THE SUBMARINE REVIEW
OCTOBER 1995

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A Quarterly Publication of the Naval Submarine League

EDITOR'S COMMENTS

This issue of **THE SUBMARINE REVIEW** features strongly endorsing statements of policy about our newest submarines by the nation's and the Navy's highest leaders. There are also four clear and concise submarine status reports by those on active duty who are responsible for carrying out those policies and executing the Navy's plan for maintaining the world's most effective Submarine Force.

The first statement of intent for submarines is from the President of the United States on the occasion of christening SEAWOLF (SSN 21). (EB doesn't slide boats down the ways anymore, they are floated in a drydock at the new building facility; therefore is it not appropriate to use the word *launching*.) The second is from the Secretary of the Navy, himself a qualified submariner, on the same occasion. Those present for the SEAWOLF christening tell us that SECNAV's delivery of the words reprinted here lifted them to a clarion call for national action on the Navy's submarine plan.

In addition to the President's and the Secretary's statements, the addresses made to the League's Annual Symposium by Admiral Chiles of the U.S. Strategic Command, Vice Admiral Bowman of BuPers, Rear Admiral Jones of the CNO's Submarine Warfare Division, and Rear Admiral Frick of Naval Sea Systems Command all sounded the same note of submariners working hard and pulling together for a common purpose. Chief of Naval Personnel Bowman's words are particularly inspiring for his reference to the American submariners of World War II as laying the foundation for the integrated professionalism which is the hallmark of today's Submarine Force.

The rest of the articles and specialty pieces present a wide mix of material of interest. From the Soviet submarines of World War II to the Russian Navy's largest ballistic missile submarine, and from the effort of a mid-western submarine designer in the late 1800s through the campaigns in the Southwest Pacific to the present submarine expansion in East Asia, the world of submarining offers broad diversity. An outstanding example of that diversity is given in an excerpted bibliography from the Italian Navy's Submarine School in Taranto. Only the Italian language section of their contribution was used, but lists of books and articles in German, French, English and other languages were also

submitted. It's a big world out there.

As this issue goes to the printer in mid-September the Congress has not completed its deliberations on the Navy's dual-track submarine plan for the third Seawolf and advanced procurement for the New Attack Submarine. Most observers are cautiously optimistic; however, the debate has shown that not all the general public, and certainly not all policy makers, are as convinced about the importance of submarines, and the criticality of near-term action, as are members of the League. To support the League's aim to educate the public, **THE SUBMARINE REVIEW** will continue to seek out and publish articles detailing the high leverage of both past achievements of submarines and the contributions which can be expected in the ever more complicated future.

Having reiterated our objective and its purpose, it is appropriate to review for the membership how editorial policy for **THE SUBMARINE REVIEW** is established and carried out. It is the Board of Directors which sets broad guidelines and it is the Editorial Review Committee which goes over all the inputs to the magazine to insure the League's policies are met. The members of both those bodies are listed on the magazine's masthead page. One of the prime, and longstanding, guidelines set by the Board of Directors is that the editorial policy of the **REVIEW** reflects the independence of the League. For effective education of the public and honest communication within our membership, it is vital that we maintain our credibility as knowledgeable submariners, as aware of current issues as we are of past precedents.

Jim Hay

FROM THE PRESIDENT

It is an honor to have relieved Bud Kauderer as President of the Naval Submarine League (NSL). Having previously relieved him as COMSUBLANT in 1986 and having worked closely with Bud over the years since then, I have always been impressed by the superb structure and outstanding results he has fashioned and passed on.

It is interesting to note that this last legislative year has been hyperactive on the subject of submarines. I say that because in earlier *decades* the Navy was relatively routinely authorized three to five submarines (SSNs and SSBNs) per year; this year the Navy

requested one SSN 23 and R&D and Advance Procurement monies for a new attack submarine (NSSN). The Navy, with strong support of the Secretary and the CNO, had to literally declare submarines as their number one priority (along with some herculean efforts by OLA, the Budget Office, NAVSEA, the Intelligence Community and N87) to ensure success. As of mid-September, the CNO expressed optimism that the Navy will receive its request but the actual *wording* of both the Bills (Authorization and Appropriations) and the separate House and Senate reports is still obscure. The Devil is in the details.

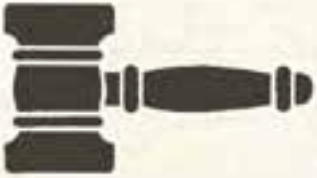
On the other hand, JANES Defense Weekly of 16 September stated,

> "Russia is in the early stages of designing an improved version of the Severodvinsk submarine that may be quieter than any vessel in U.S. Navy services ...An initial version...is under construction and is...due to be operational...(as early as)...1998."

Obviously, it is a goal of the NSL to keep our members knowledgeable of the heritage, the present status and the need for a strong viable Submarine Force. **THE SUBMARINE REVIEW** has been, and will continue to be our *first class* and primary method of achieving this goal. Jim Hay, our editor, has done a superb job of encouraging, selecting and editing outstanding contributions to the **REVIEW**.

I hope each of you will read, learn, question, and contribute to this publication, and ultimately help NSL to ensure we maintain the vital and viable Submarine Force and its professional people, necessary to help preserve peace and freedom in our country and throughout the world.

Dan Cooper



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PRESIDENT'S LETTER TO SEAWOLF CHRISTENING

The White House
Washington

June 22, 1995

Greetings to all those gathered for the christening of SEAWOLF.

SEAWOLF will strengthen and sustain the invaluable contributions the Navy makes to America's leadership in global affairs. Ready for any contingency, her combat power, mobility, and flexibility will help to promote the cause of liberty and protect our national security. This fine submarine will stand as a reminder of our steadfast commitment to maintaining a democratic world for the generations to come.

As we celebrate the christening of SEAWOLF, I want to reemphasize my continuing support for the completion of the third and final Seawolf class submarine SSN 23. The Armed Forces of the United States and our civilian defense industries share an effective partnership; proceeding with the construction of SSN 23 is the most cost effective method of retaining the vitality of these industries while bridging the gap to the future New Attack Submarine.

On behalf of all Americans, I want to thank those who design and build the Seawolf submarines, as well as those who will serve in them. Best wishes for a wonderful ceremony.

Bill Clinton

[Editor's Note: This letter was read to the attendees at SEAWOLF's christening by Secretary of the Navy John H. Dalton. See following remarks.]

FOR OUR CHILDREN'S FREEDOM

Remarks delivered by
The Honorable John H. Dalton
Secretary of the Navy
SEAWOLF Christening
Groton, Connecticut
June 24, 1995

[Editor's Note: Mrs. John Dalton is sponsor of SEAWOLF.]

One of my great privileges as Secretary of the Navy is to name ships and appoint sponsors of those ships. It is a responsibility I take very seriously. I chose a very special lady to be the sponsor of this most special ship.

Let me give an example of what kind of sponsor Margaret will be. She knew that today would be filled with such activity that she wouldn't be able to meet every member of the crew, and she wanted to know every member of the SEAWOLF crew.

So last week she got up in the middle of the night and caught the 4:30 AM train to Groton and spent the day and evening with the sailors of this ship. She will be your sponsor and champion for the life of this ship over the next 35 years.

It is said that a ship is imbued with the spirit of its sponsor and that indeed is a blessing for SEAWOLF. Through the course of its life this ship will have many fine commanding officers, and many outstanding sailors in its crew. But throughout the life of this ship there will be but one sponsor. SEAWOLF and the United States Navy are very fortunate to have Margaret.

This is indeed a historic day, and I want to thank everyone who is here; I am told there are some 12,000-13,000 strong in number. And, I would like to make each and everyone of you an honorary SEAWOLF sailor.

Obviously, Margaret and I are very proud to be here. But not simply because of the honor of participating in the christening of this submarine—the finest submarine in the world. Not simply to applaud the men and women of the shipbuilding trades here at Electric Boat and the many contractors who contribute to the building of this ship. Not just to honor the brave officers and sailors who will serve through the life of this vessel. But also to take an opportunity to recognize why we are building this submarine and why we need to build more.

A number of years ago, a public official, entrusted with the best interests of the citizens of his nation, reflected his personal judgment and the common wisdom with the following words:

> "There is no excuse for [building] submarines...So far as naval armament is concerned, it will not be long until [we] recognize that the torpedo is obsolescent; the submarine out of date; and the seaplane of so limited utility that expenditure [should] not be enlarged by any useless absurdities as aircraft carriers..."

Historians record that quite a few people applauded that particular speech. In fact, it was published in the most prestigious journal of the day. And why shouldn't those words have been applauded and accepted? Most nations of the world were at peace. An *evil empire* had been previously defeated. There was no apparent threat. Government was moving to reduce its challenges. Freedom was a given.

Ten years later, a crisis threatened that nation and the entire world. A crisis of such magnitude that many apparently wise men chose to sacrifice their very principles to avoid war—a war they were unprepared to fight.

Well, war came anyway—perhaps even sooner because of their lack of readiness—their lack of such *absurdities* as enough capable submarines or aircraft carriers. The war broke with a fury that destroyed their budget plans, their economic strength, their position of world leadership, and the very lives of a great many of the citizens of that democratic nation whose freedom was ultimately saved through the intervention of its Allies.

When that war ended, 50 years ago this year, the men and women of that nation, and many nations, would somberly ask themselves: "Why were we so unprepared?"

I am talking, of course, about World War Two—the war our parents or grandparents had to fight. The public official who made those unfortunate remarks belonged to one of our Allies. But there were many in the United States who had echoed the same sentiments for the same reasons. The irony is that the submarine and the aircraft carrier, absurd and expensive in the perspective of their critics, were the two weapons that proved most effective in winning the naval war.

Today, we face a situation not too much unlike the past. A

few years ago we won a war, a Cold War to be sure, but one that nevertheless required a great deal of military expenditure. We are now in the process of reducing our budget deficit and tackling many challenges, economic and social, that are very worthy of our attention. There is no longer a threat of global war. Many nations, though not all, are at peace. Freedom seems secure. And like their predecessors, some people think they can predict the future.

I don't claim to predict the future. And I am not, by training, a professional historian. But I do know what history teaches. I do know that freedom is not free—it is purchased by heroism and sacrifice in war, and by good judgement and preparedness in peace. In a high tech world, the world of today, it is purchased by remaining first rate in technology and innovation.

Having served as a naval officer and a submariner, I know what it is like to go down to the sea, to face potential enemies, in the most capable ship, and what it is like to go down to that sea in a ship that would be considered second rate.

As Secretary of the Navy, I am committed to ensuring that the tools we give our sailors and Marines—that their lives depend on—remain first rate.

As a businessman, I know false economy when I see it.

And as a citizen, with two fine sons, maybe to be blessed someday with grandchildren, I am not willing to gamble their future, their freedom on the chance that there will be no war, or that, if it comes, we will be suddenly able to build tomorrow what some propose to throw away today.

How do you preserve freedom? Do you preserve it by letting an entire industry go out of business in the name of false economy? Do you preserve it by allowing partisan politics to blind your judgement? Do you do it by giving a pink slip to men and women who have labored for many years to produce the finest tools for our defense? Do you do it by creating monopolies in the name of competition? Do you do it by declaring new technology unnecessary, and the status quo *good enough*?

You know that's not how you preserve freedom. We all know that. So why are some ready to sacrifice an entire defense industry and are willing to throw away hundreds of millions of dollars to stop building capable submarines? How much would we pay to start building them again when the next crisis comes?

The SEAWOLF is the finest submarine in the world. It will

regain the American lead in quietness and stealth. The second Seawolf will be better still. And the third Seawolf which we need will be the bridge that preserves this industry to build a more affordable, littoral warfare-oriented New Attack Submarine.

You can't get across a chasm without a bridge. There is a chasm in our defense industrial strength. If Congress does not authorize and fund the third Seawolf, the depth of this chasm will not simply be measured in lost jobs, or dollars wasted in higher overhead and contracting fees, but in the potential breakup of a defense industry that has always served our best interest in preserving the peace. I shudder at the thought that someday historians will say: the United States was once the best builder of submarines.

I do not predict that a global crisis is coming. I do not claim that we are in danger today. I hate war. Every night before I sleep, I pray that war never again occurs. I pray that throughout their lifetimes, my sons will be blessed with the gift of peace. But I know that, to paraphrase President John F. Kennedy, God's work on earth must truly be our own. We are the ones who are responsible for peace. We are the ones who are responsible for freedom. The steps that we take today will be the ones that may determine the freedom of our children.

The builders of this submarine, this mighty SEAWOLF, are a national treasure in knowledge and skills. The nuclear submarine building industry represents an investment we have spent over 40 years to develop. We are gambling with a national treasure if we do not take steps to preserve it. That's why I want to take this opportunity to ask each one of you in the audience, and all Americans, to urge Congress to fund the third and final Seawolf as a bridge to the submarine capabilities we will need in the future.

Just before I left Washington to come to this ceremony, I received a letter that I would like to read to you. The letter is dated 22 June. *[Editor's Note: Secretary Dalton then read the President's letter which appears as the leading feature in this issue of THE SUBMARINE REVIEW.]*

This is a wonderful occasion—this christening of a Seawolf class submarine. This is a great day for Margaret and me, for the United States Navy, for all America. But as President Clinton says, we need to do it twice more, not once more, if we are to guarantee that, as concerns the deterrence of global war, as

concerns war undersea or elsewhere, there will always be great days of peace, and freedom from fear, for our children.

No one can predict the future. But we can prepare. To stay prepared, America requires a healthy nuclear submarine building industry. Our Commander-in-Chief knows that. And Secretary of Defense Bill Perry, the Chairman of the Joint Chiefs, the CNO, these distinguished members of Congress and I are convinced of that. We are convinced that we need to build a third Seawolf to preserve this industry's health. And to preserve this vital resource—to let everyone know the real risks we take by gambling it away for false economy. To reply to those who say a third Seawolf is not necessary, to those who oppose our submarine program, my response is the words of our founding father, John Paul Jones, "We have not yet begun to fight."

Thank you very much. God bless you. ■

ANNUAL TIDEWATER OPEN MODEL CONTEST

The Fourth Annual Tidewater Open Model Contest will be held at the Little Creek Road Bingo Parlor, 1760 East Little Creek Road, Norfolk, Virginia, on Saturday, November 18, 1995. The one day event features 50 categories. Special prizes will be awarded to models representing the contest's theme, "Vietnam: A Country Divided". For a contest information package contact:

Brian Starks
601 Bond Avenue
Chesapeake, VA 23323
(804) 487-3951 after 5PM

U.S. STRATEGIC COMMAND: CHANGES, HOPES, CHALLENGES

Remarks by ADM H.G. Chiles, Jr., USN
Commander in Chief
U.S. Strategic Command
NSL Annual Symposium
June 7, 1995

In looking around this room and seeing so many of you who have done so much over the years for our country and Submarine Force, I must admit a sense of kinship with William Howard Taft's great-granddaughter who wrote in her third grade autobiography: "My great-grandfather was President of the United States, my grandfather was a United States Senator, my father is an Ambassador, and I am a Brownie."

In fact, Nebraskans recognize this status. They made my wife, Katy, an Admiral in the Nebraska Navy and made me an Ensign in the Fort Omaha Naval Reserves.

I'm glad to be back among my fellow submariners. I'm acutely aware that it's late afternoon, that I'm speaker number nine and following a luncheon that had a cash bar—you either have a great faith in my spellbinding presentation or you need a short nap before dinner. Nonetheless I will forge ahead and share some thoughts with you.

The uncertainties of today's world give us all pause. Yet, at the same time, we see rays of hope—rays from the tremendous changes which have and continue to occur.

Examples of the changes which occurred over the last 12 months include:

- On May 30th of 1994, for the first time in 35 years, the U.S. and Russia stopped aiming their strategic nuclear missiles at each other. This detargeting initiative represented a confidence-building measure. While both countries have the capability to rapidly retarget their missiles, both viewed detargeting as reaffirming and building upon the importance of U.S.-Russian cooperation.
- In July 1994, the Nunn-Lugar Cooperative Threat Reduction Program enabled, among many other items, the delivery to Russia of bulldozers to assist in silo destruction, Kevlar blankets, and guillotines for chopping wings off aircraft. Already this program has allowed the Russians to dismantle

more than 2,600 warheads, remove 750 missiles from their launchers and destroyed almost 600 launchers and bombers.

- In August, Russian Bear H bombers made a second visit to Barksdale AFB in Louisiana. Leading this visit was the Commander of the CIS Long Range Aviation, General Colonel Igor Kalugin. We shared tours of Russian and U.S. bombers and got to know their aviators.
- Also in August, I visited Russia as the guest of General-Colonel Sergeyev, the commander-in-chief of the Strategic Rocket Forces of the Russian Federation, along with several Air Force missilier general officers. This was a reciprocal visit. At the Pletesk Test Range, I was given a launch button from a SS-17 missile, with the comment: "don't worry about it we cut the wires off". They are hospitable people, generally open with a good sense of humor and tremendous pride in their country.
- In September, the year-long Nuclear Posture Review (NPR) was approved. The START II changes directed by the NPR were considerable. Our B-1B bomber fleet will transition to conventional operations only by the late '90s. We will also see a 30 percent reduction in our B-52 bomber force as well as a 22 percent reduction in ballistic missile submarines. Additionally, the NPR called for the removal of all nuclear weapons from carriers and cruisers. Russian Defense Minister Pavel Grachev reacted negatively to the results of the NPR, implying that we were just putting more nuclear weapons on submarines.
- Also at a September summit, the Presidents of Russia and the United States agreed to expedite START II deactivation.
- We were proud to host more junior officers of the Russian Strategic Rocket Forces at STRATCOM in October 1994. This visit was the result of an agreement between Sergeyev and me to expand the military-to-military exchanges to mid-grade officers—the future leaders (colonels, lieutenant colonels, majors).
- November 1994 was marked by two significant achievements. Our government in coordination with Kazakhstan officials removed 1,300 pounds of enriched uranium. Then, Ukraine accepted the results of the Non-Proliferation Treaty, setting the stage of START I.
- We ended 1994 with the entry into force of the START I treaty on December 5. While the U.S. has nearly met the

force level requirements of the treaty, the Russians are catching up rapidly.

- The New Year started off with a visit by my deputy, Lieutenant General Dirk Jameson, to Russia to brief Sergeyev and his staff on the results of the NPR to dispel inaccuracies. Since then, Sergeyev has spoken for START II ratification.
- START I inspections began in March 1995 with the first group of Russian inspectors arriving in California. I also had the opportunity to meet the Russian Chief of Naval Operations, Gromov, in Kings Bay, Georgia on April 7.
- Finally, on May 18, the last Minuteman II ICBM was pulled from its silo at Whiteman Air Force Base in Missouri—signifying the end of the MM II era. Also in May, Kazakhstan was declared *nuke free* and, the U.S. and Russia worked together to achieve the indefinite extension of the Non-Proliferation Treaty.

It has truly been a busy year of strategic changes. These changes in our force structures and our relationship with Russia do not mean we are unaware of the fragility of this new *peace*. We at U.S. Strategic Command view ourselves as the bridge between the past and the future. We have a two-fold mandate—a consistent and familiar mission—first: to *deter major military attack on the United States and its allies; and if deterrence fails, employ forces.* Granted, our mission might be viewed as a Cold War theme. But our mission is to deter aggression. We are very much aware of the 20,000 nuclear weapons that remain in Russia. And we know that each has the capability that's roughly 75,000 times more powerful than the bomb in Oklahoma City.

Secondly, we're involved in managing a stable drawdown of nuclear forces and building cooperative relations with Russia. We want to facilitate the removal of nuclear weapons from Ukraine and Belarus.

These are not contradictory mandates—rather, they are complementary means to greater security for us and our allies. We at USSTRATCOM are proud to be referred to as *America's insurance policy.*

This is a very inexpensive policy. We used to spend more than $30B on nuclear programs. Now, we spend $8.5B a year, a more than 75 percent reduction over the past 10 years when total Department of Defense expenditures declined 34 percent. Since

1985, the number of strategic nuclear weapons platforms (bombers, ballistic missile submarines and intercontinental ballistic missile silos) declined 44 percent. Additionally, the number of people in our strategic nuclear forces has declined approximately 50 percent. We are the most cost effective part of American power. At START II levels, 50 percent of our strategic capability will be on submarines, with four percent of Navy people. It is also significant to note that we have no new weapons, missiles or warheads, on the drawing boards or in design.

America's nuclear weapons remain blunt instruments of last resort. In important but intangible ways, they underwrite national influence. While they comprise a small part of our military capability, they enable our President to deal on the world stage from a position of considerable strength. Nuclear weapons not only were the underpinning of deterrence in past years but also continue to support U.S. national objectives in the post Cold War world. They deter aggression by posing unacceptable and incalculable risks to potential aggressors.

I'm sure you remember when Saddam Hussein threatened to use chemical weapons, carried by Scud missiles, on Saudi Arabia. In response to that threat, President Bush sent a strongly worded letter to Saddam. The letter essentially said, "if you use chemical weapons, the American people will demand the strongest possible response". President Bush's Secretary of State, Jim Baker, gave the letter to Iraqi Foreign Minister Tariq Aziz. Aziz refused to deliver it.

The letter was delivered by a Japanese gentleman to one of Saddam's lieutenants with the admonition, "Maybe you ought to read this..." President Bush never said he would or would not resort to the use of nuclear weapons. It is the degree of *measured ambiguity* that poses unacceptable risks to aggressors, can deter the use of weapons of mass destruction and can contribute to global and regional stability.

Yes, we are still wrestling with how to best respond to or assist in the resolution of another country's civil war as in Bosnia or how to keep people from committing atrocities against each other, as in Somalia and Rwanda. But in conflicts where U.S. forces are being shot at, we want quick resolution on our terms and to discourage our adversaries use of weapons of mass destruction.

We still believe that nuclear weapons have meaning for our allies, and that our extended deterrent guarantee is appropriate. This issue was very carefully considered during the NPR. As

other countries continue efforts to acquire or manufacture weapons of mass destruction, as well as the means to deliver them, our allies must be confident that the U.S. nuclear umbrella covers them.

So what impact does this have on the future of arms control? I emphasize the importance of a pragmatic relationship with Russia and other states of the former Soviet Union. It is in our interest to help Russia and other republics retain democracy, build a free market economy and to reduce their Cold War arsenal of weapons of mass destruction. Their future is not certain. Whereas we in the U.S. point to our economic, philosophical, political and military strength as proud facts of our international prowess, nuclear weapons constitute the ticket for the Russians at the super power table. They are keenly aware of this strength and they know it's the part of the military they can count on.

Thus, our effort to reduce their arsenal is likely to be time consuming and dependent on a stable relationship. If they become distrustful of us or perceive arms control as a means of *weakening* their stature, it's going to be harder to do meaningful business. I expect arms control with Russia to be a long term proposition.

And as we help them dismantle their arsenal, we cannot ignore the difficulties of their society. Many of the basics are lacking. General Colonel Sergeyev told me that one of his biggest problems was finding housing for his Strategic Rocket Force officers as they downsize, close bases and retire people. A month ago, Secretary of Defense Perry attended a ceremony in Ukraine for a new housing project for the very same officers—pre-fabricated housing is now being built in a factory that used to build Soviet warships. We are making progress but we do not expect to see that part of the world free of instability for many years to come.

Our forces and strategy hedge against an uncertain future. Look how much has changed in the past five years. Hence, we still retain some capability to upload weapons on our missiles and put bombers back on alert to guard against reversal of intentions in countries with sufficient nuclear capability to destroy our country. Who knows, we may well see a political, military and fiscal future we haven't envisioned. We need to hedge our bets. We need insurance.

Yes, we're emphasizing nuclear safety, here and in Russia. We're stressing cooperation to reach shared objectives. We're actually eliminating the weapons we've agreed to eliminate and we're monitoring the progress by the former Soviet Union to do

the same.

A few words about the future.

Continued safety and reliability of nuclear weapons in a no-testing environment is a concern. It is important that the Department of Defense and the Department of Energy develop a plan on how to assess and maintain the current safety and reliability standards as we continue the no-test environment and work to achieve a comprehensive test ban treaty.

The industrial base which maintains, sustains and improves our strategic forces is very much a concern. As noted before, we have no new strategic systems in development. After we comply with arms control agreements, the forces that remain will provide our strategic deterrent well into the next century. We need to sustain unique industrial capabilities in the areas of missile reentry vehicles, guidance systems and propulsion.

The START II Treaty is very much in the interest of the United States. I expect we will ratify START II soon. Ratification may be harder to achieve in Russia. Preserving the intent and integrity of the 1972 Anti-Ballistic Missile Treaty will be vital to Duma *[Editor's Note: Russian Parliament]* ratification of START II. Another sensitive issue within the Duma is the perceived eastward expansion of NATO—some of them see it as threatening. START II is also a costly treaty from the perspective of some Russians.

Speaking as the Strategic Force Commander who will rely on ballistic missile submarines for 50 percent of the country's strategic warheads at START II, we need to move beyond the improved 688s—meaning build the SSN 23 and start the new attack submarine before the turn of the century. A cadre of attack submarines with greater stealth is very much in our national interest.

At the conclusion of the NPR, the Secretary of Defense concluded that 14 Trident submarines (all equipped with the Trident II, D5 missile) was a sufficient force when Russia and the U.S. reach START II force levels. His decision considered many aspects:

- The balanced force of bombers, ICBMs and submarines was a stabilizing force structure that would give any potential aggressor pause, and we would have nearly as many warheads on 14 SSBNs loaded with five reentry vehicles as on 18 Tridents with four reentry vehicles per missile while still preserving a hedge capability to reload nearly 1,000 warheads.
- The D5 on 14 submarines provides two ocean capability

with a far newer, longer term design weapons (C4 was a 10 year design, D5 is a 20 year design). The D5 has the greater reliability, accuracy, flexibility and throw-weight to be a better weapon in the next century.

- Had we stayed with the C4 we would have encompassed greater cost in supporting two missile systems in the interim period and risk of early failure, so the prompt decision to retire the C4 early in the next century saves funds. Had C4 suffered failure we feared a retreat to 10 submarines, which would indeed jeopardize a stable deterrent and put us in single ocean operation.

And now, my final subject. Through it all, we're mightily indebted to our superb young men and women—your sons and daughters—who fully understand the price of liberty is eternal vigilance: That they are the right ones to keep that vigil, outside public limelight at sea, throughout our Navy. And it is true that just a small fraction of our Navy is strategic forces, working side-by-side with our sister services who strive equally hard outside the public spotlight.

The caliber of people in the armed forces ultimately determines our ability to deter. Deterrence theories are only visions without the hard work of many dedicated individuals.

Today's Navy and strategic forces come from a wide variety of backgrounds. They are talented and capable with as much enthusiasm as our generation.

They are motivated to serve our country through good times and bad. Their loyalty is inspiring. To maintain our robust force it is crucial that we support these young people and their families, especially through the anxieties associated with the downsizing of our forces. Pay, retirement, medical, bonuses, XO and command selection—all are issues that have contributed to turmoil in our people. Thankfully at the end of this year we'll be 75 percent through the drawdown. We need to protect this most important national treasure—our people.

I appreciate having this opportunity to share my perspective on events and issues facing USSTRATCOM.

Thank you for the superb support of the Naval Submarine Leaguers in explaining to the public our Navy's value. And thank you for your unwavering support of our men and women in uniform.

■

OUR PEOPLE—THE MOST PRECIOUS RESOURCE

Remarks by VADM Skip Bowman, USN
Chief of Naval Personnel
NSL Annual Symposium
June 6, 1995

Good afternoon. I'm delighted to be here in such distinguished company. I'm happy to see so many of our active and retired submariners and so many good friends of the Submarine Force.

I was last privileged to address you at the 1991 symposium when I was the head submarine detailer. That was only four years ago, but clearly our Navy and our world have changed a lot since then. The *new world order* didn't turn out to be very orderly at all, so the peace that followed the end of the Cold War has turned out to be a very restless one.

In the world today, there are 20 active wars and 12 *hot spots* we're keeping an eye on, and there are now over 40 nations with submarines.

Russia has replaced the Soviet Union and Russians routinely visit our SSBN homeports for treaty verification. Boy, talk about things we thought we'd never see—that will teach me to *never say never* again!

SEAWOLF will be christened later this month, sporting capabilities I couldn't have dreamed of when I was skipper of CITY OF CORPUS CHRISTI, and the New Attack Sub will expand our capability even further.

And the 80 SSN and 18 Trident Navy I was lamenting in '91 has grown even smaller; now we're looking at 45 to 55 SSNs and 14 Tridents—makes me wonder what I'll be saying when you invite me back in 1999! But I think I'll take the advice here of that sage philosopher, Yogi Berra, who said "try to say out of the business of making predictions, especially about the future."

We began this period of downsizing in 1989 with around 600,000 active duty Navy people, from building towards the 600 ship dream of the mid-'80s.

Our downsized goal reflected a one-third reduction, down to some 400,000 active duty enlisted and officers by 1999. We'll be roughly three-quarters of the way through the drawdown by the end of this fiscal year with just over 44,000 more unreplaced losses to accommodate over the remaining four years—until we

reach our projected *steady state* near the turn of the century.

Throughout this major force reduction, we have remained true to the plan generated by Admiral Boorda when he was Chief of Naval Personnel in 1989:

- First, reduce accessions to absorb as much of the reduction as possible, without creating hollow year groups;
- Second, encourage retirement of those eligible to do so within communities whose requirements were disappearing;
- Third, reduce the number of personnel entering the career force in those same downsizing communities, and
- Fourth, only if the top three methods failed to generate sufficient losses would we RIF our career force personnel. I am delighted to report that we will complete our downsizing without ever having to resort to this most distasteful of tools to achieve reductions.

Congress helped a lot. Our oversight committees have been totally sympathetic in working with the deputy chiefs for personnel, and in supporting new plans to soften the transition from military to civilian life for our great people.

Our own BUPERS team under Admirals Boorda and Zlatoper did a truly magnificent job in steering our Navy through these minefields. So good a job, in fact, that when I relieved Zap last July, I became concerned that people were starting to think of BUPERS as the place to call for information about how to get out of the Navy. And I worried that if we kept talking downsizing and didn't begin to pull back on the stick, we'd punch right through the bottom of the envelope.

So in my travels to the fleet, I've been telling sailors that we've traded in the meat axe of the hardest years of the drawndown for the scalpel of force-shaping, and the bottom line throughout is recruiting and retaining the *best of the best* for our Navy team.

Then I usually give them some proof that we've moved from downsizing to *rightsizing*. We're beginning to move money away from separation programs, such as VSI/SSB and early retirement, and into retention programs like SRB, and recruiting programs like re-enlistment bonuses; we're approving more re-enlistment requests to allow more sailors to flow into the career force, we're recruiting a limited number of Navy veterans and we're increasing advancement opportunity.

For instance, for the E7 selection board that convened this morning, we're looking at a selection rate of 16 percent, up from 11 percent last year. That translates to 4,500 new chief petty

officers!

These are just a few examples of what we're doing to keep recruit quality and retention rates high as we head toward the *steady state* of 1999.

But the drawdown has been so carefully managed that even if we took no force-shaping action—assumed a *hands off* posture—we'd still be in pretty good shape. We'd see some shortages in sailors with five to ten years of experience, but there would be adequate numbers of those with 10 to 20 years of experience to fill in the gaps.

Of course that's exactly opposite the situation during the so-called *hollow force* of the '70s, when we had very junior seamen and petty officers trying to do the work of E6s and chiefs.

So I tell our sailors we've changed our BUPERS marquee to read: "We're back in the career planning business and we want you to *stay Navy*!"

And I think the message is starting to stick. I'm getting a lot more questions on the road about advancement and commissioning opportunities, tuition assistance and quality of life programs—and far fewer about separation programs. CNO and the MCPON are hearing the same kinds of questions during their visits.

I'm comfortable telling you that most of the turbulence that resulted from downsizing is in our wake and that the hardest decisions and cuts are behind us.

But you know, through all this change, one thing remained constant—and that is the tremendously high quality of the skilled professionals in our Navy and particularly in our Submarine Force. Whether 50 years ago in World War II, 10 years ago during the Cold War or 5 years ago in Desert Storm, people have remained our most precious resource.

That's what I want to talk most about this afternoon—that most precious resource, our submarine family. And instead of giving you more data and lots of retention and command screening figures, I want to paint with a little broader brush and talk quickly about some of the unique things submariners are doing today, and then share with you some thoughts I've had about our submarine heritage and why I believe, with all the changes, that our Sub Force remains strong.

When I was here four years ago, I talked a lot about the fact that people are the most significant factor in the success of the Sub Force and the entire Navy; being CNP has only reinforced that opinion.

I'm proud to report that the men and women who man our submarines, tenders and bases today are the best educated, most motivated and most well-rounded in our 95 year history. And to my amazement, they just seem to keep getting better all the time.

Just look at the achievements of the men who will be honored during tomorrow's Naval Submarine League Fleet Awards ceremony and you'll see what I mean. Though the awards will be made to individual officers and sailors, each nomination represents the teamwork, professionalism and dedication that are the hallmarks of our Submarine Force, and which have earned our community the outstanding reputation it has in our Navy and country today.

That reputation grows more every day as we assign submarine officers and enlisted to what used to be non-traditional billets on the Joint Staff, with unified CINCs and to more and more strategic policy fellowships.

Submariners are in a number of key defense billets. Just to name a few: Captain Jim Metzger, the prospective EA to SECNAV; Captain Fred Dohse, the Deputy Executive Secretary to the National Security Council; and Commander (sel) John Richardson, the prospective Naval Aide to the President.

And we have 36 officers in Joint Staff billets including, of course, Admiral Bill Owens, the Vice Chairman.

This is the flip side of decommissioning the number of subs we have recently—our submariners are serving outside our community and are in great demand. This trend was just starting when I was here before and is in full swing now. For example, nearly a third of our captains have served, or are serving, in joint duty assignments and submariners are at sea with all our major battlegroups staffs.

Eighty submarine officers are currently at Monterey or civilian universities pursuing graduate degrees and several are in Executive Fellowship Programs at places like Harvard and Stanford. Ninety-one junior officers are serving at the Academy, at NROTC units and on recruiting duty.

And, in the main, they have such bright futures! We've weathered the worst of the drawdown. The larger year groups accessed for the 600 ship Navy have passed through the toughest screening gates, and those who follow can look forward to CO/XO screening opportunity that we struggled for years to attain.

We've turned the corner. Although junior officer retention is low, and bothersome, we're beginning to see retention stabilize,

along with deckplate attitudes for career service.

So I'm excited about the futures of the young men and women who will soon be running our Submarine Force. They really are better than we were at their stage.

And I say that with due regard for you, the many veterans and Cold Warriors here today—not to minimize your service but to remind you of the great example you set, so you can take pride in the living legacy you left to our Submarine Force.

A great truth, and the great irony of our profession, is that we keep peace by always being ready for war. No one knows that better than the people in this room. As Colin Powell said at the King's Bay ceremony honoring 3,000 patrols by our SSBN fleet, "no one has done more to prevent conflict or made a greater sacrifice for the cause of peace than America's proud submarine family."

But we must remember that our privileged role as peacekeepers was made possible by the bravery and sacrifice of the determined peacemakers who sailed before us, most especially the gallant officers and men of World War II.

Because 1995 marks the 50th anniversary of the end of World War II, this is a special year for anyone who's worn or wears a uniform. This is especially true for submariners because, although we count Submarine Force birthdays from the day when USS HOLLAND (SS 1) was launched in 1900, what we all think of as the submarine Navy really didn't come of age until the Second World War. It was then that we learned our trade and developed many of the strategies and tactics we still use today.

And, though I think today's submariners are the best qualified we've ever had, I'm convinced the lessons learned 50 years ago are still worth knowing today, as we work to adapt our modern Submarine Force to new foes and changing missions.

I worry sometimes that my generation has failed to keep our proud submarine history alive. That maybe we've been too busy *taking turbidities and back-ups* to admit that our success, and the whole way we do business, is based on the earlier successes of men who knew nothing about turbidities or neutrons.

We all know that submariners represented less than two percent of navy personnel during World War II, but their actions accounted for more than 55 percent of our enemies' maritime losses. Postwar records show they sank 214 naval vessels and 1,178 merchant ships—that equates to destroying roughly 5.5 million tons of shipping.

Of course, our submariners paid a heavy price for their success against the enemy. They bore the brunt of our own naval losses. Fifty-two of 288 American submarines were lost; 3,505 men remain on eternal patrol.

I know many of you have heard those figures before but I wonder if you still find them as astonishing as I do? I think they're still so moving because in our hearts we know that behind every one of those numbers stands a man or a crew not very different from each of us.

Men proud to be sailors but prouder still to wear the dolphins of a qualified submariner. Men who loved their country, their work and their ships, and whose homes and families were never very far from their thoughts, wherever they were in the world.

Men who grew bored sometimes underway, like we do; and lonely sometimes, like we do; and who got frustrated by the lack of showers and the lack of privacy and the endless drilling and training, just like we do.

And they were men who understood that when things got rough and there was nowhere else to turn, they could turn to each other.

As the saying goes, they were "ordinary men in extraordinary circumstances", whose courage and ingenuity enabled them to win the war.

Men like Mush Morton, Red Ramage and Sam Dealey, whose stories we all need to keep re-telling, again and again. Their sorties speak volumes about why our *silent service* was so critical in World War II and why we still are today.

Their stories show that caring leaders who live our Navy core values of honor, courage and commitment inspire those same values in their crews. And their stories teach the value of teamwork—teamwork built on a foundation of training and trust that we reinforce through shared experience.

But I think the most interesting lesson in the stories of these heroes lies in their willingness to take a risk. I sometimes worry that intelligent risk-takers are becoming an endangered species in our downsized, more competitive Navy—that there's a mentality that in order to *survive* you should just keep your head down, maintain a low profile and not get out of the box.

There are those who might consider *risk-taking nuclear submariner* to be a contradiction in terms, but I'm convinced that the risk-taking legacy we inherited will be key to our future readiness.

Morton and Dealey and Ramage could take intelligent risks

because they'd also prepared their crews to take them. Every man knew every job and every plan had a backup. It's hard to explain to non-submariners, all these checks and balances and backups that are our legacy.

Today, those who don't know our history put it down to the *obsessiveness of nukes*. But I assure them it's a tradition much older than SSNs and SSBNs, one that grew out of the double checks of rigging for dive and prepping torpedoes in WWII.

Many of those procedures have carried over to our *2-man rule* in dealing with nuclear reactors and weapons today. We need to remember this. But more importantly, we need to explain it to our young submariners, officers and enlisted.

Our procedures did not spring from some new behavior taught by Admiral Rickover, but from the lessons, often written in blood, of the Second World War. Lessons then correctly reinforced and further championed by Admiral Rickover.

Our submarine heritage is a heritage of mutual trust and mutual obligation that keep us safe and strong and lets us take risks when it makes sense to.

We must never abandon this legacy, because to meet the challenges of the 21st century, we will need innovators, not robots. Innovators like the winners of this year's Naval Submarine League Fleet Awards—Commander Dave Thieman, Lieutenant Commander Jamie Foggo, Lieutenant Commander Lindsay Hankins and Lieutenant Paul Fabish—and innovative sailors like Chief Torpedoman Pat Henderson and Machinist's Mate First Class Chris Soder.

As we continue operations *forward...from the sea* in support of our nation's interests and in support of joint task force operations well inland, we will find ourselves spending less time in the open ocean and more time in shallow water, along congested coastlines—operations which require quick decisions, backed up by expert periscope work and ship handling.

As I mentioned earlier, today's world includes over 40 countries with growing submarine capability. Our resolve and our adaptability will be tested by navies new to submarining—North Korea, China and Iran, to name a few. And we must make ready for a new Russian attack boat that will be very capable, very fast and very, very quiet.

These are examples of the kinds of real challenges facing today's skippers, like Commanders Jay Donnelly and Mike Tracey, two of our finest who'll be talking to you in a few

minutes.

Just as SEAWOLF and the New Attack Submarine are transitioning to true multi-capable missions, so our people must be encouraged to think out of the box and act with intelligent daring.

Our rich submarine heritage, yours and mine, has prepared us to meet these challenges head on. As we continue to hold the line, it is our duty to preserve and enrich our proud traditions—traditions forged for us in battle by those who sailed before.

To our retired submariners: thank you for your sacrifices and the glorious heritage we honor this anniversary year. To you of my generation: work hard to keep our heritage alive. Through your effort and your example, make the lessons of 50 years ago meaningful today.

And to you who will take submarining into the 21st century: take time to listen, to read and to remember. Make our glorious history your own. Be adaptable, take intelligent risks and be proud of who you are and what we've done—every one of you are a part of this great legacy!

In closing, let me quote (as I did in 1991) Fleet Admiral Chester Nimitz, a fellow submariner and former Chief of Navigation (now BUPERS), who wrote: "We who survived World War II, and were privileged to rejoin our loved ones at home, salute those gallant officers and men of our Submarine Force, who lost their lives in that long struggle. We shall never forget that it was our submarines that held the lines against the enemy while our fleet replaced losses and repaired wounds."

As Admiral Boorda noted recently, we haven't experienced a 20 year period of uninterrupted peace since our country was founded. Put another way, no sailor, Marine, soldier or airman in this country's history has ever completed a military career during which our nation did not engage in armed conflict at least once.

We hope that record will be broken and that today's submariners will not be involved in hostile action. But if history continues to repeat itself, I dare say it will once again be our submariners who must hold the lines against the enemy. I'm convinced today's and tomorrow's submariners can do that. ■

SUBMARINE FORCE PLANS AND PROGRAMS: PREPARING FOR THE CHALLENGES OF THE 21st CENTURY

Comments of RADM D.A. Jones, USN
Director, Submarine Warfare (N87)
Office of the CNO
NSL Annual Symposium, June 6, 1995

Good afternoon. It is an absolute honor and pleasure to be here today.

As I look around the audience and see so many familiar faces I am sure that much of what I say here will not be new to you—and that's good news because that means we like the plan we have told you about in the past and we are sticking to it.

In the past, I have talked to you mostly about today. Today I'd like to focus on tomorrow—the future—what the world might look like and what we as a force may be asked to do.

I think it is important to this audience to understand that although daily brush fires consume much of our time, the Submarine Force has put in place a well conceived plan to help us make decisions on how to keep our future on track.

Shortly after the first of the year, Admirals Emery, Barr and myself commissioned a group of our finest Captains to look at our Submarine Force strategic planning and to give us recommendations of how to proceed.

Although the submarine community has always enjoyed close coordination on key issues, it was clear that due to declining budgets, shrinking force structure and a changing security environment that it was time to revisit our action items. We needed to ensure that we remained focused on the issues and had a solid frame work for engaging other decision makers.

There were two key findings from this study that really set the stage for any decision making for the future. First of all, nothing on the *want list* was free—and the *want list* was much longer than the *give-up list*. In an era of zero sum financing, it is clear that we must be prepared to give up some things or change our way of doing business, and that is going to be hard—in fact, it may break some paradigms.

The second outcome of this review to really get your attention was this thing called Revolution of Military Affairs (RMA). Now, if you asked ten different people in the Pentagon how RMA is

defined, you will get ten different variants. The one constant in the definition though, will be *things are going to change*. They are not only going to change for our forces, but they are also going to change for potential enemy forces.

Why We Must Change

This *revolution* promises to fundamentally change the way we fight in the future—whether in the littoral or the open ocean. The case could be made that there are two principal components of this change that affect our submarines.

The first is what I call the *gee whiz!* component: technologies, systems, system of systems and platforms. Remarkable advances in science and technology in both the military and civilian sectors promise to diminish the *fog of war*, by facilitating our knowledge of our adversary's thought process, denying him knowledge of our intentions, and allowing us—at times and places of our choosing, not his—to attack him with pin-point accuracy and near-single-shot kills.

Second, and perhaps ultimately more important, is the institutional, organizational, and cultural component of change—how we exploit the *gee whiz!* component to accomplish tasks. This component focuses our attention on our concept of operations—*how we fight*. We must be prepared to develop the organizations, command structures, and military *culture*, that allow us to use technologies and systems to remain inside our adversary's decision making cycle, to keep him off guard, to attack his weaknesses and avoid his strengths, to defeat his strategy and to convince him that he cannot win.

It is the combination of these two components (technology and organization) that will bring about real change. Willingness to change the way we do business may also include maintenance and training. The money that we spend in all of these areas is linked and interchangeable, and we may be called upon to be very innovative in some areas, in order to enhance others.

Additionally, we cannot assume that future developments will be unmatched by other nations, or that we will be able to exploit the *revolution* more efficiently and effectively than those who would oppose us. Our adversaries are also seeking changes in the way they exert influence through military might. We are already seeing the results of this as the Russians get quieter and the proliferation of submarine technology continues at a rapid pace.

When you look out to the year 2015, it is almost certain that we will be dealing with an opponent who is also on the *information super highway*. He may be utilizing space based, airborne and subsurface surveillance and reconnaissance systems, in addition to having sophisticated and capable C⁴I and lethal strike systems. By the year 2015, it is safe to assume that when dealing with most *Bad Guy Countries*, if he can detect you, he will be able to attack you, often in ways you least expect.

Today as our naval forces operate *forward from the sea*, there are four major categories of weapons that concern us: ballistic missiles, cruise missiles, submarines and sophisticated mines. In 2015 they will concern us even more because they are easy to get. And this should not be just a naval concern—it should be a national concern. If the enemy is effective with these weapon systems, he can deny the arrival of tanks for our Army friends, Marine troops and even logistics for Air Force aircraft. In short, the conflict environment of the littoral will continue to grow in sophistication and lethality.

The good news is that the Submarine Force is poised—perhaps as no other element of the Armed Forces can be—to take advantage of these future situations. Our traditional core competencies of stealth, essentially unlimited operational endurance and logistic self-sufficiency, mobility, and multi-mission firepower, provide the foundation for supporting our other uniformed brethren. The submarine is the one asset that is invulnerable to ballistic and cruise missiles, can effectively avoid mines, and can dominate enemy submarines. In short, we already have—naturally—what others seek to achieve—*invisibility from the enemy*. That gives us a significant leg up on being able to maximize our resources—to enhance our offensive punch.

What the World Might Look Like

When you think of any military encounter, you really have to understand that there are at least two very distinct phases—battlespace preparation and battlespace dominance. Both phases have unique requirements because, for example, preparation may happen during peacetime, while dominance is clearly in a hostility phase.

Our new stealthy, multi-mission SSNs of 2015 must be able to prepare the battlespace for subsequent operations:

- by providing a non-provocative covert forward presence for

months at a time, as our civilian leadership labors over political issues;

- by supplying continuous intelligence data to our leadership;
- by conducting minefield reconnaissance;
- by introducing Special Operations Forces into the equation if needed;
- by working with on-scene carrier battle groups, amphibious ready groups, and other JTF elements to hone skills and rehearse the concept of operations, should they be needed.

Battlespace preparation—takes place before the first shot is fired—maybe months before CNN reports there is a problem. With the onset of hostilities, however, our on-station SSNs will still be in position to immediately support combined-arms operations to achieve battlespace dominance. This absolute control of the undersea, surface, and air battlespace, as well as the extension of the fleet's offensive reach well into the adversary's homeland is dependent on our Navy's expeditionary force's ability to:

- launch high-volume, precision strikes with advanced land-attack missiles;
- control the undersea and surface threat with torpedoes and anti-ship missiles;
- neutralize minefields and/or lay mines to deny enemy naval movements;
- protect the flanks as our Marines demonstrate operational maneuver from the sea;
- land special operations forces;
- support ground forces ashore; and
- conduct information warfare.

In short, these are exactly the things that our multi-mission platform was designed for, but we will have to improve our weapons accuracy, mining capabilities and special forces activities if we are to properly support the fight of 2015.

Another term for battlespace dominance is *kicking down the door*. And since kicking down the door is truly a naval mission, submarines will remain key to its success. However, the reason for kicking down the door is to get other fighting forces to the scene of action. In order to accomplish this task, we must ensure that all follow-on shipping and naval movement, in the littoral regions and choke points, as well as on the blue-ocean highways that connect them, are safe. In that regard, we will continue to be called upon to thwart our opponents' efforts at sea denial. An

open door is no good unless someone is there to enter.

What We Need to Invest in to Preserve Our Place in the RMA

So, what are some of the specific programs and/or ideas we are pursuing/studying? What size boots are we going to buy so that our submarines remain the primary *kicker* in the future? Four key areas are quickly identified as examples: C⁴I, off-hull sensors, on-board sensors and weapons.

Let's First Look at C⁴I. Perhaps our most dramatic post Cold War modernization effort, next to the New Attack Submarine, is in the communications area. This is a revolution in itself. We understand that if information does not flow easily between our submarines and the JTF Commander, he will declare it too hard, and will get along without us. We do not intend to let that happen. We are dedicated to being absolutely integrated. If you were comparing our plan with the plan for carriers, cruisers or amphibs, it would look very similar.

As we replace legacy systems with Navy common automated systems, our data throughput will increase dramatically. We have several *demonstrator* systems out there today. By 1998, we will introduce real-time video capability as part of standard installed equipment. This will be possible because of the recent advances in antenna technology. By the turn of the century, most of our SSNs will have multiple SHF capability. We are also taking steps to ensure that our surveillance and early warning initiatives are in step with all Navy programs.

One other very exciting area of interest that we are investigating is underwater communications. Recently, we have transmitted and received data underwater at LINK-11 data rates. This technological advance promises to revolutionize our undersea communications architecture. The ability to exchange large quantities of data, including imagery, with submerged platforms is within our reach and has many implications including undersea *combat ID*. This will be essential as our ships fight in the crowded littoral battlespace.

Turning to the area of off-hull sensors. As we acquire bigger communications pipes on submarines, we can expand the portfolio of services provided. One example involves the unmanned aerial vehicle (UAV). Within a year, we intend to demonstrate the ability to video link with a UAV and to control that UAV while it's in flight. This capability provides a reconnaissance sensor that

will enhance many submarine missions such as Special Forces support, as well as missile targeting. It will expand the domain of visual surveillance and battlefield awareness for submarines.

We are developing unmanned underwater vehicles (UUVs), which will improve our reconnaissance capability to a degree not possible today. Our first emphasis is a continuing one, to ensure that submarines have the best hull-mounted mine detection sonar possible. The ultimate solution to detecting and classifying mines however, resides with the Near Term, and eventually, Long Term Mine Reconnaissance Systems. The submarine's long dwell time, coupled with the capability of these UUVs, provides a real-time display miles ahead of the battleforce. It is yet another way we intend to prepare the battlespace.

A third important system for optimizing our performance against future submarine threats is the Advanced Deployable System—a member of our IUSS family. This portable acoustic surveillance system can be planted just about anywhere and provide continuous coverage over a 30,000 square mile area for months. It is a valuable tool that is available today and will be a key player as our surveillance requirements increase due to the growing popularity of diesel submarines and the downsizing of our own force.

In the area of onboard sensors. There are two programs that show promise for our future. The first is a wide aperture array (WAA) sonar that is optimized for the shallow and noisy waters where quality diesel submarines will operate. Some of the newer versions of these submarines can remain submerged for long periods of time, which makes finding them by acoustic means much more challenging. The WAA is designed to restore a significant margin of acoustic superiority so that we can find them before they can disrupt naval operations or commercial shipping.

The second is the new TB-29 towed array which will help our current 688s deal with the threat. This improved towed array, in combination with a WAA, will be the lineup required for routing AKULAs and diesel submarines out of the deep water, or out of the mud, should they choose to operate there.

And in the weapons area. As we transitioned from the Cold War and expanded our focus to include regional conflict scenarios, one of our first concerns was for our submarines' primary weapon—the ADCAP torpedo. Just two years ago, we were not satisfied with its capability against a slow and quiet diesel

submarine in shallow, noisy waters. Today, we have dramatically increased that effectiveness. Much has been done. Much remains to be done. Part of our long term planning includes a torpedo master plan—one that will sustain our technology base and yield the best bang for the buck. The ADCAP is the world's best torpedo, and only a continuous R&D effort will keep it so.

I also consider the Navy SEALS and the Special Forces personnel we work with as weapons. So in the world of clandestine operations, we have expended considerable effort at improving the ability to surreptitiously and efficiently land forces ashore. Within three years, we will have an operational dry mini-sub that fits on the back of an adapted SSN. This sub, called the Advanced Swimmer Delivery Vehicle will extend the reach of our *snake-eaters* well beyond what is achievable today.

Another mission area that is growing in significance is strike. Today it is not uncommon to find a significant percentage of the Tomahawk assets carried by battlegroups resident in the attached submarines. We now deploy exclusively with the more accurate Block III variant, and around the end of the century, the Tomahawk Baseline Improvement Program or TBIP missile, will be introduced. TBIP will yield even greater accuracy, resulting in greater destruction with fewer salvos.

A recent initiative involving the Army Tactical Missile System (ATACMS) further illustrates what is possible in the weapons business. We are about three quarters of the way through a feasibility study that will determine if the ATACMS can be launched from a standard SSN vertical launch tube—the same launcher our Tomahawks use. As of today, the project has uncovered no show stoppers. This ballistic missile provides a real-time, accurate and reliable ground support capability to expeditionary forces. A submarine with Tomahawk and ATACMS could provide a stealthy launch platform for strategic deep strike as well as offering a new close-in, responsive ground support capability. Support of the ground battle from a submarine using UAVs and tactical missiles is a concept of operations whose time has come and will be a complimentary addition to our other naval fire support assets.

The option of placing a subsurface to air or surface self-defense weapon on submarines is on our mind and continues to be explored. While mixing it up on shallow water, there may be a need to have a response to the threat presented by low flying

aircraft and swift, shallow draft patrol boats. We believe there are some on-the-shelf missiles that can be adapted for this purpose.

And let me just add one more thought. Strategic deterrence remains a top level warfighting requirement for our Navy and our nation. That requirement is not likely to change in the foreseeable future. We are committed to upgrading our Trident missile and ship systems as necessary. This includes sharing all technology that is developed for SSNs and vice versa. As far as I am concerned, a submarine is a submarine.

Conclusion—Staying the Course

In conclusion, I must remind you that some of the initiatives that I have outlined are funded programs—others are just a gleam in our eye—but all cost money. There are still many tough decisions to be made—**what is most important?—what do we give up?** This will be the challenge as we work through our Strategic Plan.

I didn't even mention Seawolf or the NSSN, but clearly they are our ultimate answer in fielding improvements to deal with the future threat—because within their hulls is contained almost every improvement that is within the state-of-the-art. The only reason that I have not spent time on these ships is because Rear Admiral Frick is going to discuss them in detail. **They are clearly the highest priority we have.** Even though there has been some recent turmoil in obtaining authorization for these vessels, I remain optimistic. We must not be naïve. The road ahead is rocky, but I believe when all the facts are understood, the programs will be authorized. The Navy has a good plan—we must stay the course.

But even with Seawolf and New Attack Submarine, we are obliged to improve our 688s.

After all, we really have no choice—a Revolution in Military Affairs is here, for us and potential opponents—the *change* is upon us.

I expect the U.S. Submarine Force to be a leader in this exciting and fast paced happening.

Thank you, and I appreciate your support. ■

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 content of articles is of first importance in their selection for the **REVIEW**. 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. Annually, three articles are selected for special recognition and an honorarium of up to $400.00 will be awarded to the authors. **Articles accepted for publication in the REVIEW become the property of the Naval Submarine League.** The views expressed by the authors are their own and are not to be construed to be those of the Naval Submarine League. In those instances where the NSL has taken and published an official position or view, specific reference to that fact will accompany the article.

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

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

THE SUBMARINE BUILDING PROGRAM

Comments by RADM R.E. Frick, USN
PEO Submarines
NSL Annual Symposium
June 6, 1995

It is a pleasure to be here today and have this occasion to discuss the current state of the Navy's modernization and recapitalization program. The CNO has been heard to declare that FY 96 is the year of the submarine—certainly the extraordinary activity on the Hill, in the committees and in the press supports that premise. Although I would personally prefer to remain out of the limelight so that I can spend all of my energy on executing the critical submarine programs, the issues of the day require the diligence of the entire Navy team.

I am reminded by a friend and mentor of the words of Bishop Fulton J. Sheen "There is no Easter without Good Friday."

It is clearly a critical year for the submarine Navy. It is a year in which all the decisions of the past will become focused into a national strategy that will determine the shape and capability of the submarine Navy far into the next century.

I will discuss four topics with you today:

- Summarize the Navy testimony on submarine capitalization provided to the House and Senate;
- Review the status of the New Attack Submarine program, particularly why it is the right submarine for the future;
- Provide a top level view our plans for the New Attack Submarine Command and Control System;
- Update you on the status of the Seawolf program.

The Navy Plan

The annual battle for the budget continues apace. This year most of the debate energy has been expended on the submarine recapitalization plan. I want to review the basic concepts of that plan with you but in the perspective of those charged with executing the plan in a responsible and cost effective manner.

The Navy plan, which calls for the third Seawolf in FY 96 and authorization of the lead New Attack Submarine in FY 98, is a plan

- that has been studied to exhaustion;
- that has been steadfast since the completion of the Bottom

Up Review (BUR);

- provides the best answer to the challenge of preserving the industrial base; and
- provides the nation with the most cost effective assurance of future undersea readiness and superiority.

The Navy plan is the most responsible answer to the challenge of transitioning to stable, low rate production of nuclear attack submarines from the taxpayer's point of view. The Navy plan directly supports the BUR and the President's budget request.

All of you are probably aware of the results of the House National Security Committee and Sub-Committee review of this program. Although the resultant proposed language does not support the Navy plan and is disappointing to say the least, we have a long way to go before final outcome from the authorization and appropriation process. I submit what we are seeing is the essence of the democratic process—a weighing of alternatives; an evaluation of options—all the things necessary to generate a plan that is executable and has value to the defense of the nation and to the taxpayer.

The end of the Cold War prompted the development of the CNO's Forward...from the Sea naval strategy and articulated requirements for the attack submarine force of the next century. First and foremost, we must maintain our undersea superiority—a long-standing dominance we have enjoyed as a nation—yet one that is becoming more challenging to preserve with the constant changes in the world situation. Tomahawk launches, covert intelligence collection, surveillance, special operations, Marine amphibious/battlegroup support and mine warfare are mission capabilities of growing importance for our submarines deployed to littoral regions around the world. With a leaner submarine fleet, multi-mission versatility must be an inherent quality in the new submarines we build to face tomorrow's warfare challenges.

The challenge of maintaining undersea superiority and multi-mission effectiveness is compounded as you look at the changes in the world threat. The Russians are busy. With a modern, effective submarine force they are assured a place at the super power table. This is not rhetoric. **There are about a half dozen Russian submarines operational today that are quieter than our improved 688 class submarines.** This is a historic first. We must reverse that trend with the FY 96 Navy plan for submarines.

Additionally, the modern diesel submarine with an effective combat system is available on the world market. With money, third world aggressor nations can play in the big time. The United States must maintain a capability to counter that threat.

In light of emerging mission requirements of the 1990s and the advances in both nuclear and modern diesel submarines, the Bottom Up Review directed a force structure of 45 to 55 submarines. And the Joint Chiefs of Staff have required that we have 10 to 12 submarines as quiet as Seawolf operational by 2012.

Our long term answer to these requirements is the New Attack Submarine. Our near term strategy is to provide a means of *bridging* submarine construction in order to establish stable, serial production of a more affordable submarine as rapidly and effectively as possible.

The New Attack Submarine will deliver Seawolf quieting and major technology innovations at a cost comparable to a 688I. It will be cheaper because we've focused technology not just on performance, but on cost, as well.

The bottom line is that we have achieved the best balance between cost and capability, and that's not just our view. It has been independently confirmed again and again. The question—the challenge—is how do we best get to the New Attack Submarine in a responsible and cost effective manner?

Our last submarine was authorized in 1991 and our New Attack Submarine will be requested in 1998. Unless we do something in the meantime to ensure the health of the industrial base we won't be able to get there from here—that has been our dilemma—that has been our challenge.

We looked exhaustively at several alternatives. All the analyses pointed to one best solution for the near term challenge and long term affordability of the program. One that satisfies current Navy needs and accommodates industry. That is to use SSN 23 as the production bridge.

This decision does a number of very good things. Most importantly, it maintains the national policy decision of maintaining two nuclear-capable shipbuilders, thus preserving vital national skill and technology resources.

It also provides us with a submarine for our money. And not just any submarine, but one with capabilities needed today. Capabilities needed to address the growing diesel submarine threat, as well as counter quiet Russian submarines that challenge our

undersea superiority.

Critics have argued the Navy does not need this warship because we can still deliver 10 submarines with the right capabilities by 2012 without the SSN 23.

But the fact is we need a submarine with this capability today. We currently have none. Our plan has the advantage of delivering a needed warship earlier than any other postulated alterative.

Most importantly, building the SSN 23 represents the least risk way to sustain the nation's capability to continue producing nuclear submarines.

Critical shipbuilding skills are unique and perishable. They must be exercised through the actual practice of building, integrating and testing a complete submarine. Reestablishing these skills and capabilities would be a difficult, costly and time consuming process if it could be done at all! Completing the SSN 23 will sustain these vital skills needed for the New Attack Submarine.

The Navy's strategy also provides invaluable leverage that comes with having the option for future competition. Without the Groton shipbuilder, we forfeit the ability to compete later.

The strategy also makes good sense as a hedge against an uncertain future. One thing is certain—restoring the Groton shipbuilder following a complete shutdown is **not** an affordable option.

Competition for the New Attack Submarine has become a popular topic. Competition is and will remain a key element to effective government procurement. However, competition before the design is complete, competition before the design is proven, competition when there is no production base to support it will have detrimental effects on the effective execution of the program.

Our position has been consistent throughout this debate—the Navy's plan is the most cost effective approach.

In the Submarine Recapitalization Report submitted to Ms. Slatkin, and subsequently forwarded to Congress, we acknowledged that there is a small cost premium associated with maintaining two nuclear capable shipbuilders. However, maintaining two shipbuilders is the right thing to do. The BUR decision for two nuclear capable shipbuilders is still the right answer.

The current plan for building the third Seawolf and completing the design/build of the lead New Attack Submarine at the Groton shipbuilder represents the lowest cost approach with acceptable risk to sustaining the industrial base, maintaining our ability to

control cost of the New Attack Submarine and preserving the option for future competition.

We've looked very hard at this issue as we've developed our strategy. The Navy plan is the only plan on record today that provides reasonable assurance for direct competition in the future with all of its benefits.

An alternative—compete everything now—is very high risk. The government could wind up without the promised savings, without the SSN 23, without the second nuclear capable builder and without the chance for future competition. And the government would be stuck holding the bag for all of the increased costs: design transfer, shipbuilder shutdown and delay. In the end, no advanced submarines when we need them and the costs of everything are increased.

The New Attack Submarine: The Right Ship for the 21st Century

In his book The Defense Revolution, and in many speeches, Norm Augustine has repeatedly discussed the trend of uncontrollable cost increases in the development and production of weapons systems with advancing technology. The resultant then is a 21st century weapons platform which will cost more than the entire defense budget. Mr. Augustine points out to us that unless something significant is done, we in defense procurement are simply pricing ourselves out of business.

I am here to tell you that we in the New Attack Submarine program have broken the code, reversed the trend and destroyed the mold. **The New Attack Submarine is an advanced weapons platform with major innovation in technology and design processes incorporating significant cost savings using off-the-shelf technology and open systems architecture.**

While the Submarine Force is on the threshold of a Revolution in Military Affairs, as Admiral Jones discussed, we are also now engaged in a Revolution in Manufacturing Approaches that promises significant benefits at a time when affordability and capability are critically important. The New Attack Submarine program is at the forefront of this second *revolution*, which will transform warship design and construction. We have taken the most innovative commercial practices and applied them to designing our future generation of nuclear attack submarines. The result will be a class of highly capable warships optimized for the

21st century threat environment, submarines that will also be the most affordable and efficiently produced warships our Navy has ever procured.

Some critics have recently expressed concerns over the New Attack Submarine capability. This new ship will achieve the right balance of core military capabilities and affordability. The New Attack Submarine is the Navy's first major program of the 1990s that fully embraces the new strategic concept put forth in ...From the Sea and Forward...From the Sea, and is the first U.S. submarine to be designed to satisfy the broad spectrum of regional and littoral mission requirements while retaining absolute blue-water undersea dominance. It will be a potent warship, tailored for multi-mission operations and enhanced operational flexibility. Although Seawolf requirements for maximum depth and payload have been relaxed to save cost, Seawolf-level quieting has been incorporated in a smaller hull, while other military capabilities have been maintained or improved. In addition, the New Attack Submarine will have improved magnetic stealth, sophisticated surveillance capabilities, and special warfare enhancements not found in any other U.S. submarine.

But the New Attack Submarine's capabilities are only half the story, only half the reason why it is the right ship for the U.S. Navy. Our efforts to ensure that the ship is affordable have led us to a revolution in submarine design, engineering and construction.

The New Attack Submarine's affordability initiative incorporates a two-pronged approach. First, the program incorporates key *lessons learned* from previous programs and has been, from the outset, a close partnership between the Navy, the prime contractor and other vendors.

This innovative management approach has dramatically and steadily reduced red tape and minimized design issues that traditionally have forced construction cost to increase.

Second, the ship's design and capabilities are affordability driven. We will continue to assess the ship's capabilities to ensure that they will continue to meet anticipated demands while retaining the flexibility to adapt to the changing international environment. We are using all available technologies to improve the ship wherever possible and are incorporating commercial products to the maximum extent.

The Navy's decision to use the design/build, or integrated process and product development (IPPD) approach for the New

Attack Submarine sets the program apart from any previous ship procurement program.

IPPD teams composed of representatives from the Navy, key vendors, designers and the shipbuilder are working together to design and develop both the ship and its manufacturing processes. At Electric Boat, 18 design/build teams are responsible for different sections of the submarine. These teams work to set budgets and have the authority to make design decisions based on what is best for the ship, what is easiest to build, and what is the most cost effective option. These close working relationships between the Navy and its contractors, and between representatives of the design teams and the construction workforce, have already reduced disruptions common at the start of such a complex program and will help ensure affordability through all phases of the New Attack Submarine design and construction effort.

Moreover, the design of the New Attack Submarine will be matured much earlier than in typical shipbuilding programs, which will reduce the number, and the expense of change orders which typically drive the cost of the lead ship.

Other U.S. manufacturers have used computer-aided design and integrated product teams to design cars, military aircraft, and commercial aircraft, such as the much heralded Boeing 777. However, the New Attack Submarine is the most complex product, and the first U.S. Navy warship designed using such a comprehensive design and data base management tool.

The New Attack Submarine is being designed for true modular construction—a major leap forward from previous submarine construction methods.

IPPD teams are optimizing the overall design to the shipbuilder's modular construction techniques, thus further ensuring the greatest possible efficiency. Entire deck assemblies will be completed and tested before they are mated with the hull structure. **We are truly going to stop stuffing the sausage.** We are eliminating the inherent workforce inefficiencies which dominate cost in the completion of submarine construction. The innovative application of modular design and construction will cut costs and allow future systems and technologies to be more easily and cost effectively backfitted into existing submarines, thereby avoiding unit and class obsolescence that so often has plagued other warships.

A guiding principle of the New Attack Submarine is to

incorporate all the benefits of commercial products and off-the-shelf technology. The ship will feature an innovative modular isolated deck structure (MIDS) that effectively moves the shock and sound quieting envelope to the structure and not the component. This will permit an open architecture combat system design and expanded use of non-developmental items and commercial components. This will result in a vastly improved electronics and command and control structure fire control, navigation, radio, electronic support measures and communications connectivity at much lower cost.

With smart use of existing software we have the mechanism in place to develop and build an affordable combat system that can be upgraded quickly and at very low comparative cost to the predecessor systems in place today.

I want to take a few moments to address the command and control system for the New Attack Submarine. I am committed to nothing less than full and open competition for a command and control system prime contractor. The prime will have the responsibility for providing the combat control and acoustics subsystems, the local area network architecture and the integration of all the subsystems that go into the larger fabric of the combat system suite.

We are going to release a RFP for industry comment this month that is performance based and has a minimum reliance on military unique specifications and standards. We are not going to conduct a completely new development effort as we did with previous combat system efforts. We simply cannot afford it and we do not have the time to execute it.

I am ready to listen to the best ideas industry has to offer and in the end we will select the proposal that has the best value to the future of the Submarine Force.

Like the ship platform effort we will fully exploit the use of IPPD teams to manage the combat system effort. The prime will be full partner in the overall effort and share equally in the responsibility for delivering a fully integrated system to the shipbuilder on time and within cost.

I also want to comment on the future of combat systems. I have initiated efforts to merge all submarine combat system modernization efforts into a single program office. My long term plan is to create a core group of individuals within the Navy that know the submarine combat systems business inside and out and

are fully capable of executing modernization efforts efficiently across all ship classes. This will reduce the learning curve on program definition, improve execution and allow us to reduce long term life cycle costs.

The New Attack Submarine program is well underway. Milestone I was approved on 18 August 1994 and Milestone II, Engineering and Manufacturing Development, is scheduled for this summer. We have prepared a three-dimensional product model and our IPPD teams are already working to refine the design. We are actively involved with more than 90 vendors and have a close partnership well established with the prime contractor. In short, we have a well conceived plan and program for the submarine for the 21st century. The New Attack Submarine is without question the right ship for the right time. It is taking full advantage of the **revolution in manufacturing approaches** that is sweeping the commercial world to enable the **Revolution in Military Affairs** to ensure warfighting success well into the next century.

With the spotlight on New Attack Submarine issues we must not forget that we have just launched the most capable and complex submarine this nation has ever built. The most capable submarine in the world.

SSN 21, the lead Seawolf, is waterborne and is over 80 percent complete. SSN 22 is 44 percent complete.

Seawolf is a success story. In spite of horrendous program turmoil of the late 80s and early 90s, we are going to deliver these complex ships on time and within the constraints of the cost cap. Seawolf is the submarine that will restore the superiority of the United States in the undersea battlespace.

We have made great strides in streamlining the final stages of the construction and testing process. I have implemented over a dozen waterfront integrated product teams. The end result has been a more rapid identification of problems, timely resolution at the deck plate level and much reduced cycle time in processing design paperwork.

Lockheed Martin has just completed a 120 hour endurance test for the AN/BSY-2 combat system. BSY-2 will deliver all the required functionality and is ahead of schedule for shipboard installation.

The Navy can be justifiably proud of bringing the complex Seawolf program to fruition despite the technical and budgetary turmoil this program has faced.

Already more than one-third funded, SSN 23 is the lowest cost attack submarine the nation can build today. SSN 23 provides a needed warship and supports the Joint Chiefs of Staff military requirement for submarine quieting. SSN 23 is key to maintaining the right mix of skills and supplier capabilities needed to build a class of more affordable New Attack Submarines starting in 1998.

The New Attack Submarine will be a versatile, multi-mission submarine with advanced stealth designed to dominate undersea and surface warfare, gather intelligence covertly, insert special forces and conduct land strikes with Tomahawk missiles.

The New Attack Submarine is being designed for maximum flexibility and affordability. Through innovative modular design concepts and a procurement plan that closely integrates the work of designers, builders and suppliers, the New Attack Submarine will be a capable, and more affordable, follow-on to the Seawolf attack submarine.

The Department's plan merits the full support of Congress. It is the most straight forward, lowest cost approach to meeting force level requirements with technologically robust ships, preserves two nuclear capable shipbuilders as national assets and is the only plan that preserves the option for future competition. The Department plan will minimize submarine construction costs and risk timeover and produce affordable nuclear warships from an industrial base that is capable of accommodating future uncertainties. ■

HEROES BEWARE, AND WIDOWS TOO

by RADM Mike Rindskopf, USN(Ret.)

Truth, they say, is stranger than fiction. But this tale is so bizarre, no novelist would offer it to a publisher.

The players in this game are gatherers, middlemen, and collectors. There are also, of course, victims. The game is practiced widely and it is remarkably lucrative.

And what is it?

Simply stated it is the stealing and selling of World War II medals. The predators, who are the gatherers, invade the homes of winners of the Navy Cross, and less frequently, those of winners of the Medal of Honor. If only the widow is present, the attack is even easier.

The predators use a 1945 Navy Department compilation of most of the World War II winners of the Navy Cross, officer and enlisted, as their directory. There are many sources including the Naval Academy Register by which to update addresses and identify targets. They then approach the victims with such stories as "I am doing a paper about winners of the Navy Cross"; or "I am studying for my Ph.D. in military history"; or "I am a collector of military memorabilia and wonder if you have things you are willing to sell". "In return", says the gatherer, "I will mount your medals, rank insignia, submarine pin or wings and the like in a shadow box to show my appreciation for your assistance."

The predator departs with his loot and quickly contacts the middleman who will pay him *thousands of dollars*. The gatherer then buys new medals and insignia (and they are readily available), and has them neatly mounted by a frame shop in a shadow box. He returns them to the owners who are impressed with the display, and proceed to hang them on the den wall. Meanwhile, the middleman passes his purchase to auctioneers such as the Orders and Medal Society of America (OMSA) which hold periodic sales of medals and memorabilia. The legitimate collectors buy at such functions at prices marked up considerably. The heroes' medals are gone!

I can write this story now because I was alerted to the scam by a member of OMSA a month after my visit from the gatherer. When he returned my medals in a shadow box, I expressed my appreciation, but the following day extracted the medals from the

box and clearly determined that the submarine pins were not mine, nor were the *new and shiny* medals and ribbons.

I sought and received rapid assistance from the State's Attorney's Office of Anne Arundel County. Together, we identified two Medal of Honor winners, seven Navy Cross winners including five submariners, and Army Generals as well, who are but a fraction of the victims, I am sure. Many of them reside in the Washington area. Their medals were scattered from Virginia to New York State to Florida.

A search warrant produced two carloads of material from the home of Stephen V. Pyne of Westminster, Maryland. He has been charged with three felonies for stealing the medals of three Anne Arundel County officers—and may well be charged by Federal authorities for his activities in other states. Several collections have been recovered. One gatherer has been stopped in his tracks.

But there are many more gatherers at large. Heroes beware, and widows too! ■

IN MEMORIAM

Mr. Walter J. McDonald

CAPT John F. Riley, USN(Ret.)

RADM William B. Seiglaff, USN(Ret.)

TECHNOLOGY VS. TRAINING: SOVIET SUBMARINES IN WORLD WAR TWO

by LCDR Roy W. Crowe, USN

On June 22, 1941, the world's largest submarine fleet entered World War Two. The Soviet Union possessed a force of 218 submarines spread over four distinct fleets. It consisted primarily of modern short and medium range submarines, with only a handful of ocean-going types. In the course of the war the Soviets built a further 57 submarines with an almost equal mix of long range and short range capabilities. Soviet submarines sank 160 ships, approximately 400,000 gross rated tons (GRT), while losing 109 of their subs, a 1.5 ship to sub ration.

The dismal performance of Soviet submarines can be attributed to many factors covering nearly all aspects of naval planning and operations. Of these, two factors counted most: first, shifts in Soviet naval strategy impacted force planning and building; second, the poor state of training at the beginning of the war coupled with the training techniques used during the war. The Soviet submarine experience before 1945 illustrates the problems of introducing advanced technology into a newly industrialized country that is hampered by political dogma.

Soviet Naval Strategy and Force Planning

Soviet strategy during the inter-war period went through three distinct changes, each of which strongly effected force planning. The most important for the submarine force was the emergence of a *Young School* as the dominant theory of naval warfare in the late 1920s. The *Old School* of naval planning remained dominant in the years immediately following the Revolution and was based on the need to have a battleship fleet capable of delaying an invading force, most likely the British, long enough for the Red Army to mobilize. The harsh fiscal environment of the post-civil war years, however, prevented the *Old School* from building the fleet it needed to carry out its strategy.

The Young School and Early Submarines

The *Young School* saw the submarine, aided by light surface craft and aircraft, as the major weapon to defend the coast of the Soviet Union. In addition, relatively cheap submarines and

surface craft were an appealing means of improving Soviet naval capabilities. The *Young School* was accepted for its economy of capital, and because no major capital ships were being built around the world in 1927. Aside from finishing the tsarist-designed Dekabrist class of submarines, the *Young School* developed and began construction of two classes of coastal submarines, the Shuchuka (SHCH) and Malodki (M) classes. By the beginning of the war the Red Navy would have 78 Ms and 76 SHCH boats available for use.

These submarines entered service in the early 1930s in small numbers with distinctive limitations. The SHCH boats were originally short range coastal subs with an endurance of 20 days, while the M boats were fitted with only two torpedo tubes without reloads. A medium range mine-laying submarine, the Leninitz (L) class was also produced. These submarines adequately reflected the strategy of the day, designed for use in local waters against an invading enemy fleet. While these initial submarines were floating out of the builders' yards, another change in naval strategy emerged from the Kremlin.

Stalinist Strategy and Force Planning

In the '30s the world's navies began to build battleships and aircraft carriers. At the same time, Stalin began to push to build a balanced fleet to enhance Soviet prestige abroad. He saw that the Soviet Union was unable to participate in the neutrality patrols during the Spanish Civil War, and could not intercept Fascist aid to Franco. Stalin's force planning included building aircraft carriers, super battleships, and a capable fleet of ocean-going submarines. This fleet was to function primarily as a defensive force to protect the flanks of the Red Army and to engage in action against the enemy's maritime communications.

In this period, two very capable classes of submarines were constructed. The Stalinitz (S) class (also referred to as Strednaya or medium class) was based upon, and nearly as capable as, the German Type VII design of the war; the plans being procured from a Dutch front for Krupps. The Kreiserny (K) or cruiser class submarines, originally designed to carry two search planes, was the zenith of Soviet pre-war submarine development. This sub included special mine laying tubes, two 100 mm deck guns and had the range to penetrate far into the Atlantic. These subs

represented a clear commitment to Stalin's desire for a capable blue water navy.

The war began with 17 S class and 6 K class boats primarily located with the Baltic fleet. Wartime construction would only double their numbers. At the same time, improvements were made in the early SHCH class to increase their endurance to 40 days, transforming them into medium range boats. The M class was modified to increase the number of torpedo tubes to four and to correct a problem of broaching on firing. Machinery improvements were also made in the L class. These subs would be more than capable of venturing into the Atlantic to attack merchant shipping, and that clearly supported the Stalinist view of the role of the Red Navy.

When the war began, seven versions of the five basic submarines were under construction with 18 versions of the various modern submarine classes on active duty. In reality the Soviets had 18 modern classes of submarines rather than six. Although some were only minor improvements over the original designs, several included changes to operating characteristics of the subs themselves. On top of the improvements, 50,385 tons of submarines were added to the fleet from 1939 to 1941.

The Submarine Force Personnel

This rapid growth in a very technical service occurred simultaneously with a depletion of trained submariners. Having fallen out of favor with Stalin in the early '30s, the *Young School* suffered tremendously under the purges of the military in the middle and end of the decade. By the end of the purges, only one flag officer, Kusnetzov, out of eight would survive. The improvements in the size and capability of the submarine force under Stalin were offset by the purge of the officer's corps with the majority of submarines officers not available for the war.

The effect of the purges was openly apparent in the Soviet-Finnish War of 1940. To offset the lack of qualified commanding officers, submarine division and brigade commanders (roughly equivalent to American squadron and group commanders) would personally accompany submarines to sea to ensure the proper handling and employment of the sub. To increase the number of subs at sea they operated in pairs under the guidance of a senior officer afloat while maintaining continual radio contact with their

shore commanders. By the end of their short war the Soviets sank a single ship and damaged three others.

Another indicator of the poor state of submarine force training is the loss of the D1 submarine in the Northern Fleet in November 1940. This sub was training in sight of land when it failed to surface. The loss resulted in the removal of the flotilla commander and a moratorium on submarines diving in water deeper than their working depth. Given the lack of shallow ice-free water in the Northern Fleet at this time of year, the Fleet Commander, Admiral Golovko, decided to continue with a training program, as, in his opinion, war was imminent. That a unit commander would be relieved, and submerged training restricted, indicate that the Red Navy may have been more of a fleet in being at this time than an effective military instrument in the view of Moscow, which placed it low in line concerning training resources.

Training of the submarine fleet was crucial to its success because of the tactics it employed to detect and engage its targets. They relied on detecting, tracking and acquiring a fire control solution on a surface target through the use of the submarines hydrophones or passive sonar equipment. The periscope was only raised to verify the firing solution. Once verified, a single straight running torpedo would be launched. For this tactic to work effectively, each submarine would require a well trained tracking team backing up expert sonar operators. Not exactly an easy task to perform in conjunction with the loss of trained officers and the introduction of new technologies on new submarines.

Submarine Experience in World War Two

When the war began, the Soviets found themselves facing an opponent who viewed the submarine with great respect and was very experienced in using it against merchant shipping. Rather than risk their Navy or merchant ships, the Germans closed the Baltic during the initial phase of the Barbarossa Campaign. The German Navy contributed to the offensive only by laying minefields in the central and eastern Baltic. The German invasion planned to remove the threat of the Red Navy and its 69 submarines by capturing the ports of the Red Navy. However, the lack of German sea power allowed the Red Navy to retreat into the Gulf of Finland to Leningrad and Kronstadt, conducting ineffective submarine operations as it did.

By the end of 1941, the Soviets had lost 27 submarines in the Baltic. The formation of ice in the Gulf of Finland brought submarine operations to a temporary halt, giving the Germans and the Finns time to prepare their Anti-Submarine Warfare forces for the next year and denying the Soviets the ability to train their surviving submarine crews trapped in Leningrad. During 1941, Soviet submarines suffered from broaching problems: on firing their torpedoes, and at periscope depth. The Soviet's submarines also suffered from poor operational intelligence, not really knowing where to go to find suitable targets. During that period the Soviets did transfer three of the four K class subs from the Baltic to the Northern Fleet via the White Sea Canal system.

The early days of the war in the Northern Fleet saw a different turn of events. Here, Admiral Golovko had passed a plan to Moscow to send his SHCH and some M class submarines, which dominated his 15 boat force, to attack enemy merchant shipping between Petsamo and the coast of Norway, leaving the rest of his M boats to protect the approaches to the White Sea. A sound plan given the range and capability of these submarines, but he was overruled by Moscow. The higher command ordered the SHCH to assume defensive patrols of the White Sea and the less capable M to conduct offensive operations in enemy waters. Aside from Moscow control of their operations, the Northern submarine force suffered two additional setbacks when sailors were sent ashore to defend the land approaches to Murmansk, and a lack of fuel in October 1941 temporarily ended submarine operations.

The question of where to send what type of submarines sheds some insight into the role of the navy as seen by Moscow. By holding the more capable submarines back, the view of the navy's primary mission as defending the army's flanks rises once again to the forefront. Using the less capable M boats as commerce raiders for relatively brief missions, may be in keeping with the idea of a short war, but is more in tune with the defensive concept of the navy formulated by both the *Young* and Stalinist school of naval thinking.

In 1941, the Black Sea Fleet had 44 submarines, 15 SHCH, 14 M , three each of the D and L, four S, and five obsolete Holland boats. With Moscow's direction to the Northern Fleet to send the M boats to forward operating areas it can be assumed the same message was sent to the Black Sea Fleet. Despite the dominance

of the M coastal submarines, by the end of the year submarines were maintaining station for an average of 10 days.

Overall, Soviet submarines sank 12 ships. approximately 27,000 GRT, in 1941. In comparison, British submarines operating from Soviet bases of the Northern Fleet sank 84 merchant ships, 270,000 GRT, damaging another 16 ships, rated at 69,000 GRT, in 1942. The British had had two years of operational experience in wartime conditions that the Soviets did not have, however, the poor state of Soviet training coupled with new technology was also a factor.

Operating Environment

The weather in the Northern and Baltic Fleet operating areas is extreme. The Northern Fleet suffered from the dual setbacks of short winter and long summer days. While the former hindered visual search, the latter endangered surfaced operations. The Baltic faced the threat of ice from as early as November to as late as May each year. The Northern Fleet turned to airplanes to aid its submarine operations. While the Baltic Fleet had to send its crews east, north, or south for training in the winter months because of the siege of Leningrad.

Setbacks on the land front also impacted submarine operations in the Baltic Fleet. In 1941, 80,000 Baltic Fleet sailors went ashore to form marine rifle brigades. Although only a small fraction could have possibly come from the submarine force this was another drain on qualified manpower. To prevent excessive loss of trained personnel in the Northern Fleet, the Commander had to limit his ships to sending seven men each to fill out volunteer brigades to defend Stalingrad.

German ASW Efforts

The Germans and their Finnish allies aggressively pursued anti-submarine warfare throughout the war. Most notable of these were their efforts to close the Gulf of Finland to protect their Baltic shipping. In 1942 they laid large minefields and patrolled heavily with small craft. Despite this, the Baltic Fleet submarines were able to break out with support from minesweepers, motor torpedo boats (MTBs) and aircraft. The Finns finally managed to close the Baltic by laying a submarine net across the mouth of the Gulf of Finland in the winter of 1942-43, ending Soviet submarine operations until Finland fell late in 1944.

In the other theaters the Germans protected their convoys using minesweepers and small craft which they pressed into service. Unable to fire their torpedoes through the escorts the Soviets would surface to destroy the escorts and then pursue the convoy. This was the major thrust behind the development of their combined assaults on the convoys later in the war.

Soviet Innovations and Missed Opportunities

As the war progressed, division and brigade commanders still went on patrol with new submarine commanders to oversee training and operations in all fleets. With their senior submariners at sea the Soviets were never able to fully develop tactics to penetrate the Axis convoy systems, but some new convoy penetration methods were initiated late in the war in all three theaters. In the Northern Fleet a dedicated squadron of aircraft was employed for detecting and tracking Axis convoys. This joint employment evolved to overcome the problem of the long summer Arctic days. By using aircraft as spotters the submarines could remain on the surface, keeping their batteries charged, until a convoy was located, then close for an attack. The Northern Fleet also found an ideal operating environment for the small M boats which were well suited for entering Axis-held ports and attacking small convoys within the skerries of Norway and Finland. Eventually a new tactic was developed against convoys using combined air and subsurface units; however, this was not employed until 1944 when the naval war in the north was ending. Despite repeated attempts in joint attacks, the tactic failed.

In the Black Sea, joint attacks were made by MTB squadrons with submarines starting in 1944. Like the Northern Fleet the war ended before the tactic could be effective. The Baltic Fleet would eventually employ a combination of air, MTB, and submarine attacks on retreating Axis shipping in 1945.

The Soviets seemed to have overlooked the possibility of using the Pacific Fleet as a training area for their submarine crews or to evaluate and practice new tactics to deal with the Axis convoys. The Pacific Fleet had 87 modern submarines at the beginning of the war. Yet, with the exception of sending six S boats to the Northern Fleet by way of the Panama Canal, it remained a fleet in being against the Japanese, adding little to the war effort. With the icing of the Gulf of Finland for four to six months each year and the loss of Black Sea ports in 1943, the Pacific was a bastion

of peace that the submarine force could have used to improve their capabilities. If an adequate training rotation had been established, crews from the Pacific could have replaced western fleet crews in action while the training was conducted to maintain the pressure on the Axis convoy system.

The Soviets missed a real opportunity to enhance the effectiveness of their submarine crews which may have then had a much more significant impact on the supply line of the German armies in the Soviet Union. In 1942, the Germans moved 400,000 soldiers and 1,900 ships, 5.6 million GRT, through the Baltic virtually unopposed. If the Soviets had used the winter of '41-42 to train in the Pacific or to switch fresh, better trained crews the Germans may have been forced to use the longer land route to the Leningrad front or face the loss of valuable men or material. The Germans were also able to evacuate the Crimea, parts of the Ukraine, and Finland by sea in 1944 without loss. If the tactics developed by the Black Sea and Northern Fleet had been perfected in the Pacific and brought west with trained crews these evacuations may have been prevented or performed at a higher cost to the Germans.

Aside from penetrating the convoys, the Soviets were faced with just getting to sea in the Baltic region. With the heavy minefields, and ultimately the submarine net, the Soviets had to develop anti-mine protection for their submarines in order to threaten the Axis convoys. By coating the submarines with thick paint and wooden fenders the Soviets would pass under the Axis minefields. The submarines were heavily escorted by minesweepers, MTBs, and aircraft in their attempts to break out. The support given to submarine operations is critical in evaluating the perception of the effectiveness of submarine operations by the Soviets. If the submarines were viewed as a frivolous toy the effort to get them to sea in the adverse environment of the Baltic would not have been expended.

Conclusion

Although the Soviet submarine effort is filled with tales of individual heroism and innovation, the heavy losses and poor showing can only be attributed to the rapid introduction of several classes of highly technical boats which were not supported by a highly trained, technically proficient officer and petty officer corps. The impact of the purges, and to the lesser extent the

influence of the commissars, depleted and demoralized the submarine force personnel before the war and hindered its growth and development during the war. The stationing of senior submariners on operational submarines only added to the lack of qualified and confident submariners.

The Soviets were innovative at the operational level in combining all of the available forces to attack Axis shipping but were unable to prove themselves effective in the waning days of the war. Had these operational innovations been tested in the benign environment of the Pacific and the crews rotated into the combat areas the results may have been more advantageous to the Soviets.

Without a qualified, technically proficient manpower pool to support the introduction of new technologies one cannot expect a force to operate successfully against a determined opponent. ■

SUBMARINES IN EAST ASIA

by Dr. Dora Alves

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East Asian nations have far greater assets to defend than they had a few decades ago. In addition, Asia's merchant fleets have more than doubled in the past ten years. Regional interest in security is growing and defense forces are being modernized. Asia's military spending doubled in the last ten years and this year is likely to reach US $130 billion, which will equal Europe's total defense budget.[1]

The region is dynamic, strategically and economically. Inevitable political change will make the policies of some regional states less predictable. In the post Cold War era Communist states are adjusting both to the end of bi-polar rivalry and their desperate need for hard currency. Southeast Asia, having concentrated on the internal security environment during the nation-building phase, is increasingly concerned with external security and the protection of trade.

The Asia-Pacific economies are especially dependent on safe maritime passage and on the security of offshore fisheries and minerals. Defense planners, bent on safeguarding maritime trade, turn to land-based aircraft with precision guided missiles, which are very effective in narrow waterways, and plan for submarines later. Complex modern equipment can take decades to acquire and bring into service while skills to operate high tech modern equipment also take time to develop.

Uncertainties

A mood of uncertainty prevails in East Asia where discussion focuses on Japan's and China's strategic potential. The region has not forgotten Japan's actions in World War II. Today, concern about a diminishing U.S. presence is linked to the fear that the Japanese Constitution might conceivable be changed and the Self-Defense Force transformed to make Japan a strategic power in its own right. During the North Korean nuclear impasse last year

fears were expressed that Japan's three non-nuclear principles might weaken in the face of North Korean threats. Given Japan's scientific and technological proficiency, the development of nuclear weapons would not take long if the will existed to produce them—however unlikely such a change of heart appears.

Japan is reported to be apprehensive about the ultimate outcome of North Korea's nuclear program, China's connection with North Korea, and China's own intentions now that the collapse of the Soviet Union has reduced China's concerns about its borders. Questions are raised about China's upgrading of technology and weaponry and the continuing nuclear tests conducted by a developing country with so many calls on its budget. China's determination to create a bluewater navy (something that Lee Kwan Yew, Singapore's senior statesman, estimates will take 20 to 30 years), is seen in the light of China's claims to the Spratly and Paracel Islands in the South China Sea. The Spratlys, also claimed by Brunei, Vietnam, Malaysia, the Philippines and Taiwan, are adjacent to shipping lanes from Singapore to Japan, and have confirmed undersea oilfields. Were China to attempt to enforce its claims, destabilization and an East Asian arms race would result but, despite its external ambitions and an increasing oil shortage, China is presently preoccupied with many internal pressures.

Reports that China and Myanmar have reached an agreement for Chinese naval stations to be established in Myanmar prompt questions about Chinese interest in the Indian Ocean and its sea routes. There have also been reports that China has access to Hainggyi Island in the Irrawaddy delta region, and of a signals intelligence site built with Chinese equipment on Great Cocos Island, about 30 nautical miles north of the Andaman Islands.

The Chinese Navy patrols the Yellow Sea, the East China Sea, the Gulf of Tonkin and the South China Sea, and it has cruised in the South Pacific. The Chinese Navy can operate within the Japanese, Filipino and Indonesian archipelagos, though not for prolonged periods. China's logistic support is still inadequate for true bluewater status.

The navy is divided among three regional commands. The North Sea Fleet, headquartered at Qingdao, Shandung province, is divided into nine coastal defense districts. Responsible from the North Korean border to Lianyungang, it has two nuclear submarine squadrons. The East Sea Fleet, headquartered at Shanghai, is divided into seven coastal districts and also has two submarine

squadrons. The South Sea Fleet, headquartered at Dongshan, Fujian province, is divided into nine coastal districts, and has two submarine squadrons.[2]

China's Submarines

China's Navy, now the world's third largest small ship navy, expanded with Soviet designed ships and submarines, some of which were assembled in Chinese yards. A Russian analyst has distinguished three phases of Chinese submarine building.[3] At first, the Chinese copied the Soviet designs with assistance from the Soviets. A decade later, when Chinese-Soviet relations cooled, the Chinese built ships and submarines that they developed from Soviet designs. *The Program of Balanced Development of the Navy to the Year 2000* of 1989 gave priority to the production of both nuclear powered and diesel electric submarines.

The Xia class SSBN was launched in 1981, three years after the keel was laid. The missile launching system apparently gave trouble for several years. Some analysts expect a follow-on to the Xia class to be deployed after 2000, fitted with SLBM Julang-2 now under development. Only one submarine of this type was built and it rarely goes far from port. The Xia class may have been an experimental development. However, China's potential to produce strategic nuclear submarines that could maintain a normal operating cycle clearly alters the strategic situation in the Asia-Pacific region.

Production of the multipurpose nuclear powered Han class continues. Defects that plagued the early 1970s models have been corrected. Subsequently, the Chinese have sought weapons systems and technological transfers from abroad for production under license. The Ming class diesel electric submarines developed so slowly that foreign experts suspected technical problems as construction was suspended, then resumed. It is thought likely that China will finish the Ming class, now under construction, and then continue with the Song class (originally the Wuhan class).

Both the Xia and the Han class show French design influence.[4] The planning of the Song class is based on the French Agosta class, with size and displacement similar to the Ming class, but with improved diving capability and propulsion. For the time being, it seems that the Chinese will concentrate on modernizing their diesel electric submarines of which there are roughly 30 in the fleet and over 51 in reserve. China has this year acquired four Russian Kilos—at least some of them similar to the type used by

the Russian Navy, a model that is not usually exported.

It is a matter of conjecture among Western analysts of Chinese nuclear powered forces whether there will be more of the Han class or whether a new class will be built. The *Project ESSG* cruise missile submarine being developed under the plan is expected to have a surface launch (cruise missile) capability. Each of the six tubes are able to elevate independently to fire one C801 Yingji missile.

Japan

Japan, the other major military power in Northeast Asia, uncertain about Russia's attitude and its Asia-Pacific capabilities as well as China's intentions toward the Senkaku and Spratly Islands, spends about US $40 billion a year on defense. The defense relationship with the United States is regarded as the key to security, while the Japanese Maritime Self-Defense Force (MSDF) mission has responsibility for the defense of national territory and the all important sea lines of communication (SLOC). This is a formidable task as Japan's huge raw material imports pass through the chokepoints of Southeast Asia. Since the mine-sweeping operation in the Persian Gulf there is less opposition to the navy's sailing outside home waters. The public's sentiments toward members of the armed forces seem to be softening.

Japanese Submarines

The MSDF submarine force consists of six divisions in two flotillas. In the wake of Japan's recession, future naval plans have been scaled down, but the planned procurement of five submarines remains unchanged. Development is pursued with discretion, particularly in high tech areas, but since July 1994 a "technology management group" has facilitated the bilateral exchange of military technology.

A Japanese submarine (along with surface ships) takes part in RIMPAC, the multinational exercise around the Hawaiian Islands that takes place every two years involving the United States and Canada, as well as Northeast Asian nations.

Japan has 16 submarines, some obsolescent. There are two submarines of the Harushio class (of 2400 tons submerged), first built in 1990. It is anticipated that there will eventually be six of this class. Japan is not looking to NATO models, seeming to prefer to develop its own technology and to acquire U.S. Harpoons and mines.

In March 1995 there were reports that a second Stirling-based AIP engine was tested for Japan at Kockum's Malmö plant. An earlier Stirling set, said to have lower noise and vibration levels than diesel propulsion, was then already at Karasaki's test laboratory. Japan's submarines are relatively large by non-nuclear standards and would need four of the current KVa-275R Stirling engines, each producing a maximum output of 75 kilowatts. Besides the four engines, liquid oxygen tanks and ancillary equipment in a plug-in section would be required. The Stirling AIP that has been operational for five years in a Swedish converted Type A-14 Näcken allows the submarine to operate fully submerged without battery or diesel power. The submarine's submerged endurance is chiefly determined by the amount of stored LOX.[5] The version being developed by Mitsubishi under license from Kockums may be installed on the seventh Harushio class submarine. The 1995 defense budget includes one new 2700 ton diesel submarine.

North Korean Submarines

North Korea has 26 submarines, most of an outdated Russian design, and a large stock of combatants. Much of the equipment is old and outmoded, but strenuous efforts have been made to recruit the help of Russian technologists. In late 1993 North Korea received Russian diesel submarines of the Foxtrot, Golf, Romeo and Whisky classes for scrap. At the time, fears were expressed by some observers that the submarines might be cannibalized to create ships capable of launching nuclear missiles. However, this does not appear to have happened.[6] North Korea does possess midget submarines and small attack craft capable of carrying out clandestine inshore operations.[7]

South Korean Submarines

South Korea anticipates that the reunification with the North will take a long time, due in part to North Korea's lack of contacts with the outside world. Because of its vulnerability to North Korean troops, concentrated in overwhelming numbers along the border, South Korea's budget for a long time gave priority to ground forces. Now, the government is emphasizing a "three dimensional" defense—land, sea and air. With a thriving economy and growing exports South Korea is taking more interest in maritime security and acquiring amphibious and ocean-going support ships. However, the defense budget will continue to be

reduced so long as it excites no political interest. The people are preoccupied with the economy and the tremendous improvement in social conditions of the past few years.

At the moment there are two submarines of the Chang Bo-go class. They are German Type 209/1200 submarines with a displacement of 1,285 tons. The first was completed in 1993, the second in 1994, and the third will be done in 1995. Three more are under construction. The Navy would like to have something heavier, similar to the newest Japanese type. In the conditions that prevail in South Korea's region, detection is difficult because of the great depth of water where only submarine to submarine detection is really effective. The program for nine submarines is going well—more rapidly than the new destroyer program.

Taiwanese Submarines

Taiwan (formerly Formosa) is, like South Korea, eager to safeguard its developing interests by purchasing submarines. The European Community's embargo has, however, made this difficult. Analysts mention the possibility of submarines being assembled in Taiwan.

Submarine deals with France, Germany and the Netherlands have fallen through—the Dutch submarine would have been the modified Zwardvis class, of which Taiwan has two. Australia, wishing to export its new Collins class, categorized the diesel electric submarine as a *lethal weapon* and stated that a contract of this magnitude was impossible. Taiwan has, at times, shown interest in the unfinished Argentine TR-1700 and the Russian Kilo.

Taiwan has purchased 41 Harpoon missiles. It has a great interest in state-of-the-art weapons. Faced with the problem of acquiring submarine torpedoes, the high tech armaments agency is reported to be working on a heavy wire-guided submarine torpedo and a submarine version of the Taiwanese Hsiung-Feng II missile.

ASEAN's Defense

The lucrative Asian arms market is flourishing as obsolescent equipment is disposed of by emerging medium maritime powers interested in a stable maritime regime and law and order at sea. They appreciate the stealth of submarines, or even the threat of a submarine as a deterrent. Singapore, Malaysia and Indonesia, states that flank the Malacca Strait, the principal sea route between the Pacific and Indian Oceans, are focussing on combat aircraft,

small ships with Harpoons and Exocets that can be effective against far larger ships, and advanced electronic warfare equipment to defend their interests. Thailand has both an Indian Ocean and a South China Sea coastline.

The prediction of Malaysian strategists that China would seek to make the South China Sea a Chinese lake appears closer to becoming reality. Indonesian and Filipino protests about Chinese territorial ambitions have drawn no response, but in early April 1995 Indonesia announced increased air force patrols in the Nantuna area, and ASEAN is adopting a united front. China prefers bilateral talks that might allow it to exploit differences among the ASEAN nations.

Indonesia

Indonesia, the most influential member of ASEAN, is the world's largest archipelago. It consists of five major islands (or parts of islands)—Sumatra, Java and Madura, Kalimantan, Sulawesi and Irian Jaya—and 30 smaller groups. With territorial waters four times its land area, Indonesia claims sovereignty over all the waters surrounding and between the islands. (International recognition of the archipelagic seas claim means the Indonesian Navy will be responsible for policing the restricted traffic lanes that result.)[8]

Indonesian has two diesel powered patrol submarines. The first of the German-built Type 209, CAKRA, is being overhauled in Surabaya.

Indonesia's archipelago stretches across a large part of Australia's air and sea approaches. Despite the differences in defense roles and political systems, cooperation between the two nations is growing. Australia would like to sell Indonesia its Collins class.

Malaysia

Malaysia's total defense spending is less than Singapore's. Malaysia has purchased defense equipment from both Russia and China. In addition to aircraft purchases, Malaysia has launched two well equipped frigates and plans a 27 offshore patrol boat program with substantial Malaysian participation. These measures and the purchase of the USS SPARTANBURG COUNTY (LST 1192) have postponed plans for six diesel submarines.

Thailand

Thailand has had to reduce its acquisition program because of budget restrictions. There are reports of difficulties with two Chinese-built frigates, and problems in integrating Western and Chinese electronics in four Thai frigates. A new aircraft carrier, due in 1997, is being built in Spain and pilots are being trained for it. Submarine purchases have been again postponed. Thailand is anxious to protect its gas and petroleum platforms—hence its ambitious modernization program and its desire for F-16 Fighting Falcons and P-3A Orions for surveillance. A traditionally neutral country, with a land area of some 514,000 square kilometers and a 3,219 kilometer coastline, Malaysia has invested in surface-to-surface missiles for the Royal Thai Navy's coastal protection role.

Singapore

Singapore learned the vulnerability of its geographical situation in World War II. Since independence it has shown the will and careful planning needed to deal with potential threats, intending to have the maritime control of its geostrategic region. Singapore has also developed ties with its ASEAN neighbors and with Australia.

There are reports of a pending German sale of up to six redundant Type 206 submarine to Singapore. The government has not commented but Singapore's Defense Minister Dr. Lee Boon Yang has pointed out that Singapore relies heavily on technology to overcome its limited manpower.

The Philippines

Mischief Reef, where China built structures, lies within the Filipino Exclusive Economic Zone. The Defense Secretary stated recently, "China's latest activities...appear to reflect a two pronged strategy, that is slowly but steadfastly moving into disputed territory while talking peace with its rival claimants."[9] It will be difficult for the Philippines to create a modern naval force while it is still contending with Muslim fundamentalists in the south, despite its improving economy. All the defense forces need modernization and communications equipment in particular. The Navy needs patrol boats to deal with piracy and encroachment on Filipino fishing grounds.

In this and other regional issues ASEAN has quietly demonstrated solidarity among its members. There is a growing desire for East Asian defense consultation and transparency. In the

context of rapid economic growth and increased regional trade, East Asia needs an umbrella maritime organization with the means to support effective maritime laws and treaties. Submarines, though costly to acquire, equip and man in adequate numbers to be effective, warrant the investment to protect the ASEAN tanker route through the Indian Ocean, the Malacca or Lombok Straits, the South China Sea and the Sea of Japan. Their presence, or the threat of their presence, can ensure the continued flow of raw materials and of finished goods to market.

NOTES

1. VADM Sir Somerford Teagle, "Defence Too Important for Peace Activists", The Asia-Pacific Reporter, August-September 1994.

2. Jim Bussert, "South China Sea Emerges as a Regional Trouble Spot", National Defense, January 1995, p.

3. Captain 3rd Rank M. Shepovalenko, Morskoy Sbornik, No. 2, 8 February 1994 (JPRS-UMA-94-023, 6 June 1994), pp. 37-39, 42.

4. Particularly the REDOUBTABLE, INFLEXIBLE, and the Rubis class.

5. Joris Janssen Lok, "Japan Invests in a Second Stirling", Jane's Defense Weekly, 11 March 1995, p. 36.

6. U.S. Naval Institute Proceedings, March 1995, p. 113.

7. Richard Sharpe, "Regional Navies Growing", Asia-Pacific Defence Reporter, August-September 1994, p. 30 and fn.

8. Warships within the declared lanes will not be restricted in any way, but outside the lanes submarines have to travel on the surface and show national flags.

9. Greg Early, in a report from Manila, Australian Financial Review, 12 April 1995, p. 12.

REALIZING THE POTENTIAL FOR DRASTIC MANNING REDUCTION

by John P. Jackson, Jr. and Bruce G. Coury

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If the Navy is to successfully perform the missions of the 21st century, affordability will remain a primary metric for deployment.

A substantial portion of the life cycle costs for naval combatants is associated with platform manning. An average of 30-50 percent of the direct annual operating costs for current naval combatants is budgeted for crew salaries and benefits. Examining the attack submarine force, assuming a SSN force level of 40 and a crew complement of 14 officers and 107 enlisted, this translates to $171M being spent in direct operating costs (salaries and benefits) **each year** to man our SSN units. Additional direct annual costs of pipeline student billets, personnel administration, and logistics support drive the real price of manning even higher.

Significant manning reduction can be achieved by simply applying today's technologies in a total ship engineering methodology. Several studies, including the NSWC Autonomic Ship study, have concluded that manning reductions of at least one-third are achievable on surface combatants by applying off-the-shelf technologies to a clean-slate, top-down design. Foreign navies have demonstrated that such manning reductions are realizable on submarines through construction and deployment of such platforms as the Dutch Walrus, German Type 212 and Soviet Alpha and Akula class submarines. The significant challenge to achieving significant manning reduction (up to one-third) lies in taking a

total ship perspective in all design decisions.

While automation of operator watchstation functions can improve warfighting capabilities, these efforts alone are unlikely to lead to significant platform manning reductions. Other duties such as administrative support, maintenance and damage control may dictate that an individual sailor remain onboard even though his watchstation workload has been drastically reduced or eliminated. Only by considering all the responsibilities of individual sailors, all watch organizations and department duties, and redistributing the workload amongst the remaining crew can automation lead to removal of personnel from naval combatants. If new paradigms are purposefully considered along with emerging technologies within a total ship engineering methodology, even greater manning reductions might be realized.

If one were to ask the question, "What would it take to operate a submarine with 25 people," new technologies, ship design concepts, policies and doctrine, and approaches to training would emerge. By establishing an ambitious goal and considering possible solutions with no interest or bias towards the status quo, new approaches and organizations can be generated. This approach was first introduced by Hammer and Champy as a methodology for revitalizing business organizations but is equally applicable to engineering naval warships. ARPA's Maritime Systems Technology Office (MSTO) Ship Systems Automation (SSA) program has been applying this approach with some success in the development of new manning concepts for naval combatants.

Within the ARPA SSA program new operating concepts have been developed for both submarines and surface combatants. Starting from a clean slate and considering all tasks performed by both operators and systems, one can identify critical tasks, mostly in the area of decision making, which operators must perform. Examining these critical operator tasks one can construct different crew structures that would support the execution of those tasks most effectively. The SSA program is taking these concepts further and developing prototype systems based on emerging automation technologies, then demonstrating the applicability of these systems in meeting the manning concepts. As the SSA program is successful it will be necessary to consider the other aspects of the translation (ship design, policies and doctrine, and training) within a particular ship class problem, and to evaluate

these concepts with working systems at sea.

Particular functional areas on both submarines and surface combatants can be seen to drive the manning requirements for these platforms. Maintenance activities, damage control, and combat information processing constitute a substantial portion of the crew workload for both the DDG 51 and the SSN 688. Through the employment of condition-based maintenance with accurate monitoring and predictive models of ship systems, substantial reductions in onboard maintenance activities can be achieved. If accurate and precise assessments of catastrophic damage could be assembled and damage control personnel were given tools and technology that increased their brute force capabilities, reductions in damage control parties might also be achievable. And by improving sensor processing, information processing, correlation and communication between information processing systems, ship workstation operators could be left to focus on decision making vice communication, plotting and filtering of data. While many other technologies are necessary to achieve drastic manning reduction on Naval combatants, successful development engineering of automated sensor processing, information processing, intelligent systems interface, and brute force multipliers could yield significant cost savings on future existing combatants.

For several years ARPA and the Navy have invested heavily in the development of automated tactical sensor processing systems for automatic signal recognition, signal tracking, feature extraction, and signal classification. These algorithms and processing techniques have been applied successfully to many different types of signals, across a spectrum of frequencies including radar, ESM, and sonar. Several of these algorithms have been implemented in operational systems (including AEGIS and BSY-2), but have suffered from lack of computing resources and restrictions in system architecture. With the advent of massively parallel distributed processing architectures and high performance array processors populated on standard backplanes, concepts for detecting and processing all detectable energy across all frequencies in all spatial bins can be considered. Prototypes of sonar processing systems which apply these advanced computing technologies have been developed and are undergoing evaluation within different Navy programs.

Intelligent sensors for internal ship monitoring are less mature

than automated tactical sensor processing systems, but advances in Micro Electro-Mechanical Systems (MEMS) may make it practical to consider remote monitoring and control of internal ship systems. MEMS creates miniaturized versions of typical mechanical (flow, vibration, pressure) and chemical (temperature, constituents) detection sensors and collocates them with a microprocessor. Prototypes of these sensors have been developed and produced by ARPA on the same or similar assembly lines as standard microprocessors, suggesting the fabrication of such sensors could be inexpensive. As yet not demonstrated, future advances in MEMS could provide power-scavenging capability and wireless interrogation of the sensor. If both of these advances were realized, distributed, wireless intelligent sensing might be practical. As a proof of concept, the ARPA SSA program will be constructing, integrating and testing in the next two years a distributed intelligent fire sensor for Naval combatants.

One of the primary tasks of operators working with today's modern systems is the communication of data and information. Because many subsystems have been developed independent of one another, operators must act as intelligent links between subsystems, passing data between independent processing elements, maintaining associations between unlinked data, and ensuring consistency in the information representation across disparate elements of the system.

With advances in computer networking, inter-process data communication has been substantially increased, allowing larger amounts and different types of data to flow between processing elements connected to a common network. This allows one to consider peer-to-peer inter-process communications previously limited by functional priority and bandwidth. Expanding these concepts further, one can exploit the existence of a common network to consider central information access schemes and information managers between system elements. With effective information management tools, collaboration between subsystems and operators can also be considered.

One of the key advances in the area of information management is the application of object oriented design to inter-process communications and database management. By decomposing functions into generic classes and developing schemas for representing and organizing interface information, one defines not only a method for interfacing systems, but a method for reasoning

about a problem and a mechanism for interaction among disparate systems. Realizing that operators will remain the controlling element for all decisions, object-oriented approaches also serve to allow operators to interface and control multiple Advanced Reasoning Systems (ARS) simultaneously. A baseline implementation of an object-oriented information manager called the Central Information Processor (CIP) was developed by AT&T and demonstrated in 1994 as part of the Tactical Scene Operator/Associate (TSO/A) Prototype System demonstration, described later. Such systems do more than support immediate operating requirements, but can also serve to adapt the system to support unanticipated requirements.

Information systems can be described by the flow of information between functional elements of the system. Traditionally, information flow diagrams are specified in detail and used to determine communication requirements between subsystems. Trade-offs between hardware processing capabilities and interprocess communication requirements result in an architecture of the system. But as the systems evolve and new techniques for data and information processing emerge, the interconnections between subsystems are modified, leading to costly system interface improvements.

By having an object-oriented information management approach as part of the system implementation, one can consider dynamic reconfiguration of information flows between connected subsystems, thus allowing new subsystems to be introduced even when they directly impact the existing system functional partitioning and information flow. Through information managers the decomposition of information might also be tailored to the capabilities of a particular operator, who in reality is an integral part of the system processing.

If one were to walk on to a modern day SSN, high performance computing systems and sophisticated processing algorithms can be seen in action. One would also see operators interfacing with these systems, supervising their operation, filling in gaps in processing capability, and *integrating* the results from multiple subsystems simultaneously. In this environment, operators not only perform manual manipulation of data, but monitor and control systems, interrogate the results of the subsystems, translate data into information necessary for decision making, and participate/communicate with other operators and supervisors in decision

making tasks.

In order to meet the goals of drastic manning reduction it would be expected that many of the data manipulation, analysis and integration tasks performed by today's operators would be embedded in hardware and software. The operators that remain would be responsible for monitoring and controlling systems, interrogating subsystems, and participating/communicating with other operators in making decisions. In effect, operators would supervise advanced reasoning systems (ARS) and automation.

In addition, with fewer personnel, effective workload/task management amongst operators becomes critical. Watchstations can no longer be dedicated to a particular task. Instead, operators must be considered as general resources, continuously engaged, shifting between roles as the situation changes. A new technology area of intelligent systems interface (ISI) is critical to successfully addressing these problems of supervising and interfacing with ARS's and automation while fulfilling multiple roles in standing a watch or assigned to departmental duties.

In the coming months ARPA will be initiating development of technologies to support the functional requirements of the ISI. A significant challenge will be the incorporation of the intelligenct systems interface (ISI) capabilities with existing advanced reasoning systems (ARS) and automation subsystems into working system prototypes.

Approximately one-third (132 out of 322) of the Condition 1 billets on a DDG 51 are assigned to damage control parties. Some areas are currently being automated including remote voice communications and some sensors. The significant challenge in manning reduction for damage control parties and many special details is the reduction or replacement of the adaptable brute force capabilities of human operators. These tasks typically require the operator to directly interact with the task. Such tasks might include bulkhead shoring, maintenance and repair and stowing stores during vertical replenishment. While many of these tasks can be eliminated or made easier through modifications to the ship design, the development of technologies that would multiply the brute force capabilities of a small crew are necessary to achieve significant manning reduction goals.

There are many technologies being developed by the Navy, Army and ARPA that might be applicable towards augmenting the brute force capabilities of the crew. The Army and ARPA under

the Twenty-First Century Land Warrior (21 CLW) program are developing remote monitoring capabilities for soldiers in the battlefield to locate and assess the condition of personnel. Also under 21 CLW, unobtrusive head mounted displays are being integrated for battlefield operations. These technologies might also be applicable to monitoring, assessing and communicating with damage control parties dispatched throughout a ship.

Advances in robotic systems, including tele-operated mechanical arms and visual inspection systems show promise for removing the DC personnel from having to interact directly with fires and other hazardous conditions. Advances in lightweight protective clothing might allow fire fighters to withstand prolonged exposure to high temperatures. While many of these technologies are under development, few have been evaluated for application in shipboard environments. In order to achieve significant manning reductions on naval combatants these technologies and others must be demonstrated to support the damage control and special evolution requirements of Navy platforms.

Summary

There is significant potential manning reduction on future Naval combatants. While technology development is occurring within ARPA and the Navy that could support the development of such a platform, established organizational structures and propensity towards the status quo limit our ability to consider large departures in ship design, policy and procedures, training, and ashore based infrastructure. New approaches are needed in these areas if a drastically reduced manned ship is to be pursued by the U.S. Navy. Such development is high risk and therefore possibly outside the bounds of the Navy's current fiscal constraints. Through the development and evaluation of prototype systems and operational demonstrations of those systems, a proof of concept might be put forth that would provide a baseline for considering drastic manning reduction in the near future. ■

SHARKS OF STRATEGIC DESIGNATION

by Igor Sutyagin

Igor Sutyagin is a Research Fellow at the Center of Military Policy & System Analyses of the Institute of the USA & Canada Studies in Moscow. He holds a Ph.D. in Contemporary History and has participated in a wide spectrum of arms control and nuclear safety projects. He has also authored 65 articles published in the Soviet Union and Russia as well as in the U.S., U.K., and Germany.

The giant submarines, known in the West as Typhoon class SSBNs, are known in Russian as Heavy Underwater Missile Cruisers of Strategic Destination (TRPK SN—the Russian equivalent of this phrase) Project 941. *Projects* in the Soviet Union/Russia are close equivalent to U.S. SCB technical projects or *classes*. Some of them (especially recent ones) have names, and the Project 941 is Akula. *[Editor's Note: The huge Russian ballistic missile submarines which the West has named Typhoons are actually known as Akulas in Russia. The attack submarine class which we call Akula is their Project 971 and the correct name is Stchuka-B (pike or bars) multi-purpose (attack) submarine.]* These submarines are the largest such in the world and represent an unique design which, probably, will never be repeated in the future, and due to this reason they deserve description.

Akula subs are the key element of the Typhoon missile system which was designed in the Soviet Union as the technical counterbalance to the U.S. Trident system.

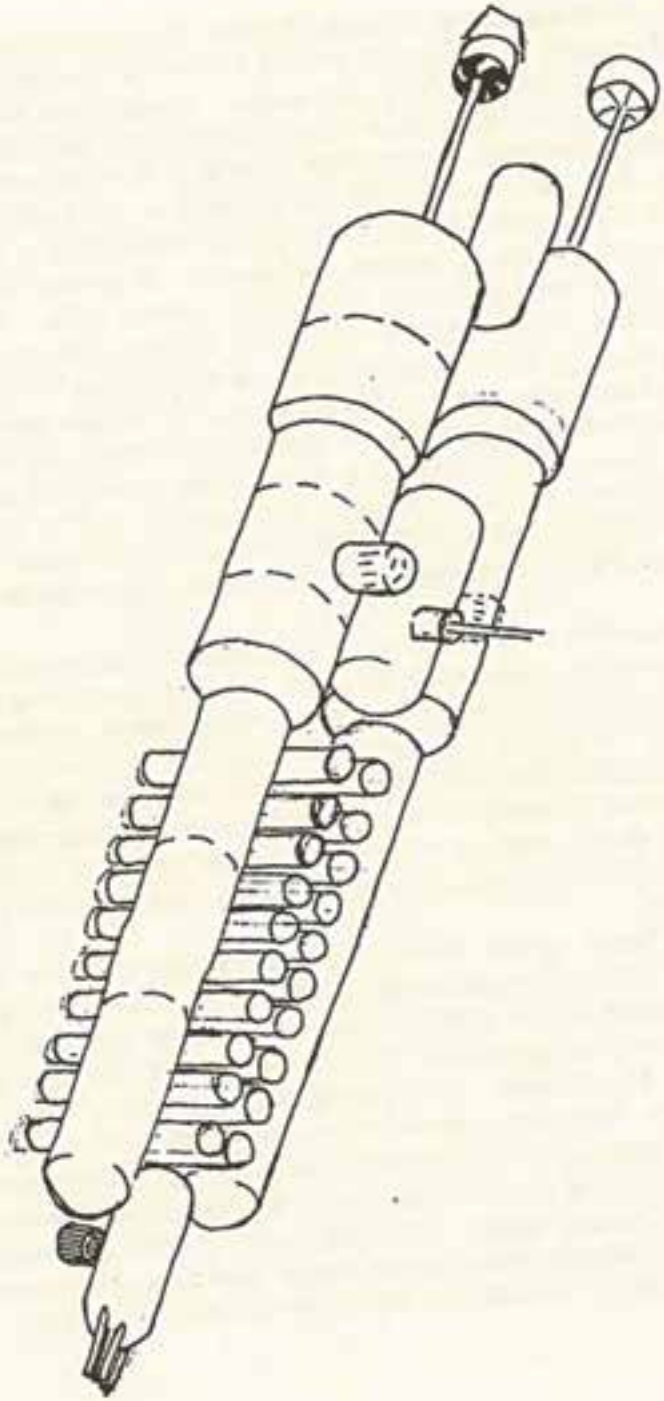
Akula subs, designed at the St. Petersburg Rubin Design Bureau, are the members of the third generation of Soviet/Russian nuclear propelled submarines. Academician Sergey Nikitich Kovalev was their Chief Designer. Their technical (design) project was confirmed in December 1972, and the construction of the first hull began at the Northern Machine Building Enterprise (Sevmash or SMP) in Severodvinsk in March 1977. The last and sixth ship of the class entered service with the Soviet Navy in September 1989, while the seventh hull was cut *for needles* at the yard. Akula subs have designations (so called tactical numbers which are permanent for the submarine's service life) TK-208, TK-202, TK-12, TK-13, TK-17 and TK-20. TK in their tactical

numbers stands for the Russian of *heavy cruise (submarine)*.

The length of Project 941 ships is 172 meters, their beam 22.8 meters and draft while in port 13 meters. (At sea these giant subs do not drain all main ballast tanks while surfaced and their draft is inevitably deeper.) The height of the ship from the keel to the roof of the sail (which hardly can be called so due to its dimensions) is 26 meters. Displacement of these submarines is 23, 500 metric tons surfaced, reserve buoyancy is 38 percent and the submerged displacement is 33,800 MT (metric tons). In fact submarines of the twin hull design, and Akula is designed along this principle, while submerged are to be described by the volume of the outer casing (*light hull* in Russian terms) because they *move* the water the light hull contains between the strong hull and the outer casing. This is especially correct in the case of Akulas due to their design with free flooding holes being closed by hatches while underway submerged for decreased underwater noise. The total underwater displacement of Akulas closely approaches 50,000 MT.

Project 941 submarines have five separate titanium strong hulls and a steel outer casing (see diagram). Two of these strong hulls are the main ones, and three separate compartments are situated between and slightly over them in the centerline fore, middle and aft of the submarine. The main strong hulls are connected to each other through separate compartments by strong passing tunnels. Twenty missile tubes, as well as main ballast tanks and auxiliary machinery and equipment are located between strong hulls of the submarine.

The length of the Akula's main strong hulls is about 149 meters. Each of the two consists of eight compartments separated by bulkheads which withstand overpressure of 10 kgf(kilograms force) per square centimeter *[Editor's Note: roughly 100 meters of depth]*. The diameter of compartments changes along the hull, with three fore compartments (76 meters of the hull's length) having a diameter of 7.2 meters, the following three compartments (in the region of the submarine's sail, their length is 31 meters) about 10 meters, reactor and turbine compartments (30 meters altogether), slightly more than 10 meters. The stern compartment has a length of 13 meters and a diameter of about 8.5 meters.



The central post and attack center of the Project 941 subs is located in the separate compartment (its length is 30 meters, diameter, 6 meters) inside the massive hump under the submarine's sail. The conning tower, as is traditional for the Soviet/Russian design practice, is mounted atop the central post compartment. The torpedo compartment is situated centerline in the fore end of the ship between and slightly over the two main strong hulls and has the length of 22 meters and diameter of about 8 meters.

The Typhoon submarines are equipped with two crew escape modules (VSK—vsplyvayustchiespasatelnyye kamery, or surfacing escape chambers) flanking the sail between the strong hulls and outer casing. The two VSKs allow the whole crew to escape in case of the submarine sinking to depths one and a half time deeper than the submarine's *design depth* (i.e., its crush depth).

The forward horizontal planes of Akulas are mounted on the hull and are made retractable. This along with the design of the stern planes (*beaver tail*) and the enhanced structure of the sail and the vertical rudder permits the submarines of this project to surface through ice as thick as 3 meters.

The Project 941 subs are powered by two pressurized water reactors (supposedly of the VM-5 type) with OK-650 core. Reactors can operate independently as well as in concert. The first loop of each reactor, each of 190 MW (thermal), includes a pair of heat exchangers (steam generators) with one circulation pump each. One reactor feeds a single main turbine with an output of 70,000 shaft horsepower (shp). The total power of the pair of turbines (140,000 shp) which drive two 6-blade skewed shrouded propellers gives Akula the top speed of 36 knots (submerged).

The steam of each reactor is also used to feed a pair of TMV-32 autonomous turbo alternators (four per ship) of 3,200 kW electric power each. Two 800 kW DG-750 diesel generators (one in each main strong hull) serve as emergency power supply. Project 941 subs are equipped with two 190 kW emergency electrical motors each driving one small size propeller. To improve maneuverability while in restricted areas (in narrows, base, etc.) Akulas are equipped with a pair of auxiliary thrusters, one forward and one stern.

The quieting technique used on the submarines of this project includes two-stage rafting on rubber cord pneumatic shock

absorbers. All quieting measures acting together permits the project 941 subs an underwater noise level (at 4 knots) as low as 65 dB (at the distance of 50 meters against the level of 20 micro Pa) for discrete tones in the range of 5 to 200 Hz and 45 dB/Hz for the 1 kHz wide band.

The main armament of the Akula TRPK SNs is the D-19 Typhoon missile complex (i.e., weapons system) with 20 launching tubes for R-39 SLBMs. (R-39 refers to the missile and associated equipment and interfaces. The missile itself is designated, item 3M65.) The launch weight of these 16 meter long three stage solid fuel MIRVed ballistic missiles is 90 MT with parts, which separate in the process of launch; net launch weight of the R-39 missile is 84 MT.

The missile usually carries 10 independently targeted warheads of 100 kT range yield and delivers the throw weight of 2.55 MT at a range of 9,300 kilometers, 1,000 kilometers more than R-29RM (RSM-54, SS-N-23) SLBM and thus 1,000 kilometers more than it is usually assumed in Western sources. The inertial guidance system of the R-39 missile allows a CEP of 500 meters at the maximal range. Interestingly, the guidance system of these SLBMs does not rely on astro-correction usual for other modern Soviet/Russian SLBMs.

The design of the Project 941 submarines and its missile complex facilitates *salvo* launch of SLBMs which in fact supposes very short—only 15 seconds—interval between separate launches.

The first two Typhoon submarines are now undergoing major overhaul at Severodvinsk. This includes installation of improved R-39UTTKh SLBMs carrying eight warheads instead of 10 as on the previous modification of the missile. (Russian UTTKh stands for "improved technical-tactical characteristics" which means they have advanced capabilities. Other submarines of the class are scheduled for the same sort of overhaul, but it is not clear, due to financial constraints, whether the plan will be successfully put into life, or if even the first two submarines will be successfully modernized. They are some rumors that, due to lack of funds, the first two Typhoon submarines will never reenter service with the Russian Navy and could be scrapped. (With regard to the latter possibility, rumors mainly mention the first hull of the Project 941 class, TK-208, which began the overhaul as early as 1992.)

In addition to the D-19 missile complex, Akulas are armed with four torpedo tubes, two each of 21 and 26 inches, located in two

rows one above another in the torpedo compartment. Combat load is the mix of 20 conventional and rocket powered torpedoes. For handling torpedoes and loading torpedo tubes, submarines of the class are equipped with hydraulically actuated automated rapid loading. In the process of loading of torpedoes aboard the ship while in base, a crane lowers a torpedo on the special tray, which, when not in use, is covered by the longitudinal rectangular hatch easily visible on the pictures of Akula centerline on the bow of the submarine. From this position hydraulic gears of the rapid loader pull the torpedo in the strong hull, move it all around the torpedo compartment to a designated rack and then, when necessary, load it into a designated tube. The operations of the rapid loader are controlled either remotely from the Murena integrated control panel in the torpedo compartment or from local control panels at specific locations.

There are two additional non-reloadable 21 inch tubes on Project 941 subs. These are located externally to the strong hull of the torpedo compartment flanking the lower row of the torpedo tubes and are used to launch VIPS self-propelled acoustic decoys/evasion devices. For self defense against low to medium altitude air threats Akulas are armed with short range IR homing 9M313 Igla-1 SAMs (SA-N-10); eight of which are located in the upper section of the sail behind the bridge.

Underwater surveillance is carried out aboard the Akula TRPK SN by the Skat (skate) sonar suit (sonar integration system) which includes four different sonars. MGK-503 low frequency sonar is the heart of the system. It has the spherical antenna of about a 3 meter diameter with 960 hydrophones situated on its surface wrapped in a 27-stave cylindrical array (with 20 double and 7 single hydrophone staves). The MGK-503's arrays are located below the torpedo compartment. The spherical array operates both in active and passive modes at the frequency range of 0.5-5 kHz which the cylindrical array is used mainly for passive detection of active *pings* of adversary submarines. For this use the cylindrical array is tuned to 3.5 kHz. Information concerning the detection range of MGK-503 sonar in direct path is not available, while it is known the sonar detects targets in the first and second convergence zones.

The MG-519 high-frequency underwater obstacle avoidance and under ice navigation sonar is mounted at the fore section of the submarine's sail on the middle of the sail height. Another sonar

intended to cover the stern arc of acoustic shadow is installed in the stern portion of the sail. The Skat sonar suit also includes the Piton (python) towed array. Its hydrophone section is 80 meters long and has a diameter of 8 centimeters, and it consists of 50 hydrophones operating at 20-200 Hz. Range of this array is 15 nm direct path and the first and second convergence zones. The hydrophone section is towed on a cable 3.75 centimeters in diameter x 750 meters long.

As far as it is known the Skat complex is built around digital computers and a common data bus and can track simultaneously 10 to 12 targets.

Project 941 submarines are equipped with the Tobol navigational radar and Samum (simoom) radio sextant which share the telescopic mast with the Kremniy-2 IFF interrogator/responder. The Medveditsa-941 inertial navigational system of the Akulas can be corrected by star observations as well as with assistance of acoustic beacons deployed all around the area of combat patrol. In addition to that, Akulas use the Simfoniya (symphonia) satellite navigational system which works with Uragan (GLONASS) satellites.

The Tsunami space communication system is the main means of communications for the Project 941 submarines while they receive also ELF and VLF transmission from Zevs and Gerkules (hercules) communication centers. In this case Akulas use Lastochka (swallow) communication buoys, a pair of which is located in the light hull abaft the sail. Tu-142RT Orel aircraft basically similar to the U.S./TACAMO planes are also used to retransmit signals to submerged submarines.

The giant subs are manned by a crew of 170 men, including 50 officers, 80 NCOs and 40 enlisted men. The fact deserves mentioning that originally there were no enlisted billets assigned for Project 941 subs. Crews were supposed to be all professional, (i.e., consist of only commissioned officers and warrant officers). But due to lack of funding for accommodations of necessary personnel ashore, enlisted men were let aboard on some billets intended for NCOs.

The living conditions aboard TRPK SN are superb: all crew members are accommodated in 2 or 4 man staterooms. There are also facilities aboard Akulas which are traditionally considered superfluous for submarines: these are recreational areas (in addition to usual wardrooms), a sauna with a small swimming pool and even a greenhouse. ■

TODAY'S SUBMARINES OFFER COMMANDERS A UNIQUE COMBINATION OF STEALTH, MOBILITY AND ENDURANCE. PIONEERED BY ELECTRIC BOAT, THESE FEATURES MAKE SUBMARINES IDEAL FOR COVERT MISSIONS, SPECIAL OPERATIONS AND BATTLE GROUP SUPPORT. AND WHILE SUBMARINES ARE MORE MULTI-MISSION CAPABLE, THEY ARE NOW MORE AFFORDABLE SINCE ELECTRIC BOAT HAS RE-ENGINEERED THE INDUSTRY. AS A RESULT, AMERICA HAS A CRUCIAL STRATEGIC ASSET GEARED TO MEET FUTURE CHALLENGES. AND SO DO BATTLE GROUP COMMANDERS.

GENERAL DYNAMICS
Electric Boat

UNHINGING THE JAPANESE GRAND STRATEGY

by CAPT Bill Ruhe, USN(Ret.)

Captain Ruhe is Editor Emeritus of ***THE SUBMARINE REVIEW*** *and is the author of* War in the Boats, *Washington/London, Brassey's Inc., 1994.*

This year marks the 50th anniversary of the conclusion of the war with the Japanese. It is thus useful to recall why the Japanese expected to win the Pacific War against the United States.

In effect, the Japanese had a Grand Strategy which they felt would produce a victory over a country that had gone soft and hence in a year or two would lose its resolve to continue fighting a really tough war. The Japanese Grand Strategy was predicated on a successful surprise attack on U.S. fleet units in Pearl Harbor—to reduce the U.S. potential for contesting control of Pacific waters. Invasion of Southeast Asia countries followed, providing a source of raw materials for fueling the Japanese war-making machine. Then inner and outer defense perimeters of Pacific islands were heavily fortified to protect both the flow of war supplies from the conquered countries and Japan itself. It was assumed that breaching these island defense perimeters would be so costly to the U.S. in men and equipment that the U.S. would let the war wind down while accepting a fait accompli of the Japanese conquests. Victory was not planned by the Japanese, only a cessation of hostilities followed by an uneasy peace for perhaps a long time.

This Japanese strategy for *victory* seemed plausible, except that the Japanese miscalculated the toughness of their enemy. (The Japanese certainly misguessed as to the tenacity of U.S. submariners in remaining on the offensive despite all-out efforts to destroy them.) Also, the Japanese failure to take eastern New Guinea, their failure to close the gap in their outer defense perimeter at Midway, and their allowing the U.S. to gain a toehold in the eastern Solomons at Guadalcanal—along with their failure to adequately resupply their war economy—proved to be the undoing of their Grand Strategy for winning the Pacific war. The planned invasion of the northeast coast of Australia was also put on hold with the buildup of MacArthur's forces in northeast

Australia and at Port Moresby, establishing the inevitability of MacArthur's forces retaking the Philippines.

This offbeat version of the war in the Pacific is derived from the observations I made as a submariner on eight war patrols, three from Brisbane, Australia and five from the West Australian ports of Darwin and Fremantle and as recorded in my book War in the Boats. Of course this view of history is colored by the rose tinted glasses with which, as a true believer in the great value of submarines, I saw their efficacy in a sea war.

My three war patrols in 1942 up into the Solomon Islands area typified the impact of U.S. submarines on the unhinging of the Japanese Grand Strategy. The first two in the S 37 and the third in the fleet boat SEADRAGON tell the story of the stop-gap effort to prevent an invasion of the northeast coast of Australia and the breaching of the Japanese outer defense perimeter at Guadalcanal. The enemy's paranoic fear of U.S. submarines generated by a few of these *old crock* boats, with their occasional torpedoing of valuable Japanese merchant ships and warships, seemingly had a decisive effect on Japanese operations for consolidating the elements of their Grand Strategy.

Starting in April 1942 with the arrival at Brisbane of five S boats from Panama and five from the Asiatic fleet, these antiquated, slow, 900 ton submarines of 30 days patrol endurance, a crew of 42 men and armed with Mk 10 torpedoes with only 360 pound warheads, produced results far greater than could be expected. At least the few torpedoes fired by the S boats actually exploded and were quite devastating, unlike the new Mk 14s used by the newer fleet boats, which prematured or were duds only too frequently.

In early May, two days after the Coral Sea Battle, the S 42 sank the large minelayer OKINOSHIMA that was loaded with troops and headed from Rabaul to Buna on the north coast of eastern New Guinea. On the next day the S 44 sank the repair ship KEIJO in about the same location. Both sinkings were of considerable importance in ensuring MacArthur's holding position at Port Moresby—a key element in his *I shall return* strategy for retaking the Philippines. In June the S 44 sank a Japanese supply ship close to Guadalcanal and on 8 July the S 37 sank a naval auxiliary troop transport off Rabaul.

These sinkings seemed to generate a flurry of Japanese activity to strengthen their forces on Guadalcanal. It had become apparent

that with the buildup of MacArthur's Army forces in northeast Australia it was imperative for the Japanese for use their hastily constructed airfield on the eastern end of Guadalcanal for the interdiction by long range aircraft of MacArthur's sea supply lines from the U.S. to Australia. Thus when, on 7 August 1942, 12,000 U.S. Marines were landed on Guadalcanal to seize the airfield there, the Japanese immediately responded by sailing a six ship convoy of transports heavily loaded with troops and their battle equipment from Rabaul—to throw the Marines off Guadalcanal. But a single torpedo fired by the S 38 sank a transport. A decisive blow. The Convoy Commander, fearing further sinkings as he proceeded down *the Slot* turned his remaining five ships back to Rabaul, giving the U.S. Marines a chance to consolidate their hold on Henderson Field and begin the breaching of the Japanese outer defense perimeter.

Two days later, on 10 August, when it seemed that a large force of Japanese heavy and light cruisers had won their finest naval victory of the Pacific war in the Night Battle off Savo Island—sinking four heavy cruisers of the Allies and seriously damaging a fifth with little damage to any of the Japanese warships—the Commander of the Japanese forces nevertheless turned his forces back to their home base at Kavieng. They might have sailed another 20 miles to the east and decimated the many U.S. ships that were offloading at Lunga Roads off Henderson Field. But inexplicably, in the moment of victory, the Japanese let the U.S. ships off the hook. Was it fear of submarines that affected the Commander's actions? Possibly.

Ironically the S 44 sank the heavy cruiser KAKO just short of Kavieng giving license to the paranoia the Japanese had about U.S. submarines. Subsequently the S 41 damaged two supply ships near Rabaul, the S 37 put a torpedo into a big warship near Savo Island, the S 44 and S 42 damaged destroyers near Guadalcanal and the S 47 put two torpedoes into a heavy cruiser that was attempting to bombard Henderson Field.

By November, when I arrived in the fleet boat SEADRAGON in St. George's Channel off Rabaul, the ubiquitous U.S. submarines were believed to be everywhere and anywhere in the Solomons area, causing the Japanese to do a lot of dumb, inefficient things. Large numbers of depth charges were dropped on false contacts. Periscopes were seen everywhere and evasive

action was taken needlessly. Single ships were escorted with several of the best Japanese fleet destroyers and they turned back if even a suspected submarine was in their path. Reinforcement of their beleaguered troops in New Guinea and the Solomons was carried out by many inefficiently loaded, high speed 45 knot fleet destroyers that zigzagged widely and randomly dropped depth charges if they felt they were crossing over a lurking submarine. The Japanese also wasted their best submarines in an unprofitable pursuit of antisubmarine warfare.

It was the persistency of attacks by our *boats*, even though torpedoings of Japanese ships were infrequent, that produced an incomprehensible X-factor in Japanese planning that muddied their thinking and unhinged their Grand Strategy for *winning* the Pacific war.

Ensuring that the U.S. would *win* however, was due in great part to the successful shipping attrition war that was fought in the South China Sea by the *boats* out of West Australian ports. Though these submarines suffered initially from faulty torpedo performance that diluted their potential for sinking ships, they subsequently sank many important ships carrying raw materials from the Japanese Southeast Asia conquests to the Empire's war-making machine. (The CREVALLE, on which I made five war patrols from Fremantle, typified the problems and successes of the fleet boats firing Mk 14 torpedoes, in eventually bringing Japan to her knees in her attempts to stop the U.S. forces from moving to the shores of Japan.) So successful, for example, was the submarine campaign in sending high priority oil tankers to the bottom that when the Japanese fleet was ordered to congregate for the defense of the Philippines, the Commander of the major fleet units at Truk called for all available oil tankers to be diverted for his fleet's use or his units could not take part in what came to be the Battle of Leyte Gulf. Later in 1945 when the Japanese fleet was to be used for one last major fleet action off Okinawa, the force of ships centered around the super-battleship YAMATO sallied forth from the Inland Sea with only enough fuel onboard for two days of fighting—and then total fuel exhaustion.

Submarines, it should be recognized, played a major role in making a U.S. victory possible just as they had been partially but importantly instrumental in denying victory to the Japanese. ■

THE BAKER SUBMARINE

by Fred A. Ballin
Naval Architect

[Editor's Note: This article was submitted by Mr. Eugene D. Story of Stamford, Connecticut, the author's grandson. The Baker Boat is recorded in several early histories. See particularly: Fife, Herbert C. Submarine Warfare: Past and Present. (2nd Ed. Rev. by John Leyland). London, E. Grant Richards, 1907. New York, Dutton, 1907. Mr. Story believes this hitherto unpublished article was written about 1920.]

In the fall of 1890, there came to the office of the Detroit Boat Works, of which firm I was then General Manager and Naval Architect, a Mr. George C. Baker and showed me the model of a submarine boat, on which he had obtained patents in the U.S. and foreign countries.

At the present time, when the exploits of the submarines have attracted the attention of the whole world, it might be of interest to the public to learn something of the first successful submarine actually built anywhere, especially as very little of what this boat accomplished has been recorded by later day writers.

Mr. Baker, the inventor, had accumulated a considerable fortune in the manufacture of barbed wire in Chicago. He was not versed in Naval Architecture but submarines were his hobby. The model which he brought to my office was made of tin and the propelling power consisted of clock-work. Before he left my office, we had come to an arrangement by which I agreed to work up a design and build a boat at the Detroit Boat Works by day work. Mr. Baker did not intend to spend on this experimental boat more money than absolutely necessary, but he wanted the boat large enough for practical demonstration.

The design, which I worked out, represented a vessel 40 feet in length, 9 feet beam and 14 feet deep with true elliptical sections. The hull was built of wood, consisting in frames molded six inches deep, all around, closely bolted together from end to end. After the surface of this frame body had been smoothly planed, it was covered with heavy prepared canvas, made impervious to water by linseed oil and beeswax, and was then planked with 1-1/2 inch oak and seams caulked and finished off smoothly. Deck beams and a deck was then constructed at half

depths to withstand the external pressure on the flat sides of the elliptic sections.

Baker's invention consisted in a system of propelling and submerging the boat with propellers placed amidship, acting upon points abreast of the vertical center of gravity and being designed to revolve around a horizontal line through these points as axis. This design was carried out by a set of bevel gears in a metal housing, which could be revolved around a shaft, connecting the gears on each side and which shaft was turned by the propelling machinery, steam or electric, on the inside. When these propellers stood vertically, they would move the vessel in horizontal directions, either forward or backwards. When the propellers stood horizontally, the boat without changing its horizontal position, could be submerged or brought to the surface. The boat was provided with a conning tower and it was calculated when this tower was just above the water, it would have sufficient reserve buoyancy to come to the surface when the propellers were not working. The propelling power was made sufficient to overcome this buoyancy, and force the boat down vertically to any desired depth.

It was also possible, that while the vessel was being propelled in a horizontal direction, with the conning tower exposed, to incline the propellers and produce sufficient downwards pressure to submerge the boat and by properly regulating this inclination to maintain the submersion to any desired depths.

The figure on the next page, taken while the boat was light and heeled over at our shop, shows one of these propellers with its housing.

In those days, the internal combustion engine was still unperfected and from necessity we had to choose a combination of steam and electricity for propelling agencies. I selected a Roberts Water Tube Boiler of 4-1/2 feet width and 5-1/2 feet depth to furnish the steam. The casing of this boiler was made of boiler plate, tightly caulked, while the fire doors and the dampers were made airtight when closed. The smoke stack was connected with a vertical, telescoping section, which could be elevated above the top of the boat, having side outlets for the smoke escape and a cap which fitted tightly upon a coaming flange, when the smoke stack was drawn in.

This boiler furnished steam at 200 pounds pressure to a seven inch by seven inch high-pressure engine, and this engine was geared to the horizontal propeller shaft and also belted to a generator and motor of 50 hp designed for 220 volts and 900 rpm. The generator when acting as motor turned the propeller shaft at 300 rpm.

The generator discharged into four sets of storage batteries of 58 cells in each set, and when the generator was used as motor, two sets of 116 cells at 232 volts were used. Woodward storage cells selected had each 360 ampere capacity.

When travelling awash, the steam engine turned the two 24 inch propellers 400 rpm, giving the boat a speed of about 10 miles per hour; while submerged, with electrical propulsion, the speed obtained was about 8 miles per hour.

Near the conning tower, in easy reach of the pilot, was placed a controlling switch connected with galvanized sheet iron resistance coils for speed regulation.

The sleeves, around the shaft, connecting on the outside to the bevel gear housings, were provided on the inside with a sprocket wheel, which by means of chain belting and a hand wheel, was operated by the pilot. The steering of the boat was by a balance rudder, located underneath the after-end and protected from grounding by a projecting keel and shoe. The arrangement of the machinery was so designed that a pilot and one electrical engineer, acting as fireman, could operate her. The interior of the hull contained 1500 cubic feet of air, sufficient for several hours submersion but no provisions were made for purifying this air, or to carry additional supply as the boat was principally built to demonstrate the operating features and not to represent a perfected vessel.

The total displacement of the boat was 75 tons, of which the hull weighted 20 tons, the ballast 30 tons, the storage battery 10 tons, engine boiler and gears 8 tons, motor 3 tons, leaving 4 tons for reserve buoyancy. With this buoyancy the normal draft of the boat left about two feet of the hull proper above water.

Entrance to the vessel was through a cast iron manhole, which formed the top of the conning tower. This manhole could be swung to one side for entrance and swung back and lowered by gears to fit absolutely watertight.

An electrical connected pump was provided to fill the bottom ball tanks with sufficient water to leave nothing but the conning

tower exposed, at which floatation the vessel was ready for submersion as above described.

The above brief description will suffice to prove that the Baker submarine was not merely a toy.

During the months of June and July 1892, this boat was tested out in the Detroit River and Lake Erie. Commodore Folger of the Bureau of Ordnance of the U.S. Navy witnessed these trials and reported as follows:

> "I consider the principles of the Baker boat feasible. It is already made clear that an efficient boat can be submerged and kept under control with but a foot of the conning tower above the surface. A Sims torpedo could be sent out from such a vessel to a distance of a mile and, directed at night by means of range lanterns, would be more effective than by day. The submerged vessel, equipped with such a torpedo could remain at a point where she would be completely invisible to an enemy's ship. The boat will be further armed with the submarine gun and projectile, tests of which have already been made with satisfactory results recently at Newport."

We were preparing for additional trials, when an accident put the boat out of commission for sometime. Goddard, the electrical engineer, was charging the batteries from a land station in the River Rouge, where the boat had its moorings,during the night and during a severe rainstorm, which prompted Goddard to close the conning tower hood. He went aboard to read the hydrometer and, while lighting a match, the hydrogen gases generated during the charge exploded and demolished practically all of the battery cells aboard. While repairs were being made, Mr. Baker went to Washington trying to interest the Democratic Administration of Grover Cleveland in building a submarine for the U.S. Navy. As is usual in this country, our government was too shortsighted and unprogressive to take any action except promising to appoint some naval officers to make additional tests with the boat. The submarine was then towed to Chicago and put in good working condition to make such tests in Lake Michigan, where the boat would not drag bottom as it did in the Detroit River.

Mr. Baker again went to Washington, waiting for the naval officers to receive their orders, but during the winter of 1892 he

fell sick and died putting an end to his hopes and aspirations.

The boat was an unprofitable legacy left to Baker's wife, and on advice she sold all of the machinery and on May 30, 1892 had the empty hull towed out into Lake Michigan, filled with sand and sunk.

Had Mr. Baker lived, I have no doubt that his design of vessel would have been given a fair trial, as it was, others took his place, and in particular J.P. Holland of New York who succeeded in 1896 to have a boat of his design constructed by the Columbian Iron Works at Baltimore.

At that time a specter of war had arisen by our dispute with Great Britain over the Venezuelan Boundary question and her threatened breach of the Monroe Doctrine, and in consequence our administration discovered the helplessness of our Navy and took a step towards preparedness.

There is a long step from the boat I built in 1891 and the DEUTSCHLAND, but George C. Baker should be given due credit for having at his own expense, invented and constructed the first power-driven submarine, which demonstrated practically the possibility of undersea navigation. I dedicate this article to his memory. ■

[Editor's Note: It should be noted that John P. Holland was operating a power-driven submarine in New York Harbor in the 1880s. The submarine HOLLAND, bought by the U.S. Navy in 1900 as its first, was built by Lewis Nixon to Holland's design at the Crescent Shipyard in New Jersey.]

REAR ADMIRAL ROGER C. LANE-NOTT, RN ADDRESSES THE NAUTILUS CHAPTER

by Hank Buermeyer

YNCM(SS) Hank Buermeyer, USN(Ret.) is a freelance journalist and a member of the Nautilus Chapter of the Naval Submarine League.

Rear Admiral Roger C. Lane-Nott, Royal Navy, Flag Officer Submarines and Commander Submarines Eastern Atlantic, was the guest speaker at a luncheon by the Nautilus Chapter of the Naval Submarine League on Thursday, June 22.

The luncheon took place at the Tavern by the Green, and was attended by over 100 members and guests.

Admiral Lane-Nott, speaking extemporaneously, told how he saw things in terms of changes in the submarine community, in his words, "on the other side of the pond".

"Change is all around us," he said. "We know how painful it is to deal with some of these things. We've already been through some of the things that you're going through now, so we know how painful it is. But change we must."

According to Admiral Lane-Nott, the UK used to build a new submarine every nine months to a year. But with the end of the Warsaw Pact, there has been a demand within the UK for a *peace dividend*. "The submarine community found themselves to be the victims of their own success," he said. One result of the *peace dividend* was that the UK lost all of their diesel submarines, including four of their brand new Upholder class submarines.

The current submarine fleet in the UK consists of five SSBNs (three Polaris and 2 Trident), and 12 SSNs.

"On the operational side, we are worldwide, like you, "he said. "We are stretched like you. Everybody wants SSNs—they want them all over the place. We're busier than we've ever been. As a snapshot today, I've got one SSN in the Pacific, one in the Adriatic, one in the South Atlantic, one in the North Atlantic, and one in the Norwegian Sea. That's pretty diverse."

Admiral Lane-Nott spoke briefly about the forthcoming Batch 2 Trafalgar class submarine program. "This is our way of saying that we're not building a new submarine—it's an upgrade of the last one," he said.

Concerning the Russians, Admiral Lane-Nott explained that they were putting most of their effort into the submarine force, not into surface ships or aircraft. He though that the decision to give greater emphasis to submarine construction was based more on a naval than a political decision. He stressed to those in attendance that "The Russians have not gone away."

With respect to the question of "How do we make our case" for submarine construction, Admiral Lane-Nott suggested that the UK should consider establishing a "UK branch" of the Naval Submarine League. "The Naval Submarine League, and what you represent in fighting the battle for the future is fundamental. They can't do without us—they know it, but they don't want to believe it. I know we're expensive, but highly competent, professional people are expensive." ■

MILITARY PATCHES

The July **SUBMARINE REVIEW** had an announcement for McGrogran's Military Patches. Unfortunately we published the wrong address. The correct address is as follows:

Don McGrogan, BMCS(SW), USN(Ret.0
McGrogan's Military Patches
P.O. Box 502
Orofino, ID 83544-0502
(800) 861-9398

EX-BOOMER AS AN SSRN

by CAPT R.A. Bowling, USN(Ret.)

The concept of a submarine-based radar picket, as described by James Mandelblatt in the April 1995 issue[1], grew in large measure from the fearsome toll taken by Kamikazes against U.S. Navy surface vessels during the Okinawa campaign in World War II: 13 carriers, 10 battleships, 5 cruisers, 88 destroyers and 33 destroyer escorts heavily damaged; 12 destroyer types sunk outright[2]. However, in its execution the submarine radar picket failed to achieve the results envisioned because of the limitations of the submarine platform and state-of-the-art electronics at the time. Primarily, those limitations were:

- Surface Ops: All radar missions/tasks initially had to be performed on the surface—the same as with surface vessel pickets. Even with the advent of the specifically designed SSRs, SAILFISH (SSR 572) and SALMON (SSR 573), which had retractable radar/ECM masts, and therefore, could conduct operations at periscope depth, daunting limitations remained.
- Lack of speed/mobility/durability: With their diesel electric/battery propulsion systems they were limited to essentially a static combat area, e.g., an amphibious objective area, such as Okinawa. They certainly could not reposition rapidly, even on the surface, in support, much less run with, fast carrier task groups (now battlegroups) engaged in widely dispersed air strikes against land targets.
- Lack of space: Attempting to squeeze bulky surface ship electronics equipment into a submarine hull was a formidable task that never quite fulfilled expectations. Even the specifically designed SSRs could not accommodate both the requisite equipment and the essential personnel required of a first class radar picket.
- Incompatible electronics equipment: The usually bulky, exclusively vacuum tube, exceedingly high heat-producing electronics equipment of four decades ago simply were not compatible with a closed submarine development.

In short, the SSR concept of 1945-1959 was ahead of its time, technologically speaking. But technological and tactical advances

since then have eliminated all of the foregoing limitations on SSRs. In fact, they have now made the concept thoroughly practical and therefore, tactically compelling. Its time has finally come. Nuclear propulsion and large submarine hulls have resolved the speed/mobility/durability/space limitations. Solid state electronics with their resultant compact, energy efficient, low heat-producing components have resolved the former constraints in that area. And speedy, reliable and secure communications by way of satellites has made even the most complex coordinated environment tactics a reality. For example, at an advance position, an SSRN, without AAW armament, could now make contact with an incoming threat, A/C or missile, and relay that information directly to the fire control system aboard an AAW weapons platform, e.g., CGN, which as yet does not have contact, but which could immediately take the hostile threat under fire.

Thus, in addition to all of the advantages of yore of an advanced SSR radar picket, those inherent in recent tactical innovations are now technologically achievable. Moreover, they can now be had in a relatively short time and at a relatively low cost simply by adopting Commander Haselton's recommendation in the same issue to "imaginatively develop meaningful alternatives uses" for the four Trident SSBNs that may soon be mothballed or converted to other uses.[3] To his "Missions" list, add SSRN.

A Trident hull would make a superb platform for a submersible, multi-purpose, advance station, early warning command and control coordination platform. Removing the missile tubes from the missile compartment—required by treaty—would provide space for a truly first class command and control center. Deletion of the billets required by the missiles should leave room for personnel required by the new mission. Those modifications alone should provide a significant tactical improvement in fleet early warning and tactical coordination capability.

Additional capability could be achieved by installing, say, two vertical launch tubes in the forward torpedo room for Tomahawk or AAW missiles. Then, the SSRN could employ the advantage of its forward station to actually engage shore, sea, or even threatening air targets.

Those four Trident hulls, as well as the four battleships, are invaluable assets that should not be laid up or scrapped. In fact, in these times of budgetary constraints, those assets must be used to their fullest potential, which is considerable. Concurrently, we

must continue to improve our AAW posture in an ever increasing threat environment. Both objectives could be met by converting one of the Tridents to an SSRN.

It is difficult to improve on Commander Haselton's admonition "Use it or lose it!"

NOTES

1. James L. Mandelblatt, Radar Pickets and the Migraine Program, THE SUBMARINE REVIEW, April 1995, pp. 85-89.

2. Samuel E. Morison, History of United States Naval Operations in World War II, Vol. XIV, *Victory in the Pacific*, pp. 233-39, 244, 251-62, 267-80, 281-82, 390-92.

3. Commander F.R. Haselton, Post Cold War Boomer Utilization, THE SUBMARINE REVIEW, April 1995, pp. 96-100.

SILENT RUNNING

Publisher John Wiley and Sons of New York have announced the publication of a new book by Vice Admiral Jim Calvert, USN(Ret.)

It is entitled Silent Running and covers the nine war patrols that Jim made during World War II in the Pacific. In addition to his eight patrols in JACK, which saw that submarine finish the war in the top ten of all U.S. submarines in tonnage sunk, Jim tells of his last patrol in HADDO and its presence in Tokyo Bay for the surrender. He had a most unusual and interesting experience there.

THE BATTLEGROUP COMMANDER'S MOST UNUSED ASSET: THE SUBMARINE

by LT Mike Dulas, USN

An award-winning essay from the Naval Submarine League sponsored contest at the Submarine Officer Advanced Course at the USN Submarine School.

Naval Expeditionary Forces — Shaped for Joint Operations Operating Forward From the Sea — Tailored for National Needs

"The Navy will be part of a *sea-air-land* team trained to respond immediately to the Unified Commanders as they execute national policy." "Naval Forces will concentrate on littoral warfare and maneuver from the sea." These are quotes from the Secretary of the Navy's white paper ...From the Sea of 1992 defining new roles for the nation's Navy in the maritime strategy. ...From the Sea directs the Navy commander to shift his warfighting philosophy from open ocean, blue water naval strategy to those strategies best suited for close-in coastal operations. Littoral operations would include shallow water operations with congested airspace within the enemy's own territory. With military emergencies such as *Operation Restore Hope* in Somalia and *Operation Restore Democracy* in Haiti, it is evident that this policy is in effect. However, examining the tactics used by today's battlegroup commanders, evidently they still do not understand the versatility of all assets at their ready. Specifically, it appears that battlegroup commanders do not understand the multi-mission capability of a submarine. This results in failure to use the submarine to its maximum effectiveness.

The end of the Soviet Empire has resulted in a chaotic perspective of the enemy leaving an unclear picture of the true world threat. It has become more difficult to figure out who is the enemy, obtain intelligence or even just detect their motive. The world is much less a *kinder and gentler place* than it once was.

From the Navy's perspective, we must be ready to carry the fight to the enemy from the sea. Proliferation of arms by small countries has become relatively easy. Of particular threat to the U.S. naval force is the diesel submarine. For a naval force to adequately achieve battlespace dominance, it must be able to

counter the threat from air, land and sea. What better way to dominate the sea than by using a sensor and weapon system that operates within the same plane as the threat? The submarine operates in concert with the ocean to counter the enemy maritime threat from beneath the ocean surface.

Well, it may sound obvious that a submarine would be the best weapon to use against a submerged threat, but it has been my observation of real world operations, exercises and wargames that the use of a submarine is often considered a burden to surface ASW forces. The potential for BLUE on BLUE engagement restrains the surface forces in an ASW attack. If a friendly submarine is operating in the same Joint Tactical Action area, friendly surface forces must positively identify the location of the submarine before executing an attack. Submarines are difficult to communicate with and are even more difficult to locate. The hesitation to attack results in the lack of desire to work in tandem with a submarine.

To illustrate, I provide the following example from a recent wargame matching students from Submarine Officer's Advanced Course (SOAC) with their surface community counterparts, Surface Warfare Officer School (SWOS) in Newport, Rhode Island. Both groups of students are experienced specialists in their own community. In brief, the scenario was: A Non-Combatant Evacuation Operation (NEO) to evacuate approximately 2000 BLUE citizens from the BLUE embassy in country GREEN. Country GREEN is a small country situated on a coast adjacent to country ORANGE. Hostilities are escalating between GREEN and ORANGE and BLUE forces aligned with GREEN. We are the BLUE force and our assignment is to plan the rescue mission. ORANGE forces have a strong naval threat relative to the rest of the region consisting of an aircraft carrier, several small combatant ships and five diesel submarines. BLUE forces consist of an aircraft carrier and support ships, an amphibious ready group for the evacuation and two submarines.

The submarine officers were not able to attend the planning phase of the operation. Thus, the mission was planned solely by the SWOS students. This opportunity allowed me to examine the inherent difference in paradigms between surface and submarine doctrine. As expected, the SWOS students planned the mission well within their familiar frame of reference. In doing so, they failed to fully achieve the goal of the exercise which was to

maximize the use of available forces to efficiently conduct the NEO. Specifically, the operation was conducted almost completely with surface and tactical air forces. Apparently no regard was given to the fact that there were five rogue enemy submarines that had not been located at the start of the problem. My prediction was that it would have been simple for one or two of the enemy submarines to lie in wait on the track of the surface forces. The way the game played out is really unimportant to this discussion (the surface guys got lucky).

The friendly submarines were remotely placed and virtually rendered ineffective. Both of the assigned SSNs were vertical launch (VLS) missile shooters. One unit was assigned *marker* operations to follow the ORANGE aircraft carrier. The second SSN's role was ASW, to hunt for ORANGE diesel submarines—good in theory but the SSN was placed astern of the aircraft carrier and amphibious ready group rending the BLUE submarine ineffective. The amphibious ready group and aircraft carrier were placed at extreme risk entering a war zone with five unlocated enemy submarines. The only real means of detecting them was behind the battlegroup.

Now, had the SOAC students been included in the plan to counter the tactical maritime threat (the diesel submarines and surface forces in the area), the following methods and missions of the SSN may have been implemented: Insert the SSNs weeks in advance to monitor GREEN and ORANGE military activity in an interdiction and warning (I&W) mission. Insert a SEAL or Marine reconnaissance team early to provide on-site advanced intelligence for the amphibious landing. As D-day approaches, the SSNs should begin an ASW sweep down the corridor the amphibious ready group intends to sail, thus clearing any enemy submarine threats from the area. As the amphibious ready group enters the theater to conduct its NEO, the SSN has covertly created a safe path. The SSN can continue guarding the BLUE surface force's flank in concert with other BLUE surface and air ASW forces. Should ORANGE force threats become apparent, the SSN can be readily tasked to counter the threat. In parallel with this guard mission, the VLS equipped SSN can plan a TLAM strike provided by the National Command Authority if consistent with the mission. Finally, as the amphibious ready group and the aircraft carrier groups depart the area, the SSN could clear ahead of the battlegroup any submarine threats that position to intercept.

The paragraphs above are not meant to criticize surface warfare tactics. They are to illustrate the inherent differences in the tactical planning conducted by surface warfare planners and submarine tacticians. As stated in ...From the Sea, the primary goal in theater is "ultimate battlespace dominance". The stealth and covertness of the submarine act as a force multiplier to allow it to change missions rapidly. I submit that in the wargame scenario, it was amateurs planning the mission. Again I state, the wargame exercise illustrates the differences between the paradigms of the Surface Force and the Submarine Force. Submariners would do no better if we were attempting to plan the tactical air strategy. I introduce the synergistic approach. Neither the surface forces nor the submarine forces are independently qualified to plan a mission such as this. Current battlegroup operations do divide the warfare commanders up to micro manage their assets. My observation is that no one has adequately used experts from all forces to truly plan an operation to achieve its maximum effectiveness.

When questioning the SWOS students about why they did not make better use of the assigned subs, interesting misconceptions were noted. One response highlighted was "although submarines are multi-mission, they can only conduct one mission at a time". True statement. However, the submarine can change roles and missions as fast as you can say "Dudley *Mush* Morton". As illustrated above, a submarine can move from one mission to the next in a matter of hours and can perform functions of multiple missions simultaneously. A second reason stated for not using submarines was that it was too difficult to communicate with the submarines. Waterspace management issues become too difficult to resolve in a hot war situation. This just takes training. Just because it is difficult does not mean it cannot be accomplished. During my tour in the Operations Department at COMSUBLANT, I witnessed the growing pains of battlegroup operations by participating in several fleet exercises in which tactical command of the two to three submarines were shifted to the battlegroup commander. No doubt communications with the submarines were difficult, but the lesson learned was that you had to plan. The concept of submarine broadcast delivery time seemed somewhat of an enigma to surface forces for a long time. The SSN does not need to communicate with multiple warfare commanders at any given time. The SSN is an extended weapon and sensor system

and needs only to report to the ASW commander.

Clearly the threats encountered in the above scenario are very real today. These threats are often considered as two dimensional. By two dimensional, I mean that the surface force has two primary missions: the short term, tactical mission—to protect the aircraft carrier, and the long term mission of logistics—sustaining operations over long periods. The submarine brings the third dimension to the table: the maritime mission—guarding against the threats in the ocean. The ASW maritime threat develops much slower than the tactical air picture. An ASW threat may take several days to manifest itself and several more days to exterminate. To adequately plan for such a threat, the battlegroup commander must surround himself with type commander level submarine experts. These are experts in maritime tactics that can most effectively advise the battlegroup commander on the best method of countering the threat at sea approaching the littoral waters.

Not all the faults lie with battlegroup commanders. Submariners are not as proactive as they could be in helping the battlegroup commander solve his problem. Submariners are raised to be independent tactical thinkers of the Cold War doctrine and of their World War II predecessors. During my shore tour at COMSUBLANT, I noted reluctance to provide a submarine asset under the tactical command of the battlegroup. The reluctance stemmed from concerns for waterspace management (preventing BLUE on BLUE engagement) and from prevention of mutual interference (preventing BLUE bumping BLUE) standpoint. The submarine operations specialists felt that the battlegroup qualifications were not up to the task. Vice Admiral Emery had the vision to see how the Submarine Force must assert itself and be involved in the littoral environment or be left behind. Therefore, this was a paradigm we had to change. It is much easier to stand back and criticize rather than take the proactive approach to work with the battlegroup commander. For us as submariners, providing our tactical expertise to the battlegroup commander will greatly enhance the ability to achieve that synergistic relationship resulting in more effective mission employment.

To conclude, battlegroup operations in littoral waters are tough. I think there are two fundamental ways to reduce the difficulty. First, warfare commanders and battlegroup commanders must realize and truly understand the robust multi-mission capability of

the submarine. This can be best done through instruction at the communitys' department head school. Both SWOS and SOAC provide direct input to the fleet. What I take with me to my next ship is considered the most modern and advanced guidance. Secondly, the battlegroup commander must surround himself with submariners during the tactical planning phase of a mission. The submariner looks at the problem from a third dimension. The ASW threat is more real to the submariner and he has trained his whole professional life to counter this threat. Let him aid in the planning.

As well evidenced in recent years, the small littoral conflict will not go away soon. Keys to success are to understand the forces available, tailor those forces to anticipate the threat and support the national needs.

■

Dr. Karel Montor, a member of the faculty at the U.S. Naval Academy is working with the Naval Doctrine Command to develop a case book covering Navy Combat leadership, and is specifically interested in personal examples on individual, ship or unit bases. Combat should be construed as including high tempo operations and fear of enemy action, even though an actual weapon might not have been fired.

Please call Dr. Montor (collect) at (410) 293-3350 or write to him at the U.S. Naval Academy, Annapolis, Maryland 21402.

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Extracted from a list furnished by Captain (Eng. Corp) Attilio Raniere, Italian Navy, Director of the Scuola Sommergibili. Shown below are a number of the Italian Language books and collections of articles in the Italian Submarine School Library. Not shown are many other books and individual articles in English, French, German, Italian and other languages. The translated titles are more literal than idiomatic. Publications of non-Italian origin have been shown in order to demonstrate the wide range of literature available to the Italian submarine school student.

Captain Ernest A. Till, USN(Ret.)

[Captain Till commanded WOODROW WILSON and went on to serve two tours in Italy. One as Chief of Staff to COMSUBMED in Naples, and one as Defense Attache in Rome.]

Note 1. U.S.M.M. = Italian Office of Naval History
Note 2. A.N.M.I. = Italian National Naval Association

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Sargent Industries, the direct ancestor of today's Sargent Controls & Aerospace, was founded by Sumner Benedict Sargent in 1920. Sumner was a designer and manufacturer of oil well equipment and tools; the first factory was in his backyard garage at Huntington Park, California. His company prospered, and expanded into the aircraft hydraulic valve market in 1935. Sargent hydraulic components were used on nearly every U.S. aircraft during WWII.

Subsequent to the war, Sargent closely collaborated with Electric Boat and the U.S. Navy in the transition from poppet-type hydraulic valves to the aircraft-type slide and sleeve valve, used throughout our submarine fleet ever since. This commenced an association with the Submarine Force that has prospered to this day, with Sargent components aboard every U.S. submarine since NAUTILUS. In the '70s, Sargent expanded into quiet hydraulics and servo valves; marine hydraulics became the major portion of Sargent's business. Sargent won a large portion of the design and production of both Trident and Seawolf hydraulic components.

Sargent was purchased by the Dover Corporation in 1987, and shortly thereafter moved to a new, modern plant in Tucson, Arizona. This 65,000 square foot facility with its total engineering capability manufactures all Sargent products. In addition to submarine and aircraft fluid components, Sargent Controls and

Aerospace also designs and manufactures a wide variety of specialty bearings for aircraft, plus many other industrial uses.

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Presearch in an innovative, high technology services and products company which as a long-standing association with the Navy and the Submarine League. Founded in 1963 by its current CEO, Len Gollobin, Presearch continues to provide valuable analytical and engineering services, as well as high tech products to the Navy, Army, other government agencies and commercial clients.

At its beginning, Presearch provided the Defense Department analytical services which were instrumental in the decision process for research and development of undersea weapons systems, including torpedoes, mines, and sensors. Presearch gained a reputation for excellence through forthright studies, analyses, and independent assessments which, over more than 30 years, provided to decision makers and program managers valuable and critically important data and information. Some examples follow:

- Technical and operational assessments of sensor and weapons developments under the purview of Program Manager ASW Systems Program (PM-4).
- SEAPLAN 2000. The study to support SECNAV's 600 ship Navy.
- Mk 48 torpedo simulation and engagement scenarios to assess effectiveness and platform tactics.
- Mk 50 torpedo design options evaluation, platform compatibility and P_k.
- CAPTOR design performance prediction, minefield measure of effectiveness and countermeasures.
- Surface ship noise specifications and quieting.
- Mining and MCM for Haiphong.
- Submarine/ASW simulation and modeling; including one-on-one and multiple engagements.
- ASW master strategy and investment studies, ASW force levels and development of the Annual ASW Master Plan.

- SLMM and Quickstrike design evaluation.
- Surface Ship Torpedo Defense simulation and modeling to assess performance in various scenarios.
- Trade-off studies and tactics development.

Presearch has grown in its scope of activities over the years. Including its wholly-owned subsidiary, Control Concepts Incorporated, Presearch employs just under 200 people who have experience and expertise to solve complex systems engineering problems and can provide effective analytical and acquisition management support. *Presearchers* included analysts, acquisition specialists, operational researchers, scientists, warfare areas specialists, and engineers. The diversity in talent permits Presearch to perform effectively with highly integrated project teams. The scope of activities over recent years has trended to application of high technology into products for commercial and government clients. Over more than 10 years, Presearch's strategy and emphasis on application of state-of-the-art technology into advanced technology prototypes, design engineering, and systems production have resulted in a company which has maintained its original analytical capability and has proven expertise in computer systems, massively parallel original analytical capability and has proven expertise in computer systems, massively parallel signal processors, algorithm development, software design, software tools integration for specialized applications, software and displays for naval applications, digital video image recall for physical security, and information technology application for intelligence analysis processes.

Presearch's capabilities in systems and software engineering have been and continue to be evident in Navy and submarine combat systems. For example:

- Display software development for the AQS-20 minehunting sonar for helicopters.
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- Application of COTS hardware, software, and Presearch designed algorithms into a Non-Traditional Acoustic Program to demonstrate new signal processing techniques.
- Mil-Std computer code for the AN/BSY-2 and AN/SQS-89 combat systems.

- Design, engineering and manufacture of a digital video image capture system for enhanced physical security of sensitive installations.
- Software and display for the Interactive Multisensor Analysis Training (IMAT) system for acoustic training within the Submarine Force and other undersea (mine warfare) training.

Presearch corporate headquarters is locate in the McLean/Tysons Corner area in Fairfax County, Virginia. Other Presearch office sites in the United States are located to best serve customers, with the largest being in the Crystal City area to support NAVSEASYSCOM, SPAWARCOM, and PEOs for Undersea Warfare and Mine Warfare.

Presearch, as a corporate sponsor of the Submarine League, has shown its valuable service to the Navy over the past 32 years and continues as a strong supporter of Navy League activities and its strategy towards the future of the Submarine Force. ■

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LETTERS

WAHOO MEMORIAL IN JAPAN

The summers are short in Wakkanai but if things go right, another memorial will grace the real estate of Cape Soya, Japan. Joining the KAL 007 airliner memorial dedicated there on the Cape in memory of the 269 people who perished when it was shot down in 1983, will be a WAHOO (SS 238) Peace monument.

Japanese WWII submariners and JSDF, among others in the Empire, are enthusiastically building a Peace Memorial, in conjunction with several American counterparts. Dedication is scheduled for September 9, 1995. The effort all began with my 1992 Space A visit to those parts at the pleading of George Logue in Williamsport, Pennsylvania. His older brother, Robert, lies entombed with Commander Dudley Morton and his WAHOO crew.

The village of Wakkanai, near Cape Soya, came alive as I groggily wandered into a hotel after an all night train ride, north from Sapporo. An earlier NSL publication describes what I encountered with locals who helped cause COMSUBPAC years ago to announce "overdue and presumed lost". There were no hard feelings then and our fellow world submariners there, in tribute to both their lost shipmates and ours in the boats, are today showing their comradeship by both erecting the memorial and splitting the cost, some five million yen or $60,000, with this U.S. committee, a small group. The Japanese have already raised more than their share. We currently stand short of some $19,000.

Thus we ask all friends and relatives of WAHOO to send any contribution in memory of *Mush* Morton and his crew to: George E. Logue, Secretary, Peace Memorial, 120 So. Arch St., Montoursville, Pennsylvania 17754; phone (717) 368-2636. Write the check to: WAHOO Peace Memorial 1995.

Full credit goes to Bill Barlow of Muncy, Pennsylvania for his design of the memorial plans. Bill teaches architecture at the Pennsylvania College of Technology in Williamsport, Pennsylvania.

In memory of his dad, Douglas Morton chairs the American side of the effort. Captain George Hendricks is his assistant. Hendricks, an active Naval Reservist, works for the Hazeltine Corporation in Massachusetts. Mr. Logue heads a construction/machine shop company in Williamsport, Pennsylvania. I am

Treasurer and I am a WWII retired Navy submarine CPO.

Steering this project along in Japan is our trusted mentor, Dr. Larry Hagen, a former U.S. Marine and current Baptist missionary who has lived in Japan for the past 35 years. Fluent in Japanese, he guides this effort with spirit and determination. Larry can be contacted at: Baptist Bible Church, 3-16-25 Sakae, Wakkanai, Hokkaido 097, Japan; phone (011) 0162-23-5710.

Dr. Hagen's direct link with the building work is with the Project Supervisor there in Cape Soya, Mr. Satoru Saga, President, Kitami Shokai Co. Ltd. (real estate) at: 3-11-4 Chome Chuo, Wakkanai 097, Hokkaido, Japan, phone (011) 0162-23-5710. While he speaks no English, his fervor in the Peace Memorial is a reflection of his chairmanship of the Old Navy Association in Wakkanai City.

Clearing the way on higher channels is Mr. Mark B. Lambert, 2nd Secretary, Political/Military Affairs at our U.S. Embassy in Tokyo. Also involved is Rear Admiral Byron E. Tobin, Jr., USN, Commander U.S. Naval Forces, Japan.

Ceremonies for this dedication are to be held at the beautiful, brand new Nikko Hotel in downtown Wakkanai. Unveiling of the memorial that shares soil from our own Statue of Liberty grounds, will take place high atop the Cape, some ten miles to the east of the city and only twelve miles from WAHOO's current berth.

Martin F. Schaffer, Treasurer
Peace Memorial
1710 Elm Street
Allentown, PA 18104
(610) 433-7737

REQUEST FOR INFO ON JAPANESE SUBMARINES

I hope you will help me in finding American reports on Japanese submarines of WWII. I have been searching for the following reports for several years and have written to all official institutions whose addresses are known to me in the USA, GB and Australia, but I have not been able to find them. The reports, as I know them, are:

- Preliminary Report on Japanese Submarine Forces - Subron 20
- Japanese Submarines and Submarine Material in Western

Japan - Subron 13

These reports are the result of US examination of IJN's submarines ordered by the Commander of the American Submarine Force, immediately after the end of WWII.

After the war USN took several IJN SS to Hawaii for close inspection and investigation. Among them were the I 400, I 401, and I 14 aircraft-carrying SS, then the largest ones in the world. Also the high underwater speed submarines I 201 and I 203 and the smaller Ha 209. I am sure that there have been written detailed reports on these investigations and I highly desire to have copies (either xerox copies or microfilms).

If any members of the League know of the existence of other material/sources on IJN SS (e.g., intelligence reports) I would appreciate any information about them.

I would be grateful to hear of any possible source for a copy of the aforementioned reports and any others still unknown to me. Of course, I agree to repay all expenses my request may cause.

Very sincerely yours,

Hans Lengerer
Rappenhalde 6
D-88447 Birkenhard
Germany

COMBINED SURFACE/SUBMARINE MAINTENANCE

An article in the Navy Times issue of September 4 has produced a shiver of uneasiness in this old quality assurance practitioner. It speaks in laudatory terms of a new "one-stop repair site" in which "the Navy has brought repairs to surface ships and subs under one roof". *[Editor's Note: The lead of the referenced article is excerpted below.]*

> *"A new intermediate maintenance facility on the Pearl Harbor submarine base—the first of several regional repair centers—combines surface ship and submarine repair into one new building with 180,000 square feet of working space and 250 pieces of industrial equipment. All were moved from the old submaine base repair facility and surface shore intermediate maintenance activity from December 1994 through April."*

I am not made more comfortable by the statement of Admiral Zlatoper that "This will free up people" or by Commander Burrill that "Submarine maintenance has a discipline that makes us envious." I doubt that submarine quality control discipline is now going to be applied to all repair work for the surface fleet. I only hope it will continue to be enforced for work on submarines.

Sincerely,

John D. Alden

CDR, USN(Ret.)

98 Sunnyside Avenue

Pleasantville, NY 10570

STEALTH AT SEA: THE HISTORY OF THE SUBMARINE

by Dan van der Vat
New York: Houghton Mifflin, 1994
374 pages, $30.00, ISBN 0-395-65242-1

Reviewed by CDR Sam J. Tangredi, USN

Commander Tangredi is a Surface Warfare Officer currently enroute to command. He holds a PhD in international relations and was most recently speechwriter for the Secretary of the Navy. He is a frequent contributor to ***THE SUBMARINE REVIEW.***

A much more accurate title for this book would be: *Submersibles at Sea: A History of Diesel Submarine Operations in the World Wars*. The trouble is that, despite the title, it makes no effort to discuss what constitutes *stealth* in modern warfare, and its account of history after World War Two can only be described as *cursory*.

That is not to say that Stealth at Sea is a bad history. Actually, it has one of the best accounts of Royal Navy submarine operations to be found on this side of the Atlantic, particularly about those "private wars", as the author calls them, conducted by the commanding officers of British submarines trapped *behind the lines* in peripheral theaters, such as the Baltic. It also provides a coherent account, from a British perspective, of the inter-war naval treaty negotiations that threatened to *outlaw* the submarine.

There is a very apparent bias against nuclear submarines. Despite the fact that only one out of the book's eleven chapters discusses nuclear powered submarines, certainly a lack of balance for a book advertised as "The History of the Submarine", the author spares no opportunity in taking swipes at nuclear power. Dan van der Vat is obviously unhappy that the Royal Navy invested so much money on the Trident SSBN program, particularly after the Cold War ended. The decision to continue this program irks him because it indicates that the British government "would rather sacrifice any item of public expenditure in its unprecedented debt crisis than this totem of status".

But not content to slam Her Majesty's choice in this matter, van der Vat is ready to assign all SSBNs and SSNs to the ash heap

of history. In his view, nukes are irrelevant now that the Soviets are gone, and "few in the west seem prepared to ask such embarrassing questions" as whether "these amazing but staggeringly costly nuclear weapons systems" are to be more than mere "underwater missile-silos against an unidentified enemy, reactor powered picket boats" or "billion dollar dinghies for commandos".

The result of the author's perspective is a history that effectively ends in 1945. The reader could devour this whole book without ever encountering the fact that **nuclear submarines are qualitatively different than diesel boats.** It is not until the *very last* paragraph of the book that van der Vat admits that nuclear boats are "true submarines" (as opposed to submersibles) that embody "real stealth at sea".

The book's polemic side would be more effective if he: (1) simply stuck to his skeptic's hypothesis that "diesel boats with the latest electronics, electronic countermeasures, stealth technology and submarine weaponry cost half as much and could carry out the majority of these tasks without the added risks of reliance of nuclear power", and (2) provided comparative cost calculations.

Since the historical portions of the text make it obvious that aircraft were the Allies greatest asset in fighting the U-Boat, it is surprising that van der Vat forgets to deal with the problem of a diesel boat's need to come to the surface periodically. Or maybe it is understandable, since the separate-service RAF effectively dismantled British naval aviation at the same time as other nations were developing their naval air capabilities.

Good grades must be given to the seven-eighths of the book that is an operational history of submarines in World Wars One and Two. The British perspective ensures that the focus remains on the Royal Navy, which means that the book contains interesting facts not known to American readers. Also, the opening chapter is one of the more complete accounts of early attempts at building submarines. Most American books on the subject neglect the European would-be inventors.

Van der Vat's account is also unique in that it ties early American and European submarine building closer to the efforts to perfect the weapon that made the submarine a weapon—the Whitehead torpedo. Perhaps American accounts are weak on this score because the pre-World War Two U.S. Navy forgot that the sub's main mission was to put working ordnance on target; hence, our faulty, infrequently tested exploders.

His account of German submarine operations is also good, though there are more thorough histories to be found elsewhere. His treatment of U.S. and Japanese submarine operations are comparatively brief, but also steady. But while acknowledging the importance of Ultra, Magic and other intelligence efforts in defeating Axis submarines, the relationship between the "stealth weapon" and operational intelligence and counter-intelligence is not extensively developed.

There is yet another off-setting aspect to the book. Throughout selected chapters, van der Vat adopts what Americans have come to think of as the British journalist's typically snide tone concerning military matters: a sort of *there's something wrong with our bloody Admirals today* attitude. This approach seems to make the coordination of relentless undersea warfare campaigns seem somewhat less heroic and important than the bold, but strategically-less-than-significant "private wars" of individual submarine commanders. It also makes tactical naval combat seem more dashing, but also less technically difficult than in reality. From that perspective the book has color but not depth. Quite frankly, the author seems quick to sniff incompetence in those situations where *too tough for human beings* is a more likely explanation.

Despite these faults, Stealth at Sea does deserve a place in the libraries of readers who *already know* much about sub capabilities and want a non-American perspective. But I don't recommend it for general readers until the publisher changes that tempting, but entirely misleading title. In purchasing this book, you are just not getting a full history of the submarine.

IN IRONS: U.S. MILITARY MIGHT IN THE NEW CENTURY
by Harlan K. Ullman
London: Gerald Duckworth & Co. Ltd., 1995
265 pages, ISBN 0-7156-2652-3
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The Royal United Services Institute, 1995

Reviewed by Alan L. Breitler

This book presents some interesting perspectives on the future of our military forces and influences of international and domestic pressures that will impact U.S. defense effectiveness in the coming decades.

Using the term *in irons* to indicate the state in which a ship would drift in a windless sea as the crew *suffered the agonies of slow death*, Harlan Ullman applies this term to the possible future of a defense establishment that is beset by complacency brought on by the lack of a credible international threat, increasing competition for the federal dollar, and the general public's perception of U.S. military superiority. The book is a cleverly woven logic screen through which the author passes ideas and concepts, weeding out those options that do not appear practical or sensible, and examining the results that remain in order to reach recommended conclusions.

The U.S. military establishment, having experienced the challenges and problems associated with four drawdowns since 1945, is now faced with a set of new problems that may well change the very character of the armed services. The series of analyses that constitute this book begins with a study of the history of these four drawdowns: the post WWII drawdown overseen by President Truman; the post Korean drawdown in President Eisenhower's administration; the post Vietnam reduction lasting to President Carter; and the *base force* reduction at the end of the Cold War started by President Bush and continued by President Clinton's Bottom-up Review (BUR). Currently the BUR is the basis for defense budgeting, but the cost estimates are too low and the range of mission responsibilities for DOD is too broad, having "established new roles and objectives that exceeded both the authority and capacity of DOD to address in effective and comprehensive ways".(p.46) This factor, combined with the underfunding stated in the BUR, set up the military for a hollow force future. But it is a future which can be avoided.

While the historical analysis is thorough and clearly presented, the numerous charts and graphs to demonstrate the drawdowns could have been more supportive of the main point; the case presented here could have been more convincing with a single graphical chart showing indexed annual dollar expenditures on defense from 1950 to the present. Beginning on page 37, and throughout the book, Ullman uses the term *readiness* without benefit of a definition, although acknowledging that it is as much

a perceived as a real quality.

After this background on drawdowns, there begins a discussion of strategic uncertainty that ends with the conclusion that "the world of the new century may in fact not be as dangerous a place as some suggest regarding absolute or relative risks to the United States".(p. 60) Somewhat glossed over in this evaluation are the risks from nuclear weapons in the hands of terrorists, terror-promoting states, or a former Soviet Union member now unencumbered by a strong central government and disciplined military. Nonetheless, the author presents a credible argument that external threats to the United States have diminished, certainly in the minds of the populace if not in reality. But the U.S. will still need standing forces to protect itself in what is still a complex and dangerous world.

Adding to the military's problem with public perception of a reduced threat is that growing preoccupation with domestic problems, the inability of the government to come to grips with economic and budgetary issues, and the fact that national defense funds are becoming increasingly synonymous with discretionary funds to the exclusion of entitlements and other domestic accounts. In the author's words:

> "...non-discretionary or mandatory spending—that is, accounts the government is legally obligated to pay, such as entitlements and interest—have grown to about 70 percent of the $1.5 trillion annual federal budget. Of the remaining third of the budget that is discretionary, about 60 percent goes to defense and the remaining 40 percent goes to discretionary entitlement programs that are all domestic in nature."(p. 69)

The focal point of this discussion is that the process of defense downsizing is prone to a slow evolution because of inaction or inattention, and that such an evolution would not necessarily avoid hollow forces unless and until the situation became demanding of remedial action or a new threat developed.

Having dealt with problems facing military budgeting, Ullman turns to a discussion of military underfunding. The severe underfunding of the military budget is placed at $120-150 billion in the current five year budget.(p. 78) Three scenarios emerge from this discussion as possible future outcomes: a *hollow force* resulting from continued underfunding of the BUR force structure; provision of adequate funding for the BUR (with all the budgetary,

tax, and economic implications); or a revised national security policy.

Force structure, including organizational relationships as well as individual morale and *esprit de corps*, is impacted by many factors: the defense budget; priorities of force basing; weapons systems and organization of fighting power; proportion of forces forward deployed; readiness levels; dependence on reserves; mobilization and reconstitution; emphasis on modernization; rates of integrating modern technology; and degree of reliance on allies, international organizations, and other policy instruments.(p. 110) There follows an examination of force structure and budgets which seeks to answer the following questions:

- What forces are needed?
- What force capability and structure can be sustained and justified politically and economically?
- How can we get from where we are now to where we want to be while maintaining security and affordability?

Based on historical comparisons across administrations from Truman to Bush, the answers provided envision a force level between 750,000 and 1.4 million supported by about four percent of the gross domestic product (between $150 billion and $270 billion in 1994 dollars). The type of force structures considered are the "garrison force" envisioning permanent land based deployments to various regions (discarded because of inherent *inflexibility*); a maritime force requiring principal reliance on naval forces (discarded because of "stifling interservice rivalry and pernicious results for the nation"); reconstitution, using a base force and heavy reliance on reserves (discarded because it would be viewed as "American entrenchment" and "exacerbate uncertainty and possibly instability with the demise or decay of U.S. leadership"). Maximum versus staggered readiness (where only some units would be at full readiness at any given time) is also considered.

The author then considers the possibility of reducing commitments and presence in order to permit reduced force levels. Presence comes under particular attack for its ineffectiveness in preventing adverse actions or providing any significant advantage in their event, except for the advantage of access. Minimal reserves and guard forces are also recommended. To reduce the costs involved in maintaining deployed forces, the author suggests a method of providing more limited presence by the quality and

timing of the deployment rather than by the quantity or length of deployments (i.e., be *smart* in demonstrating commitments). Guaranteeing access by means of agreements for port facilities, overflights, supply bases, etc., is viewed as more useful than demonstrating commitment.

Staggered readiness would further reduce costs without severely compromising the capability to deploy and fight quickly. To ensure the capability to handle one-plus (military regional conflicts) MRCs, the U.S. has to forge new regional and local alliances that will work much like NATO and can be focused by regional forums modeled after the Conference on Security and Cooperation in Europe (CSCE) to bring stability and security to each region of the world, whether it be the Middle East, Asia or Africa.

On the administrative side, the tail has been outmaneuvering (and currently outspending by about 2:1) the teeth for too long, and it is time to implement base closings and, more importantly, realignments, that will allow the services to continue maintaining, training, equipping and supplying troops in an efficient and effective manner. Further cost reductions can be achieved by providing for acquisition reform, since current support levels are about 10 percent of the total DOD budget (i.e., $20-30 billion per year according to Secretary of Defense William Perry) for procurement regulation and oversight. Furthermore, the percentage of funds devoted to infrastructure support is increasing while "teeth" receives less.(p. 157)

Expanding on this triple branched scheme for the future, the author observes that there is an absence of *vital strategy* which will make it likely that "severe compression and contractions in military might are inevitable".(p. 106) The three options are now renamed as follows:

- Steady as you go (i.e., take no action)
- Fund the BUR force (i.e., free up resources needed)
- Readjust and change

The "steady as you go" option will lead to a hollow force as funding erodes and the infrastructure chews up greater and greater proportions of available resources. The "fund the BUR force" option is not viable in today's climate of a dimly perceived major threat and competition by domestic programs for the federal dollar combined with the improbability of a tax increase. The "readjust and change" option has the greatest potential for preserving the

quality of our defense establishment. This option requires efforts to reduce costs for infrastructure, reserve and guard forces, acquisition, and forward presence while forming alliances that will fill the gaps thus created and ensure the capability to react effectively to one-plus MRCs.

The final recommendations under the "readjust and change" approach include a revised force level and structure that assumes a one-plus scenario for MRCs wherein the U.S. would be able to fight one MRC with regular forces and a second MRC with somewhat reduced levels of reserves and guard forces, and allied forces. The structure would be basically an extension of the BUR force structure, with no service having a radical change in mission or force levels. Lastly, the author suggests a mechanism by which national leaders could examine and select a fitting force structure and budget allocation for defense.

The recommended solutions laid out by Ullman are logical and straightforward. While the author does acknowledge that unforeseen conflicts could cause a reversal in force reductions, the harsh reality of the political process is not fully dealt with. The neatly packaged solutions are not likely to be accepted. Yet whatever finally emerges, the book provides a foundation for the commencement of discussion and planning that is urgently needed to keep the military *out of irons*. Furthermore, while the book requires close reading and some work by the reader to organize ideas and identify themes, it is nonetheless a thought provoking approach to the major questions facing our national political and military leaders, and fully deserves the time required to gain added perspective on these questions and related issues. It is also a warning shot across the bow of our Ship of State that the time to consider, readjust, and change is now, before events and circumstances allow our military establishment to drift into a downward spiral from which recovery will be difficult. To paraphrase Coleridge's *The Rime of the Ancient Mariner:*

> *Down dropt the breeze, the sails dropt down,*
> *'Twas sad as sad could be;*
> *And we must speak now to break*
> *The silence of the sea.*

■

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