



"To Honor Those Who Serve, Past, Present & Future"

September 2020

Volume 21, Issue 9

**Lest We Forget —
"The USSVI Submariner's Creed"**

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.

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News Brief

1. **Next Meeting:** Restrictions on group gatherings related to Coronavirus have caused a temporary suspension of our monthly meetings. One outdoor meeting is scheduled as noted below.

September 19 – In-person, outdoor, picnic-style lunch and meeting at Knollwood Sportsmen's Club at 1100. Very Important Note:

EACH SHIPMATE ATTENDING SHOULD TAKE THEIR OWN LUNCH, BEVERAGE, AND CHAIR.

October 17 – WATCH E-MAIL FOR AN ANNOUNCEMENT.

2. Duty Cook Roster:
 - a. GET READY TO VOLUNTEER WHEN OUR MEETINGS RESUME.
3. **September Birthdays:** Ted Rotzoll 8th; Charles Daniels 17th, and Bob Krautstrunk 18th. Happy Birthday Shipmates!
4. **Do you shop on Amazon?** Remember to use Amazon Smile for the benefit of our Charitable Foundation. Donations through August totaled \$3,865.
5. **Giving back** – Our base's September meeting includes standing up the Nominating Committee for officer elections. Volunteers are needed both for the Nominating Committee as well as candidates for elected positions. In 2020, the officers to be elected include the Base Commander and Base Treasurer. As the song says, "Express Yourself".

Crash Dive Meeting Minutes August 15, 2020

The August meeting and all future meetings currently are cancelled due to COVID-19.

Lost Boats

USS S-5	(SS-110)	09/1/20
USS Grayling	(SS-209)	09/09/43
USS S-51	(SS-162)	09/25/25
USS Cisco	(SS-290)	09/28/43

Undersea Warfare History

- September 3, 1943 | USS Pollack (SS 180) sank the 3,421 ton cargo ship Tagonoura Maru.
- September 4, 1941 | USS Greer (DD 145) is attacked by the German submarine U-652. Greer is undamaged in the attack, and damages U-652 with depth charges. The attack led President Roosevelt to issue shoot-on-sight order, directing Navy ships to attack any ship threatening U.S. shipping or foreign shipping under escort.
- September 5, 1776 | The Continental Navy adopts first uniforms for naval officers.
- September 6, 1997 | USS Louisiana (SSBN 743) is commissioned. The boat was the last of the Navy's 18 Ohio-class nuclear-powered fleet ballistic missile submarines.
- September 7, 1776 | American craft Turtle attacks HMS Eagle in first naval attack ever made in a submersible vehicle.

- September 9, 1943 | USS Trout (SS 202) sank the Japanese submarine I-182.
- September 10, 1944 | USS Sunfish (SS 281) intercepted a convoy coming out of the Tsushima Strait. She sank the Chihaya Maru and damaged several other targets.
- September 11, 2001 | American Airlines flight 77 is hijacked by terrorist and hits the Pentagon, causing 184 fatalities. American Airlines flight 11 and United Airlines flight 175 hit the Twin Towers at the World Trade Center, New York City. United Airlines flight 93 goes down in Shanksville, Pennsylvania after passengers engaged the hijackers.
- September 12, 1944 | USS Pampanito (SS 383) sank the transport Kachidaki Maru and the tanker Zuiho Maru while damaging a third ship.
- September 13, 1996 | USS Cheyenne (SSN 773) is commissioned at Naval Station Norfolk. Cheyenne was the 62nd and last of the Los Angeles-class submarines built.
- September 16, 1944 | USS Picuda (SS 382) probed deeper into the interior of Luzon Strait for a bold daylight attack on an 8 ship convoy guarded by 3 destroyers and air cover. Picuda sank the 5975-ton Tokushima Maru and scored hits on 2 other freighters.
- September 17, 1943 | USS Trigger (SS 237) fired 4 torpedoes striking the 6435 ton cargo ship Yowa Maru..
- September 18, 1793 | George Washington lays the cornerstone to the United States Capitol building, the home of the legislative branch of American government. The building would take nearly a century to complete.

- September 19, 1944 | USS Bang (SS 385) made radar contact with an enemy convoy, submerged and fired on 2 of the ships. The tanker Tosei Maru No. 2 sank, while the other vessel suffered substantial damage.
- September 20, 1942 | USS Wahoo (SS 238) sank a 6,400 ton freighter south of Namonuito Atoll.
- September 23, 1943 | USS Harder (SS 257) sank a 4,500 ton freighter, Kowa Maru and a 5,800 ton tanker Daishin Maru off Nagoya Bay.
- September 24, 1944 | USS Kingfish (SS 234) sailed on her 5th war patrol, headed for the South China Sea and accomplished two special missions.
- September 25, 1944 | USS Guardfish (SS 217) sinks Japanese merchant cargo ship, No.2, Miyakawa Maru, in the Yellow Sea off Chinnampo.
- September 26, 1963 | First steam-eject launch of Polaris missile at sea occurs off Cape Canaveral, Fla., from USS Observation Island (EAG 154).
- September 27, 1944 | USS Apogon (SS 308) sank the 2,000 ton cargo ship, Hachirogata Maru. Following the attack, she rescued two Japanese survivors.
- September 30, 1944 | USS Ronquil (SS 396) Began her second war patrol, which was carried out in two phases. She first operated with a coordinated submarine attack group in the Bungo Suido, then joined six other submarines to carry out an anti-patrol sweep off the Bonin Islands.

How U.S. Navy's Micro Models Will Help Submarines Stay Invisible

David Hambling, Forbes, August 12

Model submarines small enough to rest on your thumbnail will make sure real submarines stay invisible and aid in identifying enemy submarines and other vessels.

The U.S. Navy is combining two new technologies, 3D printing and nanophotonics, to create precise models showing how submarines and other warships appear to radar. Computer modeling of radar signatures is extremely time-consuming and may get it wrong; the only way to be sure how radar sees something is to put it – or an exact copy — in front of a radar set.

Full-size 'pole models' are a familiar from stealth aircraft research. The slightest radar 'glint' spoils the whole design, so rigorous testing involving an exact model is necessary. Some companies specialize in building radar test models – Advanced Technologies Incorporated have built full-scale models of the F-22, F/A-18 E/F and Comanche RAH-66 helicopter (and probably others) for radar testing. While these models are little more than a skeleton with skin stretched over it, they are still costly and time-consuming to produce.

More recently it has been possible to use scaled-down models. A radar operating at 1/100th the wavelength of an actual search radar will see a 1/100th scale model exactly as the real radar sees the full-size version. However,

accurate 1/100th scale ship models currently take months to produce. Smaller might be better, but radar only works down to certain wavelengths. Enter the new field of nanophotonics which offers an alternative, making it possible to build a sensor that works like radar, using antennas rather than lenses, but picks up visible light.

This technique makes it possible to scale everything down by a factor of 10,000. The Navy want to employ nanophotonics to create a 'desktop radar range': "At that scale, an entire Virginia-class submarine (~150 meters) can be recreated to a length of 1.5 centimeters and can easily fit in a tabletop measurement setup," according to a solicitation on the Small Business Innovation Research website.

The plan is to use near infra-red wavelengths, because there are many materials which accurately reproduce the effects of radar waves at longer wavelengths. Models will be made by 3D printing in a matter of hours, and the radar testing would take minutes. This will make radar assessment of new designs far faster than at present.

The desktop radar range would have two functions. One would be determining the radar signature of any new proposed U.S. warship or modification – the proposal specifically mentions checking changes to submarine periscopes, or 'photonics masts' as they are now known. The new approach would allow different designs to be tested rapidly before going ahead with production, without the need to make a full-scale mockup. This would ensure

that a new design is stealthy and is as close as possible to invisible to radar. (This would help, for example, with the challenge of adding a high-power laser weapon to a photonics mast, an actual project).

The desktop range will help with "identifying the location and the nature of the strongest scatters and glints from the proposed Navy structure of interest. This ability allows for an intuitive interaction with the structure model to eliminate these sources of unwanted scattering and minimize the RCS [=Radar Cross Section] from visible to RF [=Radio Frequency] range." In other words, designers can literally see where the problem is that is spoiling the stealth.

The other function would be finding out what other nation's ships look like to radar. Models can easily be created from photographs, and by checking on the desktop range it will be possible to find out their radar signature. Submarine masts can be observed when they are in port or on the surface – as in the recent Russian Oscar-class submarine transiting the English Channel. Being able to identify these by radar – from ships, aircraft or even from space — would be useful.

"Even nuclear submarines sometimes have to use their periscope, or any of the array of sensor masts which now adorn them," says Forbes contributor HI Sutton, editor of the CovertShores submarine website. "If you can get a positive identification just from a fleeting radar contact with a mast, that could be extremely powerful in a tactical setting."

The data to build models could be gathered by satellite, drones, or other means, perhaps even before a vessel has even been launched.

“Being able to predict a warship's, or submarine's, radar signature without having to encounter it at sea to gather data could be beneficial against navies which hide their best assets in port,” says Sutton.

The initial phase, proving the feasibility of the desktop radar range was carried out by two contractors, neither of whom was able to discuss the project. In the next phase, a “compact, desk top, field-operational prototype optical emulator” will be built and tested. Though a fraction of the size of the giant outdoor radar test ranges used to assess full-size gear, the desktop range will be a handy addition to the designers – and the submarine hunter’s – toolkits.

What The Ultimate Submarine Could Look Like in 20 Years

H I Sutton, Forbes, August 14

The U.S. Navy's Virginia Class fast attack submarines are ruthlessly efficient war machines, the apex predators of the deep. Yet their general appearance and many aspects of their design have a direct lineage back to the 1950s. The same can be said of British and Russian subs. However, a range of new technologies could allow radically different submarines in the future.

The U.S. Navy wants its next submarine, the SSN(X), to be bigger and faster than the current Virginia

Class boats. The Royal Navy's SSN(R) and Chinese Navy's Type-095 Class boats will likely follow generally similar thinking. So what are the trends and technologies which could revolutionize the next generation of submarine?

A driving force will be to increase the number of weapons a future submarine can carry, as well as autonomous underwater vehicles (AUVs, aka UUVs or simply 'drones'). So the torpedo room, and it is likely to remain called that despite everything I am about to say, will be more of a 'generic ocean interface.' It will have to be larger and almost certainly fully automated.

Another way that it will carry more weapons is because some of them will be smaller, like the Swedish lightweight torpedoes which are loaded two to a tube. Or the Very Lightweight Torpedo (VLWT) that Northrop Grumman is working on. These can be used against lower-value targets, which are currently a problem for submarines armed only with very expensive torpedoes. And they can be used to intercept incoming enemy torpedoes.

The small AUVs carried aboard will be used to extend the sensor reach of the submarine. Steve Hall, CEO of Society for Underwater Technology (SUT), told me that he "can easily see that expensive submarines with a human crew on board may stay silent and deep, deploying or remote-controlling a variety of air, surface and submerged autonomous or semi-autonomous systems."

With new secure, discrete, underwater communications technologies, drones and submarines will operate together as part of a network. Today submarines are generally lone wolves because of the

difficulty of identifying whether a target is friend or foe. This is even more of a challenge for armed drones, which lack human judgement. But next-generation underwater communications could change the equation.

There are mutterings of a move is away from vertical launch systems (VLS). Torpedo rooms are more versatile and can be used to launch weapons or drones at higher speeds. However it is a nuanced topic. Dr Rachel Pawling, who teaches naval architecture at University College London, suggests, "VLS is always going to hang around for those large air flight weapons where you want to launch several in quick order and don't care about reloads." This would include larger hypersonic weapons such as Boost Glide missiles.

Really large drones, termed XLUUVs (extra-large uncrewed underwater vehicles), may also be carried. Think of them as small uncrewed submarines with their own independent warfighting capabilities. But these will need their own infrastructure. Pawling believes that "by 2040 external carriage of XLUUVs would be likely. Think of it like an aircraft carrier that has to keep some aircraft on deck at all times, only having enough internal space for maintenance."

There are a few basics which are not likely to change, however. With the advent of autonomous underwater vehicles it is easy to suggest that future submarines will be completely uncrewed. None of the experts I discussed this with think that it will go that far. Yet advances in automation and artificial intelligence will greatly reduce the crews.

Those who are left will live in relative comfort, and have easy access to the

things we take for granted ashore, like social media. That is unthinkable today. Hall notes, "crew don't like being away from the internet and social media, it is a societal need. This is bad enough on a surface vessel, all but impossible on a stealthy, submerged submarine." But improvements in undersea communications could make it possible.

They will also benefit from Virtual Reality or holographic displays of the 3D battlespace in which they are operating. Command centers may look more like Star Trek with more space and physically slimmer equipment.

And much of the AI, navigation and communications may leverage quantum computing.

These technologies will also change how a submarine 'sees' in the dark of the ocean. Aaron Amick who runs the Sub Brief channel told me that sonar is undergoing a dramatic evolution at the moment. He believes three significant changes are coming to sonar in the next 20 years: "Better materials, mobile drone arrays, and artificial intelligent operators." For materials, "thousands of synthetic acoustic sensors will create an acoustic advantage, unlike anything we have seen before."

What Amick envisions for mobile drone arrays is "deployable, disposable drones which can venture away from the submarine. This will extend the sonar search beyond current hull-mounted and towed array capabilities. They might use blue-green laser data links to send the information back." This will be plugged into the third advance, AI.

More prosaically, submarines are still likely to be large steel tubes like they are today. This is largely because of

limitations in how they are manufactured — unless 3D printing can make new things possible. Pawling notes that “if 3D printing of hulls becomes possible then odd shapes might become more popular.” But I wouldn’t bet on it happening in 20 years.

How the submarines of the future will be powered is harder to speculate about. Lithium-ion batteries and the latest Air Independent Power (AIP), particularly fuel cells, are making larger non-nuclear submarines more capable. These will transform non-nuclear countries' navies.

But the power potential of nuclear propulsion will remain attractive to those countries which have it. Especially if you want to have a high-power laser firing out of the periscope. If you want to make a long bet on the ultimate submarine of 2040, maybe it will have new nuclear fusion power plants like those proposed by Lockheed Martin.

US Navy subs now have a ‘Top Gun’ aggressor

David Makichuk, Asia Times, August 18

By now, many of us have seen the Tom Cruise film, Top Gun, where US Navy and US Marine pilots sharpen their skills against an aggressor force, amid much aerial combat drama and a touch of romance.

The school — which was later relocated to Fallon, Nev. from Miramar, Calif. — does in fact exist, and it churns out top notch fighter pilots and instructors.

Not to mention a Hollywood movie or two — a sequel is on the way, although the premiere has been pushed back to

July 2, 2021, because of Covid.

The concept actually does work, which is why the US Navy’s submariners have finally got on board — quietly and secretly launching an “aggressor force” in 2019 to battle its nuclear submarine fleet, Joseph Trevithick of The War Zone reported.

The unit, abbreviated AGGRON, is part of the Navy’s Undersea Warfighting Development Center (UWDC).

It has elements at both the UWDC’s headquarters at Naval Submarine Base New London in Groton, Connecticut and at the Point Loma Annex in San Diego, California.

The Navy formally established the squadron between the spring and summer of 2019, according to issues of Undersea Warfare magazine, the official publication of the Submarine Force, War Zone reported.

“Its goal is to employ an effective cadre of experts (red team) versed in opposition warfighting philosophy, strategy, and tactics to stress submarine crews in warfighting scenarios. Red team expertise will be available locally or virtually to support training and certification,” Navy Vice Admiral Charles Richard, then Commander, Submarine Forces, wrote in the Spring 2019 issue of Undersea Warfare.

“Additionally, we are working on connectivity between attack center locations to allow remote red team engagement, and we are exploring the

possibility of employing select SSN(s) [nuclear attack submarines] as a standing red opposition force for live at-sea play.”

“All school houses are in receipt of an updated ‘red’ playbook and are working with the Aggressor Squadron to ensure that crews receive the best blue vs. red (vice blue vs. blue) training scenarios,” Richard wrote.

Aggressor units, also sometimes known as the “Opposing Force,” or OPFOR, are typically well-versed in the doctrine and tactics of possible adversaries, or the “red” force, War Zone reported.

The idea is that these elements provide added realism to training exercises, giving friendly “blue” forces an opportunity to get a feel for how potential opponents might operate and explore how existing and improved concepts of operation might work against them.

An internal job listing the Navy issued on Aug. 13, 2020, says that the squadron wants an individual with “cryptologic experience in submarine operations to assist with various Electronic Warfare (EW) projects.”

While we don’t know exactly what these projects are, electronic warfare, broadly, is a rapidly growing area of interest across the US military, as a whole, as well as among possible adversaries, especially Russia, War Zone reported.

In 2018, Vice Admiral Richard had described the still notional unit as a

version of the Navy’s famed Top Gun fighter pilot training program, but for submariners.

It’s worth noting that Top Gun also trains individuals to be able to return to their primary units, including both operational and training squadrons, and act as instructors and pass on what they have learned, a concept that could also be very advantageous for the submarine community, War Zone reported.

As Richard noted in Undersea Warfare last year, AGGRON is already working to share lessons learned and more with other operational and training elements.

The new unit will be able to provide similarly important benefits for US anti-submarine warfare elements – a much broader community that includes surface warships, fixed-wing aircraft, and helicopters – looking to hone their skills against more representative threats, as well.

Pacific-Based Sub Operates In European Waters

Staff, Sea Power Magazine, August 24

NORWEGIAN SEA — The Seawolf-class fast-attack submarine USS Seawolf is operating in the U.S. 6th Fleet area of operations and conducted a brief stop for personnel in the vicinity of Tromsø, Norway, on Aug. 21, the fleet’s public affairs office said in a release.

The Pacific-based submarine is operating in 6th Fleet under the command and control of commander, Submarine

Group 8, and commander, Task Force 69, to compliment the undersea warfare capabilities of U.S. Naval Forces Europe.

“USS Seawolf’s deployment from Bangor, Washington, to the U.S. 6th Fleet demonstrates the submarine force’s global reach and commitment to provide persistent and clandestine undersea forces worldwide to execute our unique missions with unrivaled readiness,” said Vice Adm. Daryl Caudle, submarine forces commander. “Our undersea warriors are the best in the world in submarine warfare and are equipped with unmatched capabilities designed to enhance our Navy and multiply the joint force’s effectiveness in competition and conflict.”

These subs are exceptionally quiet, fast, well-armed, and equipped with advanced sensors. Though this class of

submarines lacks vertical launch systems, it is armed with eight torpedo tubes and can hold up to 50 weapons in its torpedo room.

“The arrival of Seawolf compliments our already robust undersea warfare capabilities and demonstrates our continued commitment to providing maritime security and deterrence throughout the region,” said Rear Adm. Anthony Carullo, commander, Submarine Group 8. Seawolf was commissioned in 1997 and is the lead submarine of its class. The USS Connecticut and USS Jimmy Carter make up the rest of the class. Seawolf, which is based out of Naval Base Kitsap in Washington, is conducting maritime operations in the 6th Fleet area of operations in support of U.S. national security interests in Europe and Africa.

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APPLICATION FOR MEMBERSHIP

Regular Life Associate

OUR CREED: "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 & its Constitution."

With my signature below I affirm that I subscribe to the Creed of the United States Submarine Veterans, Inc., and agree to abide by the Constitution, all Bylaws, Regulations and Procedures governing the U.S. Submarine Veterans, Inc., so long as they do not conflict with my military or civil obligations. I will furnish proof of my eligibility for Regular membership, including my discharge under honorable conditions, and proof of my U.S. Navy (SS) Designation, if required by the Base or the national Membership Chairman. If I am not discharged, the discharge requirement is waived. If I am not U.S. N. submarine qualified, I am applying as an Associate and my sponsor is indicated below.

I certify that I was designated qualified in USN Submarines aboard _____ in _____ (Yr)
(Honorary designations regardless of source do not apply under any circumstances.)

I certify that I received a discharge under Honorable Conditions (if not currently in military service) in _____ (Yr)

Name: (Print /Type) _____ **Address:** _____

City: _____ **State:** _____ **Zip Code:** _____ - _____ **Tel:** (____) _____ - _____

Signature: _____ **Date:** ____/____/____

Your E-Mail Address _____ **Base/Chapter Desired:** _____

The Member Dues year runs from Jan 1st thru Dec 31st. Please indicate your term preference: _____
Nat'l Dues: 5 Yr term: \$115.00; 3 Yr term: \$70.00; 1 yr term (Jan thru Sep) \$25.00; (Oct thru Dec adds the next yr): \$30.00;
Nat'l Life: 76+ yrs = \$100.00; 66 thru 75 yrs = \$200; 56 thru 65 yrs = \$300.00; 46 thru 55 = \$400.00; Thru 45 yrs = \$ 500.00;
Local Base/chapter dues are separate and additional. Crash Dive Base dues are \$15 annually.

How did you find USSVI? Friend, Boat Assn, Local Event/News, Internet, Other (_____)

Who is your sponsoring USSVI Regular Member?: (Mandatory for Assoc Mbrs) _____

Associate Applicant is: Veteran Spouse of Veteran Other (specify) _____

YOUR U.S. NAVY BIOGRAPHICAL DATA

Date Of Birth (MM/DD/YY) ____/____/____ **If other military service, What Branch?** _____

Highest Rate & Rank Attained: _____ **Mil Retired (Y/N):** ____ **On Active Duty? (Y/N):** ____

YR entered Mil Service: ____ **YR left Mil Service** ____ (Active/Inactive reserve time also counts.)

Check here if your Military Service falls within these time periods: Dec 7, 1941, thru Dec 31, 1946; June 27, 1950, thru Jan 31, 1955; Aug 5, 1964, thru May 7, 1975; and Aug 2, 1990 to date.

Check here if you have been awarded an Expeditionary Medal

Submarines and ships served aboard as ship's company (Use back if you need more space.)

1. _____ Hull# _____ From Yr. ____ to Yr. ____

2. _____ Hull# _____ From Yr. ____ to Yr. ____

3. _____ Hull# _____ From Yr. ____ to Yr. ____

4. _____ Hull# _____ From Yr. ____ to Yr. ____

5. _____ Hull# _____ From Yr. ____ to Yr. ____

Next of Kin: Name: _____ **Relationship:** _____ (Spouse, Partner, Son, Dau, Parent, Other)

Addr: _____ **City:** _____ **State:** ____ **Zip:** _____ **Tel:** _____

(Leave this address line blank if the same as your home address)

Upon completion, give or mail this form, including your National and Base membership DUES (payable to 'Crash Dive Base') to Crash Dive Membership Chairman Tom Polzin, 1305 Winslow Circle, Woodstock, IL 60098; 847-867-8668