American Submariners Inc.
4370 Twain Ave.
San Diego, CA 92120-3404

The Silent Sentinel

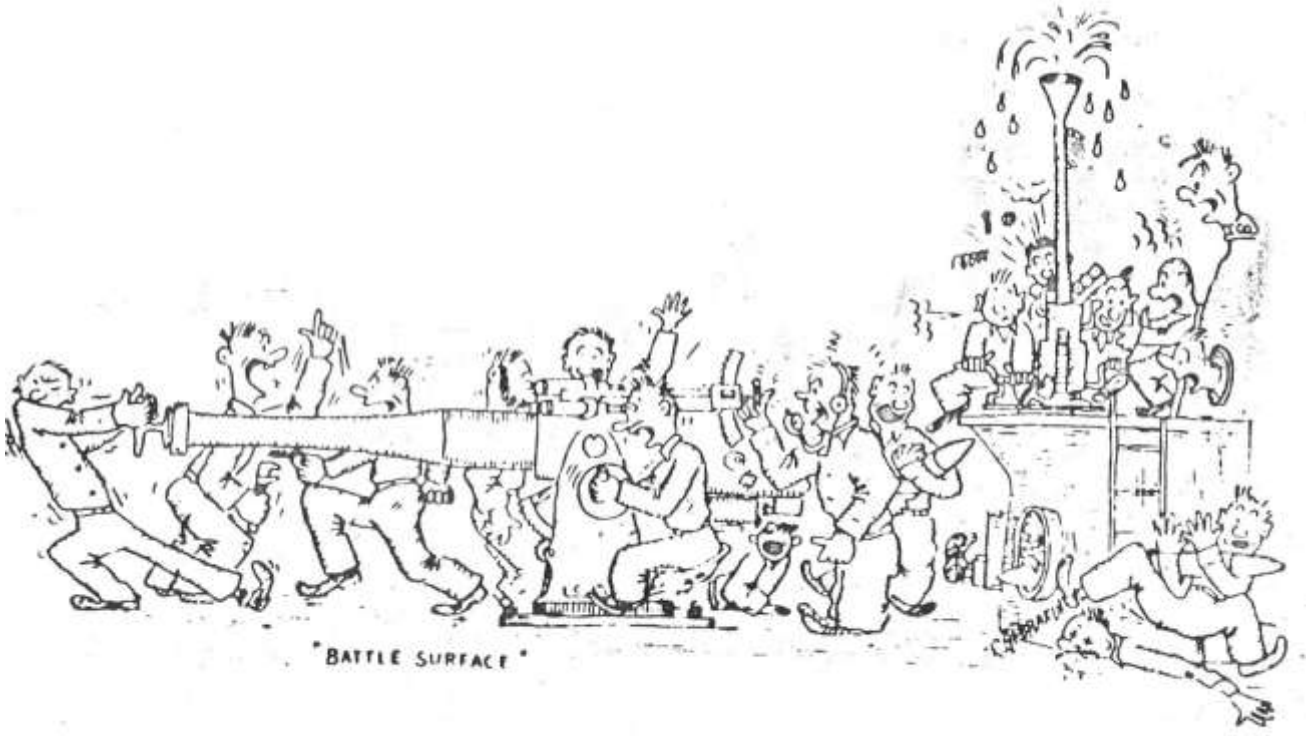
April 2016

Our Creed and 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.

In addition to perpetuating the memory of departed shipmates, we shall provide a way for all Submariners to gather for the mutual benefit and enjoyment. Our common heritage as Submariners shall be Strengthened by camaradetie. We support a strong U.S. Submarine Force.

The organization will engage in various projects and deeds that will bring about the perpetual remembrance of those shipmates who have given the supreme sacrifice. The organization will also endeavor to educate all third parties it comes in contact with about the services our submarine brothers performed and how their sacrifices made possible the freedom and lifestyle we enjoy today.



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The Silent Sentinel via Email

To all of my Shipmates and families who currently receive our Great newsletter via the mail who would like it sent via email or continue to receive it via mail, please fill out the form and mail it to the base or myself. We are trying to cut the cost of the newsletter down from $3700 to about $1900 a year. By receiving the Silent Sentinel via email will cut down the printing and mailing cost. The other plus to receiving it via email is you can save it on your computer and not have the paper lying around the house.

A subscription to the Silent Sentinel newsletter will be available to surviving family members via internet email, at no charge, upon notification of the Membership Chairman. If a printed hard-copy is preferred, via US Post Office delivery, an annual donation of $5.00 will be requested to cover costs.

NAME: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

EMAIL: _____

TELEPHONE: _____

Would like the SILENT SENTINEL emailed: YES_____ NO_____

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*DUE TO LOGISTICS CONSTRAINTS, ALL INPUTS FOR THE SILENT SENTINEL MUST BE IN MY HAND NO LATER THAN **ONE WEEK** AFTER THE MONTHLY MEETING. IF I DO NOT RECEIVE IT BY THIS TIME, THE ITEM WILL NOT GET IN. NO EXCEPTIONS! MIKE*

April 2016 MEETING

Our monthly meeting is held on the second Tuesday of the month at VFW Post 3787, 4370 Twain Ave., San Diego. Our next meeting will be on April 12th. The post is located one-half block West of Mission Gorge Road, just north of I-8. The meeting begins at 7 p.m. The E-Board meets one hour earlier at 6 p.m.

Check us out on the World Wide Web
www.ussvisandiego.org

Binnacle List

Joel Eikam, Jack Kane, Jack Ferguson, and Benny Williams

Submarine Losses in April

Originally Compiled by C J Glassford

USS Pickerel (SS-177)
Lost on April 3,1943 with the loss of 74 officers and men, while on her 7th war patrol. She was lost off Honshu. The exact cause of her loss has never been determined, but her OP area contained numerous minefields.

USS Snook (SS-279)
Lost on April 8,1945 with the loss of 84 officers and men. Snook ranks 10th in total Japanese tonnage sunk and is tied for 9th in the number of ships sunk. She was lost near Hainan Island, possibly sunk by a Japanese submarine.

USS Thresher (SSN-593)
Lost on April 10, 1963 with the loss of 112 crew members and 17 civilian technicians during deep-diving exercises. 15 minutes after reaching test depth, she communicated with USS Skylark that she was having problems. Skylark heard noises "like air rushing into an air tank" - then, silence. Rescue ship Recovery (ASR-43) subsequently recovered bits of debris, including gloves and bits of internal insulation. Photographs taken by Trieste proved that the submarine had broken up, taking all hands on board to their deaths in 1,400 fathoms of water, some 220 miles east of Boston.

USS Gudgeon (SS-211)
Probably lost on April 18, 1944 with the loss of 79 men SE of Iwo Jima, but may have been sunk on May 12, 1944 in another attack on an unidentified submarine and heard by several other submarines in the area. Winner of 5 Presidential Unit Citations, Gudgeon was on her 12th war patrol and most likely due to a combined air and surface antisubmarine attack. Gudgeon was the first US submarine to go on patrol from Pearl Harbor after the Japanese attack. On her first patrol, she became the first US submarine to sink an enemy warship, picking off the submarine I-173.

USS Grenadier (SS-210)
Lost on April 22,1943 near Penang, with no immediate loss of life. She was on her 6th war patrol. While stalking a convoy, she was spotted by a plane and dove. While passing 130 feet, Grenadier was bombed, causing severe damage. She was lodged on the bottom 270 feet and the crew spent hours fighting fires and flooding. When she surfaced, she had no propulsion and was attacked by another plane. While she shot down the plane. When enemy ships arrived, the CO abandoned ship and scuttled the boat. Of the 76 crew members taken prisoner, 72 survived the war.

San Diego Base, United States Submarine Veterans Inc.
Minutes of Meeting – 8 March 2016

1900 – Sr. Vice Commander Warren Branges called the meeting to order

Conducted Opening Exercises - Pledge of Allegiance lead by Chief of the Boat Fred Fomby.

Base Treasurer David Ball lead the prayer and conducted Tolling of the Boats for boats lost in the month of March.

Base Treasurer David Ball lead a prayer for our recently departed Shipmates now on Eternal Patrol: Jack Semmelrath, Dennis Kimmel, Richard Delozier, Charles Babcock and Charles Hudiburgh.

Sr. Vice Commander Warren Branges reported E-Board present with the exception of Base Commander and Secretary; also recognized Past Commanders, dignitaries and guests. Twenty-nine members and one guest present.

Treasurer David Ball gave his report. The report was accepted by the membership. A copy of the Treasurer's Report will be filed with these minutes. David also reported the corrections to the Annual Budget approved at the last meeting were incorporated.

The minutes of the 8 February 2016 meeting were approved as published.

Sr. Vice Commander Warren Branges Called For Committee Reports

Sr. Vice Commander Warren Branges reported the following on the Binnacle List: Joel Eikam, Jack Kane and Jack Ferguson.

Parade Chair Joel Eikam: Not present. Sr. Vice Commander Warren Branges reminded the members three parades were approved at the last meeting: Linda Vista on 23 April 2016, Fiesta de la Pensaquitos on 1 May 2016 and La Mesa on 4 June 2016.

Membership Chair Ray Febrache announced 268 members. He reported that the new National website is still a work in progress.

Scholarship Chairman Paul Hitchcock reminded everyone that Scholarship applications are due by 15 April 2016; none have as yet been received.

Storekeeper Phill Richeson reminded everyone that he still has a large stock of calendars.

Base Vice Commander Warren Branges reported the next breakfast is 29 May and thanked all those who served coffee and cooked at the last breakfast. Volunteers are still needed for the 29 May breakfast.

Base Vice Commander Warren Branges announced the next ALL FLAGS Day will be Monday, April 11th.

Float Committee reported the float is in hibernation until spring.

Shipmate Glenn Gerbrand – Not present.

1920 - Sr. Vice Commander Warren Branges called for a break.

1935 - Sr. Vice Commander Warren Branges called the meeting back to order. 50/50 drawing was held.

1940 - Unfinished Business

Sr. Vice Commander Warren Branges reported the Scamp Base will host the Memorial Day Ceremony at Roncador Memorial with assistance from San Diego Base and asked for a volunteer to help coordinate.

2016 Submarine Birthday Ball information email is out. The Ball will be at the Sheraton on Harbor Island; contact Warren Branges for tickets or additional info.

2000 - New Business

None

2015 – Good of the Order

Flyers for Roundup in Laughlin (1 May-6 May) and National Convention in Reno (15 August-20 August) on back table.

Following events are coming up - Old Timers Luncheon - 29 April (Date may change)
Submarine Birthday Ball 30 April ($65 per ticket), WWII SUBVET George Kinnison will be Guest of Honor

If anyone is interested in obtaining a video of CJ's Burial at Sea aboard USS San Francisco let Shipmate Mike Hyman know via email.

We are still in need of a permanent Chaplain.

The Meeting was adjourned at 2019

Warren Branges (for)
Jack Kane, Secretary
/s/ Warren Branges

Sailing List for 8 March 2016

Fred Fomby	David Ball	Ed Welch
Dave Welch	Tom Polen	Matt Baumann
Chris Stafford	Warren Branges	Mike Hyman
Peter Lary	Bob Farrell	Cliff Britt
Paul Hitchcock	Dennis Mortensen	Mert Weltzien
Bud Rollison	Joe Sasser	Jim Harer
Ron Gorence	Ray Febrache	Ed Farley
Bill Earl	Phil Richeson	William Pickering
Robert Golembieski	Benny Williams	Juanita Williams
Rory Schraeder ?	Fred/Frank? Bent/Bender?	Dennis McCreight

Current News

"Plataginet, I will; and like thee, Nero,
Play on the lute, beholding the towns burn" (*Henry VI*, Shakespeare)

Submarine Veterans Call For Recognition Of 'Link' Between Fuel And Blood Cancers
Dan Oakes, National Reporting Team, Australia, Apr 5

Veterans who served on Australia's submarines are pushing for acknowledgement that exposure to fuel in their line of work can be linked to a range of potentially fatal blood cancers.

The request by the Submarines Association Australia (SAA) is another demonstration of how widespread the exposure to toxic fuels has been within the Australian Defence Force (ADF) over the decades.

The ADF said it simply did not know how many servicemen and women had been exposed to fuel.

The ABC has reported over the last 12 months that many veterans and current ADF personnel have begged the ADF and the Department of Veterans Affairs to fully investigate the possibility that exposure to fuels has caused serious and long-term health problems, including fatal cancers.

The chief of the ADF, Air Chief Marshal Mark Binskin, recently wrote to a Royal Australian Air Force (RAAF) veteran, saying he agreed with the need for a full investigation, and, if necessary, for consideration of compensation for those affected.

Some Defence personnel who worked on the infamous F-111 deseal/reseal project received small ex gratia payments for the "conditions" in which they worked, after it was revealed they were exposed to a toxic mixture of chemicals, such as solvents and other cleaners.

Others successfully fought for compensation in the courts. However, the possibility is now being considered that it was the fuel itself that caused the damage.

A spin-off study from the de-seal/re-seal investigation found that jet fuel did damage the body's cells, that the damage could be spread around the body, and that the long-term impacts of exposure were unknown.

The range of ADF occupations that led to prolonged exposure to fuel is extremely wide — from soldiers who used it to clean their weapons and navy personnel who maintained aircraft, to RAAF fuel tanker truck drivers.

Benzene — a component of many fuels, including jet fuel and diesel — is a known carcinogen and has been linked to a range of blood cancers, such as myeloma, acute myeloid leukaemia and non-Hodgkins lymphoma.

Now, in a submission to the Repatriation Medical Authority (RMA) — the little-known body that sets the medical guidelines by which compensation claims are accepted or rejected — obtained by the ABC, the SAA has called for official recognition that exposure to diesel fuel on submarines has potentially caused blood cancers in submariners.

The RMA's medical guidelines, known as Statement of Principle (SOPs), have been divided into two categories, relating to veterans who served overseas or in an "operational" environment, and those who served in Australia.

Veterans say they are treated as second-class citizens

The burden of proof is lower for those who served overseas, who only need to show it is a "reasonable hypothesis" that their medical condition was caused by their service, whereas the other larger group, who served only in Australia, need to meet a "balance of probabilities" test.

The RMA said this was because it showed a "particular generosity" to those veterans who served overseas.

But the disparity has angered many other veterans, who say they have been treated as second-class citizens because they did not leave Australia.

The division also means the number of veterans who can successfully claim their medical condition is linked to their service is considerably smaller.

The RMA recently altered a number of the "reasonable hypothesis" SOPs for a number of blood cancers, slashing the amount of benzene in a liquid necessary for a veteran to have been "exposed" to the carcinogen from 5 per cent of the total volume to 1 per cent.

But it has refused to even include benzene in the matching "balance of probabilities" SOPs, leading to the puzzling situation where the authority acknowledges that benzene is potentially dangerous at lower levels than previously thought, but that it is somehow not dangerous if the veteran was exposed to it in Australia.

Evidence linking benzene, blood cancers 'limited': RMA

Ray Kemp, the SAA's pension and welfare coordinator, has asked the RMA to include benzene exposure as a potential cause of acute lymphoblastic leukaemia, chronic lymphocytic leukaemia, myeloma and non-Hodgkin's lymphoma in former submariners, even among those who do not qualify as having served in an operational environment.

"Oberon class submarines had external fuel tanks that [had] to be vented inboard to equalise the pressure in the fuel tanks when the submarine dives ... the vents for fuel tanks were located in all compartments and accommodation messes," Mr. Kemp wrote.

"The result of the venting was diesel fumes being throughout the submarine. These fumes settled on clothing, bodies, plates, cooking equipment etc.

"In fact, when having a cup of water, coffee or tea it always had a film of diesel on the top. The smell and taste of diesel was everywhere.

"Another method of exposure to benzene is in the use of 'white spirits'. White spirits were and still are used for scrubbing through the submarine.

"The submarine was scrubbed though at least two times a day if not more. White spirit was used as it was the most effective method of cleaning."

A spokesman for the RMA told the ABC recently that the scientific evidence linking benzene and blood cancers was "limited, and generally of poor quality", but went on to say where benzene was accepted as having a causal effect, that it was "likely to be at a lower level than previously specified".

The US Government Just Launched A Self-Driving Submarine To Counter Russian And Chinese Ships
Mike Murphy, Quartz, Apr 8

The future of naval warfare may well not involve any seamen. Today, April 7, the US Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research unveiled Sea Hunter, a prototype autonomous submarine that could one day be used to counter advancements in the Russian and Chinese Navies, according to Reuters.

The diesel-powered vessel can explore the ocean on its own for weeks, or months at a time, with a top speed of 27 knots (about 31 mph). It can be controlled remotely, but Sea Hunter can maneuver around obstacles on its own, obeying international maritime law, much like a 132-foot-long, underwater, version of Google's self-driving cars.

This machine however is meant to track other submarines, especially the newer, quieter diesel-powered subs—which the Russians and Chinese have recently started deploying—that are difficult to spot using traditional tracking methods. The robot ship is expected to cost the US government about $20 million, with a daily operating cost between $15,000-20,000, which, according to Reuters, is far cheaper than the average operating cost for a US military vessel.

"We're not working on anti-submarine (technology) just because we think it's cool," author Peter Singer, a security expert at the New America Foundation think tank, told Reuters. "We're working on it because we're deeply concerned about the advancements that China and Russia are making in this space."

Sea Hunter was christened in Portland, Oregon, and will be shipped to San Diego, California, where DARPA engineers will spend the next two years testing its autonomous abilities, according to IEEE Spectrum. While the ship is not the first robot vessel—the US government already uses remote-controlled underwater bots in a range of different activities—it's the first one that can scour the world's oceans on its own, thousands of miles from those monitoring it.

"You really don't want that to be a remote-controlled vessel," Sea Hunter's program manager at DARPA, Scott Littlefield, told IEEE Spectrum. "You want it to be fairly autonomous so that it can do things like obstacle avoidance on its own without being joysticked around by a person."

In maritime lore, ships without crew are usually referred to, as DefenseOne reminds us, as "ghost ships." They were often ships adrift at sea that the crew had abandoned, and are always creepy.

This robot ship, although it will may eventually spend its days soullessly roaming the seas on the behalf of the US, is not meant to invoke fear in those worried about the increasing automation of the militaries around the world, something the UN has expressed. Any decisions on whether the ship would engage another vessel with "lethal force," deputy defense secretary Robert Work told Reuters, would remain with humans.

"There's no reason to be afraid of a ship like this," Work said.

North Korean Submarine Test-fires Ballistic Missile
Staff, The Maritime Executive, Apr 7

NK News reports that North Korea attempted the launch of a submarine-launched ballistic missile (SLBM) from a Sinpo-class submarine on Wednesday.

The submarine returned to port after a few hours, which South Korean experts believe indicates the attempt was a failure.

The South Korean Defense Ministry refused to confirm or deny the claim.

"All we can say is that our military, with the close cooperation with the U.S., is keeping an eye on North Korea's SLBM development trends," an official said during a press briefing.

The exact location of where the event took place has not been publicized.

North Korea's latest successful SLBM launch took place on May last year.

Earlier this week it was announced that North Korea can mount a nuclear warhead on a medium-range missile. A South Korean official made the statement on Tuesday in a new assessment of the capability of a country that conducted its fourth nuclear test this year.

"We believe they have accomplished miniaturization of a nuclear warhead to mount it on a Rodong missile," said the South Korean official, who has knowledge of South Korea's assessment of the North's nuclear program. The official spoke to a small group of reporters on condition of anonymity.

North Korean leader Kim Jong Un said last month that his country had miniaturized nuclear warheads to mount on ballistic missiles. It was his first direct statement of a claim often made in state media though never independently verified.

Submariners Get Stuck Into Artic Role At Alaskan Ice Camp
Staff, Navynews.co.uk, Apr 7

For the first time in nearly a decade, submariners unfurl the Royal Navy's standard on the Arctic ice.

Lt. Cdr. Jimmy Moreland and Lt. Sam Harris stepped on the frozen wastes covering the Beaufort Sea – off the north coasts of Alaska and the Yukon Territories – as the Silent Service moves a step closer to renewing operations under the Arctic ice.

It's been nearly a decade since a British boat punched through the ice and emerged on the surface of the Arctic Ocean during a patrol.

Re-generating the Submarine Service's 'under ice capability' is an operational priority as the Arctic is likely to become a key theatre with the ice cap shrinking – and international military and commercial maritime activity likely to increase as a result.

Which is why a pair of UK submariners is working on a moving ice floe at temporary US Navy Ice Camp Sargo, around 170 miles north of Alaska's Prudhoe Bay.

Lt. Cdr. Moreland (HMS Astute) and Lt Harris (HMS Trenchant) are looking into the equipment, training and procedures needed to allow the Royal Navy's hunter-killer boats – Trafalgar and Astute-class boats to safely return under the ice.

The two submariners sailed with the USS Hampton to get to the US Arctic Submarine Laboratory's temporary ice camp.

The Los Angeles-class boat rose through thick sheet ice to report its safe transit through the Bering Strait and to re-fix the boat's position by GPS before continuing to Camp Sargo on ICEX (Ice Exercise) 2016.

"It was interesting to be met by the camp's crew who were armed with chainsaws and pick-axes to clear ice from the hatches to allow us to get off the boat!" said Lt. Harris.

"I was particularly interested in the navigational aspects of the training; including seeing first-hand how our US counterparts ship control team continually maintained sea clearance above and below the boat while under the ice.

"I thought that their greatest single seamanship challenge was transiting the shallow Bering Strait while avoiding frequent, and deep, ice keels from icebergs and sheet ice.

"The value to the Royal Navy from our visit is high, and we greatly appreciate the assistance of the US Navy.

"We've learned a number of lessons – especially for the Astute class which has not yet been tested in Arctic waters. A UK return to the increasingly-contested Arctic will be very much helped by this experience."

Sargo serves as a temporary command centre for conducting operations in the Arctic region. Some 70 personnel live and work in 20 temporary buildings – everything from dormitories and mess tent to a command centre and range control where the underwater tactical development exercises were conducted.

Drinking water is mined from the ice sheet and access to the camp is provided by a runway for small aircraft. Food supplies are dropped by parachute and collected on snow-mobiles.

The head of the RN Submarine Service Rear Admiral John Weale said the exchange programmer was "a key step to returning our attack submarines to the under ice battle space.

"We will use their experience and learning to prepare one of our Trafalgar class boats to operate under ice, before rolling out this capability across our entire attack boat flotilla."

Commercial Tech Gives Navy Smaller, Cheaper SEAL Subs
William Cole, Honolulu Star Advertiser, Apr 5

A new, less costly minisubmarine for Navy SEAL commandos is expected to be prowling Hawaii's waters in a few years, U.S. Special Operations Command said.

The command has been testing commercial technology subs in Hawaii and Florida following the failure of the 65-foot Advanced SEAL Delivery System.

The military envisioned a fleet of the $80 million ASDS minisubs, but only one was built after the Northrop Grumman effort was beset by technological problems and ballooned to more than $885 million by 2007. ASDS-1 burned at the Pearl City SEAL compound in 2008 as its batteries were recharged, and the program was scrapped the following year as too costly.

In the wake of the failure, the Pentagon decided bigger and more costly is not necessarily better.

Special Operations Command turned to commercial builders, and three much smaller minisub prototypes have been tested over the past several years with a contract expected to be awarded in July for a production vessel with options for two others, officials said.

The new submersibles are intended to allow SEALs and other special operators to travel undetected over greater distances and longer duration and in extreme conditions.

SEAL Delivery Vehicle Team 1 in Hawaii also has underwater vehicles, but they are open to the water and require scuba gear – sapping energy before the elite commandos even get to their mission.

"Current plans have these (minisubs) going to Pearl City," said Lt. Cmdr. Matt Allen, a Special Operations Command spokesman. "The vessels, support equipment and personnel will be housed in an existing building in Pearl City."

A $19.85 million addition is expected to be completed in coming years at an existing SEAL building for the mission.

Special Operations Command tested the 24-foot S301i under a $10 million lease from Lockheed Martin; the 31-foot Button 5.60 from General Dynamics/Electric Boat and Giunio Santi Engineering in Italy; and the 39-foot S351 from Submergence Group and MSubs.

According to Defense Department budget documents, $32.4 million had been invested in product development in the Button 5.60 through fiscal 2015, and $31.3 million in the S351.

Limited testing was conducted with the S301i in Hawaii in 2010, and then it was moved to Florida, Special Operations Command said. Testing continues on the S351 and Button 5.60 at Riviera Beach and Naval Surface Warfare Center-Panama City, both in Florida.

In June the command advertised it was seeking a pilot and co-pilot to train fleet sailors to operate the Button 5.60 minisub with the requirement that they be able to conduct underwater transits in excess of 24 hours, use obstacle avoidance sonar and the GEM Elettronica Polaris FOG-100 navigation system, and conduct diver lock-in/lock-out operations.

Technologies tested in the "dry combat submersible" – the Pentagon name for the program – include lithium ion and silver zinc batteries, improved sonar systems and a three-dimensional electro-optical infrared periscope.

Allen said the commercial route has been a success. After the costly ASDS experiment, the command placed an emphasis on the word "affordable." Allen said use of commercial submarine technology and classing reduced program costs by an estimated 65 percent and saved approximately three years of effort.

THE S301I WAS used for "risk reduction" and included 30 underwater diver lock-outs in a test pool and open water. The larger S351 weighs 57,300 pounds and can carry a crew of two pilots and eight commandos 138 miles at 5.7 miles per hour with high-energy batteries. The Button 5.60 weighs 39,000 pounds and carries a crew of two pilots and four special operators.

The production vessel will be an amalgam of the three tested minisubs, Allen said.

"Performance specifications and various aspects of the request for proposal were developed using best commercial practices, technical/technology information, and validation of performance parameters gained from the S301i, S351 and Button 5.60 technology demonstrators," Allen said in an email.

The objective requirement is for two crew and six passengers, he said. A Special Operations PowerPoint shows government acceptance testing in fiscal 2018 and initial operating capability in 2019. The second and third submersibles would follow, starting in 2019.

Five Months Ago

Submergence Group reported that the S351 had successfully completed its first deep dive. The next day the S351 demonstrated its ability to lock out/lock in divers with the company saying chief test pilot Dave Bourn noted "it's a pleasure to dive and drive" after two days of sea trials.

Another change with the program is the abandonment of the minisub mating to a mother submarine for transport and deployment, as was the case with the ASDS.

"In order to provide a cost-effective capability within a relatively short time frame, a submarine launch capability is not included; increased program costs and extended delivery schedules were significant concerns," Allen said. "This does not preclude the option to develop a (minisub) launch capability in the future."

An August request for information by the Navy's Military Sealift Command said two surface vessels would serve as host ships for Naval Special Warfare, with one in Pearl Harbor and another at Little Creek, Va., for SEAL Delivery Vehicles and minisubs.

On the West Coast the vessel would normally operate in Pearl Harbor; the outer islands of Hawaii; Apra Harbor, Guam; and Keyport, Wash., the survey said. The required ships needed to have a "moon pool" for the launch and recovery of the minisubs.

SEAL Delivery Vehicle Team 2 no longer exists; the unit was disbanded as the result of a consolidation, but a small detachment remains in Little Creek to support Pearl Harbor's SDVT-1, Allen said. More than 100 SEALs are based in Hawaii.

Allen said Naval Special Warfare already leases a 220-foot support ship at Pearl Harbor and another in Virginia, and as existing leases expire, new leases will incorporate minisubs' needs with the possibility of an even larger support vessel in Hawaii.

Special Operations Command also is replacing its SEAL Delivery Vehicles that carry commandos in flooded vehicles. The Shallow Water Combat Submersible is the next-generation free-flooding manned vehicle.

Dry Deck Shelters mounted to submarines to deploy SEAL Delivery Vehicles are being upgraded as well. According to Special Operations Command, the Virginia-class subs USS Hawaii, USS Mississippi and USS North Carolina have the capability at Pearl Harbor.

The Navy in 2004 announced the completion of a $47 million waterfront home for SDVT-1 on 22 acres at Pearl City Peninsula. A 326,000-gallon freshwater test tank was built there for the former 65-foot Advanced SEAL Delivery System sub.

Cyber war fears: UK's Trident nuclear missiles to get software update
Andrii Degeler, Ars Technica, Apr 1

Britain reportedly plans to apply a software update to its 58 Trident II missiles amid concerns of possible cyber attacks. The nuclear deterrent will be serviced by BAE Systems, which also carries out routine maintenance.

The US—which is the other user of the 25-year-old Trident system—will upgrade its missiles as well. Although both countries use the same type of missiles, their nuclear warheads are built and supported separately.

The upgrade project forms part of the increase in cash allocated to cyber security in the UK: the Ministry of Defence will set aside £1.9 billion for this plan between now and 2021, more than doubling the previous five years' spend of £860 million.

Meanwhile, the US government plans to spend some £24 billion over the next five years to boost its cyber security effort.

"Now that cyber has become even more important in our national security, there will be even more requirements," US Navy spokesman John Daniels told Bloomberg. "In our modern era, cyber-security threats are a legitimate concern."

However, the possibility of the Trident system being deviously fired by a hacker isn't a serious cyber security risk, Leicester University's nuclear strategy expert Andrew Futter told The Telegraph. Apparently, the missiles aren't connected to the Internet while the submarine is on a mission, and their software isn't responsible for the actual launch.

A bigger threat would be that malicious software could be loaded onto the deterrent during maintenance in port in order to steal design or operational secrets. It could also possibly sabotage or damage the missiles.

A spokesperson for the Ministry of Defence said earlier this week that "the deterrent remains safe and secure," before adding: "We take our responsibility to maintain a credible nuclear deterrent extremely seriously and continually assess the security of the whole deterrent programme and its operational effectiveness, including against threats from cyber."

In total, Britain is understood to control 225 nuclear warheads that make up its submarine-based nuclear deterrent. A Trident missile can carry up to 12 warheads, while a Vanguard-class boat carries up to 48 warheads loaded onto 16 missiles on routine deployments.

Submarines To Become Stealthier Through Acoustic Superiority Upgrades, Operational Concepts
Megan Eckstein, U.S. NAVAL INSTITUTE NEWS, Mar 28

The submarine community is focused on maintaining access and boosting acoustic superiority after operating in relatively permissive environments for several years, two Navy officials told USNI News.

Director of Undersea Warfare Rear Adm. Charles Richard told USNI News in a March 22 interview that the submarine community knows how to operate in a stealthy mode, but "we're not taking our stealth for granted and we're not taking this competitive advantage we have for granted."

To that end, he said, the Navy is building an upcoming Virginia-class attack submarine, the future USS South Dakota (SSN-790), with acoustic superiority features for the fleet to test out and ultimately include in both attack and ballistic missile submarines in the future.

Richard said the under-construction South Dakota will feature a large vertical array, a special coating and machinery quieting improvements inside the boat. The boat is on track to deliver early despite the changes, he said. Once South Dakota joins the fleet – in 2018, according to the boat's commissioning committee – lessons learned from the acoustic superiority features will help inform enhancements built into future Virginia class boats and the Ohio Replacement Program boomers, as well as the legacy Ohio-class ballistic missile subs and some Virginia-class boats.

"Stealth is the cover charge, stealth is the price of admission, and while we have great access now we don't take that for granted either," Richard said.

"Making the right investments to maintain acoustic superiority over a potential adversary" is of high importance to the Navy today, and the South Dakota project represents "a clear national investment in acoustic superiority."

Program Executive Officer for Submarines Rear Adm. Michael Jabaley told USNI News in a March 3 interview that acoustic superiority items, some of which will be built into the ship and some of which will be added during the ship's post

shakedown availability, "will kind of become the standard for what we do in various forms between Ohio Replacement, future Virginias and even backfit some on the Ohios and some of the delivered Virginias to make sure that submarine force is pacing the threat of these new highly capable submarines that are being delivered" from other navies like Russia and China.

Jabaley added that as the Navy looks at its next class of attack submarines, the SSN(X), stealth will be a key factor in the design and could lead to the Navy selecting an electric drive or other advanced propulsion system to eliminate as much noise as possible.

"I'm not just talking about the propeller or propulsor, it's the whole propulsion system from power generation to motion through the water," he said in the interview.

"How am I going to get beyond the limitations of a rotating set of blades and the unavoidable noise that I just can't get below?"

Richard said that operational concepts were also important to maintaining a stealth advantage. The Navy is capable of operating in a stealthy manner but hasn't had to in recent years, making it important for submariners to practice command and control in anti-access/area-denial (A2/AD) type environments, where the submarine may not be able to report back up the chain of command to minimize its electromagnetic signature. Thinking about undersea warfare in the context of a peer competitor will help the Navy learn where submarines fit into various scenarios, whether it means getting into a restricted area and sharing information back to the fleet that other assets couldn't access, or remaining stealthy and reporting back only after a mission is accomplished.

Are Doomsday Submarines Doomed?
David Hambling, Popular Mechanics, Mar 28

The U.S. and the U.K. are both readying their next-generation nuclear-powered ballistic missile submarines, the vessels that would launch nuclear weapons from the sea. While both navies are keen to go ahead with these project and replace their aging nuclear subs, British politician Emily Thornberry ruffled feathers recently by suggesting that maybe nuke subs won't have a place in the future.

If a new wave of underwater drones could track the "boomers" wherever they go, then that would make nuke-carrying subs vulnerable to a first strike and useless for deterrence. Some have hurried to dismiss the worry as "tired old science fiction," since Thornberry is far from the first person to suggest nuclear subs could be vulnerable to attack. But is science fiction becoming science fact?

During the Cold War, the Soviets found themselves on the wrong end of an underwater technology revolution. America and its allies laid a chain of ultra-sensitive microphones called SOSUS (SOund SUrveillance System) on the seabed between Britain and Iceland and between Iceland and Greenland. Unbeknowst to the Russians, every Soviet nuclear sub that passed over SOSUS into the Atlantic was detected and quietly shadowed by a NATO hunter-killer submarine, ready to unleash a spread of torpedoes if the order was given. "I felt very comfortable that we had the ability to do something quite serious to the Soviet SSBN force on very short notice in almost any set of circumstances," U.S. Admiral David Jeremiah told a symposium on Operational Intelligence in 1998.

The question today is this: Has underwater tech advanced so much since then that a new threat, nation-state or otherwise, could put our subs at risk? As Thornberry pointed out, there are two big challenges so such tracking: communications and battery life. Both are starting to look a lot less daunting.

Underwater communication has been improving rapidly over the last few decades, relying mostly on sound pulses with less bandwidth than radio frequency. Just as computer users have seen a shift from squawking, low-speed modems on analog lines to digital broadband, underwater communication speeds have lept forward. In the 1980's the standard was a mere 80 bits per second with no error correction. Now many kilobits per second are expected, and that's fast enough for underwater robots to be controlled wirelessly without the need for a tether. These improvements have come from new techniques for modulation and coding, aided by the ready availability of processing power. Speeds are still improving.

Underwater communications are typically limited to a few kilometres, but the other big development has been acoustic networking. Communications can now travel from one underwater vehicle in short hops via intermediaries, just like our own internet, so communication networks can spread over a wide area. A recent exercise by the U.S. Navy's Space and Naval Warfare Systems Command in San Diego showed how multiple underwater and surface robots could be networked together to carry out a task cooperatively. Building a wireless version of the Cold War SOSUS starts to look like a viable prospect in the next few years.

The other great challenge is power—giving underwater drones the energy for long-duration missions. But there is one type of unmanned submarine which is uniquely well-suited to long-endurance missions. It's called the underwater glider. Developed by Teledyne Webb in 1991, these gliders are generally about six feet long and resemble a torpedo with wings. Instead of using a propeller, the glider increases its buoyancy and rises slowly, "gliding" forward underwater as it does so.

When it reaches the surface, it reduces its buoyancy and glides on a shallow angle downwards. It's a slow but steady form of propulsion. In 2009, the Scarlet Knight glider from Rutgers University crossed the Atlantic in seven months.

With no engine noise to interfere, gliders can carry microphones so sensitive, as one researcher put it, that they can "hear a fish fart." In fact, one project used a glider to track shoals of fish off Florida by sound alone.

Naturally, the militaries of the of the world have been all over this technology. The U.S. Navy already has a number of projects using fleets of sea gliders. In 2010, an American counter-intelligence report noted that the Chinese were targeting this technology specifically. China's indigenous glider, the Sea Wing, was launched at the Shenyang Institute of Automation in 2011, and since then there have been a vast number of Chinese underwater glider projects. Most notable is the Haiyan or Petrel designed at Tianjin University. The Haiyan is a hybrid that has a propeller for rapid tactical maneuvering in addition to the buoyancy engine. Chinese state news reports indicated that the Haiyan may be used for mine-hunting and anti-submarine warfare, and analysts suspect the new Y-8GX-6 anti-submarine aircraft may act as a flying control station for a large number of Haiyan. The gliders would indicate the approximate location of a submarine, which the aircraft could pinpoint with its Magnetic Anomaly Detector (resembling a gigantic metal detector) before attacking.

The Haiyan can stay at sea for about a month, but China is working on ways of extending that. One solution is an underwater docking station where Haiyans plugs in and recharges. Another approach, one that Teledyne Webb considered with the original Thermal Glider, draws energy from the temperature difference at different depths. The "temperature difference engine," developed at Tianjin like the Haiyan was, would mean the glider would not require any external power for propulsion, only for its sensors and navigation. And in 2015, researchers at Northwestern Polytechnic University at Xi'an demonstrated a wave-power generator for gliders that taps the seas themselves to produce a trickle of power sufficient for the on-board electronics.

Other Chinese researchers are working on improving the dynamics of the glider design. Like U.S. Navy engineers before them, they are experimenting with flying-wing and blended-body concepts in which the glider resembles a manta ray with the wings and fuselage fusing into a single streamlined body. The U.S. developed this concept into the Liberdade series of gliders, which looked highly promising before being apparently canceled in 2011. This type of design gives more lift and less drag, making it faster and more energy-efficient, and may replace the traditional torpedo shape over the coming years.

Improvements in electronics, including the powerful, low-voltage processors produced by the smartphone industry, are making gliders and other underwater drones steadily smarter and cheaper with more effective sensors. While gliders are not capable of forming an all-seeing anti-submarine sensing network yet, the pieces are already falling into place.

The U.S. SSBN(X), America's next nuclear submarine that will cost $95 billion for 12 subs, will not come into service until 2031. The UK's Trident successor will be a year or two later, at a cost of about $44 billion for four subs. Both purchases are being made on the assumption that the new boomers will hide in the ocean depths and not, like the unfortunate Soviets, be spotted and tracked from day one. As such, defense strategists are counting on gliders and other drones not making much progress in the next 15 years…which would be surprising given their progress thus far.

Not long ago, a celebrity could walk down the street without seeing a camera. Now the mobile phone industry has produced billions of cameras, all with internet connections to make everything instantly sharable. If Thornberry is right, then the SSBN(X) will suffer the same fate as it leaves port, being mobbed by scores of small, cheap, digital sensors, unable to find seclusion and privacy anywhere.