrease in attrition and the improvements in retention force wide, but I do have a couple areas where we really have to focus hard. Junior Officer retention is a challenge. Nuclear trained enlisted personnel is a challenge. We are working hard to sell the Submarine Force to new accessions and advertising the Submarine Force through a greatly enhanced mission submarine training program.

USS NEWPORT NEWS was training some midshipmen during their cruise this summer. We've extended summer cruise period by about 4 weeks and we run through thousands of midshipmen with over 9 of our submarines to give them a taste of what it is like. All they have to do is see it and I think we own them.

I'll just summarize by saying that I think a lot of our hard work is paying off. There are many, many more challenges to come, but operational performance is improving, I think, every day. The personnel in the Submarine Force are doing well and I think we're making real progress toward a combined future force.■

DOMINATING ACROSS THE GLOBE— DETERRING, PROTECTING, ENGAGING

RADM DOUG MCANENY, USN
COMMANDER SUBMARINE FORCE
U.S. PACIFIC FLEET

NAVAL SUBMARINE LEAGUE SYMPOSIUM
OCTOBER 22, 2008

Good Afternoon fellow submariners, distinguished guests, ladies and gentlemen. I am honored to speak to you today at this 26th annual meeting of the Naval Submarine League. To stand before such a renowned group of retired submariners is truly a humbling experience for me. It's great to see so many familiar faces, some of whom had the difficult task of mentoring yours truly over the years! I thank each one of you for your steadfast, distinguished service and continued devotion to the defense of this great nation.

For the last 26 years the Naval Submarine League has been a vital part of our Submarine Force. The support provided by this great organization in raising awareness of our submarines' importance to U.S. national security is INVALUABLE in today's marketplace of ideas.

Your voices and your support now about 3500 strong, help to drive the Submarine Force message home to our Navy, our public, our Nation, and our elected officials.

You not only support us with your voices in the public sphere, but also by your support of our Sailors, through the presentation of more than 100 performance-based awards each year, some of which we will see presented at this Symposium. I can tell you that this positive reinforcement benefits recruiting, retention, and morale force-wide, and I thank you all for that.

I like to focus my remarks today on the terrific contribution our Submarine Force is making in support of Global Maritime Operations. In doing so, I hope to stimulate discussion that will help us to benefit from the collective wisdom assembled here today. The

wealth of knowledge and experience in this room is staggering, and should make for some lively discussions over the next couple days.

Deterring:

We deter, and if deterrence fails we win our Nations wars. SSBN Force patrolling at sea ensures our nation and our allies are provided with a *protective umbrella*. Submarine presence means access. Our worldwide operations mean no safe havens for enemies.

We provide credible combat power, organizing, training and equipping our submariners to fight each and every day.

Protecting:

We keep the homeland safe by deploying and pressuring potential allies far from our shores. When called on, we deliver proven combat power to fleet war fighters.

Engaging:

We work with our allies to improve interoperability and develop their capacity.

The title of my brief, "Dominating across the globe—deterring, protecting, engaging" speaks to the actions of the Submarine Force each and every day around the world. We are a global force **that never takes a day off**. We know we are a **necessary but not sufficient** element of the nation's maritime strategy.

We value the contribution of joint and allied partners. Make no mistake, even though we are the world preeminent maritime force, no single nation can "protect the maritime domain, ensure global prosperity, and address transnational threats to peace."

Let me begin with the bottom line up front: The Submarine Force, like the entire United States Navy, is committed to global security and prosperity. To this end we remain forward deployed and well positioned to dominate any threat and decisively defeat any adversary.

Our force is manned by the best trained and equipped mariners in the history of the world. We are fully engaged each and every day through committed relationships with our allies as together we work to strengthen our current partnerships and engage future

partners to build steadfast relationships that advance global maritime security and our common national interests.

Today our force and our Nation faces a broad array of challenges.

To cover just a few:

The Peoples Liberation Army (PLA) is pursuing comprehensive transformation from a mass army designed for protracted wars of attrition on its territory to one capable of fighting and winning short-duration, high intensity conflicts against high-tech adversaries which China refers to as "local wars under conditions of informatization." China's ability to sustain military power at a distance, at present, remains limited but, as noted in the 2006 Quadrennial Defense Review Report, it "has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time offset traditional U.S. military advantages."

China's near-term focus on preparing for military contingencies in the Taiwan Strait, including the possibility of U.S. intervention, appears to be an important driver of its modernization plans. However, analysis of China's military acquisitions and strategic thinking suggests Beijing is also generating capabilities for other regional contingencies, such as conflict over resources or territory.

The pace and scope of China's military transformation has increased in recent years, fueled by continued high rates of investment in its domestic defense and science technology industries, acquisition of advanced foreign weapons, and far reaching reforms of the armed forces. The expanding military capabilities of China's armed forces are a major factor in changing East Asian military balances; improvements in China's strategic capabilities have ramifications far beyond the Asia Pacific region.

North Korea and Iran both possess a potentially toxic mixture of ballistic missile technology and desired or actual nuclear weapons capability which has the potential to threaten the United States and our allies.

Afghanistan and the federally administered tribal area of western Pakistan with its terrain, poverty and tragic history promises to prolong the worldwide irregular conflict dubbed the Global War on Terror which our Nation's military and our Submarine Force confronts each day.

Today our Navy faces a more complex and unpredictable world than what many of us faced in the Cold War. These threats of potential peer competitors and our desire to shape their outlook drive our global naval and Submarine Force posture.

Your Submarine Force is fully invested in providing presence—presence which is fully supported and requested by geographic combatant commanders—across the globe.

This year we added SSGN to the deployed mix. Today, USS OHIO and USS FLORIDA are deployed to the PACOM and CENTCOM Areas of Responsibility. SSGN's proven capability is providing joint war fighters with flexibility, endurance, payload, and naval special warfare effects needed to dominate from the sea.

We are also continuing to call on Atlantic Fleet submarines to deploy to the Pacific as demonstrated by USS PROVIDENCE's operations today in the SEVENTH FLEET area of responsibility.

This year for the first time since reestablishing Guam as a homeport for three forward deployed submarines each submarine completed deployed operations in support of PACOM objectives.

USS ALBUQUERQUE, who deploys early next year from her current homeport of Groton, Connecticut for an around the world cruise and ultimately her new homeport—San Diego— will join USS HAWAII, the Pacific Fleet's first VA class submarine—as we continue progress toward a 60/40 PAC/LANT split of our Submarine Force.

Equally important to delivering on the promise to deter is a credible and scalable ability to retaliate against aggressors with our sea based strategic nuclear capability—this deterrence is provided each and every day by our strategic ballistic missile submarines and their crews.

From our Trident submarine bases in Bangor, Washington and Kings Bay, Georgia we provide our nation and our allies with the confidence that we are ready. The backbone of the Nation's survivable nuclear deterrent will continue to be provided by our Submarine Force.

To quote former Defense Secretary James Schlesinger who heads the task force on nuclear weapons management:

> "The nuclear deterrent role today is quite different, and it is much more circumscribed than it was in the days of the Cold War. However, **it is no less important**. One needs to be

aware that the United States holds a nuclear umbrella over the other NATO nations, over our allies in the Western Pacific, as well as Australia and New Zealand, some 30-odd nations which depend upon the U.S. nuclear umbrella. And the confidence that they have in that umbrella will determine whether or not they themselves may seek to acquire nuclear weapons."

In the wake of concerns for nuclear weapons management, triggered by the *Donald Report* the entire strategic nuclear enterprise is being examined. While there will likely be recommendations that require Dept of Navy action, I can assure you, today our strategic ballistic missile submarines provide national decision makers with the confidence and the means to decisively influence potential adversary decision makers.

Our fully modern force is postured to respond subject to firm command and control procedures, while conducting fully survivable and secure operations from sea bases in the Atlantic and Pacific oceans.

The credibility and survivability upon which this deterrence rests is dependent upon the terrific Sailors that man these submarines and their proven record of performance which includes 124 consecutive test missile launches and over 3800 successful SSBN patrols since 1960. They are also receiving superb day-to-day support from the outstanding shore based organizations that provide technical oversight, training and equipment which supports this important mission.

Defense Secretary Gates has stated that:

"Nuclear weapons will continue to be required for the foreseeable future. The future security environment is very uncertain, and some trends are not favorable. The future direction that any number of states may take, including some established nuclear powers with aggressive nuclear force modernization programs, could have a dramatic effect on U.S. security and the security of our allies."

And recently, Commander, US Strategic Command signaled CNO that "Sea based strategic deterrence is essential to deter future adversaries from aggression against the United States" and urged the Navy to begin planning for the replacement of the OHIO class

SSBNs and the Trident strategic weapons system which will be retired beginning in 2027.

In summary, we cannot afford to fail at strategic deterrence, and we won't. Critical to the success of this deterrent is it's survivability, which is itself dependant upon stealth. Stealth is essentially an *as-built* condition of a submarine, so it is essential that the level of stealth for our next generation SSBN be appropriate to counter all foreseeable threats over it's platform life which will extend well into the rest of this century.

While our strategic nuclear forces provide an important hedge against potential competitors our deployed submarines play an equally important role in shaping the decision making calculus of potential adversaries.

As I mentioned earlier, China has been and continues to be a focus for U.S. Naval forces operating in the Western Pacific.

Having given you an appreciation for geopolitical threats faced by our nation and the posture of our naval forces around the globe I'd like to spend time focusing on the global maritime challenge we face in some of the regions of the world where our submarines are operating today. Let me start with the challenge I am most familiar with—China.

In the last 8 years the PLA(N) has shifted from a Submarine Force dominated by 1960's technology consisting of MING, ROMEO and HAN submarines to a newer more modern force of SONG, YUAN, SHANG, KILO(4B) and JIN submarines. Almost all of them produced indigenously with ever increasing capability.

And it's not just the platform we should be focused on either. The newer submarines come equipped with anti-access weapons like the YU-6 wake homing torpedo, the SS-N-27B anti-ship cruise missile, and in the case of the JIN, the PLA(N) is developing the JL-2 sea-based ballistic missile with an assessed range of nearly 5000 NM.

For these modern platforms, China has also developed state of the art shore based facilities like the facility on Hainan island in the South China Sea. China recognizes to be relevant, they must be regionally concentrated with credible combat power that can be projected across the Pacific maritime environment— not just a force relegated to operations inside the first island chain.

While the expansive nature of the Pacific theater does provide

a challenge to U.S. naval forces, it also provides an opportunity as long as we can maintain access to the ports we operate from in the Pacific AOR.

An essential element of our naval presence in the region is forward deployed Submarine Forces that are manned, equipped and most importantly trained to meet the maritime challenge that confronts the entire region. Today, our deployed submarines from both the Atlantic and Pacific fleets are meeting the challenge and doing so while conducting port visits in over 10 separate locations and one submarine homeport—Guam. Our Sailors are welcome around the Pacific Rim. They understand the axiom "liberty is mission" and commonly engage in community relations projects that leave a lasting favorable impression of our Navy and our Submarine Force with the countries and people in the ports they visit.

Our forward presence is also helping shape the perception of allies and potential peer competitors too. We provide credible combat power continuously with forward deployed maritime forces to protect our vital interests, assure friends and allies or our continuing commitment to regional security, and deter and dissuade potential adversaries and peer competitors.

Our presence plays several key roles in the region. First it supports operations that allow us to walk the battlefield so that if conflict occurs, our submarines have already developed the environmental and operations understanding and experience to quickly engage in combat operations. Second, exercises with key regional allies that demonstrate and further develop U.S. and allied capability, integration and interoperability, which then form the cornerstone of effective theater security cooperation.

SSGN's maiden voyage to the Seventh and Fifth Fleets has been noticed too and the flexibility she brings to naval special warfare operations and global force management of tomahawk missiles is in play every single day.

Finally, the promise of three SSNs homeported in Guam has been realized and HOUSTON, CITY OF CORPUS CHRISTI and BUFFALO are leading the way.

We are well-positioned to anticipate and lead the United States Navy as we adjust to the changing nature of Maritime Operations in the Western Pacific.

I've already mentioned SSGN and the role this transformational platform is playing in the Fifth and Seventh Fleets; let's spend a few moments highlighting some of OHIO's achievements as we recap nearly a year of deployed operations:

- OHIO has completed **three successful operational periods** and today is on her fourth and final mission period of this cycle before heading back to PACNORWEST after nearly a full year of operation.
- She performed well in **exercise FOAL EAGLE with our South Korean allies,** she has accomplished operations **employing special operating forces** and she has proven the CONOPS that she was converted to do. She has validated the crew exchange concept in theater, and further substantiated the strategic significance of GUAM as a forward operating base.
- With regard to OHIO's relief, **USS MICHIGAN**, she is in her first homeport training period and will soon be finishing all her various certifications for **deployment.** During this period, MICHIGAN **will be certified ASDS and will be the first SSGN to deploy with ASDS.**

So how does this relate to executing our maritime strategy—SSGN is present and providing a unique multi-mission capability that remains in theater ready to respond and, because of it payload and capabilities, is **well suited to respond to regional crises.** As seen in a previous slide-SSGN, because of its enhanced strike and SOF capabilities is well suited for the expansive maritime environment of the Pacific.

From the Fleet Commander's perspective, SSGN brings capacity and capability that supports enhanced war fighting flexibility:

Flexibility by virtue of her Tomahawk weapons inventory that allows theater missile defense equipped cruisers and destroyers to adjust their pay loads in favor of additional ballistic missile interceptors which in turn provides our allies in the region a protective umbrella—from short and medium range ballistic missile attacks.

Flexibility to joint and combined special operations forces through enhanced platform effectiveness and improved operational support.

General Mattis—Commander Joint Forces Command—when he gives warfighters his view of platform adaptations that support meeting today's "irregular warfare" threat, often cites SSGN as an example of adapting a "classic" deterrent platform into a platform that has significant capability to respond to today's fight.

Guam has been essential to the success of forward basing our SSNs and our extended forward presence of our SSGNs too.

Guam is a key enabler to our Pacific Theater Presence and maritime domination: To our allies, Guam provides assurances that U.S. Forces are forward deployed and dominant. To our peer competitors, Guam provides a reminder that U.S. Forces can respond to regional crises on a moments notice. Collectively, our presence in Guam is a game-changer that provides our allies opportunity and our competitors caution—THAT IS A STRATEGIC MESSAGE!

Turning now to US CENTRAL Command, the maritime landscape is much different than what the Force faces in the US PACIFIC Command Area of Responsibility (AOR).

Our submarines operate in support of national and theater objectives in the Global War on Terror—taking full advantage of our inherent characteristics of stealth, mobility, firepower and endurance, we provide the warfighter with effects that are denying terrorists the ability to operate from ungoverned and unstable regions which are predominant in this part of the world.

We are positioned to respond to ASW threats to Carrier Strike Group and maritime operations.

Finally, we can respond to bids by countries seeking to deny freedom of navigation to maritime nations in and around the Arabian Gulf.

Just as important to the operations we conduct in the region is our presence and the signal it sends to our allies in the region. Deployed operations must also provide an opportunity for repairs and re-supply.

We work very closely with US NAVCENT and our allies to provide our submarines the access needed to support their operations in the US CENTRAL COMMAND AOR.

FLORIDA, like OHIO, is now deployed having just completed her second operations period.

As an example of the value she brings to the warfighter

USNAVCENT extended her operations to cover an urgent operational need.

We have demonstrated the ability to conduct deployed maintenance and crew exchange in Diego Garcia despite not having deployed a tender to serve as a logistics hub. Eventually, the EMORY S. LAND, following her DPMA in 2009 at Puget Sound Naval Shipyard will be based in Diego Garcia to provide this capability.

I could go on and discuss important operations our force is conducting in the EUCOM, AFRICOM and SOUTHCOM AOR's, which are equally important in shaping the perceptions of potential competitors and/or real or perceived threats, but, for the sake of brevity I will stop here to summarize and give you my final thoughts.

First, we are an extremely relevant force in today's complex geopolitical environment. When faced with seemingly insurmountable challenges, our force and **our industrial base** has delivered.

On the 29th of September of this year, Secretary of Defense Gates gave a seminal lecture at the National Defense University—which covered his thoughts on the ideas and analysis, as well as the points of contention behind the National Defense strategy.

In doing so, he cautioned all of us on the performance of our National Security apparatus and by extension the Department of Defense and he cited the work of a former colleague at CIA to make his point. His former colleague identified a number of tendencies that prevented institutions from adapting long after problems had been identified and solutions were proposed.

The tendencies included:

- "The reluctance to change preferred ways of functioning, and when faced with lack of results, to do more of the same;
- Trying to run a war with peacetime management structure and practices;
- A belief that the current set of problems were either an aberration or would soon be over; and
- Where because a certain problem; counterinsurgency-did not fit the inherited structure and preferences of organizations—it simultaneously became anybody's business and no one's business.

Secretary Gates went on to say, "I cite that study not to suggest

that the institutional military hasn't made enormous strides in recent years. It is, however, a cautionary reminder that these tendencies are always present in any large, hierarchical organization, and we must consistently strive to overcome them."

As I reflect on the recent performance of our Submarine Force I see none of the behavior that Secretary Gates cautions us to be wary of.

We are a flexible, adaptable, relevant and capable lot—motivated by a healthy skepticism which pushes us to ask the hard questions and move forward to constructively address problems.

Our force and our submarines are in high demand by our allies, our Navy and our Nation—because we are able to operate around the world with stealth, mobility, payload and endurance.

SSGN, thanks to the vision and wisdom of many in the room today, is changing the nature of maritime operations and with its nearly unlimited payload volume promises to be a platform that "keeps on giving" to the war fighter.

Finally, we all recognize that maritime operations and effects are a necessary but NOT sufficient component of joint war fighting. Thank you and God bless you all.■

DIRECTOR, SUBMARINE WARFARE REMARKS TO THE SYMPOSIUM 22 OCTOBER 2008 RADM CECIL HANEY, USN

Fellow officers active and retired, Senior Executive Service representatives, members of the Naval Submarine League, industry leaders, distinguished guests and especially to all submariners past and present greetings. It an honor to address you today.

Thanks VADM Reynolds for inviting me here today. What a fantastic venue today. I am really looking forward to working together to capitalize on the early success of our SSGNs.

This is my first opportunity as the Director, Submarine Warfare Division to address the Annual symposium and I am looking forward to updating and synchronizing with you on our ongoing efforts. Before I start, VADM Donnelly's Albert Einstein joke reminded me of another story about the great scientist that I think is appropriate for me today:

> Albert Einstein was getting tired with making the same presentation over and over again at different meetings. So one night, after a long day, his chauffeur jokingly said I've heard your speech so many times, I know it word for word! Why don't you take the night off and let me deliver the talk this evening?" Einstein agreed. When they arrived at the venue, Einstein put on the chauffer uniform and hat, and sat at the back of the hall. The chauffeur took his place on the podium, and effortlessly delivered the speech, and invited the audience to ask questions. He convincingly answered the first few, but then one man stood up and asked a very difficult question on his theories of relativity. The chauffeur was flummoxed, but calmly said, why, that question is so very easy, I will let my chauffeur answer it!

Now, I assure you that it is really me up here but, Joe, my Flag Lieutenant, is ready in case I get in trouble here.

Today is an auspicious day.

On Oct 22, 1941, PCU Trigger was launched at Mare Island Navy Yard in Vallejo, CA. In her short 3 year life, Trigger completed 12 war patrols, receiving 11 battle stars, and a Presidential Unit Citation for her 5th, 6th, and 7th war patrols. She is credited with sinking 18 ships totaling 86,552 tons and is the genesis of the famous poem *I'm the Galloping Ghost of the Japanese Coast.*

On Oct 22, 1965 PCU BENJAMIN FRANKLIN (SSBN 640) was commissioned at the Electric Boat Division, General Dynamics Corporation, Groton, CT marking the commencement of almost 3 decades of strategic deterrence service to our great nation. On Dec 6, 1965 the Gold Crew successfully launched a Polaris A-3 missile in close coordination with an orbital pass of the Gemini 7. During her 69 strategic deterrent patrols, she carried the Polaris, Poseidon, and Trident missile demonstrating the nation's prudent investment in both platform adaptability and missile technology.

What an incredible testament to our early pioneers in not only fighting our nation's wars but also preventing them from ever occurring again. That is the kind of effect that our Submarine Force is recognized for.

Today, I hope to briefly touch on the following topics: a recap of where we have been over the last year or so; an update on the current fiscal considerations as we move into this fall's events; an overview of our efforts to properly capture the value and effect of our submarines in the various strategy and policy efforts that are currently underway; a review of some threats to the undersea domain and some of our current efforts to ensure our undersea dominance; where I see the Navy's S&T and R&D focus moving in the near term; a review of some technologies that hold promise to further expand the payload capability of our submarines; and finally an update on our OHIO recapitalization efforts.

We continue to build momentum. Our Submarine Force continues to be in high demand by the Combatant Commanders because of their stealth, survivability, and multi-mission capabilities. The VIRGINIA program continues to deliver the most advanced and capable submarine in the world on-cost and on-schedule. With the commissioning of NEW HAMPSHIRE this weekend we will for the first time in over a decade commission 2

submarines in the same year. NEW MEXICO is following closely behind and will be christened on 13 December. OHIO and FLORIDA are on their maiden deployments and have by any measure delivered the goods. Open sources reported that China's official Xinhua news agency called the OHIO a warehouse of explosives and a devil of deterrence. Sounds good to me! The Chinese must also have read our Maritime Strategy. Finally, when MICHIGAN deploys next month we will have 3 SSGNs on deployment with GEORGIA following closely behind. What a great set of achievements for us all to be proud of!

I am happy to report that President Bush signed the FY09 National Defense Authorization Act and Appropriations Bill. The Virginia program received full funding, plus Multi-Year Procurement authority. The President's FY10 budget request is due to Congress on 2 February, but this may be a placeholder submission to be followed later by a full budget. This potential budget delay is typical in the first year of a new Administration and is reflective of our healthy political process.

With respect to DoD financial challenges, do note that the national level investment in DoD is at an historic low as it relates to GDP. However, national level requirements and expectations are conversely at historic highs. This situation will continue to force us to make hard choices in the coming years.

When this is evaluated with Navy Total Obligation Authority over the last few decades, you can see that despite a marked decrease in number of ships, aircraft and personnel since the 1980s, OMN costs have remained nearly constant, PERSONNEL costs have skyrocketed, PROCUREMENT costs show only a minimal increase and R&D funding is at the highest level ever. However, today R&D is much more than pure lab work and represents our drive for cutting edge technology. The question is now, more than ever, once a new technology is developed, how do we shift the newfound capability from R&D to steady state procurement? We are going to need to reevaluate this process.

In this recent time of global financial volatility, we are seeing dynamic changes in the following areas: global economic dependency; discretionary allocation apportionment; resource allocation; and political reform. These effects will no doubt influence the development of the current and future POM builds. At the end of

the process, however, I believe that it comes down to balancing and value. The nation and the Navy have to find the right balance and invest in what brings the most value. I believe that our recent legacy with respect to delivering SSGN on time, on budget and the current success of the Virginia program will undoubtedly be respected.

Our persistent presence has resulted in measurable effects that have had global impact. I have already discussed the Virginia class as well as some of the contributions of our SSGNs. While I don't have time to list every contribution by the fine ships and Sailors that comprise our Submarine Force, I do want to highlight just a few from the SSBN world in particular.

On 25 August, USS LOUISIANA successfully launched two Trident II D5 Fleet Ballistic Missiles, demonstrating the continued reliability and credibility of the Fleet Ballistic Missile. These were the 123rd and 124th consecutive successful launch since 1989, a record achievement! On 26 September, USS PENNSYLVANIA returned to Bangor, WA following the successful completion of her 60th strategic deterrent patrol. The patrol also marked the 500th strategic deterrent patrol of the OHIO-class submarine Trident II D5 Strategic Weapons System. This winter, our SSBN force will complete its 1,000th TRIDENT strategic deterrent patrol.

The value of submarines is increasingly recognized at the highest levels of the Navy. In my time as N87, four submarine COs have briefed CNO on their deployed operations and he is anxious for more. My staff is aggressively pursuing opportunities and avenues to provide our message to the legislative branch on the Hill. As a result of these and other efforts, our stature in relevant policy and strategy has grown. The soon to be released Naval Operations Concept (NOC) will align with our efforts to showcase our contribution and value. The NOC will describe how, when, and where U.S. naval forces will contribute to preventing conflict and prevailing in war in order to guide maritime strategy implementation. The NOC will inform naval participation in service and joint concept development and experimentation. Our country must understand we are a maritime nation and the value of the naval forces to achieve our national goals.

Today we live in a complex world. There are many and varied threats in the Undersea Domain in the news today. Russia, flush

with oil capital, continues to build and deploy very capable submarines. China continues on its quest to change its role from a regional influence to a global power. Iran's interest in nuclear weapons development and indigenous submarine production has the potential to alter the calculus in the Gulf. Venezuela's just announced strategic partnership with Russia coupled with her open efforts to purchase KILO and AMUR SSKs and other high technology military equipment, is sure to keep the 4th Fleet very busy. Finally, the increase in Self-Propelled Semi-Submersible activity in SOUTHCOM shows the level of commitment that today's traffickers and smugglers will go to. While our competitors are not 10 feet tall they are committed and we have to remain vigilant in ensuring that we maintain our advantage in and across the undersea domain.

As I travel around, I am constantly exposed to smart folks doing great work. Recently I was exposed to an effort at NWDC in reviving our concept generation and CONOP generation process by emphasizing the need to focus at the operational level of war. Concepts evaluated will include: near and far term objectives; strategic and operational perspectives in order to inform and shape tactical development; and the ability to both leverage and influence Joint and Coalition developments. Lessons learned from this effort will inform the need for changes and/or realignment in authorities, roles, responsibilities, and required resources required to ensure that the conclusions are championed into enduring program.

The first concept that will be explored will center on Undersea Superiority. Currently scheduled to get underway in the next few months, the initial cadre will consist of a small group of young and energetic experts charged with investigating the innovative employment of future capabilities as a methodology to address our most challenging undersea issues. From my perspective, I see unmanned systems as a critical element to meeting our future requirements and expect innovative breakthroughs will result from a combined and layered approach with these technologies. Part of this effort will also have to be a fundamental cultural change among warfighters as to how they view these types of technologies as compared to legacy techniques. I am anxious for their work to produce tangible results.

As we continue to execute the imperative of the maritime

strategy, we must continue to stimulate innovation, encourage prudent risk-taking, and inculcate the culture of command that has been the foundation of our Navy successes for more than two centuries. S&T and R&D is the foundation that stimulates innovation and ensures our ability to achieve and maintain superiority in all domains. We must continue to leverage S&T initiatives to ensure warfighting benefits accrue to future Sailors. Our S&T investments must address warfighting gaps and improve current effectiveness and efficiency. And finally, our S&T investments must deliver products that can be transitioned affordably to Fleet Operators within a timeframe that maximizes the value of their use. **In the end, buying technology off the shelf ensures our parity not our dominance.**

However, in this pursuit of new technologies we must practice appetite suppression, recognizing that technology can deliver great capability, but we can only afford to invest in the capabilities that bring value and balance to our needs. Key measures of our success will be measured in (1) warfighting value and, (2) the ability and agility to quickly transition our S&T investments from development to acquisition to operation. I welcome interactions with you on how to best achieve these key measures.

I am often asked about the current and future status of Unmanned Undersea Vehicles, or UUVs. I believe that UUVs and Distributed Netted Sensors have the potential to take hold in the Navy today but must overcome technical and operational challenges to take on the expanded role needed of them in the future. I think that the stage we are at is similar to the point the Navy was at when CNO Burke signed the letter directing establishment of the Polaris Missile Program. The technology is possible but strong leadership and vision is needed to make it happen. I think that future UUVs will be most effectively employed to: close warfighting gaps; gain access to places manned platforms cannot either due to environmental or survivability concerns; improve operational speed and efficiency of our manned systems; and act as total force multipliers. These vehicles and sensors will best operate as a system of systems either independently, as extensions of our manned platforms, and/or where appropriate, surrogate platforms in addressing new and risky requirements.

The Navy has several UUV programs underway today. Most fall

into the category of single mission systems deployed in benign environments. I believe that by using an incremental approach, we can translate individual successes into a comprehensive tool set to answer the following areas:

- Mission and capability definition—What are we going to use UUVs for and what capabilities will UUVs need in order to fill those roles?
- CONOPS—How, exactly, using end-to-end analysis, will UUVs be employed?
- Technology Development—What technologies require investment to achieve UUV readiness and when can adequate technology readiness be affordably achieved?
- Experimentation—What demonstrations are needed to prove technologies and build operational experience?
- Campaign Analysis—What warfighting impact results from different combinations of UUV capability and capacity?
- Funding and schedule to address key warfighting gaps—What funding in what years are required to put this vision in place?
- Proposed Way Ahead—Identify opportunities today with current technologies and programs to develop options for aligning resources including personnel demands and organizational efficiencies.

I know that your contribution to these efforts will be critical.

As many of you know, in 2027, the Navy will retire the oldest of the 14 OHIO-Class SSBNs when it reaches the end of its service life. Over the subsequent 13 years the Navy will retire the remaining OHIO-Class SSBNs at a rate of 1 per year, concluding in 2040. The Navy intends to replace these OHIO-Class submarines with a follow- on Sea Based Strategic Deterrent (SBSD) submarine. The Analysis of Alternatives is ongoing and will guide programmatic requirements in accordance with the Joint Capabilities Integration and Development System process. One of our current efforts is focused at understanding the strategic environment that will shape the required capabilities and attributes of the OHIO replacement capability. The entire OPNAV staff N1, N2, N4, N3/5, and N8—is

working to ensure that the warfighting requirements are leading the process. Earlier I said that it was all about balance and value. I am convinced that appropriate investment in SBSD R&D and concept development is essential to a reliable, persistent, survivable and adaptable sea-based strategic deterrent prepared to face an uncertain future. Defense Secretary Gates recently stated nuclear weapons will continue to be required for the foreseeable future. The future security environment is very uncertain, and some trends are not favorable . . . the U.S. nuclear arsenal continues to serve as the ultimate guarantor of security Although details about the future inventory of nuclear weapons and the make-up of the US nuclear force are uncertain, it is certain that as long as other countries possess nuclear weapons, there will be a need for a credible SSBN force.

I want to leave you with the thought that it is our great legacy of warfighting, deterrence, and prudent investment that has proved our value to our Navy and Nation. TRIGGER, BEN FRANKLIN, and OHIO all delivered. Our nation demands similar performance from us today and tomorrow. Submarines are a high-demand, low-density asset and we are playing an increasingly critical role in ongoing strategy and policy efforts. Their contribution to forward presence and deterrence is recognized. There is a broad-based top-down resurgence in the recognition of the inherent value of submarines and the Undersea Domain. We, together, need to work to continue the current momentum of delivering on-time, on-budget value and effect.

This concludes my remarks for today. Thank you for your time, your effort, and most of all your experience. I look forward to continuing this discussion and engaging with you for your thoughts and ideas. I would be happy to address any questions that you might have.■

NAVY IRREGULAR WARFARE

NAVAL SUBMARINE LEAGUE
2008 ANNUAL SYMPOSIUM
THURSDAY, 23 OCTOBER 2008

RADM (SEL) Mark Kenny, USN

Good morning ladies and gentlemen. Thank you Admiral Reynolds for the introduction and for letting me be a part of the convention. I've heard some great things from those that were here yesterday and from the CNO who kicked it off. From our perspective at Navy Irregular Warfare, we are seeing first hand the CNO's excitement and enthusiasm for SSGN during our bi-weekly updates with him.

We're going to focus today on the Counter-terrorism (CT) capabilities of SSGN. We will delve into a lot of generalities but if you let your imagination roam, if you read the newspapers and understand where the threat is, that's where we're sending these ships. It's that simple. These ships are the Navy's premier CT tools. No doubt about it.

Those are not just my words. The praises are coming back from those that lead this fight and those in the intelligence community. Our nation is fortunate that through bold leadership (both military and civilian) we now possess four SSGNs: operational and in the war. If you recall, we got approval to convert these ships right after 9/11. Through great leadership and professionalism by our acquisition community, we delivered these ships on time and on budget. These ships are truly the right platform for the right time. Fitted out for special operations, information operations, and irregular warfare they are going directly into the fight. The first two deployments, OHIO and FLORIDA, were ground-breaking. The ships worked as advertised; they brought home the bacon.

Navy Irregular Warfare

I will take the next few moments to discuss the role of our command, the Navy Irregular Warfare Office. After 3 years of working mainly submarine and special operations force integration,

in 2008 we broadened our focus to full Navy engagement in counter-terrorism operations. In recognition of this broader scope, the CNO formally established our command on his staff last summer. Our charter is to synchronize, liaison and institutionalize Navy's Irregular Warfare contribution with the Combatant Commanders, Special Operations Command, the Intelligence Community and within other government agencies and departments. The areas of Irregular Warfare that we focus on are: Counter-terrorism, counter-insurgency, intelligence collection, information operations, foreign internal defense, and unconventional warfare. We have assembled a top-notch team of active duty, reservists, contractors and detailees from other organizations. CNO has tasked us to avoid the layered bureaucracy and staffing so prevalent within the defense department and to deal directly with the warfighters forward and the fleet in delivering IW capability in the near term; 6 months to a year timeframe.

CNO has directed us to replicate much of the construct the Submarine Force uses and apply it across the rest of the fleet. Since its inception in 1900, the Submarine Force has been able to rapidly adapt new technologies and capabilities, while at the same time keeping high standards of engineering and operational excellence. The persistence and clandestinity of the Submarine Force are a perfect match with the SOF and intelligence community in our nation's pursuit of terrorist threats around the globe. Using the SUBFOR model as an example, the goal is to have a Navy that can prevent and prevail in a future conflict against a China, North Korea or Iran while simultaneously fighting today's war against the Islamist terrorist threat. Our surface brethren have risen to the challenge and today are conducting unheralded, yet high end, CT operations in a number of theaters.

The Network over Their Network

Our team concentrates on building a sensor network over the Al Qaeda terrorist network. Our network consists of ISR sensors onboard unmanned air, surface and underwater sensors combined with manned systems at sea and ashore. Of course ships, submarines and aircraft have their organic sensors trained on the terrorist networks as well. This network is the foundation of the US government's effort to Find, Fix, and Finish the High Value Terrorist

targets. The metrics are clear; terrorists killed or captured by US forces, our coalition partners or host nation forces.

SSGN IW Fusion Cell Concept

Crucial to our network over their network are the Fusion Cells that exist today in our SSGN Battle Management Centers (BMC). These Fusion Cells are modeled after similar Fusion Cells created by the Special Operations Forces and the Intelligence Community in Afghanistan and Iraq. Onboard FLORIDA, the Fusion Cell is the Processing, Exploitation, Dissemination backbone that enables rapid targeting of the actionable intelligence exploited by our sensor network. SSGN extends its organic, periscope view, field of regard with unmanned sensors while simultaneously reaching back to the Intelligence Community to form the clearest, most timely picture of the threat. SSGNs are also linked to the warfighter ashore and with the country teams forward.

More importantly, SSGN can do something with the information exploited from our sensor network. Whether it is the warhead at the tip of a Tomahawk or a .556 round from an embarked Seal team member, SSGN can deliver the full range of kinetic and electronic attack effects. SSGN is also working in collaboration with our surface and aviation warfighters who bring their unique capabilities to bear in the fight.

Details of the capability and manning of these fusion cells cannot be discussed in an open forum. The commanding officer of FLORIDA and former CO of both a VIRGINIA and 688 class SSN, CAPT John Litherland, commented after completing his recent CT mission that never had he served on a more connected, responsive, full spectrum ISR collector and deadly platform than SSGN. Team FLORIDA, as the SOF community refers to her, has revolutionized Irregular Warfare. John and his fellow SSGN skippers have only written the opening chapter of SSGN contribution in this long war.

IW Command and Control Challenges

Most of you here today have conducted or supported submarine operations against conventional threats, whether during the Cold War or against today's maritime competitors. The game is to collect intelligence, archive it onboard, and deliver it to analysts ashore upon return to port. Occasionally the value of a piece of intelligence

was deemed important enough that you would report it back to headquarters. For a number of operational reasons, transmitting from a submarine during conventional missions, was and still is, rare. That construct does not work for CT and IW missions. Our COs and their crews must have a different mindset.

In the hunt for terrorists, information more than a day old may be completely irrelevant and useless. Therefore our SSGNs and SSNs conducting *close-in* IW missions are often continuously transmitting and passing near real time actionable intelligence to the warfighter. In many of the areas we conduct IW missions we don't encounter high end anti-submarine or collection capability against our submarines, giving the CO more flexibility in communicating while maintaining his stealth. But as we operate in more contested areas, it is a heck of a balance for our COs to maintain between collection and stealth. This requires a tailored pre-deployment training and certification process and improved bandwidth, data mining and data compression technologies. SSGN and her Fusion Cells are writing the book for future employment by LCS and other surface combatants conducting IW ops.

Combat Demo Concept

Navy IW utilizes combat demonstrations to get capability rapidly into the hands of the warfighter. This process has two goals; first, get capability into the fight quickly, second, permit the warfighter to evaluate the military utility of the capability for possible transition into a formal program. This process works outside the normal acquisition process, although the acquisition community lends their technical and managerial expertise throughout the effort. Funding and support also comes from non-traditional sources.

One of the challenges we have is institutionalizing this process. We have to transition from a *one-of-a-kind* UAV, sensor, etc., into some type of program to deploy across the fleet. That is a challenge especially in the extreme budget environment we will face in the future. We've been fortunate to be able to leverage cost of war money, rapid technology funding, SOCOM, and other special funding. We have a decent baseline Navy *venture capital* funding line for technology development and integration efforts. This approach does not sit well with the program and budgeting

community in the Pentagon. There is no resource sponsor or platform advocate.

Using inputs from liaison officers forward and our frequent interaction with the warfighters we evaluate the threat, identify gaps that the Navy can fill, identify capabilities to rapidly counter the threat. When we're challenged to lay out a five-year programming and budget plan, the so called POM, our retort is that we will... when Al Qaeda gives us their five year plan! The threat rapidly changes their tactics and methods, such as changing communication regimen, which requires a rapid change in our tactics, training and procedures as well as technical capability enhancements. Our response cannot wait 5 years, 3 years or the next POM cycle. We need to turn inside their cycle to counter their asymmetric threats. Speed and agility are the bywords of this process.

Examples of Combat Demos

SSGN has deployed the full gamut of sensor technology from the hand launched tactical UAV, BUSTER, to the Reaper MQ-9 Predator variant. Admiral Donnelly has covered BUSTER in other forums. The Reaper effort, or project Saber Focus, is a major Navy/SOCOM project with SSGN as its centerpiece. The Reaper is a Predator on steroids with seven times the payload and twice the endurance. It will extend SSGN's reach hundreds of miles inland. Due to a unique WIFI network, SSGN will receive a factor of one hundred times the collection of the current Air Force Predator model. You can see now why the Fusion Cell effort is of vital importance to SSGN's mission. The capability is eye watering but unfortunately cannot be elaborated upon in this forum. Both FLORIDA and GEORGIA have been fully fitted out to control this capability, again, funded from outside of the Submarine Force. In addition to BUSTER and SABRE FOCUS UAVs we are modifying SCAN EAGLE UAVs for launch from the SSGN and eventually the VIRGINIA Payload tubes. SCAN EAGLE is currently being deployed from surface ships in the fight. The SSGN CONOP consists of surface launch and recovery of this asset in the cover of darkness. The endurance and payload of SCAN EAGLE allow for video, SIGINT and even weaponized payloads.

Much of our project successes are achieved by taking what is available and adapting it for the fight. SEA STALKER Large

Diameter Unmanned Undersea Vehicle (UUV) is an example of this approach. Many of you are familiar with Penn State's SEA HORSE UUV from the Giant Shadow series of experiments. This effort is funded largely outside the Submarine Force by NAVOCEANO/NAVY/DIA/OSD. We are converting three vehicles to conduct long dwell SIGINT collection near shore. Tom Nutter is leading our team's effort with an incredible sense of urgency to get it out to the fight. It will deploy from both surface ships and SSGN.

SEA STALKER is part of the incremental approach to deploying UUV capability. As mentioned previously, we're doing this first of all in response to a warfighter need for close in clandestine SIGINT, but also to get UUVs into the fight. Many of you have seen various UUV programs rise and fall mainly due to technical problems, funding overruns and the lack of a coherent operational requirement. SEA STALKER is our response to a valid operational need in AFRICOM, as is our follow on effort with SEA MAVERICK, a larger more capable UUV being developed for counter-narcotic and CT ops in SOUTHCOM. We're excited about these UUV efforts. We know we'll get them into the fight and they are going to show their mettle.

The Balance between Conventional and Irregular Warfare

We have hit only the wave tops of Navy's Irregular Warfare efforts and SSGN's leading role in the war. This effort is fully coordinated with and supported by leadership in the Royal Navy and the Royal Australian Navy.

Secretary Gates has spoken often and forcibly about the need for the services to realign and better balance their conventional and irregular capabilities. He has directed the services to fight and win the war we are actually fighting instead of focusing on a threat we are unlikely to face.

That ultimately means an adjustment of resources towards irregular warfare.

This fight has been called the Long War. The threat desires to inflict mass causalities against our interests overseas and indeed upon our very homeland. The threat is unlikely to be deterred. Unlike the China-Taiwan scenario that forms the basis of much of our budgeting decisions, Al Qaeda will not respond to cross straits

dialogue or military to military cooperation such as we see occurring today in East Asia. As Secretary Gates recently stated, we are unlikely to fight a China, who has more to lose economically than we do in a Taiwan crises scenario, and therefore we can take acceptable risk in this unlikely scenario.

But the fight against radical Islamist terrorism is ongoing, deadly, and will continue perhaps for a generation. There is no analysis that Al Qaeda is anywhere near calling it quits. In fact as President Bush has said over and over again, we're more at the beginning of this conflict then we are close to the end.

The Submarine Force and especially SSGN are well positioned for an increasing role in this war. Skippers such as Chris Ratliff, John Litherland, and Bill Traub have taken their crews in harm's way on SSGNs' maiden voyages in PACOM and CENTCOM/AFRICOM. Their exploits are just the opening salvos from these national treasures. Thank you, both those in and out of uniform, who did so much to bring these SSGNs from concept into reality. God protect those who sail on SSGN and God Bless America.■

USS OHIO (SSGN 726)
WESTPAC 2007-2008
WESTPAC PROLOGUE

by Captain Chris Ratliff, USN

"The Making of USS OHIO (SSGN 726)" is a colorful story that goes back many years and is filled with cliff-hanging plot twists. My first experience with the saga was in 1992, while working for Admiral Bill Owens (then OPNAV N8), as I participated in research and conceptual discussions about a missile-shooting and commando-carrying submarine based on the TRIDENT hull. The idea, while provocative, seemed closer to fantasy than reality.

Then in 1999, when I worked for the late Dr. Paris Genalis in the Office of the Under Secretary of Defense (Acquisition & Technology), the concept had matured to a proposal to convert the first four TRIDENT submarines, no longer necessary in their strategic role, to be very much like that early-1990s idea, now called SSGN. But as OHIO was fast approaching the need for midlife overhaul and refueling, the time was upon us to get serious: either start immediately investing appreciable sums of money in the idea, or accept that OHIO, with over twenty years of service life remaining in a national treasure that was truly remarkable for its capabilities, would be decommissioned, an irreversible fate. And if we made the decision to forfeit OHIO, then USS MICHIGAN (SSBN 727), USS FLORIDA (SSBN 728), and USS GEORGIA (SSBN 729)—comprising the first four TRIDENT submarines, and all hanging in the balance of either SSGN conversion or scrapping—would be destined with certainty for the same untimely fate.

While I commanded GEORGIA (Blue) as an SSBN beginning in the summer of 2000, the angst and uncertainty of SSGN conversion played out every day, as all modernizations, alterations, and improvements were canceled for my boat because the program of record directed that the first four TRIDENT hulls would be decommissioned. A last-minute reprieve seemed increasingly unlikely as time past.

Were the future bright and the horizon clear as OHIO finally entered a Puget Sound Naval Shipyard drydock in November 2002 to begin overhaul, refueling, and SSGN conversion? Let's just say optimism was guarded among then, CDR Brian McIlvaine[1] and his crew: the five-year plan that would have OHIO deploying to the Western Pacific as SSGN 726 in November 2007 was ambitious and aggressive enough to beg the same question that was asked in the early 1990s: is this program fantasy, or is it reality?

As I stood on the bridge of USS OHIO (SSGN 726) as Captain of the Blue crew on that fog-shrouded Sunday morning of October 14, 2007, we were getting underway from Puget Sound Naval Shipyard a month earlier than the five-year plan had foreseen. My shipmates and I were aboard our freshly overhauled, refueled, modernized, and SSGN-converted boat with 105 TOMAHAWK missiles (TLAM), accommodations for sixty six special operations forces (SOF) personnel, five tractor-trailers worth of SOF gear including 35 tons of specialized ordnance, a drydeck shelter (DDS) with a SEAL delivery vehicle (SDV), state-of-the-art sonar and fire control systems, and a command-and-control suite ready to embark and support a one-star battle staff. All the training and certifications were under our belts (the same could be said of Captain Andy Hale's OHIO (Gold) crew) to make us ready to operate this modern marvel in tactically challenging environments, performing SSGN-unique missions. The last word had been written on "The Making of USS OHIO (SSGN 726)." It seemed like a fantasy, but it was very much a reality as a new, more adventurous story had begun: we were ***headin' for WestPac!***

Where is OHIO now, over fourteen months later, as I write this article? OHIO is finally and with well-deserved fanfare **headin' home** to Bangor, Washington, under the command of CAPT Dennis Carpenter (Andy Hale's Gold crew relief), to arrive right before Christmas 2008.

SSGN Operational Concept

OHIO's coming home in December 2008 is by itself proof that the SSGN operational concept works. As envisaged at the outset many years ago, the boat was to forward deploy for a year. Three crew exchanges were to occur at the forward base of Apra Harbor, Guam, concurrent with each voyage repair period (VRP) of three-

week duration. Under this plan, the two crews, Blue and Gold, would have three months on-crew, followed by three months off-crew, in a repeating pattern for the duration of the boat's year abroad.

The operational concept would give OHIO and the other three SSGNs an operational availability of about sixty-seven percent for the life of the ship. This figure includes the hundred-day maintenance and modernization periods (MMPs) at Puget Sound Naval Shipyard between deployments. If you consider only the time the boat is forward deployed and account for the three VRPs, then the boat's operational availability becomes about eighty-three percent. If you consider that deployed SSGNs live assiduously by a 48-hour ready-for-sea rule even during the voyage repair periods, then the operational availability becomes over ninety-nine percent.

The first deployment made the already aggressive operational concept even more fast paced: we headed west over a month earlier than the five-year plan called for simply because we and the boat were ready, and it was clearly apparent that the security environment of the Pacific theater required SSGN. Further, we remained in theater over a month longer that the operational concept specified. Though MICHIGAN (OHIO's Pacific theater relief) was on time in its conversion and pre-deployment process, adhering to a rigid timetable for OHIO would have resulted in an SSGN gap in theater, a circumstance that we knew would be unacceptable, hence the need for OHIO to stay longer.

In a few more weeks when Dennis Carpenter's Gold crew returns OHIO to pier side in Bangor, fourteen and a half months will have elapsed since I headed westward in the fall of 2007. While it would be reasonable to expect that upon return the boat would be in rough shape, having been ridden so hard for so long, quite the opposite is true. Fleet-level inspection teams evaluated the boat as *excellent* in material condition, including its state of preservation, at about the ten-month point of the deployment, and then again near the end. The process of one-hundred-day MMP before deployment and three VRPs while deployed, overlaid on the well-proven TRIDENT maintenance plan, works above and beyond expectations! This circumstance gives the operational commander a reliable SSGN surge capability that he should perceive as a genuine force multiplier in a time of crisis. OHIO's deployment has

demonstrated convincingly that SSGN can, if necessary, delay a VRP to allow staying on station for additional weeks, or remain in theater for additional months at a time. OHIO's experience is not an anomaly, as Captain Bill Traub also proved a surge capability while FLORIDA BLUE was deployed to the Central Command (CENTCOM) theater.

Staying Busy in WestPac

SSGN was a new and therefore untried platform as the OHIO deployment began, but the volume and quality of tasking assigned from the moment we came into theater suggests our arrival was much anticipated. Each mission period was extremely busy, including at least one national-level tasking every time, and both crews executed SOF missions in support of the Global War on Terrorism. Typically, we would complete a mission, dash back to Apra Harbor, Guam, change out the embarked special forces, replenish their equipment, spend about a week at sea practicing the next mission, and then head westward again at best speed and with no time to spare. Of course, operational demands like these make indispensable the "N" (for "nuclear propulsion") in "SSGN."

While SSGN has not fired a TLAM in anger (yet), the 105 missiles onboard make OHIO a potent and important asset. Our presence in theater gave the entire fleet so much more flexibility and operational effectiveness. With TLAMs in our missile tubes rather than aboard AEGIS destroyers, the surface ships were loaded and ready to execute instead the essential ballistic missile defense mission. Similarly, with TLAMs aboard SSGN rather than in the torpedo rooms of many SSNs, the fast-attack boats are fully loaded with ADCAP torpedoes and better ready to confront the prodigious surface and submarine threats in the Pacific theater. The same can be said of the CENTCOM theater. We took our considerable strike responsibility very seriously. Whenever we were not on a mission and a strike exercise occurred, you can be sure that we were at periscope depth and fully utilizing our common submarine radio room (CSRR) with twin high-data-rate antennas and the tactical TOMAHAWK weapons control system (TTWCS) to participate whole heartedly. John Litherland (FLORIDA Gold) and Bill Traub had the same commitment to maintaining strike proficiency during their time in CENTCOM.

SSGN offers an additional strike advantage that might not have been planned in the drawing-board days. Though the Pacific theater is truly vast, the range of the modern TLAM missile is such that, more often than not, while executing real-world SOF missions, we were concurrently in launch baskets. The fact that SSGN can do strike in the same locale as SOF means the missions are not at all mutually exclusive. I am not advocating launching TLAMs while we are in the middle of a SOF mission, but the flexibility SSGN gives the operational commander to direct a significant quantum of strike on extremely short notice is recognized and appreciated.

A particularly valuable and morale-sustaining mission OHIO did a lot of is theater security cooperation (TSC). While foreign-port liberty is part of TSC—hence the positive impact on morale—RADM Doug McAneny (formerly Commander, Submarine Group SEVEN; now Commander, Submarine Force, Pacific) defines TSC as a mission because of the way it builds and bolsters alliances while sending a strong deterrent signal to potential adversaries. OHIO performed three TSC missions, at Busan, Republic of Korea; Subic Bay, Republic of the Philippines; and Yokusoka, Japan. All three were successful, though probably the greatest impact was served by Andy Hale's OHIO Gold experience with the South Koreans as part of exercises *Foal Eagle* and *Key Resolve*. The benefit of the combined and joint exercises is that Andy Hale demonstrated SSGN's capabilities and strengths for all the world to see.

Andy showed off OHIO to seventy general and flag officers. For the duration, he embarked the commanding general of Special Operations Command Korea (SOCKOR) and his staff, who manned the installed Small Combatant Joint Command Center (SCJC2) for tactical control of OHIO and embarked forces in an exercise SOF campaign. Early in the deployment, *Navy Times* quoted me as saying, "We're going to take this boat into shallow, congested, littoral waters close to the beach, ready to put SEALs ashore, ready to strike, ready to collect intelligence"[2] (hardly prophetic, since I merely reiterated some of the main reasons we built SSGN). As I read Andy's exercise sitreps, I was delighted to find that he proved me honest. He demonstrated full SOF mission profiles using Navy SEALS and Army Special Forces. How Andy got to Busan was also an important demonstration. As he threaded OHIO's way

through the shallow, narrow, and congested littorals of the Ryukyu Islands and the Tsushima Strait, he proved that the huge TRIDENT platform, modified to be SSGN, is certainly nimble and agile enough to claim assured access into much of the Pacific's restricted waters. And as we've seen so many times, any visitors aboard SSGN (Andy deftly and diplomatically handled hundreds) are in awe; to have allies onboard gives them the further opportunity to realize they have chosen their friends wisely.

The Message is Clear

Theodore Roosevelt encouraged the nation to speak softly and carry a big stick. SSGN is definitely a big stick in terms of size and, more importantly, capabilities, but as we entered the Pacific theater so many months ago, it became obvious that OHIO lacked the subtlety necessary to claim we were speaking softly. Just Google "USS OHIO" (102,000 citations) or "SSGN" (101,000 citations), and you'll agree that we had the world's attention. Cases in point:

—General B.B. Bell, USA, then-commanding general of US Forces Korea, stated at the end of exercises *Foal Eagle* and *Key Resolve*, "USS OHIO has greatly enhanced the operational readiness of this command by providing a highly mobile, survivable and lethal warfighting platform to support the ROK-US Alliance." It is noteworthy that OHIO was fully integrated into a land-centric command in ways that the general saw SSGN's utility in defending the Republic of Korea.

—The commanding general, SOCKOR, said, "[SSGN is] . . . a floating division in Army terms. . .[with] fantastic capabilities for prosecution of the GWOT." I had to go to Wikipedia to understand what an Army division is. The online encyclopedia says, "A division. . .usually consists of around ten to thirty thousand soldiers. . .A division tends to be the smallest combined arms unit capable of independent operations; due to its self-sustaining role as a unit with a range of combat troops and suitable combat support forces, which can be divided into various organic combinations."[3] And an Army division is commanded by a major general. Not only is this an impressive analogical description of SSGN, but the general also noted the GWOT applications,

despite the fact that he observed OHIO in scenarios meant to demonstrate application to the defense of South Korea.

—Commodore Gardner Howe, commander of Naval Special Warfare Group THREE told me at the end of our time working together aboard OHIO, "[Naval Special Warfare] experience with OHIO exceeds all expectations. It's the best thing to happen to SOF undersea capabilities in a long time." Had I asked his opinion at the deployment's outset, I suspect he would have said, "I have serious doubts." I would have understood his misgivings that a boat as large as OHIO, originally designed and built for the blue-water strategic deterrent mission, could be transformed to the ideal SOF platform, but dispel those doubts we did.

—Finally, SSGN's biggest fan is probably the Xinhua News Agency, the People's Republic of China's official news source. As soon as I brought OHIO into the Pacific theater in 2007, Xinhua described OHIO as "A power to invoke fear that is second only to a carrier" and ". . .capable of diving anywhere in the Pacific and can conceal itself in the territorial waters of any Asian country, turning it into the new devil of deterrence." The U.S. Navy and Submarine Force rarely speak with such bravado.

And so the message is clear: OHIO as SSGN has arrived to dominate the Pacific theater.

A Transformational Presence

As OHIO completes the first SSGN deployment in a few weeks with Dennis Carpenter's Gold crew arriving home in time for Christmas, everyone involved over the many years in developing the SSGN concept and making it a reality can feel justifiable pride. SSGN's maiden deployment demonstrated everything we expected and everything we imagined. I cannot prove the point, but it appears OHIO has garnered worldwide media attention unprecedented among submarines of any kind. But can we claim SSGN is *transformational*, a catch phrase that has been bantered about often over the years, beginning in the early 1990s? When Army generals understand SSGN would have a decisive role in defending South Korea with the same impact as tens of thousands of soldiers, when the reasonably doubting SOF community surrenders their skepti-

cism to be fervent fans, and when a single submarine in theater causes the People's Republic of China government to rethink their understanding of deterrence, then we can assuredly say that SSGN has transformed warfare in the maritime domain. Welcome home, OHIO.■

ENDNOTES

1. In a very pleasant plot development just short of Ripley's Believe it or Not, old friends got to swap boats. Now-CAPT Brian McIlvaine commands GEORGIA Blue, my 05 Command, while I commanded OHIO Blue, his 05 Command. Upon our latest turn in command at sea, we made mutual promises that we'd take good care of eachother's boats.
2. Http://www.navytimes.com/news/2007/10/ap_ohio_071023/
3. Http://en.wikipedia.org/wiki/Division_(military)

NAVY SUBMARINE LEAGUE SYMPOSIUM
BANQUET ADDRESS
FORCE MASTER CHIEF GARRISON
OCTOBER 23rd, 2008

This month of October marks the 50th anniversary of when we introduced Senior Chiefs and Master Chiefs to the Navy. In October 1958, 1,060 Chiefs became the first group to be promoted to what was then known as the *Super Chiefs*. 146 were promoted to Master Chief and 914 became Senior Chiefs. These two new pay grades were established to provide for a better delineation of responsibilities in the enlisted structure. At that time, having only seven pay grades led to situations where E-7's supervised E-7's who supervised other E-7's. It just didn't make sense. The establishment of the E-8 and E-9 pay grades made it possible to properly distinguish between the different levels of responsibility while also providing monetary recognition for those in the new pay grades. Similar to today, eligibility for promotion to Senior Chief then was restricted to Chiefs with a minimum of four years in grade and a total of 10 years of service. For elevation from Chief to Master Chief, a minimum of six years as a Chief with a total of 13 years of service was required.

This leadership construct was immediately viewed as a success and certainly serves us well today. The inspirational leaders of 1958 set the standard for those of us in uniform today. We define Deckplate Leadership best in our Mission, Vision and Guiding Principles. "Chiefs are visible leaders who set the tone. We will know the mission, know our Sailors, and develop them beyond their expectations as a team and as individuals".

One of our top 3 priorities continues to be the development of our people. There is no other group onboard a submarine that I rely more heavily on to achieve this priority than our Chief Petty Officers. Their charge is simple; they must train, develop and mentor those Sailors that they are entrusted to lead to the right standard. The right standard must be the Chief Petty Officer Standard. They must inspire their Sailors to achieve excellence and provide the personal example that makes every Sailor say "I want

to be the Chief". As Chief's we are considered leaders of the crew and must remember that our foremost responsibility is to our people, *our team*, both enlisted and junior officers. I think most Commanding Officers and Flag Officers will agree that they can attribute a measure of their success to a Chief, Senior Chief or Master Chief that put their arm around them when they were a Junior Officer and taught them how to be a good Sailor.

Just as it has been for the past 50 years, this special group of individuals is led by the Chief of the Boat. Our process for selection to this critical position is solid. As the Force Master Chief, I think it is pretty easy to identify that young Chief Petty Officer that has a sparkle in his eyes and a strong desire to become a Chief of the Boat. His COB and other waterfront COB's and Master Chiefs begin to mentor this Chief as he begins a rigorous qualifications process. These qualifications normally take about a year to complete. He will be required to obtain detailed knowledge on big Navy programs such as the Ombudsman, Career Development Boards, Chaplain services, and American Red Cross just to name a few. He will also have to develop detailed deployment augment plans, and deployment liberty briefs and liberty risk programs. He will act as the COB during an underway where he will supervise line handling evolutions; develop the plan of the week, watchbills and berthing bills. He must interview with 2 currently serving COB's, XO's and CO's. Finally we will conduct a board with 2 squadron CMC's and one serving COB before he is certified to become a COB. With the help from my Squadron and Group Master Chiefs, I will slate this prospective COB to a particular boat ensuring we match the right guy with the right CO/XO combination. Our COB process has been in place now for the past 15 years with great success. We have been so successful that big Navy has modeled both the Command Senior Chief and Command Master Chief program after the Submarine Force COB program. This process has yielded outstanding COB's like our 2006 Frank Lister award winner CMDCM Rick Atkins who just recently was selected by Admiral Giardinia as his new CMC for CSG-9. CMDCM Tom Mitchell is doing a fantastic job with our new Sailors in Kings Bay. He has set the standard in the Submarine Force on the sponsorship and indoctrination program. ETCM Tom Metcalf who is currently serving as a second tour COB on USS MICHIGAN was hand

selected for this critical position on one of our newest warfighting SSGN's. Tom's previous COB tour on USS LOUISIANA yielded fantastic results; his command not only received the Deck Division "D" and Engineering "E" but also received the Battle "E" and the prestigious Strategic Command Omaha Trophy. He was also selected this year as the Pacific Submarine Force COB of the year. And finally, who could ever forget the COB of all COB's. We like to refer to him as the COB Father. CMDCM Bob Bentley retired earlier this year. Bob was a 3 time COB and two time Squadron Master Chief. To his credit his final tour was probably his best, as he built a team onboard USS HAWAII that set the precedence for early successful submarine new construction delivery. HAWAII was delivered over three months early. During Admiral Mullen's two day ride, he commented that the Chief's Quarters on board HAWAII was one of the finest he had ever observed. These are just a few examples of the talented COB's we have leading our Force today.

But our talent just doesn't end with our COB's. The leadership that is provided by our nuclear trained senior enlisted leaders does not know limitations; it doesn't stop at the water tight door. Senior Chief Jim Grant, currently serving as the EDMC on LOS ANGELES has done a superb job and is lauded as the best EDMC in the Pacific Submarine Force. Master Chiefs like Jerry Pittman, who came through the nuclear ranks, served as the Leading ELT on board the NEW YORK CITY, EDMC on the KEY WEST and COB on the BREMERTON and LOS ANGELES and now is finishing his tour as the CMC at Nuclear Power Training Command, Charleston. This school develops about 2800 Officer and Enlisted students into sailors that understand the responsibility entrusted upon them by the American people to safely operate and supervise a nuclear reactor at sea and in foreign ports. His leadership is not stopping there: he will be relieved in January and take over as the Command Master Chief in U.S. CENTRAL COMMAND IRAQ Detachment, in Bagdad.

Leveraging on the amazing example of the Chiefs, Senior Chiefs and Master Chiefs that came before us, we are able to inspire the new leaders of tomorrow. But it takes more than just inspiration to make good leaders. Our EDMC/Nuclear LCPO courses are off and running. With this new education and in conjunction with our

Engineering Department Organization Manual revision, we have significantly reduced the administrative load and enabled our Engineering CPO's to focus more on deckplate leadership. Most of these Engineering Chiefs have had only one other sea tour. Our new LCPO course will better prepare them and provide them with additional tools to ensure their success during their first LCPO tour.

These outstanding Senior Enlisted Leaders I have mentioned just scratch the surface of the talent we have within your Submarine Force today. As in all great organizations, our success is measured through the Sailors that we lead everyday. It energizes me to see the enthusiasm, hard work and team work that happen daily on the deckplates of our boats. I can happily say that because of great leadership within our Chief Petty Officer ranks, we are more ready and capable now than ever to stand the watch at the tip of the spear.

We are making changes daily in the way we conduct business, we have a lot of irons in the fire. These changes include the way we operate, readiness, training, PRT and fitness, education..... I could go on and on. Let me throw a few numbers at you. In the past 12 months, we saw a 17 percent reduction in illegal drug use. We saw our DUI numbers drop from the previous year by 8.6 percent, but more importantly a 7.5 percent decrease from our Sailors on sea duty. 25 submarine crews have gone over a year without a DUI and USS HARTFORD has gone almost 2 years without an alcohol related incident. Great safe ride programs throughout the force have afforded our Sailor's a great alternate opportunity if their liberty plan falls apart.

As a force we continue to take pride in our ability to retain properly trained, diverse and top performing Sailors. We have seen 181 fewer attrites and 114 more Sailors reenlisted this year than last year. A total of 295 more warriors fighting the battle on our submarines. I attribute this directly to the efforts of our Chief Petty Officers. We have increased our emphasis on the people programs as highlighted in a recent NAVADMIN entitled "Brilliant on the Basics". Programs like Sponsorship, Indoctrination, Professional Development Boards, Mentorship, Ombudsman and personal recognition. Part of our jobs as Master Chief's is to ensure we never lose sight of these important programs and how they contribute to our operational readiness.

Earlier this year I had the honor of meeting our oldest living

Submariner, Floyd *SKIPPER* Mathews as he celebrated his 105th birthday party in Florence, Alabama with his family and several SUBVETS. Skipper has since past away, but at the time he was believed to be 1 of about 5 or 6 living WWI veterans. Unfortunately the night before his birthday party he had fallen ill and was not his normal spry self on the day of his party. I bent down in his ear to thank him for his dedicated service to our Submarine Force and to our great nation. As I presented him with a SUBFOR plaque and coin, he looked at me and had only one question. He said "Chief, do Chief Petty Officers still run the Navy today"? I looked at him and without hesitating, I said "your damn right we do Skipper". He looked at me, nodded his head and just smiled. Just as in Skipper's day, our Chiefs of today's Submarine Force are leading the way and shaping our future. I am extremely proud of the Chief Petty Officers in your Submarine Force today.■

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ARTICLES

FITTING SUBMARINES INTO THE FLEET

By Rear Admiral William J. Holland, Jr., U.S. Navy (Ret.)

Admiral Holland is a frequent contributor to Proceedings. A retired submarine officer, he presently is Vice President of the Naval Historical Foundation.

The nuclear-powered submarine's stealth is invaluable in eluding or surprising an adversary, but that very quality disguises its value outside the submarine community.

Musing on his experience in World War II, Pacific War leader Fleet Admiral William F. Halsey Jr. said: "A Fleet is like a hand of cards at poker or bridge. You don't see it as aces and kings and deuces. You see it as a hand, a unit. You see a Fleet as a unit, not carriers, battleships and destroyers. You don't play individual cards. You play the hand." Webster's New World Dictionary defines Fleet as: "a) a number of warships under one command, usually in a definite area of operation b) the entire naval force of a country; navy."

Little sense of a Fleet in Halsey's terms exists today. The vision of the Fleet as a great armada of warships steaming together passed out of reality some years ago. Today's Fleet is an agglomeration of many kinds of ships spread over hundreds of miles of ocean, operating semi-independently, connected not by signal flags or short-range tactical radio but netted through long-range communication links of various kinds.

A major difficulty in operating submarines as an arm of the Fleet is the nature of communications to and from them. In contrast to the other warfare specialties with which most officers are

familiar, submarines are not on the net most of the time. When operating deep, the submarine can neither send nor receive real-time radio signals. Below periscope depth the submarine can receive and transmit only on buoys or wires limited in range and capacity. Even when the submarines' fixed antennae are raised above the ocean surface their small aperture limits data rate. In communication terminology, submarines are, have been, and probably always will be disadvantaged in relation to the rest of the Fleet.

While continuing improvements are being made in the nature and type of communication links to submarines, these physical phenomena are not subject to manipulation, regardless of the anxiety of impatient flag officers. Controlling submarines in real time requires technical and process knowledge not common to other forces or platforms. In many cases, rather than accepting these physical realities and learning the processes needed to employ the submarine, commanders have simply ignored their presence, let alone their potential value.

Since their invention submarines have rarely been incorporated effectively in Fleet movements and operations. Because of their limitations, they have been adjuncts at best. Even when deployed in support of Fleet operations, their roles usually have been as independent operators.

The Submarine's Five Epochs

American submarine operations have spanned five epochs. In their youth (1900-15), they were designed to operate as coast-defense ships. In their adolescence (1918-42), submarines were designed to be scouts for the battle line. Ineffective in this role at Midway, USS DARTER (SS-227) and DACE (SS-247) not only announced the main force of the Japanese at the Battle of Leyte Gulf, they sank two heavy cruisers and so damaged the flagship that the Japanese admiral had to shift his flag with only part of his staff.

But even though they were designed as Fleet scouts, these submarines made their most significant contribution in World War II as commerce raiders, strangling imports and destroying the Japanese merchant marine (1942-45). In their late teens (1945-55), they struggled to find appropriate functions, first as pickets for

Fleet operations and national defense, then later as embryonic antisubmarine warfare platforms.

With the advent of nuclear propulsion, submarines under such power could dominate the ocean. As predicted in 1892 by Mycroft Holmes, the fictional elder brother of Sherlock, "You may take it from me that naval warfare becomes impossible within the radius of a Bruce-Partington [submarine] operation."[1] Indeed, historian John Keegan flatly asserted 20 years ago that, "the era of the submarine as the predominant weapon of power at sea must therefore be recognized as having begun. It is already the ultimate deterrent. . . . It is now also the ultimate capital ship, deploying the means to destroy any surface fleet that enters its zone of operations."

Nuclear power brought previously unfathomable stealth and endurance to the submarine. Improvements in propulsion and hull design added speed.

With these advantages, the attack submarine could participate in Fleet operations not just as scouts, but eventually filling the role of ASW escort in direct support. But it was their role as spearheads of the Maritime Strategy that dominated their missions during the Cold War, missions that capitalized on their ability to operate independently in distant waters and potentially hostile littorals.

The same stealth qualities made the ballistic-missile submarine (SSBN) the key component of the national strategic arsenal. Since then, operation of the submarines armed with national strategic weapons has not been an issue of Fleet concern or even interest. These ships will continue to operate outside the domain of the Fleet—a national mission, a political force with no equal. Ballistic-missile submarines are not in the mix of ships that will be of concern to Task Force or Fleet commanders.

So Misunderstood

The submarine's mobility and endurance are particularly useful traits, underestimated by those not familiar with them. All submarines can intrude and operate alone in otherwise enemy-controlled territory. This type of ship can not only get to the battlefield faster, but remain there indefinitely. This ability to be dispatched instantly and to transit quickly allows concentration of weapons and sensors by multiplication of platforms.

Ignorance of this dimension has been demonstrated repeatedly in war games in which blue commanders, offered more submarines as quick reinforcements, have refused to add them to the battlefield organization because they failed to understand the capabilities they would bring.

Unlike other forces in the Fleet needing escorts and chained to their logistic support, a single submarine is a meaningful and effective task force. One submarine is an effective unit as soon as it is under way. No critical mass exists; the ship need not wait for escorts, supply ships, or air-wing modifications.

This mobility and speed mean submarines serve as the Fleet's primary instrument to carry the attack early and decisively into enemy waters.

In the only maritime war since the advent of nuclear propulsion, the Falklands campaign, the Royal Navy's plan was in essence the Maritime Strategy set in the Southern Hemisphere. Nuclear-powered submarines arrived on scene first and effectively eliminated any and all threats from enemy carrier-based and surface forces.

Argentina did not have a weak or bad Navy; in fact, it was far better than most countries' and in some respects a formidable opponent. Yet this Navy, in the face of a few British nuclear-propelled submarines, lost the GENERAL BELGRANO, its major surface warship, to HMS CONQUEROR and retreated ignominiously into port.

Tactical Missiles on Board

The submarine's influence is now magnified by the addition of land-attack tactical missiles to its magazines. When the Arsenal Ship foundered on arguments of high vulnerability and low interest its mission devolved onto ballistic-missile submarines no longer required for national tasking. Today, the largest land-attack tactical missile inventory at sea lies in four converted missile submarines-invisible, nearly invulnerable, and capable of operating close to shore to provide large volumes of fire with short flight times. While these four big submarines have larger magazines, all American submarines have a capability to launch a dozen or more of these missiles with the same degree of rapidity and high accuracy.

Indeed, in the initial salvo in the Iraq War, the "shock-and-awe" phase, more Tomahawks came from attack submarines than from any other platforms. Because submarines cannot replenish ammunition under way, the sustainability of such fires is limited. But the nuclear submarines' speed and endurance compensates for individual magazine exhaustion by multiplying the number of ships in theater relatively quickly.

Those outside the community generally acknowledge the utility of the submarine in reconnaissance, but they do not understand the details—in part because of the sensitive nature of these operations in peacetime and in part because of the classification of their results. Lack of appreciation for the productivity of such operations hampers the utility of the submarine less than it might, because such operations are in large part independent of the rest of the Fleet's operations, conducted under higher-level authority. However, the enthusiasm with which the Special Operations Command has endorsed the SEAL team features incorporated into the SSGN conversions is testimony to the high value of covert platforms in sensitive operations.

Under Cover

Submarines were widely used in covert operations during World War II. Marine raiders attacked Makin Island and submarine-launched divers reconnoitered beach gradients and obstacles at Normandy and the Pacific islands and supported guerrilla forces in the Philippines. With dedicated ships these covert activities are likely to grow in importance. A more general understanding of their utility and of the intricacies of employment is unlikely to ever be more than a vague idea in the minds of most naval officers. The experience of the Army and its special forces has shown that proper coordination of these forces is not generally well understood either by the regular forces or the special forces themselves.

Though important, for operations requiring landing forces ashore, a submarine's troop-carrying capacity is small-never more than a platoon or two at best. Mounting such an operation from a submarine has all the benefits of covertness but all the shortcomings of limited firepower.

Only small numbers of select personnel can be exploited in this manner, and such operations require intense planning and careful staging. They cannot be conducted on the spur of the moment or overnight. Submarines are unlikely to ever supplant an amphibious warfare ship.

The major and regular role of submarines in operations associated with the rest of the Fleet is as a primary antisubmarine platform. The difficulty of ASW has been continuously underestimated since the submarine was invented. Every opponent of submarines has overestimated the ability to counteract the submarine threat and has underestimated the potential of enemy submarines to interdict lines of communication.

That condition exists in most of the world today. Inexperienced in ASW, with little understanding of the true potential dangers, even the majority of naval officers consider the submarine threat to be overstated until operating in the presence of a potentially hostile submarine.[2]

By being able to arrive early at any scene (even waters ostensibly controlled by an enemy), to operate wherever is most beneficial, to either hunt or hide, and to endure, independent and unsupported, throughout long periods, the submarine has innate advantages that other platforms lack. While these advantages make it the first line of attack against enemy shipping of any kind, nuclear-powered submarines are particularly effective when operating against conventionally powered boats. But time is the key.

Finding a submarine that does not wish to be found is very difficult, requiring good sensors on lots of platforms, careful accumulation of search results, and exploitation of every lead. A modern ASW submarine can sanitize an area large enough to accommodate aviation operations in a matter of days. But clearing a wide area of enemy submarines requires weeks. Even with the best sensors, ASW has to rely on a semi-cooperative enemy-one that must snorkel to charge batteries, move quickly to attack or to change patrol area, or to close a ship with effective active sonar.

ASW: A Collaborative Effort

Those who have been involved more than casually with ASW universally agree that the resources required for effective defense against even one submarine are very large. Effective ASW is a team

game. Submarines are best employed in combination with other forces that can bring wide-area sensors, e.g., maritime patrol aircraft, surveillance ships (T-AGOS), and overhead devices. These are true Fleet-wide activities.

Coordinating all the components in a major ASW operation requires skill and dedication. Major exercises that train officers of all the relevant specialties together are necessary to develop the knowledge first and then proficiency in these actions. Appreciation of these difficulties seems to be limited to those within the dedicated ASW communities. As one commentator observed: "The reason ASW has a low priority or is of minor concern is that leaders have no experience in it. Like World War I generals in chateaus who ordered frontal assaults on entrenched machine guns, they are so distant from the front line they are '. . . incapable of learning from experience.' "[3]

Autonomous and remotely operated vehicles can extend the submarine's reach into the most tightly contained and controlled sanctuaries, just as cruise missiles already extend the reach of submarine weapons well inland. For several years some submarines have been equipped to penetrate moored minefields. Soon, underwater autonomous vehicles launched from the submarine will extend their search areas and capability against bottom mines. Mine countermeasure operations, like ASW, require long time periods; search rates are low and inherent dangers great. Other forces can sweep mines faster and more safely, but only a submarine can sweep in areas where air dominance is not assured or where secrecy is desired.

Submarines are probably the least effective units in the Fleet for presence missions, blockades without the use of force, interception and boarding of merchantmen, and demonstrations of intent. In these tasks, their virtue, invisibility, becomes a drawback. On the other hand, the swift response and the great endurance of nuclear-powered submarines mean that opponents must consider that they will be present before and during any crisis situation.

Though anti-air weapons for submarines have been investigated, and some research on anti-ballistic-missile capabilities has been conducted, the use of submarines in these areas of warfare will continue to be minimal.

British submarines in the Falklands Campaign maintained

surveillance of mainland airfields that provided early warning to their fleet, but these operations fall more into the characteristic reconnaissance and surveillance roles than AAW.

As the other components of the Fleet have come to be more and more dispersed, the submarine's role has come to be seen as less and less specialized. At the same time, the submarine's capabilities and limitations remain underappreciated by those versed in other warfare specialties. Fascination with the characteristics for the Littoral Combat Ship masked recognition that the capabilities that such a warship would bring to the littorals already existed in an even more stealthy platform, the submarine.

In creating and operating a fleet, fascination with less powerful but well known pieces can distract attention from those less visible and therefore less understood, regardless of importance or value. While apparently of peripheral use in insurgent wars now, if there is ever another maritime war, submarines will be the Fleet's capital ship.

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"PERCEPTION AND REALITY: SOME THOUGHTS ABOUT QUANTUM MECHANICS"

by Mr. John Merrill

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"I think it is safe to say that no one understands quantum mechanics."
~Physicist Richard P. Feynman

Preface

Quantum mechanics, the study of matter and radiation at an atomic level, provided the foundation of enormous progress in high technology and its many widely used and successful applications in science and industry during the last half of the 20th Century. Two of many current and future areas of application include quantum computing and nuclear fusion. The technology stemming from quantum mechanics has penetrated essentially every aspect of science and the products created surround our daily lives. In 1900, QM was only a concept not clearly understood. A brief narrative of how quantum mechanics began and by 1950 significantly contributed to the growth of the United States' Gross National Product (GNP) seems fitting.

Quantum considerations apply at the atomic size or where the speed is near that of light. In the summer of 2000, James Bjorken, Stanford University emeritus physics professor, commented "Quantum Theory works. It never fails. And the scope of the applications is enormous."[1]

At the end of the 19th Century, unobservable concepts at the atomic level were not within in the awareness of most scientists. Quantum mechanics deals with the interactions of matter and radiation in terms of observable quantities. Further, quantum

mechanics has been very successful in giving correct results in practically every situation to which it has been applied.[2]

The aim of this paper is to share the author's limited grasp of quantum concepts and to bring some of the ways that they are in our purview at the beginning of the new century and an important growing presence in the future. By the end of the 20th Century, quantum brought order to the understanding of the atomic domain from crystals the size of 1 centimeter, to the electron less than 10^{-16} and quark particles less than 10^{-33} centimeter. Quantum theory provides the basis for high technology and its huge impact on United States GNP.

It should be noted that pursuing small particles stimulated the need for large-scale equipment, and this pursuit was the beginning of *big science*. Today, the recent completion of the massive CERN $8 billion particle collider, a 17-mile installation 300 feet beneath the Swiss-French border, epitomizes the need for complex scientific instruments to study the basic constituents of matter, the fundamental particles.

A significant spin-off of CERN is the powerful World Wide Web created there in 1990 to meet the communication needs of thousands of physicists to work with their vast number of colleagues all over the world. By 1993, the WEB quickly spread to the rest of the world and created over $1 trillion worth of commerce on the Internet each year.

Perception

Quanta considerations, even among the cognoscenti, are still perceived as a challenge. A quote from James Bjorken, one of the world's most foremost theoretical physicists, provides perspective about the complexity of quantum concepts: "It is often said that no one really understands quantum theory and I would be the last to disagree."[3] A remark from a scientist provides further comment regarding the complexity of quantum theory: "Even today, I believe that in order to truly understand quantum mechanics one has to teach it for at least a couple of years." Niels Bohr, major contributor to the development of quantum physics for fifty years, remarked, "Anyone who is not shocked by quantum theory has not understood a single word."

For the general public, perception of quantum often brings to many words like enigmatic, mysterious, unknown, inscrutable, and unfathomable. *100 Years of Quantum Mysteries*, the title of a Scientific American article in January 2001 supports these views of quanta theory.

Status

Quantum physics is needed to explain properties of solids, atoms, nuclei and light and is the basis for our understanding of natural phenomena. The quantum scientific revolution kindled in 1900 needed almost thirty years to come to fruition after scientist Max Plank's creation of the quantum concept. Planck, searching for an explanation of the continuous color spectrum of the frequencies of light emitted from hot bodies derived a formula for results of his experiments. Justification for his derivation led to the concept that the energy of light comes in terms of a basic indivisible unit, a *quantum** of light. Coincidentally, 1900 was the year before the first Nobel Prize for physics was awarded.

"Without quantum mechanics we would not have developed the transistor, the semiconductor industry, and the computer industry...the laser, optical communication, and the age of information technology. There would be no global economy to speak of. It is said, notably, that more than half of the US economy is based on quantum mechanics."

Current Science, Vol. 84, No. 1, 10 Jan. 2003.

*It is the smallest mount of a physical quantity that can exist independently, especially a discrete quantity of electromagnetic radiation.

A considerable number of the scientific Nobel Prize Laureates were awarded during the 20th Century for contributions to quantum mechanics and by the end of the century; the United States GNP depended on quantum for at least 30% of its total. The products and applications made possible by this complex branch of physics are world wide and particularly in the United States.

In the first decades of the last century, it was a cadre of brilliant, elite and persevering scientists who met and conquered the challenges of ascertaining the complex details of atoms and their structure and provided the basis for the theoretical and mathematical tools for today's quantum applications dealing with the minutia of electrons, and other particles that surrounding us.

A listing of the scientists contributing is not short but always includes Bohr, Planck, Einstein, De Broglie, Schrodinger, Born, Heisenberg, Pauli and Dirac. Further consideration should be given to the fact that this group, primarily in Europe, of early contributors did not have our instant communication to share their views; and their coming together lacked the ease of modern travel. The early development of quantum mechanics took place during the period from the beginning of the 20th Century until the late 1900s. Those involved faced the long upheaval of World War I and its aftermath, particularly in Germany, plus a strong and growing anti-semitism in the later pre-World War II years.

During the early years of the slowly evolving quanta considerations, those pursuing this path had a limited array of tools to deal with the experimental side of their investigation. Further, classical physics with centuries of established laws and physics of Newton, Faraday, and Maxwell was not in a one-to-one correspondence with the physics of quanta. Wholehearted acceptance of quantum theory was not universal in the scientific community. Moving from the classical to quantum physics took decades, with final validation and final acceptance in the mid-1920s. It has been noted that even at that time the Nobel Physics Laureate Award Committee was wary of making an award in the era of quanta-related achievement.

A Glimpse of the first Quantum Century*

Before Quantum

Physics journals during the last decade of the 19th Century included extensive papers on atomic spectra and essentially every

other measurable property of matter resulting from ingenious experimental knowledge. However, the resulting properties of matter were empirical and in some instances lacked proper regard for considerations of systems, science and theory. It was in this environment that the proponents of quantum, heavily theorists, brought their revolutionary approach to physics. Further, "in 1910, about one in five physics papers published in the world was mainly theoretical."[4] As quantum grew and stabilized, an exceedingly large number of experiment proofs would be essential to win its ultimate acceptance.

Quantum Theory Evolving 1900-1930

During these years, acceptance increased and active participation by a great number of the foremost physicists brought their skills to bear while mathematical tools and experimental skills grew swiftly. Quantum never stopped evolving.

In 1905, Albert Einstein wrote four seminal papers that provided the foundation for modern science. Included was a paper on the photoelectric effect for which he received the Nobel Prize in 1921. It is interesting that at the time the electron had already been discovered, the nucleus of the atom had not. To explain the photoelectric effect, Einstein expanded Planck's view that the quantification of energy was part of the process of emitting or absorbing light and applied it to the fundamental nature of light itself, a beam of particles whose energies are related to their frequencies according to Planck's formula.[5] Einstein imbued light with a particle-like behavior. Earlier Maxwell's theory and extensive experiments testified to light's wave nature providing a duality. For 20 years, quantum ideas were confused.[6] The duality question had to be resolved.

Quantum Challenge

"About 1910 a highly unsatisfactory situation had developed which could be summarized by saying that light is emitted and received as though it consisted of a stream of particles and it is transmitted as though it were a set of waves...it was impossible to be undulatory and corpuscular."[7] More than a quarter of century of broad scientific effort would be needed to have acceptance, if limited, of this concept.

Ernest Solvay

Early Physics Solvay Conferences

1911 radiation and the quanta

1913 structure of matter

1921 atoms and electrons

1927 electrons and photons

Solvay a wealthy Belgian founded several scientific, philanthropic, and charitable Foundations, including the institutes of physiology (1895) and of Sociology (1901), as well as the prestigious School of Business (1903) in Brussels that still bears his name. He saw science as a promise of progress for mankind: "...I have always sought to serve science because I love science and I see it as a promise of progress for mankind."*

In October-November 1911, Solvay organized a meeting in Brussels of most of the famous physicists and chemists of the time. The main objective of this conference was to look at problems of having two different approaches in physics *classical physics* and *quantum physics*. Participants included Marie Curie, Albert Einstein, Max Planck, Ernest Rutherford, Raymond Poincaré and the Duke Louis de Broglie. This was the first meeting of the Physics Council of the Solvay Conferences. Solvay Conferences have continued into the 21st Century. Early Solvay Conferences provided a crucible for discussion and exchange that brought about a consensus on quantum theory in the October 1927 Conference.

* Ernest Solvay, speaking in Brussels, December 4, 1893

Between Planck's quantization concept in 1900 and the 1927 Brussels meeting, significant progress favorable to the acceptance of quantum physics occurred. Those attending included Niels Bohr, Albert Einstein, Wolfgang Pauli, Louis de Broglie, Edwin Schrodinger, and Werner Heisenberg. It was the results of the experimental work, theoretical papers, mathematical developments and strong advocacy for quantum concepts at the 1927 Solvay Conference that led to Quantum Mechanics 1925-1927 Triumph of the Copenhagen Interpretation. This announcement honored Bohr of Copenhagen for his important contribution to the new and revolutionary physics.

A seminal paper presented by Werner Heisenberg and Max Born announced, "We regard quantum mechanics as a complete theory for which the fundamental physics and mathematical hypotheses are no long susceptible of modification."[8]

A comment by esteemed physicist and science writer Heinz R. Pagels in *The Cosmic Code* (1983) views the result of the Brussels meeting as follows. "The Copenhagen interpretation magnificently revealed the internal consistency of the quantum theory, a consistency which was purchased at the price of renouncing the determination and objectivity of the natural world."

Quantum Consensus and Philosophy 1927[9]

Copenhagen Interpretation of Quantum Mechanics

Mathematical equations of quantum theory are supported experimentally.
Quantum world cannot be visualized like the Newtonian world.
Randomness and probabilities are part of the quantum scene.
What goes on in the quantum world depends on how it is observed.
An electron clearly a particle could sometimes behave as a wave.
Quantum theory makes only statistical predications.
Atoms and molecules absorb and emit light.
Uncertainty, it is impossible to achieve absolute knowledge of all aspects of a systems condition.

After Consensus

It should be mentioned that as early as 1910, there were an increasing number of physicists, primarily at the universities across Europe and in the United States pursuing doctoral studies on radioactivity, X-rays, and especially electrons.[10] The events at Copenhagen in 1927 provided the mathematics to describe accurately the outcomes of the quantum experiments. With this assist, a good number of physicists worked out new applications to address unsolved problems of nuclear physics.[11] Quantum theory began to be successfully applied to atoms, molecules, and solids.

The Reality

Applications

Quantum applications surround us. "All high-tech products have been created on the basis of our detailed knowledge of atomic structures and we have gained this knowledge on the basis of theoretical foundations of quantum mechanics, the one branch of modern physics that deals with strange behavior of microcosms of atoms."[12]

Today, the breadth of quantum mechanics areas of application includes condensed matter physics, solid-state physics, atomic physics, molecular physics, computation chemistry, quantum chemistry, particle physics, and nuclear physics. Quantum mechanics describes the actions of subatomic particles, electrons, protons, neutrons and photons.

Modern technology operates at a scale where quantum effects are significant. Examples include the laser, the transistor, the electron microscope, superconductivity and magnetic resonance imaging. The transistor is indispensable for modern electronics.

Researchers are currently seeking robust methods of directly manipulating quantum states. Efforts are being made to develop quantum cryptography, which will allow guaranteed secure transmission of information. Development of quantum computers, which are expected to perform certain computational tasks exponentially faster than classical computers, is in progress.

Laser Applications

With innumerable industrial and scientific applications of quantum theory, some of the ubiquitous laser's applications may be pointed out as examples of one area of the impact of quantum concepts on science, industry and our daily lives.

Laser (light amplification by stimulated emission radiation) development resulted from the application of quantum mechanics to electronics after World War II. Together with the laser and other advances in the late 1950s, a new discipline in applied physics (Quantum electronics) was created.[13]

A list of the wide uses of the laser points out divergent applications such as medicine, barcode scanners, military applications, garment industry, surveying, laser cooling, laser scanners and printers, compact and optical discs, astronomy, geography, drill and burning holes, as well as myriad of others.

Quantum Theory Gross Domestic Product (GDP)

About 1950, the quantum revolution in the United States fostered a growing high technology (HT) industry that favorably impacted the United States GDP. In 2004, the US Office of Technology Policy analyzed HT employment in the 50 states. Of these states, three states had less than a 2% HT employment level and 13 states were at the 10% level or greater with Massachusetts at 13%. Employment in HT in 25 states was between 5% and 10% HT.[14] Certainly federal, private and university participation in the evolving science and engineering made this possible. "It is difficult to put a price tag on the amount of current U.S. gross domestic product that would not exist without the discover of the electron and quantum mechanics. But it would likely reach into the trillions of dollars"[15]

Summary

Quantum theory, precisely tested and considered the most successful theory in the history of science, provided a stunning range of scientific and practical applications. Initially, the discovery of the electron by physicist J. J. Thompson in 1897 and the pursuance of a particle too small to ever see brought Max Planck in 1900 to his insightful creation of the concept of quanta. The pro-quantum cadre of early 20th Century physicists came together in

1927 with their consensus about quantum. With quantum theory tools, the end of the century saw the information age and a global economy.

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WHERE'S OUR UNDERSEA SKUNK WORKS?

by Capt. Jim Patton, USN(Ret.)

Background

One of the enduring legends of the then Lockheed, now Lockheed Martin, organization is the famous *Skunk Works* which was first formally established in June of 1943 under the legendary Kelly Johnson who led it until 1975. Still flourishing today, this organization has been the ultimate R&D/IRAD operation in that an eclectic group of bright engineers are provided money, facilities and other assets to independently develop *leading edge* ideas and hardware, then essentially left alone until something comes out the other end. If the failure rate of their endeavors is not high enough, it can be taken internally to indicate that they are not pushing envelopes hard enough. Towards the end of WWII the Skunk Works produced the prototype of the first U.S. jet fighter, the P80 *Shooting Star*, in only 143 days (7 days earlier than the *target* date)—the proposal for which having been earlier written and hand delivered to the Army Air Corps in a month. Among their other most noted products have been:

- The U2 spy plane
- The SR-71 *Blackbird* spy plane
- The F117 *Nighthawk* Stealth Fighter
- The F22 *Raptor* Stealth Fighter

The Submarine Force would be well served by an analogue to this Lockheed Skunk Works being established—an *Undersea Skunk Works*—if not so much for hardware, certainly for concepts and ideas regarding roles and missions, payloads and exploitation of emergent technologies.

Discussion

The DARPA *Submarine Payload and Sensors* program of 1999-2001 was almost a first step towards the establishment of a no-holds barred intellectualization of future submarines and the means by which they would accomplish as yet undefined roles and missions. It involved the formulation of two large *consortia* of

various traditional submarine-associated entities together with very non-traditional entities and agencies who then independently, aided as appropriate by a small group of *government source selection advisors*, started with a clean sheet of paper to imagine submarine employment and enabling technologies a couple of decades in the future. One of the amazing outcomes of the two year effort was that, although having started from significantly different conceptual positions, both consortia asymptotically approached very similar and technically credible visions by the end of the two year effort—in essence, the front end of a Skunk Works process. At this point findings and opinions were *turned over* to the Navy, and although the essential elements of some of them have trickled into programmatic action, the bulk of the work has largely gone unexploited.

Unfortunately, some cultural and corporate barriers have arisen that would impede the establishment and success of another Skunk Works. These include:

1. A ubiquitous management focus on the *next quarter's bottom line.*
2. An intolerance of *failure* by the current military-industrial complex, even though frequent failure is the inevitable by product of truly innovative experimentation.
3. A stated corporate tenet in many cases to be *risk-adverse.*
4. Goal-oriented, meetings-dominated, process-controlled management techniques that *track* everything *except* brilliant, spontaneous insights.
5. Environments that emphasize the accounting for of 100% of a work force's time spent on assigned *solutions* at the expense of individual and introspective thought on better determining the *real* issues and the true nature of the *problems.*

Not that the answer necessarily lies in workplaces that feature skateboards, ping-pong tables and eclectic attire, but that perceived *Silicon Valley model* seems to be a feature of a segment of the economy that has gotten some things significantly *right* when it comes to paradigm-busting concepts in their realm of innovative hard- and software development. Of course, this *laissez faire* approach isn't appropriate in all areas—pouring ammonium

perchlorate for rocket motors or welding submarine hull sections needing somewhat more formal approaches—but there is room for a back room or *black hole* where IRAD *seed money* is available, schedules are loose, and eclectic personalities with significant brainpower are free to interact with one another to create an occasional *killer ap* amidst a 98% failure rate.

Conclusions

The U.S. Submarine Force and its industrial base still build and operate the world's finest and quietest submarines, and the recent example of the return to sea of four *Ohio*-class hulls as transformational SSGNs ranks right up there as *disruptive technology* along with the NAUTILUS and POLARIS. That being said, one cannot read foreign defense journals without a sense of amazement about what much smaller national economies are doing with in the area of submarine and submarine payload development, such as Li-ion main storage batteries and nuclear AIP, and wonder if we might not be resting on our laurels. To keep, if not widen, the lead in submarine-associated technologies and payloads, it would be very appropriate to establish, man and adequately fund an Undersea Skunk Works.■

SUBMARINE NEWS FROM AROUND THE WORLD

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From the October 2008 Issue

INTERNATIONAL - World Missile Developments

RUSSIA: On 11 October 2008, AMI received information that Russia has once again conducted a submarine-launched ballistic missile test in the Pacific Ocean.

The R-29RGU (Sineva) missile, NATO designation SS-N-23, was fired from the Delta IV class ballistic missile submarine TULA in the Barents Sea and was targeted near the equator. This is the first time Russia has tested a missile in the Pacific that did not target the Kura test range on the Kamchatka Peninsula.

The Sineva is the latest variant of the SS-N-23 missile and is powered by a solid-fuel rocket motor that is based on the land-based SS-23 missile. Sineva officially entered service in July 2007, has a range of approximately 8300km (5146mi), ten multiple independent reentry vehicles (MIRV), better penetration aids (decoys) and resistance to electro-magnetic pulses (EMP). Additionally the improved guidance system and onboard computer provide increased accuracy over its predecessors. Maximum launch depth is 55m (180ft).

This new test is just one in a recent series of tests believed to be in response to the proposed anti-missile shield that the US and Poland have agreed to.

TAIWAN - Large Program Package Approved, No Submarines

On 03 October 2008, the Defense Security Cooperation Agency (DSCA) notified Congress of the possible Foreign Military Sale (FMS) of US$6.5B of weapons to Taiwan.

In a continued effort to modernize its military, the weapons deal, if approved by Congress, will include the following systems and accessories:

30 AH-64D Apache Longbow attack helicopters (US$2.532B)

- 69 T700-GE-701D turbine engines.
- 17 AN/APG-78 fire control radars and AN/APR-48 radio frequency interferometers.
- 1,000 Hellfire longbow air-to-surface missiles.
- 66 M299 Hellfire launchers
- 35 Stinger captive flight trainers

330 Patriot PAC-3 missiles (US$3.1B)

- 4 AN/MPQ-65 radar sets
- 2 tactical command stations
- 2 information and coordination centrals
- 6 communication replay groups
- 4 engagement control stations
- 24 launching stations
- Plus additional associated minor equipment

Upgrades to Taiwan's four E-2T aircraft (US$250M)

- This upgrade will consist of upgrades to the avionics, navigation and electrical systems as well as the Joint Tactical Distribution System

32 UGM-84L submarine-launched Harpoon anti-ship missiles (US$200M)

- 2 UTM-84 Harpoon block II exercise missiles
- 2 advanced Harpoon weapons control stations
- 36 Harpoon containers
- 2 UTM-84XD encapsulated Harpoon certification and training vehicles
- Plus spares, documentation and technical assists

Spare parts for various aircraft (US$334M)

Although this deal is significant and much needed by the Taiwanese military, still absent from the package was the long planned for and desired diesel-electric submarines as well as UH-60 Blackhawk helicopters.

Specifically regarding the submarine deal, AMI's sources indicate that the Taiwanese LoR for phase 1 (design and construction) was forwarded to the US in late 2007. DSCA has not re-

sponded to the LoR and it now appears that it could be further delayed by the congressional freeze of June 2008 and the larger political issues surrounding the total US defense aid package to Taiwan.

Assuming the congressional freeze is lifted by early 2009 and the US responds to the LoR, a decision on the source selection could be achieved by 2010 at the earliest. Even with a successful outcome in Phase 1, AMI believes that it will still be difficult at best for the Yuan to approve the construction phase of the program due to its cost. There is also still much resistance to the sale within the US itself. If the ROCN and MND can convince the Yuan to purchase the submarines and US resistance (much from the US Navy) softens, it will probably take several years for approval, with a construction contract occurring around 2013 at the earliest.

VARIOUS DID YOU KNOW?

ECUADOR - On 05 September 2008, the Ecuadorian Navy Type 209 submarine SHYRI arrived at Chile's ASMAR Talcahuano yard to begin its two year overhaul.

PAKISTAN - On 26 September 2008, the Pakistani navy (PN) completed customer acceptance testing of the third Khalid (Agosta 90B) class submarine, PNS HAZMA (S 139).

MALAYSIA - On 09 October 2008, the Royal Malaysian Navy's (RMN) second Scorpene class submarine was floated at Navantia's Cartegena shipyard.

From the November 2008 Issue

TURKEY - Submarine Rescue and Towing Ship Project RfP Purchase Dates Extended to 31 December 2008

On 04 November 2008, the Turkish Undersecretariat for Defense Industries (SSM) announced that the RfP purchase dates for the Submarine Rescue Mother Ship (MOSHIP) and Rescue and Towing Ship (RATSHIP) projects have been extended to 31 December 2008. The final date to respond to the RfPs has also been extended to 31 March 2009.

Interested companies in the two projects can contact the Turkish SSM at:

Ministry of National Defence
Undersecretariat for Defence Industries
Ziyabey Caddesi 21. Sokak No:4 (06520) Balgat/Ankara
Tel: +90 312 411 9000 - 400 ISDN
Fax: +90 312 411 9386

Head of Naval Platforms - Serdar Demirel
Project Manager Auxiliary Ship Group - Necmi Kaldas
Tel: + 90 312 411 9278

Consistent with recent naval programs, the majority of work will be completed at either Golcuk or Istanbul Naval Shipyards or a private Turkish yard in order to keep the shipbuilding industry employed. If a foreign supplier is chosen for these projects they will probably provide design, construction and integration assistance as well as some of the engineering and electronic subsystems for both programs.

The MOSHIP could possibly displace up to 5,000 tons with a platform 10 meters in width and a minimum of 300sq meters of deck space needed to host equipment such as a Deep Submergence Rescue Vehicle (DSRV) and Submarine Rescue Chamber (SRC). Two of the most modern MOSHIP designs on the international market are the Singaporean Submarine Support and Rescue Vessel (SSRV) by ST Marine/James Fisher Defence currently under construction, and the South Korean Cheonghaejin class ARS by Daewoo Shipbuilding and Marine Engineering (DSME) which was completed in 1996. Turkey may look at both of these options as they are they latest designs on the market for this type of ship.

In regards to the RATSHIPS, the new vessels could be up to 73 meters (240ft) in length and have fire pumps to assist in putting out fires onboard vessels in distress.

With responses due back to the SSM by 31 March 2009, a preferred supplier could be identified for both projects as early as 2010 and both construction contracts in place by 2011. The MOSHIP could enter service by 2013 and the two RATSHIPS by 2012.

ITALY- New Repair and Salvage Ship in the Pipeline

In late October 2008, AMI sources indicated that the Italian

Navy (IN) was finalizing the requirements for a new class of submarine rescue ship (ARS). The new ship would replace the aging ITS ANTEO commissioned in 1980. Additionally, the IN is planning for a long-range submarine support (LRSS) platform.

ANTEO currently operates with a two person McCann rescue chamber as well as the 12 person SRV300 rescue vehicle built by Drass Galeazzi.

The new vessel will likely be a bit larger than the ANTEO, offering a more stable platform while continuing to operate the SRV300 vehicle able to conduct rescues in depths of up to 600 meters (1968) feet). It will also likely have a helicopter platform, bow thrusters and two minor caliber guns.

Other systems on the new ARS will likely include a multi-beam side-scan sonar system, one surface search and navigation radar as well as the capability to operate autonomous or remotely operated vehicles (AUV/ROV) to aid in submarine rescues.

AMI sources indicate that the requirements document should be complete by early 2009 and a Request for Proposals (RfP) will be issued by mid-2009. Assuming that a preferred supplier and construction contract is in place by 2010, the single unit of the class could commission as early as 2012.

In regards to the LRSS, the platform has not been defined yet, but may be as simple as a towed barge with repair and support facilities, or as complex as a new class of submarine tender (AS), capable of all aspects of submarine repair and rearmament.

Due to the infancy of the LRSS program, AMI believes that the requirements will not be finalized until 2010 with an RfP being available in 2012.

LIBYA - Reviewing Surface Combatant Options

(Editor's note: submarine comments in paragraphs 5, 7 and 8).

From late October through late November 2008, AMI received information from multiple sources that the Libyan Navy is still looking to replace its aging surface and submarine fleets. Information received indicates that Libya is also considering acquiring Western equipment, a departure from the predominantly Russian hardware now in service.

President Muammar Qadhafi visited Russia, Belarus and

Ukraine in early November. During his trip, Qadhafi stated that competition between Russian and Western arms manufacturers is creating a rivalry that will allow Libya to receive the most modern weapons at the best price possible.

Back in April 2008, then Russian President Vladimir Putin visited Libya in hopes of bolstering cooperation between the two nations. At that time, Putin agreed to forgive US$4.5B in debt in exchange for lucrative deals in energy and arms. This deal has resulted in a multi-billion dollar railway project as well as deals to help develop gas and oil fields. However, as of this writing no firm arms deals have materialized.

Sources close to AMI indicate that the Libyan Navy (LN) has expressed interested in surface combatants such as the Russian Project 20382 Tiger class corvette, French Gowind corvette and Combattante class fast attack craft (FAC) as well as the Croatian 62-Meter corvette design. Italy, with its recent sale of an ATR-402MP maritime patrol aircraft (MPA) to the LN as well as recent investments in commercial infrastructure projects, must also be under consideration for new surface combatants by the Libyans.

In regards to submarines, there appears to be interest in the Russian Project 686 Kilo class submarines and possibly the French Scorpene and newly designed Andrasta class submarines.

In an effort to possibly sweeten the deal with Russian, reports indicate that Libya may have offered the use of the naval base at Benghazi in an effort to sway the Russians to make a better offer on naval ships in return for a forward operating base in the Mediterranean. AMI believes that the naval base offer by Libya may in fact be a fabricated story by Russia rather than a serious offer by Libyan government.

The recent reporting demonstrates that the LN is jockeying for a position within the government in order to get the best deal to replace its submarine and surface combatant forces.

And the sea service is running out of time. Its 1960s-vintage Foxtrot submarines and Koni class corvettes need to be replaced in the near term. With Russia and France to a small degree (FACs only) being historical suppliers and Italy being recently involved in sale of a MPA to the LN and other Libyan commercial projects; AMI expects that all three of these countries will likely be considered as suppliers to meet the LN's future requirements.

The winner for both programs will more than likely be determined by the best price, offset agreements and through-life support packages. These programs could move forward as early as 2009. In regards to the Combattante II, Nanuchka and Osa FAC force; if the sea service intends to replace these vessels with a new FAC, a program would probably not start until the middle of the next decade.

AUSTRALIA - First Funding for Future Submarine (SEA 1000)

On 06 November 2008, the Australian Parliamentary Secretary of Defense for Procurement, Mr. Greg Combet, addressed the Submarine Institute of Australia. In the speech, the Secretary announced that US$4.67M had been authorized to begin studies for the Royal Australian Navy's (RAN) next generation submarine under Project SEA 1000.

**(Editor's Note: See entire speech in this issue of THE SUBMARINE REVIEW)*

The studies are being taken in order to support early decisions on critical design aspects that include battery designs and conceptual designs for weapon payload handling and storage. These studies are currently being conducted by the Defense Science and Technology organization (DSTO) and other organizations such as ASC. These studies will be complete by 2009 in order to start the concept design phase in 2010. First pass approval for the design phase by the National Security Committee is scheduled for 2011.

The Secretary also announced that a SEA 1000 project office of 17 people is being established and will be expanded in the coming years. The SEA 1000 office will probably be in place no later than 2010. Information received on 21 November indicates that a new underwater test facility was also commissioned at the DSTO in Melbourne in order to assist in the submarines development.

This latest announcement was preceded by the 2007 Kokoda Foundation study regarding the RAN's undersea warfare requirements for the 2025-2050 timeframe. This study affirmed the need for a larger, more advanced Submarine Force to counter the growing threat posed by China, as well as the many other navies in the region that have recently begun to acquire advanced submarines. The study concluded that the RAN needs a Submarine Force double that of the six-unit Collins class currently in service. Within

days of the Kokoda study, the Defense Minister gave the official go ahead for SEA 1000. The first new design submarine is scheduled to enter service in 2025.

FRANCE - New Andrasta Submarine Design for World Market

In October 2008, AMI received information at Euronaval 2008 that DCNS was promoting its latest diesel electric submarine design for export on the world market. Known as ANDRASTA, the new 49-meter (160.7ft) submarine is optimized for operations in coastal waters, an increasingly likely theater of operations for submarines in the future.

The 855-ton submarines will have a maximum diving depth of greater than 200 meters, a range of 3,000 nautical miles, submerged endurance of up to five days and a complement of 19 with additional space for eight personnel. It will also be able to deploy the latest weapons including heavy weight torpedoes and surface to surface missiles (SSMs).

The development of ANDRASTA draws on design solutions that have been tested in the successful Scorpene exported to Chile, Malaysia and India. Sources at DCNS have indicated that the ANDRASTA can be built at reduced construction and ownership costs when compared to other designs available on the international market.

At 855-tons and a small crew of only 19 personnel, this submarine could become very attractive to navies that continue to delay future submarine programs due to extremely limited acquisition, operations and personnel budgets. In addition, the ANDRASTA could be very attractive to navies that either operate in restricted waters or intend to develop a first-time capability to operate submarines. Some of these potential opportunities could exist with Argentina, Colombia, Ecuador, Egypt, Indonesia, Libya, Pakistan, Poland, Saudi Arabia, Singapore, Thailand and Vietnam.

From the December 2008 Issue

PAKISTAN—Deal Close for Type 214 Submarines

In late November 2008, AMI received information that the Pakistani Navy (PN) is apparently close to completing a deal for three new construction submarines to satisfy the sea service's requirement for additional Air Independent Propulsion (AIP)

submarines. Information received suggests that the PN has chosen the ThyssenKrupp Marine Howaldtswerke Deutsche Werft (HDW) Type 214 over the DCNS Marlin (Scorpene), the only two competitors for the program.

The deal calls for three units of the Type 214 design to be built at Pakistan's Karachi Shipbuilding and Engineering Works (KSEW) for around US$1B, which probably also includes minor modifications to the shipyard. Sources indicate that Pakistan has formally agreed to the purchase of the submarines and that all technical specifications have been finalized. A construction contract is expected in early 2009.

In regards to the DCNS Marlin (Scorpene), press reporting indicates that the French offer was for three AIP units at a price-tag of US$1.2B, although this price has not been confirmed. There was also some concern in Pakistan that the sale of the Scorpene could have met resistance in France, similar to the Agosta 90B. Similarly, there most assuredly would have been resistance from India, which is under contract to build eight units of the Scorpene design for the Indian Navy. Pakistan, which has seen multiple international embargoes on arms imports over the past decades, may have determined that the German solution carried less risk politically than the French alternative.

Assuming that a contract is in place by early 2009, the first submarine is scheduled for delivery 64 months after contract signing followed by units two and three at 12 month intervals. Two additional units could be ordered at a later date as the PN has acknowledged publicly that it has a standing requirement for eight total submarines.

EGYPT—Still Looking For a New Submarine

In late November 2008, AMI received information that the Egyptian Navy (EN) was in negotiations with ThyssenKrupp Marine Howaldtswerke-Deutsche Werft (HDW) for the purchase of three Type 214 submarines (some sources indicate possibly Type 209s). The deal is reportedly worth an estimated US$1.8B (US$600M per unit).

Egypt, with its aging force of four Chinese-built Improved Romeo class submarines commissioned from 1982 through 1984, has been considering its options since the 1990s. During the

decade, the EN apparently considered new construction options including German Type 209s, the French/Spanish Scorpene, French Agosta 90B, Dutch Moray and Russian Kilo as well as the used Dutch Zwaardvis class. The latest proposal for used vessels occurred in 2005 when German Defense Minister Peter Struck offered two type 206A submarines that were decommissioning from the German Navy.

However, financing for replacement submarines was never secured due to higher national priorities. When considering Egypt's minuscule procurement funding levels, Egypt historically has been forced to upgrade its forces through United States Foreign Military Assistance (FMA) programs. All of the services compete for the US$1.3B US Military Aid Package. Additionally, these funds can only be used for US systems, forcing the Egyptians to source new platforms from the US as witnessed by the recent procurement of three Fast Missile Craft (FMC) from the VT Halter Marine. The only other alternative is for the Egyptian Armed Forces is to find non-US suppliers that are willing to finance the purchase with very generous terms for the Egyptian Government.

Egypt, with its aging Submarine Force, no doubt feels the pressure from its Eastern Mediterranean neighbors in Israel, Greece, Turkey and Algeria, which are all operating or getting ready to take delivery of modern submarines. Regional naval force developments are pushing the EN to act as soon as possible, which is probably the basis for the 2005 discussions on the used Type 206As from the German Navy. However, the age of the Type 206s (commissioned in the 1970s) probably convinced the sea service that a modern new construction solution is needed in order to field a relevant undersea warfare force in the Eastern and Central Mediterranean, leading to the consideration of the Type 214.

Although negotiations are now underway for the Type 214s, a deal is probably a long way off due to Egypt's very tight procurement budget. If this deal does move forward, ThyssenKrupp Marine's sales are marketing arm, Marine Force International, will have to put together an extremely beneficial financing solution, an alternative countertrade/offset package or combination of both in order to close the deal. One can not also discount the offer of the used German Type 206s a second time.

Other alternatives for the EN appear to be slim at best unless the

sea service can find a way for new hulls to be built in a US yard, thus qualifying the program for funding under a US FMA solution.

INDIA—Second Submarine Line (P76) RfP Re-sked for Mid-2009

In mid-December 2008, AMI received information that the Requests for Proposals (RfPs) for the second submarine line under Project 76 will be pushed back to mid-2009. This date continues to slip as it was originally intended for release by the end of 2008. Project 76 is for a new class of conventionally powered attack/guided missile attack submarines (SS/SSG) with a vertical launch (VL) capability in order to fire BrahMos missiles.

AMI's source indicates that the four submarine designs now under consideration are the Navantia S-80A, HDW's Type 214, a DCNS Super Scorpene and the Fincantieri/Rubin S-1000, which is based on the Russian Amur 1650. The earlier offer of the Larsen and Toubro (L&T) Ltd/Russian Amur 950 Hump Back appears to have been dropped from consideration. AMI's source also indicates that the S-80A, Type 214, Super Scorpene and S-1000 design options presented to the Navy showed the option to install a plug with either four or eight vertical launch cells in order to host the BrahMos missile, similar to the Russian Rubin Amur 950 design.

AMI believes that the decision for the second submarine line will be shaped strongly by political factors and for this reason views the Italian/Russian S-1000 design as the candidate in the lead at this time, chiefly due to the commonalities with the earlier offered Amur 950. Russia and Italy are both collaborating in Indian Navy projects at this time; Russia with the BrahMos missile, the Advanced Technology Vessel (ATV) and Akula submarine programs and Italy with the Air Defense ship and 76mm gun connections. The S-1000 solution would also offer India a design that is not completely Western in origin while at the same time has commonalities with India's ATV program and its indigenous supplier base.

With the RfP date continuing to slip, a final decision on the design will probably be delayed until at least 2011 with a construction contract in place by 2013. The new submarines will be part of India's second submarine line, in other words, two distinct

programs for constructing conventionally powered submarines in country.

SOUTH KOREA—Daewoo Wins Type 214 and Hanjin Wins PKX-As

In mid-December 2008, AMI's sources indicated that South Korea's Defense Acquisition Program Administration (DAPA) selected Daewoo Shipbuilding & Marine Engineering (DSME) to build one unit (unit 4) of the KSS-2 Type 214 submarine and Hanjin Heavy Industries & Construction (HHIC) to build a further four units (5-8) of the PKX-A fast attack craft. DAPA's decision comes in the midst of ongoing technical problems with both vessel types.

DSME's selection marks its return to the submarine manufacturing business. DSME previously constructed eight of the nine 1,400-ton Chang Bo-Go class KSS-1 (Type 209) submarines, but lost the Batch I contract for three 1,800-ton Son Won-Il class KSS-2 (Type 214) submarines to its main domestic rival, Hyundai Heavy Industries (HHI), in 2000. DSME and HHI will compete for the construction of the remaining five units of the Son Won-Il class with DAPA requesting bids for each individual unit. A total of nine units are expected to be commissioned by 2018.

HHIC's selection for the Batch III PKX-A contract marks an end to naval shipbuilding inactivity at HHIC whose last construction was the single PKX-A Batch I unit completed in June 2007. The Batch II contract for three additional units (2-4) was awarded in 2007 to STX Shipbuilding initially slated for commencement in 2009. Batch III construction is scheduled to begin in 2010.

The two procurement programs are firming up as the most highly publicized in regards to technical problems of any South Korean vessels in recent memory. During the closing months of 2008, AMI learned the first class ROKS SON-WON-IL continued to suffer noise problems, largely due to alleged design faults in the ThyssenKrupp Marine Howaldtswerke-Deutsche Werft (HDW) Type 214 design. Both South Korean and Greek type 214's have suffered nearly identical problems. While most problems in the South Korean Type 214 have been reportedly resolved, the noise level has yet to be reduced to levels promised by HDW. On 22 February 2008, HDW was fined EUR 2.87M by DAPA for ongoing

technical problems. In November, a South Korean National Assembly report demanded price reduction of the remaining six Type 214's on the basis HDW was using the South Korean market to correct faults in the Type 214 to increase the submarine's overall international export potential. As of this writing, it is uncertain if DAPA received a price reduction for the fourth unit when it was contracted to DSME.

As for the PKX-A's, first of class ROKS YUN YEONG-HA, has been unable to operate effectively when sailing above 20 knots, half the required speed of 40 knots. Problems have been attributed to the nexus between the water jet propulsion system and the hull's design. While commissioned on 17 December 2008, AMI has learned YUN YEONG-HA will initially function as a test bed for the development of a revised design which is expected to be reflected in future construction. However, YUN YEONG-HA's combat management system (CMS), the first indigenously developed CMS, has performed successfully. The CMS was developed jointly by the Agency for Defense Development (ADD) and Samsung Thales.

The two vessel programs are considered urgent for the ROKN. Recent offset agreements with HDW, including those associated with submarine weapons systems, are intended to be applied to the indigenously designed 3,500-ton KSS-3 submarine which is scheduled to be laid down in 2011. Both DSME and HHI are jointly designing the KSS-3. Meanwhile, the PKX-A is on a tight schedule to replace the aging fleet of Chamsuri class patrol boats. Unlike its predecessor, the PKX-A was designed to confront navies beyond that of North Korea.

VARIOUS DID YOU KNOW?

Singapore: On 28 November 2008, the Republic of Singapore Navy's (RSN) submarine support and rescue ship, SWIFT RESCUE, was launched at ST Marine.

SOUTH KOREA: On 02 December 2008, the second type 214 submarine, ROKS JEONG JI, was commissioned into the Republic of Korea Navy (ROKN).

THE SUBMARINE COMMUNITY

USS TRITON SS201 and SSN586 REUNION HONORING THE OFFICERS AND CREW

by Admiral Hank Chiles, USN(Ret.)

We're here to celebrate TRITON's service in two very different eras of our country affecting two very different generations of Americans doing the task of their day.

The first generation: the heroes, the legends, those of incredible bravery who dared the odds in diesel electric submarines with limited submerged endurance, cramped spaces, poor air, limited sensors, torpedo problems, those who made 1600 submarine patrols to win that war. Submarine sailors were PEACEMAKERS in World War II. They had no choice but to fight to restore the peace in a terrible war we didn't start and didn't want. These PEACEMAKERS we honored tonight in tolling the bells for doing the dirty jobs of war so that we, THEIR grateful successors, might know peace and a better world.

The first TRITON (SS201) was commissioned on 15 Aug 1940, led by Captain Willis Lent, was underway for a 42 day patrol commencing in December 1941, fired the first U. S. torpedo of World War II and by June 1942 had sunk 7 ships displacing over 21,000 tons. TRITON pioneered use of the deck gun to attack enemy shipping. When TRITON I was lost on 15 March 1943 she was credited with sinking 19 ships and damaging 7, the leader of Pearl Harbor submarines in the category of ships sunk at that time and awarded 5 battle stars and 4 Unit commendations.

Jeanine McKenzie Allen and her husband Lorie, have done a marvelous job of keeping alive the spirit of TRITON I.

The second generation here are PEACEKEEPERS. Following the legends, these heroes of World War II , the PEACEKEEPERS of my generation have had a different situation. The advent of nuclear power and subsequent technological advances provided us a far more capable submarine, practically unlimited endurance, greater firepower, better sensors at longer range, a strategic weapon

with incredible accuracy over thousands of miles, a tactical weapon that can strike far inland. We've learned that American strength, judiciously applied is an essential ingredient to preservation of the peace worldwide. The Cold War never went hot.

TRITON II, at the right time, was also unique in submarine history; a two reactor sub, the first ship to circle the globe submerged, a feat forever recorded in history. In two years we'll celebrate the 50 year anniversary of that historic voyage.

In addition to TRITON's around the world voyage with its many tales, TRITON made a number of operations classified to this day. I have little expectation that they will ever be declassified. Those operations contributed significantly to the knowledge of the United States concerning developments abroad and the naval capability of foreign Navies. TRITON II's capabilities were unique, large space for information processing, stations for hard work and unique equipment installations.

The Submarine Force performed invaluable missions throughout the Cold War that enabled us to develop countermeasures to weapons, to understand the military capabilities and prepare accordingly, to be more confident in dealing with the other superpower of the day. These Cold War missions afforded us substantial intelligence information regarding Soviet operating areas, patrol habits and tactics, acoustic signatures, and tracks to and from station.

For her time TRITON was unique, well respected for her capability; a thoroughly rewarding ship on which to work. What made the ship most important to me was the crew. I had not been happy in the surface Navy. TRITON was different and I was to find that submarine sailors were different from their surface brethren. The most professional, hard working, dedicated, intelligent, but also fun-loving, personable, and loyal, helpful, and thoroughly dedicated to their ship and it's mission. It's these friendships going back now over 40 years that makes TRITON so special to me.

We, the PEACEKEEPERS of our era hope we have earned the respect of the PEACEMAKERS, the heroes and the legends of the TRITON I era.

Finally, we should not forget the next generation of submariners, the 21st Century generation represented by those who serve today. The sailors and young officers entering the Submarine Service

today were unimagined when the Cold War ended. The Cold War has no meaning for them. The book has started to be written on the submarine exploits of this new Century. The pages are filling rapidly. Submarine sailors will write that history with novel equipment, innovative techniques, skill and daring. We know they have the intelligence, the work ethic, the will to defend this country.

We turned over to them a Submarine Force that's smaller than we'd prefer, but with largely 688 class submarines, the unique, advanced capability of three Seawolf submarines, the Virginia class that's on the way, and an all Trident ballistic missile Submarine Force. Not a bad way to start. Their era undoubtedly will be demanding, thought-provoking, mentally and physically challenging.

We hope they'll only have to be PEACEKEEPERS, but we should never doubt their readiness to be PEACEMAKERS. We look to them to keep the "torch of freedom burning for all" as John Paul Jones once said.

God bless those who have gone before us, those who serve today, and those who will make this Country proud in this new century.■

REUNIONS

USS SEA DEVIL SSN-664/SS-400 Apr 23-26, 2009
Norfolk, VA
POC: Jim Schenk, Secretary USS Sea Devil Assoc.
P.O. Box 476, Morrisville, NY 13408 Phone: 315-824-3162
E-Mail: submareener@msn.com

USS SAM RAYBURN SSBN-635 Apr 26-30, 2009
Fredericksburg, TX
POC: Doc Rushing 16269 My Road, Miles, TX 76861
Phone: 325-468-2213 E-mail: SSBN-635@HullNumber.com

USS BUSHNESS S-15 May 3-6, 2009 Raleigh, NC
Loc: Raleigh North Hilton, 3415 Wake Forest Road, Raleigh, NC 27609
POC: Ben Supowitz, 13675 Philmont Ave., Unit #3, Philadelphia, PA 19116
Phone: 215-676-3585 E-mail: benel24@comcast.net
APOC: Mike Wentzel, 417 Main St., Oley, PA 19547 Phone:610-987-6641

USS SCAMP SSN-588 May 5-9, 2009 Charleston, SC
Loc: Mt. Pleasant Holiday Inn
POC: Lou Minor, 3260 Hector Road, Newcastle, CA 95658
Phone: 916-425-2149 E-mail: lou@uss-scamp.com
Web Site: http://www.uss-scamp.com

DEDICATION REMARKS FOR THE USS ALBACORE (SS 218) MEMORIAL AT THE BEAVERTON VETERANS MEMORIAL PARK BEAVERTON, OREGON 11 NOVEMBER 2008

by CAPT Chris Ratliff, USN

Good morning, ladies and gentlemen. It is a great privilege to be here at the Beaverton Veterans Memorial Park this morning to dedicate USS ALBACORE (SS 218) memorial.

Commander Marv Doty and the membership of American Legion Post 124, your motto is "For God and Country," and your organization has thus served with distinction for nearly 90 years. Thank you for your effort, with the United States Submarine Veterans Incorporated (USSVI), to build this magnificent memorial to the crew of USS ALBACORE (SS 218).

To the BLUEBACK Base of United States Submarine Veterans and all the submarine veterans with us today: gentlemen, perhaps later today we can head on down to your namesake submarine, the 581 boat[1]. Once below decks, let's tell sea stories that would amuse a submariner and no one else (of course, the story that always gets told is the one about the time so-and-so ignored the sign that says "head secured, blowing sanitaries"). We'll act like we own the place—which we do—and, in general, behave in that obnoxious but loveable way that distinguishes us as *qualified in submarines*. By the way, if, after all these years, you still don't believe you're obnoxious when you act that way, just ask your wife.

Mr. Hawthorne, your Southridge High School Choir has added much to the solemnity and majesty of this event. Many thanks to you and your very talented students.

I am in the company of my family today—my wife, Mary Jane, also a Navy veteran, and my children Melissa, Jennifer, and Christopher—because this is the ideal event for a family to experience together. Ideal because we gather to remember real

Americans who served the highest ideals and paid the ultimate price for those ideals. Today is a day of remembrance for those who served, as I do, and sacrificed, to an extent that I have not.

In a very profound way, I really had no choice but to be here today. Certainly, when CAPT Enloe[2] extended the invitation, there would have been no hard feelings had I declined. But then to meet so many of the fine people of this great American city, to stand among veterans and former submariners, and, most of all, to meet the families of the crew of ALBACORE as I have the privilege of telling the story of the noble accomplishments of those courageous submariners: nothing at all could keep me from being with you today.

The submarine ALBACORE that we memorialize today had a fabled but all-too-brief history. She was a beautiful boat, the kind any submariner would be proud to call his own, made even finer when her sail was taken down, the periscope fairings were cut away, and she was given a wartime Pacific paint scheme to make her more difficult to spot on a close horizon. She was trimmed for combat and ready to fight, which she did—magnificently.

The entire story of ALBACORE can be told within the time span of World War II: a long time as far as war goes, but tragically short for such a gallant ship. But consider what ALBACORE accomplished in those two years, five months, and six days, from her commissioning on the first day of June, 1942, to her untimely loss on the 7th of November, 1944.

As one of our best boats—then, now, and forever—she and her crew were run hard by all four skippers, LCDR Dick Lake, Oscar Hagberg, Jim Blanchard, and Hugh Rimmer. For the ten war patrols from which she returned, in each case, her crew engaged the enemy with resolve and vigor: She sank a total of thirteen ships—one of them an aircraft carrier—totaling 74,000 tons, and severely damaged five more, taking out of war's service another 29,000 tons.

That was the war that no American asked for, but the very bravest knew had to be fought and had to be won. That was the kind of war that, when you left home to serve, you did not come home until the war was won—if at all.

I have at home a group photograph of probably every ALBACORE officer and Sailor taken in May 1944 at Mare Island Naval

Shipyard, where the boat had gone for overhaul. This occasion was the rarest and last respite from the fatigue and horror of war, a welcome break that allowed the boat to get all the way back to the American mainland. No surprise, then, that the picture included not just the officers and crew, but so many of the ladies, the sweet hearts, of the men of ALBACORE. The photograph is probably the one last time they were together, devoted husband beside beloved wife, or the many young Sailors who thought themselves the luckiest in the world to be in the company of a future bride. One last time before returning to the horrible business of war.

I've studied all ten war patrol reports. Let me say this: I've served on seven submarines, and not a one would I trade; but as I read of ALBACORE's exploits, page after page, I truly wish that I had gone to sea with *those* submariners.

I wish I had been so blessed as to go to sea with Signalman First Class Morris Keith Kincaid, 28 years old, of Waukegan, Illinois. He was borne and raised so close to the Naval Training Center at Great Lakes, Illinois, that he could have stood up from the breakfast table and walked to boot camp. He probably did.

And like John Wilber Culbertson, an electrician's mate third class from Los Angeles or Electrician's Mate Second Class Elmer Weisenfluh, from Taylor, Pennsylania, they were probably true leaders among ALBACORE's blue jackets. At 30 years old but so junior, they probably left their jobs right after Pearl Harbor to become submariners because they believed their country and the cause of freedom needed them.

They were probably much like Charles Lee Carpenter of Wabasha, Minnesota, a Mississippi river town of population 2400. He was a first class motor machinist's mate—what I would have liked to have been had I enlisted back then. At age 32, he was the oldest man on board, older than the chief of the boat, older even than the captain. He was probably the kind of hard-working, no-nonsense Sailor that every captain wants in his crew.

This crew of ALBACORE, they really were a perfect resemblance of the American experience. Four of them were from right here in the Pacific Northwest:

Seaman 1st Class James Ernest Rowe from Baker, OR.

William Henry Gibson, as the leading ship's cook, the most important man onboard, from Zillah, WA.

Motor Machinists's Mate 2nd Class Allan Rose Brannam from Caldwell, Idaho.

And Chief Torpedoman's Mate Elmer Harold Peterson from Everett, Washington, a recipient of the Silver Star.

And this was a boat filled with lively characters. I've stared long at a photograph of Ship's Cook First Class Robert Daniel Hill, age 20, from Beaufort, North Carolina. As a ship's cook, his shipmates were likely to call him by the nickname, "cookie." Take a look at the photo, and you'll see that he had that look in his eyes that said, "If you call me cookie, I'll break your nose."

But Petty Officer Hill never had to make good on that threat, because always standing right beside him in the galley was Ship's Cook 2nd Class George Maurice Sisk of Follett, Texas. A huge man standing 6'4", you have to wonder how George ever fit into a submarine.

And as that genial kidding occurred across the mess decks, maybe Radio Technician First Class Herbert Hodge Burch, age 22 from Austin Texas, another giant of a man at 6'3", stood up, wondering if the unthinkable could happen: submarine shipmates come to blows.

But then the Chief of the Boat, Chief Motor Machinist's Mate Arthur Lemmie Stanton of Wauchula, Florida, steps through that water tight door just forward of the galley and says, "get me a fresh cup of coffee, would you, cookie," and sure enough, everyone is a shipmate again. What a remarkable man Chief of the Boat Stanton surely was. Take a long look at his picture, as I have, and you'll know this was a man born to lead on the deck plates.

ALBACORE's crew comprised young men who were raised in the farm lands, the coal fields, or the cities of these United States, many of whom had never even seen the ocean until they joined the Navy. Young men like:

Electrician's Mate 1st Class Philip Hugh Davis, age 26, from Hamilton, Ohio.

Seaman 1st Class Charles Chester Hall, age 22—the median age for an ALBACORE Sailor—from Bedford, IA.

Seaman 1st Class Patrick Kennyless McKenna, age 23, an orphan from Boy's Town, Nebraska, who probably thought of his ALBACORE shipmates as the family he always wanted.

And Seaman 1st Class George Kaplafka, still a teenager and the youngest Sailor onboard, from the coal mining town of Shaft, Pennsylvania.

Let's talk for a moment about Seaman First Class George Kaplafka. That obviously ethnic name Kaplafka probably originates from an immigrant family that has contributed much to American history. But aboard ALBACORE, a shipmate's ethnicity—more specifically, race, color, and creed—did not matter. Aboard ALBACORE, a person was judged only by how hard he worked to earn these dolphins that denote he is qualified in submarines. And that made ALBACORE home to great Americans like:

Seaman 1st Class Encarnacion Nevarez, age 24, from Los Angeles.

Fireman 1st Class Pasquale Charles Carracino from Newark, New Jersey.

And Steward 2nd Class James Louis Carpenter, from Washington, DC.

Aboard ALBACORE, most of the crew had just left home when they joined the Navy and volunteered again for submarine duty, very young men like:

Seaman 2nd Class Arthur Star Kruger of Louisville, Kentucky, whose promising life ended the day before his 20th birthday,

Seaman 1st Class Frank Robert Nystrom of Bessemer, Michigan, who had turned 20 years just a few weeks before.

They were among so many stalwart young men, like Yeoman 2nd Class Maurice Crooks Strattan, age 25, whose family founded the town that still bears his name, Strattanville, PA.

And the officers, they, too, were very young.

LT JG Henry Forbes Bigelow, Jr., only 22 years old, he had just graduated from Harvard and left his home in Clinton, Mass.

LT JG, John Francis Fortier, Jr., also 22 years old, a Cajun from New Orleans, LA, he was so culturally different from Henry Bigelow, yet they were likely the deepest of friends.

And LT Walter Emery Lang, Jr., age 27, from Philadelphia, PA. He bore a striking resemblance to Clark Gable, even wore the same style of mustache, and so Walt Lang probably came across as quite the ladies man.

I would have been awe struck to serve with LT Theodore Taylor Walker,[3] only 23 years old, from Mitchell, Kentucky. So very young, yet Ted was already a submarine Executive Officer, and already a hero who had earned Silver Star and Bronze Star medals for gallantry in combat.

And of course, LCDR Hugh Raynor Rimmer, 30 years old, from Manhasset on the north shore of Long Island, Naval Academy Class of 1937, and already a recipient of the Silver Star. As a submarine Captain, he sought to engage the enemy relentlessly in battle and to make every engagement a decisive victory. But he did not fight to earn glory; instead, he led with all the energy he had because he wanted to put an end to that terrible war so all of his 85 shipmates could return home and live simple, idyllic lives.

As you can tell, I've gotten to know the lost men of ALBACORE. And I've been to the place where these men died. As part of a modern submarine operation, I cannot tell you when and I cannot tell you why, but I have been to that eastern approach to the

Tsugaru Strait, near the island of Hokkaido, where ALBACORE brushed against an unexpected mine. Perhaps just moments before, Quartermaster 2nd Class Sheridan Patrick Jones, age 22 from Altadena, CA, a Sailor whose smile never left his face, was shooting a running fix to the light house at Esan Misaki, the same light house that I've used to fix a ship's position.

In the moment ALBACORE struck the unforgiving mine that every intelligence source told Captain Rimmer could not be there, the once mighty ship was instantly destroyed in a calamitous explosion. Over 64 years later, we still ask, what happened on that day? What happened when the hull of that magnificent ship, the preserver of life for all aboard, was torn asunder?

I ask you to look to the words of King David in the 2nd Book of Samuel:

"The breakers of death surged round about me,
The floods of perdition overwhelmed me.
In my distress I cried out to my God;
And From his temple he heard my voice,
The Lord reached out from on high and took me;
He drew me out of the deep waters.
And He saved me."

The men of ALBACORE did not escape their earthly end. Instead, God chose them to give what has been called the last full measure of devotion[4]. And though we might never understand, their salvation was in the grander, spiritual sense.

Short days ago[5]
They lived, felt dawn, saw sunset glow
Loved and were loved, and now they lie
In God's perfect tomb
Their earthly dust doth hide.

How tried their valor, we must tell
As from their failing hands they threw
The torch; be ours to hold high.

What is this torch that we must now hold high? It is the memory of the 86 men of ALBACORE. It is for us, the families they left behind without father or husband, the veterans who survived that

war, my family and me, and all the beneficiaries of this better world the ALBACORE Sailors made for us, to remember these men, noble in heart, pure in purpose, and in their youth wanting nothing more than to lead meaningful and loving lives.

Their memory is a torch that illuminates the path of our lives because we are citizens of a great nation that is free, secure, prosperous, and just because the men of ALBACORE sacrificed to make it so.

Ladies and Gentlemen, it has been the greatest honor of my naval career to be with you today and speak for the men of ALBACORE. Thank you and God bless.■

ENDNOTES

1. The USS BLUEBACK (SS 581) is on display at the Oregon Museum of Science and Industry in Portland, OR. Http://www.omsi.edu/submarine.
2. CAPT. Daniel Enloe, USNR, is the former Commanding Officer (CO) of Pacific Submarine Force Operations Navy Reserve Det. A and a member of American Legion Post 124 and the USSVI.
3. Ted Walker and the loss of ALBACORE are the subject of the children's book, *Across the Blue Pacific*, by Louise Borden, illustrated by Robert Andrew Parker. Houghton Mifflin Company, Boston, 2006. Ms. Borden is LCDR Walker's niece. She attended this dedication ceremony.
4. From President Abraham Lincoln's Gettysburg Address.
5. The reader will recognize the first three lines of this verse as taken with modification from John McCrae's "In Flanders Field." The fourth line is this author's. The fifth and sixth lines are taken in part from the gravestone of the tomb of Aeschylus, the Athenian poet and warrior at the Battle of Marathon. The seventh and eight lines are again taken from McRae's poem.

REUNIONS (continued)

USS SEA FOX SS-402 May 10-14, 2009 Branson, MO
Loc: Settle Inn
POC: Roy Athey, Phone: 417-581-1887 E-mail: rondo 94590@yahoo.com
George Arnold, Phone: 913-441-1998 E-mail: seafox@kc.rr.com
Web Site: http://seafoxassoc.homestead.com/09muster.html

USS SEGUNDO SS-398 May 31-Jun 4, 2009 Laughlin, NV
Loc: Edgewater Hotel, Laughlin, NV
POC: Ken Owen E-mail: kenowen1@cox.net

USS GUARDFISH SSN-612 Jun 23-27, 2009 New London, CT
POC: R.E. "Twig" Armstrong, 15 Duckworth Road, Hebron, NH 03241
Phone: 603-744-2078 E-mail: ussguardfish@metrocast.net
Web site: http://www.guardfish.org

THE SUBMARINE INSTITUTE OF AUSTRALIA

AUSTRALIAN SUBMARINE INSTITUTE

AUSTRALIA'S FUTURE SUBMARINE CAPABILITY– THE WAY AHEAD

VADM JAY DONNELLY, USN
COMMANDER, NAVAL SUBMARINE FORCES

I appreciate the kind introduction and warm welcome that I have received here in Canberra. It is truly my honor to participate in this wonderful venue for sharing innovative ideas about the future of submarines.

Thank you to Rear Admiral (Ret) Peter Briggs for the invitation to speak this morning. Also, thanks to the many others who have worked so hard to put together this well organized and impressive conference.

100 years ago, The United States Navy's *Great White Fleet* visited Sydney, Melbourne and Albany. This was a historically significant event for both of our countries and planted the seed for what has blossomed into a robust and important alliance between our two nations.

When the fleet entered Sydney Harbor on August 20th, 1908, they were enthusiastically welcomed. Some accounts say that liberty was so good in Sydney that at the planned time for their departure, almost 100 sailors failed to report.

I too have been graciously welcomed and entertained this week from the moment I arrived and my staff may have a difficult time locating me when it is time to leave Canberra later this week.

During the one hundred years after the last ship of the *Great White Fleet* departed Albany's Princess Royal Harbour, our two Nations and Navies have cultivated a close and lasting partnership that is extremely important to the future of the United States, Australia and the entire Western Pacific Region.

My experience as Chief of Staff, U.S. 7th Fleet, Commander Submarine Group 7 in Yokosuka, Japan, and Deputy Commander U.S. Pacific Fleet have provided me with some insight into issues that we will face in this important part of the world in the 2025 to 2050 timeframe. During my discussion today, I will focus on 3 main points.

- First—My Nation's new Maritime Strategy will require strong international relationships, such as we enjoy with Australia, to prevent wars and provide regional stability.
- Second—The Western Pacific is of significant global importance. The military advancements of the Chinese and the lack of transparency of their intentions are of concern and bear close watching.
- Third—And most important to my discussion today, Australia and your Submarine Force is and will continue to be critical to the stability of this region.

During my tours in the Western Pacific, I became very familiar with the close relationship that my Navy shares with the Royal Australian Navy, especially our Submarine Forces. Many of my Commanding Officers get the opportunity during their preparation for command to train on your submarines with your crews. Each year a group of Perspective Commanding Officers (or PCOs) spend 3 weeks operating with Collins Class submarines, alternating years between the western Australia exercise areas and Hawaiian operating areas.

These interactions allow our officers to share warfare tactics, learn about your submarines and develop long-lasting professional and personal relationships. The experiences of our PCOs and the interactions through larger exercises like Talisman Saber and the Rim of the Pacific (referred to as RIMPAC) continue to enhance the interoperability between our Submarine Forces and Navies.

This interoperability has also improved through the partnerships our nations share in the defense industry. HMAS Waller was not only the first Collins-class submarine to be equipped with Raytheon's advanced tactical command and control system (AN/BYG-1), but this past July was the first submarine ever to launch a live MK-48 Common Broadband Advanced Sonar System torpedo (or CBASS), sinking a retired U.S. warship. The

interoperability that CBASS provides, coupled with the AN/BYG-1 Combat Control System, is a force multiplier for both of our nations, making our submarines the deadliest in the world. Projects that increase our submarines' interoperability, along with the things we are doing to fortify our relationships, are essential to further strengthening the ability of our Submarine Forces to meet current and future threats.

This is the core of the United States Navy's new Cooperative Maritime Strategy for the 21st Century. The security, prosperity, and vital interests of the United States are increasingly coupled to those of other nations.

One of the major tenants of our strategy is to foster and sustain relationships like the one we share with Australia. We believe expanding cooperative relationships with other nations will contribute to the security and stability of the maritime domain for the benefit of all.

My Navy's challenge is to apply seapower in a manner that protects U.S. vital interests even as it promotes greater international security, stability, and trust. Because, while our forces can surge when necessary to respond to crises, trust and cooperation cannot be surged. They must be built over time so the strategic interests of our nations will be continuously considered while mutual understanding and respect are promoted.

I believe that the 21st century will be the century of the Asian Pacific and this new strategy specifically calls for credible combat power to be continuously postured in the Western Pacific to protect our vital interests, assure our friends and allies of our continuing commitment to regional security, and deter and dissuade potential adversaries and peer competitors.

Economists have said that during the 2025 to 2050 time frame, the Asia-Pacific region will be home to some of the largest and most dynamic economies in the world. These economies will be closely connected to each other and the United States though trade and investment. While this will bring much opportunity to our two countries, it will also bring risk to stability and security.

We need to continue to cultivate our cooperative approach to ensure we are ready to respond to threats and political concerns in the region, such as:

- Increased militarization
- Ongoing threat of terrorism
- Unresolved questions of sovereignty between China and Taiwan
- Challenges to our energy supplies and economic security
- -And unresolved boarder issues

Though progress has been made in resolving or managing many of these concerns, surely some of these will influence tensions. Maybe the biggest concern for the future of the region is China's increased military spending and arms build-up.

Analysis of People's Republic of China budget data from 1996 to 2006 indicates defense spending has increased an average of 12% annually (inflation adjusted) with an increase of 19% in 2007 and a similar trend for 2008. The published budget does not include large expenditures, such as the expense for strategic force development and other Research and Development. This lack of accounting transparency makes Department of Defense estimates difficult and, while the large number of ships being constructed by the Chinese is cause for concern, more important is that we simply don't understand the rationale for many of their activities.

The People's Liberation Army (PLA) has developed a variety of kinetic and non-kinetic weapons and jammers against space-based systems. They are researching and deploying capabilities intended to disrupt satellite functionality without inflicting physical damage.

PLA planners are focused on targeting surface ships at long ranges from China's shores. By combining advanced ballistic and cruise missiles with a modern command and control architecture, the PLA is seeking the capability to degrade an adversary's force generation by striking aircraft carriers, logistic nodes, and regional bases.

As part of its planning for a Taiwan contingency, China is prioritizing measures to deter or counter third-party intervention in a future cross-strait crisis. To provide a supporting defensive layer for its long-range anti-access systems, they are acquiring an extensive undersea warfare capability including submarines (KILO, SONG, SHANG, and YUAN-classes) and mines.

We must be fully aware and ready with the right mix of capabilities to adequately respond to any contingencies that might

arise. The U.S. Navy is moving 60% of the submarine fleet to the Pacific for just this reason. But, while the United States has the capabilities required to forward deploy and project power as necessary, our concerns are world-wide.

Today, more than 40 countries have Submarine Forces amounting to over 400 submarines. And this number is growing! The War on Terror will not be a short effort with Iraq and Afghanistan as our current focus. Russian military operations are on the rise. North Korea and Iran are of concern. But the part of the world you live in is extremely important to both of our nations and the United States relies heavily on Australia to maintain the watch on the day-to-day security of the region.

With the increased regional military power and the apparent area denial strategy of China, the submarine is the platform that will be called upon to operate in an anti-access environment where other naval forces can't. Providing:

- Persistent Intelligence, Surveillance, and Reconnaissance
- Early indications and warning
- And to be the first to respond if needed.

The Australian Submarine Force today is on the right track and ready, if called upon. Submarines, like your six COLLINS Class boats, will play critical roles in the strategy required in the years to come. Submarines are the ultimate stealth platform, able to operate in areas where sea and air control is not assured and gain access to areas denied to others. Large submarines like COLLINS are able to operate at long ranges and remain on task for weeks. They carry flexible sensors, weapons, Special Forces and payloads to provide the Joint Task Force Commanders with the situational awareness they need and the ability to strike without warning.

But soon, you will be facing a decision on the Collins class replacement. We made a similar decision recently with our replacement for the Ohio Class ballistic missile submarines.

In 2027, the U.S. Navy will begin to retire the oldest of the 14 OHIO-Class SSBN's as they reach the end of their service life. We decided to replace these submarines with a follow on Sea Based Strategic Deterrent (SBSD) submarine. The plan requires the first of this new class to be ready to commence operations by 2025 and

it will take about 15 years to design and construct the first ship.

While this may seem like a long time, appropriate investment in SBSD research and concept development is essential to building a reliable and adaptable submarine, prepared to face an uncertain future. Beginning Research & Development (R&D) efforts in 2010 will allow technologies to mature, lowering cost and schedule risk. The proposed plan focuses on maturing required technologies and leveraging the lessons learned from our current efforts with our Virginia Class submarine to reduce construction and life cycle costs.

To make all of this happen in time for the ship to deploy when needed, we are starting the initial planning now.

While I do not presume to know the specifics of your acquisition strategy for the Collins replacement, the basic principles of research and development, design and construction are certainly similar. Your Collins class design and construction ran a similar 15 year timeline to what we have planned for SBSD. In 2025 the Collins will be 30 years old and approaching the end of its service life. To prevent a gap in needed capability, the replacement must be able to deploy by about 2025. Achieving initial operating capability by that time requires starting R&D efforts very soon.

Admiral Chester Nimitz once said, "Our armament must be adequate to the needs, but our faith is not primarily in these machines of defense but in ourselves."

The right warfare capabilities and force structure are certainly important to be ready to provide the security and stability our nations' expect. But these machines by themselves do not win wars. To get the most out of the technology, we need well trained sailors and officers.

Your people are top-notch professionals. That does not just happen by accident. It requires continuous effort to grow and maintain a culture of first-class professionalism. Both of our countries need to place strong emphasis on providing cutting edge training for our Submarine Forces to remain competitive into the future and ensure we retain our best and brightest.

In that light, next summer MICHIGAN and one of our fast attack submarines will participate in Talisman Saber 09 here in Australia. This is a joint Australian and U.S. military exercise, focusing on operational and tactical interoperability through a

power projection, forcible entry scenario involving live, virtual and constructive forces. During the event some of your Australian Special Forces will join our Navy Seals onboard the MICHIGAN to jointly conduct several Direct Action training missions.

Talisman Saber is one of the most important high-end joint exercises our two countries conduct together. This is an extremely rare opportunity for my crews and our countries Special Forces to receive quality training in a realistic live scenario.

This Task Force level training will significantly increase the effectiveness of our two militaries to utilize the interoperability and capabilities we share. This is the sort of thing we must continue to do to be ready for the threats to our nations security in the years to come.

To Summarize:

The U.S. maritime strategy today reaffirms an enduring commitment to the Western Pacific Region demonstrated for the first time by the Great White Fleet 100 years ago. The United States and the U.S. Submarine Force in particular, very much value the cooperation Australian and United States forces demonstrate in working together to meet security and strategic challenges, both regionally and globally. We look forward to working together to continue pioneering innovative and groundbreaking approaches to provide fully capable, sustainable, and interoperable submarine forces to meet the challenges of the future.

Thank you.

LIFE MEMBERS

CAPT Gregory E. Bajuk, USN(Ret)
Mr. Gary Cooper
CDR John M. Iannettia, USN(Ret)
ET2(SS) Thomas A. Kokinda, USN
CDR Charles Thomas Weaver, USN(Ret)

ADDRESS TO THE SUBMARINE INSTITUTE OF AUSTRALIA "THE NATIONAL INTEREST— CHALLENGES OF A SUBMARINE BUILDING INDUSTRY"

CANBERRA 6 NOVEMBER 2008 REMARKS GIVEN BY THE HONORABLE GREG COMBET AM MP

Mr. Combet represents Charlton in New South Wales. He was long active in Labor Affairs, most recently as Secretary of the ACTU. As Parlimentary Secretary for Defence Procurement he has specific responsibilities for assisting the Minister for Defence on the efficiency and effectiveness of major capital equipment acquisition and Defence Industrial Policy. On May 7, 2008, Mr. Combet announced that a review of Defence Procurement and Sustainment will be undertaken. The report of the review, entitled "Going to the Next Level," has been tabled in Parliment.

I would like to start tonight by acknowledging the role of Rear Admiral Peter Briggs and the Submarine Institute of Australia for their invaluable work. They have been enthusiastic participants in the public debate about our next generation submarine and I have found their contributions to have been enormously helpful in gaining a better understanding of the relevant issues.

As Parliamentary Secretary for Defence Procurement one key area of my work is planning for future major projects including the procurement of our next generation of submarines.

This program will be the most technically and technologically complex project ever undertaken in this country. It will also be a program that is vital for our future national security.

The Strategic Rationale for Submarines

As many of you would be aware the Government has engaged in one of the biggest reviews of our strategic environment and defence capabilities required for the future.

Although the new White Paper and Defence Capability Plan are yet to be considered and released by Government, I don't think I will be revealing any secrets by saying that submarines provide an essential defence capability that we will need for the foreseeable future and beyond.

I can confirm tonight that the White Paper will clarify the operational role and capabilities required from our new submarines. This will determine the number and size of the submarines to be procured, as well as the systems and weapons that they will require.

To help make these judgements the White Paper will also closely review our strategic environment, and assess the potential for threats that might arise from the growing fleets of submarines and underwater warfare capabilities in our region.

As you would be aware the growing submarine capability within our region has already been the topic of public debate.

Dr. Andrew Davies from the Australian Strategic Policy Institute has noted that:

> "Australia will soon face a region that has a much greater capability to conduct submarines operations... Submarines will be able to seriously threaten the operation of surface fleets and commercial trade....
>
> Sophisticated Russian and Western European-designed submarines are proliferating into the region, with Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Singapore and South Korea all acquiring or planning to acquire modern conventional boats....."

The rising major powers China and India are also working to develop indigenous nuclear submarines.

The Government is already very cognisant of these challenges. As the Prime Minister noted in his speech to the National RSL Congress in Townsville:

> "The modernisation of Asian military forces is being characterised by significant improvements in air combat capability, and naval forces—including greater numbers and more advanced submarines".

To help deal with this challenge the Prime Minister has said that:

> "we need to ensure we are at the forefront of military technology development and acquisition"

And that this should include:

> "An enhanced naval capability that can protect our sea lanes of communication and support our land forces as they deploy".

The procurement of our next generation submarine will be central to this.

Collins Class Submarines

I would now like to turn to some of the challenges we will face in the construction of our new submarines.

Many of you will recall when the Collins Class was first mooted. There was debate about whether they should be built in Australia and where. There were doubts about our ability to manage such a project in Australia. There were doubts about industry's ability to design, build and modify submarines in Australia. Similar points are being raised now regarding our future submarine fleet.

However, the submarine project went ahead, and Collins submarines were successfully built in South Australia, with modular construction around Australia. Since then they have also been updated and modified locally.

Among all the controversy that surrounded that project, we should recognize and acknowledge the tremendous work that Defence and industry put in to the project. We should also recognize the first class management, professional and trade skills and the technology that form part of our indigenous submarine construction capability.

In fact the construction of the Collins Class required significantly more advanced manufacturing techniques than was prevalent in Australia at the time. The advancement in quality assurance and advanced manufacturing that came about due to the Collins build benefitted the wider Australian manufacturing industry.

I would also like to acknowledge the role of some of my Labor colleagues in the Collins Class project. Labor has a history of being very supportive of submarines as a defence capability—indeed our defence policy under the Hawke Government favored the introduction of submarines over other capabilities.

In Derek Woolner and Peter Yule's recent book on the Collins Class project they noted the work of three Labor Ministers as being very important to the success of the project—Kim Beazley, John Button and Brian Howe.

Perhaps best known for his role was my good friend Kim Beazley who at the time was Australia's youngest Defence Minister.

As Yule and Woolner note in their book

> "Beazley was well aware of the strategic value of submarines holding the view that basically submarines are the poor man's weapon to cause maximum angst to a bigger enemy."

This was further evidenced when he instructed Paul Dibb, who was conducting a strategic review of Australian defence policy at the time that he had

> "Open slather on investigations and the power to negotiate a consensus on force structure with Defence and the service chiefs and the only thing that was off limits was the submarine project – Beazley would not allow Dibb to revise the project objective, numbers or capabilities."

They also noted his efforts to raise the profile of submarine arms within Defence and the community when they wrote

> "He felt it was one of the components of the defence force that was habitually undervalued, and he recalls that at one stage he threatened to promote no more naval officers to flag

rank unless the next recommendation was a submariner. It was not a coincidence that the first (and only) submariner to become chief of the navy, Ian MacDougall, was appointed by Kim Beazley."

It is now great for me, given our history in this area, to see Labor again involved in the development of our submarine capability.

The Collins project was not without trauma and delay along the way, but the Collins Class is now recognized as among the best conventional submarines in the world. They give Australia a formidable offensive and deterrent capability.

However, underwater technology and anti-submarine warfare have also moved on since the Collins Class was launched, and if we are to retain a technological edge, a new submarine platform will be required when the Collins submarines start to retire in about 2025.

Taking into consideration the time needed for capability definition and subsequent submarine design and construction processes, the project has to start now.

Replacement Submarine Project

In view of the importance and the potential technical complexity of the replacement submarine project, the Government has already announced the first major steps forward in this project.

Last month the Government announced funding of $4.67 million to conduct studies in preparation of a submission for consideration by Government in the second half of 2009. These studies will cover diverse areas to provide a basis for understanding the international submarine industry, including potential new military-off-the shelf designs, how an Australian-build program might be supported, management of intellectual property, and commercial sensitivities.

The first stage of this will be market testing of foreign technologies and IP availability, with the next stage being engagement with Australian based companies.

The project will be known as SEA 1000 and the nucleus of a project team is currently being established. The project team will initially consist of 17 people but will expand considerably as the

project grows. It will also be under the joint control of the Capability Development Group and the DMO. This will help ensure that we get both a capability and commercial view of the project right from the start.

Some funded studies are also proposed to gain an appreciation of how companies might approach specific design problems in order to encourage risk reduction.

To support early decisions on critical design aspects, some DSTO and company technology studies are also proposed. These will cover areas such as battery technology and conceptual designs for weapons and payload handling and storage.

To help in developing and evaluating these studies and their results, it is intended to engage an internationally recognized independent submarine design consultant who will advise the project office leading up to the concept design phase in 2010-11.

A funded analysis of rates of effort against the project schedule and available workforce is planned in the next few months. This will help with an assessment of the Commonwealth's workforce requirements and risks and identify risk mitigation strategies.

I have also been meeting with representatives of the United States Navy (USN) and the US defence industry about this project. Both the USN and US defence industry will play an enormously important role in the development of our next generation submarines. We will be working with our good friends closely on this project especially in the areas of combat systems technology—drawing on their extensive expertise. Their views and advice will be very important.

Submarine Construction in Australia

The Government is committed to supporting Australian industry involvement in this project. Submarines are not only of national security importance to Australia, but we think the ability to build them in Australia is also of national strategic importance. This is why the Government has already committed to build the new submarines in Adelaide.

You will recall that when the Collins Class decision was made, the Adelaide facility was a greenfields site which had to start from scratch. Fortunately for the new submarines we will be able to utilize two decades of knowledge and experience developed in

Australia. This will ensure that whoever builds the new submarines can tap in to an existing skills base.

The Government intends to retain the option of competitive bids for submarine construction, as historically, competition in general offers significant savings over sole source and hence better value for money.

To this end we are currently working with the South Australian Government to ensure that facilities currently under construction in Adelaide can be accessed in the future by the successful construction tenderer.

Workforce and Skills Shortages

This brings us to another significant challenge that will arise from the construction of the next generation submarines within Australia— that is the current workforce and skills shortages.

My colleague the Minister for Defence Science and Personnel discussed today the issue of skills shortages within the Navy. Tonight I will be focusing on the issues of skills within industry.

Currently the DMO manages about 230 major projects, each valued at over $20 million, and sustains about 100 fleets of equipment. It does this with about 7,000 staff, of whom approximately 3,200 or 46 per cent are professionals such as engineers, technical officers, project managers and accountants.

Out in Australian industry, over 21,000 people are directly employed in defence activities, with another 10,000 indirectly employed, mostly in small to medium sized enterprises. If you add these together, almost 39,000 people are currently employed in Australia on defence acquisition and sustainment activities.

On current projections (in advance of the White Paper and the new Defence Capability Plan), in the next ten or fifteen years, about 80 per cent of the ADF's equipment will need to be replaced or upgraded. This will mean that the DMO will spend about $100 billion on defence business, and it is expected that about 60 per cent of this will be spent in Australia.

Based on this in-country expenditure and current separation rates, over the next decade it is estimated that we will need a further 18,000 skilled personnel in the Australian defence industry due to increased demand and an aging workforce. If this problem is not addressed the ADF will face reduced capability.

In 2007-2008, it was estimated that defence industry needed about 1,680 new positions across acquisition and sustainment. However, only about 650 new positions were filled—a shortage of over 1,000.

One immediate consequence of this shortfall has been that industry has been unable to meet Defence's requirements, resulting in a significant underspend by the DMO.

If we project defence industry's need for new positions against current growth rates, the gap between workforce supply and demand only widens. Clearly, training and skills development will need to be boosted. This is not a problem that is specific to Defence, but applies across other sectors such mining and resources which are competing in the same workforce pool.

The Commonwealth, in concert with the States and educational institutions, has already increased funding and the availability of training positions. Just last week, the Government announced that starting in 2009, Defence will offer up to 1,500 Defence Technical Scholarships for students entering years 11 and 12 who want to pursue a technical trade career. These Scholarships, awarded on merit, will help generate skilled technical tradespeople by helping students stay at school longer to build a better foundation for their future trade career. Year 11 and Year 12 recipients will receive $2,000 and $3,000 respectively.

Within the Defence sector, the Joint Training Task Force that was convened by the DMO and included representatives of federal and state departments, the ADF, universities and colleges and industry, has made a number of recommendations.

As I have foreshadowed on previous occasions, I would expect that the DMO's Skilling Australia's Defence Industry (or SADI) program will need to be reformed to help overcome some of the skills shortages. Industry will also need to make greater investment in education and training if we are to maintain work in Australia.

Without doubt the workforce required for the future submarine will probably be the most advanced workforce the defence industry has ever required, if not also the largest. I'm hard pressed to think of any large project in the entire Australian economy that would require similar numbers of very highly skilled labor. It will pose a significant challenge to both the Government and the successful tenderer for SEA 1000. It would not be an exaggeration to compare

it to the construction of the Snowy Mountains scheme.

As the SEA 1000 project progresses, we can expect that studies will be undertaken to assess workforce and skills requirements. The specific steps that will need to be taken to develop the workforce capabilities and capacities required should then become clearer.

Of course, other current projects such as the Air Warfare Destroyers and the amphibious ships will greatly increase the demand for a skilled shipbuilding workforce in the meantime, and eventually provide an expanded skills base that can be applied to the replacement submarine project. The Government will have to assess the risk of any gap between the construction of the AWD and LHDs and the new submarine, and consider possible remedies.

It is clear that without a highly skilled, motivated, productive workforce complementing the world's best project management SEA 1000 will not be able to be delivered. Just as the future submarine project will be a great vehicle to modernize industry and further improve our manufacturing capabilities it will also help generate a workforce that will be a national asset. It will truly be a nation building program unrivaled in our history.

Conclusion

I would like to thank the members of the Submarine Institute of Australia for your contributions to the public debate on future submarines. The SIA has a corporate knowledge and expertise that just doesn't exist elsewhere.

The Institute has already made significant contributions to advancing knowledge about the art of submarine warfare. It has made submissions to various studies and reviews about future submarine capabilities and the role of industry, and not least during the recent Defence White Paper public consultation process.

I can assure you that your submission to the White Paper will be given careful consideration.

The Government welcomes the Institute's role of informing and maintaining public interest in this project. While we might not always agree on the way ahead, I look forward to continuing dialogue between Defence, Government and the Institute Thank you.■

THE BATTLE OF THE ATLANTIC 1939-1945

THE BATTLE OF THE ATLANTIC, 1939-1945
WHY THE U-BOAT CAMPAIGN FAILED, Pt. I of III

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An essay submitted in partial fulfillment of the requirements for the degree of Master of Arts in Military History Norwich University.

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On 3 September 1939, Britain and France declared war on Germany in response to the German army's invasion of Poland. Late that same day, U-30 was on patrol at periscope depth south of Rockall, 120 miles west of Scotland. As night approached, the U-boat's captain, *Kapitänleutnant* Fritz-Julius Lemp, was tracking a large ship that was blacked-out and was steering a zig-zag course at high speed, leading him to conclude that it was an armed merchant cruiser. Lemp fired two torpedoes, one of which hit, causing the vessel to stop and slowly begin to sink. He had torpedoed the 13,600 ton British liner ATHENIA carrying over 1100 passengers, of whom all were rescued save the 118 killed when the torpedo struck.[1] What came to be known as the Battle of the Atlantic had begun.

In view of the Imperial German Navy's extensive U-boat campaign in World War I, the German Navy in 1939 arguably possessed the most experienced submariners of any navy in the world. Their exploits in 1916-1917 had nearly brought Britain to its knees, yet their campaign ultimately had failed. The same fate awaited the U-boat force of World War II, despite the expertise gained in the previous war. This paper seeks to determine why the U-boats lost the Battle of the Atlantic.

Inspired by *The Influence of Sea Power Upon History*, Alfred Thayer Mahan's description of sea power's role in making Britain a world power, and strongly encouraged by his state secretary of the Imperial Naval Office, Admiral Alfred von Tirpitz, Kaiser Wilhelm II in 1898 had embarked on a naval building program designed to make Germany a leading naval power, second only to Britain. By 1914, the Kaiser had reached his objective, but the reaction of Britain to the High Sea Fleet now sitting in its Baltic and North Sea bases was to build even more ships and, much to the Kaiser's dismay, to join with former foes, France and Russia, in forming the Triple Entente. Wilhelm had naively expected his cousin, George V, to welcome the Imperial German Navy as a potential ally against France, but instead he saw Germany encircled by the Triple Entente. Britain had historically viewed any strong European navy as a rival of which to be disposed, and the German High Sea Fleet was no exception, a history lesson that Wilhelm had somehow failed to learn.[2]

When war erupted in 1914, Germany's High Sea Fleet was immediately blocked from access to the Atlantic by the forces of the British Grand Fleet, a situation that led in 1916 to the battle of Jutland, in which the High Sea Fleet managed a tactical victory, but was unable to break the strategic blockade imposed by the Royal Navy. This led to the decision to engage in unrestricted submarine warfare in an attempt to bring Britain to the negotiating table by cutting its import of needed war materials, especially oil, and foodstuffs, a gamble that was succeeding until Britain instituted the convoy system at the urging of Rear Admiral William Sims of the U.S. Navy. The gamble had brought America into the war, and indirectly thereby brought on the convoys that turned the tide against the U-boats.[3] The experience gained by both sides in the First World War would be influential in determining the course pursued by each in the Second World War.

The Treaty of Versailles that officially ended World War I in 1919, among other restrictions on the German armed forces, prohibited any submarines in the German navy. Nevertheless, Germany took steps to maintain the submarine design expertise developed during the war. Taking advantage of requests from other navies for advice and assistance in submarine construction, Germany established a design bureau in the Netherlands that

ostensibly belonged to a private German company but in reality was a part of the German naval command. By performing actual work for its foreign clients, the bureau was able to develop submarine designs intended for eventual use by the German Navy.[4]

However, designing a submarine is only the beginning of the building process, and Germany was prevented by the terms of Versailles from building submarines in German shipyards not only for itself but for export as well. Although Germany let secret contracts in Spain and Finland for submarines built to designs developed jointly with the contracting countries, the work force was necessarily that of the foreign yards.[5] Thus, the unique critical skills needed for U-boat construction in Germany naturally withered with the passage of the years. While a sufficient number of skilled workers were still available in 1935 for limited production of new submarines, an acceleration and/or expansion of construction ran the risk of deterioration in the quality of the work. In addition, the designers tended to follow World War I designs, resulting in boats with only limited improvements as compared with the United States Navy's fleet boats, particularly in habitability, sea-keeping and long endurance, and the capacity for addition of new equipment such as radar.[6]

Following the accession of Adolph Hitler and his National Socialist Workers Party to power in 1933, the Nazi government, in a series of bold actions, executed a de facto repudiation of the Versailles treaty. In 1935, an increasingly resurgent Germany confronted a still war-weary Britain with demands for an expanded navy, and in June, the Anglo-German Naval Agreement was signed by which the German Navy was permitted to rebuild, but was held to a limit of 35 percent of the tonnage of the Royal Navy except for U-boats, which had a limit of 45 percent of the British submarine tonnage. Under certain circumstances, the U-boat tonnage could equal that of the Royal Navy. The 45 percent limit amounted to 24,000 tons, so although the percentage was higher than the rest of the navy, the actual tonnage was the smallest allowed for any arm of the navy.[7]

Given Britain's experience with German submarines in World War I, the agreement to allow a rebuilding of the U-boat arm begs the question as to why. Part of the answer may be that the senior leadership of the Royal Navy was not inclined to see submarines as

more than supplementary craft to be used for reconnaissance and picket duties, and considered that future numbers of British submarines would be sufficiently low so as to make the number allowed to Germany minimal. In addition, the British were assured by the developers of ASDIC, the active sonar carried on surface ships, that its detection capability would defeat any U-boat threat. Such reasoning was in accord with the British government's wish to avoid confrontation with Germany, and the result was Britain's agreement to Hitler's demand to rebuild the U-boat force.[8]

In view of the restriction on total tonnage, the U-boat arm was faced with the choice of building either a relatively small number of larger, long endurance, ocean-going submarines or a larger number of smaller U-boats of less endurance, smaller torpedo load, and moderate range. Compounding the problem of restoring the U-boat force was the London Naval Agreement of 1936 that imposed on submarines the requirement to abide by prize rules when attacking merchant shipping.[9] This had the effect of inhibiting support for a U-boat program that necessarily competed with surface ship construction for funds and materials.

Captain Karl Dönitz, a veteran U-boat captain of World War I, was selected in 1935 to command the U-boat flotilla. He had witnessed the effectiveness of the convoy system in World War I, and credited it with defeating the U-boat campaign which had been conducted by boats acting independently in single boat attacks.[10] After periods of irresolution by the Kaiser and his chancellor regarding whether to permit unrestricted submarine warfare, the straits in which Germany found itself in the winter of 1916-1917 pressured the Kaiser into approving an all-out U-boat effort, starting in February. The tonnage sunk per month increased dramatically, and by the month of April reached 860,000 tons, an amount that, if sustained for four more months, would have forced Britain to sue for peace. Instead, the convoy system was instituted in May 1917 and the losses quickly declined, with a concurrent increase in the loss of U-boats.[11]

As a result of his experience in World War I, Dönitz was convinced that the answer to the convoy system was the concentration of U-boats in coordinated massed attacks on a convoy. The intent was to overwhelm the escort defense, and the confusion thus caused among the escorts would create opportunities for attacking

the merchant ships with a reduced probability of successful escort attacks on the U-boats. Accordingly, he pressed for numbers as opposed to size, whereas the Naval High Command (OKM), viewing group tactics as requiring an excessive breaking of radio silence, opted for a mix of medium and larger U-boats that would operate in the single boat tradition of World War I. The final decision rested with the Commander-in-Chief, Grand Admiral Erich Raeder.[12]

Chancellor Hitler had repeatedly assured Raeder that Britain would not go to war over land considerations in Europe, an assertion apparently confirmed by the repeated British acquiescence to Hitler's moves in re-occupying the Rhineland, in rebuilding the armed forces, and in occupying Czechoslovakia and Austria. In 1935, with the signing of the Anglo-German Naval Agreement, Hitler had informed Raeder that the build-up of the German navy could start, and Raeder accordingly ordered the commencement of his plan for a balanced navy, with completion of the plan scheduled for 1948, a date later moved up to 1944, requiring an acceleration in the building rate.[13] It was Hitler's policy in 1935 to avoid war with Britain, and Raeder's plan initially at least claimed to adhere to the restrictions of the 1935 Naval Agreement, including the limit of 24,000 tons for submarine construction. The first thirty-six U-boats ordered by the OKM totaled 12,500 tons, and included prototypes secretly built and tested before 1935 in Finland and Spain. With that head start, the building yards completed thirty-five of the thirty-six in the next eighteen months, delivering twenty-four Type II (250 tons), two large Type I (750 tons), and nine Type VII (500 tons) by the end of 1936. The tenth Type VII was completed in 1937.[14]

The dispute between Dönitz and OKM centered on the remaining 11,500 tons allowed for U-boat construction. Dönitz wanted to use the entire amount to build twenty-three Type VII medium-range boats, while OKM pushed for twenty-three mixed types, consisting of eight small Type IIs, eight large, long-range improved Type Is, and seven improved Type VIIs. After months of delay, Raeder approved the OKM plan. The delay and the subsequent decision to build the larger Type Is set back the overall delivery of U-boats, with only the one Type VII completed in 1937. 1938 saw nine boats reach the fleet, while twelve were received by 1 September 1939.[15]

Dönitz advocated a strategy of attacking Britain's shipping with the goal of simply sinking more ships than could be replaced by Britain's shipyards, thus eventually so weakening the British war effort that Britain would have to sue for peace. He had determined that the U-boat force should have at least 300 boats in order to commence an effective campaign employing wolf-pack tactics against British convoys. However, when war was declared by Britain and France on 3 September 1939, he found his force to be only fifty-seven U-boats, thirty of which were the small coastal boats used for training in the Baltic, leaving a force of twenty-seven larger submarines, of which twenty-two were ready for duty in the Atlantic. Seven more boats were delivered to the navy by the end of 1939, but to Dönitz, the German Navy in 1939 "was like a torso without arms."[16]

Dönitz was not easily discouraged in his dispute with OKM, and continued his efforts to convince Hitler and Raeder of the need to make submarine construction the navy's top priority. The Type IX had replaced the Type I as the long-range boat, and Dönitz wanted to concentrate construction on Type VIIs and Type IXs in the ratio of three VIIs to one IX. At a meeting in late August 1939, Dönitz and the German fleet commander Admiral Hermann Boehm persuaded Raeder that the impending invasion of Poland would bring on war with Britain and France, Hitler's assurances notwithstanding, and urged him to scrap plans for large surface ships and instead build with all speed possible 300 U-boats, to include 200 improved Type VIIs. Raeder agreed, and several days later, OKM scrapped the long-range balanced fleet plan and instituted Dönitz's plan.[17] Germany built 1,152 U-boats by war's end, of which 704 were the several variations of the Type VII, while 236 were variations of the Type IX long-range boat.[18] These two types were thus the principal German players in the Battle of the Atlantic, and the success or failure of the Atlantic U-boat campaign rested in large measure on their capabilities.

The original Type VII boat, U27, was based on the UBIII class of World War I, modified by means of the experience gained in the work done for foreign navies in the inter-war period, and was laid down in November of 1935. The Type VII variations evolved from the 500 ton short-range boat of 1935 vintage through successive stages of improvements that increased the operating range by

addition of saddle tanks for extra fuel, and shortened diving time from 50 seconds to 30 seconds. Later in the war, the 88mm deck gun was removed, and anti-aircraft guns were added on an enlarged deck aft of the bridge. With several exceptions, Type VII variations had four bow torpedo tubes and one stern tube. They were manned by four officers and fifty-six enlisted who lived in a steel tube ten feet in diameter and 148 feet long from the forward torpedo tubes to the stern torpedo tube, crowded with machinery and other equipment. The designer did little to improve the habitability over that of the UBIII boats. There was barely enough water produced by the evaporator to provide for cooking and drinking, certainly none for showers or laundry. The ventilation when submerged was simply a matter of moving stale and odorous air from one compartment to another. Carbon monoxide accumulated in the atmosphere while submerged, and could reach dangerous levels if a boat was forced to remain under water for a period longer than 24 hours while under attack. Machinery was cooled by sea water, and any leakage onto the batteries as a result of being depth-charged caused the release of deadly chlorine fumes, forcing the boat to surface. Of the two *heads* on a boat, only one normally was operating, the other being used as a storage locker for canned foods; as a result, there usually was a line of men waiting for its use. If the flushing valves were operated improperly, the pressure expelled the flushing sea water into the boat instead of out, with resultant ill effect. In short, the habitability of the Type VII variations was far below that of U. S. submarines. Such living conditions over time have an adverse effect on performance that is insidious in that one is not aware of it, just as an alcohol-impaired driver is unaware of his erratic performance.[19]

The Type VII variations displaced roughly 770 tons surfaced, 870 tons submerged, and were capable of 17 knots flank speed on the surface and a maximum speed of 8 knots for one hour while submerged. The Type VIIC and Type VIIC/41, which together comprised 660 of the class, had a surface range of 8500 nautical miles (nm) at 10 knots, while the VIID with an additional 50 tons of fuel had a range of 11,200 nm at 10 knots; designed for dual minelaying and torpedo attack, only six VIIDs were built.[20]

In the last two years of the war, the U-boats were forced to travel submerged due to Allied aircraft coverage of the North

Atlantic, surfacing only as needed to recharge the batteries, and at the slow submerged speed required for sustained underwater transit, usually 2-3 knots, by the time that a boat reached its station, it could only remain for a few days before beginning the slow transit home. Installation of the Dutch-invented snorkel obviated the need to surface for charging the batteries, but could cause massive flooding if not secured properly when not snorkeling. The head valve in the air intake mast was designed to shut whenever sea water washed over the top of the mast but when it did so, the air inside the boat was sucked up by the diesels that continued to operate, causing a partial vacuum in the boat. When the top of the mast was clear of water, the head valve opened, causing a rapid increase in air pressure. The rapid fluctuations in air pressure in the boat was a source of considerable discomfort and even pain for the crew, and snorkeling was not always welcomed by the sailors, especially in the rough waters of the North Atlantic.[21]

The Type IX variants were designed to provide boats capable of transits to and from distant locations, with "good endurance and a substantial load of weapons, fuel, and supplies." The most numerous of the variants were the Type IXC/40, of which 95 were commissioned. With a length of 252 feet and a beam of 22 feet, the IXC/40 displaced 1,120 tons surfaced and 1,232 tons submerged. Cruising speed was 12 knots with a range of 11,000 nm on 214 tons of fuel. Top speed surfaced was 18 knots, while the submerged one-hour rate was 7.3 knots. Armament consisted of four bow torpedo tubes and two stern tubes, 22 torpedoes, a 105mm deck gun, and a 37mm and a 20mm AA battery. Unlike the single hull Type VII, the Type IX was fully double-hulled, giving added resistance to damage from depth charges. However, its diving time at 55 seconds was almost double that of the Type VII, a factor that could be critical when under air attack.[22] Habitability was better than the Type VII, being more spacious and having crew quarters that did not require sleeping among torpedoes, but the standards were still well below those of the U.S. submarine service.

A comparison of the Type VII with the Type IX raises the question as to why Dönitz preferred the less capable Type VII. Dönitz saw in the Type VII a submarine that could be produced more rapidly than a larger boat while still retaining sufficient weapons capacity to be effective in wolf pack operations, the latter

being the tactic that he was convinced was the means by which the German navy could defeat the convoy system. According to Dönitz, the Type VII was harder to detect than a larger boat, was easier to handle while submerged, and with the addition of saddle tanks, its range was adequately increased for North Atlantic operations. He was intensely determined to get U-boats to sea in the numbers he had calculated as being necessary to wage a successful campaign against Britain's vital sea lines of communication, a number he estimated to be 300 U-boats, on the basis of 100 on patrol, 100 in transit, and 100 in port for refit and repairs, and recreation and rest for the crews. He considered the Type VII the best compromise between the need for numbers quickly delivered and the level of capability required for effective coordinated attacks on convoys. "For its size, it had the greatest possible fighting power. Its diving time was 20 [sic] seconds; it behaved very well under water; and it was relatively fast—16 knots—and handy on the surface."[23]

At the same time, Dönitz recognized that there likely would be a need for a larger, long-range boat roughly half again the size of the Type VII. Thus was born the Type IX, a boat that, in the eyes of Dönitz, was slow in diving, not as easy to handle submerged, and was easier to detect because of its size. Its best features were its endurance and range of operations. Dönitz's solution was to recommend a mixed force of three Type VIIs to one Type IX, a ratio that was roughly maintained throughout the war, and a decision that was one of several critical decisions affecting the outcome of the Battle of the Atlantic.[24]

At Dönitz's urging, the submarine construction program received orders to be accelerated and expanded in October 1939, but it was not until a year later that the orders took effect, due to the higher priority in allocation of materials to the army and the Luftwaffe. In 1935, the OKM had warned that German shipyards were neither capable of accelerating construction nor of expanding, due to a shortage of workers. By 1940, the situation had been changed by the use of imported labor from occupied territories, but quality suffered due to insufficient numbers of skilled workers resulting from no submarines having been built in Germany for the past twenty years. While the OKM had been referring to surface ship construction, the same risks applied even more to submarines. As evidence of inferior design and construction, in addition to the

poor habitability previously mentioned, there were far more serious errors revealed when the boats were subjected to the stresses of depth charges. For example, the two diesel engine exhaust valves in the Type VII boats had been installed with the valves closing against sea pressure instead of with sea pressure. As a result, when the boats were under depth charge attack, the force of the explosions, which increased with the increased pressure of the water as depth increased, hit the seat of each valve like a giant hammer, causing the valves to unseat, allowing sea water to flood the engine compartment. The after battery room was immediately forward of the engine room and when sea water entered it, the reaction with the battery acid caused the emission of toxic chlorine fumes. It was not until a damaged U-boat managed to return to Germany and reported the casualty that it was recognized as a hazard and was corrected.

The principal weapon of the submarine is the torpedo. The German torpedo experts had anticipated the eventual restoration of the U-boat force, and had spent the period between the end of World War I and 1935 in developing a magnetically activated firing mechanism that detonated when a torpedo passed through the magnetic field of a steel vessel. The running depth of the torpedo was set to allow the torpedo to pass under the target vessel where the torpedo's explosion broke the keel of the ship, sinking it with one shot. The torpedo technicians had also designed a new contact detonator that was described as being more reliable than the detonators used in World War I. However, early in the war, it became apparent that the magnetic *pistol* as the Germans called it was not operating as intended. "Very frequently the pistol detonated too early while the torpedo was on the way to the target; or it detonated at the end of its run; or it failed to detonate at all, even when passing beneath its target." Reports also were received of contact detonators failing to detonate when hitting a target.[25] The ensuing investigation additionally determined that torpedoes tended to run deeper than the set depth. The most egregious example of torpedo failures occurred during the attempt of the U-boats to intercept the British landings at Narvik, Norway in March 1940. A total of thirty-six attacks by U-boats resulted in zero sinkings. While it was concluded that the fjords in which some attacks were made caused a distortion in magnetic signatures of ships that would

account for premature detonations, there remained the other failures outside the fjords, as well as the failures of the contact pistols. A thorough analysis of all torpedo attacks between January and June 1942, during which 816 torpedo hits were recorded, showed by extrapolation that the failure of the magnetic firing pistol had prevented the sinking of a very large number of ships in the early war years when conditions were most favorable for U-boat attacks. "As a result of torpedo failures the U-boat arm was robbed of great successes both in its operations against shipping and in its engagements with warships. Prematures undoubtedly led to the detection and destruction of attacking submarines."[26] The premature detonation of a torpedo shortly after being fired both alerted the enemy escorts and revealed the position of the firing boat, and, of course, the intended target was not hit.

Few things will affect morale more than a loss of confidence in weapons. Gunther Prien, the famous U-boat captain who sank a British battleship at anchor in Scapa Flow, stated it succinctly, "I could hardly be expected to fight with a dummy rifle." Recognizing the danger, Dönitz acted quickly and by dint of his personality and personal contact with the crews, he restored their confidence and fighting spirit. Interim adjustments in firing procedures were made, and by 1942, the problems themselves had been corrected.[27] However, the real extent of the impact on the U-boat campaign will never be known; clearly, it was not insignificant.

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2. Robert K. Massie, Castles of Steel: *Britain, Germany, and the Winning of the Great War at Sea* (New York: Random House, 2003), 8-10.
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4. Ibid., 16-17.
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21. Ibid.
22. Miller, *Submarines of the World*, 150-154.
23. Dönitz, *Memoirs*, 28-29. Other sources agree that the diving time was 30 seconds, not 20.
24. Ibid., 27-28, 43.
25. Ibid., 73.
26. Ibid., 94-99.
27. Ibid., 89; 96.

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BOOK REVIEWS

STEALTH BOAT: FIGHTING THE COLD WAR IN A FAST-ATTACK SUBMARINE BY GANNON McHALE

Naval Institute Press, 208 pages, $22.46
Reviewed by John Castellucci

A freelance writer, John Castellucci spent 30 years working as a newspaper reporter, most recently for the Providence Journal, where he covered politics, courts, municipal government, and crime.

The veil of secrecy that shrouded the Navy's underwater espionage program has lifted. By now, the program's accomplishments are widely known: the top secret operations that disclosed the sound signatures and combat capabilities of Soviet missile-carrying submarines. The seafaring arms race, set off when the Russians tried to match the prowess of U.S. vessels, hastened the end of the Cold War with the Soviet Union's collapse.

> "The Soviets made their Submarine Force the centerpiece of their post-World War II naval expansion, but we hounded them unmercifully," Admiral Bruce DeMars said in 1994, when the USS STURGEON (SSN-637), the fast attack sub on which he was XO, was decommissioned.
>
> "Reacting to the pressure of our attack submarines, the Soviets had to commit vast resources in the pursuit of undersea superiority—or at least parity. Finally their system went broke financially and politically," DeMars said.

Until now, the story of the Navy's underwater espionage program has been told almost exclusively from the viewpoint of the officers who commanded the fast attack-subs that played tag with their Russian counterparts: People like Commander Kinnaird R. McKee, captain of USS DACE (SSN-607), who got the first close-

up photographs and recorded the first sound signatures of the Soviet Union's second-generation nuclear powered submarines. And Commander Chester M. "Whitey" Mack, captain of the USS LAPON (SSN-661), who managed to trail a super-quiet Soviet Yankee-class sub back and forth across the Atlantic for more than 40 days.

That one-sidedness ended with the publication of Stealth Boat, Gannon McHale's evocative book about his late-1960s stint aboard STURGEON as an enlisted crew member. "I worked very hard to capture... the feeling of what it was like, at the age of 19, to be assigned to the newest, fast-attack submarine in the United States Navy—the most advanced piece of submarine technology in the world at the time," McHale said recently on book tour in Providence, R.I.

"The STURGEON was a twin turbine, single screw, 125,000-horsepower, ultra quiet, highly responsive high performance underwater hot rod," McHale said. It was, in other words, as big a thrill ride for a young sailor as the F-14 Tomcats were for the Navy fighter pilots in Top Gun.

McHale, 61, is a New York-based character actor who grew up in Pawtucket, R.I. He wrote Stealth Boat in 2006, after pitching the book to DeMars, who lined up the Naval Institute Press as publisher, and reaching out to crew members he hadn't seen since the decommissioning ceremony at which DeMars spoke.

"I got in touch with a bunch of my shipmates. We met down at the sub base in Groton. I put a tape recorder in the middle of the table. We sat around and had a bull session and said, let's talk about the boat," McHale said.

The result is a book that, for all its detail about the leadership styles of the STURGEON's first two captains, Commander Curtis B. Shellman and Commander William L. Bohannan, doesn't give short shrift to the high jinks of the crew.

Shellman, a dour, uncommunicative man who oversaw construction of the boat, drove it like it "was your father's Oldsmobile" McHale writes, exhibiting a caution that frustrated crew members and was "completely at odds with the vessel he had just built." Bohannan, more at ease with the boat and attuned to its capabilities, was a typical fast attack sub commander. At one point, hard on the heels of a Soviet November class submarine, he barged in on an

anti-submarine warfare drill the Russians were conducting, inadvertently making the STURGEON the quarry of the hunt.

The first draft of Stealth Boat was a bit much for the strait-laced Naval Institute Press, which had McHale tone down some of the salty language. He uses circumlocution to describe the inventive speaking style of Donald Deeter, a former 2nd class torpedoman busted down to seaman, who emerges as one of the more interesting characters in the book.

"Perhaps the most gifted man at cursing I have ever met, 'Deets' was not simply colorful. He was absolutely creative about it, and he possessed a wonderful knack of interspersing a particular all-purpose expletive into the middle of another word, as though it actually belonged there," McHale writes.

Deeter has his big moment when the crew piles into a redneck bar in Norfolk, Va., and the proprietor refuses to serve Johnnie McLean, a black crew member.

"Hey, you ... Can you read?" Deeter demanded, pointing to the USS STURGEON patch on the top right shoulder of his uniform.
"Yeah ... so what?" the saloon keeper answered.

"Count how many of 'em are in your bar, pal."

Needless to say, McLean got his beer.

McHale enlisted after dropping out of Providence College, where he was in the Army ROTC. He joined the Navy partly to avoid being sent to Vietnam, where, he said, "second lieutenants had about a 15-minute life expectancy," and partly to escape a Rhode Island rite of passage: Graduation from college, followed by marriage, children and a humdrum career teaching high school social studies.

In the submarine service, McHale found not only adventure, but also the camaraderie of a close-nit crew.

"I've never found any environment like that since then. Never in the theater, ever. I can say that categorically," McHale said. "[T]hat environment, that team, especially the enlisted guys—where they were from, why they enlisted, why they volunteered for submarines, the day-to-day work environment on the boat, the atmosphere, the fun we had, all of which none of us have ever forgotten—that's what I tried to reconstruct in this book. "■

ROYAL NAVY SUBMARINES, 1901 TO THE PRESENT DAY

by Maurice Cocker,
Pen and Sword Maritime Books, 2008

Reviewed by the Submarine Research Center

Americans interested in submarine history should consider adding to their library a reference book on British submarine development that is comprehensive and detailed. First written and illustrated in 1982, *Royal Navy Submarines, 1901 to the Present Day* has been brought up to date to include the newest Astute class British nuclear submarines. Detailed information and exceptionally well-drawn cut-a-way diagrams give a complete understanding of each British submarine design through 2008.

American submarine development followed transitions in propulsion, tank and compartment arrangement, weapons and fire control. It could be said that improvements in American submarine design was reasonably linear, at least when compared to that of British submarine design. For example, while Americans moved away from gasoline engines to Diesel engine propulsion, the British built submarines driven by steam. Despite the difficulties of sealing the hull and increasing the diving time, the British pursued this improbable design on the theory that no other type of propulsion could render a submarine capable of keeping up with its fast-moving surface fleet. As in America, submarine design was based on the premise that submarines were only useful as reconnaissance for the surface fleet. In order to fulfill that mission surface speeds took on an importance that subverted the more lethal quality of remaining undetected and striking with surprise.

In other respects the British Navy pursued a submarine building program that has been divergent from that of its American counterpart. This included a much more vigorous program of miniature submarine design primarily focused at the destruction of Germany's Second World War battleships while lying at anchor.

The great successes of the American Fleet Type submarine during the Second World War was matched by those of the T-Class British submarine. These boats were similar in size to Fleet Type boats but had several innovations not found in their American

counterparts. These included binocular periscopes and collision bulkheads in the forward torpedo rooms. The T-Class boats had an impressive score against both Japanese and German ships.

Just as no serious submarine library is without Norman Fiedman's two-volume work, *U.S. Submarine Through 1945 and U.S. Submarines Since 1945* so should such libraries not be without this fully illustrated reference volume on British submarine design. The 133 page, hard-bound book can be purchased by ordering the book via the Pen and Sword website www.pen-and-sword.co.uk or via Casemate email casemate@casematpublishing.com. The book can also be purchased through Amazon.com or by any bookstore.■

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 Perfect. 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, P.O. Box 1146, Annandale, VA 22003.

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