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# समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Fri, 04 June 2021 3:37PM*

## **Defence Acquisition Council, headed by Raksha Mantri Shri Rajnath Singh, approves RFP for construction of six submarines at approx cost of Rs 43,000 crore;**

*First such acquisition under Strategic Partnership model to give a big boost to Make in India*

*DAC also approves Air Defence guns and ammunition for Army worth Rs 6,000 crore*

The Defence Acquisition Council (DAC), in its meeting held under the Chairmanship of Raksha Mantri Shri Rajnath Singh on June 04, 2021, has approved proposals concerning Capital Acquisitions of various equipment for modernisation and operational needs of the Armed Forces amounting to approx. Rs 6,000 crore.

In addition, the DAC also approved issue of RFP for construction of six Conventional Submarines under Project P 75 (I) under the Strategic Partnership (SP) Model. This project envisages indigenous construction of six conventional submarines equipped with the state-of-the-art Air Independent Propulsion system at an estimated cost of Rs 43,000 crore.

This is a landmark approval, being the first case processed under the Strategic Partnership model. This would be one of the largest 'Make in India' projects and will serve to facilitate faster and more significant absorption of technology and create a tiered industrial ecosystem for submarine construction in India. From a strategic perspective, this will help reduce current dependence on imports and gradually ensure greater self-reliance and dependability of supplies from indigenous sources.

With accord of this approval, the country will be enabled to achieve its 30-year Submarine construction programme envisioned by the Government to acquire national competence in submarine construction and for the Indian industry to independently design and construct submarines in India. The availability of new technologies and advanced manufacturing capabilities to the Industry will be an important step towards enhancing the nation's quest for self-reliance in modern conventional submarine construction and sustainment activities whilst creating direct and indirect job opportunities in India.

This project under SP Model provides a unique long-term opportunity and planning certainty for the industry to invest and support submarine construction. It will also infuse the latest technology and weaponry for submarines in India through strategic tie up between Indian Industry and leading foreign OEMs.

There was a long pending need of the Indian Army for modernisation of its Air Defence guns. These had been earlier procured only from foreign sources. With the continued thrust of Ministry of Defence towards 'AtmaNirbhar Bharat' and 'Make in India', an enthusiastic response from

about a dozen Indian companies was received. All of them have expressed their willingness and commitment to manufacture this complex gun system and associated equipment by ensuring technology assimilation in India. Accordingly, the DAC accorded approval of procurement of Air Defence Guns and Ammunition at an approx. cost of Rs 6,000 crore under the Buy & Make (Indian) category.

Further to better equip the Armed Forces to meet the operational challenges and facilitate faster induction of required arms and ammunition, the DAC extended the timelines for progressing urgent Capital Acquisitions under the delegated powers to the Armed Forces up to August 31, 2021. This will enable the Armed Forces to complete their emergent and critical acquisitions.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724399>



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Fri, 04 June 2021 3:37PM

## रक्षा मंत्री श्री राजनाथ सिंह की अध्यक्षता में रक्षा अधिग्रहण परिषद ने लगभग 43,000 करोड़ रुपये की लागत से बनने वाली छह पनडुब्बियों के निर्माण के प्रस्ताव को मंजूरी दी;

*मेक इन इंडिया पहल को अधिकतम बढ़ावा देने के लिए रणनीतिक साझेदारी मॉडल के तहत इस तरह का पहला अधिग्रहण*

*परिषद ने सेना के लिए 6,000 करोड़ रुपये की एयर डिफेंस गन और गोला-बारूद खरीदने के प्रस्ताव को भी स्वीकृति दी*

रक्षा अधिग्रहण परिषद (डीएसी) ने 04 जून, 2021 को रक्षा मंत्री श्री राजनाथ सिंह की अध्यक्षता में हुई एक बैठक में सशस्त्र बलों के आधुनिकीकरण तथा संचालन संबंधी आवश्यकताओं को पूरा करने के लिए लगभग 6,000 करोड़ रुपये की राशि के विभिन्न उपकरणों के पूंजी अधिग्रहण से संबंधित प्रस्तावों को मंजूरी दी है।

इसके अलावा, परिषद ने रणनीतिक साझेदारी (एसपी) मॉडल के तहत परियोजना पी 75 (आई) के तहत छह पारंपरिक पनडुब्बियों के निर्माण के लिए आरएफपी जारी करने को भी मंजूरी प्रदान की है। इस परियोजना में 43,000 करोड़ रुपये की अनुमानित लागत से अत्याधुनिक एयर इंडिपेंडेंट प्रपल्शन (वायु स्वतंत्र प्रणोदन) प्रणाली से लैस छह पारंपरिक पनडुब्बियों का स्वदेश में निर्माण करने का फैसला किया गया है।

रणनीतिक साझेदारी मॉडल के तहत संपादित होने वाला पहला अवसर होने की वजह से यह एक ऐतिहासिक स्वीकृति है। यह 'मेक इन इंडिया' की सबसे बड़ी परियोजनाओं में से एक होगी। यह मंजूरी प्रौद्योगिकी के तेजी से और अधिक महत्वपूर्ण समावेशन की सुविधा प्रदान करने तथा भारत में पनडुब्बी निर्माण के लिए एक स्तरीय औद्योगिक पारिस्थितिकी तंत्र बनाने का काम करेगी। रणनीतिक दृष्टिकोण से,

इससे आयात पर देश की वर्तमान निर्भरता को कम करने में मदद मिलेगी और धीरे-धीरे स्वदेशी स्रोतों से आपूर्ति की अधिक आत्मनिर्भरता तथा विश्वसनीयता सुनिश्चित होगी।

इस स्वीकृति के साथ ही, भारत पनडुब्बी निर्माण में राष्ट्रीय क्षमता हासिल करने तथा स्वदेशी रक्षा उद्योग के लिए स्वतंत्र रूप से देश में पनडुब्बियों के डिजाइन और निर्माण के वास्ते सरकार द्वारा परिकल्पित अपने 30 वर्षीय पनडुब्बी निर्माण कार्यक्रम का लक्ष्य प्राप्त करने में सक्षम होगा। रक्षा उद्योग के लिए नई प्रौद्योगिकियों एवं उन्नत विनिर्माण क्षमताओं की उपलब्धता से भारत में प्रत्यक्ष तथा अप्रत्यक्ष रूप से रोजगार के अवसर पैदा होंगे। यह निर्णय आधुनिक पारंपरिक पनडुब्बी निर्माण और सतत गतिविधियों में आत्मनिर्भरता हासिल करने में देश की खोज को बढ़ाने की दिशा में एक महत्वपूर्ण कदम साबित होगा।

एसपी मॉडल के तहत यह परियोजना उद्योगों के लिए पनडुब्बी निर्माण में निवेश एवं समर्थन जुटाने में एक अद्वितीय दीर्घकालिक अवसर और योजना की निश्चितता प्रदान करती है। साथ ही इस कदम से भारतीय उद्योग तथा प्रमुख विदेशी मूल उपकरण निर्माता- ओईएम के बीच रणनीतिक गठजोड़ के माध्यम से देश में बनने वाली पनडुब्बियों में नवीनतम तकनीक और हथियार का भी इस्तेमाल सुनिश्चित होगा।

अपनी एयर डिफेंस बंदूकों के आधुनिकीकरण के लिए भारतीय सेना को लंबे समय से आवश्यकता थी। ये हथियार पहले केवल विदेशी स्रोतों से ही खरीदे गए थे। रक्षा मंत्रालय के द्वारा 'आत्मनिर्भर भारत' और 'मेक इन इंडिया' को लगातार बढ़ावा देने के आह्वान के बाद, लगभग एक दर्जन भारतीय कंपनियों से उत्साहजनक प्रतिक्रिया प्राप्त हुई है। इन कंपनियों ने भारत में प्रौद्योगिकी समावेशन सुनिश्चित करके इस जटिल गन सिस्टम तथा संबंधित उपकरणों के निर्माण के लिए अपनी इच्छा एवं प्रतिबद्धता व्यक्त की है। इसके अतिरिक्त, परिषद ने बाय एंड मेक (इंडियन) श्रेणी के तहत लगभग 6,000 करोड़ रुपये की लागत से एयर डिफेंस गन और गोला-बारूद की खरीद को मंजूरी दी है।

इसके अलावा, सशस्त्र बलों को परिचालन चुनौतियों का सामना करने में बेहतर ढंग से लैस करने तथा आवश्यक हथियारों एवं गोला-बारूद को तेजी से शामिल करने की सुविधा के लिए, डीएसी ने सशस्त्र बलों को प्रदत्त शक्तियों के तहत तत्काल पूंजी अधिग्रहण की प्रगति के वास्ते समय सीमा 31 अगस्त, 2021 तक बढ़ा दी है। यह सशस्त्र बलों को अपने आकस्मिक और महत्वपूर्ण अधिग्रहणों को पूरा करने में सक्षम बनाएगा।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724490>

## Rs 43,000-crore tender to build six state-of-the-art submarines cleared

*This is first case processed under strategic partnership model*

*By Ajai Shukla*

New Delhi: The Defence Acquisition Council (DAC), the Ministry of Defence's (MoD's) apex procurement body, on Friday gave the go-ahead for the purchase of six conventional submarines under Project 75 (I).

The DAC cleared the issue of a request for proposals (RFP), which "envisages indigenous construction of six conventional submarines equipped with the state-of-the-art air independent propulsion (AIP) system at an estimated cost of Rs 43,000 crore", stated an MoD release on Friday.

"This is a landmark approval, being the first case processed under the strategic partnership (SP) model," said the ministry.

The SP model, which is detailed in the Defence Acquisition Policy of 2020 (DAP 2020), is intended to involve private Indian firms in the building of four categories of defence equipment: Submarines, fighter aircraft, helicopters, and armoured vehicles.

In February 2020, Larsen & Toubro and Mazagon Dock Ltd (MDL) were short-listed as SPs for Project 75 (I). There is grumbling from the private industry about MDL's inclusion, since it is a defence public sector undertaking.

According to the DAP 2020, "It is acknowledged that in the Indian private sector currently there is limited experience in defence manufacturing... (Therefore)... potential SPs will be identified primarily based on their experience and competence in integration of multi-disciplinary functional system of systems, engineering and manufacturing."

The SP procedure also mandates that, in order to hand-hold the chosen Indian SPs and to access advanced technologies, "the SP will need to enter into relevant tie-ups with foreign Original Equipment Manufacturers (OEMs)".

"The MoD's clearance of the RFP for the first strategic partnership model acquisition is welcome. For the first time the private sector has been allowed to participate in a mega programme for a front-line combat platform," said Jayant Patil, who heads L&T's defence vertical.

Meanwhile, the MoD has also short-listed five foreign submarine builders for Project 75 (I): Russian export agency Rosoboronexport; Naval Group (France); ThyssenKrupp Marine Systems (TKMS) of Germany; Navantia (Spain); and Daewoo (South Korea).

With the issue of an RFP, the chosen SPs – L&T and MDL – will be required to formulate technical and commercial proposals for building six submarines, in partnership with their chosen OEMs. Each SP is permitted to submit multiple proposals, i.e. partnering more than one OEM.

"Naval Group is in discussion with both SPs and look forward to contributing to "Aatmanirbhar Bharat" and to reinforcing our historical Indo-French bilateral ties," said Alain Guillou, who heads international development for Naval Group.

The most complex challenge in Project 75(I) is expected to be the integration of AIP systems into the six submarines. An AIP system increases the submarines' underwater endurance and, therefore, its combat capability.



The SP model, which is detailed in the DAP 2020, is intended to involve private Indian firms in the building of four categories of defence equipment: Submarines, fighter aircraft, helicopters, and armoured vehicles



Conventional diesel-electric submarines, such as India's Kilo-class and Scorpene submarines, are powered by large banks of electric batteries, which drive electric motors that turn the submarine's propellers. Since the batteries get discharged, the submarine must surface every day or two to recharge them by running diesel generators (which require atmospheric air). However, surfaced submarines are visible to radar and, therefore, vulnerable to attack.

Nuclear submarines bypass this vulnerability, since nuclear propulsion requires no oxygen. Nuclear submarines can remain submerged almost indefinitely, but designing a small-enough reactor poses technology challenges. The navy is processing a Rs 90,000 crore project to build six 6,000-tonne, nuclear-powered, attack submarines.

Until nuclear-powered submarines join the fleet, AIP provides an interim propulsion solution. Since it does not have conventional batteries that require generator charging, submarines with AIP can remain underwater for 10-14 days, reducing its vulnerability to detection.

AIP systems such as "fuel cell technology" generate power through the reverse electrolysis of oxygen and hydrogen. The two elements, carried on board the submarine, chemically combine to generate electricity. This charges the submarine's batteries, doing away with the need for a diesel generator.

Separately, the Defence R&D Organisation (DRDO) is developing an indigenous AIP system that relies on Phosphoric Acid Fuel Cell technology. This is more rugged, tolerant of fuel impurities, and offers longer life and efficiency, which makes it cost-effective.

However, this is unlikely to be operationally available for Project 75(I). So far, the DRDO has demonstrated a land-based AIP prototype, which can generate power, independent of air, for up to two weeks. The challenge now is to "marinise" it, fit into an actual submarine and operate underwater in live conditions. DRDO sources say this will take another 3-4 years.

The AIP systems that go into Project 75(I) must, therefore, be provided by the foreign OEMs. The DRDO's AIP system will, from 2024-25 onwards, be "retrofitted" into the six Scorpene submarines when they come up for long refit.

The sanction to Project 75(I) is a major step towards implementing the navy's "30-year Submarine Construction Programme", which the Union Cabinet sanctioned in 1999. This involves building 12 conventional submarines in India, in partnership with foreign OEMs. Thereafter, Indian shipyards would be expected to have the expertise and experience to design and build 12 indigenous submarines in the country.

"This project under the SP Model provides a unique long-term opportunity and planning certainty for the industry to invest and support submarine construction. It will also infuse the latest technology and weaponry for submarines in India through strategic tie up between Indian Industry and leading foreign OEMs," said the MoD.

[https://www.business-standard.com/article/current-affairs/rs-43-000-crore-tender-to-build-six-state-of-the-art-submarines-cleared-121060500045\\_1.html](https://www.business-standard.com/article/current-affairs/rs-43-000-crore-tender-to-build-six-state-of-the-art-submarines-cleared-121060500045_1.html)



## India clears decks for long-pending mega project to build six new-gen stealth submarines

*By Rajat Pandit*

New Delhi: India on Friday formally cleared the decks for the long-pending Rs 50,000 crore (almost \$7 billion) project to construct six new-generation stealth submarines with foreign collaboration, as part of the plan to counter China's expanding naval footprint in the Indian Ocean in the decades ahead.

The Rajnath Singh-led defence acquisitions council (DAC) approved the tender or RFP (request for proposal) to be issued to defence shipyard Mazagon Docks (MDL) and private ship-builder L&T for the mega 'Make in India' conventional submarine-building programme called 'Project-75 India (P-75I)'.



The two, in turn, will tie-up with one of the five shortlisted foreign shipyards, under the 'strategic partnership' model to submit techno-commercial bids in the race to bag this "mother of all underwater combat deals".

The foreign firm finally selected out of Rosoboronexport/Rubin Design Bureau (Russia), Naval Group-DCNS (France), ThyssenKrupp Marine Systems (Germany), Navantia (Spain) and Daewoo (South Korea) will have to undertake comprehensive transfer of technology to its Indian partner.

It will take around a decade from now for the roll-out of the first of the six diesel-electric submarines, with a capacity to carry a total of 18 land-attack cruise missiles and heavyweight torpedoes as well as air-independent propulsion (AIP) for greater underwater endurance.

"The selection of the winning bid and the actual contract will take well over a year. Thereafter, the first submarine will be built in another seven years, with one following every subsequent year. So, in effect, the cash outflow will be spread over 10-15 years," said an official. P-75I, incidentally, was first granted 'acceptance of necessity' way back in November 2007. The Indian Navy is currently grappling with a fast-depleting underwater combat arm at a time when Chinese warships and submarines are making regular forays to the Indian Ocean Region.

The DAC decision also came at a time when India has dispatched INS Chakra, the nuclear-powered attack submarine (called SSN), to Russia after the completion of its 10-year lease here. In March 2019, India had inked a \$3 billion deal with Russia to lease a more advanced SSN to replace INS Chakra but it will be delivered only by 2025.

India is now left with a solitary indigenous nuclear-powered submarine armed with nuclear ballistic missiles (called SSBN), INS Arihant, which became fully-operational in late-2018 to somewhat complete the 'nuclear triad' after the land-based Agni missiles and fighter jets. The second SSBN, INS Arighat, will be commissioned this year.

Concurrently, another project to build six SSNs is pending with the Cabinet Committee on Security for the final nod. Construction of three of the six SSNs, each weighing over 6,000-tonne and costing around Rs 15,000 crore, is likely to be cleared in the first go, as was first reported by TOI.

On the conventional vessel front, the Navy is saddled with 12 very old diesel-electric submarines, with just half of them operational at any given time, and one more slated to retire this year.

The force has also inducted three of the six French-origin Scorpene submarines being constructed under the over Rs 23,000 crore 'Project-75' underway at MDL. As per approved plans, India should have at least 18 diesel-electric submarines, six SSNs and four SSBNs.

China, incidentally, already has the world's largest Navy with 350 warships, including 50 conventional and 10 nuclear submarines, and plans to reach a force-level of 420 by the end of this decade.

Pakistan, too, is on course to get eight Yuan-class diesel electric submarines with AIP, four Type-054A multi-role stealth frigates and other naval platforms and weapons from China under deals worth over \$7 billion.

<https://timesofindia.indiatimes.com/india/india-clears-decks-for-long-pending-mega-project-to-build-six-new-gen-stealth-submarines/articleshow/83228646.cms>



Sat, 05 June 2021

## India clears Rs 43,000 crore project to build 6 high-tech submarines

*The defence acquisition council (DAC), India's apex procurement body, approved the proposal at a meeting on Friday and the navy is expected to issue requests for proposal (RFP) for the programme, called P-75 India soon, the officials said*

*By Rahul Singh*

New Delhi: The defence ministry on Friday cleared a project worth ₹43,000 crore for building six advanced submarines in the country under the government's "strategic partnership" (SP) model to bolster the Indian Navy's underwater force levels and counter the rapid expansion of China's submarine fleet, officials familiar with the development said

The defence acquisition council (DAC), India's apex procurement body headed by defence minister Rajnath Singh, approved the proposal on Friday and the navy is soon expected to issue requests for proposal (RFP) for the programme, called P-75 India, the officials said.

The new submarines are part of the 30-year submarine-building programme approved by the Cabinet Committee on Security in 1999.

This is a landmark approval as it is the first case being processed under the SP model, the defence ministry said in a statement.

"This would be one of the largest 'Make in India' projects and will serve to facilitate faster and more significant absorption of technology and create a tiered industrial ecosystem for submarine construction in India. From a strategic perspective, this will help reduce current dependence on imports and gradually ensure greater self-reliance," the statement said.

The SP model envisages indigenous manufacturing of major defence platforms by an Indian strategic partner who will collaborate with a foreign original equipment manufacturer (OEM) to set up production facilities in the country.

In January 2020, the defence ministry cleared two Indian and five foreign shipbuilders to take part in P-75I.



INS Karanj, the third Scorpene class submarine, was constructed by Mazagon Dock Shipbuilders Limited and launched in 2018. The Mazagon Dock Shipbuilders Limited is one of the Indian strategic partners cleared to collaborate with the foreign OEMs. (File photo)

The Indian strategic partners cleared to collaborate with the foreign OEMs are Mazagon Dock Shipbuilders Limited and L&T. The foreign yards they can team up with for the project are the French Naval Group, German conglomerate Thyssenkrupp Marine Systems, Russia's Rubin Design Bureau, Spain's Navantia and South Korea's Daewoo Shipbuilding & Marine Engineering Company

The new submarines will be equipped with air independent propulsion (AIP) systems that will enable the vessels to stay underwater for longer periods and enhance their combat capabilities, the statement said.

With P-75I being cleared, the country has taken a step forward towards achieving the goals of its 30-year submarine construction programme, the defence ministry said.

The navy plans to operate a fleet of 18 new conventional submarines and six nuclear-powered boats. The government approved the plan to build six nuclear-powered submarines in 2015, tweaking the 1999 submarine-building programme.

"The availability of new technologies and advanced manufacturing capabilities to the industry will be an important step towards enhancing the nation's quest for self-reliance in modern conventional submarine construction," the statement said.

The project will take time to mature and if all goes well, the first submarine will be delivered to the navy not before 10 years, officials said.

The ministry will take the new project forward by issuing RFPs to the shortlisted Indian strategic partners who will then respond with techno-commercial offers in collaboration with one of the shortlisted OEMs. In exceptional cases, rules allow the Indian strategic partner to submit techno-commercial offers in collaboration with two OEMs.

The next steps in the long process will involve opening and evaluation of technical offers, trials, staff evaluation, opening of commercial offers of companies technically compliant with the RFP and finally, the selection of the strategic partner with the lowest bid.

A minimum of 45% indigenisation has to be ensured by the strategic partner in P-75I, officials familiar with the project said.

The strategic partner will also ensure that the sixth submarine has a minimum indigenous content of 60%, they added.

"There is an incentivisation model for specific equipment and systems under the hull, engineering and electrical heads wherein achieving indigenous content between 70% and 100% will ensure that an incentive of 5% to 20% of the equipment/system cost is paid to the strategic partner as a reward," said one of the officials cited above.

He added that a two-contract model is envisaged in P-75I -- one contract between defence ministry and the strategic partner, and the second one involving the foreign collaborator.

In August 2018, DAC cleared a project under the SP model for building 111 naval utility helicopters (NUH) to replace the navy's outdated fleet of French-designed Chetak choppers. But there has been no forward movement in the NUH project worth ₹21,738 crore.

DAC on Friday cleared another project worth ₹6,000 crore for air defence guns and ammunition <https://www.hindustantimes.com/india-news/india-clears-rs-43-000-cr-project-to-build-6-high-tech-submarines-101622799616611.html>

Sun, 06 June 2021

## DRDO developing exoskeleton for the Indian soldiers posted in high altitudes

*In the case of China, it has recently come out with military-grade exoskeleton suits which are powered and used for carrying ammunition*

*By Huma Siddiqui*

With Sino-India border issue likely to be guarded more intensely by both the sides, any support to make the lives of the soldiers safer and conducive shall go a long way in their motivation and operational efficiency.

The exoskeletons are rapidly emerging as part of the modern troops body gadget and Armed Forces may be keenly looking forward to the culmination of this project, far sooner than many others still within the Defence Research and Development Organisation (DRDO) Lab environment.

Despite many years of R&D on the exoskeleton, DRDO has yet to field any operational technology in the field of exoskeleton.

In the case of China, it has recently come out with military-grade exoskeleton suits which are powered and used for carrying ammunition. And, reports indicate that an earlier version of the non-powered exoskeleton suit was also used by the Chinese border defense troops in the later part of 2020 for supporting operations like supply delivery, patrol etc.

### **How did it help the Chinese?**

This has helped the PLA border defense troops in Southwest China's Region to carry out tasks in high altitude inhuman environments. Work is in progress to supply more types of mission specific exoskeleton suits. The operational advantages achieved have been claimed by use of these few kilogram exoskeleton suits, which are like 20 kilograms of assisted strength, relieve more than fifty percent of the load burden, thereby, reducing the risks of injury to the troops.

In the case of India, DRDO which has still not completed its R&D and is far behind, let alone looking at improvements in the efficacy of the product to be able to carry out improvements.

"In any case, user feedback after operational deployment is usually an important aspect in any development work, and wishes to be seen as a chance to enhance the likelihood of supporting the Indian Troops, especially before onset of harsh winters in the Galwan Valley," explained a senior officer, on condition of anonymity.

For the troops who are deployed at high altitude — Siachen, Ladakh, there is a requirement of special equipment and clothing which will help in their movements, as well as special sleeping tents and rations which will keep them in good health and protect them from harsh weather conditions.

### **More about Exoskeletons**

Multiple R&D in the bio-engineering and electro-medical technology are carried out by DRDO and this is done so that technological advancement reaches the soldiers.

Exoskeletons can be worn over a regular uniform or combat gear so that a soldier's strength is fully augmented. And this helps in ensuring soldiers who are on patrol duty in high altitude terrains wear leg-gear which assists in walking in the snow. This then reduces fatigue and exhaustion which is faced by the soldier in a thin oxygen climate.



Despite many years of R&D on the exoskeleton, DRDO has yet to field any operational technology in the field of exoskeleton. (Images: DRDO)

For the Indian soldiers, such futuristic technology can help in moving around in the minus 30-40 degrees Celsius temperature along the Line of Actual Control (LAC).

“AD-hoc projects like Exoskeletons are ideally suited to be handed over to the IITs and the private sector companies as it does not require much resources. In DRDO, all resources and manpower are being used, and they have no sanctions from the services, hence there is no urgency to complete the R&D,” suggested the officer quoted about on condition of anonymity.

#### **What is the current status of Exoskeletons?**

DEBEL is the nodal lab doing the R&D on this and is utilizing in-house expertise in disciplines of Biomedical/Biomechanics, actuators and control systems.

#### **Response from DRDO**

Last December (2020), in response to a question by Financial Express Online, DRDO had said that, “For enhancing Indian soldiers’ performance in military scenarios, several configurations including lower/upper extremity, and full-body exoskeletons are being developed and several DRDO labs are involved in this.”

In June 2021, responding to Financial Express Online on the current status of Exoskeletons, DRDO in an email response says: “DRDO has been entrusted with a requirement to augment the soldier’s capability during logistics activities performed by the military. Therefore, the biomechanical characteristics of the soldier during various logistics activities such as transportation of goods, ration, ammunition etc., through diverse terrain, for long distances with their complete military gear has been systematically captured and analyzed.”

It goes on to add, “Exoskeleton systems are being designed and developed for specific military logistic applications involving bending, lifting of payload, walking with payload anterior to the body, and unloading the same. Various concepts and configurations are being designed and developed currently. DRDO has been progressing on the different design approaches to build an augmentative exoskeleton for the Indian Army. There have mainly been two schools of thought/approaches for the design of augmentative exoskeletons, namely passive/unpowered augmentative exoskeleton and powered augmentative exoskeleton. The passive exoskeletons use passive elements such as springs, dampeners etc., to transfer the payload to the ground, however active exoskeletons not only transfer the payload to the ground but also impart energy through the actuators resulting in reduced energy consumption by the soldier.”

<https://www.financialexpress.com/defence/drdo-developing-exoskeleton-for-the-indian-soldiers-posted-in-high-altitudes/2265808/>



# How BrahMos & Akash Missiles have boosted India's image as a key defense exporter

*The Indian defense industry has grown very rapidly in the past few years with BrahMos and Akash missile systems leading the show of the country's military exports*

*By Dr. Ram Singh*

Since independence, India has been a net importer of defense products mainly from its trusted and strategic ally, Russia. Although India has set up a large number of Public Sector Undertaking (PSUs) for the production of a variety of defense products, they were never able to upgrade, update and align themselves with the evolving cutting-edge technology.



BrahMos MAKS2009 – Wikimedia Commons

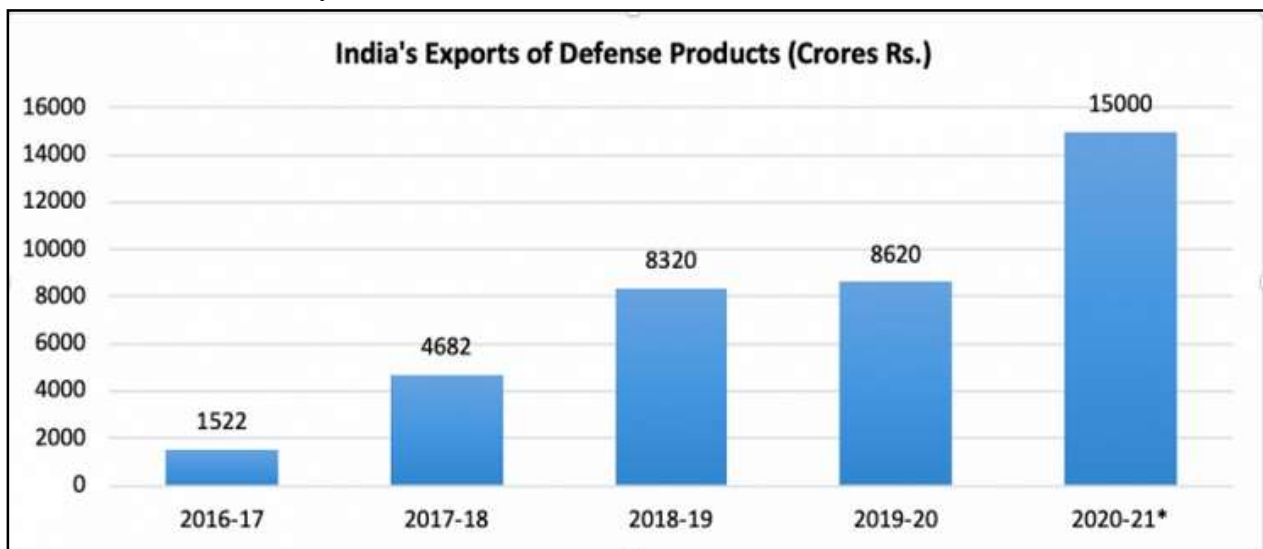
As a result, India had to procure various defense products from Russia, Israel, France, the UK, and in the past two decades from the United States as well.

India imported both technology and hardware, where technology was used for domestic manufacturing of defense hardware and equipment for the three organs of the Indian Armed Forces. The table is now turning with a change in the country's political leadership.

After taking over as Prime Minister, Narendra Modi exhorted to all defense PSUs to accelerate, upgrade, and spur up to tap all available possibilities of not only replacing existing imports but scaling up to exports to world markets.

The Ordnance Factory Board that looks after India's defense production and PSUs are being reformed and a regulatory regime is put in place for enhanced focus on both low-cost quality production and enhanced exports.

India's defense ministry has already set a target of \$25 billion for defense production in the period 2020-2024. India aims to leverage domestic manufacturing to exports \$5 billion worth of military hardware every year within a period of five years. There is a growing export performance of India's defense industry.



Source: Ministry of Defense, Government of India

### **Factors behind this rapid change**

India's emergence as an exporter of defense equipment and hardware in a short period of time is credited to factors such as first, liberalization in export policies, practices, and regime.

The export policies, practices, and regime witnessed a complete overhaul and the government of India now views defense exports as a business opportunity and India's increasing role as peace-enabler and net-security provider in the Indo-Pacific region.

The government has changed the export policy, allowing a level-playing field to both public and private companies as the new export policy is being streamlined to grant permission with the same set of procedures, without discriminating between the public and private companies.

Defense exports are not only allowed but promoted aggressively with the involvement of trade-related institutions and the Indian missions abroad. The Lines of Credit are offered to neighboring countries to procure defense equipment and hardware from India.



File Image: Akash Missile – Via Twitter @nitin\_gadkari

Indian missions abroad aggressively scout for opportunities in this sector and have lobbied with government, bureaucracy and military heads of respective countries to increasingly purchase, procure and source defense products from India.

The Director-General of Foreign Trade worked proactively wherever inter-ministerial approvals are required for the export of sensitive items. Accordingly to Stockholm International Peace Research Institute (SIPRI), India is ranked 23rd in the list of major arms exporters for 2015-2019 and is placed at 19th rank for the calendar year 2019.

### **Military exports see a huge jump**

A liberal, facilitative and propagative export regime has resulted in the quantum jump in India's defense exports.

Defense exports have increased more than five-and-half times in the past four years. Projects such 'Make in India' and 'Self-Reliant India' (Atmanirbhar Bharat) are major a contributor as dedicated efforts are being made by defense PSUs to excel in exports along with substituting the imports.

India's rising defense exports are also attributed to a reformed and improved business ecosystem. The manufacturing model for defense procurement whether for domestic or international orders has witnessed a sea-change since 2014.

The investment regime for defense products is largely liberalized, soliciting 100% foreign direct investments in all key sectors, except for the critical ones.

The concept of mandatory offset clause has been introduced to all foreign defense procurement thus providing larger business opportunities to domestic players. Further, the private players are actually at the center stage of India's defense production.

For instance, although orders from India's armed forces are placed to government-owned enterprises, they are actually executed by the private players under the Government Owned Contractor Operated (GOCO) model.

The participation of the private sector has created an environment of competitiveness in defense production.

### **Private sector playing a key role**

The improved business ecosystem also includes a radical revamp of our ordnance factories and other defense PSUs in terms of modernization of technology as well as management practices.

Private players in the defense industry are scaling up fast with technology transfer rights and are making world-class defense products not only for the Indian Armed Forces but also for world markets.



Mahindra Defence System Ltd has successfully developed the Light Specialist Vehicle which is indigenously designed and developed and is extremely agile with all-round protection against small arms fire.

Mahindra Jeep will assist small independent detachments which are required to operate this weapon platform in the operational area.

The Defence Ministry signed a contract with Mahindra Defence Systems Ltd (MDSL) for buying 1,300 Light Specialist Vehicles for the Indian Army for Rs 1,056 crore in March 2021.

Similarly, Bharat Forge has received an order worth Rs 177.95 crore from the Ministry of Defence for the supply of Kalyani M4 vehicle, a multi-role platform, designed to meet the specific requirements of armed forces for quick mobility in rough terrain and in areas affected by mine and improvised explosive devices (IED) threats.

Hindustan Aeronautics Ltd (HAL) is offering Tejas light combat aircraft and L&T Engineering is supplying K-Vajra, a light combat tank to Indian Armed Forces. All these are examples of an improved business ecosystem.

India's Ministry of Commerce & Industry and allied offices are constantly working to improve the export ecosystem for India's defense exports. New Delhi-based Indian Institute of Foreign Trade is providing training and hand-holding assistance to officers of the Ordnance Factory Board for skilling them to engage in exports and imports.

The Engineering Export Promotion Council of India is extending wholesome support in organizing trade fairs and exhibitions globally to showcase the capabilities of Indian defense product manufactures.

The Director-General of Foreign Trade has revamped the complete system for obtaining a no-objection certificate (NOC) from the Ministry of Defence. All other allied export promotion institutions are extending support to India's defense industry to focus on export promotion/facilitation and export regulation.

The government is even contemplating setting up an export promotion body involving public and private players to advise the government, coordinate all export facilitation schemes of the government, and promote exports through specific marketing in select countries.

A Defense Export Steering Committee headed by the Secretary, Department of Defense Production with representatives from the armed forces, DRDO, Planning and International Cooperation Wing, and Acquisition Wings of the MoD, MEA, and the Director-General Foreign Trade — was set up to improve the defense export ecosystem.

It is tasked with making decisions on the export of sensitive equipment, monitoring the progress of defense exports, and suggesting specific steps/strategies to boost exports. India missions abroad are extending wholesome support to buyers-sellers meetings involving the delegations from the public, private and joint venture sectors with friendly countries to inspire confidence in India's defense products.

EXIM Bank of India has facilitated export on credit by extending the line of credit(s) to foreign countries to import defense products. Further to boost the eco-system of defense exports, the offset policy was reviewed and aligned towards the integration of weapons/systems in India to enable exports.

### **Global Traction — BrahMos & Akash**

Lastly, India's defense manufacturers are also aiming to make their products globally competitive in terms of price, quality, technology, ease in operations, and assured after-sales services and maintenance support. Some of the Indian defense products have elicited great interest from foreign countries.

India has been able to sell its BrahMos Missile system to the Philippines. The UAE has shown keen interest in procuring India's Akash system, which is considered to be the best of its class in the world. India has supplied critical defense radar to Armenia in its fight with Azerbaijan.

Indian defense players are also entering into technology agreements with established global players so as to access world-class technology to develop defense products for the Indian Armed Forces through reverse-engineering. All these efforts are paying a rich dividend and India's defense exports have witnessed a quantum jump in exports with greater participation of private players.

*(The author is a Professor, & Head (MDPs) at the Indian Institute of Foreign Trade, New Delhi. Views expressed are personal.)*

<https://eurasianimes.com/how-brahmos-and-akash-missile-systems-boosted-indias-image-as-a-defense-exporter/>



Sat, 05 June 2021

## **Battle of ATGMs: How do India's Nag & Spike ATGMs compete against China's Red Arrow Anti-Tank Missiles?**

*The Indian Army acquired its homegrown 'Nag' and the Israeli Spike anti-tank guided missiles (ATGM) amid the border standoff with China last year*

*By Anupama Ghosh*

The Chinese PLA boasts its Red Arrow-10 (HJ-10) that can shoot down helicopters, drones, and damage tanks and howitzers.

The PLA first approved the Red Arrow-10 multi-purpose missile system, also known as the AFT-10, in 2012. The system was designed by the China Aerospace and Industry Corporation Limited (CASIC).

The ATGM is intended to effectively engage modern armored vehicles, which may be equipped with dynamic protection and fortifications features. The system can also shoot down combat helicopters, unmanned aerial vehicles, and damage self-propelled artillery.

According to the specifics mentioned in Missilery.info, the Hong Jian 10 or the Red Arrow-10 has a solid propellant launch and marching engines. In front of the rudder and on the side surface of the missile, recessed taper-type marching engine nozzles are located.

Weighing 43 kgs, the Red Arrow has a length of 1850mm and its hull diameter is 165mm. The maximum flight range of the missile is 10km. With a speed of 150m/s, the missile can reach 230 m/s on its final dive.

The ATGM is guided by a combined system of television/thermal imaging (IIR) homing head, an inertia system, and a two-way fiber optic data transmission channel.

A data transmission channel generates the target image by the homing head to the operator's console. The same channel relays the control commands to the missile.

This enables it to put the missile on a variety of uses, like use in combat, including fire-and-forget technology, command guidance, and composite paths, target acquisition and redirection after launch, shooting indistinguishable targets from a closed position.

The upgrade that is being planned includes the replacement of the present fiber optic data channel with a radio channel.

The ATGM can hit a target directly and from above through various other combat units.

The missile complex can be placed on the chassis of a ZBD-04A infantry fighting vehicle, weighing 20 tons. Protection against bullets of large caliber, smaller arms and artillery shell fragments is provided by the hull armor of the ZBD-04A.

The guidance equipment of the missile complex includes a radar target detection station, optical and electronic equipment with a thermal imager, and a laser ring finder. The two work stations of the missile operators enable the firing of a double missile volley.

In 2018, the Red Arrow 10-A was showcased at the sixth International Exhibition of Arms IQDEX-2018 held in Baghdad by the Chinese foreign trading company NORINCO.

### **The Israeli Spike ATGM**

The nearest equivalent of the Red-Arrow 10 is the Israeli Spike ER. Developed by Israel's Rafael Advanced Defense Systems, the Spike-ER is an anti-tank missile system capable of engaging dynamic armored vehicles.

The EurAsian Times reported that India had opted for the third-generation Israeli Spike MR (medium-range) ATGM following the Balakot airstrike in 2019. It procured the 4th-generation Spike LR (long-range) missiles in early December 2020.

The Indian military has reportedly acquired more than 200 Spike ATGMs through the emergency procurement route. These can be fired from vehicles, helicopters, ships, and ground launchers.

These advanced missiles have optical seekers, smart target trackers, and various artificial intelligence features.

These missiles can be fired either in "direct attack or mid-course navigation based on target coordinates" mode, according to The Jerusalem Post.

### **India's Nag Missiles**

In February 2018, Indian successfully test-fired its ATGM Nag. The Nag has been manufactured by the Defence Research and Development Organisation (DRDO).

After the successful completion of the trials, the DRDO stated that the missiles are ready for induction into the army. It is an all-weather missile and has an operational range of 500m to 20 km.

The Nag ATGM can be launched from land and air-based platforms. The missile when launched from land can strike up to a range of 4 km, while the strike range when launched from an air-based platform is 7 km. It has an indigenous IIR (imaging infra-red) seeker with integrated avionics.

The missile is also equipped with 'top attack' and 'front attack' capabilities. It can effectively rout heavy armor, both 'reactive' and 'composite' armor found in many modern battle tanks. Due to its IIR seeker, the missile can operate both day and night, against silhouette tanks, whether moving or stationary.

India is also set to acquire the Milan- 2T Anti-Tank Guided Missiles, as reported by the EurAsian Times. It is expected to be manufactured by Bharat Dynamics Limited under the license of MBDA Missile Systems, France.

The Milan-2T is a second-generation infantry ATGM. Described as a Tandem Warhead ATGM with a range of 1,850 meters, it is capable of destroying both moving and immobile targets. The Milan-2T can be launched from the ground and vehicle-based launchers as well.

The Milan-2T follows the induction of indigenous third-generation ATGMs – the Helina and Dhruvastra.

According to Nitin J Ticku, a strategic expert with the EurAsian Times, India had opted for the Israeli Spike ATGMs after the Balakot airstrike in 2019. An order was placed for 240 missiles and 12 launchers as part of an "emergency purchase" to meet immediate operational requirements.

Ticku says between all the three ATGMs, Israeli Spike is battle-tested and widely regarded as one of the best anti-missiles systems in the world alongside American Javelin. Besides India, Israel has supplied more than 27,000 Spike missiles and systems to over 26 nations.

<https://eurasianimes.com/battle-of-atgms-how-does-indias-nag-spike-atgm-compete-against-chinas-red-arrow-anti-tank-missiles/>

## India's artillery modernisation programme must not go the vaccine way

*Rather than working in silos, the Army and the govt must look at the fastest way possible to realise Field Artillery Rationalisation Programme, designed in 1999*

*By Snehesh Alex Philip, Edited by Anurag Chaubey*

It was in 1999 that India finalised the Field Artillery Rationalisation Programme. It was to become the backbone of India's fire assault in any future wars, especially in the mountains.

After all, the Bofors gun had proved its mettle in the 1999 Kargil conflict with its pinpointed pounding of enemy positions that enabled the infantry to launch daring attacks on Pakistani forces.

Under FARP, the Army is supposed to have, by 2025-27, a mix of around 3,000-3,600 155mm but different caliber types of towed, mounted, self-propelled (tracked and wheeled) howitzers. This was to be achieved through a mix of direct imports, licensed manufacturing and indigenous systems.



[Dhanush artillery guns | Ministry of Defence](#)

After years of being in the rut, the artillery programme got a push post 2015 with successful completion of trials (which had begun around 2012), signing of contracts and various systems entering the last stages of decision making.

The artillery programme was then seen as a success story by everyone in the defence establishment.

In a way, it is similar to the highs and lows of India's Covid vaccine management. Before the second wave hit us, our vaccine policy was the toast of the world. But as the pandemic raged and people started demanding vaccines, we realised how ill-equipped we were.

The Narendra Modi government then took decisions that are likely to come handy in the months to come. Since Covaxin is an Indian product, the government entered into agreements with three public sector undertakings that will get the technology from Bharat Biotech and manufacture the vaccines at their own facilities. The government has also welcomed private players.

A similar approach is needed for the artillery modernisation programme too, so that India can make the best use of skill and technology available to equip our forces in the quickest time possible.

Let us take a look at where our modernisation programme is and why it is floundering.

### **Bofors jinx was broken in 2016**

It was in 2016 that the Army was finally able to break the "Bofors jinx", as I had reported then, and inked the first agreement for artillery guns after the Bofors scandal came out in the 1980s. India had placed an order with the US, in what is a nearly Rs 5,000-crore-deal, for 145 M777 ultra-light howitzers, which is expected to be deployed near the LAC.

This was the first artillery deal in three decades and signalled the beginning of the realisation of a long-delayed artillery modernisation programme.

Then in 2017, private player Larsen & Toubro (L&T) won the contract to supply 100 K9 Vajra-T 155 mm/52 calibre tracked self-propelled gun systems. In 2018, an order was placed for 114 of

the 155mm x 45mm Dhanush guns, a product of the Gun Carriage Factory (CGF) in Madhya Pradesh's Jabalpur, which comes under the state-run Ordnance Factory Board (OFB). There was also a deal for Project Sharang with the OFB for upgunning the 130mm M-46 artillery guns to 155mm.

Amid all this, a deal for a towed artillery gun system under the 'Buy and Make' category, a proposal which has been in the works for nearly two decades, was also on.

And then there was also the Advanced Towed Artillery Gun System (ATAGS), being developed by the Defence Research and Development Organisation (DRDO), along with private firms Bharat Forge of the Kalyani Group and TATA Power SED.

Artillery does not mean just the guns. It also means rockets. In August 2020, the defence ministry inked a deal to procure the extended range Pinaka rocket launchers for six regiments at a cost of Rs 2,580 crore.

The contract has been signed with Tata Power Company Ltd (TPCL) and L&T while defence public sector undertaking Bharat Earth Movers Ltd (BEML) will also be part of the project as it will supply the vehicles on which the rocket launchers will be mounted.

The Army has also issued a Request for Information (RFI) for mounted artillery gun systems this year.

### **Where does the artillery programme stand?**

Among all the projects mentioned above, the only completed one has been the Vajra. L&T this year finished the delivery of the 100th gun ordered in 2017 by the Army, much before the contracted delivery schedule.

As of 2 June 2021, the BAE Systems has delivered 59 of the 145 M777 ordered in 2016. The guns are being assembled, integrated and tested in India by Mahindra Defence Systems Limited.

The OFB has delivered an abysmally low number of 12 Dhanush guns out of the 114 ordered in 2018 to the Army, which has flagged key production quality concerns.

It was only last year that the OFB supplied the first Sharang gun, which is basically an upgrade of the existing 133mm guns to 155mm, which means adding new barrels.

The ATHOS guns of Israel's Elbit Systems had emerged as the winner after years of Army trials in 2019 but a final decision is yet to be taken.

While the original plan was for direct supply of 400 guns and indigenous production of the remaining 1,180 guns by OFB, under a full Transfer of Technology (TOT) process, the Army has now decided to restrict it to just the direct import.

The Army is still pushing for this gun and the Israelis have offered faster delivery than what India had proposed, besides an indigenous content of over 70 per cent even for the 400 guns.

The Army plans to meet the requirement of the 1,180 guns through the ATAGS, a system which is still undergoing trials with the force raising certain concerns.

To add to the problem, the barrel of the ATAGS burst in September 2020 during firing. While there is no official word behind the reasons, a *Business Standard* report says "the gun has undergone changes" after the accident.

### **Spread out manufacturing of artillery guns**

There is no doubt over the fact that the ATAGS and Dhanush are the guns that will be the backbone of India's firepower for the next, at least, two decades. However, the DRDO, OFB, Kalyani Group and TATA can't ignore the concerns raised by the Army with the systems. And neither can the OFB ignore the abysmal pace of manufacturing.

The ATAGS and Dhanush cannot be seen as just DRDO or OFB products. It is India's just like Covaxin. And to scale up and address the concerns of the Army, more private firms need to be involved.

For example, in the case of Dhanush guns, the technology can be given to L&T and the Kalyani Group, and they can produce them and deliver along with the OFB. The Army can actually go in for higher numbers and the private firms can also look at an export variant.

In the case of ATAGS, expertise can be sought from other private firms to reduce weight, and a combined order can be given to them while covering the development cost of both Kalyani Group and TATA.

Rather than thinking in silos, the Army and the government need to think out of the box and look at the fastest way possible to realise the FARP designed in 1999, over two decades ago.

India currently has a case of three artillery programmes, including two indigenous (ATAGS, Dhanush) at the brink of success. When the three programmes, including the ATHOS was initiated, the hope was that at least one would succeed. But we now have a case where all the three towed guns are near fruition.

The defence establishment needs to step up and take control lest we again fall back on our modernisation plan.

Lt Gen P Ravi Shankar (Retd), former Director General (Artillery), the man who can be credited with taking the programme out of the rut, tells me that the need of the hour is a special purpose vehicle (SPV).

“The aim of the special purpose vehicle is to ensure that the scale and technology capability of various groups can be brought together for the ultimate benefit of the armed forces,” he said.

*(Views are personal.)*

<https://theprint.in/opinion/brahmastra/indias-artillery-modernisation-programme-must-not-go-the-vaccine-way/671460/>

THE  
**WIRE**

Sun, 06 June 2021

## With haphazard equipment planning, Indian Army could be using five different tank types soon

*Operating multiple tank types inflicts not only an exorbitant financial burden in their acquisition, but also a massive cost incurred in deploying, maintaining, servicing and upgrading them*

*By Rahul Bedi*

Chandigarh: The Indian Army's (IA's) arbitrary and haphazard equipment planning could, over the next decade, make it the only force operationally fielding five different tank types simultaneously.

Presently, the IA operates 3,500-odd licence-built Russian T72M1 'Ajeya' main battle tanks (MBTs) and directly imported and domestically assembled and constructed T90S 'Bhishma' platforms, alongside 124 indigenous Arjun Mk1 MBTs.



Indian Army Armoured Corps T-90 main battle tank. Photo: cell105/Flickr CC BY 2.0

But on April 23 the army dispatched a request for information (RfI) to overseas and domestic vendors for the intended procurement of 350 locally manufactured light tanks for deployment in assorted terrain and varied climatic conditions, making it the IA's fourth potential tank type. And, thereafter, on June 1 it launched the search for its fifth tank type by inviting responses by mid-September from overseas original equipment manufacturers (OEMs) to its RfI for the planned acquisition of 1,770 medium weight Future Ready Combat Vehicle's (FRCVs) by 2030 at tremendous, but undefined, cost.

The latter RfI stated that the FRCV would serve as the IA's principal MBT for the ensuing 40-50 years, leading to the obvious inference that the other in-service larger platforms like the T72s



,T90s and Arjuns would imminently be phased out to make way for the former. But the IA's and Ministry of Defence's (MoD's) confused projections indicate otherwise, or as 'an embarrassment of tank riches' as a two-star IA officer aptly defined it.

Eager to progress the governments *atamnirbharta* or self-sufficiency initiative, the MoD recently approved the Rs 8,350 crore procurement of another 118 Arjun Mk1A variants, the deal for which is likely to be imminently concluded with the state-owned Ordnance Factory Board (OFB) that series builds the MBTs at its Heavy Vehicle Factory (HVF) at Avadi, near Chennai. Alongside, the government-run Defence Research and Development Organisation (DRDO), responsible for designing Arjun, anticipates additional orders for 300-400 more, despite the IA's severe reservations over the overweight 68.25 tonne MBTs multiple operational and logistic handicaps, that limit its employment almost exclusively to Rajasthan's desert region.

And, earlier in November 2019, the MoD had signed a Rs 20,000 crore contract with the OFB to licence build 464 T90S MBTs over five years, as part of an earlier 2006-7 deal with Russia to locally construct 1,000 such platforms under a transfer of technology. Six months previously, in April 2019, the MoD had amazingly approved the Rs 13,448 crore import of an equal number of 464 advanced T-90MS MBTs in kit form from Russian tank manufacturer Uralvagonzavod (UVZ) for assembly by the HVF.

No contract, however, has yet been signed for the latter procurement, but the proposed 48-tonne T90MS's are expected to "significantly" enhance the IA's firepower, as they feature several upgrades over the basic T-90S platform. These include a modified 1,130-hp multifuel, turbo-diesel engine coupled with an automatic transmission system; a new air-cooling unit; advanced explosive reactive armour (ERA); and a remotely operated weapon station. The T-90MS also uses the Russian-made Relikt ERA, which is believed to provide a 40 to 50% reduction in the efficacy of kinetic energy armour-piercing rounds, and as much as a 70% reduction in the effects of a tandem high-explosive anti-tank (HEAT) warhead.

Formerly, in late-2018, the MoD had sanctioned the Rs 2,300 crore procurement of 1,000 new 1,000hp engines to replace the T-72M1's 700hp 5TDF power packs, under the 'Buy and Make' category of the Defence Procurement Procedure-2016. As a follow-on to this earlier approval, the MoD's recently released list of 108 military platforms, items and related systems which are to be progressively sourced indigenously end-2021 onwards, include the proposed 1,000 hp engines for the T72M1 MBTs. In short, the eventually up-engined 1,500-odd T72M1's would remain operational for at least two decades alongside the IA's other varied tanks.

Senior retired and serving IA officers told *The Wire* that operating multiple tank types poses problems for all armies. It inflicts not only an exorbitant financial burden in their acquisition, but also on the massive cost incurred in deploying, maintaining, servicing and upgrading them over a 35-40 year period they remain operational.

Many officers said that in normal fiscal times these costs, though considerable, would 'somehow' be manageable. But in India's current depressed economic milieu, savaged further by the ongoing COVID-19 pandemic and with limited prospects of any impending financial recovery, the IA's disposition to acquire new armoured platforms appeared excessive at best, or iniquitous at worst. "Such ad hoc procurement planning only displays a total disregard of all financial reality by the army," said Amit Cowshish, former MoD acquisitions advisor. The proposed tank procurements, which are being prioritised by the IA, he added, are nothing but fiscal profligacy and one the resource-strapped force can ill afford.

On a lighter note, the IA's planning mirrors the dilemma of an indigent, but indulgent aristocrat who invariably followed the dictum that since he had no money to pay his tailor, he simply ordered another suit. Sadly for the IA, such giddy logic of simply acquiring yet another tank type, without adequate funds in the kitty, finds no resonance in the real world. It merely adds to its overloaded fiscal encumbrances.

In the fiscal year (FY) 2021-22, for instance, the IA received Rs 36,531.9 crore as capital expenditure for modernisation via new procurements and upgradation of existing platforms and



equipment, which was Rs 14,960.2 crore less than the Rs 51,492.1 crore the force had demanded as its outlay from the MoD. Similarly, the IA's revenue outlay, earmarked for salaries, operating expenses, fuel and acquiring assorted ordnance and supplies for the same fiscal year was Rs 147,644.13 crore, against its projected requirement of Rs 170,705.28 crore.

This registered a shortfall of Rs 23,061.15 crore, leaving limited moneys to support overly ambitious deployments, especially after the IA's incredibly costly placement of troops and equipment along the disputed line of actual control (LAC) in eastern Ladakh against China's People's Liberation Army (PLA) over the past 12 months. This expensive deployment continues, and is likely to persevere for the foreseeable future, as there appears to be no imminent pullback or withdrawal by the belligerent PLA that has seized vast swathes of territory India claims as its own in the complex border dispute.

Deposing before Parliament's Standing Committee on Defence in 2018, then IA Vice Chief of Staff Lieutenant General Sarath Chand had disturbingly admitted that "marginal" budgetary hikes were "barely enough" for the force to meet inflation costs and mounting taxes. Thereafter, India's annual defence budget had reduced even further in real terms, dropping to 1.43% of the country's Gross Domestic Product, or GDP, in FY 21-22 despite growing security challenges in its neighbourhood.

"Besides the massive capital investment needed to acquire new tanks, their inventory management, which even today poses a formidable challenge to the army, will become even more acute with additional platforms," said military analyst Major General A.P. Singh (retired). Adding another two entirely new tank types to the existing assortment will only make this task nightmarish, he warned. Furthermore, acquiring sector-specific platforms like light tanks, principally for deployment in mountainous regions along the LAC, too would significantly exacerbate the army's logistical obligations by imposing an additional financial burden, the former armoured corps officer added.

Presently, 65 of the IA's 67 armoured regiments operate a mix of some 3,500 T72Ms and T90S MBTs, while the remaining two have 124 Arjun Mk1s. But in keeping with the IA's planning, as declared earlier, these will be complemented by 350 light tanks and 1,770 FRCVs. The latter are envisioned as a universal tracked platform on which to construct a family of vehicles like recovery, bridge laying, air-defence, artillery observation, engineer reconnaissance and armoured ambulance variants.

The IA's FRCV concept too is borrowed, modelled principally on Russia's Armata Universal Combat Platform that includes the T-14 and T-15 MBTs, in addition to other assorted systems fabricated on the same chassis. These include combat engineering vehicles, armoured recovery vehicles (ARVs) armoured personnel carriers and varied self-propelled artillery systems, amongst others.

And though the IA aims, at some point over the next two-three decades, presumably after inducting adequate numbers of FRCVs to phase out the older T72Ms, followed progressively by ageing T90Ss, there would be an extended overlap during which all five tanks may well be concurrently in service. Senior IA armoured corps officers admitted that unlike the IA, other armies, largely operated one tank type or its upgraded or retrofitted variant, significantly easing logistical problems of spares and maintenance and streamlining platform production lines.

The US, for instance, operates variants of the M1 Abrams MBT, whilst Israel fields the Merkava, Britain the Challenger-2, Canada the Leopard 2A6M, Germany the Leopard and France the Leclerc MBT respectively. The Russian army, for its part has T72, T80 and T90 MBTs-all with a high degree of commonality-and has only recently begun inducting the T-14 Armata, based on the aforementioned Universal Combat Platform.

Paradoxically, the Pakistan Army apes the IA in that it has five MBT types totalling around 1,800-2,000 platforms, of which only the Ukrainian T-80UD MBT is the outlier platform. The remaining four MBTs-Type 85-11AP, Al Zarar, Al-Khalid and VT-4/MBT3000-are either licence-built Chinese models, or have been jointly developed in conjunction with China, thereby conferring

a high degree of structural correlation between them. This renders not only their manufacture, and but also their logistic and maintenance support, less problematic.

Ironically, India's steadily declining budget outlays remain in inverse proportion to the IA's grand plans to add additional tank types to its inventory, merely to execute outdated WW2 concepts of attrition and manoeuvre warfare, instead of gainfully spending its limited resources on developing 21st-century informationalised capabilities to deal with the PLA, its primary military rival.

In recent years, senior military analysts have critiqued the IA for focusing unduly on major platforms like MBTs and not enough on future technologies like robotics, artificial intelligence, cyber and electronic warfare. They have also observed that relatively inexpensive 'swarm drone' squadrons have in recent months effectively destroyed advancing columns of hugely expensive MBTs, rendering them ineffective on the battlefield.

Perhaps, an operational audit on the nature of future conflicts is overdue for the IA, instead of persisting with what generations of army commanders feel 'comfortable' planning for and executing, with numerous tank types like in the 1965 and 1971 wars with Pakistan.

<https://thewire.in/security/indian-army-tanks-equipment-planning>

## COVID 19: DRDO's Contribution



Mon, 07 June 2021

### DRDO Covid-19 Hospitals

By Lt. Gen Prakash Katoch

India is battling the second pandemic wave which is more intense than the first one especially since it has spread to the villages. India's rural population is 65.53 percent of India's total population as last reported in 2019. Among the blame game between the Centre and States on vaccines, government says all Indians will be vaccinated by end of the year, judiciary seems unconvinced and posts on social media are lambasting the judiciary for overstepping – typical scenario in India.

Vietnam has reported a much more virulent strain of the virus and Britain is in the early stages of the third pandemic wave. A recent report warns a third wave in India that will possibly be as severe as the second wave. The report goes on to say that the third wave may last for 98 days. The magical figure of 98 days presumably is on the premise that the China Virus will not mutate into more virulent strains. This may be wishful thinking. The third wave overlapping the second wave that we are still combating too remains a possibility.



DRDO Covid-19 Hospitals

The DRDO (Defence Research and Development Organisation) acted with alacrity to help fight the second pandemic wave by establishing six hospitals for Covid-19 patients at Delhi, Lucknow, Varanasi, Patna, Bengaluru and Ahmedabad. These locations were apparently chosen by the Ministry of Defence (MoD) based on political considerations. It is commendable that these facilities were set up speedily with no shortages and high quality medical equipment. DRDO could

establish these from scratch through turnkey contracts awarded to external vendors using unaudited funds, which are always in abundance. The same funds could have been used easily to hire adequate number of civil-government and civilian doctors in stations where these DRDO hospitals have been set up to take on the load at least partially if not fully. However, MoD ordered the military to man these hospitals. Like the DRDO the Medical Branch of the Army is directly under the MoD. This is despite having created a Chief of Defence Staff (CDS) and a Department of Military Affairs (DMA). The CDS is also the Secretary of the DMA.

Hence, manpower from all Zonal and Command Hospitals less Northern Command has been pooled for the six DRDO hospitals. The Navy has reportedly not provided any doctors taking the stand they don't have enough to run their own hospitals. The Air Force has provided manpower from Bengaluru. Specialist training of officers at the Armed Forces Medical College (AFMC) has been curtailed, which is long-term detriment of the organization as these officers have missed out on nearly a year of training from their three year Advance Course.

Total number of medical staff provided to DRDO facilities is not known but about 200 doctors, some 80 nurses and about 150-200 medical and technical personnel other than officers are deployed in the DRDO hospitals at Varanasi and Lucknow alone. The overall medical staff for the six hospitals therefore may be roughly three times the numbers mentioned here. Zonal and Command Hospitals have had to pull out even specialists and super specialists to provide support to these DRDO hospitals. Nearly 50 percent of the clinical specialists barring a skeleton crew to hold the fort have been deployed from Command Hospitals to staff these hospitals. Reportedly, Doctors of the Army Dental Corps (ADC) too have been roped in to man the Covid Wards of Military Hospitals!

The Army Medical Corps (AMC) already stretched in specialist and super specialist capability in military hospitals is left with no depth in reserves. In addition, the station medical cover has been hit for serving personnel, their families, veterans and dependents. The double whammy is the pandemic coupled with shifting away of specialist and super specialist cadre officers from their regular work. News reports of last month had reported that more than 5,000 Army soldiers are battling Covid-19 in hospitals. This may be upwards of 7-8000 presently considering our bulk troops are from rural areas, and these figures do not include their families.

China attacked India last year capitalising on the first wave of Wuhan Virus. While India is prepared for any further PLA mischief China for which it has pumped in more advanced weaponry into the region. Chinese President Xi Jinping's call for China to portray a "loveable" face is more of a ruse. It is not without reason that Chinese maps are not showing Ladakh as part of India. 16 Chinese fighter aircraft recently intruded into Malaysian airspace as the whole country was going into lockdown mode. China could do more offensive actions against India this summer maybe in Ladakh, elsewhere or both areas as also in Bhutan. This would be even bigger certainty as and when the third wave hits India.

While the policy makers are sanguine about our operational preparedness, requisite medical cover for conflict too needs to be ensured. This time the conflict maybe intense, even if short duration, as China would likely try out its latest weaponry to include long range strikes, AI, drones and the like. Northern Command by itself may not be able to take on the entire load of casualties.

The MoD has now reportedly directed that these DRDO hospitals will continue to be manned by the military for another six months. This is not likely to be the only extension as the pandemic is not likely to disappear that easily. These hospitals may continue even after the third wave gets over, whenever that happens and provided there is no fourth wave which Japan is already suffering. Moreover, considering the paucity of health infrastructure in the country, it would be prudent to let these hospitals continue as general hospital even after the pandemic eventually leaves India.

There is no doubt that we are fighting a biological war and Armed Forces must join the nation in combating the pandemic. This they have already demonstrated with full dedication; manning the DRDO hospitals; providing 18 officers and 116 personnel below officer rank from Army's Remount Veterinary Corps (RVC) to provide administrative staff for civil hospitals, treating

civilian Covid-19 casualties, naval warships and air force aircraft bringing emergency equipment post haste from foreign countries despite civil aircraft and merchant ships available on call.

However, in view of the operational imperatives mentioned above, it is time for the policy makers to commence relieving the military staff from the six DRDO hospitals, replacing them by civilian doctors outsourced by the DRDO for latter should have no dearth of finances. Here the issue is not only operational preparedness but it is also linked to the morale of troops.

The Defence Minister needs to reflect on the long term effects of continued deployment of medical staff by the military in these six DRDO hospitals, which by the looks of it will continue for another 12 months at a conservative estimate.

<https://www.thenorthlines.com/drdo-covid-19-hospitals/>



*Mon, 07 June 2021*

## **CM discusses various issues with Union Ministers**

Dehradun: Chief Minister Tirath Singh Rawat met various Union ministers during his visit to the national Capital on Sunday. Meeting the Union Health and Family Welfare minister Dr Harsh Vardhan, Rawat requested that a branch of All India Institute of Medical Sciences (AIIMS) be established in the Kumaon region in addition to a medical college in Kotdwar. Vardhan assured Rawat of appropriate action in this regard.

The chief minister also met the Union Defence minister Rajnath Singh and thanked him for the establishment of one temporary Covid-care centre each in Rishikesh and Haldwani through Defence Research and Development Organisation (DRDO). Stating that these Covid care centres have all necessary facilities, he said that these are major development in Uttarakhand's health sector. Referring to the importance of Uttarakhand, Singh said that the border areas of the state are also strategically important. He assured all possible help from the centre to the state. Rawat then met the chief of defence staff, general Bipin Rawat. The duo discussed aspects related to encouraging defence and aerospace manufacturing in the state. A delegation from Uttarakhand will soon meet the chief of defence staff in this regard.

Meeting the Union minister of State for Power, New and Renewable Energy, RK Singh, the chief minister informed him about the works done in green energy sector by encouraging solar and pine needle projects by linking these to employment generation. Rawat said that the state is committed to environmentally sustainable energy development. He requested that a new policy/guidelines be framed for the MNRE providing grant for construction and development of small hydro power projects. He also sought case to case basis viability funding for under construction projects like the 120 MW Vyasi project considering the high tariff. Singh also assured all possible assistance from the Centre to the State government.

The chief minister also met the Union Jal Shakti minister Gajendra Singh Shekhawat. He informed the minister that under the Jal Jeevan mission more than 6.60 lakh drinking water connections have been provided in the state. When Prime Minister Narendra Modi had announced this mission in 2019, the personal domestic water connections in Uttarakhand were eight per cent which have now increased to 45 per cent. The chief minister also requested Shekhawat for the cabinet committee's permission for the Lakhwad project. The central government will provide all possible help to the state government, assured the Union minister.

<https://www.dailypioneer.com/2021/state-editions/cm-discusses-various-issues-with-union-ministers.html>

## CM तीरथ सिंह रावत की रक्षा मंत्री राजनाथ सिंह व सीडीएस से मुलाकात, उत्तराखंड में डिफेंस निर्माण सहित इन मुद्दों पर चर्चा

देहरादून: सीएम तीरथ सिंह रावत ने रविवार को नई दिल्ली में रक्षा मंत्री राजनाथ सिंह से भेंट की। इस दौरान दोनों नेताओं के बीच सीमांत में सुरक्षा हालात पर भी चर्चा हुई। मुलाकात के दौरान सीएम ने ऋषिकेश और हल्द्वानी में डीआरडीओ के माध्यम से एक-एक कोविड केयर सेंटर की स्थापना करवाने के लिए रक्षा मंत्री का आभार व्यक्त किया।

मुख्यमंत्री ने कहा की इन कोविड केयर सेंटरों में सभी सुविधाएं उपलब्ध हैं। स्वास्थ्य के क्षेत्र यह उत्तराखंड के लिए एक बड़ी सौगात है। इस दौरान रक्षा मंत्री राजनाथ सिंह ने कहा कि उत्तराखंड देवभूमि और वीरभूमि है। उन्होंने कहा कि उत्तराखंड के सीमांत जिले सामरिक दृष्टि से भी महत्वपूर्ण है। केन्द्र सरकार द्वारा



राज्य को हर संभव मदद दी जाएगी। गौरतलब है कि पिछली जनगणना के बाद से अंतरराष्ट्रीय सीमा से सटे उत्तराखंड के 14 गांव पूरी तरह निर्जन हो चुके हैं, उक्त सभी गांव अंतरराष्ट्रीय सीमा से पांच किमी के दायरे में स्थित हैं। जबकि अन्य छह गांवों में आबादी पचास प्रतिशत से कम हो गई है।

### रक्षा निर्माण पर जोर

मुख्यमंत्री तीरथ सिंह रावत ने नई दिल्ली में चीफ ऑफ डिफेंस स्टाफ बिपिन रावत से भी उनके आवास पर भेंट की। इस दौरान उत्तराखंड में रक्षा निर्माण और एयरोस्पेस निर्माण की संभावनाओं पर चर्चा की गई। सीएम तीरथ सिंह रावत ने कहा कि उत्तराखंड में खासकर देहरादून में कई रक्षा संस्थान काम कर रहे हैं। अब निजी क्षेत्र को बढ़ावा देने के लिए राज्य सरकार एयरोस्पेश और रक्षा औद्योगिक नीति - 2020 लेकर आई है। इसके तहत इच्छुक कंपनियों को कई रियायतें दी जा रही हैं। इसलिए उत्तराखंड में निजी रक्षा उत्पादन की काफी संभावना है। सीएम ने बताया कि शीघ्र ही उत्तराखंड से एक प्रतिनिधिमंडल पूरा प्रस्ताव लेकर सीडीएस बिपिन रावत से मिलेगा।

<https://www.livehindustan.com/uttarakhand/story-chief-minister-tirath-singh-rawat-meet-defence-minister-rajnath-singh-cds-general-bipin-rawat-defence-production-uttarakhand-4097150.html>

## BEML share rises over 4% after firm starts making oxygen generating units

*BEML stock touched an intraday high of Rs 1,359.9, rising 4.23% against previous close of Rs 1,304.65 on BSE*

BEML share rose over 4% today after the state-run firm started manufacturing oxygen generation units at its KGF complex in Kolar in Karnataka. BEML stock touched an intraday high of Rs 1,359.9, rising 4.23% against previous close of Rs 1,304.65 on BSE. BEML share is trading higher than 5 day, 20 day, 50 day, 100 day and 200 day moving averages.

BEML share has gained 127.44% in one year and risen 39.86% since the beginning of this year. In a month, the stock has gained 16.47%.

Market cap of the firm rose to Rs 5,676 crore. Total 0.75 lakh shares changed hands amounting to turnover of Rs 10.16 crore on BSE.

The stock hit 52 week high of Rs 1,544 on March 9, 2021 and 52 week low of Rs 570.25 on June 12, 2020. The production of oxygen has been started to mitigate the shortage in the country amid the second wave of COVID-19.

These units are being manufactured under a transfer of technology agreement signed with Defence Bio-Engineering and Electro Medical Laboratory (DEBEL), Bengaluru, which works under the Defence Research and Development Organisation (DRDO).

"BEML has received orders for 100 oxygen generation units from DEBEL on May 21 under "PM Cares" fund and the same is expected to be supplied by July-end," the statement said.

Second wave of COVID-19 pandemic has hit India and hospitals in several states have been complaining about shortage of oxygen, vaccines, drugs and equipment.

"To mitigate the oxygen shortages in the country for Covid patients, BEML has successfully started manufacturing 960 LPM (litres per minute) medical oxygen plants (units) at its KGF complex in record time under a ToT (transfer of technology) agreement with DEBEL," the statement said.

The first set of oxygen generation unit has been rolled out and is being delivered to Koppal Institute of Medical Sciences in Karnataka.

<https://www.businesstoday.in/markets/company-stock/beml-share-rises-firm-starts-making-oxygen-generating-units/story/440822.html>



BEML share is trading higher than 5 day, 20 day, 50 day, 100 day and 200 day moving averages.



## मेरठ में कोविड कांट्रोल:मिलिट्री अस्पताल में 25 जून से प्राणवायु देगा DRDO का ऑक्सीजन प्लांट, 545 बेड पर मरीजों को मिलेगी राहत

वैश्विक महामारी कोरोना की तीसरी लहर से पहले मेरठ मिलिट्री अस्पताल में 25 जून से डीआरडीओ का ऑक्सीजन प्लांट प्रारंभ हो जाएगा। डीआरडीओ द्वारा 1000 लीटर प्रति मिनट क्षमता वाले इस ऑक्सीजन प्लांट से 545 बेड्स पर सीधे ऑक्सीजन का फ्लो किया जाएगा। प्लांट लगाने के लिए एनएचएआई ने अस्पताल में सिविल वर्क तेजी से शुरू कर दिया है।

15 जून तक एनएचएआई करेगी काम, डीआरडीओ करेगा प्लांट इंस्टॉलेशन

एनएचएआई के परियोजना निदेशक ने बताया कि 15 जून तक अस्पताल में ऑक्सीजन प्लांट का सिविल वर्क हमारी टीम पूरा कर देगी। इसके बाद डीआरडीओ की टेक्निकल टीम प्लांट इंस्टॉलेशन की तकनीकी जिम्मा संभालेगी। जो 25 जून तक लगभग पूरा कर दिया जाएगा। इसके बाद मरीजों को सीधे प्लांट से ऑक्सीजन मिलेगी। सिलिंडर के लिए मरीजों को भटकना नहीं पड़ेगा। प्लांट में 24 घंटे बिजली व्यवस्था रहेगी।

कंप्यूटराइज्ड प्लांट में बनाई जाएगी ऑक्सीजन

मेरठ के मिलिट्री अस्पताल में डीआरडीओ द्वारा लगाए जा रहे इस ऑक्सीजन जनरेशन प्लांट में तरल ऑक्सीजन तैयार की जाएगी। हवा को ट्रेप कर यहां तरल ऑक्सीजन बनेगी। जिसे 99 फीसद तक प्यूरीफाई करते हुए मेडिकल ऑक्सीजन में बदल जाएगा। इसके बाद ऑक्सीजन की सप्लाई सीधे बेड पर होगी। मरीज के बेड तक प्लांट से पाइप लाइन के जरिए ऑक्सीजन वितरण होगा। ऑटोमेटिक प्लांट होगा, जो कम्प्यूटर ऑपरेटिंग सिस्टम से संचालित रहेगा।

<https://www.bhaskar.com/local/uttar-pradesh/meerut/news/drdo-oxygen-plant-will-give-life-to-military-hospital-545-beds-patients-from-25-june-128562715.html>



15 जून तक एनएचएआई कर देगा प्लांट का सिविल वर्क, तीसरी लहर से पहले प्लांट होगा तैयार। प्रति मिनट 1 हजार लीटर ऑक्सीजन तैयार करेगा प्लांट।



## Installation of oxygen generator underway in Virudhunagar

*Govt. Medical College will be able to face third COVID wave: Dean*

Virudhunagar: Even as medical oxygen supply has stabilized in the hospitals in Virudhunagar district, installation of one oxygen generator has come as a big relief to Virudhunagar Government Medical College hospital.

The generator, sponsored by National Highways Authority of India, can produce 1,000 litres of gaseous oxygen a minute. The cost of the plant is ₹ 94.4 lakh.

“We have procured the plant with the help of Defence Research Development Organisation. We are also helping in its civil and electrical installation on the hospital premises,” said NHAI, Madurai Project Officer, Mathivanan.

“The new plant will be commissioned very soon and will make us self sufficient to meet the hospital’s oxygen requirements,” said Virudhunagar Collector, R. Kannan.

Dean of Virudhunagar Government Medical College hospital, J. Sangumani, said that the hospital has got 450 beds and has plans to increase the beds up to 600 in immediate future. “We have 380 oxygen-supported beds, and it would be increased by another 100 beds when the new plant becomes functional,” the Dean said.

However, the hospital has got a 6KL liquefied oxygen tank on its main premises for the high-flow oxygen needs. “Though our need is only 20 cylinders a day, we also have got 98 cylinders as a backup facility,” the Dean said. The hospital, which has allocated 380 beds for COVID treatment, will be able to face the third wave of COVID, the Dean said.

<https://www.thehindu.com/news/national/tamil-nadu/installation-of-oxygen-generator-underway-in-virudhunagar/article34743885.ece>



A new oxygen generator is under installation in Virudhunagar Government Medical College Hospital in Virudhunagar on June 05, 2021. | Photo Credit: The Hindu

## डीआरडीओ के परियोजना निदेशक व कलक्टर ने किया ऑक्सीजन प्लांट सिविल वर्क का निरीक्षण

पीएम केयर फंड से 200 सिलिंडर का लगाया जाएगा ऑक्सीजन प्लांट

By Raj Singh

**श्रीगंगानगर.** पीएम केयर फंड के अंतर्गत राजकीय जिला चिकित्सालय में 200 सिलेंडर ऑक्सीजन प्रतिदिन उत्पादन क्षमता का ऑक्सीजन प्लांट लगाया जा रहा है। इसको लेकर शनिवार को डिफेंस रिसर्च एण्ड डेवलपमेंट ऑर्गनाइजेशन (डीआरडीओ) के परियोजना निदेशक मोहम्मद सफी, जिला कलक्टर जाकिर हुसैन ने एसडीएम उम्मेद सिंह रत्नू व पीएमओ डॉ. बलदेव सिंह के साथ निरीक्षण किया।

पीएमओ ने बताया कि यहां डीआरडीओ की ओर से लगाए जा रहे ऑक्सीजन प्लांट का सिविल वर्क शुरू हो चुका है। जिसका निरीक्षण करने के लिए डीआरडीओ के परियोजना निदेशक आए थे। उन्होंने प्लांट के लिए चल रहे सिविल वर्क का निरीक्षण किया और आवश्यक दिशा-निर्देश दिए। 15 जून तक इस प्लांट का सिविल वर्क पूरा होने की उम्मीद है। इसके बाद 30 जून तक प्लांट को चालू करने की संभावना है। इसके बाद राजकीय चिकित्सालय में कोरोना और भविष्य में मेडिकल कॉलेज आदि बनने के बाद तक ऑक्सीजन की समस्या नहीं आएगी।

यह प्लांट पर करीब 2 करोड़ 25 लाख रुपए खर्चा होने का अनुमान है। अभी ऑक्सीजन आपूर्ति के लिए निजी ऑक्सीजन जनरेशन प्लांट और औद्योगिक प्लांट पर निर्भर रहना पड़ रहा है। इस हिसाब से चिकित्सालय में ऑक्सीजन सिलेंडर की प्रतिदिन की क्षमता 340 सिलेंडर की हो जाएगी। कोरोना महामारी की दूसरी लहर में श्रीगंगानगर सहित राज्य भर में ऑक्सीजन संकट बहुत ज्यादा पैदा हो गया था। यहां पर ऑक्सीजन की खपत की तुलना में सप्लाई अपेक्षाकृत कम मिली। इस कारण रोगियों की हर पल सांसे अटकी रही। जबकि अब राज्य में ऑक्सीजन उत्पादन क्षमता बढ़ाने पर तेजी से काम किया जा रहा है।



डीआरडीओ के परियोजना निदेशक व कलक्टर ने किया ऑक्सीजन प्लांट सिविल वर्क का निरीक्षण

<https://www.patrika.com/sri-ganganagar-news/drdo-project-director-and-collector-inspected-oxygen-plant-civil-work-6881278/>

## Kashmir: ‘Expedite work on construction of 500 bedded COVID Hospital at Khonmoh’

Deputy Commissioner Srinagar, Mohammad Aijaz Asad today chaired a meeting of concerned officers to sort out all the issues to ensure completion of 500-bedded COVID CARE Hospital at Khonmoh within the deadline set by the Lieutenant Governor during his recent visit at the work site in Khonmoh.

Chief Engineer, KPDCL, Ajaz Ahmad Dar, Medical Superintendent of the Hospital, Chief Planning Officer, Srinagar, besides concerned Officers from DRDO, PHE, PDD, FCS&CA, Revenue were present in the meeting

During the review the project Incharge from DRDO apprised the meeting that work is in full swing and expected to be completed shortly. The DC asked the officers to take comprehensive measures to ensure that all requisite staff, medical supplies, equipment, diagnostic tools, and other logistics are ready within the timeline.

The DC directed for taking all necessary measures with regard to Housekeeping, Laundry, disposal of Bio-medical and other wastes. He also directed the installation of a fire fighting system at the hospital.

To ensure adequate water supply to the hospital, the DC asked the Ground Water Division to dig up a dedicated Bore Well in the hospital premises within two days.

The Deputy Commissioner also passed the directions that SMC would ensure Sanitation and Sanitization in and around the hospital.

The DC Srinagar reiterated that the operationalization of DRDO's Hospital at Khonmoh would further strengthen efforts against Covid pandemic. On the occasion, the Chief Engineer KPDCL assured that all possible measures have been taken to ensure reliable and uninterrupted supply of power in the hospital round the clock. The Medical Superintendent of the hospital also put forth some suggestions for better functioning of the hospital.

Pertinent to mention that the Covid Hospital, Khonmoh has capacity for 125 ICU beds and 375 beds with oxygen and substantially will increase the Covid dedicated bed capacity to ramp up the healthcare infrastructure to effectively deal with the Corona virus pandemic.

In the end DC enjoined upon all the Departments to work in double shifts to meet the deadline fixed by the Lieutenant Governor. He assured DRDO of all support to achieve the intended target.

<https://www.indiablooms.com/news-details/N/72710/kashmir-expedite-work-on-construction-of-500-bedded-covid-hospital-at-khonmoh.html>



## Breathing easy

*Installing oxygen generating plants in hospitals can help tide over logistical problems in the supply of the gas*

*By Sunil Kumar*

When Covid-19 patients do not respond to treatment at home, their oxygen requirement increases. Such patients are typically admitted to hospitals that have facilities to administer this life-saving gas. The overall oxygen demand did increase in the country during the first wave, but it was managed well by mobilising oxygen from the resources within the country. India, therefore, dealt well with the first wave of the pandemic.

The second wave challenged and overwhelmed our healthcare resources, especially with respect to the availability of oxygen. The government mobilised medical oxygen on a large scale from all possible resources. However, the availability of cryogenic tankers for transportation and great distances to be covered from the big oxygen generating plants to hospitals proved to be limiting factors. It soon became apparent that transporting oxygen in tankers to the hospitals was not a sustainable and best solution. The hospitals had to be made self-reliant in terms of oxygen generation.



A health worker checks a Covid patient on oxygen support at a hospital, during the second wave of the coronavirus pandemic in Bengaluru. (PTI)

In an internal meeting of the Union Health Ministry on April 23, the Minister directed to ensure fast track installation of the medical oxygen generation plants in five central government hospitals: AIIMS JPN trauma centre, Safdarjung Hospital, RML Hospital, LHMC and Associated Hospitals and NCI, AIIMS Jhajjar. This was a game changing decision.

DGHS (MOHFW, GOI) teamed up with scientists/technical officers from DRDO and visited these five hospitals and finalised the site for installation of these oxygen generating plants in consultation with hospital authorities within 24 hours. The order for installation of the five oxygen plants at these five sites was placed the next day.

The entire project was closely monitored on a day-to-day basis by all the top brass of the Union Health Ministry. The Medical Superintendents of Safdarjung and RML Hospitals and the Director of LHMC, Nodal officer from AIIMS-JPN trauma Centre and NCI facility of AIIMS, New Delhi in Jhajjar (Haryana) supervised the preparation of sites in terms of civil, electrical and oxygen pipeline work for installation of the plant.

In the meantime, senior scientists from DRDO ensured that the plants under construction met quality standards. The Indian Airforce provided its services in air-lifting the oxygen generating plants in semi-knocked down condition, as the sites in hospitals got ready. The plants were installed/commissioned one by one — on May 7 at AIIMS, on May 10 at JPN Trauma Centre, and RML hospital on May 16 at Safdarjung Hospital, on May 17 at NCI, Jhajjar and, finally, on May 18 at LHMC.

These plants function 24 hours a day, producing 960L of medical grade oxygen per minute. They are based on the pressure swing adsorption (PSA) technology developed by DRDO and produced by M/s Trident Pneumatics Pvt Ltd. Coimbatore. These are compact and can operate under all weather conditions. The hospitals have reported satisfaction on the performance of these oxygen generation plants. No noise pollution issue has been reported. These plants are easy to operate and maintain — the first maintenance measure is scheduled after 4,000 hours; so they can run for about six months. A few hours of orientation and training to the technical persons (already



available with the hospitals) is all that is required. These plants work on electricity and do not require polluting diesel.

They generate oxygen from ambient air by employing PSA technology for separating oxygen and nitrogen by passing air at high pressure through a zeolite bed. Once fully functional, these plants do away with the need for transporting liquid medical oxygen.

The government plans to install more than 1000 such oxygen generating plants in public healthcare facilities across the entire nation in its efforts to strengthen the health infrastructure. This will help us to not only fight the pandemic but also deal with other health crises.

*(The writer is Director General Health Services, Ministry of Health & Family Welfare, GoI)*

<https://indianexpress.com/article/opinion/columns/covid-second-surge-oxygen-demand-india-7346682/>

## Defence News

### Defence Strategic: National/International



Press Information Bureau

Government of India

Ministry of Defence

*Fri, 04 June 2021 11:32AM*

## Rear Admiral Kapil Mohan Dhir appointed as the Joint Secretary (Navy & Defence Staff)

Rear Admiral Kapil Mohan Dhir has taken over as the Joint Secretary (Navy & Defence Staff) in the Department of Military Affairs. He is the first Armed Forces officer to tenant this assignment. He is an alumnus of National Defence Academy Khadakwasla, Pune and was commissioned into the Indian Navy on 01 Jan 1985.

He is the Senior most Serving Marine Commando (MARCOS) and has served in frontline afloat and ashore assignments including Command of the premier MARCOS establishment, INS Abhimanyu, Indian Naval warships INS Khanjar and INS Rana, and peacekeeping missions both within and outside the country, including 'Op Pawan' and 'Op Jupiter'. He has held important operational and staff appointments, which include Fleet Operations Officer of Eastern Fleet and Commodore in charge Work up, Indian Naval Workup Team (INWT), Kochi.



The officer has rich experience of Ministry of Defence, having worked in various capacities at Naval Headquarters, as well as Headquarters Integrated Defence Staff. As ACIDS (PP&FS) in the HQIDS, he played an important role in taking forward Govt's focus on 'ease-of-doing business', as well as 'Make in India' initiative by streamlining acquisition processes with greater focus on indigenisation. Being the architect of major policies, some of his contributions inter-alia include 'Strategic Partnership (SP) Model, revised 'Make-II' and 'Make-III' procedures, as well as the 'Positive Indigenisation List'. He has also furthered tri-service integration in Capability Development, besides introducing systemic approach to defence planning.

He is a graduate of Defence Services Staff College, Wellington and National Defence College, New Delhi.

He is also a recipient of the 'VishistSeva Medal' and the 'AtiVishishtSeva Medal' for distinguished service.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724306>



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Fri, 04 June 2021 11:32AM

## रीयर एडमिरल कपिल मोहन धीर को संयुक्त सचिव (नौसेना एवं रक्षा स्टाफ) नियुक्त किया गया

रीयर एडमिरल कपिल मोहन धीर ने सैन्य मामलों के विभाग में संयुक्त सचिव (नौसेना एवं रक्षा स्टाफ) का पदभार संभाल लिया है। वह इस असाइनमेंट पर आने वाले पहले सशस्त्र बल अधिकारी हैं। वह राष्ट्रीय रक्षा अकादमी खड़कवासला, पुणे के पूर्व छात्र हैं और उन्हें दिनांक 1 जनवरी 1985 को भारतीय नौसेना में कमीशन प्रदान किया गया था।

वह वरिष्ठतम सेवारत मरीन कमांडो (मार्कोस) हैं और उन्होंने अनेक अग्रिम तटीय तथा जलीय जिम्मेदारियों में पद संभाला है जिसमें प्रतिष्ठित मार्कोस प्रतिष्ठान आईएनएस अभिमन्यु, नौसेना के युद्धपोत आईएनएस खंजर एवं आईएनएस राणा की कमान शामिल है, तथा देश के भीतर और बाहर शांति मिशन जिसमें 'ऑपरेशन पवन' और 'ऑपरेशन जुपिटर' शामिल हैं। वह महत्वपूर्ण ऑपरेशनल तथा स्टाफ नियुक्तियों पर भी रहे हैं जिनमें पूर्वी बेड़े के फ्लीट ऑपरेशंस ऑफिसर और कमोडोर इंचार्ज वर्कअप, इंडियन नेवल वर्कअप टीम (आईएनडब्ल्यूटी), कोच्चि शामिल हैं।



नौसेना मुख्यालय तथा एकीकृत रक्षा स्टाफ मुख्यालय में विभिन्न जिम्मेदारियां संभालने वाले इस अधिकारी को रक्षा मंत्रालय का समृद्ध अनुभव है। एकीकृत रक्षा स्टाफ मुख्यालय में एसीआईडी (पीपी एंड एफएस) के रूप में उन्होंने 'ईज ऑफ डूइंग बिजनेस' पर सरकार का ध्यान केंद्रित करने के साथ-साथ स्वदेशीकरण पर अधिक ध्यान देने के अलावा अधिग्रहण प्रक्रियाओं को सुव्यवस्थित करके 'मेक इन इंडिया' पहल करने में महत्वपूर्ण भूमिका निभाई। प्रमुख नीतियों का शिल्पकार होने के नाते उनके कुछ योगदानों में 'रणनीतिक साझेदारी (एसपी) मॉडल, संशोधित 'मेक-II' और 'मेक-III' प्रक्रियाएं, साथ ही 'सकारात्मक स्वदेशीकरण सूची' शामिल हैं। रक्षा क्षेत्र में योजना निर्माण के प्रति प्रणालीगत दृष्टिकोण शुरू करने के अलावा उन्होंने क्षमता विकास में सेना के तीनों अंगों के बीच एकीकरण को भी आगे बढ़ाया है।

वह डिफेंस सर्विसेज स्टाफ कॉलेज, वेलिंगटन और नेशनल डिफेंस कॉलेज, नई दिल्ली से ग्रेजुएट हैं।

उत्कृष्ट सेवा के लिए उन्हें 'विशिष्ट सेवा मेडल' और 'अतिविशिष्ट सेवा मेडल' भी मिला है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724436>





Press Information Bureau  
Government of India

Ministry of Defence

Fri, 04 June 2021 9:59PM

## Indian Navy's oldest Hydrographic Survey Ship INS Sandhayak Decommissioned

INS Sandhayak, the Indian Navy's oldest Hydrographic Survey Vessel was decommissioned at Naval Dockyard in Visakhapatnam after serving the nation for 40 glorious years on Friday, 04 Jun 21. The ship was decommissioned in a solemn and low key event due to the ongoing COVID Pandemic when the National Flag, Naval Ensign, and the Decommissioning Pennant were lowered at sunset time in the presence of Vice Adm Ajendra Bahadur Singh, AVSM, VSM Flag Officer Commanding-in-Chief Eastern Naval Command, the Chief Guest for the ceremony. The Decommissioning Ceremony was also attended by Vice Adm Vinay Badhwar, AVSM, NM Chief Hydrographer to Govt. of India and by serving Hydrographers, outstation ex-crew members and veterans virtually through live streaming.



During her 40 years of illustrious service in the Indian Navy, INS Sandhayak undertook over 200 major hydrographic surveys in Western and Eastern coasts of the Indian peninsula, the Andaman Sea, and surveys in neighbouring countries including Sri Lanka, Myanmar and Bangladesh. The ship also took part in important operations like Op *Pawan* in Sri Lanka, 1987, Op *Rainbow* for Humanitarian Assistance in the aftermath of the *Tsunami* in 2004 and the maiden Indo-US HADR Exercise *Tiger-Triumph* in 2019.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724589>



पत्र सूचना कार्यालय  
भारत सरकार  
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## भारतीय नौसेना का सबसे पुराना हाइड्रोग्राफिक सर्वेक्षण जहाज आईएनएस संधायक कार्यमुक्त

भारतीय नौसेना के सबसे पुराने हाइड्रोग्राफिक सर्वेक्षण पोत आईएनएस संधायक को शुक्रवार, दिनांक 04 जून 2021 को 40 गौरवशाली वर्षों तक राष्ट्र की सेवा करने के बाद विशाखापट्टनम के नौसेना डॉकयार्ड में कार्यमुक्त कर दिया गया। समारोह के मुख्य अतिथि ईस्टर्न नेवल कमांड के फ्लैग ऑफिसर कमांडिंग इन चीफ वाइस एडमिरल अजेंद्र बहादुर सिंह, एवीएसएम, वीएसएम की उपस्थिति में एक सादे समारोह में राष्ट्रीय ध्वज, नौसेना एनसाइन एवं डिकमीशनिंग पेनेंट को सूर्यास्त के समय झुकाकर कार्यमुक्त कर दिया गया। इस कार्यमुक्त समारोह में भारत सरकार के प्रमुख हाइड्रोग्राफर वाइस एडमिरल विनय बधवार, एवीएसएम, एनएम तथा सेवारत हाइड्रोग्राफर, आउटस्टेशन चालक दल के पूर्व सदस्यों तथा पूर्व सैनिक आभासी तरीके से लाइव स्ट्रीमिंग के माध्यम से सम्मिलित हुए।



भारतीय नौसेना में अपनी 40 वर्षों की शानदार सेवा के दौरान आईएनएस संधायक ने भारतीय प्रायद्वीप के पश्चिमी और पूर्वी तटों, अंडमान सागर तथा श्रीलंका, म्यांमार और बांग्लादेश समेत पड़ोसी देशों में 200 प्रमुख हाइड्रोग्राफिक सर्वेक्षण किए। यह जहाज 1987 में श्रीलंका में भारतीय शांति सेना की सहायता वाले ऑपरेशन पवन जैसे कई महत्वपूर्ण अभियानों में सक्रिय भागीदार रहा है, जैसे ऑपरेशन सारंग, ऑपरेशन रेनबो जिसमें 2004 की सुनामी के बाद मानवीय सहायता प्रदान की गई और 2019 में प्रथम संयुक्त भारत-अमेरिका मानवीय सहायता एवं आपदा राहत (एचएडीआर) अभ्यास 'टाइगर-ट्रायफ' में भागीदारी की है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1724609>

## Army to set up new battle groups for offensive punch by next year

By Rajat Pandit

New Delhi: The Army is now firmly on course to create new self-contained fighting units called 'integrated battle groups (IBGs)', which can mobilize fast and hit hard, after some delay due to the Covid pandemic and military confrontation with China.

The initial lot of IBGs, each with around 5,000 soldiers and a varying mix of infantry, tanks, artillery, air defence, signals, engineers and other units permanently deployed together, should be carved out of existing formations by early-2022, say officers.

Army chief General M M Naravane, in turn, told TOI: "Creation of IBGs is a logical step towards our operational thought process on how to conduct future operations in an integrated all-arms paradigm."

"The process of 'IBG-isation' is well underway and in-house deliberations are being carried out to evolve force structures proficient in fighting and winning future wars," he added.

The creation of IBGs and theatre commands as well as the ongoing organizational restructuring of the 13-lakh Army are all geared towards acquiring a greater offensive punch and addressing the two-front challenge posed by China and Pakistan.

"The changing character of warfare, RMA (revolution in military affairs) and the extant/future threats to our active borders emphasize the requirement for faster application of forces. Technological advancements also necessitate a change in the concept of war-fighting and organizational structures," said Gen Naravane.

The continuing stand-off with China in eastern Ladakh, which first erupted in April-May last year, has already led the Army to rebalance forces and firepower towards the 3,488-km Line of Actual Control (LAC) as the primary front from the decades-long focus on Pakistan.

This recalibration includes the change in the operational role of the 1 Corps towards the northern sector with China, including Ladakh, from the earlier focus on Pakistan. The truncated 17 Corps, in turn, will have a strike role in the eastern sector, including the Chumbi Valley opposite Sikkim, as was earlier reported by TOI.

"But the 1 Corps will also retain operational flexibility to deploy against Pakistan at short-notice. So, with an adequate number of acclimatized troops, the corps will be available for both China and Pakistan. This will be in addition to the Leh-based 14 Corps," said an officer.

Overall, the Army has 14 corps (40,000 to 70,000 troops in each), with four of them being 'strike' or offensive formations. Apart from 1 Corps (headquarters in Mathura) and 17 Corps (Panagarh), the two Pakistan-specific ones are 2 Corps (Ambala) and 21 Corps (Bhopal).

As for the composite IBGs, already war-gamed in exercises, the Army plans to first carve out 8-10 of them from the 9 Corps (Yol), 17 Corps (Panagarh) and 33 Corps (Sukna). To be commanded by Major-Generals, IBGs will be larger than brigades (3,000 soldiers each) but smaller than divisions (12,000 soldiers each).

"After the initial 8-10 IBGs have settled down, more will be created over the years. Different IBGs will be configured differently as per the threat, the type of terrain involved and the task to be achieved," said another officer.



So, IBGs meant for Pakistan will be focused more on tanks and heavy artillery due to the plains involved, while the ones for China will revolve more around infantry and light artillery for mountain warfare.

<https://timesofindia.indiatimes.com/india/army-to-set-up-new-battle-groups-for-offensive-punch-by-next-year/articleshow/83290857.cms>



Sat, 05 June 2021

## Why Indian Army is seeking 'Future Tanks' amid tensions with China

### *Story highlights*

***The Army is looking for a "modern" battle tank platform that is not only superior but also "incorporates niche technologies" i.e Artificial Intelligence***

Nearly a year after India's Bhishma tanks were deployed in the Himalayas amid tensions between India and China along the Line of Control (LAC), according to the Request for Information (RFI) floated by the defence ministry, the Indian Army is looking to procure new generation "Future Tank" platform for "Future Ready Combat Vehicle" (FRCV) in a phased manner.

The Army intends to induct the "Future Tanks" by 2030.

The Indian Army has sought foreign takers for the tender and plans to procure the tanks under the "strategic partnership" route.



India's first T-90s Bhishma tank Photograph:( AFP )

The RFI says that "in conformity with the emerging future threat spectrum and the technological advancements, the Indian Army intends to induct a new "state-of-the-art" "technology-enabled" tank to operate in varied terrain profile (High Altitude Areas, Plains/Riverine, Deserts/Semi-Deserts) across the current and future spectrum of conflict.

The RFI clearly states that the government has invited "responses only from foreign OEMs" with the end-user of the equipment being the Indian Army.

The last date of "acceptance of receipt of response" has been set for September 15.

The Army is looking for a "modern" battle tank platform that is not only superior but also "incorporates niche technologies" i.e Artificial Intelligence, see-through armour along with the ability to operate in a "network-centric environment."

The new tanks are also required to be in continuous operations by day and night in real-time awareness, all-terrain agility and high mobility, precision lethal firepower, multi-layered protection with the use of niche technologies.

The Army needs the next generation battle tank to have high detection recognition and identification ranges with thermal night fighting and "lock on target" capability with smoke dischargers with anti-thermal and laser capability.

The Army wants the battle tank to have a loading system to provide auto-loading with minimum intervention and engagement time.

The Army has insisted the tank should be lightweight in order to achieve higher operational advantage, with "soft kill systems" and other countermeasures meaning laser warning system and RF sensors.

Not just this, along with the tank, the company should also be able to provide a family of combat vehicles for example recovery vehicle, bridge layer tank based on modularity and standardisation of platform, the Indian Army has stated in the RFI.

<https://www.wionews.com/india-news/why-indian-army-is-seeking-future-tanks-amid-tensions-with-china-389540>



Sat, 05 June 2021

## Russian T-14 Armata the ideal ‘Futuristic Tanks’ for the Indian Army, but not against China?

As India sets eyes on futuristic main battle tanks to phase out older ones, the Russian T-14 Armata Tanks could be the right pick, an Indian defense analyst believes.

The Indian Army has recently issued a Request for Information (RFI) to procure 1,770 Future Ready Combat Vehicles (FRCV) by 2030. The FRCV could eventually become India’s main battle tank in the coming decades, replacing the existing Russian-made T-90 and T-72.

The proposed FCRV would have “state-of-the-art”, “technology-enabled” and “high mobility” features with an ability to operate in different terrains, such as high altitude areas, plains, and riverine borders as well as deserts, the RFI said.



T-14 Armata Tank in Moscow: Wikimedia

The prospective vendors for the FRCV have to respond to the RFI by 15 September.

In another RFI issued in April this year, the Army addressed the procurement of 350 light-weight tanks, weighing less than 25 tons under the ‘Make in India’ initiative, to “sharpen its mountain warfare edge” amid the ongoing Ladakh stalemate with China. Lightweight tanks are much more maneuverable and are operationally flexible.

Tanks act as a decisive deterrent and have tremendous war-fighting capabilities. It is natural for India to look for alternatives as the standoff with China is likely to continue.

The Chinese have deployed their T-15 lightweights up against India’s main battle tank T-90. A typical T-15 weighs 33-35 tons whereas a T-90 is a heavyweight of approximately 46 tons.

### Why T-14 Armata is a Good Option

The EurAsian Times earlier reported on the features of the T-14 Armata main battle tank and the possibility of India procuring it.

Equipped with the Active Protection System (APS), this next-generation battle tank can intercept and destroy incoming missiles and works against all types of anti-tank missiles.

It was officially unveiled for the first time during the Moscow Victory Day Parade in May 2015 and the mass production for exports is expected to begin in 2021.

But what makes it special for India is its suitability for high-altitude warfare. Another report by The Eurasian Times said the T-14 is capable of operating in temperatures as low as -50 degrees.

The EurAsian Times had also reported that Russia had offered ‘Sprut’ lightweight tanks last year amidst the India-China standoff. However, lightweight tanks didn’t feature in India’s demands then.



## **What Analysts Say**

“India has a familiarity with the Russian defense system which makes the process of transfer of technology easier and faster. A system of purchasing is already in place which makes it convenient for the Indian army to acquire weapons in such a case where time is of value,” Professor Rajan Kumar, who is associated with the Russian Centre at Jawaharlal Nehru University, told The EurAsian Times.

“Indian has previously set up joint production with the Russians like in case of Brahmos missile; such an arrangement can be worked out for T-14 Armata that will also give a boost to India’s Make in India initiative,” he added.

The Russians know how to share their technology and so far, it has worked in India’s favor. But there is also a cause for concern. While India remains the primary recipient of the Russian arms exports (23%), its arch-rival China follows second at 18%.

Russia has exported high-tech equipment, including the S-400 air defense system, early warning systems, and aircraft engines to China while the latter has successfully mirrored Russian technology and created domestic weapons.

“The biggest challenge for India is the deepening Russian-China strategic and military ties. If the primary objective of acquiring a lightweight battle tank is to use it against China, then whether Russian-made Armata leaves India with any real advantage or not needs to be strategically calculated,” Professor Kumar said.

However, allaying such fears, Rajorshi Roy, an analyst with New Delhi-based Manohar Parrikar Institute for Defence Studies and Analyses, observed that a military alliance between Russia and China appears unlikely.

“Russia has also sought to expand its engagements, without ruffling China’s feathers, with countries such as India, Japan, Philippines, Vietnam and Indonesia which has witnessed tensions in their bilateral ties with Beijing. A military alliance under these conditions, therefore, appears unlikely,” Roy wrote in a research paper.

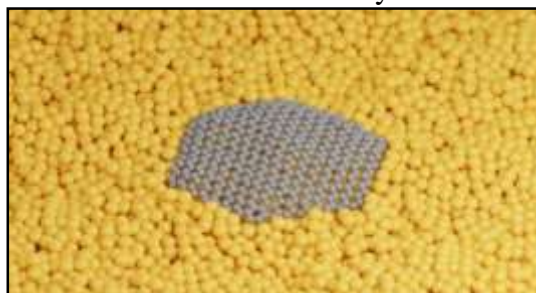
<https://eurasianimes.com/russian-t-14-armata-the-ideal-futuristic-tanks-for-the-indian-army-but-not-against-china/>



## Researchers continue to refine graphene production using HPC

Graphene may be among the most exciting scientific discoveries of the last century. While it is strikingly familiar to us—graphene is considered an allotrope of carbon, meaning that it essentially the same substance as graphite but in a different atomic structure—graphene also opened up a new world of possibilities for designing and building new technologies.

The material is two-dimensional, meaning that each "sheet" of graphene is only 1 atom thick, but its bonds make it as strong as some of the world's hardest metal alloys while remaining lightweight and flexible. This valuable, unique mix of properties have piqued the interest of scientists from a wide range of fields, leading to research in using graphene for next-generation electronics, new coatings on industrial instruments and tools, and new biomedical technologies.



Snapshot from MD simulation of graphene on liquid Cu. Credit: Santiago Cingolani

It is perhaps graphene's immense potential that has consequently caused one of its biggest challenges—graphene is difficult to produce in large volumes, and demand for the material is continually growing. Recent research indicates that using a liquid copper catalyst may be a fast, efficient way for producing graphene, but researchers only have a limited understanding of molecular interactions happening during these brief, chaotic moments that lead to graphene formation, meaning they cannot yet use the method to reliably produce flawless graphene sheets.

In order to address these challenges and help develop methods for quicker graphene production, a team of researchers at the Technical University of Munich (TUM) has been using the JUWELS and SuperMUC-NG high-performance computing (HPC) systems at the Jülich Supercomputing Centre (JSC) and Leibniz Supercomputing Centre (LRZ) to run high-resolution simulations of graphene formation on liquid copper.

### A window into the experiment

Graphene's appeal primarily stems from the material's perfectly uniform crystal structure, meaning that producing graphene with impurities is wasted effort. For laboratory settings or circumstances where only a small amount of graphene is needed, researchers can place a piece of scotch tape onto a graphite crystal and "peel" away atomic layers of the graphite using a technique that resembles how one would use tape or another adhesive to help remove pet hair from clothing. While this reliably produces flawless graphene layers, the process is slow and impractical for creating graphene for large-scale applications.

Industry requires methods that could reliably produce high-quality graphene cheaper and faster. One of the more promising methods being investigated involves using a liquid metal catalyst to facilitate the self-assembly of carbon atoms from molecular precursors into a single graphene sheet growing on top of the liquid metal. While the liquid offers the ability to scale up graphene production efficiently, it also introduces a host of complications, such as the high temperatures required to melt the typical metals used, such as copper.

When designing new materials, researchers use experiments to see how atoms interact under a variety of conditions. While technological advances have opened up new ways for gaining insight into atomic-scale behavior even under extreme conditions such as very high temperatures, experimental techniques do not always allow researchers to observe the ultra-fast reactions that facilitate the correct changes to a material's atomic structure (or what aspects of the reaction may have introduced impurities). This is where computer simulations can be of help, however, simulating the behavior of a dynamic system such as a liquid is not without its own set of complications.

"The problem describing anything like this is you need to apply molecular dynamics (MD) simulations to get the right sampling," Andersen said. "Then, of course, there is the system size—you need to have a large enough system to accurately simulate the behavior of the liquid." Unlike experiments, molecular dynamics simulations offer researchers the ability to look at events happening on the atomic scale from a variety of different angles or pause the simulation to focus on different aspects.

While MD simulations offer researchers insights into the movement of individual atoms and chemical reactions that could not be observed during experiments, they do have their own challenges. Chief among them is the compromise between accuracy and cost—when relying on accurate ab initio methods to drive the MD simulations, it is extremely computationally expensive to get simulations that are large enough and last long enough to accurately model these reactions in a meaningful way.

Andersen and her colleagues used about 2,500 cores on JUWELS in periods stretching over more than one month for the recent simulations. Despite the massive computational effort, the team could still only simulate around 1,500 atoms over picoseconds of time. While these may sound like modest numbers, these simulations were among the largest done of ab initio MD simulations of graphene on liquid copper. The team uses these highly accurate simulations to help develop cheaper methods to drive the MD simulations so that it becomes possible to simulate larger systems and longer timescales without compromising the accuracy.

### **Strengthening links in the chain**

The team published its record-breaking simulation work in the *Journal of Chemical Physics*, then used those simulations to compare with experimental data obtained in their most recent paper, which appeared in *ACS Nano*.

Andersen indicated that current-generation supercomputers, such as JUWELS and SuperMUC-NG, enabled the team to run its simulation. Next generation machines, however, would open up even more possibilities, as researchers could more rapidly simulate larger numbers or systems over longer periods of time.

Andersen received her Ph.D. in 2014, and indicated that graphene research has exploded during the same period. "It is fascinating that the material is such a recent research focus—it is almost encapsulated in my own scientific career that people have looked closely at it," she said. Despite the need for more research into using liquid catalysts to produce graphene, Andersen indicated that the two-pronged approach of using both HPC and experiment would be essential to further graphene's development and, in turn, use in commercial and industrial applications. "In this research, there is a great interplay between theory and experiment, and I have been on both sides of this research," she said.

**More information:** Maciej Jankowski et al, Real-Time Multiscale Monitoring and Tailoring of Graphene Growth on Liquid Copper, *ACS Nano* (2021). [DOI: 10.1021/acsnano.0c10377](https://doi.org/10.1021/acsnano.0c10377)

**Journal information:** [ACS Nano](https://doi.org/10.1021/acsnano.0c10377) , [Journal of Chemical Physics](https://doi.org/10.1021/acsnano.0c10377)  
<https://phys.org/news/2021-06-refine-graphene-production-hpc.html>

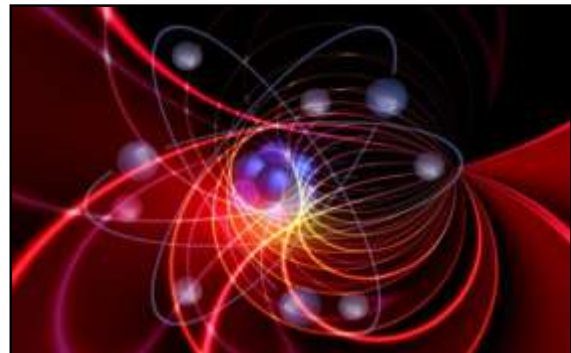
## Quantum holds the key to secure conference calls

The world is one step closer to ultimately secure conference calls, thanks to a collaboration between Quantum Communications Hub researchers and their German colleagues, enabling a quantum-secure conversation to take place between four parties simultaneously.

The demonstration, led by Hub researchers based at Heriot-Watt University and published in *Science Advances*, is a timely advance, given the global reliance on remote collaborative working, including conference calls, since the start of the C19 pandemic.

There have been reports of significant escalation of cyber-attacks on popular teleconferencing platforms in the last year. This advance in quantum secured communications could lead to conference calls with inherent unhackable security measures, underpinned by the principles of quantum physics.

Senior author, Professor Alessandro Fedrizzi, who led the team at Heriot-Watt, said: "We've long known that quantum entanglement, which Albert Einstein called 'spooky action at a distance' can be used for distributing secure keys. Our work is the first example where this was achieved via 'spooky action' between multiple users at the same time—something that a future quantum internet will be able to exploit."



Credit: CC0 Public Domain

Secure communications rely upon the sharing of cryptographic keys. The keys used in most systems are relatively short and can therefore be compromised by hackers, and the key distribution procedure is under increasing threat from quickly advancing quantum computers. These growing threats to data security require new, secure methods of key distribution.

A mature quantum technology called Quantum Key Distribution (QKD), deployed in this demonstration in a network scenario for the first time, harnesses the properties of quantum physics to facilitate guaranteed secure distribution of cryptographic keys.

QKD has been used to secure communications for over three decades, facilitating communications of over 400km over terrestrial optical fibre and recently even through space, however, crucially, these communications have only ever occurred exclusively between two parties, limiting the practicality of the technology used to facilitate secure conversations between multiple users.

The system demonstrated by the team here utilises a key property of quantum physics, entanglement, which is the property of quantum physics that gives correlations—stronger than any with which we are familiar in everyday life—between two or more quantum systems, even when these are separated by large distances.

By harnessing multi-party entanglement, the team were able to share keys simultaneously between the four parties, through a process known as 'Quantum Conference Key Agreement', overcoming the limitations of traditional QKD systems to share keys between just two users, and enabling the first quantum conference call to occur with an image of a Cheshire cat shared between the four parties, separated by up to 50 km of optical fibre.

Entanglement-based quantum networks are just one part of a large programme of work that the Quantum Communications Hub is undertaking to deliver future quantum secured networks.

The technology demonstrated here has potential to drastically reduce the resource costs for conference calls in quantum networks when compared to standard two-party QKD methods. It is

one of the first examples of the expected benefits of a future quantum internet, which is expected to supply entanglement to a system of globally distributed nodes.

**More information:** "Experimental quantum conference key agreement" *Science Advances* (2021). DOI: [10.1126/sciadv.abe0395](https://doi.org/10.1126/sciadv.abe0395)

**Journal information:** [Science Advances](https://phys.org/news/2021-06-quantum-key-conference.html)  
<https://phys.org/news/2021-06-quantum-key-conference.html>

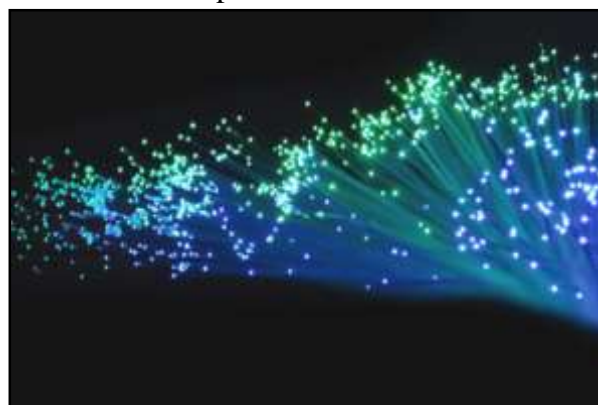


Sat, 05 June 2021

## Lasers capable of transmitting signals at 224 gigabits per second, enough to achieve 800 gigabit ethernet

With the massive proliferation of data-heavy services, including high-resolution video streaming and conferencing, cloud services infrastructure growth in 2021 is expected to reach a 27% CAGR. Consequently, while 400 gigabit ethernet (GbE) is currently enjoying widespread deployment, 800 GbE is poised to rapidly follow to address these bandwidth demands.

One approach to 800 GbE is to install eight 100 gigabit per second (Gbps) optical interfaces or lanes. As an alternative to reduce the hardware count, increase reliability, and lower cost, a team of researchers at Lumentum developed an optical solution that uses four 200 Gbps wavelength lanes to reach 800 GbE.



Credit: CC0 Public Domain

Syunya Yamauchi, a principal optical engineer at Lumentum, will present the optimized design during a session at the Optical Fiber Communication Conference and Exhibition (OFC), being held virtually from 06-11 June, 2021.

"Active optical devices are the most important components of optical communications systems," said Mike Staskus, vice president of Datacom Product Line Management at Lumentum.

To achieve high speed, high bandwidth operations, Yamauchi's team developed a lumped-element (LE) electroabsorption modulator-integrated distributed feedback (EA-DFB) laser capable of 2-kilometer transmission—a transmission length requirement for many modern large data centers—of 224 Gbps signals operating over a wide temperature range.

"There are tradeoffs between high bandwidth and modulation characteristics, such as extinction ratio," Staskus said. "We overcame the tradeoff by optimizing the design of EA-DFB using a simplified packaging method."

Compared to a conventional EA-DFB, the LE EA-DFB's reduced capacitance and inductance resulting from design and assembly optimizations in the EA modulator improves its power and bandwidth.

"It can enable the development of optical transceivers with twice the data rate of current 400 GbE modules, without dramatic increases in the cost and power consumption, by using higher-speed laser transmitter chips that do not require power-hungry thermoelectric coolers," said Staskus.

These results suggest that the LE EA-DFB could enable 800 GbE applications, making this device a promising light source for future data center applications.



"Next-generation lasers using this same 'toolbox' of advanced semiconductor and packaging processes may enable higher speeds, longer reaches and lower costs with the competitive levels of performance, reliability and power consumption," said Staskus. "With the increase of various data streaming and other internet services, intra-data-center links will require higher speeds, including 1.6 terabits per second and beyond."

**More information:** "224-Gb/s PAM4 Uncooled Operation of Lumped-electrode EA-DFB Lasers with 2-km Transmission for 800GbE Application," Syunya Yamauchi, Koichiro Adachi, Hideaki Asakura, Hayato Takita, Yoshihiro Nakai, Yoriyoshi Yamaguchi, Masatoshi Mitaki, Ryosuke Nakajima, Shigehisa Tanaka, and Kazuhiko Naoe, Tuesday, 08 June 2021, 03:00 PDT (UTC – 07:00).

<https://phys.org/news/2021-06-lasers-capable-transmitting-gigabits-gigabit.html>



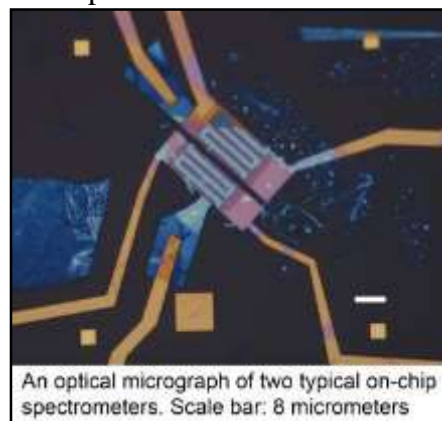
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## Researchers make ultracompact on-chip computational infrared spectrometer

An international team of researchers has developed a mid-infrared spectrometer smaller than the diameter of a human hair.

With potential applications that range from detecting greenhouse gases to making self-driving vehicles safer, there has been a great deal of interest in recent years in developing compact, on-chip spectrometers. Traditional spectrometers, which measure the spectral information of light, are bulky and expensive. An on-chip spectrometer would greatly expand the applications and accessibility of the technology.

Toward this goal, a team of researchers in the U.S., Israel, and Japan has developed an ultracompact mid-infrared spectrometer. The work is the result of a collaboration between the laboratory of Fengnian Xia, the Barton L. Weller Associate Professor in Engineering and Science at Yale University; Professor Doron Naveh of Bar-Ilan University, Israel; Kenji Watanabe and Takashi Taniguchi of National Institute for Materials Science, Japan. The findings were recently published in *Nature Photonics*.



An optical micrograph of two typical on-chip spectrometers. Scale bar: 8 micrometers

Credit: Yale School of Engineering and Applied Science

The device incorporates black phosphorus (BP), a material that has long been a focus of the Xia lab, for a spectrometer that is operational at a 2- to 9- micrometer wavelength range, based on a single tunable photodetector. The material, which is about ten nanometers thick, allows users to tune the light-matter interaction to capture the different spectral components—a key to the device's success. Moreover, an advanced algorithm plays an equally important role in this spectrometer, partly shifting the innate complexity in spectroscopy from hardware to software.

With a size of  $9 \times 16$  square micrometers—much smaller than the cross-section of a human hair—the spectrometer's dimensions are comparable to the wavelength of light that it measures. Even if it were possible to make the device smaller, it would not show much improvement, since light in usual conditions cannot be focused onto a spot much smaller than its wavelength, due to diffraction.

"It is very exciting to realize such a high-performance spectrometer with the ultimate compactness," said Prof. Doron Naveh of Bar-Ilan University. "We expect that the principle of

leveraging advances in hardware and software simultaneously as shown in this work will lead to commercial applications in medicine, agriculture and food quality control."

With conventional spectrometers, light is split up by the colors that compose the spectrum.

"This spectrometer shows an advantage over conventional light-splitting spectrometers because the light doesn't need to be split into different parts spatially," said Shaofan Yuan, a Ph.D. student in Xia's lab, and lead author of the study.

And unlike conventional spectrometers, the system does not rely on such advanced optical components as interferometers or tunable infrared lasers. That opens the possibility for an extreme miniaturization of spectrometers and could enable on-chip, affordable mid-infrared spectroscopy and spectral imaging. The researchers note that automobiles, drones, and satellites are often outfitted with infrared cameras that take grayscale thermal images to detect pedestrians, vehicles, and other hazards. The Xia lab's spectrometer has a potentially higher detection ability for such potential threats since the spectral information can be continuously measured, albeit with moderate resolution. Additionally, it can also be useful in remote sensing.

**More information:** Shaofan Yuan et al, A wavelength-scale black phosphorus spectrometer, *Nature Photonics* (2021). DOI: [10.1038/s41566-021-00787-x](https://doi.org/10.1038/s41566-021-00787-x)

**Journal information:** [Nature Photonics](#)

<https://phys.org/news/2021-06-ultracompact-on-chip-infrared-spectrometer.html>



## Prior infection cuts COVID-19 infection risk for up to 10 months: Lancet study

*The research looked at rates of COVID-19 infections between October last year and February among over 2,000 care home residents and staff in England*

New Delhi: The risk of being infected with SARS-CoV-2, the virus that causes COVID-19, is substantially reduced for up to 10 months following the first infection with the virus, according to a study. The research, published in the journal *Lancet Healthy Longevity* on Tuesday, looked at rates of COVID-19 infections between October last year and February this year among over 2,000 care home residents and staff in England.

The researchers from the University College London (UCL) in the UK compared people who had evidence of a previous infection up to 10 months earlier, as determined by antibody testing, with those who had not been previously infected. They found that residents with a previous infection were 85 per cent less likely to be infected during this four-month period than those who had never been infected.

Staff members with past infection were 60 per cent less likely to be infected than those who had not had the infection before. The researchers said this showed strong protection in both groups, but cautioned that the two percentages may not be directly comparable.

This is because the staff may have accessed testing outside the care home, leading to positive tests not being included in the study, they said.

“It’s really good news that natural infection protects against reinfection in this time period. The risk of being infected twice appears to be very low,” said study lead author Maria Krutikov, from UCL Institute of Health Informatics. “The fact that prior COVID-19 infection gives a high level of protection to care home residents is also reassuring, given past concerns that these individuals might have less robust immune responses associated with increasing age,” Krutikov said.

For the study, 682 residents, with a median age of 86, and 1,429 staff in 100 care homes underwent antibody blood tests in June and July last year following the first wave of COVID-19.

About a third tested positive for antibodies, suggesting they had previously been infected.

Researchers then analysed the results of participants’ PCR tests, starting approximately 90 days after the blood samples were taken to ensure the tests did not pick up the initial infection.

PCR tests were taken once a week for staff, and once a month for residents, with further testing in the event of an outbreak. Positive test results were only included if they were more than 90 days apart to make sure that the same infection was not included more than once.

The number of staff and residents who were reinfected between October and February was very small. Based on the antibody test results, out of the 634 people who had been previously infected, reinfections occurred in only four residents and 10 members of staff.

Among the 1,477 participants who had never been infected, positive PCR tests occurred in 93 residents and 111 staff. “This was a unique opportunity to look at the protective effect of natural infection in this cohort ahead of the roll-out of vaccination,” said senior study author Laura Shallcross, from UCL Institute of Health Informatics.

<https://www.eastmojo.com/coronavirus-updates/2021/06/04/prior-infection-cuts-covid-19-infection-risk-for-up-to-10-months-lancet-study/>

