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Press Information Bureau
Government of India

Ministry of Defence

Mon, 01 March 2021 6:22PM

DRDO Celebrates National Science Day

National Science Day 2021 was celebrated in Defence Research & Development Organisation, DRDO Head Quarter in New Delhi today on 1st March, 2021 with great fervour. To mark the occasion, a special function was organised by Defence Science Forum. Principal Scientific Advisor to Government of India, Prof K Vijay Raghavan was the Chief Guest on the occasion. The function was presided over by Secretary DDR&D and Chairman DRDO Dr G Satheesh Reddy.

In his keynote address, Prof Vijay Raghavan said that there is a significant amount of work being done by DRDO that epitomizes quality science. He appreciated the speed and quality of innovations by DRDO during the pandemic. He stated that “we are a design driven world, and our two major goals should be designing and manufacturing indigenously”. He further said that in this new era of partnership between DRDO and industry, we should have the capability to buy local and make local.

Secretary DD R&D and Chairman DRDO in his address congratulated the scientific community for its ongoing quest to achieve excellence and self reliance. He emphasised the need to concentrate on science in laboratories and academic institutes to come out with state of art technologies. He highlighted the requirement for a focus group in each DRDO laboratory to work on future technologies. Dr G Satheesh Reddy further said that it is very important for any nation to work on the fundamental side of science, for which the universities need to be made stronger, so that the nation can come out with quality products.

Forty-Seven research papers were received from various DRDO labs/establishments, out of which three research papers were adjudged best. Defence Science Spectrum, a compilation of the scientific papers received from labs of various clusters, was also released by dignitaries on the occasion. DRDO Science Day orations were delivered by scientists of three DRDO laboratories namely, Advanced Systems Laboratory (ASL), Hyderabad, Aeronautical Development Establishment (ADE), Bengaluru and Defence Research and Development Establishment (DRDE), Gwalior.

National Science Day is celebrated each year on 28 February to commemorate the discovery of “Raman Effect” in 1928 by Sir Chandrasekhara Venkata Raman, which led to the Nobel Prize being awarded to him in the year 1930. The purpose of celebrating this day is to enhance scientific



temper, popularization of science and encouraging innovative activities by infusing scientific temperament in the masses and to create a positive scientific research culture.

Defence Science Forum is a platform of DRDO where scientists of various discipline interact to foster fellowship, exchange of ideas with luminaries of different disciplines and feasibility and planning of all inter-disciplinary projects where expert opinion is required.

Director General (DG), Life Sciences, and Convenor Defence Science Forum, Dr AK Singh, DG (TM), Shri Sudhir Gupta, DG (HR) Shri KS Varaprasad and DG (SAM & R&M) Ms Nabanita Radhakrishnan were also present on the occasion.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701739>



पत्र सूचना कार्यालय

भारत सरकार

रक्षा मंत्रालय

Mon, 01 March 2021 6:22PM

डीआरडीओ ने राष्ट्रीय विज्ञान दिवस मनाया

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) मुख्यालय में आज दिनांक 1 मार्च, 2021 को राष्ट्रीय विज्ञान दिवस 2021 बड़े हर्षोल्लास के साथ मनाया गया। इस अवसर पर रक्षा विज्ञान मंच द्वारा एक विशेष समारोह का आयोजन किया गया। इस अवसर पर भारत सरकार के प्रधान वैज्ञानिक सलाहकार

प्रो. विजय राघवन मुख्य अतिथि थे। समारोह की अध्यक्षता रक्षा अनुसंधान एवं विकास विभाग (डीडीआर एंड डी) के सचिव और रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के अध्यक्ष डॉ जी सतीश रेड्डी ने की।

मुख्य भाषण में प्रो विजय राघवन ने कहा कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने बहुत महत्वपूर्ण कार्य किया है जो बेहतर विज्ञान का प्रतीक है। उन्होंने महामारी के दौरान रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा नवाचारों की गति और गुणवत्ता की सराहना की। उन्होंने कहा कि "हमारा संसार एक डिजाइन संचालित संसार है, और हमारे दो प्रमुख लक्ष्य स्वदेशी रूप से डिजाइन और विनिर्माण करना होने चाहिए"। उन्होंने आगे कहा कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और उद्योग जगत के बीच साझेदारी के इस नए युग में हमारे पास स्थानीय रूप से खरीदने और स्थानीय रूप से बनाने की क्षमता होनी चाहिए।

रक्षा अनुसंधान एवं विकास विभाग (डीडीआर एंड डी) के सचिव और रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के अध्यक्ष ने अपने संबोधन में वैज्ञानिक समुदाय को उत्कृष्टता और आत्मनिर्भरता हासिल करने के लिए चल रही खोज के लिए बधाई दी। उन्होंने कला प्रौद्योगिकियों की स्थिति के साथ आने के लिए प्रयोगशालाओं और अकादमिक संस्थानों में विज्ञान पर ध्यान केंद्रित करने की आवश्यकता पर बल दिया। उन्होंने भविष्य की प्रौद्योगिकियों पर काम करने के लिए रक्षा अनुसंधान एवं विकास संगठन



(डीआरडीओ) की प्रत्येक प्रयोगशाला में एक फोकस समूह की आवश्यकता पर प्रकाश डाला। डॉ जी सतीश रेड्डी ने आगे कहा कि किसी भी राष्ट्र के लिए विज्ञान के मौलिक पक्ष पर काम करना बहुत जरूरी है, जिसके लिए विश्वविद्यालयों को मजबूत बनाने की जरूरत है ताकि राष्ट्र गुणवत्तापूर्ण उत्पाद लेकर सामने आ सके।

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की विभिन्न प्रयोगशालाओं/प्रतिष्ठानों से 47 शोध पत्र प्राप्त हुए, जिनमें से तीन शोध पत्रों को सर्वश्रेष्ठ घोषित किया गया। इस अवसर पर विभिन्न समूहों की प्रयोगशालाओं से प्राप्त वैज्ञानिक पत्रों के संकलन डिफेंस सर्विस स्पेक्ट्रम का गणमान्य व्यक्तियों द्वारा विमोचन भी किया गया। डीआरडीओ विज्ञान दिवस ओरेशन को तीन रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) प्रयोगशालाओं नामतः एडवांस सिस्टम लेबोरेट्री (एएसएल), हैदराबाद, एयरोनॉटिकल डेवलपमेंट एस्टेब्लिशमेंट (एडीई), बेंगलुरु और रक्षा अनुसंधान एवं विकास प्रतिष्ठान (डीआरडीई), ग्वालियर- के वैज्ञानिकों द्वारा वितरित किया गया।

सर चंद्रशेखर वेंकट रमन द्वारा 1928 में "रमन प्रभाव" की खोज के उपलक्ष्य में हर साल 28 फरवरी को राष्ट्रीय विज्ञान दिवस मनाया जाता है, जिस खोज के परिणामस्वरूप उन्हें वर्ष 1930 में नोबेल पुरस्कार प्रदान किया गया। इस दिन को मनाने का उद्देश्य वैज्ञानिक सोच को बढ़ाना, विज्ञान को लोकप्रिय बनाना एवं आम जनता में वैज्ञानिक स्वभाव को पैदा करके अभिनव गतिविधियों को प्रोत्साहित करना तथा एक सकारात्मक वैज्ञानिक अनुसंधान संस्कृति का निर्माण करना है।

डिफेंस साइंस फोरम, रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) का एक मंच है जहां विभिन्न विषयों के वैज्ञानिक फैलोशिप को बढ़ावा देने, विभिन्न विषयों के दिग्गजों के साथ विचारों का आदान-प्रदान करने और उन सभी अंतर-अनुशासनात्मक परियोजनाओं की व्यवहार्यता और योजना बनाने के लिए बातचीत करते हैं जिनमें विशेषज्ञ राय की आवश्यकता होती है।

इस अवसर पर जीवन विज्ञान के महानिदेशक (डीजी) एवं संयोजक डिफेंस साइंस फोरम डॉ ए के सिंह, महानिदेशक (टीएम) श्री सुधीर गुप्ता, महानिदेशक (मानव संसाधन) श्री के एस वराप्रसाद एवं महानिदेशक (सैम एंड आरएंडएम) सुश्री नवनीत राधाकृष्णन भी उपस्थित थे।

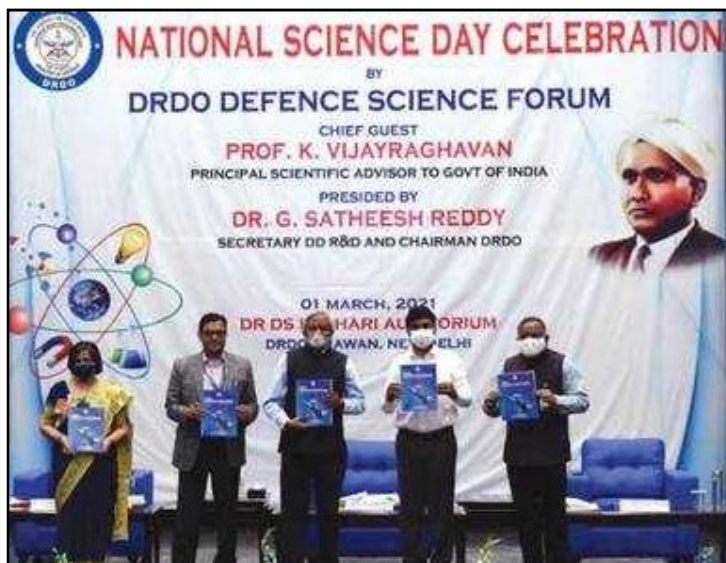
<https://pib.gov.in/PressReleasePage.aspx?PRID=1701791>

DRDO Chairman Satheesh Reddy says focus groups needed in labs to develop future technologies

By Ch Sushil Rao

Hyderabad: DRDO Chairman G Satheesh Reddy on Monday said there was a need for a focus group in each DRDO laboratory to work on future technologies. He was speaking at the National Science Day 2021 at DRDO HQs in New Delhi on Monday at a function organised by Defence Science Forum.

Satheesh Reddy who is the Secretary DD R&D and DRDO Chairman congratulated the scientific community for its ongoing quest to achieve excellence and self-reliance. He emphasised the need to concentrate on science in laboratories and academic institutes and to come out with state of the art technologies. Satheesh Reddy highlighted the requirement for a focus group in each DRDO laboratory to work on future technologies. "It is important for any nation to work on the fundamental side of science, for which universities need to be made stronger. With this, the nation can come out with quality products," he said.



DRDO Chairman G Satheesh Reddy and Principal Scientific adviser K Vijay Raghavan and others at the national science day organised in Delhi on Monday

Principal Scientific Advisor to Govt. of India, Prof K Vijay Raghavan said there was a significant amount of work being done by DRDO that epitomizes quality science. He appreciated the speed and quality of innovations by DRDO during the pandemic. He said in a ordesign driven world, two major goals should be designing and manufacturing indigenously. "In the new era of partnership between DRDO and industry, we should have the capability to buy local and make local," he said.

Forty Seven research papers were received from various DRDO labs/establishments, out of which three research papers were adjudged best. Defence Science Spectrum, a compilation of the scientific papers received from labs of various clusters, was also released by dignitaries on the occasion. DRDO Science Day orations were delivered by scientists of three DRDO laboratories namely, Advanced Systems Laboratory (ASL), Hyderabad, Aeronautical Development Establishment (ADE), Bengaluru and Defence Research and Development Establishment (DRDE), Gwalior.

Dr AK Singh, Director General (DG), Life Sciences, and Convenor Defence Science Forum delivered the welcome address. Sudhir Gupta, DG (TM), K S Varaprasad, DG (HR) and Nabanita Radhakrishnan DG (SAM & R&M) were also present on the occasion.

National Science Day is celebrated each year on February 28 to commemorate the discovery of "Raman Effect" in 1928 by Sir Chandrasekhara Venkata Raman, which led to the Nobel Prize being awarded to him in 1930.

Defence Science Forum is a platform of DRDO where scientists of various disciplines interact to foster fellowship, exchange of ideas with luminaries of different disciplines and feasibility and planning of all inter-disciplinary projects where expert opinion is required.

<https://timesofindia.indiatimes.com/home/education/news/drdo-chairman-satheesh-reddy-says-focus-groups-need-in-labs-to-develop-future-technologies/articleshow/81274934.cms>

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Tue, 02 March 2021

Visakhapatnam: NSTL celebrates National Science Day

Highlights

- **Visakhapatnam: Naval Science and Technological Laboratory (NSTL), the premier naval research laboratory of Defence Research and Development Organisation.**

Visakhapatnam: Naval Science and Technological Laboratory (NSTL), the premier naval research laboratory of Defence Research and Development Organisation (DRDO), celebrated 'National Science Day' here on Monday.

Participating as Chief Guest, Director of National Institute of Ocean Technology (NIOT), Ministry of Earth Sciences GA Ramadass paid floral tributes to the portrait of Sir CV Raman.

Dr. Ramadass delivered a talk on 'Ocean Research – A Civilian Perspective'. He explained the work being carried out by NIOT in emerging and futuristic areas of oceanography in detail.

Samir V Kamat, Distinguished Scientist and Director General (Naval Systems and Materials) DRDO, OR Nandagopan, Outstanding Scientist and Director of NSTL and other dignitaries were present.



Director of National Institute of Ocean Technology (NIOT), Ministry of Earth Sciences, G A Ramadass delivering a talk as a part of the National Science Day celebrations organised by NSTL in Visakhapatnam on Monday

This year, B Suresh Kumar, Scientist-E and K Anjappa, Scientist 'B' walked away with silicon medal for their work on 'design and development of FPGA based on shock and vibration measurement system'.

Scientists, officers, members of NSTL Civil Employees Union, works committee; and staff of NSTL participated in the celebrations.

<https://www.thehansindia.com/andhra-pradesh/visakhapatnam-nstl-celebrates-national-science-day-674778>

Why did Indian Army select Prithvi missiles to strike Pakistan after the deadly 2019 aerial skirmish?

India's Modi government had reportedly ordered the army to deploy homegrown Prithvi ballistic missiles in the Rajasthan sector bordering Pakistan when Indian Air Force (IAF) pilot Abhinandan Varthaman was held captive by the neighboring country in 2019

By Mansij Asthana

During the post-Balakot border skirmishes on February 27, 2019, the 37-year old IAF pilot's aircraft was shot down in an aerial dogfight by a Pakistani jet after which he was captured by the Pakistan Army.

In the wee hours of February 26, India had carried out cross-border airstrikes at Balakot to dismantle terror infrastructure. The operation was launched to avenge the killings of 40 Indian CRPF troopers in Jammu and Kashmir's Pulwama by the Pakistan-based terror outfit Jaish-e-Mohammed on February 14, 2019.

According to *Hindustan Times*, the then Research and Analysis Wing (RAW) chief Anil Dhasmana had made a rare phone call to his counterpart, Lt General Syed Asim Munir Ahmed Shah of Inter-Services Intelligence (ISI), demanding the immediate release of Varthaman.

During the phone call, he apparently threatened the Pakistani intelligence chief that India would not hesitate to use its arsenal if the Indian pilot was inflicted any harm, HT reports.

New Delhi had then ordered its military to move mobile Prithvi ballistic missile batteries to the Rajasthan sector as a pressure tactic against Pakistan to make it release the captured Indian pilot. Wing Commander Varthaman was subsequently walked out of captivity after 60 hours.

Why India Chose To Deploy Prithvi Missiles

Developed by India's Defence Research and Development Organisation (DRDO), the Prithvi is a tactical surface-to-surface short-range ballistic missile (SRBM).

The Prithvi (meaning Earth) is the country's first indigenously-developed ballistic missile produced under the Integrated Guided Missile Development Program (IGMDP).

While two versions of the missile — Prithvi-I and Prithvi-II— are now in service with the Indian armed forces, the third missile, Prithvi-III, is under development.

With a range of 150 km and a 1,000 kg payload, the Prithvi-I is capable of striking roughly a quarter of Pakistani territory including areas of Islamabad and major cities.

The Prithvi-II, which has a range of 250 km and a 500-750 kg payload, can strike at least half of Pakistan, which means it can destroy key military targets and major cities.

While India has not used any of these missiles in recent times, the post-Balakot situation had all the triggers required for the country to change its stance, according to former DRDO scientist Ravi Gupta.

Gupta told The Eurasian Times – “When our pilot was captured by the Pakistani forces, it was necessary to ensure that no harm was done to him.



India's Prithvi-II missile being test-fired. (File photo)

“That was a moment when our pilot was captured and we needed two things, technological and military way of resolve. And, the second thing was political will. Fortunately, this time, the political will too, was very strong.

“The message sent was very loud and clear, that if you meddle with us, any harm done to our pilot, then you will have to pay a price that you cannot afford. And that has reflected in the outcome. The adversaries were forced to release the pilot unconditionally.”

According to the former DRDO official, the fact that Prithvi was indigenous, there was no chance of there being an “arm-twist”.

“I can ensure that we have all the technological abilities. Our missile systems are all indigenous, completely indigenous, so, nobody can arm-twist. When you are having imported systems, the countries from where you import, they try to arm-twist, that okay, you don’t use them against such and such (country).”

“But, because all our ballistic missiles are indigenous, and that fact is known to the world, (It could work in our favor),” Gupta maintained.

The Prithvi missiles make up for most of India’s arsenal of short-range ballistic missiles and can be used for tactical and battlefield purposes. They are highly maneuverable and mobile and can be used according to the needs.

“In terms of maneuverability and speed, it is comparable to any other missile of its class in the world. It is highly maneuverable, so it is very, very difficult, almost next to impossible to counter it.”

“Once the Prithvi missile is fired, it is bound to hit the target. So, that sends shivers down the spines of our enemies because they know that once it is fired, it is going to hit and the accuracy is very high. The target is bound to get destroyed, whether it is a building or a bunker or whatever it is,” added Gupta.

<https://eurasianimes.com/why-india-chose-to-deploy-prithvi-missiles-near-pakistan-border/>



Tue, 02 March 2021

Unitysat Trio, SindhuNetra, SD Sat: students built five of the payloads in ISRO's PSLV-C51 Mission

25,000 names are being flown in SD Sat, in an effort to spread public awareness in India about space and missions to explore it

The first mission undertaken by the Indian Space Research Organisation in 2021 is the PSLV-C51/Amazonia-1 mission, which saw the launch of Brazil's optical earth observation satellite Amazonia-1, along with 14 other academic and commercial payloads. Five of those satellites were built and designed by students. Among them is the three-component radio satellite UNITYsat, the Satish Dhawan Sat (SD SAT) from Chennai-based Space Kidz India (SKI), and technology demonstration satellite SindhuNetra.

The UNITYsat and SD SAT were projects facilitated by the recently-established Indian National Space Promotion and Authorisation Centre (IN-SPACe). PSLV-C51/Amazonia-1 was also the first dedicated commercial mission undertaken by the commercial arm of ISRO, NewSpace India Limited (NSIL), under a commercial arrangement with US-based satellite ride-share and mission management provider Spaceflight Inc.

UNITYsat Trio

A combination of three individual satellites under the umbrella "[UNITYsat](#)" was built by students from institutes in Nagpur, Sriperambadur and Coimbatore. The trio includes:

- JITSat (by Jeppiaar Institute of Technology, Sriperumbudur),
- GHRCEsat (by G H Raison College of Engineering, Nagpur), and
- Sri Shakthi Sat (by Sri Shakthi Institute of Engineering and Technology, Coimbatore).

Ground stations at Chennai, Nagpur and Coimbatore will be a network for monitoring the UNITYsat in orbit, according to an earlier ISRO release. The station and nanosatellite research centre in JIT, Sriperambadur is reportedly named after Dr Kalpana Chawla, the first Indian origin woman to fly in space.

Satish Dhawan Sat

The main objectives of the SD Sat, a microsatellite built by Space Kids India, are to study space radiation, the magnetosphere and a successful technical demonstration of nanosatellite technology under the Aatmanirbhar Bharat (Make in India) initiative.

For his effort in championing the Aatmanirbhar Bharat initiative, a picture of PM Narendra Modi is engraved on the top panel of the spacecraft, the Space Kidz India website claims. The organisation is also sending up a copy of an Indian epic, the 'Bhagavad Gita', in an SD (secured digital) card.

Flying alongside the satellite and memorabilia are 25,000 names on SD SAT – an effort to spread public awareness about space and space missions in India.

"When we finalised the mission, we had asked people to send the names that will be sent to space", an SKI official said.

SindhuNetra

SindhuNetra, another satellite payload on the PSLV-C51 mission, was developed by students of Bengaluru-based PES University. The satellite concept was awarded a Rs 2.2 crore contract by Research Centre Imarat (RCI), a lab under the Defence Research and Development Organisation (DRDO) that is tasked with R&D of missile systems, guided weapons and advanced avionics for Indian Armed Forces. Sources were quoted by *PTI* as saying the DRDO satellite can monitor military and merchant navy ships in the Indian Ocean – a critical capability to enhance India's military/strategic and commercial interests.

SindhuNetra can automatically identifying warships and merchant ships operating in the Indian Ocean Region, according to an *ANI* report.

The satellite has a confirmed communication link with ground systems and the government as per the 28 February report.

India and France entered an agreement in August 2019, to collaborate on building a constellation of satellites for maritime surveillance, primarily tasked with identifying and tracking ships in the Indian Ocean.

Other US payloads onboard

The American payloads on the mission include a technology demonstrator called SAI-1 NanoConnect-2, and twelve SpaceBees' from Swarm Technologies. The SpaceBees are part of a larger hive that the company is working on, in low Earth orbit.

<https://www.firstpost.com/tech/science/unitysat-trio-sindhunetra-sd-sat-students-built-five-payloads-on-isros-pslv-c51-mission-9360081.html>

अर्जुन मार्क-1ए: बेहद शक्तिशाली, घातक और विध्वंसक टैंक

योगेश कुमार गोयल

प्रधानमंत्री नरेन्द्र मोदी द्वारा गत दिनों देश का मुख्य स्वदेशी युद्धक टैंक 'अर्जुन मार्क-1ए' (एमके-1ए) चेन्नई में सेना प्रमुख जनरल एमएम नरवणे को सौंपते हुए राष्ट्र को समर्पित किया गया। सीमा पर दुश्मनों को करारा जवाब देने के लिए इस टैंक का विकास रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के 'लड़ाकू वाहन अनुसंधान और विकास प्रतिष्ठान' (सीवीआरडीई) द्वारा किया गया है। डीआरडीओ रक्षा क्षेत्र में देश को आत्मनिर्भर बनाने के लिए तेजी से कार्य कर रहा है। अत्याधुनिक क्षमता से लैस अर्जुन मार्क-1ए टैंक पूर्णतः स्वदेशी है, जिसकी डिजाइनिंग से लेकर डवलपमेंट और मैनुफैक्चरिंग तक का सारा काम देश में ही सम्पन्न हुआ है। भारतीय सेना अर्जुन श्रेणी के कई टैंकों का पहले से ही इस्तेमाल कर रही है। गौरतलब है कि टैंक निर्माण के क्षेत्र में आत्मनिर्भर बनने के लिए भारत ने वर्ष 1972 में शुरुआत की थी लेकिन तीन दशकों तक इस क्षेत्र में अपेक्षित सफलता नहीं मिलने के बाद आखिरकार भारत का स्वदेशी 'अर्जुन' टैंक परीक्षण में खरा उतरा। अर्जुन टैंक वर्ष 2004 में सेना में शामिल हुआ था और तब से अब तक इसमें कई बदलाव हो चुके हैं।

अर्जुन टैंक को सेना में शामिल किए जाने के बाद सेना द्वारा इसके अपडेटेड वर्जन के लिए 72 तरह के सुधारों की मांग की गई थी, जिसके बाद डीआरडीओ द्वारा सेना के सुझावों को शामिल करते हुए नया 'हंटर किलर' टैंक अर्जुन मार्क-1ए तैयार किया गया। 'अर्जुन मार्क-1ए' अर्जुन टैंक का अद्यतन वर्जन है और पहले के वर्जन से ज्यादा अपग्रेडेड, शक्तिशाली, घातक और विध्वंसक है। अर्जुन टैंक दुनिया के बेहतरीन टैंकों में शामिल है और अब इसका अत्याधुनिक वर्जन भारतीय सेना में शामिल होने के बाद भारतीय सेना की ताकत काफी बढ़ जाएगी। डीआरडीओ के वैज्ञानिक वी बालामुरगन के मुताबिक अर्जुन टैंक में कुल 71 बदलाव किए गए हैं, जिनमें 40 बड़े बदलाव हैं। अर्जुन मार्क-1ए आधुनिक युद्धक टैंक प्रौद्योगिकियों के साथ सुसज्जित है, जिसमें बेहतर मारक क्षमता, उच्च गतिशीलता, उत्कृष्ट सुरक्षा इत्यादि अनेक विशेषताएं हैं। स्वदेशी रूप से डिजाइन व निर्मित मुख्य युद्धक टैंक अर्जुन एमके-1ए में स्वदेशी गोला-बारूद का भी इस्तेमाल किया जा सकता है।

दुश्मन को खोजकर मारेगा 'हंटर किलर'

डीआरडीओ द्वारा अर्जुन टैंक के नए संस्करणों की सप्लाई करने के लिए कुछ समय पूर्व सेना के साथ अनुबंध किया गया था। भारतीय सेना के पास पहले से ही 124 अर्जुन टैंक हैं लेकिन वे परम्परागत तकनीक के टैंक हैं, जो पश्चिमी रेगिस्तान में तैनात हैं जबकि अर्जुन मार्क-1ए को आर्म्ड फाइटिंग व्हीकल क्षमता में देश की आत्मनिर्भरता के लिए विकसित किया गया है। बता दें कि वर्ष 2012 में ही 118 उन्नत अर्जुन टैंक खरीदने के लिए मंजूरी दे दी गई थी और रक्षा खरीद समिति ने वर्ष 2014 में इसके लिए 6600 करोड़ रुपये जारी कर दिए थे लेकिन सेना द्वारा इसकी फायर क्षमता सहित कई अन्य सुधारों की मांग की गई थी। वर्ष 2015 में रूस के साथ 464 मध्यम वजन के टी-90 टैंक की खरीद के लिए 14 हजार करोड़ रुपये का सौदा किया गया था और डीआरडीओ द्वारा सेना की मांग के अनुरूप अर्जुन टैंक को उन्नत किए जाने के बाद 'अर्जुन मार्क-1ए' की खरीद को 2020 में हरी झंडी मिली। भारतीय सेना और

डीआरडीओ द्वारा संयुक्त रूप से राजस्थान के सीमावर्ती जैसलमेर स्थित पोखरण फील्ड फायरिंग रेंज में मार्च 2020 में देश में निर्मित उन्नत युद्धक टैंक अर्जुन मार्क-1ए का परीक्षण किया गया था, जो सभी मानकों पर खरा उतरा था लेकिन सेना द्वारा डीआरडीओ से इसमें कुछ और सुधार की मांग की गई थी।

सेना के लिए 8400 करोड़ की कीमत पर 118 अर्जुन मार्क 1ए टैंक खरीदे गए हैं। अर्जुन टैंक का डिजाइन तैयार करने वाले रक्षा अनुसंधान व विकास संगठन (डीआरडीओ) के चेयरमैन जी. सतीश रेड्डी के मुताबिक सेना को पांच टैंक ढाई वर्ष के भीतर सौंप दिए जाएंगे। रेड्डी के अनुसार टैंक के नए संस्करण में जो 71 अतिरिक्त फीचर जोड़े गए हैं, वे इसे दुनिया के सभी श्रेष्ठ टैंकों के समकक्ष खड़ा करते हैं। दुनियाभर में सबसे ज्यादा 9150 टैंक चीन के पास हैं जबकि अमेरिका के पास 8325 और भारत के पास 3569 टैंक हैं। ऐसे में सेना को बेहद ताकतवर बनाने के लिए ऐसे अत्याधुनिक स्वदेशी टैंकों को सेना में शामिल किया जाना समय की बड़ी मांग है। इस टैंक के सेना का महत्वपूर्ण अंग बनने के बाद भारतीय सेना की जमीन पर मारक क्षमता को काफी मजबूती मिलेगी। अर्जुन मार्क-1ए साधारण अर्जुन टैंक से कई गुना ज्यादा ताकतवर है और तेजी से अपने लक्ष्य का पीछा कर सकता है। यह टैंक अपने लक्ष्य को ढूंढकर उस पर वार कर सकता है तथा इसमें आड़ लेकर हमला कर रहे दुश्मनों को तबाह करने की विलक्षण क्षमता है और इसी कारण इसे 'हंटर किलर टैंक' भी कहा जाता है। मारक और बचाव क्षमता के दृष्टिगत विश्वस्तरीय अर्जुन मार्क-1ए टैंक में मुख्य हथियार और सहायक हथियार, दोनों की भूमिका निभाने की क्षमता भी है। इस टैंक में विशेष सेंसर लगाए गए हैं, जो रासायनिक हमले से इसकी रक्षा कर सकते हैं। यही नहीं, टैंक पर ग्रेनेड और मिसाइलों से हमले का भी कोई असर नहीं होगा।

भारतीय सेना की विशेष ताकत बना यह टैंक न सिर्फ लैंड माइंस को साफ करते हुए आसानी से आगे बढ़ सकता है बल्कि अपने लक्ष्य को स्वयं तलाश करने में भी सक्षम है। यह टैंक दिन-रात, हर प्रकार के मौसम अर्थात् हर समय अपने लक्ष्य पर अचूक और तेज गति से हमला कर सकता है और दुश्मन को खोजकर मार सकता है। उच्च कोटि के इंजन और बेहद दमदार ट्रांसमिशन सिस्टम से लैस इस टैंक का लचीला हाइपरन्यूमेटिक सस्पेंशन इसे बहुत घातक बना देता है। इसमें दुश्मन पर पहले वार करने, दौड़ते-भागते लक्ष्यों पर भी निशाना साधने और लगातार हिलने वाले लक्ष्यों पर अचूक निशाना लगाने की विलक्षण क्षमता है। युद्ध के दौरान कम से कम समय में दुश्मनों के हमलों का जवाब देने की क्षमता से लैस यह टैंक युद्ध में ज्यादा से ज्यादा दूरी तक दुश्मन के सैन्य साजो-सामान का विनाश कर सकता है। इसमें लगा उच्च गुणवत्ता का रनिंग गियर धमाके के समय भारी झटके को सीमित कर देता है।

68 टन वजनी और 58 किलोमीटर प्रतिघंटा की गति से दौड़ने में सक्षम इस टैंक में गन कंट्रोल सिस्टम और ट्रैक सिस्टम इंजन स्वदेशी हैं। इसमें 1200 एमएम की गन के अलावा 7.62 एमएम और ग्राउंड टारगेट के लिए 12.7 एमएम की गन लगी है। रात में दुश्मन पर नजर रखने के लिए इसमें थर्मल इमेजिंग सिस्टम लगे हैं। इसके अलावा इसमें लगी एंटी एयरक्राफ्ट मशीनगन से जमीन से ही लड़ाकू हेलिकॉप्टर को मार गिराया जा सकेगा। माना जा रहा है कि आने वाले समय में इस टैंक से मिसाइलें भी छोड़ी जा सकेंगी। टैंक में कमांडर, गनर, लोडर और चालक का क़्र होगा। 118 अर्जुन मार्क-1ए टैंकों की कुल दो रेजीमेंट बनेंगी और दोनों रेजीमेंट में 59-59 टैंक होंगे। सेना की दो टैंक रेजीमेंट के पुराने टैंक अर्जुन मार्क-1ए टैंकों से बदले जाएंगे।

<https://www.pravakta.com/arjun-mark-1a-extremely-powerful-deadly-and-destructive-tank/>

Rishikesh's 'warship' that does not require a captain

Alappuzha: An unmanned warship, a system that can control it from anywhere in the world - Rishikesh, a native of Muhamma, is currently working to develop such a technology. Rishikesh, who has made several inventions, uses a land-based satellite system for this. With this system, missile launching technology, artillery and other weapons can all be coordinated in one place.

Rishikesh said the discovery was prompted by a desire to avoid soldiers dying in battle as much as possible. He was about to inform the Ministry of Defence of his new contribution to national security when he learned about the 'Dare to Dream 2.0' contest announced on the Defense Research and Development Organization's (DRDO) website. Rishikesh also participated in a competition to present new ideas that would strengthen the defence forces. He has also won the 2015 President's Award for Rural Innovation.

With the DRDO expressing satisfaction with the prototype of the Unmanned Weapon Carrier and Controller Ship, Rishikesh is in the process of developing a working model of the technology. For this, Rs 7 lakh was spent by mortgaging the document of his house. He now needs an investor to design a model expected to cost Rs 20 lakh.

Rishikesh has not disclosed the technicalities of the plan for national security. The ship, with a mast at surface, will have tanks, artillery, missiles and the ship's propeller is powered by a solar panel. An operator in the control room will control the ship and equipment, including a machine gun, with the cameras. If someone grabs the device at sea it will explode on its own. Sensors will be installed to detect damage to the ship. The same technology can be used on land vehicles as well.

<https://keralakaumudi.com/en/news/news.php?id=501980&u=>





Press Information Bureau
Government of India

Ministry of Defence

Mon, 01 March 2021 5:05PM

Vice Admiral Ajendra Bahadur Singh takes over as the Flag Officer Commanding-in-Chief, ENC

Vice Admiral Ajendra Bahadur Singh, AVSM, VSM took over as the Flag Officer Commanding-in-Chief (FOC-in-C), Eastern Naval Command (ENC) from Vice Admiral Atul Kumar Jain, PVSM, AVSM, VSM at an impressive Ceremonial Parade held at the Naval Base here today, 01 March 2021. Vice Admiral AB Singh inspected the Ceremonial Guard and reviewed platoons of naval personnel drawn from various ships and establishments of the ENC. The ceremony was attended by all Flag Officers and Commanding Officers of ships, submarines and establishments. Later, he also paid homage to martyrs who have made the supreme sacrifice in service of the nation, by laying a floral wreath at the War Memorial on Beach Road, Visakhapatnam.

Commissioned on 01 Jul 1983, Vice Admiral Ajendra Bahadur Singh is an alumnus of the prestigious National Defence Academy (NDA) Khadakvasla. A Navigation and Direction Specialist, Vice Admiral AB Singh has held various Operational Staff and Command Appointments in his career spanning over 38 years.

The officer has excelled in all professional courses in India and abroad and received his first Masters from Madras University during the Staff Course, where he was awarded the Scudder Medal. The Flag Officer has also earned a Master's Degree in Global Security from Cranfield University, United Kingdom.

He has commanded Indian Naval Ships Veer (Missile Vessel), Vindhya giri (Frigate), Trishul (Guided Missile Frigate) and Viraat (Aircraft Carrier). The officer has rich operational experience of Op Pawan in Sri Lanka and Op Parakram on the Western Seaboard as the Fleet Navigating Officer of Western Fleet. He has also been the Chief of Staff at Western Naval Command during the period of intense Op activity in early 2019.

He has commanded the Eastern Fleet and is familiar with the peculiarities of Eastern Seaboard, and was closely associated with the response to Super Cyclone *Hudhud* in 2014.

As Principal Director and ACNS (Policy & Plans) at Naval HQ, he was closely associated with promulgation of Maritime Strategy, Transformation & Long Term capability development plan and *Atmanirbhar* shipbuilding roadmap of the Indian Navy.

The officer has a rich tri-service exposure in jointmanship during the tenures as instructor at NDA and DSSC Wellington, Deputy C-in-C at Strategic Forces Command and Deputy Chief (Operations & Training) at HQ IDS (prior to assuming Command of the Eastern Naval Command).



He is the first Alumni of UP Sainik School to achieve the rank of Commander-in-Chief in the Indian Navy.

For his distinguished service, he was awarded the Vishisht Seva Medal in 2011 and Ati Vishisht Seva Medal in 2016.

The Flag Officer is married to Smt Charu, who now heads the Navy Wives Welfare Association, and they have two daughters Ambika & Ajita.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701715>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Mon, 01 March 2021 5:05PM

वाइस एडमिरल अजेंद्र बहादुर सिंह ने फ्लैग ऑफिसर कमांडिंग-इन-चीफ, ईएनसी का पदभार संभाला

वाइस एडमिरल अजेंद्र बहादुर सिंह, एवीएसएम, वीएसएम ने आजदिनांक 01 मार्च 2021 को यहां नेवल बेस पर आयोजित एक शानदार औपचारिक परेडमें वाइस एडमिरल अतुल कुमार जैन, पीवीएसएम, एवीएसएम से फ्लैग ऑफिसरकमांडिंग-इन-चीफ (एफओसी-इन-सी), ईस्टर्न नेवल कमांड (ईएनसी) का पदभारसंभाला । वाइस एडमिरल एबी सिंह ने औपचारिक गार्ड का निरीक्षण किया और ईएनसीके विभिन्न जहाजों और प्रतिष्ठानों से तैयार किए गए नौसेना कर्मियों कीप्लाटूनों की समीक्षा की । समारोह में जहाजों, पनडुब्बियों और प्रतिष्ठानोंके सभी फ्लैग ऑफिसर्स और कमान अधिकारियों ने भाग लिया । बाद में उन्होंनेविशाखापट्टनम के बीच रोड पर युद्ध स्मारक पर पुष्पांजलि अर्पित कर राष्ट्रकी सेवा में सर्वोच्च बलिदान देने वाले बलिदानियों को भी श्रद्धांजलि दी ।



दिनांक 01 जुलाई 1983 को कमीशन प्राप्त वाइस एडमिरल अजेंद्रबहादुर सिंह प्रतिष्ठित राष्ट्रीय रक्षा अकादमी (एनडीए) खड़कवासला के पूर्वछात्र हैं । एक नेविगेशन और डायरेक्शन विशेषज्ञ वाइस एडमिरल एबी सिंह ने 38 वर्षों में फैले अपने कैरियर में विभिन्न सामरिक स्टाफ और कमाननियुक्तियों पर रहे हैं ।

वाइस एडमिरल अजेंद्र बहादुर सिंह ने भारत और विदेशों में सभीपेशेवर पाठ्यक्रमों में उत्कृष्ट प्रदर्शन किया है और स्टाफ कोर्स के दौरानमद्रास विश्वविद्यालय से अपना पहला परास्नातक प्राप्त किया, जहां उन्हेंस्कडर मेडल से सम्मानित किया गया । फ्लैग ऑफिसर ने क्रैनफील्डयूनिवर्सिटी, यूनाइटेड किंगडम से ग्लोबल सिक्योरिटी में मास्टर डिग्री भीकी है ।

उन्होंने भारतीय नौसेना के जहाजों वीर (मिसाइल पोत), विंध्यागिरी (फ्रिगेट), त्रिशूल (गाइडेड मिसाइल फ्रिगेट) और विराट (एयरक्राफ्ट कैरियर) की कमान संभाली है । इस अधिकारी के पास श्रीलंका मेंऑपरेशन पवन और वेस्टर्न फ्लीट के फ्लीट नेविगेटिंग ऑफिसर के रूप मेंपश्चिमी समुद्र तट पर ऑपरेशन पराक्रम का समृद्ध सामरिक अनुभव है । वह 2019 की शुरुआत में तीव्र सामरिक गतिविधि की अवधि के दौरान पश्चिमी नौसेना कमानमें चीफ ऑफ स्टाफ भी रहे हैं।

उन्होंने ईस्टर्न फ्लीट की कमान संभाली है और पूर्वी समुद्र तट की सारीविशिष्टताओं से परिचित हैं, और 2014 में सुपर चक्रवात हुदहुद से निपटने कीमुहिम में निकटता से जुड़े थे ।

नौसेना मुख्यालय में प्रिंसिपल डायरेक्टर और एसीएनएस (पॉलिसी एंड प्लान्स)के रूप में, वह समुद्री रणनीति, रूपांतरण और दीर्घकालिक क्षमता विकास योजनाऔर भारतीय नौसेना के आत्मनिर्भर भारत निर्माण रोडमैप के प्रवर्तन सेनिकटता से जुड़े हुए थे ।

वाइस एडमिरल अजेंद्र बहादुर सिंह के पास एनडीए एवं डीएसएससीवेलिंगटन में प्रशिक्षक, स्ट्रेटेजिक फोर्सज़ कमांड में डिप्टी सी-इन-सीएवं एकीकृत रक्षा कमान मुख्यालय में डिप्टी चीफ (ऑपरेशन एंड ट्रेनिंग) केरूप में कार्यकाल के दौरान सेना के अंगों के बीच संयुक्तता का एक समृद्धट्राई-सर्विस एक्सपोजर है।

वह भारतीय नौसेना में कमांडर-इन-चीफ का पद हासिल करने वाले यूपी सैनिक स्कूल के पहले पूर्व छात्र हैं।

उनकी विशिष्ट सेवा के लिए उन्हें 2011 में विशिष्ट सेवा पदक और 2016 में अति विशिष्ट सेवा पदक से सम्मानित किया गया।

फ्लैग ऑफिसर का विवाह श्रीमती चारु से हुआ है, जो अब नेवी वाइक्स वेलफेयरएसोसिएशन की प्रमुख हैं और उनकी दो बेटियां अंबिका और अजिता हैं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701745>



Press Information Bureau
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Ministry of Defence

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Assumption of the Office of CISC

Vice Admiral Atul Kumar Jain, PVSM, AVSM, VSM took over as Chief of Integrated Defence Staff to Chairman Chiefs of Staff Committee (CISC) on 02 Mar 2021. On assumption of the coveted appointment, Vice Admiral Atul Kumar Jain paid homage to the Bravehearts of the nation by laying a wreath at the National War Memorial. Vice Admiral Jain got commissioned in July 1982 into the Indian Navy. He is an alumnus of the National Defence Academy, the Defence Services Staff College (Wellington), the College of Naval Warfare (Mumbai) and the National Defence College (Pretoria, South Africa). The Flag Officer is also a graduate of Jawaharlal Nehru University (Delhi) and has received his Masters in Defence and Strategic Studies from Madras University.

Prior to his appointment as CISC, Vice Admiral Jain has held various Operational, Staff and Command Appointments in the course of his distinguished career spanning over 38 years. He has commanded four ships including the indigenously built Destroyer, INS Mysore. His appointments ashore include Director, Naval Intelligence (Protocol), Director, Foreign Liaison and Principal Director Staff Requirement at Integrated Headquarters, Ministry of Defence (Navy), New Delhi. On promotion to Flag rank, he commanded Karnataka Naval Area and the Eastern Fleet and was the Dy Chief of Integrated Staff at HQ IDS at New Delhi before taking over as the Commander-in-Chief of Eastern Naval Command. For his distinguished service, he was awarded Vishisht Seva Medal in 2009, Ati Vishisht Seva Medal in 2015 and Param Vishist Sewa Medal in 2020.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1701804>



Mon, 01 March 2021 5:36PM

MOU signed between Directorate of Indian Army veterans (DIAV) and Mrs Veena Nayyar to support families of servicemen deceased in the line of duty

Directorate of Indian Army Veterans (DIAV) and Mrs Veena Nayyar, wife of Late Vice Admiral KK Nayyar, former Vice Chief of Naval Staff signed a Memorandum of Understanding (MoU) to pledge Rs Two Crores for welfare schemes run by the Army, Navy and Air Force. Mrs Veena Nayyar presented a Cheque of Rs 2 Crores to three Services which was received by Admiral Karambir Singh, Chief of the Naval Staff, Gen MM Naravane, Chief of the Army Staff and Air Marshall VPS Rana, Air Officer In Charge of Administration at Army Headquarters, New Delhi.

The main objective of the MoU is to facilitate various welfare schemes instituted for Next of Kins of service personnel died in harness. The welfare schemes include Education Scholarships and Computer Grant for wards and widows of deceased service personnel, Grant for Higher Education of widows and Marriage grant for widows and daughters.

The Chief of the Naval Staff and the Chief of the Army Staff conveyed their gratitude to Mrs Veena Nayyar for her benevolent contribution to the three Services and said that her noble gesture would support more than one lakh widows and wards in leading a respectful life.

DIAV is one of the primary organisations of Indian Army which looks after the Rehabilitation and Welfare of the families of Service personnel who have died in harness. DIAV has disbursed approximately Rs 86 Crores to about 76,000 beneficiaries over the past 20 years towards various welfare schemes.

Lt Gen Harsha Gupta, Adjutant General and Mrs Veena Naravane, President Army Wives Welfare Association and Mrs Sudha Gupta, General Secretary, Army Wives Welfare Association were also present on the occasion.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701724>





पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Mon, 01 March 2021 5:36PM

ड्यूटी के दौरान अपनी जान गंवाने वाले सैन्यकर्मियों के परिवारों को सहारा देने के लिए भारतीय सेना पूर्व सैनिक निदेशालय (डीआईएवी) और श्रीमती वीणा नैय्यर के बीच समझौता ज्ञापन पर हस्ताक्षर किए गए

भारतीय सेना पूर्व सैनिक निदेशालय (डीआईएवी) और पूर्व नौसेना उप प्रमुख, दिवंगत वाइस एडमिरल के के नैय्यर की पत्नी श्रीमती वीणा नैय्यर ने सेना, नौसेना और वायुसेना द्वारा संचालित कल्याणकारी योजनाओं के लिए दो करोड़ रुपये की शपथ के प्रावधान वाले एक समझौता ज्ञापन (एमओयू) पर हस्ताक्षर किए। श्रीमती वीणा नैय्यर ने सेना के तीन अंगों को दो करोड़ रुपये का चेक भेंट किया, जिसे नौसेना प्रमुख एडमिरल करमबीर सिंह, सेना प्रमुख जनरल एम एम नरवणे और एयर ऑफिसर इंचार्ज प्रशासन एयर मार्शल वी पी एस राणा ने सेना मुख्यालय, नई दिल्ली में प्राप्त किया।



इस समझौता ज्ञापन (एमओयू) का मुख्य उद्देश्य ड्यूटी के दौरान प्राण गंवाने वाले सैन्यकर्मियों के निकटतम परिजनों के लिए बनाई गई विभिन्न कल्याणकारी योजनाओं को सुगम बनाना है। इन कल्याणकारी योजनाओं में जान गंवाने वाले सैनिकों के बच्चों और विधवाओं के लिए शिक्षा छात्रवृत्ति और कंप्यूटर अनुदान, विधवाओं की उच्च शिक्षा के लिए अनुदान और विधवाओं तथा ऐसे सैनिकों की बेटियों के विवाह के लिए अनुदान शामिल हैं।

नौसेना प्रमुख और सेना प्रमुख ने सेना के तीनों अंगों में श्रीमती वीणा नैय्यर के हितकारी योगदान के लिए उनका आभार व्यक्त किया और कहा कि उनके नेक कार्य से एक लाख से अधिक बलिदानी सैनिकों की विधवाओं और उनके बच्चों को सम्मानजनक जीवन जीने में सहायता मिलेगी।

भारतीय सेना पूर्व सैनिक निदेशालय (डीआईएवी) भारतीय सेना के प्राथमिक संगठनों में से एक है जो ड्यूटी के दौरान जान गंवाने वाले सैन्य कर्मियों के परिवारों के पुनर्वास और कल्याण की देखभाल करता है। डीआईएवी ने विभिन्न कल्याणकारी योजनाओं के लिए पिछले 20 वर्षों में लगभग 76,000 लाभार्थियों को तकरीबन 86 करोड़ रुपये वितरित किए हैं।

इस अवसर पर एडजुटेंट जनरल लेफ्टिनेंट जनरल हर्ष गुप्ता, आर्मी वाइक्स वेलफेयर एसोसिएशन की अध्यक्ष श्रीमती वीणा नरवणे और आर्मी वाइक्स वेलफेयर एसोसिएशन की महासचिव श्रीमती सुधा गुप्ता भी उपस्थित थीं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701783>

Scorpene submarine Karanj to be commissioned into Indian Navy on March 10

By V Narayan

Mumbai: The Indian Navy on Monday announced that the third indigenously-built Scorpene-class submarine Karanj will be commissioned on March 10 after she completed sea trials for almost two years after it was launched at Mazagon Dock Shipbuilders Limited (“MDL”) on January 31, 2018.

It was handed over to the Indian Navy on February 15. The submarine is the third out of the six submarines that will add teeth to the Indian Navy. Initially, the submarine was supposed to be commissioned into the Indian Navy by mid-2019 but got delayed.

The construction of the submarine began 10 years and five months ago and finally it will be inducted into the Navy. The pressure hull fabrication of the submarine began in October 2010. The pressure hull is the primary structural element of the submarine and is designed to be able to withstand external hydrostatic pressure. It is designed for a particular collapse depth, at which complete failure is expected within a very narrow range. The collapse depth is calculated by multiplying the maximum operable depth (MOD) or service depth with a factor of safety. The hydrostatic pressure at this depth is considered as the design pressure for all the pressure hull calculations.



A defence spokesperson told TOI, "Submarine Karanj is going to get commissioned on March 10 after she completed rigorous sea and harbour tests and is fitted with all the armament. The time taken for constructing the sub-sections of the third submarine was lesser than that has been taken in the previous two submarines—INS Kalvari and INS Khanderi."

INS Kalvari, the first Scorpene-class submarine was commissioned into the Indian Navy, by Prime Minister Narendra Modi on December 14, 2017. INS Khanderi, the second Scorpene class submarine was launched at MDL in January 2017 and commissioned into the navy on September 28, 2019.

The fourth submarine Vela was launched on May 6, 2019, and commenced her sea trials. While the fifth submarine Vagir was launched November 12, 2020, and has commenced her harbour sea trials whilst the sixth submarine Vagsheer is presently in the advanced stage of outfitting. "The Scorpene project would not have achieved the current progress without the unconditional support and active encouragement of the department of defence production (MoD) throughout its various phases," said the official.

<https://timesofindia.indiatimes.com/india/scorpene-submarine-karanj-to-be-commissioned-into-indian-navy-on-march-10/articleshow/81280402.cms>

Tue, 02 March 2021

This Chennai-based startup builds unmanned underground vehicles for the Indian Army

Founded in 2019, defence tech startup Torus Robotics is designing, developing, and delivering fully electric unmanned ground vehicles for the Indian Army

By Shreya Ganguly

The Indian government has been calling for innovators to leverage technology to build solutions for the defence sector. Earlier in February, at an industry event, Defence Minister Rajnath Singh revealed that the government is aiming to bring down defence imports by at least \$2 billion by 2022.

While pursuing their mechatronics engineering degree, SRM University alumni M. Vignesh, Vibhakar Senthil Kumar, and K.Abbhi Vignesh set out to build solutions for the Indian defence sector.



Image Credit: Torus Robotics

In 2019, the trio launched Torus Robotics in Chennai to help the Indian Armed forces with modular Unmanned Ground Vehicles (UGV) that could cater to diverse mission requirements.

Co-founder and Director Vignesh M tells YourStory that the trio opted out of campus placements and decided to get into defence robotics solutions.

“It was the same time when India and the Indian Armed Forces suffered its worst loss in 20 years when four heavily armed terrorists launched a grenade attack at a camp in Uri on September 18, 2016. This was our eureka moment and we decided to develop Unmanned Systems to aid and safeguard the lives of our Indian Armed Forces,” he says.

Torus was launched exactly three years after the Uri attack — post rigorous research and multiple interactions with the Indian Armed forces to understand their requirements.

<https://yourstory.com/2021/03/chennai-defence-tech-startup-builds-unmanned-underground-vehicles>

Hot electrons send carbon dioxide back to the future

Atmospheric carbon dioxide (CO₂) is a major driver of global warming, but this gas could also serve as a valuable resource. Researchers at KAUST have developed an efficient catalyst that uses light energy to convert CO₂ and hydrogen into methane (CH₄). This counteracts the release of CO₂ when methane is burned as a fuel.

Many researchers worldwide are exploring ways to convert CO₂ into useful carbon-based chemicals, but their efforts have been limited by low efficiencies that restrict the potential for large-scale application.

"Our approach is based on the synergistic combination of light and heat, known as the photothermal effect," says postdoc Diego Mateo. He explains that the heat is generated by the interaction of light with the catalyst, so the two forms of energy come from absorbed light.

Some other industrial approaches require heating from external sources to attain temperatures as high as 500 degrees Celsius. The KAUST research demonstrates that the reaction can be achieved using just the photothermal effect of daylight.

The catalyst is built from nickel nanoparticles on a layer of barium titanate. It captures the light in a way that kicks electrons into high energy states, known as "hot electrons." These electrons then initiate the chemical reaction that sends CO₂ back into methane. Under optimum conditions, the catalyst generates methane with nearly 100% selectivity and with impressive efficiency.

A major advantage is the wide range of the spectrum of light harnessed, including all visible wavelengths, in addition to the ultraviolet rays that many catalysts are restricted to. This is hugely significant since ultraviolet light comprises only 4 to 5% of the energy available in sunlight.

"We strongly believe that our strategy, in combination with other existing CO₂ capture techniques, could be a sustainable way to convert this harmful greenhouse gas into valuable fuel," says Mateo.

Any fuels made from CO₂ would still release that gas when they are burned, but the CO₂ could be repeatedly recycled from the atmosphere to fuel and back again, rather than being continually released by burning fossil fuels.

The researchers are also looking to widen the applications of their approach. "One strategy for our future research is to move towards producing other valuable chemicals, such as methanol," says Jorge Gascon, who led the research team. The researchers also see potential for using light energy to power the production of chemicals that don't contain carbon, such as ammonia (NH₃).

More information: Diego Mateo et al. Efficient Visible-Light Driven Photothermal Conversion of CO₂ to Methane by Nickel Nanoparticles Supported on Barium Titanate, *Advanced Functional Materials* (2020). DOI: [10.1002/adfm.202008244](https://doi.org/10.1002/adfm.202008244)

Journal information: [Advanced Functional Materials](https://doi.org/10.1002/adfm.202008244)

<https://phys.org/news/2021-03-hot-electrons-carbon-dioxide-future.html>



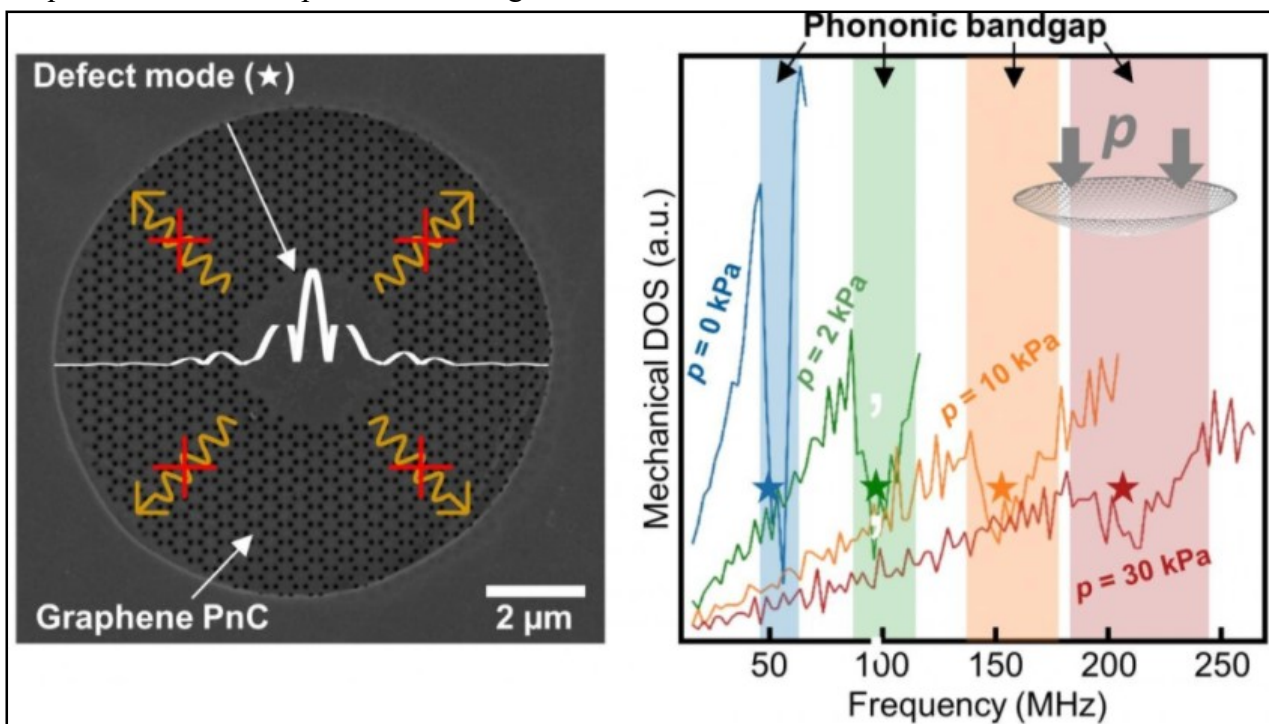
The catalyst nanoparticles developed by KAUST scientists use light energy to convert carbon dioxide and hydrogen into methane. Credit: KAUST; Anastasia Serin

New skills of graphene: Tunable lattice vibrations

Without electronics and photonics, there would be no computers, smartphones, sensors, or information and communication technologies. In the coming years, the new field of phononics may further expand these options. That field is concerned with understanding and controlling lattice vibrations (phonons) in solids. In order to realize phononic devices, however, lattice vibrations have to be controlled as precisely as commonly realized in the case of electrons or photons.

Phononic crystals

The key building block for such a device is a phononic crystal, an artificially fabricated structure in which properties such as stiffness, mass or [mechanical stress](#) vary periodically. Phononic devices are used as acoustic waveguides, phonon lenses, and vibration shields and may realize mechanical Qubits in the future. However, until now, these systems operated at fixed vibrational frequencies. It was not possible to change their vibrational modes in a controlled manner.



Electron microscopy shows the graphene sample (gray) in which the helium beam has created a hole pattern so that the density varies periodically. This results in the superposition of vibrational modes and the emergence of a mechanical band gap. The frequency of this phononic system can be adjusted between 50 MHz and 217 MHz by mechanical tension. Credit: K. Höflich/HZB

Periodic hole pattern in graphene

Now, for the first time, a team at Freie Universität Berlin and HZB has demonstrated this control. They used graphene, a form of carbon in which the carbon atoms interconnect two-dimensionally to form a flat honeycomb structure. Using a focused beam of helium ions, the team was able to cut a periodic pattern of holes in the graphene. This method is available at CoreLab CCMS (Correlative Microscopy and Spectroscopy). "We had to optimize the process a lot to cut a regular pattern of holes in the graphene surface without touching neighboring holes," Dr. Katja Höflich, group leader at Ferdinand-Braun-Institut Berlin and guest scientist at HZB, explains.

Bandgap and tunability

Jan N. Kirchhof, first author of the study now published in *Nano Letters*, calculated the vibrational properties of this phononic crystal. His simulations show that in a certain frequency range no vibrational modes are allowed. Analogs to the electronic band structure in solids, this

region is a mechanical band gap. This band gap can be used to localize individual modes to shield them from the environment. What's special here: "The simulation shows that we can tune the phononic system quickly and selectively, from 50 megahertz to 217 megahertz, via applied mechanical pressure, induced by a gate voltage." says Jan Kirchhof.

Future applications

"We hope that our results will push the field of phononics further. We expect to discover some fundamental physics and develop technologies that could lead to application in e.g. ultrasensitive photosensors or even quantum technologies," explains Prof. Kirill Bolotin, head of the FU working group. The first experiments on the new phononic crystals from HZB are already underway in his group.

More information: Jan N. Kirchhof et al, Tunable Graphene Phononic Crystal, *Nano Letters* (2021). DOI: [10.1021/acs.nanolett.0c04986](https://doi.org/10.1021/acs.nanolett.0c04986)

Journal information: [Nano Letters](https://doi.org/10.1021/acs.nanolett.0c04986)

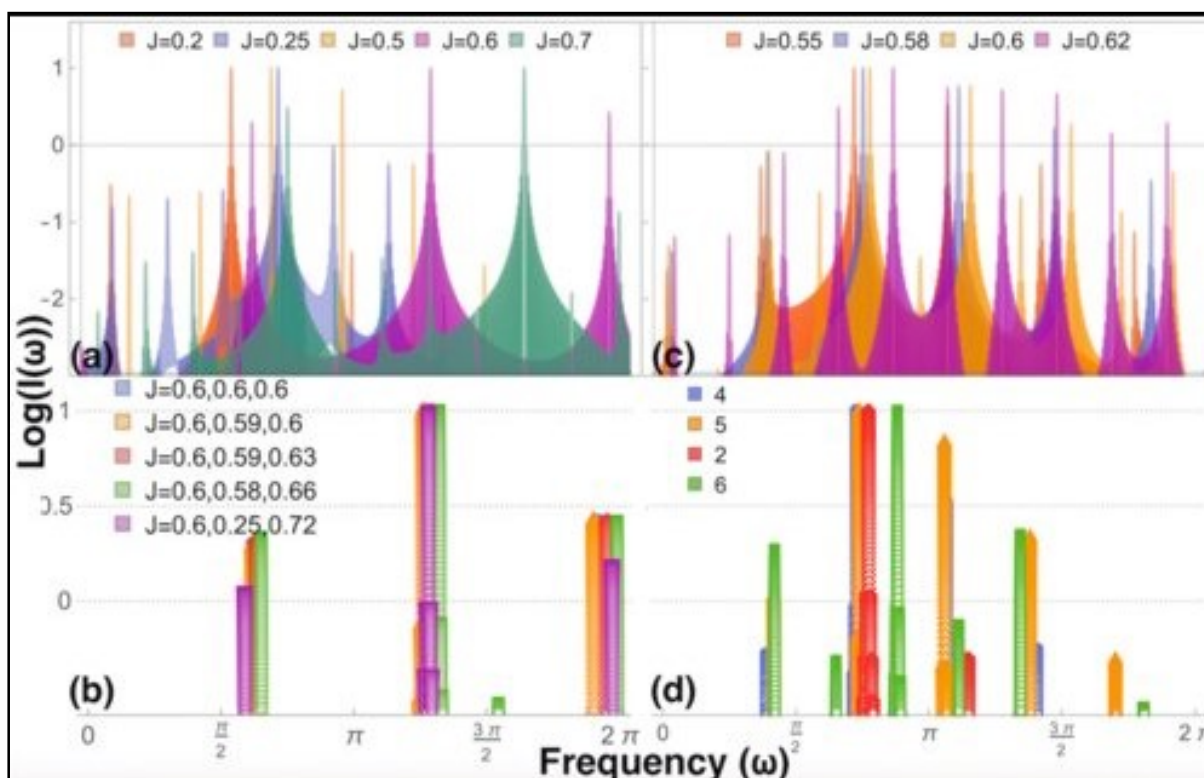
<https://phys.org/news/2021-03-skills-graphene-tunable-lattice-vibrations.html>



Tue, 02 March 2021

Through the looking glass: Artificial molecules open door to ultrafast polaritonic devices

Researchers from Skoltech and the University of Cambridge have shown that polaritons, the quirky particles that may end up running the quantum supercomputers of the future, can form structures behaving like molecules—and these "artificial molecules" can potentially be engineered on demand. The paper outlining these results was published in the journal *Physical Review B*.



The spectral weights of oscillatory states are associated with discrete spectral lines. Their number and separation can be controlled by changing the number and geometry of condensates, reflected by the coupling strengths. Credit: *Physical Review B* (2021). DOI: [10.1103/PhysRevB.103.L060507](https://doi.org/10.1103/PhysRevB.103.L060507)

Polaritons are quantum particles that consist of a photon and an exciton, another quasiparticle, marrying light and matter in a curious union that opens up a multitude of possibilities in next-generation polaritonic devices. Alexander Johnston, Kirill Kalinin and Natalia Berloff, professor at the Skoltech Center for Photonics and Quantum Materials and University of Cambridge, have shown that geometrically coupled [polariton](#) condensates, which appear in semiconductor devices, are capable of simulating molecules with various properties.

Ordinary molecules are groups of atoms bound together with molecular bonds, and their physical properties differ from those of their constituent atoms quite drastically: consider the water molecule, H₂O, and elemental hydrogen and oxygen. "In our work, we show that clusters of interacting polaritonic and photonic condensates can form a range of exotic and entirely distinct entities—"molecules"—that can be manipulated artificially. These "artificial molecules" possess new energy states, optical properties, and vibrational modes from those of the condensates comprising them," Johnston, of the University of Cambridge Department of Applied Mathematics and Theoretical Physics, explains.

When researchers were running numerical simulations of two, three, and four interacting polariton condensates, they noticed some curious asymmetric stationary states in which not all of the condensates have the same density in their ground state. "Upon further investigation, we found that such states came in a wide variety of different forms, which could be controlled by manipulating certain physical parameters of the system. This led us to propose such phenomena as "artificial polariton molecules" and to investigate their potential uses in quantum information systems," Johnston says.

In particular, the team focused on an "asymmetric dyad," which consists of two interacting condensates with unequal occupations. When two of those dyads are combined into a tetrad structure, the latter is, in some sense, analogous to a homonuclear molecule—for instance, to molecular hydrogen H₂. Furthermore, artificial polariton molecules can also form more elaborate structures, which could be thought of as "artificial polariton compounds."

"There is nothing preventing more complex structures from being created. Indeed, in our work we have found that there is a wide range of exotic, asymmetric states possible in tetrad configurations. In some of these, all condensates have different densities (despite all of the couplings being of equal strength), inviting an analogy with chemical compounds," Alexander Johnston notes.

In specific tetrad structures, each asymmetric dyad can be viewed as an individual "spin," defined by the orientation of the density asymmetry. This has interesting consequences for the system's degrees of freedom (the independent physical parameters required to define states); the "spins" introduce a discrete degree of freedom, in addition to the continuous degrees of freedom given by the condensate phases.

The relative orientation of each of the dyads can be controlled by varying the coupling strength between them. Since quantum information systems can potentially have increased accuracy and efficiency if they utilize some kind of hybrid discrete-continuous system, the team therefore proposed this hybrid tetrad structure as a potential basis for such a system.

"In addition, we have discovered a plethora of exotic asymmetric states in triad and tetrad systems. It is possible to seamlessly transition between such states simply by varying the pumping strength used to form the condensates. This property suggests that such states could form the basis of a polaritonic multi-valued logic system, which could enable the development of polaritonic devices that dissipate significantly less power than traditional methods and, potentially, operate orders of magnitude faster," Professor Berloff says.

More information: Alexander Johnston et al. Artificial polariton molecules, *Physical Review B* (2021). DOI: [10.1103/PhysRevB.103.L060507](https://doi.org/10.1103/PhysRevB.103.L060507)

Journal information: [Physical Review B](https://phys.org/news/2021-03-glass-artificial-molecules-door-ultrafast.html)
<https://phys.org/news/2021-03-glass-artificial-molecules-door-ultrafast.html>

Tue, 02 March 2021

Small things can save lives: coping with COVID-19 in resource-scarce hospitals

Everywhere, patients have died from COVID-19 when patient numbers exceeded the capacity of the health system. The number of doctors, nurses and oxygen points just wasn't enough.

People died from a lack of oxygen because no one noticed that their oxygen mask wasn't well positioned or that their oxygen saturation was dropping. They died of dehydration or kidney failure because they didn't receive enough water. They died because there weren't enough staff, or because new staff added in an emergency were inexperienced and poorly organised.

There are a number of things every hospital can do to prevent unnecessary deaths when the system is overloaded.

COVID-19 has exacerbated the global shortage of health workers, already estimated to be over seven million before the pandemic. Where there are not enough doctors and nurses to deliver medical care, one solution is to move certain tasks to less specialised health workers, a process called task-shifting.

There is extensive public health experience with task-shifting and substantial evidence that this can reduce costs and improve efficiency in the areas of HIV, tuberculosis (TB) and other diseases.

In January 2021, during the peak of the second wave of COVID-19 in South Africa, I coordinated a support intervention of Doctors Without Borders in a large hospital in the country's KwaZulu-Natal province. Hospital staff were so overwhelmed that many patients died because of lack of the basics: oxygen, water and basic patient monitoring and support. Colleagues supporting interventions in other resource-limited settings reported similar experiences.

When there is a shortage of nurses, such as in the COVID-19 pandemic, task-shifting of basic care to less specialised cadres such as caregivers, nursing auxiliaries or community health workers can prevent unnecessary deaths. Hiring lower level workers and staff to manage them can be life-saving.

Precedents

Distribution of antiretroviral therapy has been successfully shifted from doctors to nurses, to lay counsellors or peer educators, and even to patients in the community.

In Mozambique, task-shifting of tuberculosis logistic management services to hospital auxiliary workers reduced delays to tuberculosis treatment initiation and hospital mortality. In another study, triage by lay staff reduced child deaths in the emergency department of a rural hospital.

And there are examples of family members partially taking over some basic tasks in resource-limited hospitals. Research in Kenya has shown that to cope with difficult work conditions nurses delegate tasks to family and support staff. But family members aren't allowed into COVID-19 wards and these tasks have fallen back to nurses.



“We saw patients dying for avoidable reasons. They were dying because masks that came loose were not being replaced,” says MSF COVID-19 intervention nursing activities manager, Caroline Masunda. Chris Allan

Task-shifting can and should be used in COVID-19 wards.

Nursing assistants or caregivers can provide basic care and patient support. Volunteers or lay staff can be hired to function as runners and porters, and communicate with families. This leaves time for nurses to focus on more medical tasks.

In KwaZulu-Natal and in Lesotho, Doctors Without Borders hired enrolled nurses to monitor oxygen saturation, and lay caregivers or ward attendants to ensure oxygen masks and nasal prongs were in place, and help with proning, hydration, bedpans, feeding and mobilisation of patients. In addition, doctor and nurse activity managers ensured management, coordination and training. This led to rapid improvements in patient care.

What needs to be done

Where resources are limited, basic care and oxygen delivery save more lives than intensive care. Yet the basics are often neglected. To prepare for future waves of COVID-19, hospitals need to plan for sufficient oxygen delivery, be prepared to hire sufficient basic health staff, and organise task-shifting of basic care and support.

Emergency responses require a great deal of coordination. Attention is needed to ensure adequate managerial staff are added to coordinate teams of sometimes inexperienced or new staff to work coherently. For example, in Ngwelezana hospital in South Africa, addition of a nursing activity manager was essential to improve organisation and quality of care in the ward.

Special attention should also be given to the night shift. Most patients die at night. Ensuring increased attention to and sufficient staff for patient monitoring and support at night can save lives.

Then there's the provision of basic materials such as water bottles, cups, straws, pillows for proning (which can increase oxygen saturation by up to 10%) and bedpans. Availability of these items in sufficient quantities can also make the difference between life and death.

Healthcare workers have learned many things from the fight against epidemics such as HIV and Ebola in Africa over the past twenty years. When doctors and nurses were overwhelmed, innovative ways of task-shifting allowed them to efficiently provide quality care to high numbers of patients.

Small things can prevent unnecessary deaths during the COVID-19 pandemic, even in the poorest countries with the weakest health systems. Investing in sufficient oxygen capacity and basic care by hiring entry level health staff may save more lives than ventilators and high care.

<https://theconversation.com/small-things-can-save-lives-coping-with-covid-19-in-resource-scarce-hospitals-155585>

