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

The Silent Sentinel

March 2017

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 camaraderie. 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.

Base Vice Commander Warren Branges presenting Juanita Williams a Certificate of Appreciation

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San Diego Base

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Chaplain
Position is Open

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_____

Robert Bissonnette
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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*

March 2017 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 *March 14th.* 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

Phil Richeson, Harry Humpreyville

Submarine Losses in March

Originally Compiled by C J Glassford

USS Perch (SS-176): Lost on March 3, 1942 near Java with no immediate loss of life, while on her 1st war patrol. She survived 2 severe depth chargings in less than 200 feet of water by 3 Japanese destroyers. The crew abandoned ship and scuttled her. Of the 59 officers and men taken prisoner, 53 survived the war and six died as POWs.

USS Grampus (SS-207): Lost on March 5, 1943 with the loss of 71 officers and men, on her 6th war patrol. She was lost in Vella Gulf, sunk after engaging 2 Japanese Destroyers.

USS H-1 (SS-28): Lost on March 12, 1920 with the loss of 4 men as they tried to swim to shore after grounding on a shoal off Santa Margarita Island, off the coast of Baja California, Mexico. Vestal (AR-4), pulled H-1 off the rocks in the morning of 24 March, only to have her sink 45 minutes later in some 50 feet of water. She was originally named the USS Seawolf before becoming H-1.

USS Triton (SS-201): Lost on March 15, 1943 with the loss of 74 men. She was sunk north of the Admiralty Islands during a fight with 3 Japanese Destroyers. Triton was the 1st boat to engage the enemy in December 1941 off Wake Island, sinking 9 ships, 1 submarine and a destroyer.

USS Kete (SS-369): Lost on March 20, 1945 with the loss of 87 officers and men at the end of her 2nd war patrol. Probably sunk near Okinawa, by a Japanese submarine that itself was subsequently lost.

USS F-4 (SS-23): Lost on March 25, 1915 with the loss of 21 men. She foundered 1.5 miles off of Honolulu when acid corrosion of the lead lining of the battery tank let seawater into the battery compartment, causing loss of control. She was raised in August 1915.

USS Tullibee (SS-284): Lost on March 26, 1944 with the loss of 79 officers and men, on her 4th war patrol. It's believed she was a victim of a circular run by one of her own torpedoes. The lookout was the only survivor and he survived the war as a Japanese prisoner.

USS Trigger (SS-237): Lost on March 26, 1945 with the loss of 89 officers and men, on her 12th war patrol. She was lost during a combined attack by Japanese antisubmarine vessels and aircraft. Trigger ranked 7th in total tonnage sunk and tied for 8th in number of ships sunk.

San Diego Base, United States Submarine Veterans Inc.
Minutes of Meeting – 14 February 2017

1900 - Base Vice Commander Warren Branges called the meeting to order
San Diego Base, United States Submarine Veterans Inc.
Minutes of Meeting - 14 February 2017

1900 - Base Senior 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

Base Treasurer David Ball conducted Tolling of the Boats for boats lost in the month of February.

Base Junior Vice Commander Manny Burciaga recognized Past Commanders, dignitaries and guests.

Base Secretary Jack Kane announced 24 members and one guest present.

Base Treasurer David Ball gave his report. A copy of the Treasurer's Report will be filed with these minutes.

The minutes of the 10 January 2017 meeting were approved as presented published in the Sentinel.

Base Senior Vice Commander Called For Committee Reports

Acting Chaplain David Ball reported the following on the Binnacle List: Harry Humpreville, Frank Walker and Phill Richeson.

Parade Chairman Joel Eikam had no report.

Chairman Ray Febrache reported 249 members in San Diego Base. Anyone who was contacted by National about non-payment see Ray at the break.

Scholarship Chairman Paul Hitchcock noted that the Scholarship Form is on the website. Application deadline is 15 April 2017. Paul will be asking for volunteers to help decide who we will award scholarships to.

Election Chairman Paul Hitchcock took last minute nominations for Base Elections. Paul will hand out final ballots later in the meeting.

Storekeeper Phill Richeson is on Binnacle List. No Report.

Base Vice Commander Warren Branges reported that the Breakfast on 29 January 2017 served 102 paid patrons. This appears to the largest turnout for at least 10 years. We cleared over $400 on the day. Next Breakfast is 30 April 2017. Warren will circulate a signup sheet for wait staff for the event.

Base Vice Commander Warren Branges reported that the 3 damaged markers from 52 Boat Memorial are at the repair shop. The recent Go Fund Me Drive and direct donations raised $14,800. LS1(SS) Yentzer will not be able to attend this evenings meeting to receive recognition for his efforts in this fund raising effort. His daughter is ill. Petty Officer Yentzer did attend the Navy Submarine League meeting earlier in the day. His USSVI Membership and LOA will be sent to his home address. PO Yentzer is transferring to the Presidential Support at Camp David before our next meeting. The Memorial Board is working on developing ongoing relationships with Point Loma Rotary, Midway Museum and Naval Submarine League. Next ALL FLAGS day is 11 April 2017.

The Float Committee will be doing some maintenance and upkeep before the April Parade.

Boy Scout Committee Chair Nihil Smith reported that 2 Eagle Scout Presentations for Scouts from Troop 959 will be held in the upcoming month. Eagle Scouts are presented USSVI Certificates and a set of miniature dolphins. Nihil will provide date, place and time for the ceremonies.

1925 - Base Vice Commander called for a break.

1937 - Base Vice Commander called the meeting back to order. 50/50 drawing was held. Nihil Smith won the cash prize. He donated that prize to the Charlie Marin Scholarship Fund.

1940 - Unfinished Business

Base Senior Vice Commander Warren Branges presented Juanita Williams with a Certificate of Appreciation for her support of the San Diego Base USSVI.

Nominations for USSVI San Diego Base Officer positions were closed and ballots were handed out to all members present. Nominees were:
Base Commander - Warren Branges
Base Senior Vice Commander - Robert Golembieski
Base Junior Vice Commander - Manny Burciaga
Base Treasurer - Joe Peluso
Base Secretary - Jack Kane

Each of the nominees was duly elected to the positions they were nominated for. Installation of new officers will be done before the March meeting.
Warren Branges will relieve Robert Bissonnette as Base Commander
Robert Golembieski will relieve Warren Branges as Base Senior Vice Commander
Manny Burciaga will continue as Base Junior Vice Commander
Joe Peluso will relieve David Ball as Base Treasurer
Jack Kane will continue as Base Secretary

Base Senior Vice Commander Warren Branges asked for volunteers for the Financial Review Committee. The Committee will need to review the records of the Base Commander and Base Treasurer to facilitate turnover of those two positions to the new elected members. See Warren after the meeting to volunteer.

Base Senior Vice Commander Warren Branges reported that the base presented the SUBPAC Sea and Shore Sailors of Year a stipend of $200 each. Each of the eight Runners-up was presented $75. National provided the cash awards.

2000 - New Business
Base Senior Vice Commander Warren Branges briefed and/or reported on the following:

A motion was made and seconded that SAN DIEGO Base USSVI sponsor two WWII Veterans at the Submarine Birthday Ball. Each sponsorship to include tickets for two and one nights' accommodations at the hotel where the Ball is to be held. A long discussion was held including particulars of who and how we can contact WWII Submarine sailors. The motion passed. The Submarine Birthday Ball is on 6 May 2017.

It was suggested we do Quarterly fund raiser dinner at the VFW. After lengthy discussion the matter was tabled is favor of more research.

Food Handler Training will be held on Saturday, 11 March from 1100 til 1200 at the VFW.

The next ALL FLAGS Day will be 11 April. Everyone is encouraged to attend at 0700. As this is not a major holiday (Memorial Day, 4th of July, etc) this is a good opportunity for the 52 Boat Committee to invite SUBRON ELEVEN, Naval Submarine League, Point Loma Rotary and others to attend the ceremony. This will be a PR Session. The 52 Boat Committee is working on developing a marketing strategy and materials going forward.

2016– Good of the Order

Several Members presented topics including

The State of The Submarine Force

HR 303 - a Bill in Congress to extend VA Benefits without Retirement Pay offset to all retired veterans, not just those rated at 50% or higher Disability. Everyone is encouraged to let their Congressman and Senators know that we support the bill.

Terry Ulmer's Naval Museum in Alpine will be holding an open house in the spring. Base Commander Bob Bissonnette will be providing further information.

The Meeting was adjourned at 2025..

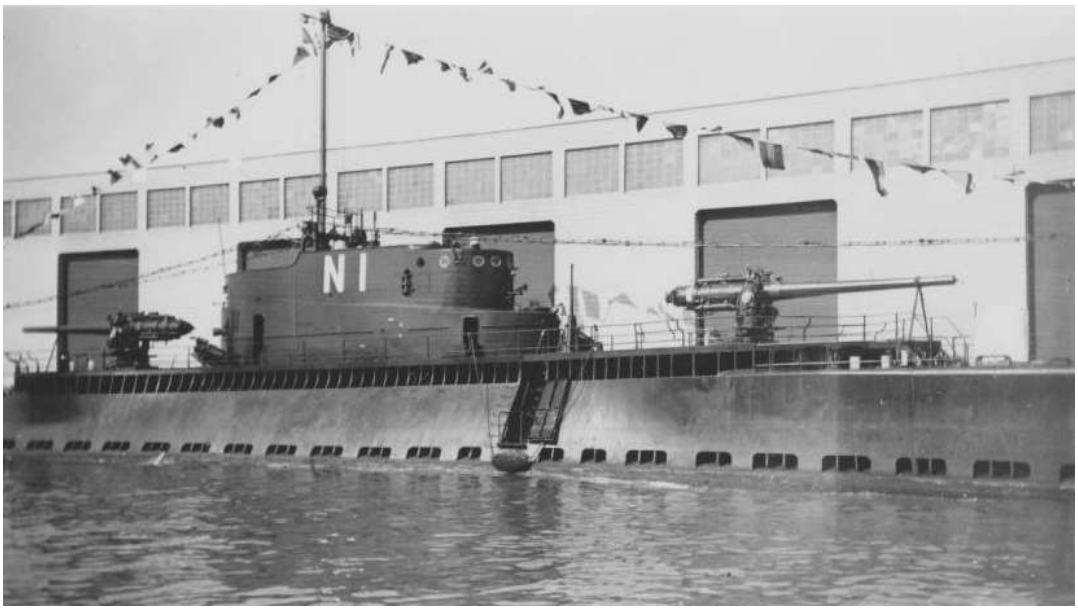
/s/ Jack E. Kane
Jack Kane, Secretary
Sailing List for 14 February 2017

Fred Fomby	Jack Kane	Warren Branges	Mike Hyman
David Ball	Joe Tursky	Robert Golembieski	Joe Peluso

Bob Farrell	Bill Earl	Rocky Rockers	Bob Welch
Chris Stafford	Matt Baumann	Paul Hitchcock	Ray Febrache
Dennis Mortensen	Ron Gorence	Peter Lary	Nihil D. Smith
Jim Harer	James Pope	Manny Burciaga	Joel Eikam
Juanita Williams (Guest)			

Computer Corner

In January 2017, in cooperation with various government regulatory agencies, HP announced an expansion of its ongoing worldwide voluntary safety recall and free replacement program for certain notebook computer batteries. This program which was initially announced in June 2016. These batteries have the potential to overheat, posing a fire and burn hazard to customers. The affected batteries were shipped with specific HP, Compaq, HP ProBook, HP ENVY, Compaq Presario, and HP Pavilion Notebook Computers sold worldwide from March 2013 through October 2016, and/or were sold as accessories or spares, or provided as replacements through Support. Customers should cease the use of affected batteries immediately. Customers may continue to use their notebook computer without the battery installed by connecting the notebook to external power. Determine if your battery is affected by going to https://h30686.www3.hp.com and using the battery validation utility download or validate it manually. Be aware and be safe. David Kauppinen, USSVI San Diego Webmaster 2/25/17



USS Nahwal 1933 (those are some serious deck guns!)

Current News

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

Aluminum Batteries Could Let Submarine Drones Range Farther
Staff, The Economist, March 9

Much is made of the potential of flying drones. But drones are useful at sea, too. Unmanned underwater vehicles (UUVs), as they are known technically, are employed for things ranging from prospecting for oil and gas to naval warfare. Like their aerial cousins, though, ocean-going drones have limited ranges—limits that are often imposed by their batteries.

At the moment those batteries are usually either alkaline or lead-acid. Lithium-ion batteries, fashionable elsewhere, have not conquered the UUV world. Their tendency to catch fire counts against them. And they are sensitive to pressure, which is undesirable in devices that operate underwater. But a firm in Massachusetts, called Open Water Power (OWP), is offering an alternative: batteries based on aluminum. With these, its engineers hope to extend the ranges of underwater drones tenfold.

Each of OWP's battery cells has a block of aluminum as its anode. The cell's cathode is made of nickel. In a working battery, these anodes and cathodes alternate, and are bathed in an electrolyte made of seawater with some potassium hydroxide dissolved in it. This chemical keeps the battery free from marine organisms that might otherwise grow within it. It also plays two other roles. These are in the battery's chemical operation.

One of these roles lies in the reaction that drives the battery, between the aluminum of the anode and the hydroxide ions in the electrolyte. A hydroxide ion is a negatively charged combination of a single hydrogen atom and a single oxygen atom (OH- in chemical shorthand). Unadulterated water contains some hydroxide ions (its molecules, H2O, sometimes disintegrate spontaneously into OH- and positively charged hydrogen ions, H+) but adding potassium hydroxide boosts their number.

The result of the reaction is aluminum hydroxide, which is electrically neutral, and electrons, which carry away the hydroxide ion's negative charge. These electrons then travel towards the cathode via a circuit that can, for example, power a motor. To complete the circuit, electrons at the cathode combine with hydrogen ions from the electrolyte's water to produce hydrogen gas, which is vented from the battery, leaving those ions' hydroxide partners behind to replenish the store of OH-.

Previous attempts to make a commercial aluminum battery have failed because their anodes have got clogged up with aluminum hydroxide, which is insoluble in water. This is where the added potassium hydroxide does its third job, for an aqueous solution of potassium hydroxide will dissolve aluminum hydroxide in a way that pure water cannot.

A pump circulates the potassium-hydroxide-bearing electrolyte through the battery, where it picks up aluminum hydroxide from the anodes. The resulting solution then passes through a chamber filled with a plug made of foam rubber. This is a material that packs an enormous amount of surface area into a tiny volume and whose chemistry encourages the aluminum hydroxide to precipitate on that surface. A small piece of foam rubber can thus hold a lot of aluminum hydroxide. When a plug is saturated with the stuff the battery ejects it and replaces it with a fresh one that has been kept, compressed, in an adjacent plug store. Each battery carries enough plugs to keep it going until its supply of aluminum has run out.

One test of OWP's technology will come this summer, when the firm will fit its batteries into UUVs built by Riptide Autonomous Solutions, which is also in Massachusetts. Riptide's products are used by oil and gas companies to undertake underwater surveys. At the moment, they have a range of about 100 nautical miles (185km). Riptide reckons that OWP's batteries could increase that to 1,000 nautical miles.

The armed forces are interested, too. Though OWP is coy about the details, records in the public domain show that OWP is working with America's navy and also with the country's Special Operations Command, which carries out clandestine missions. The navy contract asks for something to replace the existing batteries on its Shallow Water Surveillance System, a series of acoustic sensors designed to detect enemy submarines. The Special Operations contract is light on detail, but is for "man-portable UUVs".

One other use for aluminum batteries might be to power crewed deep-diving submersibles such as Alvin, which found fame in 1986 when it was used to explore the wreck of Titanic, a British liner sunk by an iceberg in 1912. At the moment Alvin still relies on lead-acid batteries. This limits its dives to eight hours and means it cannot go as far down into the ocean as its titanium shell would otherwise permit. Aluminum batteries would let it and its kind dive longer and deeper, letting researchers visit the abyss more easily in person.

Correction: This article has been corrected. A previous version misnamed Riptide Autonomous Solutions, and gave the wrong actual and hoped-for ranges for its UUVs.

Lab Team To Explore More Cost-Effective Way To Inspect Welds On Nuclear-Powered Submarines

Staff, Phys.org, March 9

Lawrence Livermore National Laboratory (LLNL) researchers are joining forces with the U.S. Navy Metalworking Center (NMC) to study ways to reduce the high cost of inspecting welds on nuclear-powered submarines.

LLNL entered a feasibility study agreement with the Navy to look at developing a non-destructive technology that can essentially peer through the submarine's coating—known as special hull treatment—to find defects in the ship's welds. Currently, hull inspections require the removal and reinstallation of the coating in order to examine the structure underneath, which is a costly and time-consuming process.

"We're investigating a cross-platform technique that allows us to interrogate the welds without doing destructive work on that treatment," said LLNL Materials and Engineering Section Leader Karl Fisher, a principal investigator on the project. "[Submarine maintenance] is a major undertaking. A lot of things can happen and anything that impedes the schedule is bad. Our proposal is to reduce the cost, but it is a costly process."

Fisher said researchers will be looking at using acoustical structural excitation along with ultra-wide-band radar technology, which has proven useful in penetrating underground to search for improvised explosive devices. While Fisher cautioned the technology isn't guaranteed to work on submarines, it could help narrow the area where a crack or defect in the welding has occurred.

"We would use acoustics and vibration excitation to get the hull moving, and then watch and listen for changes in motion," Fisher said. "It's analogous to a wineglass—if you tap it and the glass is solid, it will make a 'ding.' If there's a crack in it, you'll hear a dull thud. In theory, the defect will radiate differently and have a different mechanical response, and we could scan it and find out where."

For the first phase of the study, the Lab team will use test samples to try the technique and gauge for efficacy. At the same time, two other institutions will be investigating terahertz and phased array approaches. The Navy will review the three proposals in early 2017 before moving on to developing a prototype system. At LLNL, engineer and co-principal investigator John Chang will lend his expertise in remote sensing to the project.

"Each modality has its shortcomings; there's no one technique that will address the problem," Chang said. "To me it highlights the Lab's uniqueness in multidisciplinary research and tapping into experts in their fields to generate new capabilities."

The Navy estimates that reducing the amount of coating that has to be removed and reinstalled on a Virginia Class submarine during inspections could reduce costs by as much as $1.2 million per hull per inspection cycle, or $6 million over a five-year period.

Russia To Arm Antey Nuclear Subs With Kalibr Missiles

Ryan Maass, UPI, March 7

Russian Project 949A Antey submarines will be armed with Kalibr missile systems following an upgrade project, according to state media reports.

The vessels, also known by their NATO reporting names Oscar I and Oscar II, are currently armed with P-700 Granit cruise missiles in addition to various anti-ship and anti-submarine weapons. The Kremlin's plans to improve the Soviet-era ships were announced by Russian Deputy Defense Minister Yuri Borisov.

"The Zvezda shipyard is carrying out profound modernization of Project 949A nuclear submarines, including the replacement of armament with the Kalibr missile complex and also the replacement of navigation, life support and other systems," the minister told the TASS news agency.

Moscow has so far constructed 11 Project 949A Antey submarines, 8 of which have remained operational with the country's navy. Each vessel displaces 24,000 tons at sea.

Russia's Rubin Central Design Bureau for Marine Engineering CEO Igor Vilnit adds all Project 949A Antey submarines will receive the upgrade.

U.S. Navy Buys New Submarine Sonar Systems
Staff, UPI, March 6

Lockheed Martin received a $100.4 million contract modification to deliver Technical Insertion-16 Acoustic Rapid Commercial Off The Shelf Insertion systems.

The contract supports vessels operated by the U.S. Navy. The Acoustic Rapid Commercial Off The Shelf Insertion system, or A-RCI, is designed to improve acoustic improvements for a ship as well as improve sensor processing. The Navy will also receive spares and pre-cable kits.

A-RCI was developed by Lockheed Martin as a commercial computer platform in the 1990s. In addition to boosting sonar capabilities, the system allowed for frequent hardware and software upgrades and enhanced acoustic quieting measures.

Lockheed Martin says the Navy's entire submarine fleet has been equipped with the system.

According to the U.S. Department of Defense, work on the contract will be performed in Manassas, Va. and Clearwater, Fla., and is expected to be complete by December 2022.

Lockheed Martin received all funding at the time of the contract award. The Naval Sea Systems Command is the contracting activity.

30 Years Old Sub With 64 Nuclear Warheads Ready For Re-Launch
Thomas Nilsen, The Independent Barents Observer, March 7

«Tula» is a Delta-IV class submarine carrying 16 ballistic missiles, each armed with four nuclear warheads. In total, the sub has a lethal load of 64 nuclear warheads.

First launched in 1987, the 30 years old submarine has been in for modernization at the Zvezdochka shipyard in Severodvinsk since December 2014.

Before the end of this year, «Tula» will again be ready to sail for the Northern fleet for many years to come. The Russian navy has six Delta-IV nuclear powered submarines, all based in Gadzhievo northwest of Murmansk on the Kola Peninsula.

Russia's ballistic missile submarines normally patrol the northeastern part of the Barents Sea and represents an important leg in Russia's nuclear deterrence.

Next Delta-IV submarine in line for upgrades after «Tula» now is taken out of the ship hall is «Bryansk», the shipyard's portal reports.

This is likely the last round of overhaul of the Delta-IV fleet. The class will be replaced with the newer 4th generation Borei-class submarines, of which the three first are already in operation, two with the Pacific fleet and one with the Northern fleet.

With eight Borei submarines, the number of strategic warheads will be a maximum of 888; three with 16 missiles and five with 20 missiles. In practice, not all Borei's will be deployed at the same time due to maintenance and repair work. Also, some of the missiles are likely to carry dummy warheads for test-launchings.

In the period when both the current fleet of Delta-IV subs and the upcoming Borei-class subs will sail together, the numbers of nuclear warheads in the Barents Sea will be substantially higher than today, as reported by the Barents Observer last week.

Navy Subs Still Show Issue With Stealth Coating
William Cole, Honolulu Advertiser, March 5

In 2010, when rubberlike quieting material started to peel off the hulls of newer Virginia-class submarines, the Navy said it was fine-tuning a fix for a problem occurring on the first few ships made.

Seven years later, the Navy still appears to be seeking a cure.

When the $2 billion USS Mississippi recently returned to Pearl Harbor, its "Mold-In-Place/Special Hull Treatment" looked ragged and was missing chunks on at least one side of the hull. The sub was commissioned in 2012.

The loss of stealth comes at a time when China and Russia are making worrisome advances in submarine technology.

A photo that appeared on Facebook prompted the comment that the Mississippi looked "pretty banged up." No collision, no accident, and no hull damage, reported the Pacific Fleet Submarine Force at Pearl Harbor.

The Naval Sea Systems Command in Washington skirted questions about what happened to the Mississippi and how much of a problem the debonding remains for Virginia-class attack boats.

Asked what caused the damage, the command in an email cited the "wear and tear from the harsh environment in which the submarine operates," but would not say when or why it occurred.

The Honolulu Star-Advertiser also asked how much of a problem debonding remains across the Virginia-class fleet, given past problems with the hull treatment that is applied in sections.

"Navy and industry continue to find efficiencies and improvements in the construction and maintenance of Virginia-class submarines," the command said in the emailed response. "An integrated process team was assembled to address conditions such as those reflected in the (USS Mississippi) photograph, and improvements to materials, processes and testing were subsequently identified, evaluated and implemented. The Navy is continually assessing and developing more effective solutions."

Bryan Clark, a senior fellow at the Center for Strategic and Budgetary Assessments and a former Navy submariner, said the amount of acoustic coating missing on the Mississippi "could create enough flow noise to be a sound problem at even relatively slow speeds. Also, there is enough tile missing that it could reduce the coating's ability to absorb sonar energy and make the submarine easier to find with active sonar."

Clark said it isn't clear from the photo if the tiles came off due to debonding, meaning a loss of adhesion, "or if they got stripped off from something rubbing against the submarine. Nets and cables adrift at sea can do this."

Cmdr. Corey Barker, a spokesman for the Pacific Fleet Submarine Force, said that in terms of possible abrasion, he was "not aware of anything of that nature" happening.

The 377-foot attack submarine returned to Pearl Harbor on Feb. 13 after being in and out of port for routine training, Barker said. On Sept. 1, the Mississippi came home after a six-month deployment to the Western Pacific.

A Navy photo taken June 13 during a port stop in Busan, South Korea, shows the same side of the sub missing a few coating pieces, but not anywhere close to the degree of loss exhibited last month.

Asked if the debonding occurred during the deployment, the Naval Sea Systems Command said, "As a matter of (Defense Department) policy, we do not discuss the specifics of submarine operations."

Anechoic, or echo-reducing, tiles were used by Nazi Germany in World War II. The application helps break up incoming sound waves and reduces the sound that travels back from sonar. The Soviets adopted the use of the coating, and the U.S. Navy followed in 1988.

The USS Hawaii, Texas and North Carolina, all now based at Pearl Harbor and among the first Virginia subs to be built, were part of a group of about six of the vessels identified in 2010 as having a problem with the mold-in-place urethane coating.

"We've been made aware of the issues, we're making improvements in the process, and we're seeing results already," the Associated Press quoted Alan Baribeau, a Naval Sea Systems Command spokesman, saying at the time.

The website Next Navy posted photos from 2013, however, showing the submarines Minnesota and Missouri with some coating coming off. The Navy has been replacing older Los Angeles-class subs at Pearl Harbor with the more capable Virginia-class. Four Virginia subs are based in Hawaii now. The USS Illinois is expected to be relocated to Oahu.

Naval analyst and author Norman Polmar, who served as a consultant to three secretaries of the Navy, said it's a glue issue with the acoustic material.

"Remember, (the coating sheets) are external to a submarine, which is going from surface pressure down to, let's say, 1,000 feet occasionally," Polmar said. "In addition, the temperature changes radically."

The glue has to "take the constant changes in pressure, constant changes in temperature, and it ain't an easy thing to do," he said. Additionally, submarines periodically brush against floating debris, against a pier, or "rarely, but sometimes, against another submarine."

The Pearl Harbor Naval Shipyard said in 2015 that it was working on special hull treatment restoration on the USS Hawaii. Naval Sea Systems Command did not disclose when the Mississippi will receive repairs or the estimated cost.

Clark, with the Center for Strategic and Budgetary Assessments, said the Navy always has had difficulty keeping anechoic coatings on submarine hulls. Since the sound energy from sonar hits the whole submarine, a few missing tiles will not significantly affect the return, he said.

But he said the Navy will have to continue to improve the acoustic coating's resilience with other countries starting to use more active variable-depth sonars on ships and helicopters that can be positioned to more effectively look for submarines.

The Russians have made significant strides in acoustic technology on the Severodvinsk-class submarines, and the U.S. Navy's Acoustic Superiority Program is an attempt to stay ahead of the pack. The sub USS South Dakota, expected to be christened this summer, is being used as a test for an improved acoustic coating and noise-reducing machinery.

General Dynamics Electric Boat in 2012 said it was delivering the Mississippi to the Navy a year ahead of contract schedule and more than $60 million below target cost. The USS Mississippi Commissioning Committee reported the sub's cost at $2 billion.

A 2016 Congressional Research Service report said the procurement cost of two Virginia-class subs in fiscal 2017 was $2.7 billion each.

That same year, Rear Adm. Charles Richard, director of undersea warfare, and Rear Adm. Michael Jabaley, program executive officer for submarines, told members of Congress that the need for submarines is only growing.

"As the threat from adversary advances in sensors and weapons such as cruise missiles, anti-ship ballistic missiles and integrated air defense systems grows," the pair said in written testimony, "undersea forces will be increasingly asked to accomplish missions once conducted by forces that are now held at increased and potentially unacceptable risk by the improved range, precision, and lethality of advanced systems."

ONI Report: Iran Developing Sub Launched Missiles To Combat Ships In Strait Of Hormuz

Sam LaGrone, USNI, March 2

Iran is developing a submarine that could launch an anti-ship cruise missile designed to quickly sink an American warship operating in the Strait of Hormuz, according to a new assessment of Iranian naval capabilities published Wednesday by the U.S. Office of Naval Intelligence.

Citing Iranian press reports, the new ONI study – Iranian Naval Forces: A Tale of Two Navies – said development of Tehran's new Besat-class of diesel-electric attack submarine will include an anti-ship cruise missile (ASCM) capability.

"In terms of armament, the Besat will likely have six torpedo tubes, capable of employing torpedoes and mines, as well as submarine-launched ASCMs," reads the report.

While ONI did not identify a specific missile system for the Besat, the report's conclusion said the capability would likely emerge in the Iranian fleet "over the next five years."

Beyond a scattering of press reports, little is known about the 1,300-ton Besat program – part of Iran's domestic shipbuilding effort for the regular Iranian Navy.

Iranian naval forces are split between the Islamic Republic of Iran Navy (IRIN) that is responsible for blue water operations and the Islamic Revolutionary Guard Corps Navy (IRGCN) that is charged with coastal defense of Iran and most operations in the Persian Gulf.

Both operate in the Strait of Hormuz and both count the U.S. Navy as their primary potential adversary.

The Iranian development of a submarine-launched anti-ship cruise missile would allow the IRIN a better chance of getting closer to a U.S. ship undetected than the IRCGN's fleet of fast attack craft before firing a weapon, giving less time for the threatened ship to react to the attack.

For example, the Chinese YJ-18 sub-launched ASCM is a key worry for U.S. forces operating in the Western Pacific in the event of a full-blown war.

Naval analyst Chris Carlson told USNI News on Wednesday that the general description in the ONI report of the Besat attack boat is consistent with the early variants of the German export Type 209 family of conventional attack subs that can be modified to launch the U.S.-built UGM-64 Harpoon ASCM.

However, the considerable increase in size of this new submarine, twice that of the lone Fateh-class coastal submarine, plus incorporating a sub-launched ASCM, will present serious technological challenges for the Iranians. And while they have repeatedly expressed their desire for this capability, Carlson noted the Iranians are notorious for overstating their abilities.

"When the Iranian's say they're 'building,' take it with a grain of salt," he said.

For example, the Iranians have spent years developing the much smaller and less complex 600-ton Fateh class submarines for costal defense.

More than three years after the submarine launched, "the IRIN has yet to declare the Fateh submarine operational," read the ONI report.

Iran also fields three Russian-built Kilo-class submarines it received from Moscow in the 1990s but elected to modernize them domestically. Indications are that the IRIN did not include a cruise missile capability.

In addition to development of submarine-launched cruise missiles, the report indicated Iran was working to create an overlapping network of land-based anti-ship cruise missiles to put at risk ships operating in the Persian Gulf.

"The tight water space in the Strait of Hormuz, as well as vast miles of coastline, both provide optimal ring positions for coastal defense cruise missiles," read the report.

"Iran has invested heavily in procurement, research, and production of multiple anti-ship missile systems over the past several years."

Iran has developed a family of missiles – based on the Chinese C-802 ASCM (which was in turn based on the French Exocet ASCM) – that have ranges of up to 186 miles and cover the entire width of the Persian Gulf.

Iran is also working to acquire the supersonic SS-N-26 Yakhont coastal defense cruise missile capable of ranges of more than 300 miles.

The missile development fits into Iran's evolving strategy to take on a foreign force operating in the region, the report said.

"IRGCN commanders claim that in the event of a conflict, they will move swiftly to attack and destroy enemy warships present in the Persian Gulf and Strait of Hormuz. They believe that sinking several enemy warships in the early stages of a conflict would break the political will of an adversary to continue with a military campaign against Iran," the report said.

"The doctrine manifests itself as hit-and-run style, surprise attacks, or the amassing of large numbers of unsophisticated weapons to overwhelm the enemies' defenses. The amassing of naval forces is often described as a swarm of small boats."

In 2015 – as part of its highly publicized Noble Profit exercise – the IRGCN destroyed a facsimile of a U.S. Navy Nimitz-class aircraft carrier as part of a less-than-subtle strategic message.

"Today, more than 100 of our vessels are conducting patrols daily in the Persian Gulf to the extent that the Americans see us wherever they look," IRGCN commander Rear Adm. Ali Fadavi said in the Iranian press.

"We shouldn't play nice with the Americans. If we were to do that, there would be no end in sight; we would be going from "A to Z."