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

The Silent Sentinel
September 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 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.

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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.

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September 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 *September 13*. 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

Benny Williams

Submarine Losses in September

Originally Compiled by C J Glassford

USS S-5 (SS-110)
Lost on September 1, 1920 when a practice dive went wrong and she sank bow-first, with her stern showing above the water. In a dramatic adventure, her exhausted crew was rescued during the next few days. Salvage attempts were unsuccessful, S-5 settled to the bottom and was abandoned.

USS Grayling (SS-209)
Lost on Sept 9, 1943 with the loss of 76 men near the Tablas Strait. Grayling was on her 8th war patrol and sank two ships before being lost.

USS Pompano (SS-181)
Pompano was sunk (between Sept 17 and Oct 5) with the loss of 77 men while on her 7th war patrol. Possibly lost on Sept 17, 1943. Japanese records show that a submarine was sunk in her patrol area on 17 September by air & depth charge attack off the Aomori Prefecture near Shiriya Zaki. Before being lost, she sank two enemy cargo ships. The exact cause of her loss remains unknown, but she probably was sunk by the air/sea attack above or fell victim to a mine on or after 9/25/1943. This boat's last recorded ship (Taiko Maru) sunk happened on Sept 25th, so she probably hit a mine on or after that date but before Oct 5th, when she was scheduled back at Midway.

USS S-51 (SS-162)
Lost on Sept 25, 1925 with the loss of 33 men when it was sunk after collision with SS City of Rome off Block Island.

USS Cisco (SS-290)
Lost on Sept 28, 1943 on her first war patrol with the loss of 76 men in the Sulu Sea west of Mindinao.

Current News

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

US Navy demonstrates Blackwing UAV
Shephard News Team, September 12

The US Navy has successfully demonstrated the ability of the submarine-launched Blackwing UAS to link with a swarm of unmanned undersea vehicles (UUVs) and communicate with the submarine's combat control system. The demo took place during the navy's Annual Naval Technology Exercise (ANTX) in August.

During the exercise the Blackwing UAS was used to provide communications relay for command and control. An AeroVironment-developed secure digital datalink called DDL, which was integrated into all Blackwing UAS, relayed real-time information from the surrogate submarine via the Blackwing to and from multiple UUVs.

Blackwing builds on AeroVironment's Switchblade Lethal Miniature Aerial Missile System and its common DDL to provide the navy with a deployable submarine-launched UAS optimised for distributed anti-access/area denial environments.

The UAS is designed to provide intelligence, surveillance and reconnaissance capabilities to submarine commanders as well as high-speed data and communication relay for command and control between geographically separated vessels such as surface ships, UUVs and manned submarines.

Kirk Flittie, AeroVironment vice president and general manager of its unmanned aircraft systems business segment, said: 'Our Naval Undersea Warfare Center partners seek solutions for quickly and seamlessly linking the air and undersea domains to enhance warfighter capability.

'Blackwing delivers significant value to the undersea community, and we look forward to working closely with our partners to expand this powerful new capability to enable underwater vehicles and cross-domain interoperability.'

US, Taiwan Move Forward on New Torpedoes
Wendell Minnick, Defense News, September 8

TAIPEI, Taiwan — The United States is set to approve the sale of Mk-48 heavyweight torpedoes for Taiwan after many years of delay, said a Taiwan Ministry of National Defense (MND) official.

The Advanced Capability torpedo will be outfitted on Taiwan's two remaining combat attack submarines after they undergo a life extension program upgrade.

Taiwan procured two Dutch-built Sea Dragon-class (Zwaardvis Mk 2) submarines in the late 1980s. The recent $200 million procurement of 32 UGM-84L Sub-launched Harpoon Block II anti-ship missiles will also give the Dutch-built submarines a bigger punch.

Taiwan is also moving forward with the Indigenous Defense Submarine (IDS) program to build eight attack submarines. With a total of ten attack submarines armed with Mk-48 torpedoes and additional UGM-84L Harpoons, China will hesitate to invade Taiwan, according to the MND source.

Chilean Navy Submarine Arrives in San Diego for CHILEMAR VI
MC2 Derek Harkins, Navy.mil, September 7

SAN DIEGO (NNS) – The Chilean Navy diesel-electric submarine SS Thomson (SS 20) arrived at Naval Base Point Loma on Sept. 6 to participate in the bi-lateral exercise CHILEMAR VI.

CHILEMAR is designed to demonstrate interoperability between U.S. submarine rescue systems and Chilean submarines, including a simulated submarine rescue operation, and to promote greater understanding and cooperation between the two nations.

Cmdr. John Croghan, senior deputy, Commander, Submarine Squadron 11 (CSS-11), greeted Chilean Navy Cmdr. Oscar Manzano, the commanding officer of Thomson, on the pier upon the ship's arrival.

Manzano, a staff and submarine warfare officer, holds a professional degree in weapons engineering with a major in submarines and a Master of Science in naval and maritime sciences. With more than 10 years of seagoing experience, he has navigated more than 15,000 miles submerged aboard Thomson.

"I am very pleased and excited to work with the U.S. Navy," said Manzano. "My crew and I are blessed to have the opportunity to come to San Diego and work with your fine Sailors. We are ready to get started."

During this iteration of CHILEMAR, Undersea Rescue Command (URC), assigned to CSS-11, plans to conduct a full scale submarine rescue exercise with Thomson. URC intends to utilize divers donning atmospheric diving suits (ADS) along with a pressurized rescue module (PRM). The PRM is a submarine rescue chamber that submerges to the submarine on the ocean floor and seals over its hatch to conduct a personnel transfer.

"I'm pleased we have been able to add submarine rescue as an additional capability on top of those we already get through the DESI initiative," said Croghan.

CHILEMAR supports the Diesel-Electric Submarine Initiative (DESI). DESI enhances the Navy's capability to operate with diesel-electric submarines by partnering with South American navies equipped with these vessels. This provides a degree of authenticity and realism to exercises, providing the Navy with opportunities to build experience both tracking and operating with them. The program strengthens partnerships and encourages cooperation between partner nations, furthering the capabilities of U.S. maritime strategy.

"Submarine rescue operations involve very challenging procedures, and they require consistent training to maintain proficiency," said Croghan. "Our ability to cooperate with our partner nations during such a technical evolution will ensure that, in the unlikely event of an actual submarine emergency, we will be operationally prepared."

URC has the only U.S. based deep ocean submarine rescue capability and is trained to respond to submarine emergencies around the world.

Russia Orders More Submarines, Corvettes
Staff, The Maritime Executive, September 8

The Russian Deputy Defence Minister Yury Borisov has signed 17 public contracts with a value over 130 billion rubles during the International military and technical forum Army-2016.

The contracts include orders for six diesel-electric Varshavyanka submarines and three small Buyan-M missile ships (corvettes). In addition, over 230 pieces of military hardware will be modernized with contracts for deliveries of munitions, repair parts, tools and other equipment as well as research and development projects.

The submarines will be built at St. Petersburg-based Admiralty Shipyard and construction is expected to start in 2018 with two delivered in 2019, 2020 and 2021.

The submarines were developed by the Rubin Central Design Bureau. They are designed for anti-submarine warfare, anti-surface-ship warfare and for general reconnaissance and patrol missions. They are considered to be to be one of the quietest diesel submarines in the world and reputed to be capable of detecting an enemy submarine at a range three to four times greater than it can be detected itself.

There are already four submarines of this type in Russia's Black Sea Fleet. The first, the Novorossiysk, was delivered to the Russian Navy in August 2014. The second submarine, the Rostov-on-Don, was delivered in December 2014, and in 2015, it launched Kalibr cruise missiles to destroy Islamic State targets from a position in the Mediterranean Sea.

A further two submarines are already under construction and expected to enter service this year.

The number of missile ships to be delivered under this contract was not specified. Buyan Class is a river-sea type corvette designed by Zelenodolsk Design Bureau.

The 62-meter (203-foot) vessels have a displacement of about 950 tons and are capable of speeds of up to 25 knots. They are equipped with a Kalibr missile system, a 100mm A-190 gun mount, Gibka launchers for Igla anti-aircraft missiles and an AK-630-2 Duet air defense gun system. They can operate at up to sea state six and can employ weapons at up to sea state four. At present, there are five such ships in service.

'A Step Forward in Submarine Radar Technology'
Eric Haun, MarineLink.com, September 7

Kelvin Hughes, a U.K. baesd designer and supplier of navigation and security surveillance systems, announced that it can now bring all the benefits of its SharpEye radar technology to submarines.

Traditionally, submarines only use radar for navigation in and out of port because a high power RF transmission can compromise its ability to remain undetected. However, with its low power output – up to 300W as opposed to the 25kW of legacy submarine radar systems – SharpEye can reduce the probability of detection by ESM systems.

Due to the solid state technology at the heart of SharpEye, it is now possible to locate the X-band transceiver downmast within the pressure hull, making use of the existing bulkhead infrastructure and the existing external antenna, rotational drive and waveguide connections. The downmast transceiver enclosure measures 743 x 487 x 330mm.

Moreover, the Doppler processing of the radar returns, means it can detect more targets, earlier and at a longer range. Delivering improvements in sub-clutter visibility of approximately 30dB, SharpEye can identify targets with a low Radar Cross Section (RCS), typically 0.5m2, even in adverse weather conditions. A series of electronic filters enables SharpEye to distinguish between targets of interest and sea and rain clutter.

With its patented pulse sequence, SharpEye enables multiple users to see the optimum picture simultaneously regardless of the radar range scale in use at each display.

Mark Bown, Kelvin Hughes' Group Marketing Manager, commented, "Kelvin Hughes has a long history of supplying naval radar and 27 of the world's navies are currently operating SharpEye systems. We're delighted that we have been able to take this major step forward in submarine radar technology, ensuring submarines can now operate with a truly multipurpose naval radar system, covering navigation, surface search and bi-directional links to combat management systems."

The Submarine: A New Kind of Warfare
Frank Winn, Americas 1st Freedom, September 7

Facing by far the most powerful navy of the day, it is no wonder that the tiny Continental Navy—barely a year old—had to rely on imagination and outsized courage in those early days. Two hundred forty years ago this week, it did both in launching the first attack by a submerged vessel. It was decidedly audacious; auspicious, not so much.

It is correct to observe that militaries had long used underwater measures against one another. Even the invention of the submarine, however loosely defined, preceded the deployment of the minuscule Turtle against the 64-gun flagship of British Vice Admiral Lord Richard Howe by several hundred years. Historical records refer to diving exploits during the siege of Syracuse (415 B.C.), and reconnaissance by no less than Alexander the Great during his siege of Tyre in 332 B.C.

But a recognizable conception of a maneuvering, surface-independent underwater warship would wait many centuries. Leonardo da Vinci expounded a rough version in notes he long kept secret in the late 1400s, and Englishman William Bourne actually advanced to a workable plan a century later. Dutch inventor Cornelius Drebbel built a successful prototype for James I of England in the 1620s, though his craft did not appear to achieve "neutral buoyancy," the hallmark of the true submarine that allows it to rise or descend as commanded or propelled.

The Turtle of 1776 was therefore primitive and modern at the same time. Its name derived from two vaguely hemispheric wooden halves covered with tar for waterproofing, and bound together by metal hoops. The brainchild of framer, patriot and Yale student David Bushnell, the proposed use went hand-in-hand with another invention of his—a workable underwater explosive.

The plan was for the one-man, 10-foot-long, 6-foot-tall, and 3-foot-wide Turtle to be towed as close to a target vessel as feasible, and then released. Using a hand-cranked and treadle-operated propeller and a hopefully advantageous tide, it would maneuver toward the target mostly submerged—only a small "conning tower" and snorkels would remain above water—and then dive for the actual attack. Once underneath the target, the scant 20- to 30-minute air supply meant that drilling into the enemy hull (via the hand-turned bore mounted through the Turtle's hull), the attachment of Bushnell's 150-pound black powder "mine," and the getaway had to proceed before carbon dioxide poisoning overtook the operator. Connecticut clockmakers Isaac Doolittle and Phineas Pratt had modified both a clock and flintlock mechanism at Bushnell's behest to give time enough to escape the blast.

In execution, the plan to sink Howe's HMS Eagle as she lay moored in New York Harbor did not go nearly so well. Bushnell's brother, Ezra, who had conducted most of Turtle's tests was taken ill, and was replaced by volunteer Ezra Lee. Undaunted by his relative inexperience with the completely new technology, Lee was towed into position, and bobbed for two hours, station-keeping until near dawn when the tide turned in his favor. He maneuvered under the Eagle as planned, but was twice thwarted in attaching the mine. (Explanations vary as to why, though David Bushnell speculated on the bad luck of hitting an iron plate associated with the rudder on the first attempt, and exhaustion and CO2 inhalation by the time of the second.)

Lee released the torpedo (he may have coined the enduring term) when a British boat rowed out from nearby Governor's Island after dawn to investigate the now-visible Turtle. British caution thwarted this alternative plan, however; while Lee reported a successful detonation of "tremendous violence" in the East River, there was no damage to any British vessel.

Bushnell's Turtle was destined to a short career, despite its relative—and at the time, unique—technology. Ezra Lee attempted another attack the following month on a Royal Navy frigate anchored off Manhattan, but this too was unsuccessful. Shortly thereafter, the Turtle's tender was sunk in the Hudson off of New Jersey's Ft. Lee. Though Bushnell reported salvaging the Turtle, she was never used in combat again, and disposition after October 1776 remains unknown.

Naval powers the world over were paying attention, however. While materials, propulsion and breathable air for the crew were stubborn problems, the advantages of undetected maneuver over seven-tenths of the globe's surface held undeniable appeal. Advances at first were slow, though American ingenuity fueled many of them: H.L. Hunley would finally inflict the first submarine sinking in 1864, when the Confederate privateer sank the USS Housatonic in Charleston Harbor, S.C.

World War I would see submarine activity burgeon on a huge and deadly scale. Diesel/electric British and German submarines would extensively harass each other's surface shipping throughout the war, but the sinking of the RMS Lusitania by German Unterseeboot U-20 in May, 1915, would later be seen as the beginning of the end of American neutrality in the conflict.

By the onset of World War II, all (eventual) major combatants would field large numbers of submarines. German submariners earned a ferocious and deadly reputation early on, sinking roughly one quarter of all U.S. and Canadian aid sent to allied England before German losses became unacceptable by the end of 1943. In what English Prime Minister Winston Churchill dubbed "The Battle of the Atlantic," 3,675 Allied merchantmen and warships went to the bottom of the Atlantic, along with 783 U-boats.

The advent of nuclear power was surely the biggest game-changer in the history of submarines, and one pioneered—again—by American innovation. Beginning in the 1950s, submerged endurance became essentially unlimited; without the need for combustion or breathable air ("nukes" did not need the first, and could perpetually manufacture the second), patrols were limited only by food stores. Fast, quiet and huge by even World War II standards, the roles of the submarine expanded markedly too, with submerged-launch conventional and nuclear weapons extending their reach well beyond the merely nautical antagonists of yesteryear.

Some observers have also suggested the end of the Cold War was made possible by submarine technology and the efforts of the Silent Service. The U.S. lead in stealth and precision allowed American submariners to form the third leg of the so-called "Nuclear Triad" (of land-based, air-dropped and sea-launched nuclear weapons). Matching this technology became impractical in the former Soviet Union by the late 1980s for a host of reasons, and contributed to the behemoth's dissolution.

That's a long convoluted walk—or swim—to be sure, from David Bushnell, Ezra Lee and the diminutive Turtle.

United States Navy Demonstrates Cross-Domain Communications, Command and Control via AeroVironment Blackwing Submarine-Launched UAV

Steven Gitlin, Business Wire, September 7

NEWPORT, R.I.--(BUSINESS WIRE)--Naval Undersea Warfare Center, Newport Division – AeroVironment, Inc. (NASDAQ: AVAV), a global leader in unmanned aircraft systems for both military and commercial applications, today announced the United States Navy has successfully demonstrated the use of its submarine-launched BlackwingTM UAV to link with a swarm of unmanned undersea vehicles and communicate with the submarine combat control system during the Annual Naval Technology Exercise (ANTX) on August 16.

Along with providing a new and unique intelligence, surveillance and reconnaissance (ISR) capability to submarine commanders, the Blackwing UAV can also provide high-speed data and communication relay for Command and Control (C2) between geographically separated vessels such as manned submarines, unmanned undersea vehicles (UUVs) and surface ships. Deployed UUVs collect large quantities of data while conducting diverse missions ranging from mine-hunting to wide-area oceanographic sensing. During the ANTX exercise, an AeroVironment developed, government-owned, secure digital datalink called DDLTM, integrated into all Blackwing UAVs, relayed real-time information from the surrogate manned submarine via the Blackwing UAV to and from multiple UUVs.

Blackwing builds on AeroVironment's extensive development and operational experience with its SwitchbladeTM Lethal Miniature Aerial Missile System (LMAMS) and its common DDL to provide the Navy with a deployable submarine launched unmanned aircraft vehicle optimized for distributed Anti-Access/Area Denial (A2/AD) environments.

"Our Naval Undersea Warfare Center partners seek solutions for quickly and seamlessly linking the air and undersea domains to enhance warfighter capability. We successfully demonstrated the innovative utility of AeroVironment's new Blackwing unmanned air vehicle," said Kirk Flittie, AeroVironment vice president and general manager of its Unmanned Aircraft Systems business segment. "Blackwing delivers significant value to the undersea community, and we look forward to working closely with our partners to expand this powerful new capability to enable underwater vehicles and cross-domain interoperability. In addition to our Navy partners, we also thank our industry partner Sparton for their continued support on Blackwing efforts."

Scorpene Submarine Leaks May Have Sunk India's First 100% FDI in Defense Proposal

Anuj Srivas, The Wire, September 7

A combination of technology concerns and stress over the Scorpene data leaks have put a French naval firm's FDI proposal in cold storage for now.

New Delhi: The Scorpene submarine leaks may have been the final nail in the coffin for India's first 100% foreign direct investment (FDI) proposal in the defense sector, according to people with direct knowledge of the matter.

The FDI proposal in question was made earlier this year by French naval firm DCNS – the company which is currently helping build and design India's six Scorpene-class submarines and was at the center of last month's military data leak scandal.

It's no secret that India's push for indigenous defense production and greater foreign investment in the defense sector has been moving along slowly. While the DCNS proposal is a relatively modest investment, its rejection represents the challenges that defense minister Manohar Parikkar has had to face in building India's defense manufacturing ecosystem.

In March, DCNS submitted a Rs 100 crore proposal for the setting up of a wholly-owned Indian subsidiary that would undertake research and development activities "in relation to air independent propulsion (AIP) systems for submarines".

"From the moment the proposal was submitted, there were a couple of issues. As with almost any multi-million dollar defense deal, things were stalled because communication was not clear and adequate paperwork was not received. This happened around the time that the norms around FDI in defense were eased," one defense ministry official, who declined to be identified, told The Wire.

In the months after the proposal was submitted, negotiations hit yet another roadblock: Namely, whether the AIP technology that DCNS was centering its FDI proposal and proposed Indian subsidiary around, qualified as "modern technology" required under India's FDI regulations.

"One of the key stumbling points was that the propulsion technology that their Indian subsidiary would research and develop was already being transferred by DCNS itself to the DRDO (Defense Research Development Organization) as part of the Scorpene submarine development happening in Mumbai. The company is already developing the proposed tech in India, so how could it be allowed," said the official quoted above.

According to industry sources, DCNS's FDI plan specifically banked on the Modi government ordering another three Scorpene submarines that could have been outfitted with the AIP technology; which would have given the ships greater underwater endurance. According to two defense experts The Wire spoke to, if the defense ministry ended up ordering more submarines, the FDI proposal stood a better chance of going through.

Data leak fiasco:

On August 24, The Australian published excerpts of what it claimed was a 20,000-page document data leak that detailed the technical specifications of DCNS's Scorpene-class submarines; including the ones being inducted into the Indian navy. This, according to sources, eventually proved to be the final nail in the coffin of the FDI proposal.

Two days after the data leaks, The Wire, quoting industry sources, reported that "it would be a wonder if DCNS' FDI proposal went through" at this stage; with defense ministry officials going into damage-control mode and wanting to play down the data leaks as quickly as possible. A few days after that, Reuters reported that the government had no intention of purchasing an additional three Scorpene submarines.

Industry observers pointed out that before the data leaks were made public, both the defense ministry and the DCNS were still cautiously hopeful of sorting out any differences over whether the AIP technology qualified as modern technology and whether its existing technological collaboration with DRDO didn't count as a conflict of interest. In fact, senior executives of DCNS were scheduled to visit New Delhi, in order to secure final approval for its FDI proposal, the week after The Australian eventually published its story.

After the leaks were made public, much of India's defense establishment was riled up, with many senior officials advocating for a quick withdrawal from anything to do with the Scorpene submarines. Over the last few days, a number of indicators point towards the FDI proposal being dead in the water.

"The FDI proposal has essentially been put into cold storage. It is a lose-lose situation for the government. There is almost nothing to be gained by approving the FDI proposal. Not only is the technology in question, it would look terrible for the government to approve a proposal by DCNS, which is in hot water over the Scorpene leaks. Even if the government's probe point towards the Scorpene leak not being a big deal, it isn't prudent to immediately do business with this company right away," an industry source told The Wire.

DCNS's FDI proposal largely hinged on the government ordering three extra submarines: its proposed subsidiary could have helped the DRDO outfit the ships with stronger underwater endurance technology. Without that purchase, defense experts say, the FDI proposal looks less appealing.

In that regard, the FDI proposal by DCNS isn't as state-of-the-art or valuable for India's defense manufacturing ecosystem as the much-hyped American combat aircraft manufacturing proposals by Boeing and Lockheed Martin.

"The FDI proposal by DCNS, while very tiny in the larger scheme of things, was the first 100% FDI proposal under the Modi government's new procurement policy. To have to reject it under these circumstances, even if it is a prudent decision, is a little bitter-sweet," said one senior defense analyst, who declined to be identified.

Nuclear Submarine Only Solution To N.K. SLBM Threats
Choi Kyong-ae, Yonhap News Agency, September 6

SEOUL – A submarine expert on Tuesday called for South Korea to build a nuclear-powered submarine, saying it is the only solution to counter the threats posed by North Korea's submarine-launched ballistic missiles (SLBMs).

"With the conventional diesel-electric submarines, it's impossible to track and strike nuclear-powered submarines that could carry SLBMs. We are running out of time to build our own nuclear submarines as the North moves to deploy its SLBM-armed submarine in a couple of years," Moon Keun-sik, an analyst at the Korea Defense and Security Forum, said in an interview with Yonhap News Agency.

A nuclear submarine, powered by a nuclear reactor, doesn't need to surface to be refueled. This greatly reduces its chance of being detected by the enemy. In contrast, diesel-electric submarines have to surface or use a snorkel to charge their batteries, making them more vulnerable to detection.

Calls for a nuclear submarine have gained urgency in South Korea in recent months as North Korea has demonstrated technological progress in SLBM development.

That SLBM, fired on Aug. 24 from off the northeastern port of Sinpo, flew some 500 kilometers toward Japan, far exceeding the range of the North's previous sub-launched missiles. North Korean leader Kim Jong-un hailed the test as "the greatest success" with experts saying that it could have flown at least twice as far if the missile was launched at a regular angle.

"Given the missile was fired at a high angle and used solid fuel, (which is more stable than liquid fuel), it is just a matter of time before North Korea starts to deploy an SLBM-mounted submarine. It will pose a formidable threat to the security of South Korea," said Moon who served as a submariner for 22 years out of his 32-year-long career in the Navy. He retired as a colonel from the military in 2012.

To counter the threat, the submarine expert called on the government to build a nuclear-powered submarine in the shortest possible time.

"All that is needed is the government's willingness to kick-start the nuclear submarine project. South Korea has the technology to develop a 4,000-ton nuclear-powered submarine," Moon claimed.

For South Korea, a 4,000-ton nuclear submarine, bigger than France's compact Rubis-class submarines but far smaller than the U.S.' Virginia-class attack boats, will be enough of a deterrent against the North's growing missile threats, he said.

"If Seoul makes it clear that it is building a nuclear-powered submarine for the sole purpose of self-defense, the international community will find no reasons to object."

In this photo provided by the North's official Korean Central News Agency (KCNA) on Aug. 25, 2016, an SLBM leaves the water and heads into the sky in North Korea. (For Use Only in the Republic of Korea. No Redistribution.) (Yonhap) In this photo provided by the

North's official Korean Central News Agency (KCNA) on Aug. 25, 2016, an SLBM leaves the water and heads into the sky in North Korea. (For Use Only in the Republic of Korea. No Redistribution.) (Yonhap)

In the past four decades, South Korea has purchased low-enriched uranium from global markets, such as France and Russia, to operate its nuclear reactors. It ratified the nuclear Non-Proliferation Treaty (NPT) in 1975 and has remained formally committed to it since then.

On top of the government's strong will, there should be understanding and cooperation from the United States to push forward the nuclear submarine project. That's because it takes eight to 10 years from now before Seoul could develop a nuclear submarine, the expert said.

"Seoul needs to further strengthen its alliance with the U.S. during the time to have the U.S. nuclear submarines deal with any provocative moves from Pyongyang," he said.

Meanwhile, he dismissed any possibility of South Korea going nuclear

It only requires low-enriched uranium with a lower than 20 percent concentration of uranium to power a submarine and the low-purity uranium cannot be used to make a nuclear weapon. To produce a nuclear arsenal, enriched uranium with a concentration of more than 95 percent is needed, Moon explained.

"To transform low-enriched uranium into weapons-grade uranium, there should be facilities for reprocessing and enrichment," he said. "But we don't have such facilities."

After a 7-year Search, a Missing German U-boat is Lost no Longer
Michael E. Ruane, The Washington Post, August 31

OCRACOKE, N.C. — The sonar "target" first appears as a green and yellow streak on Randy Holt's computer screen. Up ahead, nothing can yet be seen through the dark water 700 feet below the ocean surface.

Holt's submersible, Nomad, glides over the sandy bottom, fighting the current and searching. With each sonar sweep, the image grows more distinct on the screen. "Very good," Holt says. "We're real close to this thing."

Then he spots something outside and switches off the lights: "See the shadow?" A large black silhouette emerges from the gloom. "Yeah," Holt says. "This is our U-boat."

It's the German submarine U-576, resting on its side, right where it sank in 1942. Its wooden deck plates have rotted away after 74 years underwater. But its hull, conning tower and deck gun — nicknamed "Peterle," little Peter — are still there.

The encrusted hatches are all closed. And almost certainly entombed within are the skipper, Hans-Dieter Heinicke, and 44 German sailors, including one Herbert Sprissinger, who perished on his 20th birthday.

On Aug. 24, after a seven-year search, the National Oceanic and Atmospheric Administration (NOAA) got the first look at U-576 since the sub went down in a wild battle off North Carolina's Outer Banks on July 15, 1942.

NOAA's Office of Ocean Exploration and Research, along with the University of North Carolina's Coastal Studies Institute and the federal Bureau of Ocean Energy Management, had been looking for the sub since 2009 in the area where the battle had taken place.

With the help of sonar and other devices, it was found in August 2014. One of the merchant ships it sank in the battle had been found nearby the year before.

But last month was the first time anyone had actually seen the sub since it was shelled and depth-charged to the bottom that Wednesday in 1942, eight months after the United States entered World War II.

In partnership with a marine research outfit called Project Baseline, the University of North Carolina Coastal Studies Institute and SRI International, scientists made a series of dives from the 146-foot vessel Baseline Explorer.

Operating from within the thick plastic bubble of two-person submersibles, they studied the wrecks of the U-boat and its victim, the Nicaraguan freighter Bluefields, which had a huge torpedo hole in its side. (The crew of the freighter survived.)

On one dive Thursday, a reporter went along.

The Unterseeboot 576 rests about 35 miles east of here, out in the Gulf Stream, where German subs savaged merchant shipping during the war, sinking scores of vessels and killing hundreds of people.

It's in 721 feet of water, well below the "crush depth," where the enormous pressure would collapse its inner hull, NOAA experts said.

It's an eerie, lonely place. The seafloor is barren. And the few fish around the wreck have a sickly gray pallor.

Inside the 2¾ -inch-thick sphere of the submersible, the only sounds were the whirring of the carbon dioxide scrubber, the occasional hiss of air, and Holt's voice as he radioed depth and bearing to the surface.

"It's sort of unreal," said NOAA maritime archaeologist Joe Hoyt, the chief investigator on the project, who was among the first to glimpse the boat on Aug. 24.

"I knew the story, [but] the moment that we get in there and it comes out of the gloom at you .?.?. it was humbling," he said.

At that great depth, the boat remains substantially intact. "It's all there, just as it went down in 1942," he said.

"One of the things we're looking for is what happened to the crew," he said. "Did they try to get out the escape hatches? Did the ship flood catastrophically? Were they on the seabed for some period of time, disabled with air still in the sub?"

"All the hatches we were able to see .?.?. were dogged down, closed," he said. "So, you see those hatches closed and the moment you kind of see that .?.?. you're immediately aware that it's a tomb."

"There's 45 guys inside of that thing," he said. "And no matter the exact circumstances of their demise, it had to just be horrifying."

'A dangerous situation'

On the afternoon of July 15, 1942, Kapitänleutnant Heinicke had to make a crucial decision.

He was in a crippled, unlucky boat that had been damaged and nearly sunk by an aircraft attack a day or two before.

The attack had affected a ballast tank and hampered the boat's ability to dive and surface. Heinicke had signaled his superiors that the boat could not be repaired.

"Under normal circumstances, that's the end of the operation," said retired National Archives expert and U-boat historian Timothy Mulligan. "If you can't dive, or if you dive and you don't know you're going to come back to the surface .?.?. you're in a dangerous situation."

Heinicke was 29, the son of a German cavalry officer who had been killed on the Eastern Front in World War I. He was an experienced, observant commander who had been in the Navy for almost a decade.

He was on his fifth patrol with a year-old boat but had bagged only three ships and was plagued with engine trouble.

One of his victims, the armed British freighter Empire Spring, had gone down off Nova Scotia with all 55 hands aboard, according to the website Uboat.net.

Another, the Norwegian vessel Taborfjell, sank off Cape Cod so fast that only three of its 20-man crew survived.

But in the case of the American freighter Pipestone County, torpedoed off Cape Henry, Va., in April 1942, Heinicke surfaced near the lifeboats. He gave the survivors provisions and apologized for sinking the ship. There were no fatalities.

U-576 had a young crew. No one was older than 29, according to a crew list provided by NOAA. Seaman Egon Gablick was 18. Heinz Beckers, Kurt Bauer, Willi Steuer and Erwin Schlussler were 19.

The oldest on board was another kapitänleutnant, August Bohnenkamp, who would have turned 30 in November.

On the 29th day of the patrol, the damaged sub was headed east, perhaps toward home. Heinicke reported that he had made 16 miles, running on the surface in moderate seas.

"That's the last communication," Mulligan said.

At some point after that, the boat encountered an irresistible target.

It was an Allied convoy, designated KS-520 — 19 merchant ships and five escorts, bound from Hampton Roads, Va., to Key West, Fla.

Heinicke had spotted another convoy a few days earlier, but had lost contact with it.

He had also found one back in the spring, a group of seven troop transports. It was a potential feast for a U-boat. But he had been out of torpedoes and could do nothing.

Now he had to decide: Should he take the hobbled U-576 into battle or continue toward his home base in France?

"What does he do?" Mulligan said in a recent interview. "He tries to go after the convoy."

Heinicke got into position and fired four torpedoes. Two hit and damaged the Chilore, an American freighter, according to NOAA. One hit and damaged the big Panamanian tanker J.A. Mowinckel, and the fourth sank the Bluefields.

But after firing the torpedoes, the U-boat inexplicably bobbed to the surface in the middle of the convoy. Patrolling airplanes and gunners on one of the convoy ships pounced.

The Navy seaplanes dropped depth charges, one of which slid off the sub's hull before exploding, according to National Archives records Mulligan examined.

Debris flew up. The U-boat headed down, and black oil spread over the water.

Three days later, German headquarters asked U-576 to report. There was no reply. Headquarters tried to reach the boat again on July 19 and again on July 21.

Nothing was heard.

'Torpedo Junction'

Few people realize that desperate fighting raged just off the East Coast during World War II as U-boats torpedoed Allied shipping and U.S. forces fought back, NOAA said.

German subs sank 600 ships off the coast, often using the glow from U.S. towns to backlight their targets at night, according to historians.

The heavily traveled area off Cape Hatteras, N.C., was such a grim killing ground that it became known as "Torpedo Junction."

It is what NOAA calls an oceanic battlefield. And the federal agency said it is working to determine exactly what happened there, just as historians would on a land battlefield.

NOAA is also considering expansion of its nearby Monitor National Marine Sanctuary, which protects the wreck of the famous Civil War vessel, to include the U-boat, the Bluefields and other historic shipwrecks in the area.

An estimated 90 vessels — including U-576 and three other subs — were sunk there between January and July 1942, NOAA said. And 1,600 men — 1,100 of them merchant seamen — were lost.

This week, the U-boat project had to be suspended because of bad weather, said David W. Alberg, supervisor of the Monitor sanctuary. He said the scientists hope to be back at the site this weekend.

The submarine is still technically the property of the German government, and the United States has agreed to care for it. NOAA's aim is to conduct an underwater laser scan of both wrecks and produce exact 3-D models for posterity.

Last Thursday, as the submersible drifted through the dark water around the boat, Holt noted that the sub's forward and aft dive planes were set as if the stricken vessel was struggling to surface.

It was one of the few outward clues to the sub's end. There was also a patch of the outer hull that was peeled away near the front of the boat. Holt said that might be where a depth charge exploded, fatally weakening the structure.

It may have been that the crew sealed off flooded compartments but the boat was too heavy to rise, he said. "Maybe they just waited it out till the end," he said.

An hour and a half after submerging, Nomad was cleared to ascend, and it slowly rose toward the surface and the sunlight, leaving U-576 behind in the dim underwater battlefield where it met its end.

Pyongyang's Submarine-launched Missile Triggers Diplomatic Shock Waves
Ken Moriyasu, Nikkei Asian Review, September 1

TOKYO - The deepening relationship between China and South Korea over the past several years was described as one of the most consequential changes in East Asian politics in decades. Chinese President Xi Jinping has met six times with his South Korean counterpart, Park Geun-hye, a Mandarin speaker. He has yet to meet with North Korean leader Kim Jong Un.

And yet, the honeymoon has been cut short. Much to China's surprise, the Park administration is now rushing to strengthen ties with the U.S. and Japan.

North Korea's successful test of a submarine-launched ballistic missile, or SLBM, on Aug. 24 has hastened Seoul's change of heart. All signs suggest Park has concluded that China's influence over Pyongyang is limited -- and certainly not strong enough to form the basis of the South's national security strategy.

The about-face has far-reaching implications, including the revival of a currency swap agreement between Japan and South Korea. The SLBM is nothing short of a game changer.

ALL IN ON MISSILES: Under the direct orders of Kim Jong Un, restaurants in Pyongyang recently stopped serving foreign beers. Instead, customers are served Taedonggang Beer on tap.

This has not caused riots -- and not simply because the regime has zero tolerance for dissent. Taedonggang is based on a British beer called Ushers of Trowbridge, which dates back 190 years. In 2000, North Korea purchased the equipment from the Wiltshire brewery in Southwest England and rebuilt the production line in Pyongyang. "Kim Jong-ale," as foreigners call it, "is not bad," according to one diplomat in Pyongyang.

The ban on foreign beer is aimed at preventing precious foreign currency from leaving North Korea's borders. Kim wants all resources, even money to stock up on beverages, allocated to his missile program. According to South Korea's Chosun Ilbo, North Korea has launched 33 ballistic missiles during the four years of Kim's rule -- about twice as many as his father, Kim Jong Il, oversaw in 18 years. The cost of those 33 launches adds up to 120 billion won ($107 million), enough to feed the entire population for two months.

SLBMs are not just any missiles. For the U.S. military, they are one of three options for delivering nuclear weapons, alongside strategic bombers and intercontinental ballistic missiles, or ICBMs. SLBMs trump the other two in terms of stealth.

"At present, there is no missile defense system that can protect against the SLBM," said Tetsuo Kotani, chief researcher at the Japan Institute of International Affairs, a think tank. "Unlike land-based ballistic missiles, where you can estimate the rough location and detect preparations for a launch, a submarine-launched missile can be fired from anywhere at sea, and it's too quick to capture the trajectory."

SLBMs pose an entirely new level of threat, Chosun Ilbo pointed out in an editorial the day after North Korea's "North Star" SLBM flew 500km before dropping into Japan's air defense identification zone. "North Korean submarines could sneak into South Korean waters and fire a missile that would render existing defenses useless," it said.

Pakistan to Acquire Eight Attack Submarines from China
DNA India, August 31

In a nearly $5 billion agreement, Pakistan will acquire at least 8 submarines from China by 2028

Pakistan will acquire at least eight modified diesel-electric attack submarines from China by 2028 in a nearly $ 5 billion agreement, said to be the biggest arms export deal for the Communist giant. The head of Pakistan's next-generation submarine program and senior naval officials briefed the members of the National Assembly's Standing Committee on Defense on August 26 regarding the deal worth approximately USD 4 to 5 billion, according to state-run media.

The statement made by naval officials to the committee members showed that the program of next generation submarines was moving ahead, Radio Pakistan reported.

In April, a senior Pakistan Navy official had announced that Karachi Shipyard and Engineering Works (KSEW) had secured a contract to produce four of the eight submarines, which will be fitted with air-independent propulsion (AIP) systems.

Often described as Pakistan's "all weather friend", China is expected to extend a long term loan to Pakistan at a low interest rate to cover the cost of the project, the report said. It has not officially been confirmed what type of submarines will be supplied to the Pakistan Navy by the China Shipbuilding Trading Company (CSTC) and there has been considerable speculation on the subject in the past.

Analysts speculate that the new submarines will be lighter export versions of the People Liberation Army Navy's (PLAN) Type 039 and Type 041 Yuan-class conventional attack submarines. The first four submarines are expected to be delivered by the end of 2023 while the remaining four will be assembled in Karachi by 2028. These are expected to form the sea-based arm of Pakistan's burgeoning nuclear second-strike triad.

China is Pakistan's biggest supplier of military hardware which included battle tanks, naval ships as well as fighter jets. The two jointly manufacture J-17 Thunder warplane. Pakistan's submarine fleet comprises five Agostas two Agosta70 and three Agosta90B and three MG110 miniature submarines (SSI).

One of Agosta90B -- Hamza (Khalid Class) -- was indigenously constructed and commissioned in 2008 and another was partially completed here. The third was built in France.

Skills Crisis Threatens to Sink Subs Program
Noel Towell, The Canberra Times, September 1

Australia's $50 billion future submarine project is facing more trouble with the Defence Department down to just just one in-house naval architect working on developing the new subs as well as the task of keeping the existing fleet afloat.

The department's senior submarine naval architect retired at the end of last month, taking 30 years of specialist experience with him, and a colleague has transferred to another area of the department, leaving just one public servant working in the safety-critical role.

The specialist's union says the skill shortage has raised the risk to lives at sea to "an unacceptable level".

Naval architects perform a safety-crucial role, ensuring the stability and structural soundness of existing and proposed naval vessels from submarines to frigates and patrol boats.

The revelation comes after a difficult week for the future subs program, with the government forced to warn the French manufacturer of Australia's new generation of submarines over a cyber leak of sensitive information on subs being built for the Indian navy.

The Department of Defence has not responded to a series of questions from Fairfax this week.

But the department is aware of the problem: the Royal Institution of Naval Architects warned in a 2015 submission that the department's naval architecture staffing level was in "functional disintegration" posing "significant risks" to Australia's defence capabilities.

Of the three submarine naval architects currently on staff at Defence, one retired on August 31 from his role on the Collins sustainment program and another has walked away from his job on the SEA1000, the $50 billion future subs project, moving to the Defence Science and Technology Group.

The move leaves just one in-house naval architect working in the Navy Technical Bureau.

In 1995 when Defence was both maintaining existing subs and the first Collins Class boat was hitting the water, there were around eight submarine naval architects.

The number had dwindled to five by 2005 when the specialists were engaged in maintaining the Collins boats but by 2015 there were just three naval architects shouldering responsibility for both the Collins and the Future Submarine program.

Dave Smith, of technical union Professionals Australia, was scathing of Defence's failure of succession planning for its specialist workforce.

"Navy civilian engineering has been a problem for a long time," Mr Smith said.

"The risk to lives, capability and cost is at an unacceptable level when you divest yourself of your internal expertise.

"The loss of the Kanimbla and Manoora supply ships at a cost of $500 million was connected to the running down of the Navy civilian engineering workforce and the inability to ensure contracted maintenance was being appropriately performed.

"This led to the Rizzo Review and a lot of rhetoric about rebuilding engineering capability.

"This rebuild has been stopped in its tracks by a mindless approach to reducing the APS workforce, with technical mastery residing in the levels most under attack, and a push to outsource and contract out as a first resort approach to staffing."

The union official said he and his colleagues were seeing a similar picture across the Defence establishment.

"There are similar stories right across Defence: a devaluing of technical expertise and an over-reliance on contractors despite the cost and consequence for the Government and ultimately the community," he said.

"This is not only gross mismanagement of technical expertise but it opens up unacceptable levels of risk in terms of safety and effectiveness of capability let alone the eye-watering financial and human costs that are associated with potential materiel failures.

"(Union) members aren't talking about whether accidents will occur but when they occur."