

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



The Silent Sentinel *March 2018*



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.



Bissonette Strikes Again!
USS Hartford SSN 768

*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 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 *February 13th*. 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

Harry Humpreville, Joel Eikam and Frank Workman

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 - 6 February 2018
At VFW Hall, 4370 Twain Avenue, San Diego CA 92120**

1905- Base Commander Warren Branges called the meeting to order.

Conducted Opening Exercises - Pledge of Allegiance lead by Chief of the Boat Bob Bissonnette

Chief of the Boat Bob Bissonnette lead the prayer.

Chief of the Boat Bob Bissonnette conducted Tolling of the Boats for boats lost in the month of December.

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

Base Secretary Jack Kane announced 20 members present.

Base Treasurer Joe Peluso gave his report. A copy of the Treasurers Report will be filed with these minutes.

Minutes of the January meeting were not published in the Sentinel. Chief of the Boat will provide a copy to be published at a later date.

Base Commander Warren Branges called for Committee Reports

Binnacle List - Base Commander reported Harry Humpreville, Joel Eikam and Frank Workman are on Binnacle. Base Commander also noted the passing of Ron Martini's wife, Shirley. Ron is the Past Western Region Commander. Also passing during the month was Roy Bannach's wife, Patsy.

Parade Committee - No Report - Chairman Joel Eikam on Binnacle

Membership Committee - Chairman Ray Febrache. We have currently have 245 base members. National Membership in now below 12,000.

Scholarship Committee - Committee Chairman Paul Hitchcock noted the Deadline for Scholarship Applications is 15 April. No applications have been received to date.

Storekeeper - Paul Hitchcock is now the Storkeeper. We have set up an "away-box" of things to be sold when we setup the float as a static display.

Breakfast Committee - Chair Base Commander Warren Branges. The next Breakfast will be 29 April 2018.

52 Boat Memorial - Chair Base Commander Warren Branges- The next "ALL FLAGS DAY" - will be 11 April 2018. We will put up flags at 0700. SUBRON Eleven has been asked to join us for putting up and taking down the flags. The Memorial Committee is looking into ways to involve the Point Loma Optimist Club in Memorial functions. The Committee is also researching how to include the Memorial in National Wreath Day.

Float Committee - Chair David Kauppinen - No Report.

Eagle Scout Program - Co Chairs Nihil Smith and Glenn Gerbrand. Nihil Smith reported two Eagle Scout Presentation will be made in the coming months. Troop 959 did an overnight campout at Naval Station Point Loma and toured USS Scranton on 19 and 20 January 2018. It was a great success.

1931 - Base Commander called for a break. 50/50 Raffle held. \$47 was raised for the General Fund. The Raffle winner donated \$47 to the Base Scholarship Fund.

1945 - Unfinished Business

Baja Fishing Trip Fund Raiser - We have sold 196 tickets to date. The drawing will held at the March Base Meeting.

2018 Membership Drive of Active Duty Submariners. Base Commander Warren Branges will meet again COMSUBRON 11 Command Master Chief. "Rolling out" details will be forthcoming.

Budget for 2018 will be presented at the March Meeting.

Member donations to the Hurricane Harvey/Irma Relief Fund stands at \$500. A motion was made, discussion held and passed overwhelmingly to have the Base donate \$100 to the Fund. All monies raised and \$100 will be sent to National in March 2018.

NAVY MUSEUM in ALPINE. Base Secretary Jack Kane will contact Terry Ulmer again about touring his property in Puetz Valley. We will ask Terry if having a half-day outing/tour would be feasible on 19 May 2018.

Parade and Static Display Schedule. The Base Secretary Jack Kane handed out a list of Parades and Static Displays for 2018. Please look at the list and pick your top four or five. We will need to cut the number of commitments for 2018 due to personnel and insurance liability concerns. The Lists were collected and the results will be presented at the next meeting.

Obtaining Glassware with the Base Logo for the Base Store is proceeding. Base Commander is looking for a vendor. Tentative Price will be \$8.00 each for both Pint Glasses and Wine Glasses.

National Website - The new National Website should be up and running very soon.

2011 - New Business

The Submarine Birthday Ball has been rescheduled for 12 May 2018 vice 21 April 2018. The Ball will be held at the Sheraton Hotel in San Diego. A motion was made to have San Diego Base Sponsor two WWII Submarine Sailors (+1) at the Birthday Ball. A discussion was held and the motion was passed. Approximate cost to the base will be \$600.

FOOD HANDLER TRAINING will be held at VFW on Twain Avenue at 1100 on 11 March 2018.

A motion was made to have San Diego Base sponsor Associate Member Phillip Richeson going forward. The motion unanimously.

2020 - Good of the Order

2018 NATIONAL CONVENTION will be the Caribbean Cruise from Fort Lauderdale October 27 - November 3, 2018. Information and registration forms at the National Website (<http://ussviconvention.org/2018/>). 273 members are signed up. The following boats will hold reunions on the cruise: SS-241 Chivo, SS-484 Odax, SSN-585 Skipjack, SSBN-619 Andrew Jackson and SSN-687 Richard B. Russell.

WESTERN REGION ROUNDUP will be held at SAM' TOWN Hotel and Casino in Las Vegas, April 23-27 2018.

OLD TIMERS LUNCHEON/TOLLING OF THE BOATS will be held at Roncador Memorial on Naval Base Point Loma - Friday 11 May at 1100.

THE SUBMARINE BIRTHDAY BALL is scheduled for Saturday, 12 May 2018.

MEMORIAL DAY/TOLLING OF THE BELLS Ceremony will be held at Roncador Memorial on Naval Base Point Loma - Monday, 28 May 2018 at 1000.

ANNUAL SUBMARINE VET PICNIC - Saturday 14 July 2018 - All Day. Submarine Tours as operational schedules allow.

EL CENTRO AIRSHOW - 10 March 2018 - We will setup the Float as a static display.

SAN DIEGO BASE CHRISTMAS PARTY - 8 December 2018 - Saturday

OUT YEAR National Conventions - will be in Austin for 2019 - in the Western Region for 2020 and in Orlando for 2021

MEMORIALS for Roy Bannach's wife Patsy will be held on 11 and 24 Feb in Clairemont. Interment will be at Miramar National Cemetery on 27 February.

Copies of NSL Quarterly Review from past years are available on the back table courtesy of Ray Febrache

The Meeting was adjourned at 2042.

/s/ Jack E. Kane
Jack Kane, Secretary

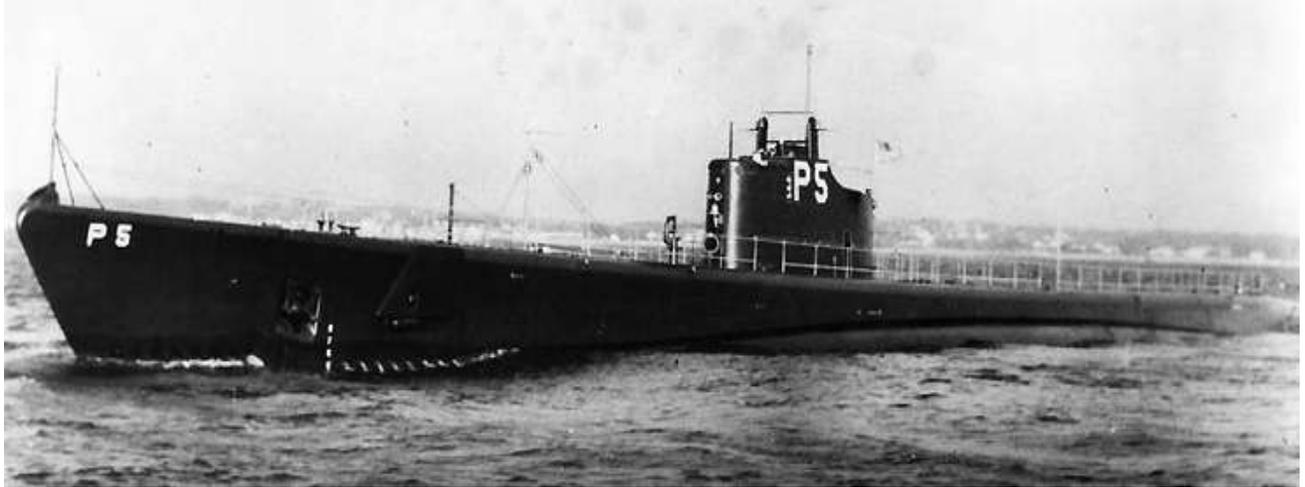
Sailing List for 6 February 2018

Members

Bob Farrell	Bob Bissonnette	Jim Harer
Jack Kane	Matt Baumann	Chris Stafford
Nihil D. Smith	Warren Branges	Manny Burciaga
Joe Peluso	Peter Lary	Ed Farley
Mert Weltzein	Dennis Mortensen	Paul Hitchcock
Chris Sultana	Rus Stoddard	Don Mathiowetz
Ray Febrache	Phillip Richeson	

USS Perch (SS-176) - Perpetuating the Memory

by David Kauppinen



The USS Perch (P-5) (SS-176) was a P Class submarine commissioned November 19, 1936 at Electric Boat Company, Groton, CT, with Lieutenant Commander George C. Crawford in command. The USS Perch was part of the Asiatic Fleet in 1940 and 1941 with Lieutenant Commander David A. Hurt, Sr. in command. Since war was inevitable, the Perch rendezvoused with two transport ships off Shanghai and escorted the Fourth Marine Regiment from China to Subic Bay in the Philippines arriving on December 1, 1941. During the Pearl Harbor attack December 7 she was in Cavite Navy Yard undergoing a two-week overhaul. During the attack on Cavite December 10, the Perch was able to leave the harbor without damage.

First War Patrol: After clearing the Corregidor minefields, the Perch went looking for targets along the coast of Luzon, Formosa (Taiwan), and finally Hong Kong where she fired four torpedoes at a large merchant ship on December 25. Three torpedoes passed under the target and the fourth circled back and exploded near the conning tower as she was diving, luckily not causing significant damage. Several days later the Perch fired at an 8,000 ton merchant ship, but was unable to observe the sinking, because she was forced down by escort depth charges. On December 28 while the tall periscope was being raised for maintenance, the upper limit switch failed to stop movement. This caused the cables to break, and the periscope fell from full height. In addition, two main engines were out of commission and could not be repaired at sea. Consequently, the Perch was ordered to Darwin, Australia for two weeks of repairs.

Second War Patrol: Commenced on February 3, the assigned area was to the south and east of Celebes (Indonesia). After a week of close contact with the enemy and gathering valuable intelligence, she made a night attack against a large merchant ship. Return fire blew away the bridge deck, punctured the antenna trunk, and put the radio temporarily out of commission. After making repairs in the dark, she headed west to her final patrol area in the Java Sea. On March 1, 1942 she surfaced to attack an enemy convoy that was landing troops on Java. She was spotted by a convoy of 2 cruisers and 3 destroyers that attacked with depth charges and drove her into the bottom at 147 feet. Continued depth charging caused extensive flooding and knocked two of the motors out of commission. She made repairs, surfaced again at 2 AM, but was forced down once more by repeated depth charges from the destroyers. The subsequent loss of oil and air from the damaged ballast tanks convinced the enemy that she had been sunk.

At this point all lights were out, there were multiple shorts and grounds in electrical gear, the pressure hull was distorted in many locations, the hold down bolts on engines and motors were broken, three torpedoes had run inside the tubes, torpedo tube doors were jammed, periscopes were inoperative, and sound gear was inoperative. However, after making repairs for a full day, she used the last of her air and surfaced on the night of March 2. The decks were awash and only one engine was in commission. She proceeded at 5 knots and commenced charging batteries with the auxiliary diesel generator. On the morning of March 3, she did a test dive with almost fatal results; water poured in through the damaged Conning Tower Hatch, Engine room Hatch, and several other locations. Skillful handling and luck allowed her to resurface. Perch was again discovered by the destroyers that commenced firing on her. She attempted to return fire with the 3-inch deck gun, but it would not train. Since the submarine could no longer attack or dive, the Commanding Officer

ordered open all possible hull penetrations and all hands on deck with life jackets. After the sinking and being in the water for 45 minutes, the entire crew of 54 men and 5 officers were captured by the destroyer Ushio.

During their incarceration in POW camps, six men died of malnutrition. After the end of hostilities, the 53 surviving crewmembers were repatriated to the United States in September 1945. Ironically, 2 months after his release, and after surviving 3 ½ years as a prisoner of war, Captain David A. Hurt, Sr. died in a hunting accident on November 23, 1945.

Flashback: Robert Lents, was a 20-year-old torpedoman when the USS Perch sank. In 2005, he recalled abandoning the submarine, "I left \$35 in my locker. The only thing I grabbed when I left the ship was my toothbrush and the Japanese took that away."



On November 23, 2006, the USS Perch was discovered at a depth of 190 feet by a dive team from the MV Empress. The Empress is an exploration ship that has discovered more than 600 shipwrecks in the waters of Indonesia, Malaysia, Singapore, and Australia.

Note: Two years after the loss of SS-176, the Balao Class USS Perch (SS-313) was commissioned on January 7, 1944. The SS-313 completed seven war patrols before the war ended in August 1945. She was decommissioned May 27, 1967 after a storied history.

Current News

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

Navy Kicks Off ICEX 2018

SUBPAC Public Affairs, DVIDS Hub, March 7

ARCTIC CIRCLE – Commander, Submarine Forces (COMSUBFOR) officially kicked-off Ice Exercise (ICEX) 2018 in the Arctic Ocean with the construction of temporary Ice Camp Skate and the arrival of two U.S. Navy fast-attack submarines and one U.K. Royal Navy submarine, Mar. 7.

ICEX 2018 is a five-week biennial exercise that allows the Navy to assess its operational readiness in the Arctic, increase experience in the region, advance understanding of the Arctic environment, and continue to develop relationships with other services, allies and partner organizations.

The Seawolf-class fast attack submarine USS Connecticut (SSN 22) from Bangor, Wash., the Los Angeles-class fast attack submarine USS Hartford (SSN 768) from Groton, Conn., and the Royal Navy Trafalgar-class submarine HMS Trenchant (S91) will conduct multiple arctic transits, a North Pole surfacing, scientific data collection and other training evolutions during their time in the region.

“With every ICEX we are able to build upon our existing experience and continue to learn the best way to operate in this unique and harsh environment,” said Rear Adm. James Pitts, commander, Undersea Warfare Development Center (UWDC). “We are constantly testing new tactics, techniques, and procedures (TTP) under the ice, and this exercise allows us to do so on a larger scale and alongside our U.K., joint, and academic partners.”

The Navy’s Arctic Submarine Laboratory (ASL), based in San Diego, serves as the lead organization for coordinating, planning and executing the exercise involving three nations services, three submarines and over 100 participants over the five weeks of operations. Ice Camp Skate is a temporary ice camp that was established on a sheet of ice in the Arctic Ocean, known as an ice floe. Skate will serve as a temporary command center for conducting submarine operations, including under-ice navigation

and torpedo exercises. The camp consists of shelters, a command center, and infrastructure to safely house and support more than 50 personnel at any one time.

“Our Arctic Submarine Laboratory team has been working for over a year to ensure our Submarine Force is able to conduct dynamic torpedo and under-ice operations in this unique environment,” says Larry Estrada, Director of ASL. “This year’s camp is prepared to support the force with communication and weapons recovery.”

The camp gets its namesake from USS Skate (SSN 578), the first submarine to surface through open-water surrounded by ice in 1958 and the first submarine to surface through the arctic ice at the North Pole in March 1959. Since the success of Skate’s surfacing, arctic operations have been a crucial part of the missions conducted by nuclear submarines.

For more than 70 years, submarines have conducted under-ice operations in the Arctic regions in support of inter-fleet transit, training, cooperative allied engagements and routine operations.

The U.S. Submarine Force has completed more than 27 Arctic exercises; the last being conducted in 2016.

Courtney Urges Navy to Rev Up Sub Building
Peter Urban, CT News Junkie, March 7

U.S. Rep. Joe Courtney urged the Navy on Tuesday to find ways beyond what is already in its budgeted plans to speed construction of the U.S. submarine fleet so that it can achieve the 66-boat level called for in its recently released long-term Force Structure Assessment.

“While the budget reflects a sustained two-a-year construction rate for Virginia class submarines, at this rate the force would not achieve the 66-boat level that was called for in the force structure assessment until 2048 — 30 years from now,” Courtney said. “So we’ve got to do better and move faster.”

Courtney, the ranking Democrat on the House Armed Services Seapower and Projection Forces Subcommittee, made the remark during the panel’s hearing Tuesday on the Navy’s Fiscal 2019 budget request. He has long advocated for a three-a-year submarine build, which would directly benefit Electric Boat in his district.

Courtney noted that Congress “demonstrated its strong support for expanding the attack submarine production line” by authorizing the Navy to go beyond building two submarines a year within the next five-year block of contracting.

“I urge the Navy to take advantage of this opportunity, and others like it that provide a great opportunity in the years ahead to add to the plan presented to us here today.

Assistant Secretary of the Navy James Geurts, who appeared before the subcommittee, said he views the budget proposal (which now calls for 10 submarines over five years) as “a starting point” that could be increased in the future.

“As we get more efficient building ships it should create more opportunities as we go forward. We look at it as a starting point. It will continue to move and adapt as we try and drive out cost on the back end of things,” he said.

In his written testimony, Geurts offered more details on the Fiscal 2019 budget for the submarine fleet:

The long-term strategy for our attack submarines and future payload submarine is the Tactical Submarine Evolution Plan, or TESP, which features the Virginia Class submarine. The Virginia Class program is continuing to deliver submarines within budget and with increased capability in each block. The Navy will be building on past success by awarding a five-year procurement contract for 10 ships in Fiscal 2019. This represents an increase from the Fiscal 2018 budget request of one submarine in Fiscal 2021.

The Columbia Class program, he said, is on track to start construction in October 2020 and deliver to pace the retirement of our current ballistic missile submarines, deploying for its first patrol in Fiscal 2031.

In September 2017, the Navy awarded General Dynamics Electric Boat a \$5.1 billion contract for the design completion, technology development, and prototype manufacturing for the Columbia Class program. The contract leverages the authorities contained within the National Sea-Based Deterrence Fund and incentivizes construction readiness, affordability and supplier base capability and capacity.

Navy Researches Ways To Build Stealth Submarines
Staff, The Times of India, March 6

PUNE - A group of 30 officers from Indian Navy will engage in an elaborate research at the Defence Institute of Advanced Technology (DIAT) here with a view to reduce vulnerability of military submarines and ships to detection by the enemy from noise and vibrations generated by propulsions that run them.

Commodore A K Sinha (ret), DIAT registrar, who also specialises in submarines, told TOI on Tuesday, “The naval headquarters recently communicated to us the need for a collaborative research project on this aspect. As of now, 30 naval officers are pursuing advanced postgraduate studies at DIAT and these officers, along with the institute’s professors, will work on the project.”

Sinha said, “The project, to be directly monitored by naval headquarters, is at a primary stage and we are working on various aspects related to it. Our laboratories will play a key role as they have modern equipment essential for carrying out such research. The practical aspect of the project will be carried out by the navy on its ships and submarines.”

Element of stealth is critical to military submarines which are designed to move around undetected under the sea and surface only in situations where they need to establish radio contact or perform data communication with their respective headquarters.

A senior navy officer, who did not wish to be named, told TOI over phone, “Every ship and submarine is equipped with different types of propulsion system and each of these systems generate a particular type of noise or vibration underwater. Using sound

navigation and ranging, better known as sonars, the enemy can identify the type of ship or submarine, distance and its speed. Reducing or tweaking propulsion sound of ship and submarine will give a big operational advantage.”

He said, “Modern generation stealth submarines are difficult to track. The submarines of Class A212 of German Federal Navy or Saab A26 of Swedish Navy have been designed in such a way that they hardly make any noise, emit almost no heat and minutely reflect radar or sonar signals. To develop such systems, researchers need to carry out studies so that we can develop such systems indigenously.”

Another senior navy officer said, “Propulsions generate maximum noise and vibrations under water. If you equip ship or submarine with silent propulsion, you will have to compromise on speed and longevity of the vehicle. Therefore, having a new propulsion system which will generate less noise and vibration and at the same time have no effect on other functioning of ships and submarines is critical.”

Navy to Send More Unmanned Systems to Sea
Jon Harper, National Defense Magazine, March 5

The Navy is moving ahead with unmanned surface and undersea vehicle development, and pursuing enabling technologies that will make the platforms operationally effective.

A wide range of USVs and UUVs are in the works, littoral combat ship program executive officer Rear Adm. John Neagley said during a presentation at the Association for Unmanned Vehicle Systems International conference in National Harbor, Maryland.

“Those capabilities will be delivered over the next couple years and start to get into our procurements in ‘18 and ‘19 and really start hitting the fleet,” he said.

Neagley’s portfolio includes the unmanned maritime systems program office, PMS 406.

“LCS was built from the ground up to really leverage and take advantage of unmanned systems,” he said. “It’s a modular ship ... [with] a lot of reconfigurable space.” It has a built-in capability for launching and recovering UUVs and USVs, he noted.

Unmanned vessels can range in size from small man-portable devices to extra-large platforms that are more than 50 meters in length. They allow the U.S. military to take warfighters out of harm’s way and perform certain missions more effectively and efficiently, he said.

Surface vehicles that are in the works include the unmanned influence sweep system minesweeper (UISS); the mine countermeasures USV (MCM USV); and the Sea Hunter medium displacement UUV, an anti-submarine warfare continuous train unmanned vessel.

Operational evaluation of the UISS is slated for spring 2018, and Milestone C is expected in the fourth quarter of this fiscal year, according to Neagley.

Construction and payload integration for the MCM USV is underway with initial operator testing in fiscal year 2019.

The Sea Hunter recently transitioned from the Defense Advanced Research Projects Agency to the Office of Naval Research, where development and testing will continue. The system could potentially transition to Navy operations this year, according to DARPA.

Undersea vehicles that are moving through the development pipeline include: the Knifefish for hunting bottom and buried mines; the Snakehead large displacement UUV for intelligence, surveillance and reconnaissance; and the Orca extra-large UUV for mine warfare.

The Knifefish has undergone sea acceptance trials, and Milestone C is slated for the third quarter of this fiscal year, according to Neagley.

Detailed design work on the Snakehead is in progress, and initial hull long-lead raw material is on order.

Design contracts for the Orca have been awarded, and follow-production is scheduled for fiscal year 2019.

Capt. Jon Rucker, Navy program manager for unmanned maritime systems, said Chief of Naval Operations Adm. John Richardson has inquired about the possibility of accelerating the acquisition of “the entire family” of UUVs.

However, the service isn’t just looking for new unmanned platforms. They have limited value if they aren’t equipped with support systems, such as energy sources, autonomy and precision navigation, command, control and communications, payloads and sensors, and platform integration, officials noted.

“You have to consider all those key enablers to really kind of get the most out of that technology,” Neagley said.

Energy is critical for endurance, Rucker noted during a media briefing at the Surface Navy Association symposium in Arlington, Virginia.

In the near term, Rucker hopes to have lithium-ion batteries certified for platform integration. Officials are also in talks with the auto industry about fuel cells, he noted.

There are “more energy-dense technologies that aren’t ready today but we’re looking down the road so all the vehicles we design ... you can take out the energy section and put in the new energy technology when it’s ready,” he said.

Autonomy and precision navigation technology are also essential.

UUVs are expected to deploy for an extended period of time in conditions where command, control and communications are more difficult than they are for surface vessels, said Lee Mastroianni, special projects officer at the Office of Naval Research.

They need to have environmental sensing capabilities and be able to adapt accordingly, he said.

“Whether it be in the Arctic or very shallow water or everything in between, we need to improve that autonomy so we have systems that can think, understand and adapt more to achieve their missions, recognizing that there’s a whole subset of sensors and payloads and stuff that feed into making those decisions,” he said.

USVs also have some unique challenges. There are complex rules when it comes to navigation, and the platforms must be able to operate in crowded waterways without human intervention. Combat situations would only add to the complexity of operations, he noted.

“That gets into the ability to understand a dynamic situation ... and trying not to run into the other boats,” he said. “The algorithm aspect — that’s kind of what we’re really going after.”

Today, most autonomous systems operate on a rules-based or deterministic paradigm where machines are programmed to take certain actions in specific situations, Rucker explained.

By leveraging advances in artificial intelligence, the Navy hopes to reach the point where autonomous devices can shift to more open knowledge-based and probabilistic decision-making, and perform their own reasoning, he said.

At the end of the day, unmanned platforms are simply hosts for other capabilities, officials emphasized. Mastroianni said he views them as trucks that haul gear around.

“A UUV [by itself] does nothing for me,” he said. “It needs to have a mission, which means it needs to have some sort of payload, some sort of capability. It could be as simple as a camera [or] it could be some massively expensive, super-secret payload that solves world hunger.”

He continued: “It’s what goes inside of them that really makes the difference on whether it can support our needs or not. What kind of processing, what kind of sensors does it have on it? Are they lightweight enough in order to work in the environment that we need? And can I afford it?”

To prevent schedule delays and encourage technological maturity, the service is pursuing an incremental approach to capability development rather than try to “deliver a Cadillac right off the bat,” Rucker said.

Modularity is required to make that a viable strategy, he noted.

“Whether it’s an unmanned surface vessel or unmanned undersea vessel, we are ensuring that we develop that modularity and have the interfaces, so as [enabling] technology is ready we can insert it into the production line — not break the production line — and ensure we stay on track to deliver that capability,” he said.

Modularity will also allow the Navy to make unmanned platforms multi-mission capable by adding or swapping in new payloads. That is especially true for larger vessels, which have greater size, weight and power parameters than smaller ones, and are therefore able to carry more devices. For example, the Orca XLUUV will initially be a single-mission platform but it is expected to take on additional missions going forward, Rucker explained.

The service is looking to give industry opportunities to showcase their technologies. ONR has developed multiple “innovative Naval prototype” UUVs that recently transitioned to Rucker’s office. They have been delivered to unmanned undersea vehicle squadron 1 in Keyport, Washington, to give warfighters more experience operating large UUVs and elicit their feedback.

“We will then in ’19 open it up to industry if they want to come out and bring their sensors or payloads ... so we can then now test sensors and payloads on a vehicle that the fleet operates,” Rucker said.

Those efforts would inform programs of record. Later on, the technologies could be inserted into other vessels when they are proven and ready, he added.

However, acquisition officials won’t be lining up to buy new equipment if it isn’t cost effective, noted Frank Kelley, deputy assistant secretary of the Navy for unmanned systems.

The aim is to “drive affordability into everything we do,” he said.

The service wants to buy large numbers of platforms and enabling technologies to conduct dangerous missions and swarming operations, he said.

“What we could do is have devices that do one or two or even three things really well ... and then deploy that not in the hundreds but in the thousands,” he said.

With that in mind, high-priced equipment might be cost prohibitive in some cases, Mastroianni said.

“For a one-way mission [with a] high probability of loss, that isn’t a cost-benefit analysis that works too well in our favor,” he said.

As it pursues UUVs, USVs and enabling technologies, the Navy is working with a wide variety of industry partners including small businesses, startups and the commercial sector, Neagley noted.

Officials in the unmanned systems world are gung-ho about the arrival of James “Hondo” Geurts as the new assistant secretary of the Navy for research, development and acquisition. Geurts previously served as the acquisition chief at Special Operations Command, where he gained a reputation for rapidly procuring new technology.

He is bringing the same mindset to his new role, Rucker said. “One of the things he really challenged us on is ... how do we go faster.”

Neagley said his office has special acquisition authorities that provide speed and flexibility in contracting and allow the Navy to reach a broad supplier base.

“We recognize that a lot of the innovation ... exists in small businesses,” he said. “We want to make sure we have a way to reach into those small businesses to bring that technology into our systems.”

Officials expect unmanned maritime systems to conduct a wide range of missions in the future, including mine warfare, ISR, anti-submarine warfare, anti-surface warfare, electronic warfare, armed escort and communications relay.

“UUVs, USVs for us is a growth industry [with a] tremendous amount of potential,” Neagley said.

They could transform the U.S. military’s minewarfare inventory, he noted. “As we transition our legacy mine fleet, that transition is largely a transition to unmanned systems.”

In the next five years, the Navy plans to issue conceptual design and detailed design and construction contracts for a new FFG(X) multi-mission frigate. Neagley expects it to have enough size, weight, power and modularity to support the deployment of unmanned vessels.

Looking further down the road, the Navy intends to acquire a future surface combatant USV, which could include a family of systems. Lessons learned from ongoing science and technology efforts will inform that project, Neagley said.

“As we finish up the analytical underpinning for that, we’re trying to make sure that ... we look at what capability gaps the UUVs and the USVs can kind of go fill,” Neagley said. “Then we can ... rapidly acquire those systems really to complement the larger fleet architecture.”



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Iron Coffin: Inside North Korea's Infiltration Submarine
Andrew Salmon, Asia Times, March 4

It is an incongruous sight. Balanced on a stand on the rocky shoreline of northeastern South Korea perches a small submarine, just 100 meters from one of the many, many concrete bunkers that stand sentry over this strategic stretch of surf-smashed coast.

The bunkers and tangles of razor wire are South Korean. The vessel is not: She is a North Korean infiltration boat which ran aground here in 1996.

Despite her toy-like exterior - small in size, painted in green and red, she resembles a child's drawing of a submarine - what happened to her crew is one of the grimmest tales in the annals of modern warfare.

On the night of September 17, 1996, a taxi driver motoring along the coastal road just outside the city of Gangneung spotted something odd in the dark water. Curious, he stopped his car and looked closer. What he was looking at was a North Korean Sango ("Shark") class infiltration submarine.

He contacted police. At dawn, South Korean naval commandos gingerly boarded the boat and breached her hull. She was empty. Inside, a fire had been lit in an unsuccessful attempt to destroy onboard equipment, but her crew - and the commando unit they had been conveying - had disappeared.

Massacre and manhunt

A security alert was issued at 05:00 on the morning of the 18th for the whole of Gangwon Province, the area where the Winter Olympics and Paralympics are currently underway. According to a detailed report on the operation published by specialist website NK News, over 40,000 South Korean troops deployed into the rugged hills and mountains to track down the infiltrators. Among the hunters were two full brigades of South Korea's own killer elite: "black berets," or airborne special forces.

One of their first finds on a hillside was a row of 11 dead men. All had been shot in the head. There was no sign of a struggle. They are believed to have lacked physical fitness, so been executed - apparently without resisting - by their comrades. The remaining sailors - some of whom had special forces training - and a three-man commando team split up and headed north. Their plan was to exfiltrate through 150 km of South Korean territory, then cross the DMZ into friendly territory.

Some of the escapees were dressed in dark-colored civilian clothes and tennis shoes; others were in South Korean uniforms and carried South Korean weapons. These men were elite troops of the Reconnaissance General Bureau, or RGB: North Korea's 200,000-strong directorate for espionage, special operations and, more recently, cyber warfare.

Over the next days and weeks, scattered firefights would take place across Gangwon's autumnal forested terrain as groups of infiltrators were discovered and engaged. When it was over, 13 had been killed in gunfights. One surrendered to local police. (He was debriefed, turned, and now works as a special advisor to the South Korean Navy.) One was never found. He is presumed to have escaped back to North Korea - a masterly feat of tactical field craft.

In the 49-day search operation, 12 South Korean troops and four South Korean civilians were killed.

It was later discovered that the commandos, using scuba gear, had carried out a successful reconnaissance of South Korean military installations ashore before their vessel ran aground as it came inshore to pick them up.

It would not be the last such operation.

In 1998, a Yono ("Salmon") class mini-submarine was trapped in the nets of a South Korean fishing boat outside the nearby port of Sokcho - like Gangeung, on the Sea of Japan, or what Koreans call the East Sea. The vessel sunk as it was being towed into shore; by accident, or as a result of scuttling by the crew is unclear.

This time, the crew did not escape. Inside, was a gruesome scene. When the boat's hatches were forced open, it was discovered that the nine men aboard, crew and commandos, had shot each other and themselves rather than face capture.

An RGB-controlled midget submarine is widely believed to have launched the deadliest attack on South Korea in recent years - albeit on the other side of the peninsula, in the Yellow Sea. The submarine was blamed for the sinking of the corvette Cheonan in 2010, for the loss of 46 South Korean sailors. North Korea denies that attack.

All aboard a claustrophobe's nightmare

However, North Korea did, belatedly, admit to the 1996 incident: It called it a training operation that went wrong. As a result of Pyongyang's admission, the cremated remains of the infiltrators were returned to North Korea. The submarine, however, was not.

The boat is now accessible by the public in what is an open-air, waterfront museum just outside Gangeung. The damage to her stern and screws from her grounding is plain to see. A ladder takes you up and into her interior, through either bow or stern hatches.

German U-boat men of World War I dubbed their craft "iron coffins," but the North Korea boat, at just 35 meters long and less than four meters wide, is smaller than their wartime vessels. Her interior is cramped to the extreme. The three compartments are lined with a tangle of tubing, valves and communications equipment; fire damage can be seen in the conning tower. The only sanitation facility aboard is a single sink.

To picture 26 men, complete with scuba gear and weapons, compressing themselves into this tiny underwater space is a claustrophobe's nightmare.

Back in the sunshine, the museum's exhibits also include a small wooden vessel. A North Korean semi-submersible infiltration boat, piloted by naval commandos, she is one of several that have been found off the South Korean coast.

Far more impressive is a World War II-era US destroyer, the USS Everet Frederick Larwon that was donated to the South Korean Navy in 1972. Renamed Jeonbuk, she remained in service until 1999, after which she became part of the

museum exhibit. Bristling with gun turrets, anti-aircraft weapons and anti-submarine mortars, she towers over the puny North Korean naval assets in her shadow.

A potent threat; viable potential

Yet, while much evidence suggests that the regular North Korean People's Army is poorly equipped and poorly fed with minimal medical backup - a defector last year was infested with intestinal worms contracted through eating contaminated food - there is no question that North Korea's special forces represent a potent threat.

In repeated operations - in 1968, 1969, and the two submarine incursions - these troops have fought to the death, killed each other or killed themselves to avoid capture. And each time, they have taken a heavy toll on their South Korean opponents.

While their equipment may be primitive, their training and motivation are clearly top-tier. A US special force veteran evinces a grudging respect for their spirit.

"Morale probably is high when they are willing to carry out such operations - to send a special forces soldier on an unsupervised, cross-border, probably kamikaze mission, requires very high morale," said Michael Yon, a former Green

Beret who covered the Afghan and Iraq conflicts as a blogger and independent journalist. "They realize that if caught, chances of torture are high, and all odds are stacked up against them. They must be self-reliant - they cannot call for reinforcements or extraction."

With US war planners reportedly mulling limited strikes against North Korea's nuclear and missile programs after the Paralympics end on March 18, the RGB is a viable asset that Pyongyang could activate in response.

Korea-based US troops, speaking off the record, say that they do not expect North Korea to react to a US attack with conventional weapons, such as artillery: to do so could lead to North Korea losing any possible control as the conflict escalated. The result could mean all-out war, and the likely downfall of the Kim regime.

Hence, a "deniable" response - such as terrorist attacks carried out by deep cover, plain-clothes RGB personnel against US military, political or commercial assets in South Korea, or further afield, such as in Japan or Okinawa - is a plausible retaliation scenario.

Assets may already be in place, Yon speculated. "For those who have not been there and may infiltrate during the time of war, they likely have memorized in detail the maps and terrain around their targets," he said. "There is a high chance weapons and other war materiel are cached in the South."

The fact that they sound and look local would make them very, very hard to detect, Yon continued.

"North Korean special forces already speak the language and look the part: A change into civilian clothes backed by counterfeit documents is enough to blend in and supply themselves," he said. "There is a good chance that some of the officers are living there right now - one wonders how many defectors are operatives, including females."

Even so, special forces alone are not war winners - and the 28,500 GIs in Korea can draw on much recent experience fighting terrorists, including suicide bombers.

"[North Korean special forces] put more allied troops at risks, we would have to take more casualties because of their unwillingness to surrender," said Dan Pinkston, a strategy expert who teaches at Troy University. "Our infantry and special forces would have to think about this, they would have to have special tactics - but they have experiences of fighting this kind of threat in the Middle East."

Putin Says He Has 'Invincible' Nuclear Missile

Neil MacFarquhar And David E. Sanger, New York Times, March 2

MOSCOW — President Vladimir V. Putin of Russia threatened the West with a new generation of nuclear weapons Thursday, including what he described as an "invincible" intercontinental cruise missile and a nuclear torpedo that could outsmart all American defenses.

The presentation by Mr. Putin, which included animation videos depicting multiple warheads aimed at Florida, where President Trump often stays at his Mar-a-Lago resort, sharply escalated the military invective in the tense relationship between the United States and Russia, which has led to predictions of a costly new nuclear arms race.

While Mr. Putin may have been bluffing about these weapons, as some experts suggested, he cleverly focused on a vulnerability of American-designed defenses: They are based on the assumption that enemy nuclear missiles fly high and can be destroyed well before they reach their targets.

The new class of Russian weapons, he said, travel low, stealthily, far and fast — too fast for defenders to react.

Mr. Putin's announcement, in his annual state of the nation address, seemed intended chiefly to stir the patriotic passions of Russians at a moment when he is heading into a re-election campaign, even though his victory is assured in what amounts to a one-candidate race.

He also used the speech to reassure Russians that the military buildup was taking place even as the government was spending big sums to improve the quality of their lives.

But the main attention grabber in the speech was the weapons, which Mr. Putin described as a response to what he called the repudiation of arms control by the United States and its plans for a major weapons buildup.

The Trump administration has said that countering the world's two other superpowers, Russia and China, was becoming its No. 1 national security mission, ahead of counterterrorism.

It has largely blamed Russia's military modernization for that shift and has justified new work on nuclear weapons and bolstered missile defenses as the appropriate answer.

Mr. Putin may have further fueled the tension on Thursday by essentially declaring that Russia's military brains had made America's response obsolete.

He said a team of young, high-tech specialists had labored secretly and assiduously to develop and test the new weapons, including a nuclear-powered missile that could reach anywhere and evade interception.

“With the missile launched and a set of ground tests completed, we can now proceed with the construction of a fundamentally new type of weapon,” Mr. Putin said.

He showed a video that illustrated the weapon flying over a mountain range, then slaloming around obstacles in the southern Atlantic before rounding Cape Horn at the tip of South America and heading north toward the West Coast of the United States.

Given that deception lies at the heart of current Russian military doctrine, questions arose about whether these weapons existed. American officials said that the nuclear cruise missile is not yet operational, despite Mr. Putin’s claims, and that it had crashed during testing in the Arctic.

The threats evoked the bombast of the Cold War. But this time they are not based on greater numbers of bombs but increased capabilities, stealth and guile.

Mr. Putin’s boasts about undersea nuclear torpedoes and earth-hugging cruise missiles emphasized the uselessness of American defenses against such weapons.

Oddly, apart from a reference to renewing the American nuclear arms enterprise in his State of the Union address, Mr. Trump has said almost nothing about the new era of competition with Mr. Putin or Russia. With multiple investigations into whether his campaign’s connections to Russians had influenced policy, he has neither protested the Russian buildup nor publicly endorsed, in any detail, his own administration’s plans to counter it.

The cruise missile was among five weapons introduced by Mr. Putin, each shown in video mock-ups on giant screens flanking him onstage. He threatened to use the weapons, as well as Russia’s older-generation nuclear arms, against the United States and Europe if Russia were attacked.

“We would consider any use of nuclear weapons against Russia or its allies to be a nuclear attack on our country,” he said.

Mr. Putin said he could not show the actual weapons publicly, but assured his audience of Russia’s main political and prominent cultural figures that they had all been developed.

If Mr. Putin was not bluffing, said Aleksandr M. Golts, an independent Russian military analyst, then “these weapons are definitely new, absolutely new.”

“If we’re talking about nuclear-armed cruise missiles, that’s a technological breakthrough and a gigantic achievement,” he said in an interview. But, he added, “The question is, is this true?”

Several analysts writing on Facebook and elsewhere leaned toward the bluff theory. Given the recent history of Russian launch failures or premature crashes, the idea that Russia suddenly possessed a new generation of flying weapons strained credulity.

“The real surprise in among all of this is a nuclear-powered cruise missile,” said Douglas Barrie, a senior fellow for military aerospace at the International Institute for Strategic Studies in London. “It was talked about in the ’60s, but it ran into a lot of obstacles. To the extent that the Russians are seriously revisiting this is pretty interesting.”

Such technology could alter the balance of power, but Mr. Barrie questioned whether Russia was even close to deploying it.

“Does reality mean you have an item in the budget saying, ‘Develop nuclear propulsion for a missile?’” he said. “Or does it mean, ‘We’re going to have one ready to use soon?’ I’d certainly want to see more evidence to believe that.”

Mr. Putin said Russia had developed the weaponry because the United States had rejected established arms control treaties and was deploying new missile defense systems in Europe and Asia.

President Barack Obama said that he was willing to negotiate cuts deeper than the 1,550 arms that Washington and Moscow are permitted to deploy under the 2010 New Start treaty, which took full effect last month. But it expires in a few years, and neither Mr. Putin nor Mr. Trump has shown interest in renewing it.

The United States has also accused Russia of violating the Intermediate Nuclear Forces treaty. After Mr. Putin’s speech, Heather Nauert, the State Department’s spokeswoman, said Mr. Putin essentially confirmed that by trumpeting the country’s development of new nuclear weapons.

Mr. Putin was correct that the United States is investing in expanding missile defenses. But those were not meant to counter Russia’s huge arsenals, but rather the launching of a few missiles by a state like North Korea.

The new Russian weapons would render such defenses obsolete, Mr. Putin gloated, and if anyone found a workaround, “our boys will think of something new.”

Other weapons the Russian leader discussed included a ballistic missile called Sarmat that could round either pole and overcome any defense system; hypersonic nuclear weaponry that fly at 20 times the speed of sound; and unmanned deepwater submarines that could go huge distances at enormous speed.

Mr. Putin said that some of the weapons were so new that they had yet to be named, and announced a naming contest on the Ministry of Defense website.

Political analysts said it was an effective campaign ploy whether the weapons existed or not. “He’s giving people the image of a desired future, of a future for Russia, and that’s appealing for his domestic audience,” said Aleksei V. Makarkin, the deputy head of the Center for Political Technologies, a Moscow think tank.

Mr. Putin’s guns-and-butter, Russia-can-do-it-all speech came 17 days before the March 18 election. It seemed intended to reassure voters that expanded social spending would help solve the economic problems of the past four years, while sending the message that Mr. Putin was their best hope in protecting a Russia portrayed as a besieged fortress.

The reality that the country lacks the money to pay for a giant increase in social spending combined with a new generation of weapons was beside the point, Mr. Makarkin said.

“People may say Russia depends on oil, Russia doesn’t have the money, but the population at large doesn’t care about that,” he said. “They just want to know that we are a superpower.”

On the social front, Mr. Putin promised to double government spending on health care and raise pensions. He said Russia would reduce the poverty rate — official statistics indicate that around 14 million Russians live below the poverty line — by 2024.

Mr. Putin also said that life expectancy, currently at 73, a leap from when he first took office in 2000, should exceed 80 by 2030.

Critics doubt that Russia will ever have the means to deliver so much, given its stumbling economy and relatively depressed oil prices. Max Trudolyubov, a newspaper columnist and political analyst, called the speech a modern version of the Czar Cannon, a giant 16th-century piece of armament that sits on the Kremlin grounds and that legend holds never really worked.

For years, Mr. Putin has chafed at the perceived disrespect showed to him and Russia by the United States. “Nobody listened to Russia,” he said near the end of the speech, to huge applause. “Well, listen up now.”

***Russia Claims 100 Times Smaller Nuclear Reactor Than Submarine Reactors But With More Power
Brian Wang, Next Big Future, March 1***

Russia in a speech by Putin claims it has a new nuclear reactor that is 100 times smaller than those used by nuclear-propelled submarines and generates more power. The reactor can also reach its peak power 200 times faster than a conventional nuclear power plant

The miniaturization of a nuclear reactor will give Russia another advanced weapons system in the form of a high-endurance underwater drone. The drone can dive “really very deep” and travel between continents at a speed that is several times higher than that of a submarine, a modern torpedo or even a surface ship.

The highly-efficient onboard miniaturized nuclear reactor powers the flight. Such a missile can fly low enough to avoid early detection, can change course to avoid enemy anti-missile assets along its path, and maneuver to pierce the anti-missile systems protecting its target.

Nextbigfuture has written hundreds of articles on all of the advanced nuclear reactor systems that have been made or have been proposed. What Russia is claiming would take something like an advanced molten salt nuclear reactor combined with something like an advanced super-critical CO₂ turbine or another batch of advanced reactor innovations. If they did then it would not make sense to use them only for such trivial purposes as infinite duration nuclear cruise missiles. Russia would be factory mass producing them or something slightly easier to make and dominating world energy production. Russia can only be talking about an unshielded reactor to directly power a jet engine.

The Russian Borei-class submarine uses the OK-650 reactor with OK-9 GTZA (Turbine). This pressurized water reactor (PWR) uses 20-45% enriched uranium-235 fuel to produce 190 MW of power. This means 21 Kg is needed for each kilowatt of power.

The reactor + steam generator would weigh $37284 \times 21 = 782964$ Kg (approximately 782 tons), not taking into account the weight of the shield tank and foundation.

The weight of the shield tank and foundation is about 261 tons. The total weight would then be 1043 tons.

Russia is thus claiming about 10 tons or reactor and turbine to generate about 200 megawatts in order to be 100 times smaller and generate more power than a sub reactor. This flips from having more weight per kilowatt to more kilowatts than weight. Not 20 kilograms per kilowatt but 20 kilowatts per kilogram. The super-energy density includes power conversion and shielding.

Nextbigfuture thinks the claim of a hundred times smaller reactor is BS. Russia would have to have advanced molten salt reactors to make the power generation work and they do not. Russia would have to have supercritical CO₂ turbines for lightweight power generation and they do not.

What is technologically possible if for Russia to have gone back to revise and update what Russia and the US were trying to do with the 1960s Project Pluto. This would be an unshielded nuclear reactor that produces heat to power a jet engine. The design would spew radiation and would be very dangerous. The Russians have said it would be an unmanned drone. So radiation hardened electronics could fly it. It would be a hundred times lighter because it would have no radiation shielding and it would use the heat directly for the engine.

Other nuclear reactor designs that are lower weight and high power density

Molten salt nuclear reactors can be lower weight and higher power density. The current designs that are targeting the commercial energy generation markets are not trying to reach the highest power densities. The commercial designs are looking to get the fastest regulatory approvals.

Terrestrial Energy (of Canada) is trying to develop integral molten salt nuclear fission reactors. These nuclear reactors would have about 20-200 times less volume than conventional nuclear fission reactors.

The US, Europe and China are trying to develop supercritical carbon dioxide turbines that would have 100 times less volume than regular steam turbines. The more compact turbine would be needed to convert the heat into electricity.

By shrinking the nuclear reactor and the turbine by 100 times, plenty of other vehicles are made possible. Various nuclear ships and submarines can be revamped. Advanced molten salt nuclear could achieve energy densities that Russia is claiming but would need to be combined with innovations on the power conversion side to change heat into electricity.

The 650 MWth IMSR (Integrated Molten Salt) reactor is about the same size as the smAHTR (125 MWth) reactor.

The smAHTR reactor is 9 meters tall (30 feet) by 3.5 meters (12 feet) in diameter.

The 220 MWth S8G reactor for the Ohio submarines is 42 feet in diameter, 55 feet long; 2,750 tons

A 650 MW thermal integrated molten salt reactor with a supercritical CO₂ turbine would have about 400 MWe of power with about 200 tons of weight. This would be about 2 kW/kg.

There have been other molten salt designs with about 18 KW of power per liter. There were early molten salt reactor designs and the engineers believed that they can achieve 100 kW per liter.

Project Pluto

In the 1960s, the US had Project Pluto for nuclear powered aircraft. Nuclear-powered ramjets would power a cruise missile, called SLAM, for Supersonic Low Altitude Missile. In order to reach ramjet speed, it would be launched from the ground by a cluster of conventional rocket boosters. Once it reached cruising altitude and was far away from populated areas, the nuclear reactor would be made critical. Since nuclear power gave it almost unlimited range, the missile could cruise in circles over the ocean until ordered “down to the deck” for its supersonic dash to targets in the Soviet Union. The SLAM as proposed would carry a payload of many nuclear weapons to be dropped on multiple targets, making the cruise missile into an unmanned bomber. After delivering all its warheads, the missile could then spend weeks flying over populated areas at low altitudes, causing tremendous ground damage with its shock wave and radiation from its unshielded reactor. When it finally lost enough power to fly, and crash-landed, the engine would have a good chance of spewing deadly radiation for months to come.

In 1957, the Lawrence Radiation Laboratory (later Lawrence Livermore National Laboratory) began detailed design studies of ramjet propulsion reactors. The flight reactor was intended to have thermal power in excess of 500 megawatts, but to prove the concept a sub-scale reactor was built first. This reactor, designated Tory II-A, had a design power of 155 megawatts. It heated incoming air to a temperature of 1080 °C, and had a flow rate of 320 kg/sec.

With the success of Tory II-A, work began on Tory II-C, a full-scale, flight-weight reactor capable of sustained low altitude flight in excess of Mach 3. With design power of 500 megawatts and much greater airflow, the tank farm had to be expanded by a factor of ten, employing 40 km (25 miles) of oil well casing pipe, which took five days to fill with air.

There are now public documents about the Project Pluto work.

LANL Megapower reactor will be pretty compact but only 2 megawatts and not 200 megawatts

One vSMR concept being developed by Los Alamos National Laboratory (LANL), which the Task Force reviewed, is the “MegaPower” reactor [Patent No. US 20160027536 A1].

Mobile heat pipe cooled fast reactor system US 20160027536 A1

A mobile heat pipe cooled fast nuclear reactor may be configured for transportation to remote locations and may be able to provide 0.5 to 2 megawatts of power. The mobile heat pipe cooled fast reactor may contain a plurality of heat pipes that are proximate to a plurality of fuel pins inside the reactor. The plurality of heat pipes may extend out of the reactor. The reactor may be configured to be placed in a standard shipping container, and may further be configured to be contained within a cask and attached to a skid for easier transportation.

In this concept, the nuclear fuel is uranium oxide enriched up to 19.5% in uranium 235. This level of low enrichment is considered “non-weapons grade” from a proliferation standpoint. The large mass of fuel is encapsulated in a solid steel monolith to form a sub-critical nuclear core which is surrounded by a material that reflects decay neutrons emanating from the uranium metal core back into the core, in a controlled way, causing a sustained nuclear reaction (a “critical reaction”). The thermal energy created by the fission reactions is removed from the uranium metal core by heat pipes, which in turn produce electrical energy via open-air Brayton or supercritical carbon dioxide Stirling engines. This concept is designed to provide 2 MW of electricity and another 2 MW of process heat for 12 years of continuous operation, weighs about 35 metric tons, and is transportable by air and highway. Funding from NASA and Laboratory

Directed Research and Development programs is being leveraged to mature MegaPower. The system could be connected to the generators and operated within 72 hours upon arrival.

The reactor system can be shut down, cooled, disconnected, and “wheeled out” in less than seven days. The reactor core and all other critical equipment are housed in special armor, which protects the reactor systems from beyond the design basis attack, and also shields personnel and environment from the core radiation during operation and transport. The design is mature, but would require additional investment for demonstration. Every component has technology readiness level (TRL) of six 40 or better, with integration of the components into system prototypes the major remaining work to be done. A projection has been made that a unit could be available for concept demonstration in five years.

Lessons learned from the kiloPower development program (for NASA and possible Mars usage) are being leveraged to develop a Mega Watt class of reactors termed MegaPower reactors. These concepts all contain intrinsic safety features similar to those in kiloPower, including reactor self-regulation, low reactor core power density and the use of heat pipes for reactor core heat removal. The use of these higher power reactors is for terrestrial applications, such as power in remote locations, or to power larger human planetary colonies. The MegaPower reactor concept produces approximately two megawatts of electric power. The reactor would be attached to an open air Brayton cycle power conversion system. A Brayton power cycle uses air as the working fluid and as the means of ultimate heat removal.

MegaPower design and development process will rely on advanced manufacturing technology to fabricate the reactor core, reactor fuels and other structural elements. Research has also devised methods for fabricating and characterizing high-temperature moderators that could enhance fuel utilization and thus reduce fuel enrichment levels.

Phantom Threat: The Russian Nuclear Submarine Carrier Would Check the US Hegemony Staff, Maritime Herald, March 1

The hegemony of the US in the world’s oceans is guaranteed by its aircraft carriers. But the ambitious and revolutionary project of the new Russian submarine aircraft carrier could be a serious challenge, says Alexei Overchuk in an article for the Vzglyad newspaper.

Today, the network is rife with rumors that Russia is creating a nuclear submersible aircraft carrier. The messages are accompanied by the image of a large submarine with an airfield at its top, where modern fighters are preparing for takeoff. The image provoked numerous comments from users who laughed at the project.

However, it is only an artist’s fantasy, emphasizes Overchuk. It is clear that this type of aerodrome simply will not allow the submarine to submerge under water or float on the surface, he explains.

According to Overchuk, the aerodrome must be aerodynamic and contour the hull of the ship. Instead of fighters, unmanned aircraft capable of taking off and landing vertically are more likely to be used. The author notes that the Russian Ministry of Defense is already developing a drone of this type called Fazan.

After taking off from the platform, the aircraft gains altitude, speed and then enters the usual horizontal flight mode. Fazan can carry on board not only reconnaissance equipment, but also attack systems. Its estimated speed is 350-400 km / h and the flight range reaches 2,000 kilometers.

In this way, the Russian military will not have to spend money on expensive training for naval aviation pilots. On the other hand, the price of a Fazan is much lower than that of a modern fighter. In addition, the loss of an unmanned aircraft is not perceived as a tragedy.

But the main advantage of the nuclear submarine carrier is its poor visibility and the sudden appearance of unmanned combat aircraft over the enemy, says Overchuk. "Any aircraft carrier with a group of ships is like a funeral orchestra that can be heard from very far away, and in the meantime, tracking the nuclear submarine cruise is almost impossible," he says.

Defense Chief Refuses To Confirm N.K. Official's Alleged Link To 2010 Naval Attack Staff, Yonhap News, February 28

SEOUL – South Korea's Defense Minister Song Young-moo refused Wednesday to confirm a controversial North Korean official's alleged link to the communist state's naval attack in 2010 that killed 46 South Korean sailors.

Song's remarks came amid continued criticism of Seoul's decision to embrace Kim Yong-chol, a vice chairman of the Central Committee of the North's ruling Workers' Party, as the chief of Pyongyang's delegation to the closing ceremony of the PyeongChang Winter Olympics.

Kim has been accused of masterminding the torpedo attack on the South Korean corvette Cheonan, as well as other provocations, while leading the Reconnaissance General Bureau (RGB), which handles military intelligence operations and cyberwarfare, from 2009-2016.

"(I) cannot confirm it," Song said during a parliamentary session in response to a question about whether he could clarify if Kim was involved in the deadly attack or not.

"We can make presumptions about the North Korean situation, but it is impossible to confirm anything," he added.

But the minister said he believes that the communist state is responsible for the sinking of the Cheonan.

"I understand that (the submarine that carried out the attack) was the North's Yeoneo-class midget submarine belonging to the RGB," he said.

Pyongyang is known to have an assortment of submarines, including 130-ton Yeoneo-class submarines, 300-ton Sangeo-class submarines and 1,800-ton Romeo-class submarines.

Conservatives, along with the families of the deceased victims of the torpedo attack, have strongly protested Seoul's acceptance of Kim as a North Korean delegation chief. They have called Kim a "murderer" and "war criminal," and demanded President Moon Jae-in's apology.

Apparently mindful of the political offensive, Moon held a low-key, closed-door meeting with the North's delegation in the northeastern alpine city of PyeongChang hours before the closing ceremony of the Olympics on Sunday.

The liberal Moon administration has been gingerly striving to use the delegation's visit to maintain the growing momentum of inter-Korean rapprochement, though Washington, its key ally, appears to be at odds with its dovish approach, hammering away at its "maximum pressure" campaign.

Russian Official's Offhand Remark About Nuclear Submarine Fire Ignites Fresh Speculation And New Denials Charles Digges, Bellona.org, 27 February

A Russian official has admitted there were missiles aboard the Yekaterinburg nuclear submarine when it was ravaged by fire during repair work at a shipyard near Murmansk in late 2011, reviving a six year old mystery about what specific dangers faced the Russian public when the accident occurred.

And while many Russian media rushed to report the official's remarks as conclusive proof that the submarine was armed with nuclear missiles when it was swept by the blaze, it remains unclear whether they, in fact, had been topped with their warheads at the time the fire swept through the sub, injuring 19.

If they weren't, then numerous government denials about the submarine fire posing any radiation dangers would hold up. If they were, then the official's admission constitutes a major revelation that shatters an official policy of lying, and exposes major violations in the navy's own handling of nuclear weapons during repair work on submarines.

So which is it? We still don't know.

The comments came from Dmitry Rogozin, Vladimir Putin's deputy prime minister in charge of military affairs, who Monday gave a wide-ranging interview to the business daily Kommersant. In discussing formative moments in his career, he described the fire aboard the Yekaterinburg as his "baptism."

This drama, he said, was occasioned by how urgently he had to mobilize his ministry's machinery to avert disaster, as repair workers had failed to remove "ballistic missiles" from the Yekaterinburg before the fire broke out.

The remarks seemed to come off the cuff. If Rogozin was toppling a wall of secrecy built by his ministry and the Russian Navy, he didn't seem to be aware of it. But he also didn't specify if those ballistic missiles had been armed with

nuclear warheads at the time in question. Many news outlets in Russia seized on Rogozin's comments to Kommersant as proof that they were, and headlines of shock and surprise spread nationwide.

The Russian Navy's Northern Fleet, of which the Yekaterinburg is a part, jumped into the fray on Tuesday to insist that the sub's ballistic missiles weren't armed with nuclear warheads at the time of the blaze.

But the Navy's new denials only fuel the problem. At the time of the accident in 2011 it issued so many of them that it became unclear what precisely it was denying – the presence of missiles on the sub, or the presence of nuclear armed missiles on the sub – and, in the case of Rogozin's defense ministry, whether there had been a fire at all.

The fire aboard the Yekaterinburg submarine came in the early morning hours of December 29, 2011. A spark from a welding torch the Roslyakovo repair yard is said to have ignited flammable oils surrounding the vessel's navigational equipment, which set off a smolder beneath the rubber coating of the hull.

This eventually erupted into a conflagration of such intensity that the submarine was submerged repeatedly by emergency officials before the fire was extinguished two days later. Local residents reported the blaze was visible from several kilometers away.

In the aftermath fears surrounding the condition of the Yekaterinburg's nuclear weaponry were compounded by official denials alternating with official silence, leaving a frightened public to seize on worst case scenarios. Initially, the Defense Ministry wouldn't even confirm that 19 were injured during efforts to extinguish the fire.

In February of 2012, Alexander Vitko, the then deputy commander of Russia's Northern Naval fleet, told the Russian news site Lifenews that he was "sure that the Yekaterinburg's weapons had been on board," but failed to say whether they were armed with warheads.

That was followed by a statement from Rogozin himself in which he too admitted to the "armaments" and went on to vent his outrage that they had been on board when the the Yekaterinburg put in for repairs. Still, he stopped short of clarifying whether the armaments included nuclear warheads.

In fact, it may be that the only direct denial from the Navy or the Defense Ministry about the warheads came today – six years and two months later – when Bellona called the Northern Fleet for clarification of Rogozin's remarks on Tuesday morning.

Bellona's Alexander Nikitin, himself a former submarine captain, said Monday he tends to think that the missiles weren't armed. He said submarines are only armed with warheads during times of war, or when they are on patrol far from port – which at the time of its repair yard blaze the Yekaterinburg wasn't. Likewise, he said that for a sub to put in for repair with warheads is a major violation of Russian Naval policies.

But is he sure? He says he's not. Perhaps in another six years and two months we will be.

The Submarines of the Future Will Be Robotic ***Robert Farley, War is Boring, February 26***

Imagine a future in which nuclear attack submarines (SSNs) can deploy undersea drones (UUVs) to hunt, and possibly kill, enemy subs. The U.S. Navy, at least, is taking steps to make this a reality. What impact could this have? On the one hand, UUVs could shake modern antisubmarine warfare (ASW) to its core, making existing platforms vulnerable or obsolete. On the other hand, the development of UUVs could reinforce existing hierarchies; in contrast to popular understanding, established organizations are often the best at adapting to disruptive military innovations. The future of the U.S. Navy depends to great extent of which of these becomes a reality.

History

In a sense, submarine launched drones have existed for quite some time; even in World War II, navies used pattern following or acoustic homing in order to find their targets. Wire guided torpedoes were introduced in the 1960s, allowing the submarine a measure of control over how the weapon approached its target. These torpedoes are suicidal drones in the same sense as cruise missiles; weapons that can be launched, then directed to their target either through autonomous mechanisms or by user interface.

Both the United States and competitor nations have eagerly pursued the potential of UUVs. UUVs can contribute to both the hunting and the killing parts of ASW, although as of yet the only firm plans involve using them in the former. Such drones offer better opportunities to track and destroy diesel-electric subs, even those which use Air-independent propulsion (AIP) technology. These vessels can operate more quietly than manned subs, and remain submerged for a greater length of time. Instead of hunting enemy submarines, they can simply lay in wait until the prey comes to them.

China has reportedly experimented with "glider" drones, capable of remaining at specific depths without the need for propulsion. The United States has used such drones for years, and although at this time they lack much practical applicability under wartime conditions, they do offer a way of monitoring and evaluating the undersea environment. China is also working on integrating UUVs into its network of undersea sensors, creating an "Underwater Great Wall" capable of detecting and deterring U.S. subs. The United States has also done work on surface autonomous vessels that could perform the hunting, and potentially the killing, of enemy submarines. A prototype vessel joined the U.S. Navy in January.

Motherships

The newest thinking combines drones with torpedoes. The U.S. Navy hopes to use small UUVs, capable of being launched from a torpedo tube, to create the same kind of picture of the undersea space that satellites, radars and UAVs can create of airspace. Using both passive and active sonars, UUVs could deploy from an SSN and explore the area, attempting to detect any threats to their mothership. Having ascertained the existence of threats, the UUVs could either light the target up with active sonar (allowing the SSN to target and destroy it with torpedoes), passively communicate data to the mothership, or potentially carry out a "suicide" attack against the target themselves. In effect UUVs have the potential to expand the lethal reach of an attack boat, as well as take care of threats in its own area.

Problems

The success of combat UUVs depends, at least to some extent, on the development of communications technologies that can enable human operators to remain in contact with drones, and for the drones themselves to relay an accurate picture of their space. The nature of water makes this more difficult at sea than it is in the air, but DARPA (and presumably its Chinese and Russian counterparts) has begun work on improving undersea connectivity and transparency. Even the effort to communicate data back to the mothership could reveal the location of the latter, however. Even more problematic, a drone using active sonar could accidentally light up the mothership, leaving it open to attack.

The idea of suicidal UUVs also has its problems. Although navies have long been comfortable with the idea of homing torpedoes that can close with a target on their own, more advanced drones operating at greater distances from the mothership might require more complex decision-making parameters. This runs into the same complications that autonomous fighting machines on land and in the air suffer from, with the added communications difficulties that the undersea environment poses.

Conclusion

In Peter Singer and August Cole's *Ghost Fleet*, the U.S. Navy turns to drones to kill Chinese submarines after it loses the bulk of its SSN fleet. Desperation offers strong motivation for innovation. With advances in communications and artificial intelligence, it's not at all impossible to imagine scenarios in which SSN mothership deploy a lethal force of killer torpedoes, capable of remaining on station for days (or longer) while waiting for a victim. This requires a certain tolerance for risk, of course; even under the best of conditions operators sometimes lose control of their drones. But it also offers a way in which the large, powerful nuclear attack subs of the U.S. Navy can reclaim the advantage that they may be losing against the small, quiet AIP boats increasingly used by the world's navies.

Turkey, German Company Join Forces For Third Locally-Made Submarine Compiled from Wire Services by the Daily Sabah, February 25

Expanding its locally-made arsenal, Turkey officially launched the construction of Murat Reis, the third in a new submarine fleet made with local resources and the assistance of a German company. Prime Minister Binali Yıldırım joined dignitaries at the inaugural welding of the submarine in the Gölcük shipyard in northwestern Turkey Sunday.

The country launched the project in 2009 after the Defense Industry Undersecretariat signed a deal with a foreign and local consortium for construction of submarines. Equipped with modern weapons technology, the submarines aim to boost Turkish navy's operations in the Aegean and the Mediterranean Sea. The country started the production of the first submarine of the project, TCG Pirireis, in 2015. It is estimated that the construction of three submarines is to take an average of 61 months. Germany's multinational conglomerate ThyssenKrupp is the main contractor in the project. The subcontractors are prominent Turkish defense firms including ASELSAN, Havelsan, Ayesaş, Milsoft, Koç and STM.

Turkey's leading state-run science body TÜBİTAK also contributes to the project.

Turkey has been heavily investing in the defense industry and has substantially increased the number of defense projects over the last 15 years, while also increasing the rate of domestic production whereby local resources are used in the development of defense projects and equipment. The number of defense projects, which was 66 in 2002, has now increased to 600, and the size of these defense projects has reached \$60 billion. External dependency, which was around 80 percent 16 years ago, has also rapidly declined with the nationalization of projects. The use of domestic resources has increased from 25 percent to more than 60 percent. Turkey's defense industry has around \$6 billion production and \$2 billion export capacity.

Speaking at the welding ceremony for Murat Reis, which is named after a famed Ottoman admiral, Prime Minister Binali Yıldırım, who worked as a marine engineer before his political career took off, said he was excited to inaugurate a new addition to the Turkish navy. Citing the rapid development of the Turkish defense industry over the past 15 years, Yıldırım said they invested more than \$35 billion in the defense industry since 2003. "The industry also boosted its export capacity to over \$2 billion," he added.

The prime minister said that the country's defense industry executive committee recently approved projects worth \$10 billion for a new set of projects for land, air and maritime defense. "The Turkish naval forces are now capable of eliminating all kinds of threats against Turkey," Yıldırım emphasized.

He said Murat Reis will be a member of a six-submarine fleet and the project will also help in improving the state of the Gölcük shipyard, the main shipbuilding hub in Turkey. Yıldırım also urged companies to speed up the construction process "at a time of risks Turkey currently faces at sea," referring to "conspiracies in the Aegean and Mediterranean Sea."

Turkey and Greece have been at odds over territorial waters for decades and tensions flared up recently over the Kardak islets in the Aegean. Turkish and Greek coast guard vessels collided off the islets earlier this month, sparking a crisis between Athens and Ankara. Turkey has accused Greece of "making dangerous moves" by violating territorial waters after the incident. In the Mediterranean Sea, Turkey faces a challenge from the Greek-controlled part of Cyprus, which unilaterally tried to exploit a natural gas exploration zone recently. Turkey says the Turkish Cypriot-controlled part of the island also has rights to the zone and Turkish warships blocked an Italian oil rig from reaching the zone earlier this month.

Iran Looking To Build Nuclear Submarines, Watchdog Says Staff, The Times of Israel, February 23

Iran is still sticking to the 2015 nuclear accord, a UN atomic watchdog report showed Thursday, but noted Tehran is looking to develop seaborne nuclear capabilities.

The International Atomic Energy Agency document, the ninth since the deal came into force in January 2016, showed Iran complying with the accord's key parameters, four months ahead of US President Donald Trump's deadline to fix its "disastrous flaws."

However, the IAEA report also said that Iran informed it in January by letter of a decision to "construct naval nuclear propulsion in future."

The IAEA has asked Tehran for further details. Press reports in the past have said that Tehran wants to develop nuclear-powered ships and/or submarines.

This has created concern in the past because of the possibility that Iran might use highly enriched uranium, forbidden under the nuclear deal, to power such vessels.

In December 2016, Iranian President Hassan Rouhani ordered the country's scientists to start work on nuclear-powered ships in response to the renewal of sanctions by the United States.

In letters read out on state television, Rouhani criticized the congressional move to renew sanctions as a breach of last year's nuclear accord and told Iran's Atomic Energy Organisation to start work on "planning the design and production of nuclear fuel and reactors for maritime transport."

The 10-year-old sanctions legislation against Iran related not just to nuclear issues, but also ballistic missile-testing and human rights.

The IAEA downplayed Tehran's plans; a senior diplomat at IAEA headquarters said the comments were likely "rhetoric" in response to Trump's threats to rip up the deal.

The diplomat said Iran's plans appeared vague for now and low-enriched uranium could be used for the nuclear naval vessels "Everything in the letter only refers to the future. The indirect indication is that (actual designs) don't exist," the diplomat said.

Uranium, when enriched to high levels of purity, can be used in a nuclear weapon. At low levels, it can be used for peaceful applications such as power generation — Iran's stated aim.

The IAEA report Thursday confirmed the number of centrifuges to enrich uranium was below the agreed level of 5,060, while Iran's total stockpile of low-enriched uranium "has not exceeded 300 kg."

The volume of heavy water, a reactor coolant, remained below the agreed maximum of 130 tons throughout the past three months.

Iran has inched above that ceiling twice since the enactment of the accord, known as the Joint Comprehensive Plan of Action (JCPOA).

It removed and rendered inoperable the core of the Arak reactor, which could in theory have produced weapons-grade plutonium, before the accord entered into force.

Aside from the relatively minor breach on heavy water, the IAEA reports have consistently shown Iran adhering to the deal in the two years since it took effect.

However, the future of the hard-won agreement between Iran and the five permanent members of the UN Security Council plus Germany is highly uncertain.

In January, President Trump set a 120-day deadline for US lawmakers and European allies to "fix" his predecessor Barack Obama's main foreign policy achievement or face a US exit.

He is concerned that parts of the deal begin expiring in 2026 and that it fails to address Iran's missile program, its regional activities or its human rights abuses.

A US exit could kill the nuclear deal, which the Islamic Republic has refused to re-negotiate.

While Iran has reaped massive economic benefits from the accord, notably by being able to resume oil exports, it is still constrained by US sanctions in other areas.

Earlier on Thursday, Iran's top nuclear negotiator warned that the agreement was under threat unless foreign businesses and banks were able to trade freely in the country.

Deputy foreign minister Abbas Araghchi told London's Chatham House that Trump's hostility toward the pact was creating a "destructive atmosphere" that meant businesses were afraid of dealing with Iran.

"As far as Iran is concerned, JCPOA is not a successful story," he said. "Iran is not benefiting from sanction lifting in full."

PH Navy Needs Submarines To Gain Respect – Empedrad Staff, The Philippine News Agency, February 23

The country needs to acquire submarines as they are the "future of naval warfare."

Rear Admiral Robert Empedrad, Philippine Navy flag officer-in-command, stressed this while pushing for the completion of the country's first two missile-capable frigates.

When asked by Senator Emmanuel "Manny" Pacquiao on what other equipment the Navy needs to be fully modernized, during the Senate hearing on the Frigate Acquisition Project earlier this week, Empedrad said, "Sir, we have a lot of

concerns in the Navy, your honor. But for me, the future of naval warfare is submarine warfare. And I believe that if we want to get the respect of other foreign countries or navies, we should acquire submarines."

This, he said, is due to their stealthy nature, which makes them very difficult to detect.

Submarines are naval vessels that can operate in deep or shallow waters and are capable of carrying a variety of weapons that can be used to attack land, sea, and air targets.

“Sabi nga nila, mahirap kalabanin iyong kalaban na hindi nakikita (As they say, it is difficult to contain an invisible enemy). So if we have submarines, I’m sure other powerful navies would respect the Philippine Navy – if we get the submarine, your honor,” Empedrad said.

The Armed Forces of the Philippines is expected to acquire its own diesel-electric class submarines during the 2nd Horizon of the AFP Modernization Program, which is expected to begin this year and end in 2022. (PNA)

Brazil’s First Scorpene-class Diesel-Electric Submarine Enters Final Assembly Phase
Staff, Defenseworld.net, February 21

Brazil’s President Michel Temer on Tuesday launched the final assembly phase of the Riachuelo-class diesel electric attack submarine, at the Shipyard and Naval Base (SNB) of Itaguaí, Xinhua reports.

S40 Riachuelo is the first of four Scorpene submarines being built in Brazil under a 2008 contract between the Brazilian Navy and Naval Group. After final assembly, the submarine is set to launch later this year and enter service in 2020.

Brazil’s Submarine Development Program (PROgrama de SUBmarinos PROSUB) calls for three more conventional units (Humaita S41, Tonelero S42 and Ango Stura S43) and the first Brazilian submarine with nuclear propulsion (SSN).

The signed contract covers the design, production, and technology transfer required for four Scorpene-class conventional submarines, and the design assistance and production of the non-nuclear part of the SSN.

According to Military Factory, S40 Riachuelo will be a 75-foot long vessel capable of 21 knots when submerged and approximately 12 knots when surfaced. As an attack submarine, the vessel will showcase six torpedo tubes cleared to fire the widely-accepted 21” torpedo as well as the French SM-39 “Exocet” Block 39 Mod.2 anti-ship missile.

Male-Female Crew Planned For Kings Bay Navy Sub
Joe Daraskevich, The Florida-Times Union, February 19

ST. MARYS, GA. – Capt. Gregory Kercher spent about a week on an Australian diesel-powered submarine back in 2006 as part of a command course to prepare for a position as the executive officer on a U.S. Navy submarine.

The Royal Australian Navy had already integrated the submarine force, and Kercher was impressed by how well men and women worked together on the vessel.

He said he knew at the time that the United States would one day make the transition from an all-male submarine culture to one allowing women to serve, but there was no telling how long that change would take.

Twelve years later, he’s playing a major role in the transition at Kings Bay Naval Submarine Base in Southeast Georgia by leading one of the first crews at the installation mixed with enlisted male and female submariners.

"If we tried to do this 15 to 20 years ago in a sudden manner, I think it would have been difficult," Kercher said. "We wouldn't have been prepared for it, and it probably wouldn't have went off as seamless as it has."

Each submarine uses a two-crew concept - blue and gold - to alleviate the long periods of time spent at sea. Kercher took over as the commanding officer of the gold crew on the Ohio-class guided-missile submarine USS Florida in September. His counterpart, Capt. Brett Moyes, is leading the blue crew.

Kercher said his crew will be ready to deploy for the first time in a few months thanks to careful planning by the Navy that allowed the integration process to unfold one step at a time.

First, female officers started serving on submarines in 2011. Then enlisted women joined the crews of the USS Michigan in Bangor, Wash., in 2016. Now the Navy has made the transition on the East Coast with the two crews of the Florida.

ASKING FOR ADVICE

"I had a lot of thoughts over the six months leading up to the time when I was coming to take over and become the commanding officer," Kercher said.

So he reached out to his peers for advice on how to handle the new environment. He said he talked to some who had served with female officers on submarines, and he reached out to personnel on the Michigan to see how it went when the first enlisted women joined.

Kercher said most of the advice he received dealt with low-level issues like how the modifications worked out with berthing and bathrooms. There wasn't much advice on how to deal with actual crew members getting along, Kercher said, because for the most part they were focused on the mission instead of the difference in gender.

He said the Navy did a great job of setting up berthing without taking away very much space for the men.

One obvious difference Kercher noticed was the chief petty officer quarters were altered to accommodate three people in each one, allowing for three women to live in one of the spots together.

The same is true of the bunk rooms for enlisted sailors in the missile compartments, he said. The submarines already had nine-person bunk rooms, and now some of them are designated for women with bathrooms nearby.

PLENTY OF PRIVACY

Kercher said the idea that Navy submarines are places without privacy is a common misconception that goes back to World War II when the vessels were much smaller. It's not like current submarines have as much room as surface ships, he said, but there are definitely doors on all the toilet and shower stalls.

"I just don't think that we had that many privacy concerns before, and I really don't think about that now," he said.

The crew completed a training drill recently with special forces and Navy SEALs on board. Kercher said the total compliment on the vessel was about 240 people, and the major concern was how to feed everybody. Privacy wasn't an issue.

"I would say many of the female sailors are helping take care of the problems we are working on rather than there being problems because of them," Kercher said.

Neither Kercher, his executive officer or the chief of the boat have any experience serving with women on board a submarine, so they've been relying on some of the women on the crew to help work through any potential issues related to gender that might come along.

"Sometimes we might over-think things," Kercher said. "But I'd rather we over-think and plan properly."

He said the men on his crew were getting used to the idea of women joining them well before he arrived. Discussions started as soon as the decision was made to involve the Florida in the integration process, and it helped that the modifications were made in dry dock at Kings Bay so the sailors could monitor the progress.

"It remains an all-volunteer force. If somebody wanted to step up and say 'I no longer want to serve on a submarine,' they could have certainly done that," Kercher said. "We've had none of that."

FITTING IN NICELY

Kercher said he's been impressed with the attitude displayed by the women and their willingness to work hard to fit in, but he's also impressed with the behavior of the men.

He said there's always been an unwritten rule to look after sailors who are serving on submarines for the first time. They seem to be meshing just like they would if all the newcomers were men, Kercher said.

"The rest of the crew sees this as the same opportunity I see, and they see it as a pride thing for the Florida," he said.

Kercher said it's obvious through interacting with his crew that the women share that same sense of pride. They don't necessarily show it outwardly because they are so focused on the mission, he said.

"They won't go out of their way to show that pride, but it's there, it's evident all the time," Kercher said. "They just don't want to make it about themselves."

In some cases serving on a submarine is a lifelong goal for the women, Kercher said, but they aren't thinking of themselves as pioneers. He said they just want to be thought of as submariners just like the rest of the crew.

FIRST TO EARN PIN

A member of the blue crew just cemented her place on the vessel by becoming the first junior enlisted woman to earn her enlisted submarine warfare pin, or "dolphins," this year while the submarine was underway.

Fire Control Technician 2nd Class Jasmine Kiernan-Rolen was required to qualify as petty officer of the deck, topside roving patrol and numerous in-rate qualifications in order to receive the pin. She also was required to perform damage-control functions and demonstrate proficiency in the various areas of submarining.

"It feels incredible to be a part of such a tightly woven community, and it's an honor to earn the right to wear the Navy's first qualification pin," Kiernan-Rolen said. "The guys here have been both tough but inspiring."

The leaders from the Florida and Michigan recently got together to talk about their experiences over the last six months. But they moved on from the topic of women pretty quickly, and the conversation turned to operating in a deployed status, Kercher said.

Moyes said the talent level of the women on the blue crew has made the integration process smooth and successful. Kercher echoed that sentiment and was excited about the prospect of the first enlisted woman on the gold crew going through her qualification board recently in the hopes of receiving her pin.

FORCE GETTING STRONGER

The women on both Florida crews amount to about 30 total, with a handful of them being officers. More are expected to arrive soon, just in time for deployment.

Kercher said it's a universal thought that the U.S. submarine force is the greatest in the world, and adding enlisted women to the equation is only going to make it better.

"We need that constant infusion of the best talent possible in order to maintain the submarine force as the best in the world," Kercher said.

He said by opening the pool of candidates to the female population in the United States, the Navy is going to have a whole new group of talented submariners that weren't available before.

Kercher said the deliberate integration process took a long time to accomplish, but it was the right way to do it to ensure a smooth transition.

Soon it will be time to see how they do on deployment.

Submarine programme under scrutiny; acquisition could begin after 2020
Corneliu-Aurelian Colceriu, Agerpres, February 20

Romania's Defence Minister Mihai Fifor said on Tuesday that the submarine acquisition programme is currently being looked into by the Navy and the acquisition proper could start after 2020.

"The submarine programme is currently being scrutinised by the Romanian Navy. They are discussing the kind of submarine that we can have for the Navy. They have not yet completed this technical analysis that we want. Once the technical analysis is ready, the steps are as follows: as with any other major acquisition programme we will seek the approval of the Supreme Council for National Defence (CSAT) and we will also ask Parliament to approve this programme as well. When I mentioned submarines I meant there is a request for three submarines. This is a medium and long-term programme. In our opinion, such a purchase could start after 2020 but everything is done through competitive dialogue, because we want things to go as much as possible to the benefit of Romania. Competitive dialogue means maximum transparency, compliance with both Romanian and European legal provisions and, ultimately, we are very interested in the offset of such contracts, such as the one for Corvette, where the offset will be used to modernise the frigates of the Romanian Navy," Fifor said at a news conference hosted by the Defence Ministry (MApN).

Asked if he had discussed with the German Defense Minister at the Munich Security Conference the acquisition of submarines, he said the meeting was aimed at German support for the Craiova Multinational Brigade and industrial co-operation.

"Germany cannot participate at a ministerial level in the acquisition of submarines. We had a very good bilateral relationship with the German defence minister, and we mentioned the support we were requesting from Germany for the development of the multinational brigade in Craiova. (...) We also discussed industrial cooperation, because every country asks for industrial cooperation. Everyone wants to know how Romania will contribute to the PESCO [Permanent Structured Cooperation] format and what industrial cooperation programmes Romania will join," said Fifor.

Indian Navy to get submarine rescue vehicles in June
Prasun Sonwalkar, Hindustan Times, February 17

LONDON - The two complete flyaway submarine rescue vehicles are to be delivered under a £193-million contract awarded to JFD, a leading underwater capability provider, in March 2016.

A Scotland-based company expects to supply two third-generation deep search and rescue vehicles (DSRVs) to the Indian Navy by June following the successful completion of harbour acceptance trials.

The two complete flyaway submarine rescue vehicles are to be delivered under a £193-million contract awarded to JFD, a leading underwater capability provider, in March 2016.

The systems include launch and recovery systems equipment, "transfer under pressure" systems, and all logistics and support equipment required to operate the DSRVs.

"The initial harbour acceptance trials of the first DSRV, which were undertaken at Glasgow's King George V dock, are now complete. As part of this process the system has been comprehensively tested in a variety of conditions," JFD said in a statement this week.

Following the harbour acceptance trials, the DSRV will be fully integrated with the rest of the rescue system at a site in Glasgow, including the offshore handling system, intervention suite and 90-person decompression facilities.

Ben Sharples, India DSRV project director at JFD, said: "The completion of the initial harbour acceptance trials for the first DSRV, to be delivered to the Indian Navy, is an important step in the delivery of this contract.

"This is part of the progressive acceptance of the system designed to drive out risk during the later stages of sea acceptance."

Sharples added that the third-generation DSRV marked a significant step-change in real world submarine rescue capability with its weight optimised for maximum payload and optimum transportability.

JFD said the system had been developed to maximise the chances of successfully rescuing the crew of a distressed submarine. The full certified systems are due to be delivered to Indian Navy in June, it said.

A total of 72 Indian Navy personnel have also been trained by JFD at a facility in Scotland to operate the vessels. The Indian Navy, which operates a mix of Russian and Western submarines, has for long projected a need for deep sea rescue vessels to cope with possible accidents.