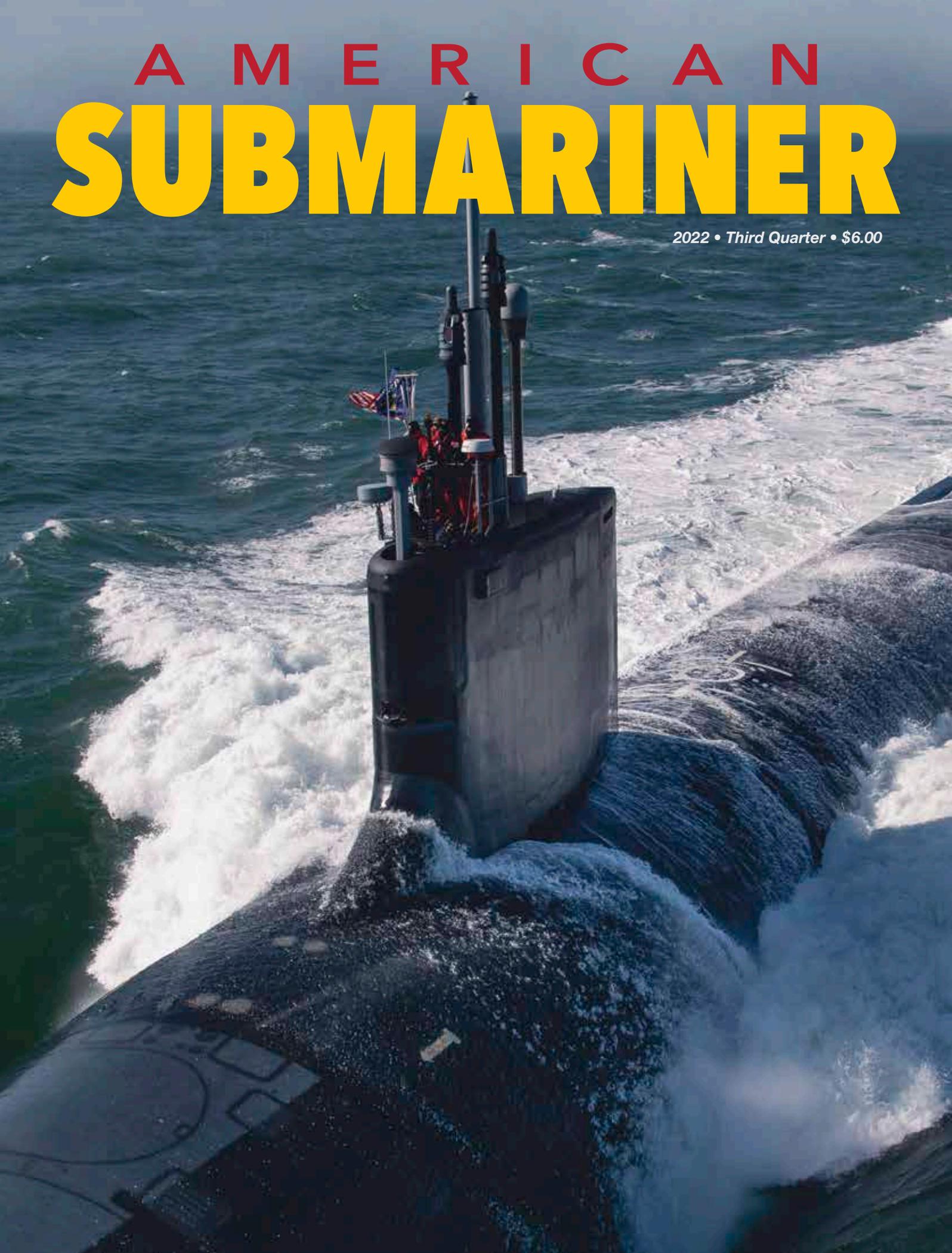
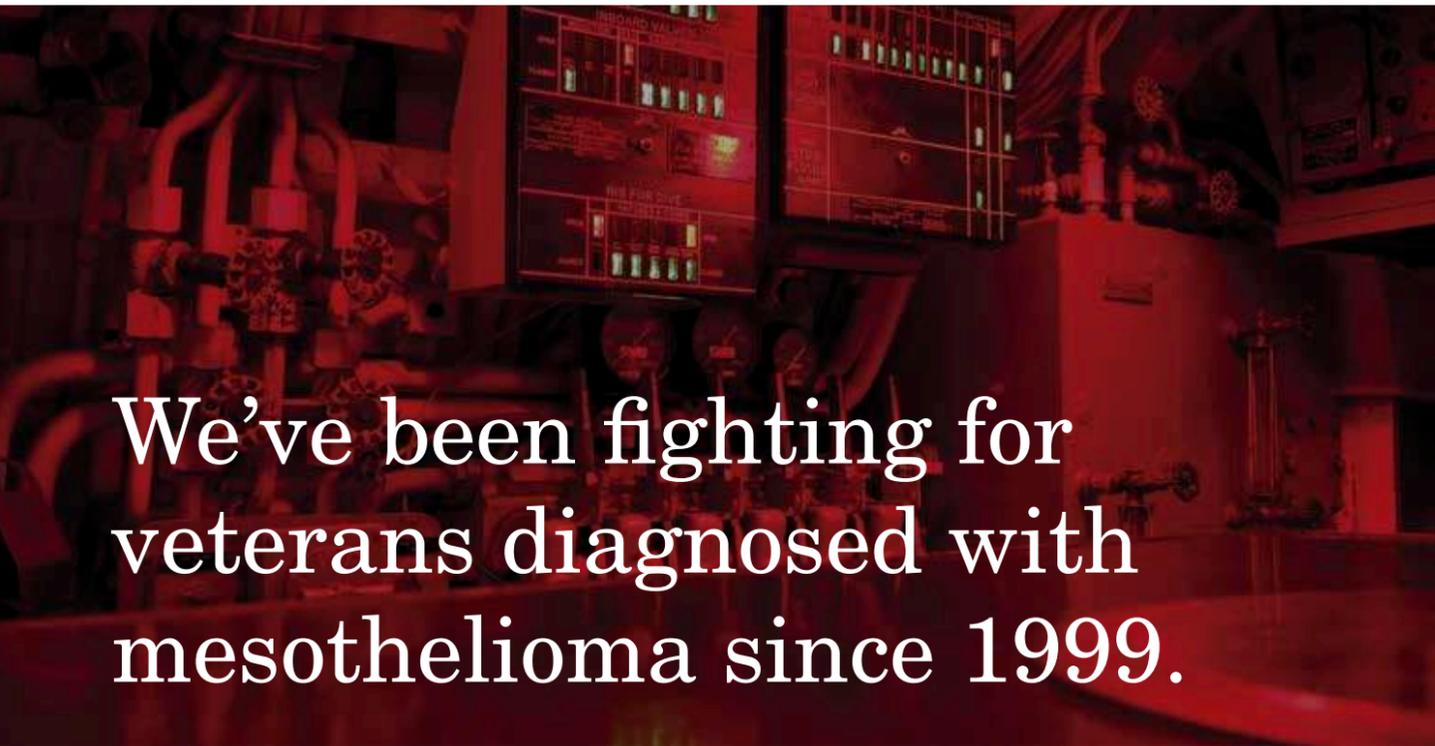


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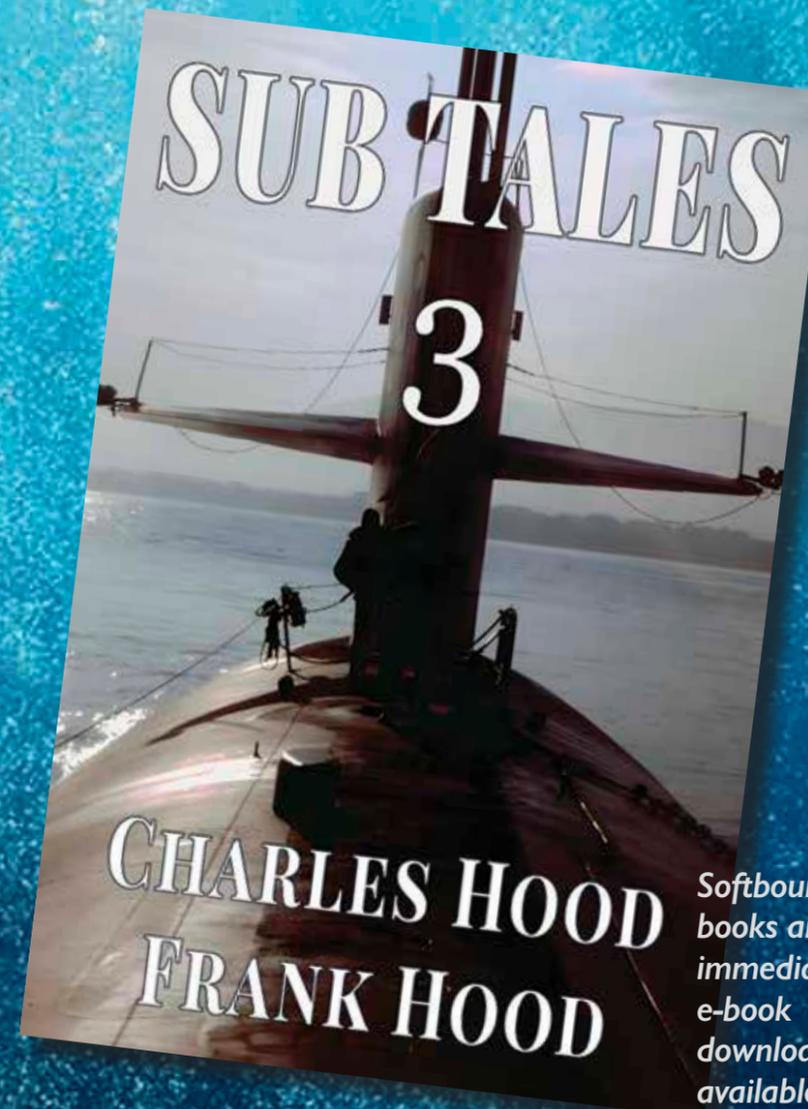
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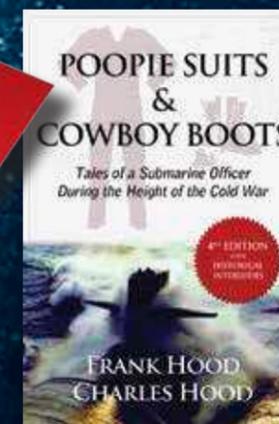
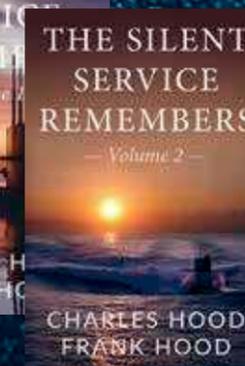
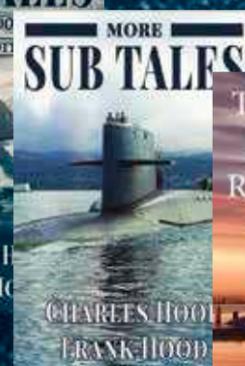
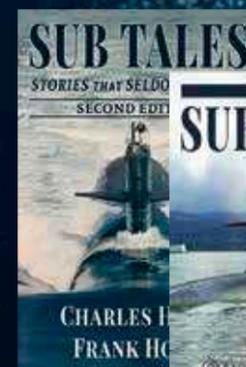
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The official magazine of the United States Submarine Veterans, Inc. is published quarterly by USSVI. United States Submarine Veterans, Inc. is a nonprofit 501(c)(19) corporation in the State of Connecticut.

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Article submissions should be sent to editor@americansubmariner.org. Submission does not guarantee publication. The *American Submariner* reserves the right to refuse, edit or modify submissions.

DEADLINES

First Quarter December 1
Second Quarter March 1
Third Quarter June 1
Fourth Quarter September 1

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2022 USSVI NATIONAL ELECTION ONLINE VOTING

The USSVI National Election is now open and continues until 2359, August 15, 2022.

Members can vote on the interim USSVI website at www.ussubvets.org. Clicking the "Vote in Election" button will take you to the ballot, where you can cast your vote(s) or write in a candidate of your choice.

Note that your Regional Director vote reflects the location of your primary base and may differ from where you live. You can only vote for the candidate representing the region in which your primary base resides.

If voting using the paper ballot in the Q2 issue of *American Submariner*, your ballot must be received by the Election Master no later than August 15, 2022, to be counted.

Candidate statements and the text of the proposed amendment are published in the Q2 issue of *American Submariner* on pages 16 and 19.

THE VIEW FROM THE BRIDGE



Wayne Standerfer
National Commander

Shipmates,

My final term as your National Commander will be coming to a close after our 2022 Board of Directors Annual Business Meeting next month in Buffalo.

For me personally, the last four years have alternated between periods of exuberance and uncertainty.

Exuberance when sections of our membership from top to bottom put away some old resentments and grudges and began collaborating with each other to accomplish the stated goals of our "Purpose/Creed."

Exuberance when the seemingly constant barrage of criticism directed toward our leadership at the national level subsided considerably. I attribute this to the conscientious effort put forth by members of our chain of command from top to bottom to improve communications, listen to members' concerns, and fulfill the responsibilities of their position.

Now for the uncertainty. Starting in January 2020, our country encountered a devil in disguise in the form of COVID-19. None of us knew anything about this virus, especially how to combat it.

Over the next several months, we were told to stay indoors, wear face masks, and keep a six-foot distance from each other. In other words, isolate ourselves as much as possible. These largely mandated restrictions contradicted everything usually practiced by an organization that considers camaraderie and personal contact two central cores of its existence.

But with submariners' unique ability to improvise, online virtual meetings replaced these constraints at all organizational levels. Granted, the level of participation noticeably dropped, but at least the old adage "out of sight, out of mind" was reduced considerably.

Real progress is being made on our new website! Regular updates are now going out, so I will not go into much detail except to say we owe great gratitude to our new in-house development team of Bill Stuple (Volunteer Base), Gerry Smith (Wyoming Base), Vinny McCrum (Volunteer Base), and Chairman Tim Carlisle (Mare Island Base Commander). These shipmates, Bill Stuple in particular, have spent untold 24/7 hours converting and merging our old website database so it can be integrated into our new website. It's currently under construction by Blackbaud and scheduled for launch in late August or early September.

Our interim website (ussubvets.org) is now accessible using almost any current browser, primarily through the efforts of Gerry Smith.

These shipmates have achieved in only four months what several mainstream website development companies said could not be accomplished at all.

By way of concluding, I want to thank all of you who have contributed to making my time as your National Commander a cherished period of my life.

Shipmates, it has been a Privilege and Honor.

Respectfully,

Wayne Standerfer

On the Cover

The future *Virginia*-class attack submarine *Montana* (SSN-794) conducts initial sea trials, February 1, 2022, in the Atlantic Ocean. *Montana* is the twenty-first *Virginia*-class submarine.

U.S. Navy photo courtesy of Huntington Ingalls Industries by Ashley Cowan.



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USSVI PURPOSE

"To Perpetuate the memory of our shipmates who gave their lives in the pursuit of their duties while serving their country. That their dedication, deeds and supreme sacrifice be a constant source of motivation toward greater accomplishments. Pledge loyalty and patriotism to the United States of America and its Constitution."



FROM THE WARDROOM



Jon Jaques
National Senior Vice Co mmander

Shipmates,

As you know, this is an election year and I encourage you all to vote next month. It takes a lot of time and effort to successfully manage a national organization of this size, and it can't be done without committed leadership. I appreciate our shipmates who have stepped up to become base commanders, district commanders, and regional directors. They are all vital parts of our leadership team.

In 2024, the board of directors will have new faces, and I hope you'll consider this opportunity to serve your shipmates in a leadership role over the next election cycle.

Our upcoming convention is in Buffalo, New York and it should be an exciting location. There is so much to see and do in that area! I do hope you'll join our USSVI family at this gathering.

One of my primary responsibilities as senior vice is to oversee the financial condition of the organization. Back in February, we had a review of our finances conducted by our regional directors, headed by Central Region Director, Tom Williams. Their report cited no issues in the handling of our finances. As an organization, we are being affected by stock market fluctuation and inflation just as you are. But we believe we're managing these difficult circumstances in the best ways to serve our organization.

I'd like to express my gratitude to outgoing National Commander Wayne Standerfer for the job he has done. Wayne has spent countless hours working on issues facing USSVI—updating our website and navigating the COVID pandemic being just two of them. He has always had the best interests of subvets in mind in all his work. Thank you, shipmate!

Please let me know if I can ever be of service to you.

Jon

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Steve Bell
National Junior Vice Commander

Shipmates,

How time does fly. We have two events coming up soon, both of which seemed to have happened only a few weeks ago. They are the National Election and the National Convention.

A paper ballot was included in the second quarter issue of the *American Submariner*, along with information about the election. Please take the time to vote when the electronic notice comes out to prompt you. If nothing else, vote on the proposed amendment to our bylaws. It's your organization and you need to at least be aware of the issues surrounding the proposed changes to how we do business. It's not difficult to vote and will only take a few minutes.

Next is the National Convention. If you're planning to attend and have not yet registered, please do so now. You can register online at ussviconvention.org/2022. It's almost too late, but you can still make it if you get cracking. I'm looking forward to seeing you in Buffalo.

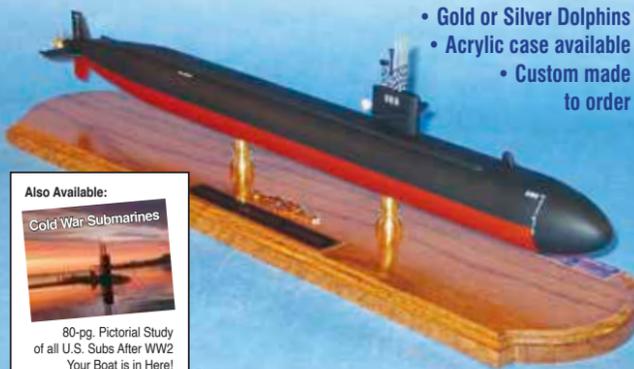
Take care and stay safe,

Steve

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Jim Sandman
National Chaplain

Do you have a relative who served in the military, either recently or during centuries past? Many of us do, and we cherish the memories and stories of these loved ones.

In his *Autobiography of Mark Twain*, Samuel Clemens writes about his family history, and includes this beloved line: "Back of the Virginian Clemenses is a dim procession of ancestors stretching back to Noah's time."

Well, I guess we could all claim that! Twain's great grandfather was William Montgomery, an Irish immigrant who settled in what is now Kentucky. Montgomery was my sixth great grandfather. This makes Mark Twain my second cousin—five times removed—which, with a dollar, might buy me a fifth of a gallon of gas!

Like many of you I'm sure, several ancestors/relatives of mine served in the American Revolution (militia or Continental Army), the War of 1812, and the Civil War.

My uncle Edgar Wickliff from Indiana served on at least one submarine during WWII, I believe. I've got some research to do.

But the relative closest to me who served was my late father, William Sandman, who was a Navy storekeeper during WWII.

He was assigned to two supply ships, USS *Zebra* (AKN-5) and USS *Rebel* (AM-284), based in the Pacific theater. In 1945 at the age of twenty-two, while courting the young lady who would become my mother, he wrote a poem to her and then recorded it in one of those recording booths made available to servicemen at the San Diego USO, I believe. I'm fortunate to have an audio file copy of it, which I can share with my two sons and their families. Here it is:

Why Must This Be?

*Last eve beneath a full moon bright
I strolled down to the ocean's brink,
and breathing deep the night's pure air
I stopped to watch the waves and think.
And that I then, why must this be?
That two who love each other so,
must spend their precious youth apart
and separate, lonesome pathways go?
I'm sure that God is not to blame
for all that's evil in our day.
It's man's own narrow, selfish mind
that taught the world to fight this way.
But someday sweetheart we shall know
that joy that is supreme
and peace will be a reality
not just an idle dream.*

The third verse of my father's poem alludes to these truths in the Bible: "What causes quarrels and what causes fights among you? Is it not this, that your passions are at war within you?" (James 4:1, ESV)

"The Lord saw that the wickedness of man was great in the earth, and that every intention of the thoughts of his heart was only evil continually." (Genesis 6:5, ESV)

Evil in our world is man's fault, not God's. But there's a future time coming to this Earth when there will be no more evil, death, hatred or suffering. More on that next time. Keep looking up!

If you can make plans to attend the Buffalo convention in August, please do so! I hope to see you there.

In His service,
Jim

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Mail Buoy!

Letters from our readers

Views expressed do not necessarily reflect those of *American Submariner*, its editorial staff or USSVI.

I served on USS *Skipjack* (SSN-585). I've often felt a special kinship with the men of the *Scorpion*. When I remember them, as did the article's author ("Waiting on the *Scorpion*," Q2-2022), I often express my thoughts in terms of poetry. Here is a poem I once read and usually fall back on:

In Waters Deep

*In ocean wastes no poppies blow,
No crosses stand in ordered row,
There young hearts sleep...beneath the wave
The spirited, the good, the brave,
But stars a constant vigil keep,
For them who lie beneath the deep.
'Tis true you cannot kneel in prayer
On certain spot and think, "He's there."
But you can to the ocean go...
See whitecaps marching row on row;
Know one for him will always ride...
In and out...with every tide.
And when your span of life is passed,
He'll meet you at the "Captain's Mast."
And they who mourn on distant shore
For sailors who'll come home no more,
Can dry their tears and pray for these
Who rest beneath the heaving seas...
For stars that shine and winds that blow
And whitecaps marching row on row.
And they can never lonely be
For when they lived... they chose the sea.*

by Eileen Mahoney
October 11, 2001

Noel Risener former ETR2(SS)

The cover of the fourth quarter 2021 issue of *American Submariner* shows an officer at the periscope of a submarine wearing a mask. The second quarter 2022 issue contains a letter from a shipmate arguing against the wearing of masks on submarines. I wish to rebut his letter because I think that masks should be worn on submarines under some circumstances.

A submarine captain (I don't remember

who) once said that the only thing a submarine can do without her crew is rust. This was exemplified by the plight of the carrier USS *Theodore Roosevelt* (CVN-71) that was sidelined for nearly two months in the spring of 2021 when over a 1000 of the crew were infected by COVID and one sailor died. More recently, last December the USS *Milwaukee*, a littoral combat ship whose crew was 100% vaccinated, was sidelined in port at Naval Station Guantanamo Bay due to COVID. Conditions on a submarine are more confined without fresh air for extended time, which is more conducive to the spread of COVID.

I am confident that submarine crews drill with masks so they know what to expect just as we drilled with EAB masks during simulated emergency conditions. All orders on a submarine are repeated back to reduce the probability of a misunderstood order. I am also confident that there are carefully thought out protocols detailing under what conditions the masks should be worn. In an emergency masks can be removed in under a second. In addition, the masks would only be required during the initial week to ten days of a patrol, after which masks can be safely removed for the remainder of the patrol. Thus, the proper use of masks enhances the efficient operation and performance of the submarine and her crew.

I am very happy the Navy takes the health of its submarine personnel seriously.
Van McAdams, former ET1(SS)

Thanks for another great edition in the second quarter 2022 issue. I especially enjoyed the article by Charles Hood, MD, "Waiting on the *Scorpion*," and John Lundstedt's "Hyman, We Hardly Knew Ye."

I downloaded the Hood brothers' first five books about the submarine force onto my Kindle and thoroughly enjoyed reading

them. I agree with everything printed therein. They brought back a lot of excellent memories. What tremendous reminders of the high quality of all the Navy personnel I served with or otherwise observed throughout my service in the Pacific and Atlantic Submarine Forces (September 1954 to September 1984).

The article by John Lundstedt was confirmation of my long-held suspicion that Admiral Rickover had a very normal, human side to his private life. The last two paragraphs reinforced my strong view of this one-of-a-kind person. Reading this article also reminded me of the very great opinion I have of Admiral Rickover's contribution to the establishment of the very safe, reliable nuclear propulsion capabilities of the U.S. Navy's submarines and surface ships, as well as his singular contribution to the end of the Cold War and demise of the Soviet Union.

James D. (Jim) Tow, CDR, USN, Retired

I'm a *Stickleback* survivor who was a nineteen-year-old seaman when she went down sixty-four years ago. I'm looking to reconnect with any of the old crew who might still be around. Can you publish my contact information so old shipmates can get in touch for some reminiscing?

Hobert Lee Scharff, former QM3(SS)
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I enjoyed the article about the renovation of the Groton clubhouse. It brought back some good memories of my time in Groton aboard USS *Cobbler* (SS-344) in the early '70s.

I wonder if Dr. Jill and her entourage were able to participate in the time-honored tradition of a recently qualified submarine sailor "drinking his fish" during their visit?

Keep up the good work on the magazine.
Mike Shannahan, former TM2(SS)

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One Fish, Two Fish, Redfish, Crawfish!

Following the regular April meeting of Slidell, Louisiana's Redfish Base, all in attendance were thrilled to dive into the group's mouth-watering annual "Crawfish Boil." Guests on hand included Southwest Regional Director Ken Nichols, Drum Base Commander John Algee, and Baton Rouge Base Commander Bill Pedneau—plus members of other USSVI bases from as far away as Texas. About seventy in all were on hand for the delectable fun.

Southern Louisiana's crawfish are usually at their best in the spring, so it's customary for just about any kind of gathering or occasion at that time of year to feature a crawfish boil. On the menu, of course, are boiled crawfish ("mudbugs"), corn on the cob, boiled potatoes, andouille and/or smoked sausage. Salads, desserts, and "refreshing beverages," of course, round out the feast.

Once again the base's celebrated Boil was a rousing success, as indicated by its barrage of glowing compliments. Camaraderie and fellowship were enjoyed in abundance, with old acquaintances renewed and new friends acquired. Sea stories flowed with the drinks as always, and a boiling good time was had by all.



Boiled crawfish is the order of the day at this Redfish binge. Now it's the spicy broth that snaps back at you!

Albany-Saratoga Base Helps New York Celebrate Submarine Day

In conjunction with National Submarine Day, Albany-Saratoga Base member Jim Irwin was asked in May to appear before the New York State Assembly Chamber to accept a recently passed Legislative

Resolution. This was to memorialize Governor Kathy Hochul in proclaiming April 11, 2022, as Submarine Day in the State of New York. Irwin was introduced and acknowledged by the Chamber and greeted with a warm round of applause. He was then presented a copy of the Resolution by Assemblywoman Mary Beth Walsh from the 112th Assembly District of New York.

From Senator Jim Tedisco's website: Senator Jim Tedisco and Assemblywoman Mary Beth Walsh, on May 11, at the state capitol, honored U.S. Navy Submarine Veterans from New York State by passing a resolution and presenting a copy to U.S. Navy veteran Jim Irwin of Clifton Park. Irwin, a member of the NYS Senate Veterans Hall of Fame, served in the Navy from 1966 to 1970 and was assigned to the nuclear-powered submarine USS *Theodore Roosevelt* (SSBN-600), wherein he served as the ship's small arms petty officer and became certified as a nuclear weapons handler.

After leaving the service, Jim worked as a U.S. Treasury Department Customs Patrol Officer and Inspector and became involved in veterans' service organizations. He helped found the Albany-Saratoga Submarine Veterans and has served as its base commander since 2012. He was also the driving force behind the creation of the NYS Submariners Memorial in Ballston Spa to honor all those members of the silent service who gave their lives so we could be free.



Resolved to Honor Submarine Day.

From Senator Jim Tedisco's

Takin' Care o' Business

Central District One Commander Ellis "Moe" Moses visited Twin Lakes Base at their March meeting to present strategies for recruiting and retention of members. He also suggested some great ways to make locals aware of the base and its activities. Moe then happily participated in newest base member Doug MacPherson's proud induction into the Holland Club. B.Z, gents, on a successful meeting all around—B.T.O. couldn't have described it any better!

At right—Doug MacPherson (left) receives his Holland Club certificate from Twin Lakes Base Commander Curtis Grant (right), as Central District One Commander Ellis Moses looks on.



"I Hear That Train a-Comin'..."

Gets his kicks on Route 66? Maybe. But more likely Vice Commander Rollin Patrick of South Lake Florida Base would rather "Take the A Train" or come aboard... "The Night Train." See, even though he retired from the submarine Navy in 1985 as a chief missile technician—after serving on *Patrick Henry* (SSBN-599), *George Washington* (SSBN-598), *George Washington Carver* (SSBN-656), and *Theodore Roosevelt* (SSBN-600)—he now spends his time immersed in railroading rather than nuke-boating.

Yes, Rollin is an avid model train devotee, and last February warmly shared that enthusiasm by inviting base members and their families to the Ridge Live Steamers Train Meet in Lake Wales, Florida. Featured at the event were approximately seventeen miles of model railroad track, miniature towns, and landscaping. The annual gathering typically draws thirty-five to forty 1/6"-scale live steam engines and over a hundred rolling stock from nearly every state east of the Mississippi. Many of the trains even include scale passenger cars visitors can ride on.

Several base members and their families showed up to enjoy the event, with little kids and "big kids" alike delighted by railroad rides and learning about model trains from participating engineers/hobbyists. Many of them, including Rollin, hand-build their steam engines and rolling stock, and local Ridge Live Steamer members have spent untold hours laying and maintaining the site's track and landscapes. It all requires special skills, patience, and tenacity—talents which likewise served Rollin in the days when he ran a



Rollin Patrick shows off his scratch-built Shay locomotive, taking her for a run around the park. All aboard!

successful woodworking business. Now he has a dual shop and all the tools for working with wood and machining metal projects.

Rollin's South Lake Florida Base shipmates tip their new railroad engineer hats to him and wish him well as he rides off on what they hope will not be his "Last Train to Clarksville." In retirement, it's more like riding the Gravy Train, eh, Rollin?

Dolphin Base Shows Horse Sense in Visiting Unique 'Dreampower' Therapy Center

In March 2022, members of San Jose's Dolphin Base visited the DreamPower Horsemanship in Gilroy, California. Base member Tom Salzano, a regular volunteer at the center, arranged for the special visit. The base was honored to hold its monthly meeting at the site, and afterward was introduced to the group's director and other team members, then provided a tour of the facility.

The non-profit DreamPower Horsemanship was founded in 2002, and today provides services to over five hundred individuals through several equine-assisted programs. One of these, Horses for Warriors—a free weekly support group for veterans—was of particular interest to Dolphin Base members. These sessions are led by Professional Association of Therapeutic Horsemanship International (PATH) internationally registered therapeutic riding instructors.

DreamPower exists through the generous commitment of time and energy of its dedicated volunteers. While solid horse experience is a plus, it's not a requirement for volunteering with the center. Also supported are internships for post-Master's pre-licensed psychotherapists working toward California psychotherapy

certification. Many other enjoyable horse-related programs are available for families and children as well.



Base members are encouraged to ask questions when being shown around and introduced to the trained therapy horses. One of the largest was "Chief," pictured here. (Left to right) Dave Kite, Mark Buxton, Larry Scheierman, Don Kranz, John Armenta, Jim Garvey, Scott Sutherland, Alyss Swanson, Tom Salzano and Carl Hickman.

Keystone Base Adds to U.S. Submarine Memorial

Keystone Base, home-ported in Harrisburg, Pennsylvania, recently held a dedication ceremony after the completion of their United States Submarine Memorial—now fully installed along Monument Row in Indiantown Gap National Cemetery. The multi-year project includes additions to the existing World War II Submarine Monument, dedicated in 2018. A new stone at its base lists all fifty-two submarines and crews lost during WWII. Two additional stones flanking the monument pay tribute to the nine submarines and crews lost before World War II, plus the four postwar losses.

Unfortunately, poor weather forced the ceremony indoors at the Fort Indiantown Gap Military Reservation Community Club, but attendees no less appreciated the pomp and reverence of the service.

Base Commander Allen Boyer and Vice Commander Earl Gee began by warmly welcoming attendees, followed by an invocation, Pledge of Allegiance, and the national anthem. The colors were posted by members of the Junior Naval ROTC and an honor guard from the Linglestown American Legion.

Next, Base Historian Mike Sobkowski stepped up to provide a detailed history of the monument, followed by Henry Shipman and Mike Sobkowski's unveiling of the new additions. A memorial wreath placement preceded the keynote speaker, retired U.S. Navy



Beautiful new wings flank this U.S. Submarine Memorial.

Captain Dennis Dyckman. A solemn Tolling of the Boats ceremony, led by Base Chief of the Boat Mark Pater Noster, followed. Military honors and taps played by Eagle Scout Christian Snouffer concluded the proceedings.

More than 150 people attended the presentation. One very special guest was John Price, a submarine veteran of World War II combat patrols. An informal reception followed the ceremony.

South Lake Florida Base Stands Shoulder to Shoulder with Sea Cadets

In keeping with South Lake Florida (SLF) Base's effort to honor USSVI's goal of providing service, education, and charity, it was only natural for its members to become involved with the Clermont Sea Cadet Battalion. And so, this local battalion's CO, Gary Schindele, was invited to speak about the group and its activities at SLF's August 2021 general meeting.

Soon afterward, Gary himself joined the base as an associate member, and SLF Base members have now likewise attended the Sea Cadets' monthly weekend drills to: teach a basic submarine class for the cadets; participate in cadet promotion boards under the direction of their CO; and further the cadets' initiative to interview local WWII veterans to preserve this important history—then provide information about it to local and national media to help spread the word.

To launch this initiative, Clermont Sea Cadet Battalion's Chief, Kurt Schindele, interviewed retired Chief Gunners' Mate (SS) Bob Dickinson, a very active 97-year-old SLF Base member and plankowner. On March 10, 2022, Kurt further interviewed Daniel Keel, a Tuskegee Airman. An interview with Irving Locker, a survivor of the Utah Beach D-Day invasion, is now planned for a future date. All three of these remarkable WWII veterans reside in the local area.

The Clermont Battalion Sea Cadets have now also acted as honor guards in the first local parade participated in by the SLF Base. Several Cadets even rode as guests on the maiden voyage



SLF Base member Fred Pando and Clermont Sea Cadet Battalion CO Gary Schindele answer questions after a submarine training class in basic electricity.

of the base's new parade float.

SLF Base hopes to include *Sea Perch* training in the cadets' submarine basics course. An award is also being worked on to be presented annually to cadets demonstrating outstanding performance.

South Lake Florida Base members hope this is just the beginning of a long and fruitful relationship with these Sea Cadets and look forward to reporting more of their joint activities in the future.

A Caribbean Cruise and Seagoing Tribute of a Very Different Sort

Recently, one of South Lake Florida Base's members, retired Master Chief Cryptologic Technician (Maintenance) (SS) Bobby Mock, a salty veteran of *Trepang*, *Shark*, *Silversides*, *Narwhal*, *Cavalla*, and *Flying Fish*, embarked on a sea cruise of quite a different sort. He relates his heartwarming experience below.

My wife and I recently sailed on the *Caribbean Princess*, where it is customary for the cruise line to host a "veterans get-together" on every cruise. I volunteered to help prepare party area and had my iPad set to play the national anthem and Taps when called upon. After things got rolling we all introduced ourselves and talked about our service. I counted over forty veterans in attendance, and it seemed we'd come from all corners of the country. Army, Navy, Air Force, Marines, Coast Guard, and the Merchant Marine were all represented. There were also veterans there hailing from Canada, the UK, and Australia. It was a huge and inviting opportunity to connect and share our experiences.

As the gathering came to its end, an older Asian couple was noted standing to one side, listening intently to the goings-on. We could see that the gentleman had been filming the affair, and after a moment, his consort began to speak. She introduced herself and her husband as Mr. and Mrs. Dat Nguyen. They now lived in California but had been born in Saigon, Vietnam. Mrs. Nguyen explained they were not veterans of their former nation, nor had they served with any U.S. Armed Forces. They had simply been a couple of the very lucky few who, on April 30, 1975, had been with the last group of Americans evacuating South Vietnam: they'd been airlifted out of the country just as Saigon fell to communist forces.

They explained they'd just come to the get-together that night to be able to give their thanks to all the veterans in attendance. They wanted to thank them for fighting for their freedom and for trying to save their South Vietnamese homeland. They wanted to shake the hands of every veteran on hand, to offer gratitude to each of them for fighting for those who couldn't fight for themselves, and specifically for allowing them to come to the United States to live a better, more fulfilling life. They'd each been about twenty-four when fleeing South Vietnam and now were in their seventies.

Wow, what a heartwarming tribute it was to experience, and I wished all who had served in Vietnam could've been there to witness it. I don't think there was a dry eye in the place by the time they were done.

I would like to introduce these fine Asian-American citizens, Mr. and Mrs. Dat Nguyen, with the photograph shown here.

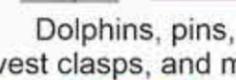


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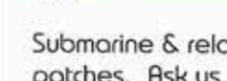
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Fidget Mats Fit the Comfort Needs of Cognitive Patients

by Wayne Hartlich and Jeff Porteous

The last thing I ever imagined as an IC2(SS) serving aboard USS *Baya* (AGSS-318) from 1967-70 was that someday I'd be spending my retirement years sitting in front of a sewing machine. I also never imagined how fulfilling it would become to create something giving comfort and pleasure to people with dementia.

It all started when my wife Gail was approached to see if she could make "Fidget Mats" for some patients with Alzheimer's. Of course, at the time, we had no idea what a Fidget Mat was, what materials were needed to create one, or how to go about it.

We began by searching the internet for photos of Fidget Mats and information about materials used in making them. We wanted to learn the do's and don'ts of what makes a good one, but in the process discovered many makers actually had no idea what items should or should not be used in their construction. We also learned that Fidget Mats were costly, or at least could be. Admittedly, Gail and I briefly felt this might be an opportunity to make a profit. But we quickly decided that our mats would be donated to those in need; we simply couldn't justify charging for them when they offered such potential to help people.

And so, armed with this decision and our limited knowledge, we began this adventure.

Our first challenge was to find things we could use to make a good, solid, appealing mat. We referred to these items as gizmos or doo-dads, and our search for them soon resulted in the regular haunting of local rummage and garage sales. We sought only clean, safe items of novel interest which could be securely sewn onto a mat. I have to admit our first attempts and acquisitions would not really pass muster today, but we continually improved with experience.

I'll also admit I came to hate rummage sales. And garage sales. And Gail didn't much care for them either. Nevertheless, we found ourselves bouncing from yard to yard. Riches to us were simple items that could be firmly attached to heavy fabric. It was important they not easily be pried off because dementia patients are known to put into their mouths almost any loose thing they can grab onto, and we needed to be confident our mats would be safe. Over time we turned into dedicated rummage sale fanatics despite ourselves—world-class scroungers, beggars of the worst degree—and I couldn't believe what we'd become. One weekend alone, we visited over a hundred sites during a citywide yard sale search! Admittedly most were failures, but some were moderately successful. Still, others yielded introductions to the most wonderful people—folks who not only gave us whatever we wanted for free but also promised to

keep an eye out for things we could use in the future. Wow.

During these endless scavenger hunts, we came across leather purses (which I could disassemble and use as parts), neckties, assorted jewelry, ribbons, buttons, embroidered patches, other flotsam and jetsam. All good—because we sought anything clean, safe, and able to be sewn down tightly. Even small pocket watches, stuffed toys, and military medals worked out. The point here was that once attached to mats, these baubles could actually be part of a patient's

therapy, providing visitors and caregivers topics of conversation and a way to engage. Indeed, the items stimulate the senses and may even help reinforce memory. Their ultimate goal is to provide a better quality of life.

After Gail and I looked at a few samples, we knew we could make mats as interesting as any we'd seen. And having operated a home business custom-manufacturing Eco-fleece jackets and vests for over twenty years, we were well set up to handle producing such a "product." This was especially true because we had also been required to upgrade to heavy industrial sewing machines to handle some upholstery work. Moreover, we now had time available since we'd been winding down our business and moving into retirement.

We began this new endeavor slowly, finishing our first Fidget Mats in May 2018. Since then we've completed and donated about 350 mats and continue to produce them whenever we can. We happily donate our mats to anyone in need, but most of our work goes to a specific home care and hospice agency. In recent years, we've made mats for veterans, so now I'm constantly on the hunt for military paraphernalia to go on mats aimed at them.

The pandemic has slowed our rummage/garage/yard sale sweeps, of course, but we always keep an eye out for a good, safe place to pick up our next batch of gewgaws and gimcracks to go on new mats. Some local companies have helped us with upholstery fabric, odds and ends, and even zippers (patients often enjoy opening and closing zippers or pockets on these mats). One of our biggest contributors has been an embroidered patch company that sends us outstanding pilot-type patches for veterans' mats. Now I'm always looking for Army, Air Force, Marine, Coast Guard, and Navy patches.

It feels wonderful every time a batch of new Fidget Mats leaves our shop. But Gail and I quickly learned that this satisfaction is nothing compared to the joy of meeting wonderful new people in driveways, garages, and backyards everywhere and all the heart-warming thank you letters we've received over the years as well. We had no idea of the warm fuzzies we'd been missing!

Fidget Mats

Ornamented fabric mats whose purpose is to stimulate and soothe people challenged by cognitive disorders. Because dementia patients sometimes fidget, these mats can interest and engage them. They lift spirits for their users and so give brief relief to caregivers as well.



'Woody' Woodhouse Tips His K4K Cap One Last Time During Memorable Final Hospital Visit

May 11 was certainly a poignant day for Peoria Base's most recent regular Kap(ss) for Kid(ss) endeavor. It marked the final time beloved base member and longtime K4K booster "Woody" Woodhouse would participate in a visit to St. Francis Children's Hospital as part of the base's popular charity program.

Woody, chairman of this group's K4K efforts and unabashed enthusiast of and participant in the program for more than twelve years, finally decided that, at age ninety-two, it was time to hang up his K4K cap. It's obviously been a good, long run. Over the years, he has truly given his all to visiting the hospital's health-challenged kids, having delivered his own brand of submarine sweetness—better make that saltiness—and light to over four thousand of them since his first weekly visit.

Why retire now? Well, Woody reveals his wife of sixty-four years is currently dealing with some health challenges of her own, and he simply needs to redirect his healing energies toward the home front.

Obviously, St. Francis Hospital is most sorrowful about his departure, for they will much miss seeing him continue all he's done for the hospital's patients and staff—everyone, in fact, who's ever come in contact with him. But of course they understand and support his reasoning and decision.

Those who've known Woody fondly remember his usual K4K regimen. After first navigating the hospital's vetting process, every Wednesday like clockwork, he would visit with up to twelve ailing children, talking with them and showing them what it was like to be a submariner. He would happily explore the clinic unescorted,



Woody with just two of his thousands of satisfied submariner customers.

interacting freely with each child encountered as well as with whatever members of their families happened to be on hand that day, being sure to spend plenty of time with each of them. These families—and the hospital itself, of course—all recognized and greatly appreciated the healing benefits Woody brought to their children. To assist him and the Peoria Base's K4K efforts in general, the hospital showed their appreciation by generously paying for all the Honorary Submariner ball caps Woody would so happily hand out.

At the close of the visit, the Saint Francis staff surprised Woody with a party in recognition of his long service. All wanted him to know how much he'd meant to them and how they would miss seeing him wandering the halls, delivering submariner smiles wherever he went.

Groton Base Kap(ss) 4 Kid(ss) Team Still Running Steady as She Goes

On April 28, once again, the Groton Base Kap(ss) 4 Kid(ss) team of Bob Dulin, Bob Sharpe, and John Riley visited children at Yale New Haven Hospital's Child Psychiatric Inpatient Unit. This clinic provides comprehensive psychiatric, psychosocial, and educational evaluation, plus short-term treatment for kids aged four to thirteen.

This time eleven children were declared honorary submariners—and a new staff member was likewise welcomed into the base's K4K submarine family with a certificate and sub goodies. As usual,

plenty of fun was had with the kids as information was presented about life aboard a submarine, including shared sub-related photos and videos, while many keen questions were answered.

Groton Base has now been visiting (or Zooming with) kids in this hospital two to four times a year for about eleven years, and it is always a rewarding experience. The staff has acknowledged that bringing comfort to these children—all dealing with very challenging health issues—makes a positive difference in their lives.

Support Kap(ss) 4 Kid(ss) in Your Community

For years, USSVI has participated in this heartwarming community outreach program through our local bases. It simply involves visiting ailing children at local hospitals and making them Honorary Submariners by presenting them with certificates, hats, and other submarine-themed goodies. It always brings smiles to the young patients and wonderful warm feelings to their subvet presenters. What a satisfying and productive way to bring joy to sick kids and to the subvets who visit them. The experience is priceless!

Get involved! Organize or participate in your base's existing K4K program today. To learn more visit bit.ly/3IMEIGp.

Ornery Admirals Must Be Kept at Arm's Length

While I was the weapons officer on the staff of Commander, Submarine Squadron Ten, the commodore informed me that Admiral Rickover would arrive at New London's State Pier the next day. He said he wanted me to be the only Navy officer on the pier when the admiral's car arrived. He did not intend that I greet the admiral; just that I open his door to let him exit, keep my mouth shut, salute, and let the admiral proceed to the brow of the submarine he was scheduled to ride. He also said the commanding officer of this submarine would greet the admiral topside when he arrived.

Then the commodore directed me to have a line handling party from the submarine tender on the pier to assist the submarine in getting underway as soon as the admiral was embarked. This party was to be:

- standing at attention, well out of the way, but in sight of the admiral,
- neatly dressed in fresh, clean working uniforms,
- not overweight and with good haircuts, and,
- the only people on State Pier other than me.

When the admiral's car arrived, it stopped at the head of the submarine's brow with the left rear door just a few steps away. The enlisted line handlers were standing at attention at least twenty feet away from the right side of the car. I opened the car's left rear door and stood at attention, awaiting the admiral's exit onto the pier.

Although I was sure he saw me open the door before he acted, Admiral Rickover opened the right rear door and stepped onto the pier. He was dressed in a civilian suit, was frowning, ignored the enlisted men and my salute, and walked around the car to board the submarine. I imagined he thought, "I'm not going to let this lieutenant commander have an opportunity to do something for me."

The squadron commander and his chief of staff were on the submarine tender, witnessed this scene, and were satisfied with the results.

While serving on the staffs of the Commanders, Atlantic and Pacific, Submarine Forces, I was occasionally embarked aboard the same submarines as Admiral Rickover. Each time, I kept as far away from the admiral as possible, and tried to never eat at the first sitting of meals in the wardroom.

James D. (Jim) Tow, CDR, USN, Retired
Blueback Base

Tech Training and Hank Williams: A Marriage Made in Dive Bar Heaven

It was April, 1962. Cold War tensions with the USSR were high. Just after Bay of Pigs the Russians had started surface testing their nukes. President Kennedy authorized "Operation Dominic" to answer in kind, only bigger and better. At the time I was an ICI(SS) reactor operator aboard the USS *Ethan Allen* (SSBN-608), and though we didn't know it yet, we were on our way to the Pacific to fire an A-2 Polaris with a live nuclear warhead.

We departed New London, pulled into Norfolk for de-perming, then went on to Charleston to load missiles and pick up spare parts.

Last came Cape Canaveral for test shots. At that time I had seen a good bit of our United States, but had never been in Florida, so I requested a special liberty and was granted a "72."

I was involved in auto racing (stock cars, sports cars, and go-karts) and wanted to see the Daytona track, so I stuck out my thumb and headed north. Remember when hitchhiking was accepted, legal, and safe? I rented a motorscooter and toured the Daytona area, then headed west to the Gulf Coast. During my wanderings around Florida I enjoyed receiving some of the most incredible rides—like being fifth man in a Nash Metropolitan (true story, so help me God) and in a dairy delivery truck shaped like a barn—with no seat except the driver's...but that's another story. At one point I came south on an inland highway—probably 27?—stopped to see the Sebring race track, then continued south past the west side and around the south end of Okeechobee and on to Ft. Lauderdale. After going further south to the Keys, I reversed course and headed back to the boat.

I was on Route A1A and got dropped off in the middle of nowhere in the dark of night. And I do mean dark: I couldn't see my shoes! I was tempted to walk, just to be moving, but with all the unfamiliar night sounds, not knowing if there were snakes or gators or whatever on the road, I thought better of it and just stayed put. Eventually I heard a vehicle coming up the road, but it must have been five miles away because it took forever to come into view. I stuck out my thumb and it thundered on past me, going like a bat out of hell. Then the brake lights came on and it pulled to a stop. As I approached, the passenger leaned forward and pulled the seat forward so I could get in the back. It was a two-door Buick. The occupants appeared to be construction workers—two big burly men with ragged, dirty t-shirts. The passenger offered me a beer, which I thanked him for, but declined. About that time I realized we were still accelerating, so I glanced at the dashboard to see how fast we were going. The speedometer on that vehicle was a solid red horizontal line: that translated as somewhere upwards of 120 mph! I then said, "If you don't mind, I *will* have that beer..."—not that I wanted it, I just didn't want them to have it! I soon learned, however, that we weren't really going that fast: the speedometer was broken and always registering 120+ mph. As it turned out, that beer given me was their last, so they decided to stop at a bar to score another six pack. They asked if I liked country music because this bar we were going to—The Mala Bar—billed a musical act the two described as "a Nashville reject" named Jimmy who was some kind of "incredible musician." I was looking to find any way out of this ride—they were just too far gone to suit me—so I assured them I was a real country music fan.

Finally arriving at the Mala Bar, a nondescript dive in the middle of nowhere, we pulled into its parking lot on the right side of the

road. You could hear the bar's internal sounds escaping through its open front doors: laughter, conversation, the jukebox—but no live music. When we entered, the place suddenly fell dead silent. All eyes were on us. I thought, "These guys must really be some bad news dudes"—all the more reason to find a way to disconnect from them.

They now asked the bartender where "Jimmy" was and were told he was on break and that his electric guitar was broken so he could only play his flattop. A bunch of my buddies were in a band back home, so I knew something about instruments. I asked them to point Jimmy out, then introduced myself and asked what was wrong with his guitar. He said it was giving him electric shocks. I asked if I could take a look at it since I might be able to fix it. He hauled out a Fender Stratocaster, a guitar I was familiar with. I suspected a ground wire in one of the cable ends might be broken—a common problem—so I took apart the plug on one end. No problem there, so I opened up the plug on the other end and—*voila!*—a broken ground connection. There were table candles in the bar, so I held the broken connection in place over a candle until the solder melted, then took it off the heat until it re-solidified. I put it back together, handed it back to Jimmy and said, "Try that." Jimmy recoiled with a "Bullsh*t, you try that!" So I struck a C-chord and a G-chord and handed it back to him. He excitedly said, "You play?" I assured him I did not. "But you can chord," he surmised, "so we can play. You know any Hank Williams?" I told him I knew all of them—so I got his Martin flattop and he got on the Fender and we began to play and sing Hank's stuff...and the table began to fill with bottles of beer. Soon my ride guys came by to tell me they had to hit the road, asking if I was coming along. I told them I was having the time of my life and thanks for the ride, but I was staying. As soon as they were gone I gave Jimmy back his Martin, noted about a hundred beers on his table, wished him luck and headed for the door. The crowd begged me to stay and keep up my country accompaniment, but I told them I had to get back to the boat since I was running out of time. They handed me a souvenir ashtray made from an opened clam shell, one all painted up inside with palm trees and such. I thanked them, stuck it in my ditty bag, and hit the road.

When I arrived back at the boat I went below to the crew's berthing compartment. At the bottom of the ladder was a bulletin board containing info on the plan of the day, menu, etc. I stopped to check out what was what, and there, among all the other stuff, was a list of "out of bounds" liberty spots. Of course the Mala Bar was high up on the list. I had not slept since leaving the boat, so I showered and hit the rack. Next day I tried to discover why the Mala Bar was "out of bounds." It turned out that earlier on the day I had been there, a sailor had been stabbed at the place. I suddenly came to the awful realization that the silence in the bar when we entered wasn't because of those "bad news" guys I was with after all, but because of me. Thank God for country music and IC training!

Newell E. (Kit) Carson, former IC-1(SS)
Montana Base

Flow Meter Has This Watchstander's Ear

I was standing AOW onboard USS *Albuquerque* (SSN-706) early in 2001. We were heading for Puerto Rico for weapons stuff, and had to have our oxygen banks below 500 psi. I was ordered to

adjust the bleed from 40 FWD and 80 AFT, to 60 FWD and 120 AFT. The AFT adjustment went fine. FWD however, did not. Every time I would move the regulator even a little, the needle in the flow meter would move up a bit, then go back to 40. I backed off the adjustments I had made and consulted my chief. I was told, "It's been like that for years". So...I went over my procedure again and adjusted the flow once more. Again, the needle would move but go back to 40. About a half-turn into adjusting it I happened to turn my head away and look at my procedure.

At that moment the flow meter's face blew out. Its top half disintegrated into about a million pieces. The bottom half came out rounded on the bottom and serrated on the top. It bounced off my right forearm and right cheek, then turned and struck my right ear, tearing through and down its lobe, effectively filleting it from top to bottom. The top half of my ear had been almost completely cut in half; only the skin on the back was holding it on. Since I couldn't see a damned thing, ETI(SS) Thomas pulled me out from between the 400hz switchboards. Once my sight returned I slid down the ladder right there and into the doc's office. We happened to have an undersea warfare doc onboard for a ride, so he ended up sewing me up: twelve stitches if memory serves. Forty-five minutes later I was back on watch. On swim call the following day, COB wouldn't let me out of the hatch farther than my chest. Later that year when we went to PNSY to start our refuel, the yard birds there cut that flow meter out and gave it to me. I still have it somewhere. Now that the whole boat's awaiting cut-up, I'd love to get the entire FWD bleed station. To this day I can only hear about half through my right ear.

Steve Blakeman, former MM1(SS)
Sheridan Base

Keep That Harangue Bottled Up, Bosun!

In 1967, while the USS *Bream* (AGSS-243) was on a WestPac deployment, we pulled into Cebu in the Philippines. I had the duty, so could not leave the boat. Anchored in the bay was a heavy cruiser that had some gas bottles we needed. The cruiser sent over a launch to take a shipmate and me to pick up our bottles.

Upon arriving at the cruiser, we saluted the flag and requested permission to come aboard. On duty on the quarterdeck were a first class bosun and an ensign, apparently right out of school.

That bosun took one look at us and roared, "What effin' Navy are you guys in?!" as we stood there in our rolled-up sleeves, dirty white hats and greasy dungarees. He said there was no way he would let us board his "squared away" Navy ship.

All we could do was turn around, get back in the launch and return to the *Bream* empty-handed. When we explained what had happened to the OOD, he said, "Change into your cleanest hat, dungarees, and shirt, and go back and try again."

So we did. Following another tongue-lashing, the bosun finally permitted us to come aboard and get the gas bottles. We were subjected to another lambasting as we departed the quarterdeck, then laughed our way back to the boat.

Sure was good not to be in the damned skimmer Navy.

Pete Rathmell, former QM3(SS)
USS Snook Base

Got a Good Sea Story?

<i>American Submariner</i>	n	n	bm	n
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CHINA TURNS TO THE SEA

THE PLAN SUBMARINE FORCE

by Tom Dougherty

During the Cold War, the Chinese submarine force of the People's Liberation Army Navy (PLAN) was not considered a credible threat to Western forces. Indeed, their diesel submarines were mostly either castoff Soviet Whiskey-class boats, or a Chinese variant of the Soviet Romeo-class design, designated the Type 033, or its missile-launching variant, the Type 033G. But with the post-Cold War rise of Chinese power, the geopolitical situation dictated that for it to become a true competitor on the world stage and a dominant power in Asia, China had to field a modern navy—including a credible submarine force. As stated in a 2020 Department of Defense report to Congress: “Beijing seeks to reshape the international order to better align with its authoritarian system and national interests, and a vital component of its strategy to achieve the ‘great rejuvenation of the Chinese nation.’” The PLAN’s sixty-plus diesel, AIP (Air-Independent Propulsion), and nuclear submarines are a crucial part of that goal.

The Chinese Geopolitical Problem

It’s important to understand the background of China’s increased focus on the sea. Looking at a map, the country’s access to the ocean is concentrated solely along its eastern coast. The Bohai Economic Rim on the northern part of the East Coast includes the seaport of Tianjin, and just inland, the Chinese capitol, Beijing. Seagoing access is also available via the central Yangtze River Delta Economic Zone, which includes the port cities of Nanjing, Shanghai and Ningbo. There’s also the southern Pearl River Delta Economic Zone, including

Zhuhai and Hong Kong. Chinese commercial shipping and military ship movements are primarily out of these various ports. Given the huge overseas market for Chinese goods, it’s understandable how China is concerned about expanding its PLAN to guarantee freedom of navigation in the region. However, China has also laid territorial claim to large areas of the South China Sea, and has even built bases on the Spratly and Paracel Islands. These claims are disputed, since the locations border on Taiwan, Indonesia, the Philippines, Malaysia, and Vietnam. Ironically, it’s actually been the Western powers which have for years—ever since the close of WWII, in fact—ensured open seas in the region; even now the U.S. Navy continues to sail “freedom of navigation” cruises through the area.

Stretching from South Korea to Japan and on through the Ryuki Islands to Taiwan—but also south to the Philippine archipelago and Malaysia—is what’s deemed “The First Island Chain.” This arc of islands borders a series of straits, from Soya in the north to Palawan in the south, perceived by China as limiting her access to the open waters beyond. This chain—aligned with Western influences and ideologies rather than being in Chinese hands—is thus seen by Chinese political pundits as something of a barrier to full national access to the Pacific Ocean. One Chinese writer even claims his country is “suffer[ing] from the harshest global geopolitical security situation among the great powers. China’s eastward oceanic geostrategic structure is abnormally complex and unfavorable.” With this as its prominent viewpoint, China seeks to break free of such constraints, a key component of which is to return Taiwan to its direct influence.

For this reason and others, the Chinese have embarked on a massive and modern PLAN fleet buildup, financed by its ever-burgeoning economy. In addition to an operational aircraft carrier and another under construction, the expansion has included numerous advanced destroyers, frigates, and corvettes, plus a notably larger submarine force of newly enhanced capabilities—the subject of this article.

The Chinese Submarine Force

Early Submarines

China’s original submarine force after the 1949 Communist Revolution was made up of Soviet-supplied submersibles and engineering plans. These diesel boats were not seen as any real threat to Western interests and included five of the Soviet NATO-named “Whiskey” class and sets of parts for twenty-one more. These were designated “Type 03” submarines. The later Type 033 attack submarine (251 feet in length with a 22-foot beam) was basically a Russian “Romeo” (Russian Project 633) model; over eighty of them were built in all. A substantially improved Chinese Type 033 derivative was also developed: the 249-ft./4-in. long Type 035 *Ming* class with a 25-foot beam. The initial units were unsatisfactory in performance, but the redesigned 035A *Ming* featured significantly upgraded propulsion plus improvements in noise reduction, weapons, sensors and crew living quarters. The single Type 033G *Wuhan*-class submarine built was a modified Type 033 derivative which could fire six YJ-8 anti-ship cruise missiles via launching tubes erected from the deck casing—similar to the Soviet NATO-named “Juliett” and “Echo” cruise missile submarine classes.

The Next Generation of Diesel and AIP Boats

In a step toward modernization, the PLAN next embarked on several building programs in the late 1980s through early 1990s. The first was a new generation of diesel submarine, the Type 039 *Song* SSK class (see photo opposite page). Again, the initial unit, launched in 1989, was ultimately not put into service until 1993 due to design deficiencies. The 245.7-foot length and 27.5-foot beam of the original Type 039 *Song* design featured a low-drag hydrodynamically profiled hull and sail—the first Chinese boat to employ a teardrop shape, though its bow was blunt, not a dome. The hull was covered with anechoic tiles to attenuate sonar. Problems with noise levels and underwater performance led to revisions in the design and ultimately only a single boat was built to the original specifications. Improvements and changes resulted in the Type 039G (“G” for “Gai”—meaning improved), which became the bulk of Chinese submarine production at the time, with seven of the type eventually entering service. *Song*-class weapons included Yu-4 torpedoes and YJ-82 anti-ship missiles. On October 26, 2006, a Chinese *Song*-class submarine surfaced without prior detection within torpedo firing range (five nautical miles—9 km) of the U.S. aircraft carrier *Kitty Hawk* while she was



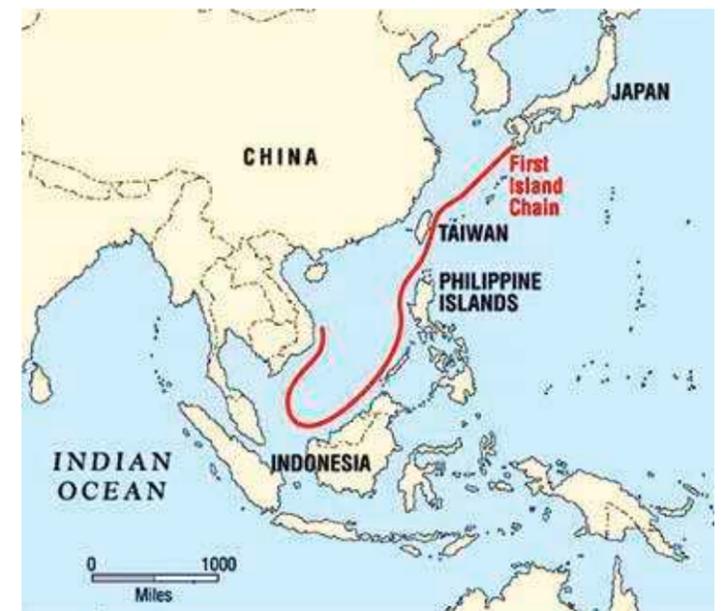
Type 033-class submarine, originally derived from the Soviet Union’s “Romeo” class.

operating in the East China Sea between Japan and Taiwan.

The redesigned and modified submarine developed next—confusingly designated Type 039A (but also listed in some publications as Type 041)—was the *Yuan* class. It was meant as a direct follow-on to the *Song* class. Design-wise, the hull was similar to the *Song* boats, but now with a rounded bow similar to the U.S. *Albacore* and *Skipjack* classes. The most obvious external visual difference between the new Type 039A and its predecessor Type 039/039G *Song*-class boat was the shape of its sail. The design change reduced the submarine’s acoustic signature while also improving its underwater performance. Most notably, the boat also featured Air-Independent Propulsion (AIP) capability, which was the *Yuan* class’ biggest technical leap. While most likely comprising a Sterling AIP plant in the Chinese vessel in question, there have been numerous different implementations of AIP technology in submarines around the world. The core concept remains the same: AIP is a method by which submarine propulsive power is produced extremely quietly and for prolonged periods of submergence without need for snorkeling.

As for weaponry, the *Yuan*s carry Yu-3 and Yu-4 homing torpedoes, and they can also launch the YJ-82 anti-ship turbojet cruise missile, an advanced weapon with an estimated range of 120 kilometers (72 miles). The Type 39A boats can also carry the CM-708 UNB missile, allegedly featuring a range of about 290 kilometers (180 miles). Both of these airborne weapons—in addition to the new Chinese missile for their SSNs (described later)—pose a serious threat to U.S. carrier battlegroups. Long-range attacks on aircraft carriers and other large vessels by submarine-launched missiles has thus moved from a PLAN strike capability wish list to practical reality for Chinese naval forces.

The first Type 039A submarine was launched in November, 1999 and commissioned in April of 2001. The second of the class was commissioned in December, 2001, and the third was placed in service at the end of 2003. A series of twelve of these submarines were built out of two shipyards. The impressive *Yuan*-class SSK integrates advanced noise reduction techniques, including anechoic tiles, with passive/active noise reduction and an asymmetrical seven-blade skewed propeller. The 039A is therefore suspected to be about as quiet as other modern diesel-electric submarines, which indeed



The First Island Chain, an arc of potentially unfriendly nations and islands, at least as perceived by China.



Type 035 *Ming*-class diesel submarine on patrol. An improved model of the Type 033.

have become quite difficult to track by passive sonar. Further changes to the *Yuan*'s sail have resulted in the Type 039B- and C-class designations. The Type 039C version's sail modifications—including a noticeable bulge at its top—may be related to an upgraded sonar or communications system, according to one source. The number of *Yuan* 039A- and 039B-class submarines is now about seventeen, with the new 039C-class boats just coming into production.

Also, in the mid-1990s, the PLAN purchased twelve Russian-built *Kilo*-class submarines: two of the original design (Project 877), plus ten of the later, improved Project 636 types. The latter are equipped with improved MGK-400EM sonar and anechoic hull tiles. The two early Project 877 boats have since been decommissioned.

The New Generation of Nuclear-Powered Submarines

The PLAN began a program to create nuclear power for submarines in the late 1950s, and after developing a land-based prototype, the Type 091 *Han*-class boat came to fruition. The first attack submarine in this class, *Changzheng 1* (“Long March 1”), was commissioned in 1974; the last of the five boats was launched in 1990. The first two, however, have since been decommissioned. These 321.5-foot long (almost 33 feet in beam) submarines again feature an *Albacore*-style teardrop hull. Displacement is about 5,500 tons. They're powered by a 90-MW pressurized water reactor (PWR) and are armed with six forward torpedo tubes. Noteworthy is that these SSNs employ turbo-electric propulsion rather than a steam-driven turbine drive. The propeller is a five-bladed version with no blade skew, meaning there's more detectable low frequency blade rate acoustical noise. Purportedly, these early SSNs are acoustically noisy, of limited reliability, and their propulsion plants of relatively low thermal efficiency. To their credit though, in the 1970s the Chinese were able to develop integrated sonar, a sound trajectory tracer, reconnaissance sonar and underwater sound detection systems without assistance from Russia—despite the limited technological and manufacturing capabilities of local Chinese industry. As stated, the first two *Hans* are retired, but three do remain in service. The first Type 091 *Han*-class submarine, *Changzheng-1*, was actually converted



The single Type 033G *Wuhan*-class submarine, capable of firing short-range missiles.

into a museum in 2017 and now resides at the Qingdao Naval Museum in Shandong Province.

With the *Han* class having been recognized as possessing significant deficiencies, a new SSN design was developed to replace it: the *Shang* class. This boat has a displacement of roughly 7000 tons, is just short of 361 feet in length, and sports a 36-foot beam. There has been some confusion over its reactor plant. One suggestion has it that it might be powered by two PWR reactors. But a Chinese source claims the *Shang* runs on a gas-cooled reactor, which would definitely be a first; this is considered unlikely by Western observers however. The boat does implement a seven-bladed skewed propeller to help reduce its low frequency blade rate acoustic signature. This new Type 093 is armed with six torpedo tubes, although their diameter remains uncertain. The submarine may also carry either the YJ-12 or YJ-82 anti-ship missile. Chinese sources reported in 2002 that their noise level at sea was equal to a Flight III *Los Angeles*-class boat. However, the U.S. Navy's Office of Naval Intelligence said in 2009 that the *Shang* was more in the range of the Soviet “Victor III” class of 1979. Only two of this early version were built; they were launched in 2002 and 2003.

Before long a more advanced version, the Type 093A *Shang II*, was developed to supplant the early *Shangs*. Longer than the preceding class, they featured six torpedo tubes and a vertical launch system (VLS) for YJ-18 supersonic anti-ship missiles, plus anti-ship variants of the CJ-10 cruise missile. The YJ-18 weapon is especially concerning to the West, since it features a subsonic cruise mode and supersonic (Mach 2+) terminal attack capability with a purported range of some 290 nautical miles. Armed with conventional high explosives, it's a credible threat to surface ships from well beyond torpedo range.



A Type 094 *Jin*-class submarine dockside with open missile hatches. The turtleback has numerous free-flooding limber holes, resembling the Russian “Delta IV.”



A Type 091 *Han*-class SSN, the first Chinese foray into producing a nuclear-powered attack submarine.

At this date, four of the Type 093A Chinese submarines are reported to be in service.

Currently under construction is the Type 095, a third generation SSN design. Relatively little is known about this class. In some circles, it's thought the boat will feature both a reduced acoustic signature and an improved hull type. It may also be powered by a natural circulation nuclear reactor, and brandish VLS tubes and greater number of advanced sensors—such as a new active/passive flank array sonar as well as a towed sonar array.

The SSBNs

On the southern edge of Hainan Island sits one of China's most important military facilities: the Yulin Navy Base. This is the home of China's impressive and growing fleet of missile-firing SSBN nuclear submarines.

The first Chinese SSBN was the single Type 092 *Xia* class of ballistic missile nuclear boat, commissioned in 1983. It was 393.7 feet in length, had a beam of almost 33 feet and a submerged displacement of 6500 tons. Derived from the Type 091 SSN, the submarine featured twelve launch tubes for the JL-1 missile. This solid fuel missile had a limited range of 1100-1200 miles, but carried a powerful nuclear warhead. Initial tests of the missile were carried out with a modified “Golf I”-class submarine obtained from Russia before the Sino-Soviet split.

The *Xia* class is reportedly slow and noisy, and its PWR reactor problematic. The initial JL-1 missile failed its first live firings in 1985, and it took three years to finally achieve a successful test launch. The Type 092 boat has now undergone numerous refits, adding new black paint, possible quieting technologies, and upgraded sonar. It's also newly outfitted with the improved, longer-range JL-1A SLBM—capable of striking from 4,800 miles distant. It's believed



The unusual sail shape of the Type 039C *Yuan* class is somewhat similar to the Dutch Navy's *Zeeleeuw* sail modification.

the Type 092 has never actually conducted strategic patrols outside of Chinese regional waters. Interestingly, a second *Xia* was reportedly also constructed, but might possibly have been lost in a 1985 accident. The truth remains uncertain.

The follow-on PLAN class of SSBN submarine is the Type 094 *Jin*. These are a true second generation SSBN: 436 feet in length, with a 41-foot beam and 9000 tons of submerged displacement. Externally, the 094 class appears to be a scaled-up version of the previous Type 092 *Xia* class. It also incorporates some technologies of the Type 093 SSN described above, and is powered by a single PWR reactor. The new boat carries twelve JL-2 SLBM missiles, each with an estimated range of about 4200-4800 miles. The JL-2 is believed to contain either a single 250-1,000 kiloton nuclear warhead or three or four smaller warheads with a yield of ninety kilotons each. Six torpedo tubes are also fitted into this class. At this point it's believed six of these *Jin* SSBNs now exist.

The most recent one or two Type 094 boats may actually be an improved variant Type 094A class. One of them clearly shows visible external differences. For instance, it appears to mount a modified and improved sail. It might possibly also carry sixteen missiles instead of twelve, and its design features a more prominent missile turtleback—perhaps to accommodate a next generation SLBM. Other changes in the hull contours are seen as well. This new



Topside view of the Type 094 *Jin* class, with its twelve missile tube hatches visible.



The Chinese Type 092 Xia-class SSBN at sea. A somewhat rare event due to technical problems.

Type 094A further appears to mount a retractable towed sonar array atop its upper rudder. According to the U.S. Navy's Office of Naval Intelligence, the Type 094 is two orders of magnitude louder than current U.S. and Russian SSBNs however, and is even noisier than the old Soviet "Delta III" SSBN first launched in 1976. The Type 094 Jin-class SSBNs and the Type 093 Shang I-class SSNs are all based at Yalong Bay, on Hainan Island, as part of the Chinese South Sea Fleet. Now under development is also the Type 096 (Tang?)-class SSBN. Little is known about this future combatant. It may carry sixteen and possibly as many as twenty-four of the JL-3 SLBM—a new missile fitted with MIRVS and offering a 6000-mile range.

It's certainly obvious that China has embarked on an aggressive fleet-building program of quiet diesel-powered submarines—some with AIP—plus nuclear-powered attack submarines and ballistic missile submarines. Their goal is clearly to operate a world class Navy by 2049—the anniversary of their Chinese Revolution. How will the West respond to this future PLAN force? The United States is currently developing a next generation SSN (SSN[X]) and SSBN (Columbia class). The SSN(X) design will return to the size of the formidable Seawolf class, bringing a distinctly increased weapons loadout and sensor capability. The new attack boats will also incorporate the highly maneuverable X-tail stern plane design, plus the same quiet electric drive already in progress for the new Columbia class. In addition, on September 16, 2021 the Australian government announced it would also acquire nuclear-powered submarine capability via newly agreed support from the UK and the U.S.

For more effective ASW hunting against future underwater foes, new technology under development includes submarine-launched, AI-enhanced, Unmanned Underwater (UUV) and Unmanned Aerial (UAV) Vehicles. The Navy is further sponsoring research into a UAV deploying a Photoacoustic Airborne Sonar System, or PASS, which uses a laser to focus pinpointed heat pulses upon the ocean's surface, generating sound waves. The same hovering drone then senses returning sound waves, but this requires extremely sensitive detection due to the degradation of sound as it transfers from water to air. Most current sonar sensors are piezoelectric, which generates an electrical potential in detecting sound. PASS uses an extremely



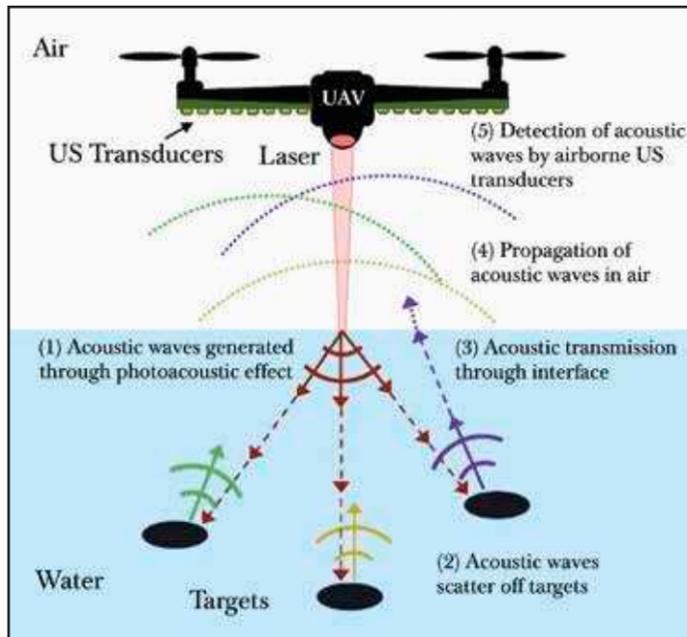
The improved Type 093A (or G "Gai") SSN with a noticeable fillet at the leading edge of the sail and a "hump" abaft it for a towed array reel, deployed from the upper rudder.



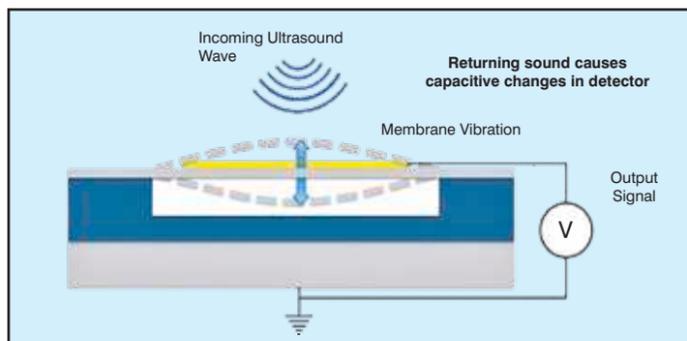
The original Type 093 Shang-class SSN, an improvement over the previous Han class.

efficient array of sensors known as capacitive micromachined ultrasonic transducers (CMUTs). These arrays consist of multiple tiny capacitors made up of two thin parallel plates very close to one another. Any disturbance of the plates—such as the vibration of a sound wave—changes the electrical properties of the capacitor, making the wave easily detectable.

The capability of submarines and surface ships to launch multiple UUVs and UAVs equipped with advanced technologies such as PASS will certainly reshape Western sea power projected toward the Far Pacific. And only the Chinese know what further submarines and weapons they will bring to bear in affecting the balance of naval power in any future conflict close to their shores.



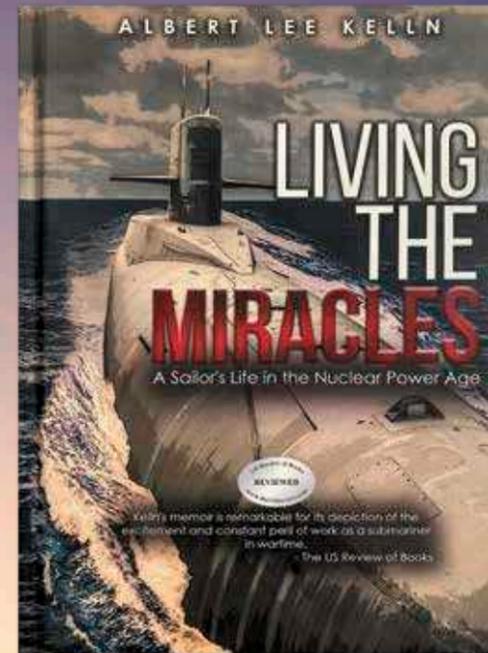
An acoustic UAV uses a laser system to generate sound waves, and a capacitive micromachined ultrasonic transducer (CMUT) to detect the returning acoustic signals.



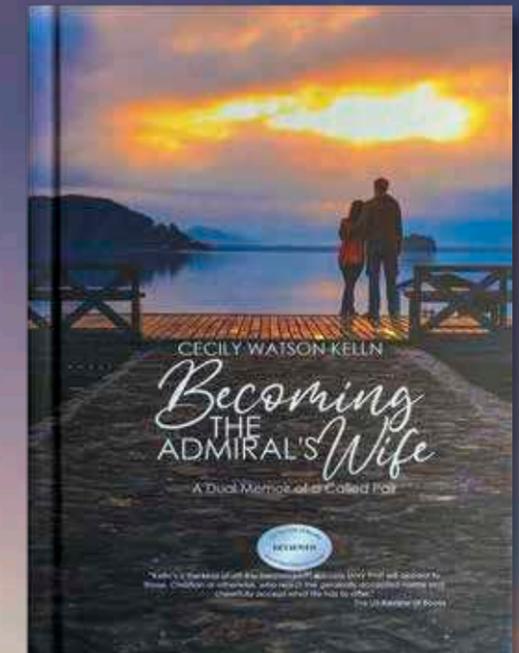
The capacitive micromachined ultrasonic transducer (CMUT) is far more sensitive than current sonar transducers: it's capable of detecting ultrasound across the air/water interface.

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In looking at how U.S. submarines are created—and by whom—it's been noted that all our boats have been designed locally... or rather, domestically. That is to say, their designers were Americans or worked for American firms. This has been true of our entire production history of submarines but for one unique exception. And it's an exception like this which can make life interesting.

Midway through the first decade of the twentieth century, the world's navies were in admitted turmoil. New technologies and innovative weapons requiring focused planning, and detailed decision-making would mean the success or failure of both tactical and strategic combat over the next thirty years.

Questions abounded: battleships, battle cruisers, aircraft, torpedo boats—what should be built and how many were needed? Navies worldwide wrestled with the questions of design and construction, arriving at solutions ultimately requiring a blending of engineering, facilities, workforce skills, long lead times, and money. Always money. Few countries actually possessed the essential facilities and experienced designer/builders to make big things happen. Those who had the working capital but neither the trained personnel nor adequate shipyards soon found themselves looking to foreign builders to shore up their navies. Meanwhile, countries of all stripes were trying to figure out just how many ships they could afford to maintain given their existing wherewithal, not to mention what *new* ships they could add to advance their strategic aims.

Enter the Royal Navy. With the advent of their breakthrough HMS *Dreadnought*, in a single stroke most of the rest of the world's battleships had moved over to the “obsolete” column. Now countries with sufficient facilities, ripe workforces and plentiful treasuries were suddenly forced to put new battleship fleets on their builders' ways. A from-the-keel-up total shift in battleship design wasn't really needed, but any new and different approaches did have to compete with the swift, all-big-gun advanced battlewagon of the era.

The next development was therefore predictable: countries with fewer resources were soon looking to create different naval weapons to counter the big new battleships constructed by others. Torpedo boats and submarines immediately seemed good alternative—they were smaller, required fewer crewmen, were significantly cheaper

to build in numbers, and could even be put to sea fairly quickly. Of these last two types, the submarines—though still a relatively new naval concept and thus an unknown quantity in combat—held the most promise. And so they became the most tempting.

But not everyone could build submarines; submersible creation and construction was and is more complex than most shipbuilding. Unlike tried-and-true surface ship development already long in existence, effective submarine design remained firmly anchored in steep learning curves; though admittedly several submarine-specific inventors and designers were now successfully plying their trade around the world.

In the U.S., those undersea entrepreneurs were Simon Lake (with his Lake Torpedo Boat Company), and Issac Rice, Frank Cable and L.Y. Spear of the Electric Boat Company (a descendent of the Holland Torpedo Boat Company). These two factions differed distinctly in their approaches to submarines and business models. Lake fostered innovative ideas and was an accomplished designer, but operated few construction facilities and suffered a penchant for changing project designs in mid-stream. Rice and his team, on the other hand, sported significant construction facilities; he would design a boat, offer a prospective buyer additional options or upgrades, then freeze that buyer's chosen design, building multiple copies of the selection.

Rice and crew were also lucky enough to have the ear of the Navy in their plus column. The U.S. government liked the idea of ordering several of a particular design in order to keep costs down, but didn't much care for having one builder be a “sole source” supplier. This might possibly lead (and in some cases actually did) to said company—instead of the client—making crucial design decisions affecting purchasing, thus impinging on strategic naval planning...which of course was the exclusive purview of the Navy, *not* the Electric Boat Company. Unfortunately, the Navy did not yet itself possess shipyards with the expertise required to produce sufficient submarines on its own.

So, the problem inevitably boiled down to using Electric Boat as a sole provider after all, while still waiting for Simon Lake to finalize a design and establish a place to build it, and/or pushing the Navy to learn how to build their own submersibles in available government-run shipyards as well. Indeed, Lake had already taken the Navy to task

in his perception that their tests of his own designs were flawed and biased toward favoring Rice's group. He felt, therefore, that he should be included in any U.S. government submarine buying plan. However, he was still in no position to supply submarines in the quantities the Navy desired.

It soon became evident that a further option was called for. Taking a page from countries choosing to commission foreign yards to construct their fleets for them—as Japan had done, for instance, in employing the UK as its battleship builder—a plausible solution was eventually presented: buy or license a foreign submarine design to be built here in the U.S. That way, the technology would be transferred to a U.S. shipyard and the Navy. A prime design source candidate was the inventor/builder Lieutenant Commander Cesare Laurenti of the Italian Navy (Regia Marina). Born in 1865, he was, in 1894, the construction manager for the initial class of submarines being built at the Royal Shipyard in Venice. By 1906, he had left his navy to join the Fiat San Giorgio Shipyard at La Spezia. It was there he designed the line of submarines the Italians used during WWI, as well as boats for eight other countries. His signature creation featured a double hull (an outer hull with ballast and fuel tanks plus an inner or pressure hull) similar to that eventually seen in most submarines of the world all the way up to the advent of the modern teardrop-shaped hull. The double hull existed, however, only in the center of the sub—the area at each end remained a single hull. It was felt that most collisions would likely occur toward the middle of the boat, so it was that area which needed the most protection. Laurenti's designs also featured multiple compartments with internal bulkheads, plus a unique superstructure used as part of the boat's surfaced and submerged trim system. This superstructure was watertight, thus able to be flooded or drained by a set of valves and vents. The side valves (for flooding or dewatering) and the vent valves in the deck were closed tight when the superstructure was empty to provide more surfaced buoyancy. But the structure could also be flooded, ballasting the boat down so it could run in a main decks awash configuration. This superstructure being a part of the vessel's ballasting system seemed like a useful idea, and had been similarly used by Lake in his submarine design. There was also a lead-filled drop keel which could be released from inside the boat—permitting

a rapid surfacing in the event of some dire emergency (or so it was hoped, anyway).

Laurenti's promising design had actually been derived from—and improved upon—the revolutionary submarine conceptual work done by Maxim Laubeuf, an engineer in the French Navy whose own work had evolved from that of another Frenchman: Gustave Zede. All these engineers were of course taking on the same submersible design issues John Holland and Simon Lake likewise tackled simultaneously back in the States.

That so many talented submarine engineers were pursuing parallel paths isn't surprising given the similarities of their design solutions. And of course, with all this competition and like thinking, the patent process was bound to eventually affect submarine development too—in the U.S., coming into play by 1903-4. Setting up this Rubik's Cube of legal twists and turns, John Holland's patents had been purchased by Isaac Rice, so that any of those submarine specifics Simon Lake might have wanted to pursue in his own designs would be blocked by rights restrictions. The reverse was also true in that Rice found many of Lake's ideas off limits by previously filed patent constraints. Adding more confusion was that foreign countries didn't operate under the same legalities with their own submarine development, further putting a damper on the marketing, construction and sale of offshore-produced boats. Added rules even banned outright the purchase of warships from foreign suppliers when such war materiel remained available at home. To skirt these procurement issues, thought the Navy, perhaps a domestic shipbuilder could license the rights to a Laurenti submarine design for construction right here in a U.S. yard? It was worth a try...

In 1908, the U.S. Navy's Board of Construction issued a circular (a “Request for Proposal”—or RFP, in current bureaucratic parlance) carefully worded to allow Lake, Electric Boat and Laurenti (now a corporate entity freshly created under the name of the “American Laurenti Company”) all an equal opportunity shot (more-or-less) at grabbing the Navy's submarine business.

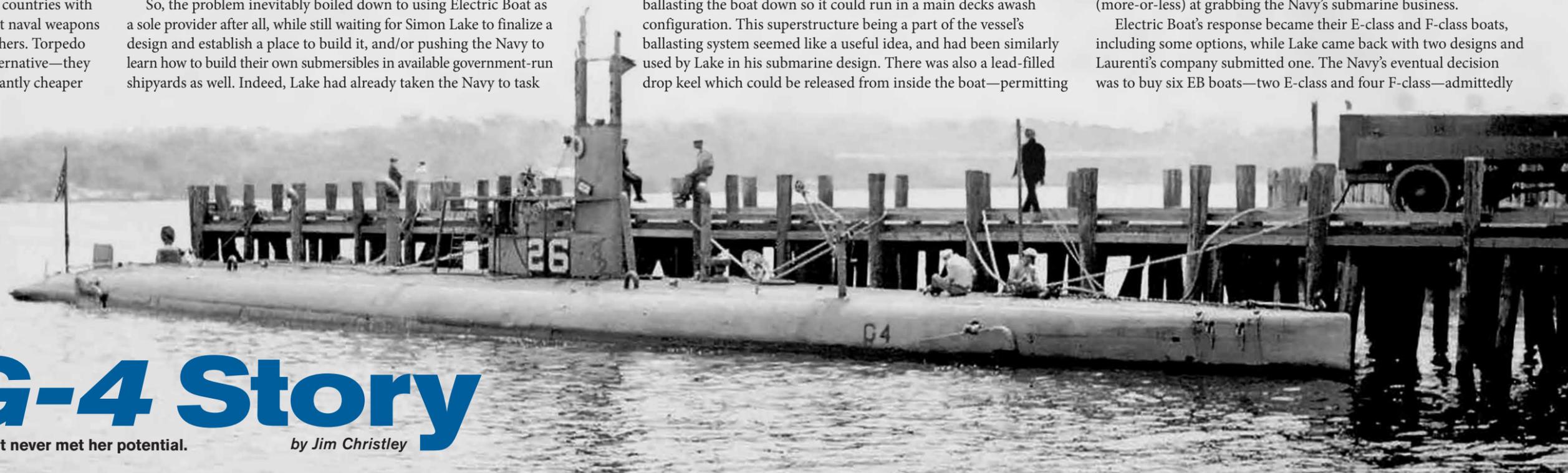
Electric Boat's response became their E-class and F-class boats, including some options, while Lake came back with two designs and Laurenti's company submitted one. The Navy's eventual decision was to buy six EB boats—two E-class and four F-class—admittedly

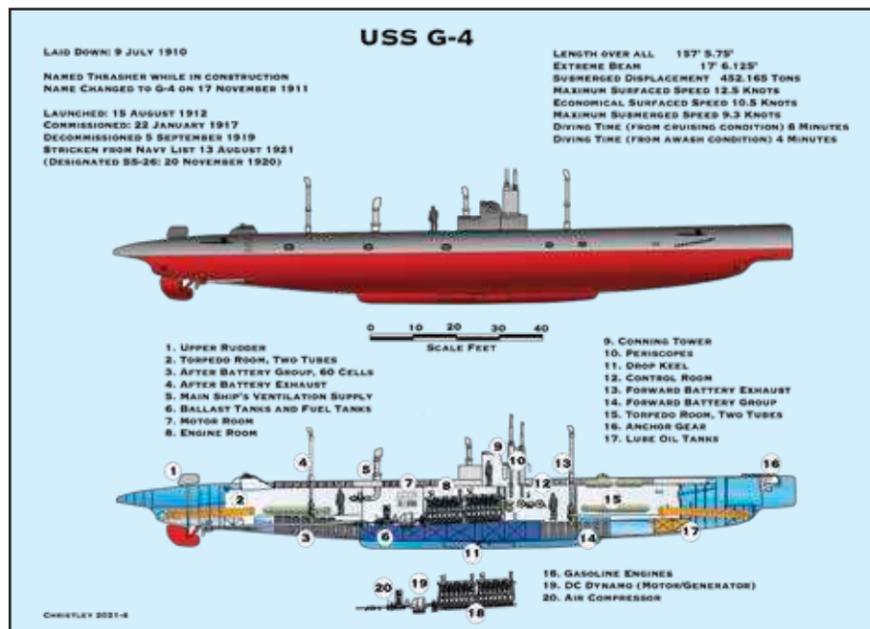
Designed Abroad:

The G-4 Story

The woeful tale of an outlier boat that never met her potential.

by Jim Christley





satisfying a desire to have submarines built on both coasts. Further, one of the two Lake designs (which would become the G-2) was authorized, and one Laurenti design was also ordered—to be built at the W.M. Cramp & Sons Ship & Engine Building Company in Philadelphia. In the interest of full disclosure, it should be noted that the president of the new American Laurenti Company was also the president of the Cramp Company. Cramp had already been well known and liked by the Navy, having successfully built several battleships and cruisers.

Thus would finally come to the United States Navy a submarine built to foreign design specs—the G-4—our star of this piece. What was initially to be called the USS *Thrasher* (renamed G-4 during construction) was contracted using Fiscal Year 1909 funds and laid down in July of 1910.

The Cramp shipyard's inexperience with such complex and sophisticated shipbuilding became evident almost as soon as construction began on the submarine. And as more building issues continued to crop up, perplexed workers there could scarcely go to EB or Lake for assistance with their Italian design and blueprints. Any taxing technicalities had to be solved in-house—an intimidating and time-consuming prospect. In fact, problems became so pervasive they threatened to postpone the boat's intended delivery target and followup 1912 sea trials. As we shall see, these goals indeed were not met.

One of G-4's first obvious problems had to do with her weight. When building a battleship, the addition of a ton or two to the superstructure or an engine room reaps a relatively small effect on the stability of the vessel; it represents only minute portion of the ship's overall mass, after all. But for a small vessel like G-4, that extra two tons is a game changer—significantly affecting trim, speed, and general seakeeping. In fact, when you consider the G-4's displacement as only about eighty tons, any significant extra weight has the potential to overwhelm the boat's reserve buoyancy and present it with a permanent new address on the bottom. Submarines are indeed very delicate instruments when it comes to how items get added to or located within their hulls; where things are positioned affects not only buoyancy but total perfor-

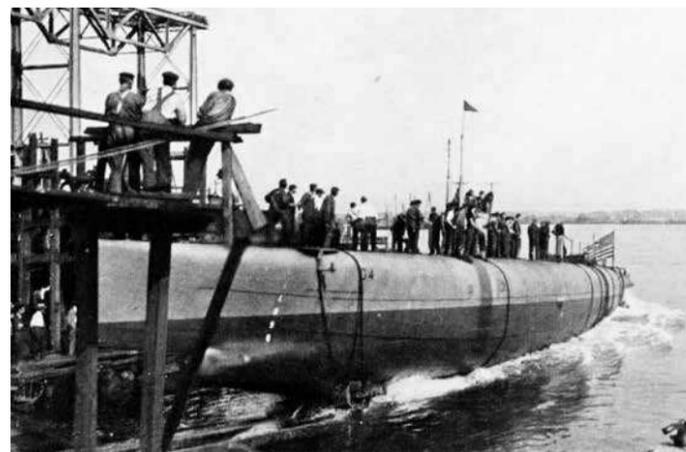
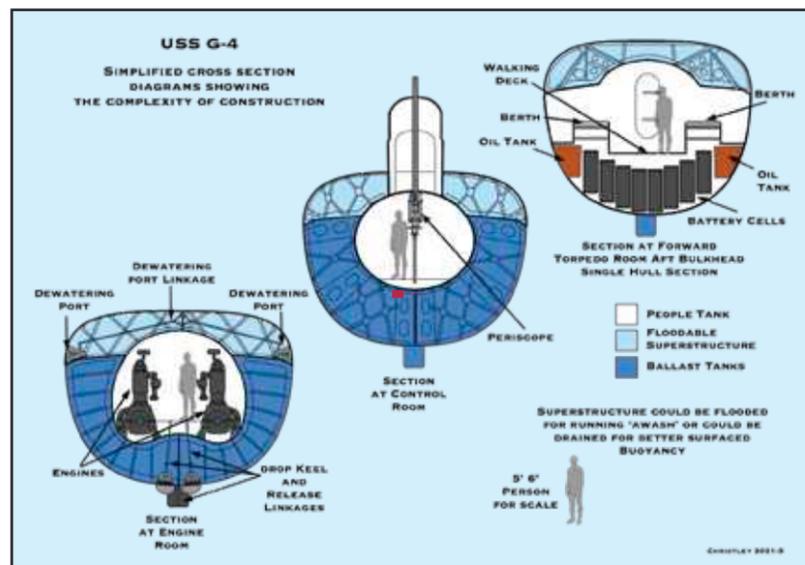
mance on and below the surface.

A submarine's reaction to any weight placement in specific relation to its center of gravity must therefore be considered within separate calculation sets for both surfaced and submerged conditions. Critical to this is the location of the boat's internal and external components; during construction, the weight of every piece of equipment has to be carefully calculated and recorded, along with its exact position within the hull. Engines, hull plates, pipes, valves, battery cells and a thousand other concerns must be cautiously tracked and their effects accounted for...or you're definitely asking for trouble.

Obviously, the stability of the boat depends on how and where its designer distributes all these various weights. And sometimes patent issues can affect those decisions, placing serious constraints on submarine designers and engineers. For example, Lake's design produced a problem EB boats had happily avoided: instability from battery

location. EB's patented U-shaped internal ballast tank meant space was left for the boat's batteries to be positioned low, below the hull's centerline, which greatly aided stability. It also made the boat's overall design more forgiving, allowing for equipment to be safely located where needed for use, rather than being a slave to trim issues only. Lake was denied this luxury, however. His design required the batteries—the submarine's heaviest component except, perhaps, for its engines—be placed higher in the hull. Destabilizing heavy power cells unavoidably in this location meant fewer options for positioning the rest of the boat's gear, which now had to act as a counterbalance to the batteries. This was indeed a tricky problem overall, though not necessarily unsolvable. Still, Laurenti's design, on the other hand, skirted the issue by putting the batteries in two sections low in the single-skinned areas of the hull—split up fore and aft.

Calculating all this weight tracking and distribution for G-4's construction was taken on by an engineer sent from the home office in Italy. It didn't go well. In fact, the string of mistakes made were significant enough to require excessive time to straighten out, adding to the already steep learning curve of the poor Cramp



Launch of G-4: Entering the water, all is going well...then G-4 rolls to port, dumping two in the drink and sending the rest scrambling for safety.

shipyard workers. The Navy really then had no choice but to agree to a delayed delivery. The offending Italian engineer, not surprisingly, was sent packing back to Italy.

Then, as if there hadn't already been enough hurdles thwarting G-4's development, preliminary pressure testing revealed additional problems. The Navy's basic test procedure called for each compartment to be closed off and pressurized to 15 psi over atmospheric, and it was imperative that any leakage detected at that level be determined to be less than a given amount. This confirmation of the hull's watertight integrity required completion before the boat could be launched, of course. Failing the watertight tests would mean a trip to drydock for lengthy repairs—and more unacceptable delays.

In G-4's case, her pressure-testing issues involved watertight ventilation valves specifically designed to stand up to sea pressure outside the boat, not necessarily to hold up to air pressure within the boat—also a desirable trait. To account for this during testing, temporary fixtures would need to be built and temporarily engaged to hold the valves shut against internal pressure. But this, of course, would've been costly and taken more time. Not surprisingly, the Navy decided it was sufficient that the valves be shown only to not leak against external pressure.

There were also problems with leaks in torpedo tubes and voice tubes. Modifications were made and the retests were considered satisfactory, but all this took still more time. Every other test which could be run while the boat remained on the ways was completed, and the issues they revealed dealt with.



Fitting out. In the background is Cramp's floating crane.



Finally it came time for G-4's launch. This also didn't go well. Surprised? Don't be. It wound up something of a comedy of errors, in fact, and you could almost envision Laurel and Hardy or Buster Keaton among the crowd. As G-4 slid down the ways, the port side of the slipway beneath her began to sink and she was thrown into a steep port list—creating a panicked scramble topside and sending two people overboard. They were fortunately quickly recovered—shaken and wet, but otherwise okay. At least G-4 was now finally in the water.

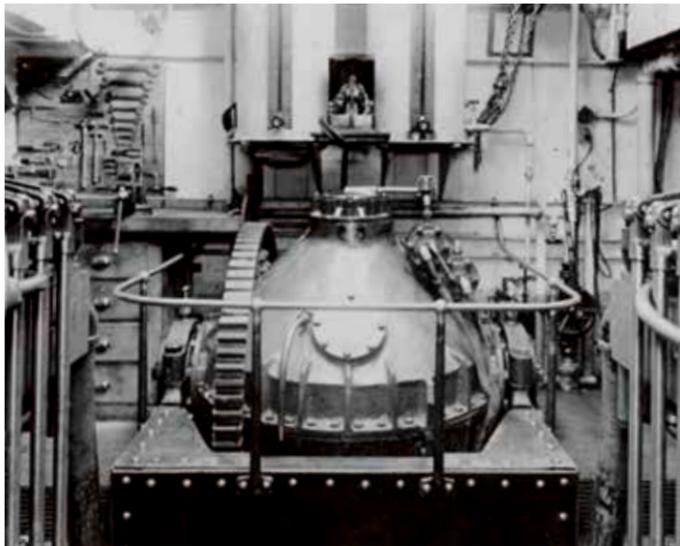
Next came the task of finally finishing and fitting out the boat. Followup dockside and underway trials were now engaged, putting her under the microscope of critical Navy inspectors whose sole purpose was to discover any iota of anything possibly wrong.

Readers who have served on boats during new construction tests, post-overhaul sea trials or refit after-checks will be able to relate to the frustrations encountered with G-4 at this time. Builders of radio-controlled model submarines likewise have a feel for the deadly dance of find-a-problem/fix-a-problem/find-another-problem/fix-that-problem—rinse and repeat—until all is found acceptable and this seemingly endless Whack-A-Mole can end with celebratory relief.

Even the timing of G-4's proposed sea trials caused concern. The crew at Cramp felt winter trials off Cape Cod and the coast of Maine would be difficult and needlessly risky, so they applied to the Navy for a delay in such testing. It was granted, so it wasn't until the summer of 1913 that the boat was finally ready for full underway trials...or, well, maybe not. For you see, G-4's engines were a big problem too. And their issues were the same ones which would go on to plague the U.S. Submarine Navy well into the middle of World War Two.

Submarine engines have to be built small and light to function within submersible design limits. When tested upon the stable foundation of a factory test stand, their engineering usually worked well. Installed within a submarine hull, however, not always so much. In G-4's case, the problem wasn't with who had actually built the engines, but with a combination of compromising factors like metallurgy, casting technology, hull and foundation flexing, fittings, and whether parts could withstand heavy vibration for extended periods. All these issues applied to G-4's engines and then some. And of course, being fueled by gasoline, there were also the attendant concerns of leakage, toxic fumes, and the ever-present danger of fire.

Cramp workers, representatives from Fiat-San Gorgio—the engines' builders—and of course the Navy itself all applied their



A Sperry stabilizer on a passenger ship.

individual expertise and countless hours of effort in trying to coerce these uncooperative engines into functioning properly. In fact, since all the sub's other systems seemed satisfactory, work focused exclusively on the engines throughout the summer and early fall of 1913. The American Laurenti Company, ultimately realizing the extent of repairs and modifications required by the troublesome propulsion plant, proposed the boat's sea trial program be delayed until early 1914, further suggesting she be accepted by the Navy on an interim basis regardless in January of 1914. Thus, the Navy took delivery of *G-4* on January 22, 1914, commissioned her under the command of Lt. Ernest D. McWhorter, USN, and never looked back.

G-4 then finally started her trials and training in Long Island Sound, continuing them throughout the spring and summer of 1914. Her overall performance was proven acceptable, and specific approvals were regularly marked on long checklists until it inevitably came time for her required twenty-four-hour full-power run. But even this, with the exception of minor issues like an excessive turning circle and overly consumed lubricating oil, went surprisingly well.

And so it was that on September 21, 1914, *G-4* was conditionally accepted into the USN—and finally reported to Submarine Base New London. Now would come rigorous testing in the open ocean, which would quickly reveal more problems not evidenced earlier within the relative calm of Long Island Sound.

For starters, it was discovered that the engine exhaust line had no closure valves! This meant that when the boat submerged, the exhausts would flood all the way back to the engine cylinders. To restart the engines upon surfacing, all this seawater had to be

drained, the spark plugs cleaned and dried, and the engines first turned over by the motor to clear out any residual water before they could finally be engaged.

Consider as well that the circulating water suction hull openings were so high up on the hull that with any 20° roll of the boat they would come right up out of the water. This instantly converted a critical water-cooled system into a destructive air-cooled one—an operational disaster! To correct it, the engine would have to be quickly shut down and the air within it fully vented out before restarting. Now consider too that the boat rolled quite a lot!

When it came to maneuverability, *G-4* was further found to be practically unsteerable in a moderate sea. And depth control in anything but calm conditions also proved extremely difficult. Pitching and rolling were instantly a serious problem—the result of hull form, superstructure, and weight issues all combining to sabotage seaworthiness.

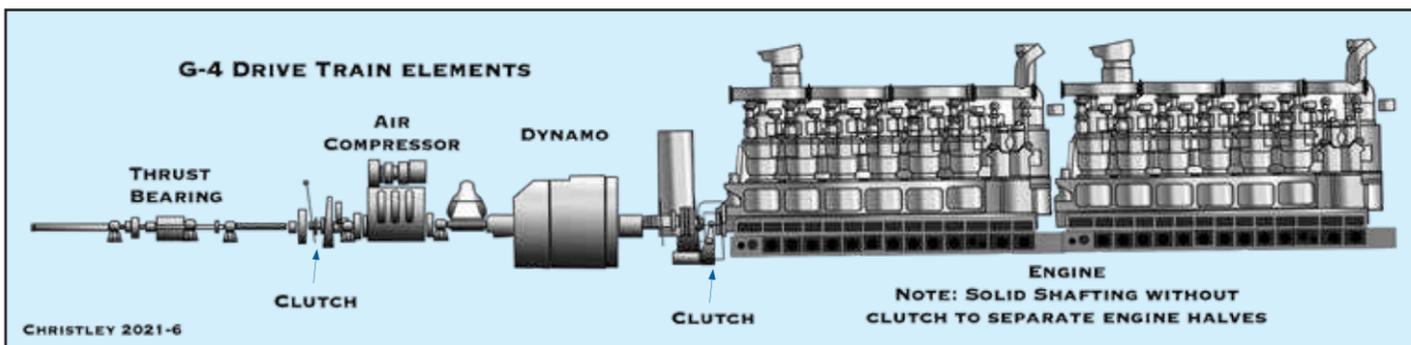
Meanwhile, corrective work on *G-4*'s troubled engines continued through the summer of 1915 and on into the following winter.

Finally, on November 8, 1915, she passed her final sea trial; it seemed the problems with her recalcitrant engines were nearly fixed at last. The following February, 1916, *G-4* was handed over to a new master, Lt. (j.g.) Paul F. Foster.¹

Not unexpectedly, since this was common with many “first ship in class” vessels, a new crop of problems now sprang up for *G-4*, each requiring a deft solution for the boat to continue her path to becoming a proper warship. Recall that her early tests had been conducted in the relatively calm waters off Long Island. Those trials had ultimately gone fairly well. But subsequent tests held in the less friendly seas from Block Island Sound to Georges Bank had demonstrated serious stability issues with her design—her pitching and rolling a large, complex challenge for which a solution was now imperative. Even in moderate seas the boat was known to roll 35°—so violently her bridge works were being damaged—while other submarines performing the same exercises at sea were experiencing no such troubles. Her rudder operation was slow too, making the boat nearly unmanageable, and even when submerged she was difficult to control if too near the surface. In fact, *G-4*'s excessive pitching and rolling had earned her the unfortunate sobriquet of a “bad sea boat.” Something had to be done.

Enter the Sperry Gyroscope Company. Sperry had devised a “stabilizer” in the form of a large gyroscope developed and marketed for passenger ships. When attached to a vessel it would create a more stable platform, helping to reduce rolling and pitching. One

¹ It should be noted that within the roster of submarine commanding officers awarded the Medal of Honor, Lt. (j.g.) Foster is often omitted. In 1914, Ensign Foster skillfully and very bravely led his contingent of men from the USS *Utah* (BB-31) in battle during the Veracruz expedition. For this he was awarded the Medal of Honor. Thus, he earned the award prior to becoming a submarine captain—his taking command of USS *G-4* being part of his reward.



Ship's officers and crew posed on deck, 1917. *G-4* was then operating out of the U.S. Naval Submarine Base, New London, at Groton, Connecticut. The two officers (4th and 5th from left, front row) are Commanding Officer LTJG Paul F. Foster and Executive Officer LTJG William F. Callaway.

U.S. Naval History and Heritage Command Photograph. (Collection of Vice Admiral Paul F. Foster.)

was eventually installed aboard *G-4*, but Foster didn't care for it, considering it, in fact, a serious danger. The spinning of its large, heavy, high-speed rotor could become, he said, “a dangerous, uncontrollable machine of enormous destructive power,” and Commander, Submarine Force Atlantic Fleet (COMSUBLANT), Rear Admiral Albert Weston Grant, agreed with him. Grant even sent a letter to the Navy Department pointing out that in his opinion “...the best preventative [sic] of seasickness is to increase the size of submarines so that they will be habitable, and then retain the vessels at sea until all hands obtain their sea legs.”

The stabilizer proved to be ineffective aboard *G-4* regardless, doing little but adding cumbersome weight when the sub was already so heavy it required sponsons built onto the upper hull to increase buoyancy as it was. As might be expected, the stabilizer was soon given the deep six—figuratively if not literally. An advanced version of the device would turn up in our Submarine Force again later when fitted aboard the first of the *George Washington*-class ballistic missile boats. It didn't last long there either.

In a more successful experiment—a bit ahead of its time, really—a variable pitch propeller system was then installed in *G-4*. The screw's blade angle could be altered through the use of a small motor connected to a separate shaft within each propeller shaft. This device allowed the engines to be run at a fairly constant rate while still varying the speed of the boat. It also permitted the blade angle to be reversed, which would produce the same effect as reversing the shaft (answering a backing bell) without having to switch the engine's direction. The variable pitch propeller concept did not ultimately survive to be used in submarines today; but it is used on *Arleigh Burke*-class destroyers.

The Diehl main motors aboard *G-4* (which also served as her main generators when turned by the engines) were an early form of double-armature slow-speed electric motors. The concept was again used by the U.S. Navy when the motor/reduction gear propulsion motors on *Balao*- and *Tench*-class boats were replaced. The Guppy and Fleet Snorkel fleetboat conversions, as well as some of the other converted boats, all had a two-armature slow-speed motor setup on each propulsion shaft. It's described by many as having two complete motors on each shaft, leading to debates as to whether these boats had two main motors (one double-motor set on each

shaft) or four main motors (accounting for each motor separately). The author has always sided with calling it four main motors. This, then, of course, is the correct view.²

Though her crew and the Navy both labored long hours to produce a good working warship out of the *G-4*, she would never be considered a reliable asset. In fact, she wound up so overweight she couldn't even carry her own full design complement of torpedoes. Further, as time went on, undersea warfare lessons learned in WWI proved that submarine design—and history—had simply passed her by. Her defects remained so extensive that work to correct them was thought impractical and prohibitive. Her new Commanding Officer, Lt. John H. Brown Jr., put in charge in February of 1919, concurred, forwarding his report detailing her numerous problems up the chain of local brass as required upon taking command.

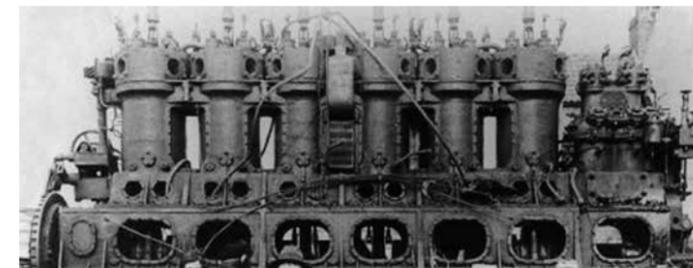
To no one's likely surprise, his superiors came back with a recommendation that no further work be performed on *G-4*, pending a formal material review by the Bureau of Inspections—a full INSURV (In-Service Inspection).

Afterward, the report from said inspection was indeed damning. The boat was clean and in good order, but her defects list was so lengthy and involved that to make repairs and required improvements would necessitate gutting the submarine of much of her internal equipment, basically redesigning and re-outfitting her from her torpedo loading tracks to her engine room.

It was obvious *G-4*'s time was running out. Her final evaluation, when it came, decreed: “*G-4* has practically no military value....” In response, the Bureau of Construction & Repair directed in its endorsement to the INSURV report that she be used as practice target. That recommendation slowly wound its way up the Navy chain of command, which included inputs from the Bureau of Ordnance, as *G-4* patiently awaited her fate.

Finally, the Chief of Naval Operations issued a memorandum allocating *G-4* to become a target for various tests by the Bureau of Ordnance. But—surprise—even this was not to be! The Navy Department had already issued instructions in June of 1919 to remove all material of any use from the submarine—the inevitable “strip ship” order—so that by the time she was officially designated a target, the poor boat had been transformed pretty much into a gutted hulk beforehand. She couldn't even be put to useful service as a punching bag for depth charge testing by the Bureau of Ordnance because she simply could not be safely submerged.

It was over: time—perhaps past time—for the boat to be “put down.” Her crew had done their best, but it had been to no avail. Those remaining mustered themselves topside to hear the words



Engine similar to the FIAT San Gorgio engine (one of four).

² Some of *G-4*'s components were built by companies which are in some form or another still in business today. An example, according to Wikipedia, is Diehl Manufacturing Company: now more famous for making sewing machines. It was eventually acquired by Singer and became a division of that firm. They built motors and even small electrical devices like fans and drills, and as such became a supplier for Sears. The Diehl division was later bought by the Ryobi Company and still supplies equipment for the Ryobi and Craftsman brands.

which would decommission the U.S. Navy submarine *G-4* (SS-26). It was a short, bittersweet ceremony as the Union Jack and Colors were hauled down to be presented to the last commanding officer. Some of the crew held fond memories, others not so much, as they hoisted their seabags and crossed over to shore. Their careers would continue on to other boats or ships or shore stations—while those memories of *G-4* passed into a history which would be revisited only now and then by articles such as this.³

Selected Characteristics:

From the Bureau of Construction and Repair General Characteristics handbook in the National Archives Record Group. (Paraphrased from the listing as published in *Warship International* No. 4, 1995, pp. 349-351.)

Length overall: 157' 5¼"

Breadth, molded: 17' 4⅞"

Breadth, extreme: 17' 6⅞"

Total displacement in submerged tons:

452.165 draft, normal: 11' 2⅜"

Displacement at this draft in tons: 370.623

Armament

Four torpedo tubes; two forward and two aft—5.2 meter (17 feet) long x 45 cm (17.7 inches) in diameter.

Eight torpedoes, four carried in the tubes and four stowed inside the vessel. (Note: As covered in the text, *G-4*'s weight-related inability to carry a full load of torpedoes was a big factor in the decision to retire her.)

Hull

Constructed with high-tensile steel with a strength of not less than 75,000 lbs. per square inch.

Engines

Fiat six-cylinder, four-cycle enclosed crankcase type; four in number on two shafts. Cylinders: 9.449 inches in diameter with a 10.236-inch stroke for a designed total of 1000 HP per shaft (running at about 650 RPM).

Battery

Two groups of 62 cells each for a total of 4620 ampere hours capacity. Manufactured by the Gould Storage Battery Company, New York.

Motors

Four motors in two sets (two on each shaft) with a nominal total of 440 HP. Made by the Diehl Manufacturing Company.

Propellers

Meisner type 3'11¼"-diameter adjustable pitch screws from 3'6" forward to 3'6" astern. Reversing is accomplished by altering the angle of the propeller blades through a small motor and internal shaft fitted with each line shaft.

Total Complement

Two officers and eighteen enlisted men.

Sources:

A special note of thanks to Mr. Christopher Wright, who produced the primary source research presented here. His work in *Warship International* is the basis for this article. The quotes within the text are drawn from his cited sources.

Warship International, Quarterly Journal of the International Naval Research Organization.

Wright, Christopher; "Thrasher/*G4*: The U.S. Navy's Laurenti Boat"; *Warship International* Issues number 3/95, 4/95

Turrini, Allesandro; "Laurenti-Type Submarines in the World's Navies"; *Warship International* Issues 2/95, 4/95

Submarine "Boat Book" USS *G-4*; Submarine Force Library and Museum

NavSource; "Submarines, *G-4*"

Lake, Simon; *The Submarine in War and Peace* Hedman, Ric; Pigboats.com

Various internet articles from sites including but not limited to: Pigboats.com, NavSource.org and Navweaps.com.

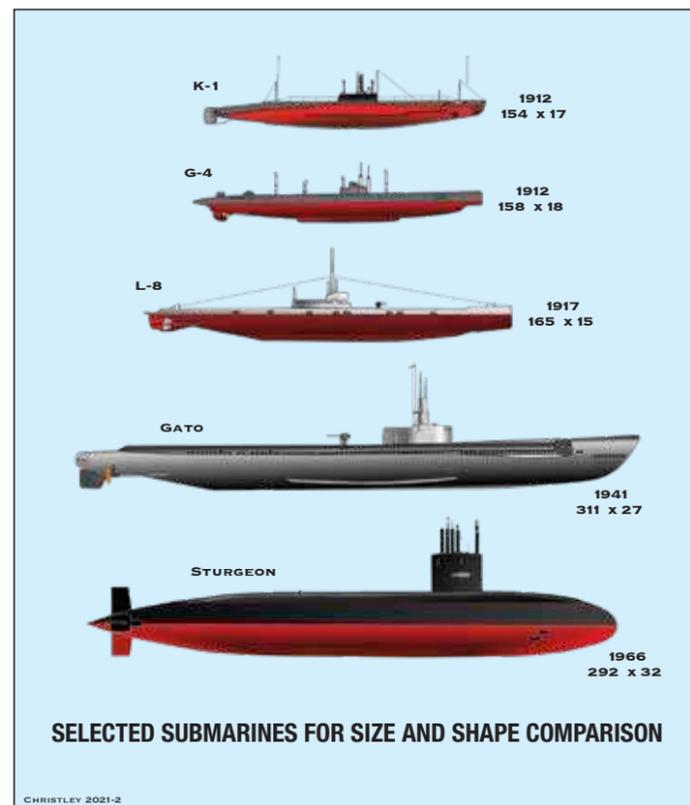
Primary source plans for *G-4* are held at the U.S. National Archives and Records Administration facility in College Park, Maryland.

Listed as:

"Plans for the Submarine USS *G-4* (SS-26)"

From Record Group: 19 Alphabetical Series of Ship Engineering Drawings National Archives Identifier: 53484184 Creators: Department of Defense. Department of the Navy. 9/18/1947; War Department. 1789-9/18/1947

³ On April 15, 1920, *G-4* was sold for scrap to Connecticut Iron and Metal of New London for \$2725.00. Due only to a slow-moving bureaucracy, the official date of her being stricken from the Naval Registry, however, was August 13, 1921. She remains the only U.S. Navy submarine ever built to a foreign design. Laurenti's efforts were, however, successfully operated in other navies, so using *G-4* to condemn her inventor and engineer is quite in error. WWI, after all, proved without question the progress made from 1904 to 1914 in the building and deploying of seagoing submarines as critical components of any nation's combat fleet. The U.S. would go on to build bigger and better boats, of course, having now learned to evolve its submarines "in house," given the Navy's burgeoning success at designing and constructing sophisticated submarines at its own shipyards. Lastly, Cesar Laurenti went on to design and build successful boats for several European navies and to assist with designs for many more.



No Acts of God Permitted in This Man's Navy, Got It?

by Captain Robert Gillette, USN, Retired

Many have related incidents reflecting Admiral Rickover's powerful impact on the submarine force. One such episode occurred for me while I was a submarine Flotilla Commander representing the Force Commander during trials of newly commissioned submarines. These were especially memorable when Admiral Rickover and his merry band kept all involved on their highly stressed toes.

The occasion in question provided me with a real first-class example of his omnipotence. It involved a trial in the Norfolk area requiring rendezvous with an ASR for a deep dive beyond the 100-fathom curve. The ASR left New London en route to the rendezvous while our boat was conducting ship control drills off Norfolk.

Everything was going well as we cleared the sea buoy off Norfolk and headed for our deep dive area. Then I suddenly received a voice message from the ASR declaring an "Act of God" had transpired which required them to tow a sixty-foot ketch. The ketch had lost its rudder and had been adrift for four days, so this was something of an emergency. The ASR skipper, of course, then indicated he now wouldn't be able to make our scheduled rendezvous on time.

After quickly plotting the ASR's position, I decided to inform Admiral Rickover of the problem while also trying to improvise a solution. I knocked on the Admiral's cabin door, entered, and began my briefing with the ASR skipper's description of this turn of events being an "Act of God." This elicited an immediate response from the Admiral, who sternly insisted that: a) "There are no acts of God," b) he had no intention of having his schedule interrupted by such nonsense, and c) I was to inform COMSUBLANT that he (Rickover,

not the deity) would not put up with any delays." He then capped his position with a disquieting... "Act of God be damned." I stepped back, half expecting a thunderbolt, but responded with a cheery "Aye, aye, sir!" and beat a hasty retreat to lick my wounds and consider what could be done about it. Perhaps a prayer was in order?

Upon consulting the chart, it was apparent that our wayward ASR was off Watch Hill near a Coast Guard Station. Fortunately, the Almighty now seemed to show some interest by providing a potential solution. I told the ASR skipper to check the tow's condition, contact the Coast Guard to put a plane in the air, arrange for a Coast Guard tow, inform the crew of the ketch of this new plan, and cast them loose.

The skipper of the ASR rogered this and, much to my surprise, was back on the circuit in only three or four minutes. "We've encountered another "Act of God," he said. I immediately interrupted him, informing him in no uncertain terms that I could handle no other "Acts of God" today. However, my mood immediately altered when he explained a tanker had just come over the hill, would pick up the tow, and our schedule would now be met.

I was on my way to inform the Admiral of this good fortune when I decided on a different verbal tack. I told him instead that COMSUBLANT had taken care of the situation, the schedule would be met, and COMSUBLANT wished the Admiral a successful set of sea trials.

The Admiral was slightly taken aback, but took only a moment to muse aloud that such quick action was "...damned unusual." He dismissed me, returning to a bunch of grapes he'd been snacking on.

See you in church on Sunday.

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TRAPPED AT THIRTY FATHOMS

The Jesse DaSilva Story: The Saga of USS *Tang* (SS-306)

There is nothing greater a man can give than his life for his country. Yet we must also acknowledge acts of courage resulting in the sparing of life—even one's own life—through initiative and actions which, in overcoming overwhelming risk, assure a single spirit ultimately survives instead of perishes. These stories of living fortitude teach us perseverance, offer hope, and provide inspiration. This is the story of one such man.

Introduction by Mark J. Denger and Jeff Porteous • Story by Jesse DaSilva as told to Bill “Radar” Hagendorn

Jesse B. DaSilva was born on November 13, 1924, in Los Angeles, California, and after graduating from high school enlisted in the Navy in March of 1943. Completing Recruit Training, he went on to attend Motor Machinist School and Submarine School in San Diego before reporting to Submarine Base Pearl Harbor in October of that year. He was assigned to the Relief Crew before joining the *Balao*-class submarine USS *Tang* (SS-306) after her second war patrol.



Tang was commanded by Commander Richard H. “Dick” O’Kane, a brash young Pacific campaign vet who had cut his war teeth as Executive Officer under firebrand Commander Dudley W. “Mush” Morton, a living legend of the sub force at the time, aboard the famed USS *Wahoo* (SS-238).

Tang’s WW2 career likewise became legendary in U.S. submarine lore. During her five war patrols, she truly wreaked havoc upon the Japanese merchant marine, destroying thirty-one enemy vessels totaling over 227,800 tons. In addition, as one of the first boats assigned “lifeguard duty” during island air strikes, *Tang* rescued twenty-two shot down, stranded airmen, a record that still stands today. It was these exploits, as well as the circumstances surrounding her final patrol, which earned O’Kane the Congressional Medal of Honor and *Tang* two Presidential Unit Citations.

Tang’s final attack of her last patrol became one of the epic submarine sea battles of all time. Between this and her prior breathtaking actions, she had expended nearly all her twenty-four torpedoes. Now number twenty-three streaked en route to its mark in another enemy ship. But twenty-four, also launched on October 25, 1944, turned rogue—a defective weapon which circled back to abruptly end the career of its master, sending *Tang* stern-first swiftly to the bottom. *Tang*’s loss was a tragic finalé to what Vice Admiral Charles Lockwood called “One of the greatest submarine cruises of all time.”

Of the eighty-seven crewmen aboard *Tang* on that horrible night, only nine were to survive. O’Kane himself tells the story in his book, *Clear the Bridge*. Here is an excerpt from its final page:

...the torpedo hit abreast *Tang*’s after torpedo room, close to the maneuvering room bulkhead. Our stern went under before those of us topside could recover from the blast. One glance aft told me that there would be insufficient time to clear the bridge ahead of the sea.

Our ship sank by the stern in seconds, the way a pendulum might swing down in a viscous liquid. The seas rolled in from aft, washing us from the bridge and shears, and of small consolation now was the detonation of our twenty-third torpedo as it hit home in the transport.

Tang’s bow hung at a sharp angle above the surface, moving about in the current as does a buoy in a seaway. She appeared to be strug-

gling like a great wounded animal.... I found myself orally cheering encouragement and striking out impulsively to reach her. Swimming against the current was painfully slow and interrupted momentarily by a depth-charging patrol. Now close ahead, *Tang*’s bow suddenly plunged on down to Davy Jones’s locker, and the lonely seas seemed to share in my total grief.

Jesse DaSilva’s own story—occurring below decks aboard the tortured *Tang*—is fully recounted below. First, it’s important to know that when the boat went down from the explosion of her own torpedo, eighty-seven were aboard her. Of that number, thirty survived the blast and initial sinking as *Tang* settled to the bottom in thirty fathoms of water. Now they were trapped. Of those harried, sunken crewman on the ocean floor, only five would eventually escape their deathtrap by using Momsen Lungs to safely ascend to the surface 180 feet above, then survive exposure in the water for hours more afterward. Jesse DaSilva was among them, the last man to successfully exit the stricken sub. He and four others, including Cmdr. O’Kane, were eventually picked up by an enemy ship remaining in the area, and made to live out the rest of the war as POWs—ultimately surviving the harshest conditions in order to eventually be able to tell the story of *Tang*’s final moments and their ordeal as wards of the wartime Japanese Empire.

Jesse’s account continues now in his words, as told to his good friend Bill Hagendorn, a fellow WW2 submariner...

Everyone’s thoughts were of heading home on that fateful day, October 25, 1944. *Tang* was due for an overhaul and that meant a stateside trip with a thirty-day leave. Nearly all torpedoes had been expended on what had been the most hair-raising, spine-tinglingly successful run *Tang* had ever made.

With her two remaining fish, *Tang* was on the trail of what was to be her last target. The patrol was rapidly coming to a close. The sudden soft bounce of the deck told us one of those fish had been sent on its way, and the last one would soon follow in its wake. Swoosh!—another soft bounce. Knowing grins around the boat now mutually confirmed we’d soon be headed for the “barn.” Long pent-up emotions began to flow. Overly-white complexions were noticed among us from lack of sunlight on the patrol. Our mood eased, but complete relaxation could not come until our mooring lines were wrapped around those big iron cleats on the pier at the sub base, securing us to safety.

Weary after long, tension-filled hours, it wasn’t unusual to request coffee breaks from battle stations. I had manned the battle phones in the after engineering room for hours, so asked for brief relief to go score a cup o’ Joe.

I didn’t know it, but Lady Luck had just winked at me—with both eyes.

A catastrophic explosion somewhere aft jolted *Tang* like a fish

hooked on a line, lifting deck plates, snapping high-pressure air lines and causing men as far forward as the control room to suffer broken limbs. Those happy grins of just moments ago instantly disappeared. Now all eyes revealed a deep foreboding—full expectation of the horrible circumstances about to change our lives forever...or snuff them out in short order. Our boyish faces had aged significantly in the blink of an eye.

The loud, droning throb of our four giant diesels suddenly stopped, the boat lost headway, and the deck tilted alarmingly upward. No one was certain what was happening. No alarm had sounded, but stunned men began to react automatically, events moving with surreal speed. Tons of water poured into the after battery from the control room, spilling over the raised hatch combing and swiftly rushing down to the closed after hatch and bulkhead. Now the deck slanted even more, its sharp angle increasing each moment. Forward motion by the crew was becoming nearly impossible. “Just hang on!”

Men slipped and slid aft, but frantically rose again to paddle-wheel toward the still open control room hatch. All were frantic, the situation critical. This seawater must be stopped!

My fingers strained to grasp the hatch, to find purchase and pull, but the half-ton door stubbornly resisted. Closing it against gravity—and against a mighty torrent of rushing seawater—seemed all but impossible. But desperate men in desperate situations can sometimes perform superhuman feats. And here, with now-or-never inspiration, the application of overwhelming muscle power inch-by-inch completed the task as it slowly banged into place.

Wide-eyed men now considered one another with blank stares. Words were not spoken nor needed. This handful of brutally shaken men suddenly found themselves locked inside the battery-filled after compartment—a space without exit! And the 126 giant storage batteries stored in rows just beneath our feet, subject to producing deadly chlorine gas if compromised by any seawater, were here separated from the roiling flood in this compartment by a single layer of decking. And the water was up to our knees!

Elsewhere, the bigger picture was coming into focus. The unthinkable was actually happening: mighty *Tang* was going down stern first and taking her crew with her. I hung onto the ladder with all my strength—and began to wonder how my end would come, for surely it was all over now. *Tang*, her stern dropping to the ocean floor like a stone, had been sunk by her own torpedo! No doubt Davy Jones eyed these events with glee; another boat to add to his fleet, already the largest and fastest-growing submarine fleet on earth.

Tang’s stern now touched bottom, but her buoyant forward compartments still held her nose just above the waves. It was as if the submarine herself were trying to breathe in her last, holding on as long as possible.

This, of course, was not acceptable to our determined enemy. Depth charges were now dropped nearby to assure a kill, and as the sound of their explosions penetrated the hull, some men inside *Tang* hoped for a swift end to their suffering. Still, in the forward torpedo room, deft hands struggled to open the vents so the boat’s bow could be brought back down into the safety of the sea. Air hissed as it streamed from the vents and water silently took its place. *Tang* now made her last dive, pivoting as if on the point of a compass into what would be her final resting place. Now in her bed on the ocean floor, she rested on an even keel; the devastating up-angle was gone.

Those of us trapped in the after battery reassessed our situation; many feeling it could be no worse. All life aft of us had already been extinguished as the compartments back there had flooded in turn.

Our only hope was to exit forward through the control room. Was it flooded too? The twenty or so of us languishing in the crew’s quarters and mess knew we couldn’t remain long. Looking through the eye-port of the control room door, it seemed this section just forward of us was flooded as well. Could we make it through?

Very slowly and with trembling hands, we cracked open the room’s bulkhead flapper above the door. If water gushed through, we knew our doom was certain; no other exit remained to us. We also knew chlorine gas would soon be in our future if we stayed...

The flapper was opened carefully—slowly at first, then fully. No water appeared. As in our after area, apparently the control room was only partially flooded too—someone had managed to close the upper hatch!

As we waded together in our knee-deep water, it was decided to open the freezer hatch in the deck at our feet to drain away as much water as possible. The small meat locker below filled quickly, but our hopes soared—there still remained a chance for escape.

Not really knowing what to expect by opening the control room hatch, we all climbed atop the four mess tables—then it was slowly cracked and swung open. We gratefully shuffled forward into the room from which an escape still seemed possible. Though we knew our troubles were only beginning, we were suddenly elated by a surprise bit of good news: the high-pressure air gauge confirmed its bottle retained a full charge: we could blow ballast and perhaps get *Tang* to the surface! Hopes were dashed, however, when the attempt only bled air through her ruptured tanks. Valuable air wasted by a useless effort. Our old girl was apparently down to stay, but still doing her best to sustain life for her suffering crew; a real thoroughbred, this boat—dying, but knowing what to do and trying to hang in there just a little longer.

By now we after battery survivors were all bone weary, and when at last we had dragged ourselves all the way forward into the torpedo room, we found it was already overcrowded. Ship’s lighting became noticeably dimmer as batteries began to short out one by one. Life support was slowly ebbing away.

How much time had elapsed since the attack had started? I looked at the ship’s clock and my troubled mind slowly began to clear. What had seemed a mere few minutes had actually been six full hours! What did fate have in store for us now?

Before he’d entered the forward torpedo room, one of the officers had ordered the crew to burn all the classified documents. The papers were set ablaze in the forward battery and the men there then quickly moved forward, closing the hatch behind them. Because the torpedo room was now so crowded, it was thought that a part of the group could return to the control room to make their escape from there. It seemed a good idea because the air was rapidly fouling and breathing was difficult. But when the hatch was merely cracked, immediately the pressure behind it pushed thick smoke and acrid fumes from the burning documents back into the torpedo room—making an already bad situation immediately so much worse. The hatch was quickly secured but the damage had been done; now the air was truly unbreathable. Uncontrollable coughing and choking overtook every man in the room. Momsen Lungs were distributed and donned but normal breathing was impossible. Looming death moved in closer...

Imagination can devise fiendish images even under hospitable conditions, but now dark fantasies were working overtime as the hellish compartment went black. Battle lanterns were lit, but with all the dense smoke, they did little good. No question, here Lady Luck began to seriously ponder just who was to live and who was to die.

By now several attempts had been made to exit the boat via the

escape hatch, but the procedure hadn't gone according to plan. Men had climbed back out of the escape chamber because of pain from the pressure inside, and others refused to even try, feeling their failure might jeopardize the chances of shipmates trying ascents after them. Those who chose to remain in *Tang* fully realized their position—simply giving up, no doubt encouraged by senses dulled from the poor air. Now they sat together, quietly speaking of loved ones and waiting for the end to come.

I and a friend whose name I can no longer recall had been standing by the torpedo tubes when we were attracted to the activity occurring under the escape hatch. Curiosity got to us and we moved over to be where the action was. A voice now called from the lower hatch for two more men to enter. Already in the chamber were Pete Narowanski and Hank Flanadan, the torpedo officer. I recall saying, "Hell, I'm not afraid to try!"—and up I went while frantically motioning my friend to enter it with me. He hesitated, and another immediately took his place. Once again, Lady Luck turned from watching the others to give me the once over, smile, and offer that essential next wink.

We four inside the chamber were now ready for our death-defying escape attempt. I remember Pete truly taking charge of things; he was the one truly responsible for getting us out of there. The hatch was closed and its flood valve opened. As seawater began to fill our cramped little space, Momsen Lungs were strapped into place. Our voices, attempting to speak above the noise in the chamber, came out only as strange squeaky sounds, almost animalistic.

Now water began to compress trapped air against the overhead, and it became noticeably hotter and harder to breathe. We began to pant heavily, and with sharp pains developing in our ears, we would pinch our noses and blow to try to equalize the pressure in our nasal passages.

It was Pete and Hank and I and a fourth man I don't remember, all jammed up into this tiny space, our bodies pressed tightly together, desperately trying to survive this unspeakable ordeal. We all knew this attempt would be our last chance, our only chance, to cheat the death we knew awaited the others we were leaving behind.

The chamber now filled with enough water to equalize our inside pressure with that of the outside; it was time to open the outer hatch—our door to freedom, or our invitation to be swept away to an eternity under the waves.

We opened that hatch, and noted the escape line secured to a float already sent up to the surface 180 feet above. I was the third man to exit. I ducked my head under the water, then grabbed the ascent line and started my way up. The water grabbed me immediately, the buoyancy of my body and the air in my lungs and Momsen device pulling me hard to shoot up.

How slow should I go? I tried to remember. Stop every ten feet? Or was it fifteen feet? Is that last man coming up behind me? Jesse, tighten your grip with your feet or you'll turn upside down!

Where the hell is the next knot? How long have I been ascending? Slow down and breathe. I should be seeing light by now. Who is up there? Where the hell is the surface? Sure wish a rescue team was waiting up top. Maybe the Japs are already there. A knot—stop. Stop. Now slowly up again. Up and up and up....

I broke the surface from thirty fathoms down—it was daylight! I was alive! I'd made it! And now I could really *breathe!*

Pete and Hank, having ascended just before me, were bobbing nearby, grinning to see me. But the man who'd been coming up after me we never saw again. I still wonder if he'd tried to return to the boat, or had simply drowned and was carried away.

Motor Machinest Mate 3rd, Clayton Decker, and Torpedoman 2nd, Hayes Trukke, were also there with us, treading water like we were. I'd been the fifth man up, but soon two more heads appeared from below. Larson, the Pharmacist's Mate, and the officers' steward. Larson was in bad shape, we saw blood spurting from his nose. He appeared to be in a stupor, and his head had to be held above water.

The steward—I've forgotten his name too—had lost his grip on the ascent line and surfaced about fifty feet from the rest of us. His face had been bashed earlier, so I went to his aid, but before I could reach him, his arms began to flail wildly and he suddenly slipped under, drifting away in the strong tide. He had drowned just as life was within reach—it was awful. With my strength draining away, I paddled back to the group. No further heads popped up to join us from below; *Tang* had given up her last man. The rest of the crew belonged to her now.

Above, the six of us on the surface huddled close together. In the distance, we could just see the bow of our last target poking out of the water. Beyond that lay the coast of China in the early morning mist. If we could just somehow swim ashore...but the current was flowing in the wrong direction. Lady Luck had apparently now departed, her duty done. I hoped she was off somewhere saving other shipwrecked sailors. We'd had our fair share of her attention.

It wasn't long before a Japanese patrol boat happened by, spotted us, and lowered a launch to pick us up and take us aboard. They immediately set about slapping and kicking Larson to bring him to, but when he failed to respond he was removed and we never saw him again. I'm certain he was simply tossed overboard somewhere out of sight.

On board the patrol craft we were met by four other survivors they'd also picked up: Captain Dick O'Kane, Bosun's Mate Bill Liebold, Radio Tech 1st Floyd Caverly—all three had been on the bridge and washed over the side when the boat went down—and Lt. Commander Larry Savadkin, our engineering officer, who had miraculously escaped the conning tower in a free ascent using no escape apparatus. Our surviving group numbered only nine men out of a once proud crew of eighty-seven. Now we were officially Prisoners of War, and the treatment first meted out to our poor lost Pharmacist's Mate became our way of life under our Japanese stewardship for the next year.

Strangely, I would reach my twentieth birthday in Japanese captivity the very next month—circumstances I had never imagined. When submarines are lost, most times the whole crew goes down with them. Who knew?

We were eventually taken to Formosa (now Taiwan), and later ultimately transported to Japan. Somehow we survived uniquely and inexplicably harsh treatment our entire time in captivity. When the war finally ended, our American saviors found we nine *Tang* survivors in truly emaciated and deplorable condition. O'Kane was days, perhaps only hours, from death. But with this joyous rescue our long suffering had finally come to an end. Only then did we dare think of a future, and again of reunions with our loved ones. They'd suffered too, never having had an inkling of our status, and learning only after the war that we had somehow survived. Now loving plans could be made—because Lady Luck had chosen to make that one final appearance at the end of the war for all of us.



Jesse DaSilva's Life Saved by Charles "Swede" Momsen's Newfangled Contrivance

You may not have heard of him, but Swede Momsen—a submariner of extraordinary character, compassion and genius—forever changed the nature of saving lives under the sea. Yet to this day he remains something of an unsung hero.

Submariners know all too well the risks attached to their profession. And while the U.S. Navy has always upheld the safety of its sailors in the performance of their dangerous work—and warfare—beneath the waves, it has sometimes been slow to initiate corrective measures in the wake of a submarine disaster. In the Silent Service's early days, escape from any submarine casualty meant either coming back up with the boat—or not coming back at all.

The tragic operational loss of the submarine USS *S-4* (SS-108) on December 17, 1927 helped to put an end to that horrible status quo, bringing the situation into fixed focus and greenlighting serious rescue research within the Navy at last. *S-4* had sunk off the coast of Massachusetts in a collision with the Coast Guard destroyer *Paulding*. Rushed to the scene, a diver found the sub lying in 102 feet of water. Signaling hoped-for survivors inside by tapping on her outer hull, he indeed found six men alive within the forward torpedo room. Air lines from surface ships were coupled to the boat in an attempt to blow water from her ballast tanks. When this failed, pontoons were positioned over the wreck in a similar attempt to raise the hull. Then foul weather blew in and ended all rescue efforts. Another three months would pass before *S-4* was finally brought to the surface, her crew obviously having all perished. Submarining remained a very dangerous business.

After the disaster, Navy engineers and civilian scientists hired to work with them set about devising ways to liberate trapped submariners. As a result, inventions such as the diving "bell" were developed to achieve rescue through outside means. In other words, such a device could be lowered from the surface to attach to the submarine's deck (via previously installed modifications), enabling survivors to exit the stricken hull by crawling up into this transport vessel and being hauled back up to the surface. However, before this, the first essential contribution to individual escape technique was perfected in 1929 by Charles B. "Swede" Momsen, a submariner himself: the so-called "Momsen Lung."

This now famous device was actually a portable, individual breathing mask connected by flexible hose to a bag containing oxygen and carbon dioxide absorbent. The volume of oxygen it held was a little over a gallon—sufficient quantity to supply the person wearing it a slow ascent to the surface from a submarine resting as far down as three hundred feet. The procedure to achieve this, however, was exacting, and had to be followed very precisely for any hope of success. Death—slow or fairly quick—awaited any wearer not sticking closely to user protocol. For this reason, strict Momsen Lung training was required for all potential users.

To make possible an individual escape from a sunken sub



through use of a Momsen Lung, Navy designers first had to provide submariners a way out of a crippled vessel without flooding it. In U.S. fleetboats of WW2, such escape exits were provided in the torpedo rooms at the forward and after ends of the submarine. Each consisted of a special chamber mounted within the sub's superstructure which featured a lower hatch for entry from the pressure hull. A side hatch inside then permitted exit to the sea once the lower hatch was sealed. Controls within the chamber provided admission of compressed air and sea water as necessary to effect escape. These chambers could hold four men at a time. The escapees, each carrying a Momsen Lung, would enter it from its lower hatch in the torpedo room. After shutting that hatch, a valve would be opened to allow sea water in until pressure inside the chamber equaled that of the sea pressure outside. Air was then admitted from the ship's onboard supply to lower the level of water in the chamber to the top of its side door. The men then charged their Momsen Lungs and opened the door. In turn, each one seized hold of a nearby cable descending from a float on the surface. To assure the crucial upright stance during ascent, each escapee clamped the line between his feet. Rate of ascension was controlled by the braking action of his hands on the line.

A slow rate of ascent was essential for a successful escape. Yielding to any impulse to rise rapidly would be fatal: an "embolism" would form in an impatient sailor's lungs from the high-pressure air breathed in at the start of the process. As water pressure quickly dropped during a fast ascent, the lungs would overexpand and inevitably rupture, forcing air bubbles into his bloodstream. When a bubble reached his heart, the organ would lose suction—just as air bubbles in a water line will cause a pump to lose its "prime." Then the heart would simply stop pumping, and the only escape achieved would be from back taxes or jury duty the next time it rolled around.

Jesse DaSilva was one of only five men to have survived such an escape from a sunken submarine during WW2. This was undeniably thanks to "Swede" Momsen's ingenious Momsen Lung, the first self-contained breathing device for underwater use. This innovative technology later paved the way for the invention of modern scuba diving as well.

“We shall never forget that it was our submarines that held the lines against the enemy while our fleets replaced losses and repaired wounds.”

Fleet Admiral Chester W. Nimitz, USN



USS S-5 (SS-110)

38 officers and men on board. Lost on September 1, 1920 when a practice dive went very wrong; she sank at a steep down angle, her bow touching bottom and her stern eventually rising about seventeen feet out of the water. In a dramatic rescue, the entire crew escaped through a small hole cut in the exposed hull. Salvage attempts were ultimately unsuccessful, and S-5 settled to the bottom. **No loss of life.**

USS S-51 (SS-162)

33 officers and men on board. Lost on September 25, 1925 when she sank in a collision with SS *City of Rome* a British ocean liner, off Block Island, Rhode Island. **All hands lost.**

USS GRUNION (SS-216)

70 officers and men on board. Lost July 30, 1942 while on her first war patrol near Kiska Harbor, Alaska. Current theory suggests structural damage from a circular torpedo run together with jammed dive planes combined to put *Grunion* on the bottom. **All hands lost.**

USS S-39 (SS-144)

42 officers and men on board. Lost on August 14, 1942 after grounding on a reef south of Rossel Island in the southwestern Pacific during her third war patrol. All the crew were rescued. **No loss of life.**

USS GRAYLING (SS-209)

77 officers and men on board. Presumed lost on September 9, 1943 to unknown causes near the Tablas Strait in the Philippines during her eighth war patrol. The loss includes a U.S. Army Air Force passenger. **All hands lost.**

USS CISCO (SS-290)

76 officers and men on board. Lost on September 28, 1943 during her first war patrol in the Sulu Sea west of Mindanao. **All hands lost.**

USS POMPAÑO (SS-181)

77 officers and men on board. Lost at some point in September or early October 1943 while on her seventh war patrol. Japanese records indicate a submarine in *Pompano's* patrol area was destroyed on September 17 by an air and depth charge attack. If not sunk by this action, she likely fell victim to a mine sometime between September 9 and October 5. Although the exact cause of her loss remains uncertain, current information suggests her loss to a mine is the correct theory. **All hands lost.**

USS S-28 (SS-133)

49 officers and men on board. Lost on July 4, 1944 while conducting training exercises off Hawaii in coordination with the U.S. Coast Guard cutter *Reliance*. **All hands lost.**

USS ROBALO (SS-273)

81 officers and men on board. Lost on July 26, 1944 during her third war patrol when she struck a mine off the east coast of Balabac Island in the Philippines. At least four men survived the sinking and were captured by the Japanese. None survived the war. **All hands lost.**

USS FLIER (SS-250)

78 officers and men on board. Lost on August 13, 1944 when sunk by Japanese mine in the Balabac Strait south of Palawan. Thirteen survivors made it into the water to swim ashore. Eight survived and were later rescued by USS *Redfin* (SS-272). **70 Men lost.**

USS HARDER (SS-257)

79 officers and men on board. Lost on August 24, 1944 while on her sixth war patrol from a minesweeper's depth charge attack near Hermana Mayor Island off the west coast of Luzon in the Philippines. **All hands lost.**

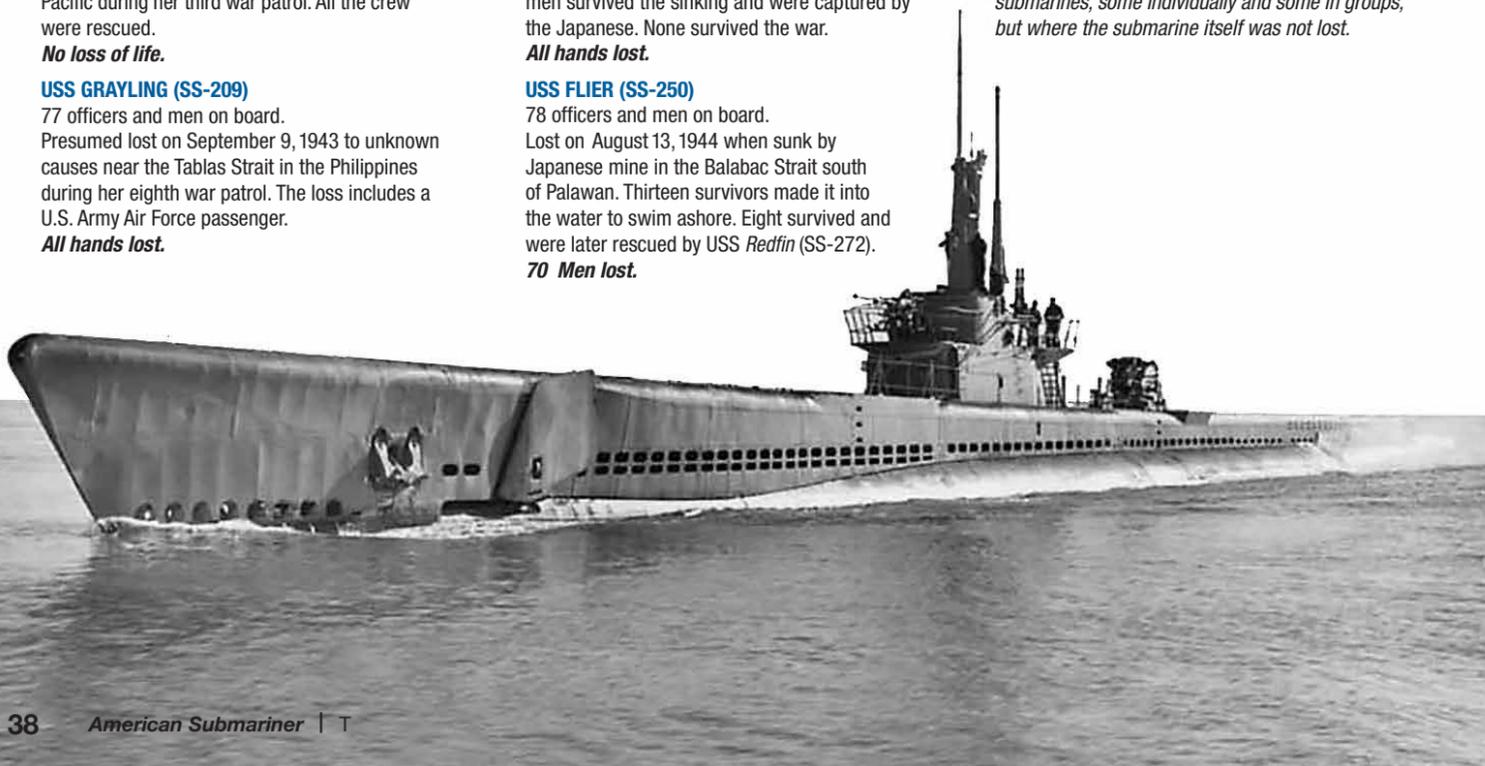
USS BULLHEAD (SS-332)

84 officers and men on board. Lost on August 6, 1945 in the Lombok Strait during her third war patrol. She was sunk by a depth charge dropped from a Japanese army aircraft. *Bullhead* was the last U.S. submarine lost during WWII. **All hands lost.**

USS COCHINO (SS-345)

90 officers and men on board. Lost on August 26, 1949 off the coast of Norway due to a battery explosion and fire. After a fourteen-hour rescue operation by *Cochino* crew members and the nearby *Tusk* (SS-426) another explosion occurred, sending *Cochino* to the bottom. *Tusk's* crew managed to rescue *Cochino's* entire crew except for one civilian engineer. Six men from *Tusk* were lost during the heroic rescue effort. **7 men lost.**

Finally, we remember all the brave submariners who died in the course of their duties aboard submarines, some individually and some in groups, but where the submarine itself was not lost.



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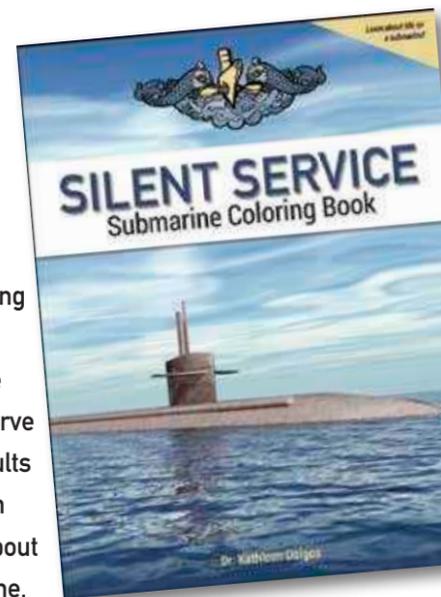
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Blakely	Stuart	1977	Archerfish
Broadway	Ronald Edward	1968	Archerfish
Smalley Jr.	James Harrison	1970	Aspro
Durrange	Daniel H.	1967	Atule
Larson	David P.	1956	Balao
Best	Frederick	1972	Barb
Johnson	Scott L.	1989	Barb
Foley	Kenneth	1978	Benjamin Franklin
Stonebarger	John Ernest	1973	Bergall
Thomas	John A.	1975	Billfish
Fisher	Bruce E.	1966	Bonefish
Caron	Kevin M.	2005	Bremerton
Petry	John	2003	Bremerton
Johanning	Vance	1989	Buffalo
Fisher	Wallace	1967	Carp
Ettwein	Duane	1971	Casimir Pulaski
Hampshire	David J.	1981	Casimir Pulaski
McKittrick	Owen	1969	Catfish
Sowers	Leroy E.	1964	Corporal
Longbrake	Daniel	1961	Cutlass
Cunard II	Bruce T.	1993	Dallas
Teskey	Alexander	2012	Dallas
Hernaes	Joe C.	1970	Daniel Boone
Carney	James G.	1970	Daniel Webster
Reed	Paul D.	1982	Daniel Webster
Hendren	Richard H.	1978	Drum
Eberly	Norman P.	1979	Ethan Allen
Smith	Wallace	1972	Flasher
Delmore	Vincent	1977	Francis Scott Key
Wadiak	Robert	1988	Francis Scott Key
Proctor	John	1967	George Bancroft
Yeakley	Guy	1977	George C. Marshall
Brown	Johnny D.	1977	George Washington
Wilcox	Paul	1968	George Washington Carver
Matkovich	Mark J.	2002	Georgia

Last Name	First Name	Qual.	Boat
Schinella	David	1984	Georgia
Martin	David M.	1976	Grayback
Duckworth	Robert L.	1970	Guardfish
Kerwath	Eric G.	1967	Guardfish
Scheldt	John C.	1969	Guardfish
Glass	Allan J.	1977	Guitarro
Graf	Harry	1978	Guitarro
Powers	Lonnie	1985	Guitarro
Wittman	David	1978	Guitarro
Stevenson	William	1992	Hammerhead
Bymers	Lon J.	1978	Hawkbill
Harmon	Thomas	1978	Henry L. Stimson
Negley	Robert K.	1990	Henry L. Stimson
Talavera	Luis	1989	Henry M. Jackson
Spracklin	Paul	1988	Honolulu
Ferrigan	Jake	2012	Houston
Gray	Dylan	2013	Houston
Patterson	Mark	1987	Indianapolis
De Rouse	Gary Alan	1972	Jack
Dickerson	Douglas	1976	James K. Polk
Scheier	Patrick M.	1986	John Adams
Derrick	Paul	1968	John C. Calhoun
Holcomb	Thomas Joseph	1974	John C. Calhoun
Briggs MD	John R.	1962	John Marshall
Manofsky	Steve	1974	John Marshall
McDonald	Alan E.	1965	John Marshall
Smith	Stephen A.	1966	John Marshall
Andrews	George R.	1977	Kamehameha
Boes	Jeff	1997	Kentucky
Ball	Ernest	1975	Lafayette
Cormier	Raymond	1976	Lafayette
Browne	Melvin N.	1973	Lapon
DuBois	Steven	1973	Lewis and Clark
Weinert	David P.	1981	Los Angeles
Dougherty	John D.	1963	Medregal
Vykhrist	D'Surak A.	2018	Michigan
Lev	Michael A.	1984	Minneapolis-St. Paul
Wiggins	Michael C.	2017	Minnesota
Jaremback	Rick B.	2017	Montpelier
McKenzie	Bill	1976	Narwhal
Dreznin	Neal	1969	Nathan Hale
Limbert	Craig W.	1970	Nathan Hale
Romig	Terry	1977	Nathan Hale
Shearer	Richard F.	1971	Nathan Hale
Giuliani	Ronald G.	1975	Nathanael Greene

Last Name	First Name	Qual.	Boat
Hanagan	Terry	1968	Nathanael Greene
Justice	Garry Dean	1973	Nathanael Greene
Willis	Jonathan A.	1999	Nebraska
Serra	Phillip	2004	Norfolk
Smith	Nathan	1997	Oklahoma City
Guillen	Jesus	1984	Pargo
Lundgren	Rick	1977	Pargo
Van Oosterwyk	David A.	1970	Pargo
Sulman	Bernie I.	1963	Patrick Henry
Tester	Dennis W.	1970	Patrick Henry
Valley	Casey	2012	Pennsylvania
King	Tim	1978	Permit
Kovach	Anthony Fred	1966	Permit
Dennison	James L.	1998	Philadelphia
Hartley	Daryll	2003	Philadelphia
Young	John Phillip	1957	Pickerel
Lopez	Carlos J.	1944	Pilotfish
Guillory	Mark	1994	Pintado
McKeen	James	1987	Plunger
Howell	Joel N.	1993	Pogy
Kyle	Steven	1981	Pollack
Waters	Dennis	1970	Pollack
Donohoo	Daren	1990	Portsmouth
Gray	Maxwell	2006	Providence
Nettel	Hans	1974	Queenfish
Schnurr	Brian	1985	Queenfish
Hartman	Richard	1966	Quillback
Langenheim	John P.	1959	Quillback
Hatman	Bobby R.	1980	Ray
Bowman	Richard C.	1963	Redfish
Gibson	Hugh David	2007	Rhode Island
Farmer	Lyle	1983	Salt Lake City
Tassinari	Timothy D.	1984	Sam Rayburn
Norton	Wesley	2012	San Juan
Lincoln	Geoffrey	1988	Sand Lance
Waldrop	James Wesley	1960	Sarda
Ginapp	David W.	1976	Sargo
Allred	Andy	1987	Sculpin
Haas	Randy C.	1981	Seahorse
Hamm	Steven	1990	Seawolf
Stewart	James J.	1955	Segundo
Lavoie	Leland T.	1975	Silversides
Cochran	David O.	1972	Simon Bolivar
Higgins	Richard J.	1961	Skate
Licht	Kevin D.	2012	Springfield

Last Name	First Name	Qual.	Boat
Davis	Earl Ray	1971	Stonewall Jackson
Yuhus	John	1973	Stonewall Jackson
Plunkett	Daniel	1973	Tautog
Cason	Bill	1976	Thomas A. Edison
Heilman	Robert E.	1970	Thomas Jefferson
Derickson	Gary E.	1972	Tinosa
Wallace	William F.	1969	Tirante
Chaves	Neal	1968	Tiru
Bliss	William S.	1958	Trigger
Cook	Donald A.	1967	Triton
Wetzel	Nick	1965	Triton
Godfrey	Sean	2018	Vermont
Sgrignoli Jr.	Roger E.	1985	Von Steuben
Brewster	Alonzo	1992	West Virginia
Wilkens	William Gaither	1997	West Virginia
Leon	Stephen	1992	Will Rogers
Veny	James E.	1968	Will Rogers
Mazza	Timothy	1975	William H. Bates
Sanchez Jr.	Enrique D.	1976	Woodrow Wilson
Mendez	Chris	2000	Wyoming
Yamashita	Garon H.	2012	Wyoming
Brown	Bruce W.		Associate
Frost	Sharon		Associate
Hempeck	R. Wayne		Associate
Heron	Mary		Associate
Hogan	Frank W.		Associate
Hutchinson	Robert F.		Associate
Jacobsen	Adrienne		Associate
Jilek	Lorrie		Associate
Kozikowski	Mike		Associate
Lindenberg	Robin Anne		Associate
Lueck	Laura		Associate
Luna	Laura		Associate
Nagelbush	Larry		Associate
Nolan	Daniel C.		Associate
Swiggard	Joan		Associate
Vile	Randy Norman		Associate
Wagner Jr.	Sara		Associate
Warner	Cynthia		Associate
Wayles	Cecil J.		Associate
Williams	Riley		Associate
Wimberly	Tommy C.		Associate
Woods	Alice		Associate

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clutch617@gmail.com

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North Myrtle Beach, SC
Charles McAleer • (609) 238-7606
chickmacsr@gmail.com

USS Diablo (SS-479)
September 18-21, 2022
Portland, ME
Dave Matthes • (540) 665-6454
dmatthes479@gmail.com

USS Dogfish (SS-350)
October 5-9, 2022
North Little Rock, AR
John Cronenberg
DogfishReunion2020@gmail.com

USS Grayback (SS/SSG/LPSS-574)
October 16-20, 2023
Las Vegas, NV
Kent Weekly • (951) 445-6279
ss574@earthlink.net

USS Grenadier (SS-525)
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Reginald Thurlow • (352) 464-2453
reggiethurlow100@gmail.com

USS Patrick Henry (SSBN-599)
November 3-6, 2022
Kings Bay, GA
Dale Dietz • (434) 944-4134
daledietz68@gmail.com

USS Piper (SS-409)
August 25-28, 2022
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Frank Whitty • (508) 946-5274
Whitty409@aol.com

USS Robert E. Lee (SSBN-601)
October 26-30, 2022
Mystic, CT
Joe White • (405) 410-9205
jwhite.ag68@shelterinsurance.com

USS Ronquil (SS-396)
August 20-23, 2022
Buffalo, NY
Richard Osentoski • (734) 671-3439
ussronquil@yahoo.com

USS Sam Houston (SSBN/SSN-609)
September 8-10, 2022
Omaha, NE
Howard Dobson • (302) 764-1197
howardvaldobson@verizon.net

USS Sea Cat (SS-399)
October 17-20, 2022
Little Rock, AR
Ed Hymer • (515) 981-3006
Ednmeg@mchsi.com

USS Sea Owl (SS-405)
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Roy Purtell • (518) 330-8794
Roy@ussseaowl.com

USS Sea Poacher (SS-406)
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Bill Brinkman • (512) 255-0285
seapoacher@att.net

USS SKATE (SSN-578)
August 28-September 3, 2022
Tisch Mills, WI
Bob Hogue • (410) 804-4666
SkateReunion@gmail.com

USS Threadfin (SS-410)
November 3-6, 2022
Jacksonville, FL
Stephen Kolb • (904) 646-3814
snrkolb@comcast.net

USS Tunny (SS-282/SSN-682)
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Steve White • (704) 600-7716
Tunny.reunion.2022@outlook.com

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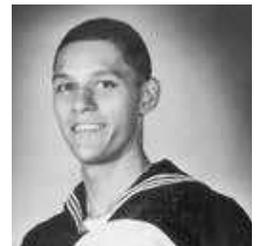
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