

**MINUTES OF THE USSVI NORTHERN VIRGINIA BASE  
MEETING HELD ON SATURDAY, JANUARY 13, 2018**

The Base CDR, Chuck Martin, called the meeting to order at 1111 on 13 January, 2018 at American Legion Post 162, Lorton, VA and welcomed all members and guests.

**MEMBERS AND GUESTS IN ATTENDANCE**

CAPT Rich Arnold, Robbin Arnold, Steve Bishop, Cathy Chatham, Howard Chatham, Bob Glover, Steve Jaeger, Chuck Martin, Paul Nelson, Tim Oliver, Mike Varone, George Wallace, Penny Wallace, and Woody Woodworth. (14 attendees)

■ Holland Club Member

■ Associate Member

■ Guest

The COB, Mike Varone, led all hands in the Pledge of Allegiance.

The Chaplain, Steve Jaeger, delivered the Invocation.

The Chaplain read the list of boats lost in the month of January. These were:

USS Scorpion (SS-278)	Jan 5, 1944
USS Argonaut (SS-166)	Jan 10, 1943
USS Swordfish (SS-193)	Jan 12, 1945
USS S-36 (SS-141)	Jan 20, 1942
USS S-26 (SS-131)	Jan 24, 1942

The COB tolled the ship's bell twice for the 24 USSVI Northern Virginia members on Eternal Patrol.

**IN MEMORIAM:** RADM Peter Conrad, USN, Ret. – 12/10/2017, and CAPT Don V. Hahnfeldt, USN, Ret. – 12/24/2017

**INDUCTION OF 2016 BASE OFFICERS**

The Immediate Past Base Commander, Howard Chatham, swore in the newly-elected NOVA Base Commander, Chuck Martin.



Chuck Martin then swore in the other newly-elected NOVA Base officers:

Vice Commander      George Wallace  
Treasurer             Steve Jaeger  
Secretary              Steve Bishop



#### **APPOINTMENTS FOR BASE APPROVAL**

The Base Commander nominated the following members for Base appointed positions, subject to approval by the members present:

**CHIEF OF THE BOAT** – Mike Varone  
**MEMBERSHIP** – Steve Jaeger  
**PAO** – Mike Varone  
**VETERANS AFFAIRS** - Bill Clement  
**CHAPLAIN** – Steve Jaeger  
**KAPS 4 KIDS** – Steve Bishop  
**SUBMARINE HISTORIAN** - TBD  
**STOREKEEPER** – Howard Chatham  
**WEBMASTER** – Howard Chatham  
**SCOUTING COORDINATOR** – Chuck Martin  
**NJROTC/SCHOOL PROGRAM COORDINATOR** – TBD

The members in attendance unanimously approved these member volunteer appointments. Then Woody Woodworth inquired about the duties and responsibilities for the Base Submarine Historian. He volunteered for this position and then the members approved his appointment.

#### **MEETING MINUTES**

There was no December 2017 NOVA Base meeting due to the inclement weather. In lieu of meeting minutes, the News and Events for the December meeting have been distributed to the membership.

The Treasurer, Steve Jaeger, presented the Treasurer's monthly report:

Starting balance: \$ 8,838.93 (as of 14 OCT 2017)  
Receipts:             \$ 911.13  
Expenditures:      \$ 1,739.66

Ending balance: \$ 8,010.40  
Minus remaining K4K Walmart grant monies \$ 1,302.60  
Grand Total (Discretionary) \$6,707.80

The Treasurer then presented the Proposed 2018 NOVA Base budget. Copies were made available to all in attendance at the meeting. There was no discussion and the budget was approved by the members.

The Base CDR next presented the Proposed 2018 USSVI NOVA Base calendar. Copies were available on each table. The base members approved this 2018 Base calendar.

### **COMMITTEE REPORTS:**

The **Base Commander** presented a summary of the recent Executive Board Meeting held on January 3, 2018. Major items included: potential new members, plans for upcoming meetings and events, K4K program, updates to the Base website, 2018 Base Budget and Calendar, and the Eagle Scout Program.

The **Vice Commander** reported that there will be four NOVA Base Holland Club inductees for 2018 and clarified that this will not be a joint base event this year.

**COB** Nothing to Report (NTR)

**Membership Report** by Steve Jaeger: 80 members. This total includes 38 Holland Club members, 33 regular members, and 9 associate members.

The **PAO** noted that the MCPON has been invited to be the speaker at the Holland Club event and we are awaiting his confirmation that he will attend.

### **VETERANS AFFAIRS**

The Base CDR reported that Electronic IRS Form 1095-B (Affordable Care Act) for 2017 is available on myPay at <https://mypay.dfas.mil/>.

The **STOREKEEPER**, Howard Chatham, reported that 2018 USSVI Calendars are here. There are a few extras available for those who had not pre-ordered them.

### **KAPS 4 KIDS**

Our recent visits were:

- Fairfax INOVA in Falls Church, VA on Thursday October 26, 2017.
- Walter Reed Medical Center in Bethesda, MD on Thursday November 16, 2017 was cancelled by the nursing staff due to low census (that's a good thing in a cancer ward)

Our next K4K visit will be:

- Walter Reed Medical Center in Bethesda, MD on Thursday February 22, 2018 at 10:15 AM
- The older children will be receiving the new USSVI NOVA K4K Coloring Book.
- Our intent is to provide to each child we visit a nice folder containing the "Honorary Submariner" certificate, instructions on arranging a submarine tour, and a coloring book.

Steve Bishop also noted that he would be submitting requests for donations for our K4K program to local Walmart stores again this year.

### **CHAPLAIN**

Inurnment for Richard Lowry was held on Wednesday January 10, 2018 at Arlington National Cemetery. Present representing USSVI and USSVI NOVA Base were the CDR, VCDR, TREAS, COB, and Immediate Past CDR.

### **SCOUTING COORDINATOR**

Recent Eagle Scout Court of Honors:

Eagle Scout Luke Cann, Eagle Scout Court of Honor was held on January 9, 2018. The CDR, COB, and Immediate Past CDR attended/participated in the Court of Honor.

### **NJROTC/SCHOOL PROGRAM COORDINATOR**

Potomac Senior High School NJROTC has contacted the Base about teaching an introduction to Navigation class during the week of February 26. Steve Bishop is the Base's point of contact. He is coordinating with the school to obtain more information on the request. If you would like to volunteer to help contact Steve.

### **SUBLEAGUE**

The Sea Air Space Exposition will be in April.

Tim Oliver remarked on how well USSVI and NSL have worked together in the past on veteran's yard work, mutual advertising in each other's publications, and at Navy-related expositions getting out the word about submarines. He hopes this sharing continues going forward.

The Capitol Chapter luncheon will be Thursday, 1 February 2018 at the Army-Navy Country Club, Arlington, VA, 1130-1330 with the feature speaker being VADM Fritz Roegge, President of the National Defense University (and former COMSUBPAC).

### **OLD BUSINESS**

USS Scorpion (SSN 589) 50th Anniversary Memorial

- May 25 - 27, 2018 in Norfolk, Va.
- CNO, Admiral John M. Richardson is the keynote speaker for the memorial service.
- The Base made a donation of \$99 and is sponsoring crewmember RMCS Robert Johnson.

The Military & Veteran Legal Resource Guide by Virginia Office of the Attorney General

- Released in July 2017
- Outstanding resource for Military & Veterans

USSVI Membership Policy for 2018 Calendar Year

- Any Armed Services Active Duty member is eligible to join USSVI as a regular or associate member.
- Membership dues for first calendar year are waived.
- Restrictions

- An application must be sent into the National Office.
- Membership card will not be issued until their first renewal in December of 2018.
- Member will receive only the electronic version of the American Submariner during 2018.

Bob Glover reported that he had visited former Base Commander, Vice Commander, and Secretary Tom Perrault, at the Oakton, VA Sunrise medical facility on Hunter Mill Road, near Route 123. **Tom has Alzheimer's disease and would welcome visitors.**

## NEW BUSINESS

The Base CDR called Paul Nelson forward and then presented to him the Dick Higman Award for his dedicated service to the NOVA Base and its community activities. The award is named for the first USSVI Base Commander in Groton, CT.



The Base CDR presented to the Base the USSVI Northern Virginia Base Officers plaque and then the Eternal Patrol plaque.

- Special thanks to our VCDR, George Wallace, for making the plaques for the Base.

Nominations for the 2018 National Officer Elections are being taken until March 1st 2018.

- If you feel you would like to run for any of the below positions please send Al Singleman, Jr., Nomination Chairman, an e-mail at [al@ssbn657.com](mailto:al@ssbn657.com) with your nomination letter stating your qualifications for the position and a statement that if elected you will accept the position.
  - o Current nominees are:
    - National Commander - Wayne Standerfer
    - National Senior Vice Cdr- Jon Jaques
    - National Junior Vice Cdr - Steve Bell

- National Secretary - Ray Wewers
- National Treasurer - Paul Hiser
- Western Regional Director - Jim Denzien
- Central Regional Director- Tom Williams and Carl Schmidt
- Eastern Region North Director - Les Altschuler
- Eastern Region South Director - Ken Nichols

USSVI National Treasurer asks that any money being sent to USSVI for any reason be sent to the USSVI National Office. Indicate on the check memo line the purpose of the funds.

The U.S. Mint will commence the sale of the World War I Centennial 2018 Uncirculated Silver Dollar on Wednesday January 17 at noon (EST). The introductory price will start at \$48.95 and there is a combination set that includes the Navy Medal (other Services are also available). Funds from the sale will go toward building the WWI National Memorial.

Wreaths Across America's Wreath Retrieval/Clean-Up Day at Arlington National Cemetery is January 20<sup>th</sup>. The event begins at 0845 with the gates opening at 0800 and a briefing at 0830.

Veterans Administration will issue Veteran ID Cards. You can request a copy of the new Veteran ID Card at <https://www.vets.gov/veteran-id-card/>.

Howard Chatham noted that the Smithsonian Channel was starting a new series on Combat Ships. The first episode will be the week of 1/15/18 entitled War Beneath the Waves and will discuss the evolution of submarines.

### **The Binnacle List**

Please keep in your thoughts and prayers:

Al Anceravage, Barbara Harmody, Steve & Darlene Jaeger for Darlene's mom, Howard & Cathy Chatham on the passing of Cathy's sister, Tony Poblete, Tom Perrault, and Ray Stone.

**For the Good of the Order**, the VCDR read the list of birthdays for January: Dan Arquette, George Billy, Hank Chiles, Nader Elquindi, Bob and Susan Glover, Bruce Miller, Mike Murphy, Einer Nielson, and Judy Perrault.

The 50/50 raffle was won by Woody Woodworth and he donated his winnings back to the Base Gold Bucket for the USSVI Scholarship program. THANK YOU, Woody!!

The Benediction was delivered by the Chaplain.

The next regularly scheduled meeting will be on February 10<sup>th</sup> at American Legion Post 162 with a Sweethearts luncheon at Paradiso Italian Restaurant following the meeting.

The CDR requested a motion to adjourn. It was so moved and seconded. The meeting was adjourned at 1200.

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After a short break, the Base VCDR introduced CAPT Rich Arnold (PMS 401).



CAPT Arnold graduated with a B.S. in Marine Engineering from the U.S. Naval Academy in 1992. Following Nuclear Power training, CAPT Arnold reported to the USS PARCHE (SSN 683) in November of 1993. He completed three deployments during this tour prior to transferring to the Nuclear Power Training Unit, Charleston in December of 1996.

After shore duty, CAPT Arnold attended the Submarine Officer Advance Course and reported to the USS MONTPELIER (SSN 765) in November of 1999 for duty as the Engineer Officer. During this tour, he completed a UNITAS deployment to South America. In November of 2002, CAPT Arnold transferred to the Office of Undersea Surveillance on the OPNAV staff.

He then attended the Air Force Command and Staff College in Montgomery, Alabama. Following this tour, he reported to the USS ALBUQUERQUE (SSN 706) as Executive Officer. While onboard, ALBUQUERQUE conducted a six month CENTCOM deployment and was awarded the 2006 COMSUBRON TWO Battle Efficiency "E".

In June of 2007, CAPT Arnold transferred to Washington, D.C. where he served as the Director of Undersea Warfare Programs for the Deputy Assistant Secretary of the Navy.

CAPT Arnold took command of USS DALLAS (SSN 700) in August of 2009. During his tour, DALLAS completed a shipyard availability and a six month CENTCOM deployment. He completed his command tour in March of 2012.

Following command, CAPT Arnold reported to OPNAV N81 where he served as the analysis section head for the Force Structure and Integration Branch from April of 2012 to November of 2013. He served as the Director of Fleet Integration for the Unmanned Maritime Systems Program Office (PMS406) from November of 2013 to April of 2015. He served as the Director for Future Systems and Fleet Liaison for the Submarine Acoustics Program Office (PMS401) from April of 2015 to April of 2016. In April of 2016, he relieved as the Program Manager for PMS401.

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The Captain gave us an unclassified briefing on PMS 401's responsibilities for submarine acoustics systems. His office produces, procures, installs, and sustains submarine and surface ship sonar systems. He receives newly-developed systems at Milestone 3. Aboard SSNs, and now aboard SSBNs also, his teams install together as a package upgrade: acoustics, fire control, imaging, and EW systems.

Today's acoustic systems use commercial processors and software code that is off the shelf. The Technical Insertions (TI) are for hardware and they are always "state of the practice". Advanced

Processor Builds (APBs) are the software upgrades.

His office usually modernizes 8 SSNs per year. His “Raiders of the Lost Ark” warehouse is in Manassas, VA for all sonar equipment removed from all upgrades. Additionally, his office acts as the Navy’s supply system for outboard cables and hydrophones. His office owns all the systems’ components which connect the seawater to the glass display in front of the operator.

Towed arrays are the bane of PMS 401’s existence. These include the TB 34A, TB 29X, and the Compact Towed Array.

Hydrophones are no longer just used in bow or spherical arrays. The Large Vertical Array and the Low Cost Conformal Array are working well in the fleet, and some of them even incorporate lasers in their operation.

20% of his budget and 33% of his manpower goes to fleet support. Improved diagnostics built into the operating sonar systems lead to improved anticipatory maintenance actions. Having at least two PMS 401- supported tech reps in each submarine homeport helps the active duty sailors maintain the systems in top operating condition.

The Base CDR thanked CAPT Arnold and presented him with a USSVI NOVA Base challenge coin. In return, the Captain presented Chuck with his PMS 401 Command’s challenge coin. Thank you!!!



Meeting Minutes Respectfully Submitted by  
Stephen C Bishop  
Secretary  
USSVI Northern Virginia Base



## **UNDERSEA WARFARE NEWS**

## U.S. Undersea Warfare News

### [USS Jacksonville Arrives In Bremerton To Be Decommissioned After 36 Years Of Submarine Service](#)

[Staff, Q13 Fox, December 11](#)

**BREMERTON, Wash.** — The Los Angeles-class fast-attack submarine USS Jacksonville arrived at Naval Base Kitsap-Bremerton on Monday to be decommissioned.

The USS Jacksonville was commissioned on May 16, 1981, and is named for the largest and most populous city in Florida.

The USS Jacksonville completed its most recent deployment on Aug. 10, 2017. The boat and crew spent 208 days at sea, covered 48,000 nautical miles and conducted security operations and joint exercises with Japan's and India's navies.

The Jacksonville has been homeported in Hawaii since 2009. It departed Joint Base Pearl Harbor-Hickam for Bremerton on Dec. 4 and arrived Monday.

During the inactivation process, the Puget Sound Naval Shipyard and Intermediate Maintenance Facility will de-fuel the submarine, with the hull retained in safe storage until decommissioning.

### [GAO Report on Columbia-Class Ballistic Missile Submarine Technology Maturity](#)

[Staff, USNI News, 26 December](#)

The following is a December 2017 Government Accountability Office report, Columbia Class Submarine: Immature Technologies Present Risks to Achieving Cost, Schedule, and Performance Goals.

From the report:

Additional development and testing are required to demonstrate the maturity of several Columbia class submarine technologies that are critical to performance, including the Integrated Power System, nuclear reactor, common missile compartment, and propulsor and related coordinated stern technologies (see figure). As a result, it is unknown at this point whether they will work as expected, be delayed, or cost more than planned. Any unexpected delays could postpone the deployment of the lead submarine past the 2031 deadline.

Further, the Navy underrepresented the program's technology risks in its 2015 Technology Readiness Assessment (TRA) when it did not identify these technologies as critical. Development of these technologies is key to meeting cost, schedule, and performance requirements. A reliable TRA serves as the basis for realistic discussions on how to mitigate risks as programs move forward from the early stages of technology development. Not identifying these technologies as critical means Congress may not have had the full picture of the technology risks and their potential effect on cost, schedule, and performance goals as increasing financial commitments were made. The Navy is not required to provide Congress with an update on the program's progress, including its technology development efforts, until fiscal year 2020—when \$8.7 billion for lead ship construction will have already been authorized. Periodic reporting on technology development efforts in the interim could provide decision makers assurances about the remaining technical risks as the Navy asks for increasing levels of funding.

Consistent with GAO's identified best practices, the Navy intends to complete much of the submarine's overall design prior to starting construction to reduce the risk of cost and schedule growth. However, the Navy recently awarded a contract for detail design while critical technologies remain unproven—a practice not in line with best practices that has led to cost growth and schedule delays on other programs. Proceeding into detail design and construction with immature technologies can lead to design instability and cause construction delays. The

Navy plans to accelerate construction of the lead submarine to compensate for an aggressive schedule, which may lead to future delays if the technologies are not fully mature before construction starts, planned for 2021.

## [The Navy's High-Tech New Torpedo Is Back After Six Years](#)

[Kris Osbron, Warrior Scout, December 26](#)

The U.S. Navy is now engineering a new, longer range and more lethal submarine-launched heavyweight Mk 48 that can better destroy enemy ships, subs and incoming weapons at longer ranges, service officials said.

Many details of the new weapon, which include newer propulsion mechanisms and multiple kinds of warheads, are secret and not publicly available. However, senior Navy leaders have previously talked to Scout Warrior about the development of the weapon in a general sense.

Naturally, having a functional and more high-tech lethal torpedo affords the Navy an opportunity to hit enemies at further standoff ranges and better compete with more fully emerging undersea rivals such as Russia and China.

Progress with new torpedo technologies is happening alongside a concurrent effort to upgrade the existing arsenal and re-start production of the Mk 48, which had been on hiatus for several years.

A MK 48 ADCAP torpedo is unloaded from the fast-attack submarine USS Annapolis by Sailors from the Submarine Base New London weapons department during a snowstorm.

A MK 48 ADCAP torpedo is unloaded from the fast-attack submarine USS Annapolis by Sailors from the Submarine Base New London weapons department during a snowstorm.

Navy officials did add that some of the improvements to the torpedo relate to letting more water into the bottom of the torpedo as opposed to letting air out the top.

The earlier version, the Mk 48 Mod 6, has been operational since 1997 - and the more recent Mod 7 has been in service since 2006.

Lockheed has been working on upgrades to the Mk 48 torpedo Mod 6 and Mod 7 - which consists of adjustments to the guidance control box, broadband sonar acoustic receiver and amplifier components.

Lockheed developers told Scout Warrior last year that Lockheed is now delivering 20-upgrade kits per month to the Navy.

Part of the effort, which involves a five-year deal between the Navy and Lockheed, includes upgrading existing Mod 6 torpedoes to Mod 7 as well as buying brand new Mod 7 guidance control sections.

The new Mod 7 is also resistant to advanced enemy countermeasures.

Modifications to the weapon improves the acoustic receiver, replaces the guidance-and-control hardware with updated technology, increases memory, and improves processor throughput to handle the expanded software demands required to improve torpedo performance against evolving threats, according to Navy information on the weapon.

The Mod also provides a significant reduction in torpedo radiated-noise signatures, a Navy statement said.

Alongside Lockheed's work to upgrade the guidance technology on the torpedo, the Navy is also preparing to build new Mk 48s.

Upgrades to the guidance control section includes the integration of a system called Common Broadband Advanced Sonar System, or CBASS - electronics to go into the nose of the weapon as part of the guidance section, Lockheed developers explained.

This technology provides streamlined targeting and allows the torpedo to transmit and

receive over a wider frequency band, Lockheed engineers said.

The new technology involves adjustments to the electronic circuitry in order to make the acoustic signals that are received from the system that allow the torpedo to better operate in its undersea environment.

Upgrades also consist of movement to what's called an "Otto fuel propulsion system," Lockheed officials added.

Lockheed will deliver about 250 torpedoes over the next five years. The Mk 48, which is a heavy weapon launched under the surface, is quite different than surface launched, lightweight Mk 54 torpedoes fired from helicopters, aircraft and surface ships.

The Navy's Mk 48 torpedo is also in service with Australia, Canada, Brazil and The Netherlands.

A Mk 48 torpedo is 21 inches in diameter and weighs 3,520 pounds; it can destroy targets at ranges out to five miles and travels at speeds greater than 28 knots. The weapon can operate at depths greater than 1,200 feet and fires a 650-pound high-explosive warhead.

## **International Undersea Warfare News**

### **[Wrapped In Secrecy: New Report Reveals India's Push For Building A Nuclear Submarine Fleet](#)** **[Staff, Swarajya, December 12](#)**

India's costliest defence project — a Rs 90,000 crore push to develop and construct a fleet of nuclear-powered and nuclear-armed submarines monitored directly by National Security Adviser Ajit Doval — has been making progress away from media glare.

The effort has borne fruit in recent years in the form of INS Arihant – India's first indigenously built SSBN – a submarine that is powered by a nuclear reactor and is equipped with nuclear-tipped ballistic missiles. The second Arihant class submarine, INS Arighat, was launched by Defence Minister Nirmala Sitharaman during a low profile ceremony at the Ship Building Centre (SBC) drydock in Visakhapatnam on 19 November, a report by Sandeep Unnithan of India Today has revealed.

A high-profile launch of Arighat, a move that could have helped the government given elections in Gujarat, was rejected by the Prime Minister's Office to maintain a high level of secrecy, the report has revealed. Arighat would undergo extensive sea trials for three years before being commissioned into the Indian Navy.

Two other SSBNs, which are still unnamed, will be launched by 2020 and 2022. The two boats will displace 1,000 tonnes more than the Arihant class and will be equipped with eight ballistic missiles or twice the Arihant's missile load. The design was tweeted a decade ago to make space for additional missiles after the then finance minister P Chidambaram questioned the utility of having just four nuclear-tipped missiles on a boat worth billions.

The nuclear reactor for these submarines has been developed by the Atomic Research Centre, and the Defence Research and Development Organisation (DRDO) has developed submarine-launched ballistic missiles (SLBMs) to arm the boats.

It doesn't end here. On 1 December, Navy Chief Admiral Sunil Lanba revealed that a Rs 60,000 crore project to build six indigenous nuclear-powered attack submarines (SSNs) had been kicked-off by the Navy. SSNs are conventionally armed submarines powered by nuclear reactors. Unlike the SSBNs, these boats do not carry nuclear-tipped missiles. Design work for the submarines, displacing around 6,000 tonnes, is currently underway at the submarine design centre in Gurgaon.

The Navy is also working on a new series of 13,500-tonne ballistic missile submarines. The boats, built under this project, will be capable of carrying 12 nuclear-tipped missiles, compared to four carried by the Arihant-class submarines. Submarines developed under this project, the report says, will be on par with those fielded by the five permanent members of the United Nations. To be built at least a decade from now, the submarines will have 80 per cent. indigenous component.

India is, therefore, working on three different nuclear submarine projects at the same time. Although the effort behind the projects is indigenous with 60 per cent of the component for the Arihant-class being sourced from local manufacturers, the Navy has benefited from close design and technical cooperation with Russia. New Delhi is currently in talks with Moscow to lease another Akula-class submarine to replace the existing INS Chakra after its lease ends in 2022. INS Chakra, having suffered damage in an incident earlier this year, is currently non-operational.

Another important development comes in the form of Project Varsha. The project involves the construction of a nuclear submarine base for the Navy, reportedly at the cost of Rs 30,000 crore by 2022. The base will have concrete pens to securely house one of India's costliest and most-advanced defence platforms.

Induction of these submarines, many of which are expected to be in active service by the end of the next decade, will strengthen India's nuclear triad – the ability to launch a nuclear attack from land, air and sea. Although the naval variant of the triad is currently operational with INS Arihant in service, it is not as strong as that of China's. The People's Liberation Army Navy has at least four SSBNs in service.

The push for nuclear submarines also assumes greater importance as India has reportedly decided to hold back on its plan to build a nuclear-powered aircraft carrier. A platform that is powered by nuclear reactors can remain operational for an extended period without breaks. Therefore, if India decides to have a conventional aircraft carrier, its reach would remain limited. Nuclear-powered submarines will be the only platforms that would provide the Indian Navy with the option to reach far-off waters.

Additionally, nuclear propulsion helps submarines move faster underwater, making them difficult to locate and track.

While the platforms are being designed and built, India has also been working on the armament. The DRDO has made progress on the K-series missiles, named after former president A P J Abdul Kalam. As part of the series, DRDO has developed K-15 (also called B-05) missile with a range of 750-km. While the K-15 has entered series production, the next missile in the series – K-4 – is in the trial phase.

The fourth test of the K-4, which has a range of around 3,500 km, is expected sometime in December, the India Today report says. This will be followed by tests of K-5 missile, a 5,000 km SLBM. Work on the fourth missile in this series – K-6 – began at DRDO's Hyderabad-based Advanced Naval Systems in February. The missile is reported to have a range of 6,000 km.

## **[New Target In Search For Missing Argentine Submarine](#)**

**[Staff, NDTV, December 12](#)**

**BUENOS AIRES, ARGENTINA** – Workers used sonar equipment Monday to get the facts on objects found 26 days after an Argentine submarine went missing with 44 crew members aboard.

President Mauricio Macri and the navy consider the crew to have been tragically lost.

But family members desperate for closure have been pushing for the search to continue until the vessel is located and questions about its fate are answered, despite a series of false hopes.

"A new object has been found at 1,000 meters (3,280 feet) with sonar search equipment in the South

Atlantic. And it is being looked at to determine if it could be the Argentine sub," along with a second object at about 700 meters, navy spokesman Enrique Balbi told reporters.

They were spotted by the US vessel Atlantis.

Authorities have not set any date for when the search might be officially abandoned.

The navy's final contact with the German-built ARA San Juan, a 34-year-old diesel-electric sub, came on November 15, when it was sailing in the South Atlantic 450 kilometers (280 miles) from the coast.

In its final communication, the submarine reported it had overcome a mechanical breakdown that resulted from a short circuit due to water that seeped through the vessel's snorkel.

Three hours later, a noise similar to an explosion was recorded 48 kilometers from where the crew had given its last report.

The position was in line with the planned path the submarine would have taken to reach its base in Mar del Plata, according to the navy.

## [Australian First World War Submarine Discovered 103 Years After It Mysteriously Vanished](#)

[Tom Embury-Dennis, Independent, December 21](#)

The wreck of an allied First World War submarine has been discovered 103 years after it sank off the coast of Papua New Guinea.

The fate of the 800-tonne vessel was Australia's longest-running naval mystery after it vanished on 14 September 1914 without a distress call.

But following 13 separate retrieval attempts over the past century, an expedition was launched this week which found the submarine 300 metres (984ft) below the sea off the coast of the Duke of York Island group.

The HMAS AE1, which had 35 crew members aboard from Australia, New Zealand and Britain when it disappeared, was the first ever launched by the Royal Australian Navy (RAN) and its first wartime loss.

It had been sent from Sydney to help capture what was then German New Guinea, but disappeared a day after Germany surrendered the colony.

The images captured by the expedition show the submarine apparently in one piece. The Navy described the wreck as "remarkably well preserved".

Marise Payne, Australian defence minister, said that while the reasons for the submarine's sinking remain unclear, the Australian government was now trying to contact descendants of those killed on board.

"It was the first loss for the RAN and the first Allied submarine loss in the First World War — a significant tragedy felt by our nation and our allies," she said in a statement.

Ms Payne said a commemorative service was held to remember those who died after the vessel was found. Australia will now discuss with the Papua New Guinean government the building of a lasting memorial and ways to preserve the site.

The AE1 made final contact with an Australian ship at 2.30pm the day it disappeared. Mystified villagers on a nearby island at the time spoke of seeing a "monster" or "devil fish" that appeared and quickly disappeared into the water.

It had always been assumed the AE1 was not a victim of enemy action, since the only German vessel nearby at the time was a small survey ship.

Because no wreckage, oil or bodies were found, it was also believed the AE1 sank intact, most likely after striking a reef that punched a hole in the pressure hull. Whether or not this is what happened is still to be publicly verified.

## [What is Known About Russia's 5th Gen Husky-Class Stealth Subs](#)

[Staff, Sputnik News, December 20](#)

The first Husky-class submarine is planned to be completed by 2030. The fifth-generation sub will join Russia's fleet of nuclear-powered submarines, many of which are currently being modernized, including with advanced cruise missiles.

As Russia continues to build its new Yasen-class nuclear submarines and keeps modernizing the Soviet-era Shchuka-class submarines, the Russia Navy has set its sights on a fifth-generation multipurpose sub, which is already in development.

The project is known under the name "Husky" and is planned to replace the Shchuka- and Yasen-class submarines.

On Wednesday, the commander of the Russian Navy, Adm. Vladimir Korolev, reviewed the preliminary design of a fifth-generation submarine, which was developed by St. Petersburg Marine Design Bureau "Malachite."

The research and development stage of the project is scheduled to be completed next year. The first Husky-class submarine will be laid down in 2023-2024 and will be completed by 2030, Deputy Navy Commander Vice Adm. Viktor Bursuk told Sputnik in July.

The construction will be funded under the 2018-2025 State Armaments Program, adopted in 2015 and defining massive military hardware upgrades, with the plan of 70 percent rearmament by 2020.

Open sources provide very few details on the project, but what is known already suggests that it will be a breakthrough in scientific and technological terms.

Hypersonic Arsenal

According to information from open sources, the main feature of the new Russian submarine will be armed with the 3M22 Zircon hypersonic anti-ship missile, which is already undergoing tests.

The specifications of the missile are also kept secret. It is known that the Zircon will be able to reach speeds of Mach 5-10 (5-10 times faster than the speed of sound) and hit a target at a distance of 300-500 kilometers. Currently, the Russian Navy has in service anti-ship missiles with a maximum speed of Mach 2-2.5.

"The threats are getting more obvious and more dangerous now. They need to be responded," Adm. Vladimir Komoedov, former commander of the Black Sea Fleet, told RIA Novosti. "I advocate for a multipurpose submarine with maximum versatility. It should have reliable target detections and weapons systems. In addition, it should be able to receive target information from aviation and from space."

According to Western and Russian experts, the deployment of Zircon missiles will weaken the positions of the United States' naval force, which is based on aircraft-carrier striking groups. The National Interest's observer Sebastien Roblin suggested that the new missile would be more dangerous for the US Navy than the Soviet-made Granit missiles (NATO reporting name Shipwreck).

According to Komoedov, the Russian Navy needs new multipurpose submarines that would be armed with a hypersonic anti-ship missile, instead of the Kalibr subsonic cruise missile.

Stealth, Equipped With Robots

The key difference between the Husky-class and the submarines of previous generations is its extremely low level of noise. According to Bursuk, the new submarine will be at least twice as silent as the Yasen- and Shchuka-class.

The construction of the Husky-class will involve light and durable composite materials. The submarine will be equipped with advanced electronic systems and will have automatic control and weapons systems. As a result, the submarine will be relatively compact and will be capable of simultaneously tracking a large number of targets.

Oleg Vlasov, head of the robotics sector of the Malakhit Marine Engineering Bureau, said that the Husky-class submarine would be equipped with robotic systems to be used

for carrying out tasks for military and civilian purposes.

"I can say that there will be robotics on the Husky, which will work in two environments. The development is already underway, now that the forms are laid out, they will be specified," Vlasov told Sputnik.

#### Russia's Fleet of Nuclear Submarines

The construction of fifth-generation nuclear-powered submarines will begin after the commission of seven Yasen-class (project 885) submarines, which are planned to join the Russian Navy by 2023. The flagship, the Severodvinsk, is already in service.

The second submarine, the Kazan, has been floated out and is undergoing sea trials, after which it will join the military in 2018. It will be armed with 533-mm torpedoes, Kalibr-PL cruise missiles and P-800 Oniks missiles.

"A global war today is unlikely, but the risk of regional conflicts is high. Taking this into account, submarines armed with cruise missiles will be tremendously important because they can attack both surface and ground targets," Adm. Vyacheslav Popov, former commander of the Northern Fleet, told RIA Novosti.

The Russian Naval Doctrine envisages that such submarines will be the core of the multipurpose submarine force until the Husky-class submarines enter service.

According to Popov, today the most important capability of a naval force is versatility.

According to the Military Balance report by The International Institute for Strategic Studies (IISS), the Russian multipurpose submarine force currently includes one Yasen-class submarine, 11 Shchuka-class submarines, five Antey-class subs, two Kondor submarines (project 945A) and three project 671RTM (Shchuka-class, second generation) submarines.

Currently, several project 971 submarines are undergoing modernization, including being equipped with Kalibr-PL missiles. By 2025, four Antey submarines will be upgraded with Kalibr and Oniks missiles.