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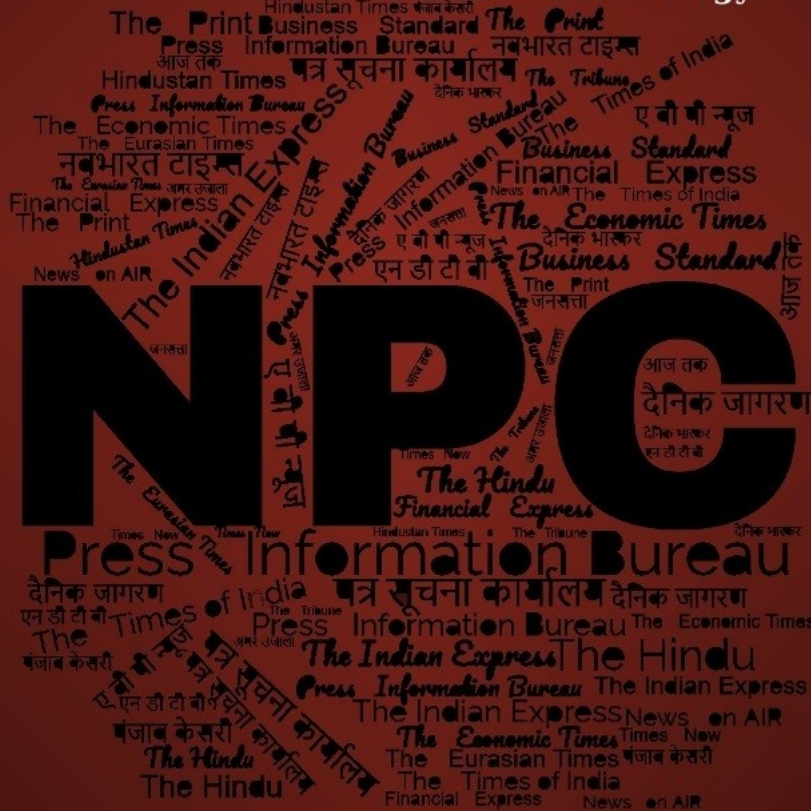
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# समाचार पत्रों से चयनित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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Sat, 10 Aug 2024

### DRDO बना रहा मीडियम वेट फाइटर जेट, लगाए जा सकेंगे 13 हथियार, 2026 में पहली उड़ान

LCA MK-2 यानी लाइट कॉम्बैट एयरक्राफ्ट मार्क 2 को लेकर हाल ही में डीआरडीओ प्रमुख, भारतीय वायुसेना के डिप्टी चीफ ऑफ स्टाफ, डीआरडीओ लेबोरेटरी, डिफेंस पीएसयू, CEMILAC, NPTC के अधिकारियों की मीटिंग हुई. यह एक उच्च स्तरीय रिव्यू मीटिंग थी. जिसमें एलसीए के डेवलपमेंट पर बातचीत की गई.

आपको जानकर हैरानी होगी कि इस मीटिंग में यह पता चला है कि अगले दो महीनों में LCA MK-2 का पहला प्रोटोटाइप बन जाएगा. साल 2025 से यानी अगले साल से इसका रोल आउट शुरू हो जाएगा. यानी HAL में इसका प्रोडक्शन शुरू हो जाएगा. पूरी संभावना है कि 2026 में इस फाइटर जेट की पहली उड़ान पूरी होगी. यह एक मीडियम वेट फाइटर जेट (MWF) होगा.

यह फाइटर जेट वर्तमान LCA यानी तेजस से अपग्रेड होगा. इसमें बेहतर मैन्युवरेबिलिटी यानी उड़ान के समय इसकी हैंडलिंग आसान होगी. शानदार एवियोनिक सुईट्स यानी विमान के नियंत्रण के लिए लगाए गए यंत्र. बेहतर सेंसर और ज्यादा ताकतवर इंजन होगा. यह नई पीढ़ी का फाइटर जेट होगा. इसके शामिल होने के बाद वायुसेना अपने जगुआर, मिराज 2000, MiG-29 एयरक्राफ्ट्स को हटा देगी.

#### LCA MK-2 की स्पीड और रेंज होगी और बेहतर

यह स्वदेशी मल्टीरोल सुपरसोनिक फाइटर जेट होगा. इसमें एक या दो क्रू बैठ सकेंगे. लंबाई 47.11 फीट होगी. विंगस्पैन 27.11 फीट और ऊंचाई 15.11 फीट होगी. अधिकतम टेकऑफ वजन 17,500 kg होगा. यह अपने साथ 6500 kg वजन के हथियार लेकर उड़ सकेगा.

एलसीए मार्क-2 फाइटर जेट की सबसे बड़ी ताकत होगी उसकी गति. यह अधिकतम 2385 km/घंटा की स्पीड से उड़ेगा. यानी दुनिया के सर्वश्रेष्ठ फाइटर जेट्स की गति को टक्कर देगा. इसकी रेंज कुल 2500 km होगी. कॉम्बैट रेंज 1500 km होगी. यह अधिकतम 56,758 फीट की ऊंचाई तक जा सकेगा.

#### 13 तरह के हथियार या उनका मिश्रण लगा सकते हैं

इसमें 13 हार्ड प्वाइंट्स होंगे यानी 13 अलग-अलग प्रकार के हथियार या फिर उनका मिश्रण लगाया जा सकता है. हवा से हवा में मार करने वाली MICA, ASRAAM, Meteor, Astra, NG-CCM, हवा से सतह पर मार करने वाली ब्रह्मोस-NG ALCM, LRLACM, स्टॉर्म शैडो, क्रिस्टल मेज लगाने की योजना है. एंटी-रेडिएशन मिसाइल रुद्रम 1/2/3 लगाया जाएगा. इसमें प्रेसिशन गाइडेड म्यूनिसन यानी बम भी लगाए जाएंगे. इन प्रेसिशन गाइडेड म्यूनिसन में

शामिल हैं स्पाइस, HSLD-100/250/450/500, DRDO Glide Bombs, DRDO SAAW. लेजर गाइडेड बमों में सुदर्शन बम लगाया जाएगा.

कई तरह के गाइडेड बम, आत्मघाती ड्रोन लगा सकेंगे

इसके अलावा क्लस्टर म्यूनिशन, लॉयटरिंग म्यूनिशन कैट्स अल्फा और अनगाइडेड बम लगाए जा सकते हैं. LCA Mark 2 फाइटर जेट में जो एवियोनिक्स लगे हैं वो उसे दुश्मन का पता लगाने. हमलों से बचने में मदद करेंगे. इसमें LRDE Uttam AESA Radar, DARE Unified Electronic Warfare Suite (UEWS), DARE Dual Colour Missile Approach Warning System (DCMAWS) और DARE Targeting pod लगे होंगे. ये ऐसे राडार और सेंसर हैं, जो दुश्मन के आते हुए विमान, मिसाइलों, रॉकेटों, हेलिकॉप्टरों आदि की खबर देते हैं. साथ ही विमान को बचाव के लिए पहले से तय तकनीक को ऑन कर देते हैं.

<https://www.aajtak.in/defence-news/story/tejas-mk-ii-first-flight-targeted-for-2026-review-meeting-done-at-drdo-bhawan-2006492-2024-08-10>

## THE ECONOMIC TIMES

Sun, 11 Aug 2024

### **India's plan for advanced fighters: LCA Mark2 by 2029, AMCA by 2035**

In a significant boost to India's indigenous fighter aircraft program, 4.5 generation plus LCA Mark 2 fighter jets are slated to commence flights by March 2026, with mass production expected to begin by 2029.

Furthermore, the mass production of the Advanced Medium Combat Aircraft (AMCA), a fifth-generation fighter, is anticipated to start by 2035, according to defense officials. These timelines emerged during a high-level meeting presided over by DRDO chairman Dr. Samir V. Kamat and Indian Air Force Deputy Chief Air Marshal Ashutosh Dixit.

The high-level review meeting focused on the LCA MK-II Development program, held at DRDO Bhawan. Dr. Kamat and Air Marshal Dixit reviewed the developmental progress made by the Aeronautical Development Agency. Various DRDO Labs and Director Generals of Clusters involved in developing systems and sub-systems, alongside the Flight Testing of the prototype, were present to discuss the development status, risks, and mitigation plans toward achieving the first fly-worthy prototype.

During the discussions, the timeline for the LCA Mark 2 program was a central focus. The prototype, initially expected by early 2025, has been delayed by approximately a year, attributed to delays in the release of approved funds, linked to the engine deal for the next indigenous fighter. The LCA aircraft are scheduled to be powered by American GE engines; LCA Mark 1 and Mark 1A by GE-404 engines, while the LCA Mark 2 will utilize the more advanced GE-414, manufactured in India with indigenous content.



The Indian government aims to replace the primary fleets, including the Mirage 2000, Jaguar, and MiG-29s, with over 250 LCA Mark 2 planes over the next 10-15 years. Additionally, the Indian Air Force has placed an order for 180 LCA Mark 1A planes. Officials indicated that the production of the LCA Mark1A is likely to be completed by 2032.

The Tejas Mark 2 will feature significant indigenization, with the Uttam radar as its primary sensor. An indigenous AESA radar, also under development, is part of the upgrade program for the Russian-origin Su-30 MKI fighters.

The Cabinet Committee on Security recently approved the design and development of the AMCA aircraft. The LCA Mark-2 will also incorporate indigenous weapons like the Astra air-to-air missile and Smart Anti-Airfield Weapons. Efforts are underway to explore export opportunities for the Mark-2, offering advanced capabilities at a competitive price point. Efforts have been made to ensure progress despite the delays.

A DRDO official stated, "All the DRDO Labs and Director Generals of Clusters involved in the development of systems and sub-systems, along with the Flight Testing of the prototype, participated in and presented the development status, risk and mitigation plan towards the realisation of first-fly-worthy prototype." The indigenous development aligns with the broader goal of achieving selfreliance in defense production, and with these advancements, India continues to enhance its defense capabilities with homegrown technologies.

The close collaboration between DRDO and the Indian Air Force is crucial in achieving these ambitious targets, ensuring enhanced operational capabilities for the nation's defense forces.

<https://economictimes.indiatimes.com/news/defence/indias-plan-for-advanced-fighters-lca-mark2-by-2029-amca-by-2035/articleshow/112446470.cms>



*Sat, 10 Aug 2024*

## **DRDO ने विकसित की हल्की बुलेट प्रूफ जैकेट, देशभर में लगभग दस हजार से अधिक एकड़ रक्षा भूमि पर अतिक्रमण**

सरकार ने शुक्रवार को संसद को बताया कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने सशस्त्र बलों के लिए सबसे हल्के फ्रंट हार्ड आर्मर पैनल वाली बुलेट प्रूफ जैकेट (बीपीजे) विकसित की है। इसके लिए नई सामग्री के साथ-साथ नई प्रक्रियाओं का उपयोग किया गया है।

एक प्रश्न के लिखित उत्तर में रक्षा राज्य मंत्री संजय सेठ ने कहा कि बीपीजे को डीआरडीओ परियोजना के तहत विकसित किया गया है। इसके उत्पादन के लिए डीआरडीओ की प्रौद्योगिकी हस्तांतरण (टीओटी) नीति के अनुसार विकसित प्रौद्योगिकी को भारतीय उद्योगों को ट्रांसफर करने की प्रक्रिया शुरू की गई है।

जैकेट का वजन लगभग **10.1** किलोग्राम

यह स्तर 6 का सबसे हल्का बीपीजे है। इस जैकेट का वजन लगभग 10.1 किलोग्राम है। एक अन्य प्रश्न के उत्तर में मंत्री ने कहा कि देशभर में लगभग 18 लाख एकड़ रक्षा भूमि में से लगभग 10,354 एकड़ भूमि पर अतिक्रमण है। उन्होंने रक्षा भूमि पर अतिक्रमण का राज्यवार ब्यौरा साझा किया।

भूमि पर कुछ राज्य सरकार की एजेंसियों का कब्जा

आगे कहा कि रक्षा भूमि के अतिक्रमण में राज्य सरकार के अधिकारियों की मिलीभगत की कोई सूचना नहीं है। हालांकि कुछ भूमि पर कुछ राज्य सरकार की एजेंसियों का कब्जा है। मंत्री ने रक्षा मंत्रालय संबंधी भूमि को अतिक्रमण से बचाने के लिए सरकार द्वारा उठाए गए कुछ कदमों की जानकारी भी दी।

उन्होंने कहा, अतिक्रमण का पता चलने पर पुलिस अधिकारियों और जिला प्रशासन के साथ समन्वय में कानूनी प्रक्रिया का पालन करते हुए अतिक्रमण विरोधी अभियान चलाकर उन्हें हटाया जाता है।

रक्षा भूमि अभिलेखों का डिजिटलीकरण कर दिया गया है

मंत्री ने कहा कि रक्षा भूमि अभिलेखों का डिजिटलीकरण कर दिया गया है। सरकार ने कुछ संवेदनशील रक्षा भूमि क्षेत्रों के चारों ओर चारदीवारी, बाड़ या खंभे के निर्माण के लिए धनराशि आवंटित की है। एक अन्य प्रश्न के उत्तर में उन्होंने कहा कि सरकार ने दिव्यांगता पेंशन के संबंध में सेवारत अधिकारियों और सेवानिवृत्त सैनिकों के विरुद्ध कोई अदालती मुकदमा शुरू नहीं किया है।

<https://www.jagran.com/news/national-parliament-drdo-developed-light-bullet-proof-jacket-23775431.html>



**Press Information Bureau**  
**Government of India**

**Ministry of Defence**

*Fri, 09 Aug 2024*

## **Light Bullet-Proof Jacket Developed By Drdo**

DRDO has developed the Bullet Proof Jacket (BPJ) consisting of lightest Front Hard Armour Panel (FHAP). This jacket has been developed in two configuration viz. In-Conjunction-With (ICW) and Standalone with different areal density of FHAP. The Bullet Proof Jacket has been developed under DRDO project. The process to transfer the developed technology to Indian Industries has been initiated as per Transfer of Technology (ToT) Policy and procedure of DRDO for production.

This BPJ is based upon new design approach, where novel material along-with new processes have been used. This BPJ confirms BIS standard 17051 and therefore, it is the lightest BPJ of level 6 with approx. weight of 10.1 kg for medium size, which enhances the wearability and comfort during the operation. This Jacket has also a unique feature of Quick Release Mechanism (QRM) along with other associated features. This BPJ will protect the soldier of Indian Armed Forces/ CAPFs from maximum possible threat of 7.62×54 R AP/ API rounds as on date.

This information was given by Raksha Rajya Mantri Shri Sanjay Seth in a written reply to Shri CM Ramesh in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2043606>

## DRDO on track to test powerful Tejas Mark 2

Undeterred by delay in the deliveries of the existing lot of Tejas fighter jets, India is looking at testing a prototype of a more powerful and next version of the jet — Tejas Mark 2.

A high-level review meeting chaired by Samir Kamat, Chairman, Defence Research and Development Organisation (DRDO), on Friday laid down targets towards realisation of the first fly worthy prototype of Tejas Mark 2, an upgraded version of the existing Tejas Mark 1A, having a wider array of weapons and a more powerful engine.

Various stakeholders — all those associated with testing of the fly worthy prototype of Tejas Mark 2 — gave their status report on the progress. All DRDO labs involved in the development of systems and subsystems of the jet were present. The Centre for Military Airworthiness & Certification and National Flight Test Centre under Aeronautical Development Agency were also part of the meet.

Sources said it was a review meeting to track the progress of Tejas Mark 2, which was on track. However, much would depend upon the engine. The jet is to be powered by US firm General Electric's F414 engine which is planned to be made in India under a joint venture between GE and Hindustan Aeronautics Limited (HAL). The JV was announced in June last year when PM Narendra Modi visited the US. The contract is yet to be signed.

The sources said India was working to get a couple of F414 engines to test the flying prototype of Tejas Mark 2 even before the contract was inked. The supply of GE engines has hit the existing deliveries of 83 Tejas Mark 1A jets contracted to be made by the HAL. The jet is powered by an F404 engine, which is less powerful than the F414. The deliveries that were to commence in March this year, have yet not started.

Tejas Mark 2, also known as the medium weight fighter (MWF), is expected to have a 17-tonne all-up weight and is bigger than Tejas Mark 1 A, which weighs 13.5 tonnes. The IAF is looking at having about 180 Tejas Mark 2 jets. The US has okayed the technology transfer of 80 per cent of the engine and this includes critical and restricted technologies like crystal blade coating, laser drilling and polymers, to name a few. The US, France, the UK and Russia have these elusive technologies.

<https://www.tribuneindia.com/news/india/drdo-on-track-to-test-powerful-tejas-mark-2/>





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**Ministry of Defence**

*Sat, 10 Aug 2024*

### **Indian Air Force Team Returns After Successful Participation In Exercise Udara Shakti 2024 At Malaysia**

After successful participation in Exercise Udara Shakti 2024 at Malaysia, the Indian Air Force (IAF) contingent returned to India, on 10 Aug 24. The joint air exercise was conducted in collaboration with the Royal Malaysian Air Force (RMAF) from 05 to 09 August 2024 at Kuantan, Malaysia. The IAF participated with Su-30MKI fighter jets.

During the exercise, IAF's Su-30MKI fighter jets engaged in air combat missions alongside the RMAF's Su-30MKM fighters, enabling the crew of both air forces to familiarize with each other's operational protocols, thereby enhancing interoperability, commonality and overall effectiveness in Su-30 aircraft operations. Aimed at bolstering operational efficiency, technical experts of both Air Forces engaged in exchange of their maintenance practices.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2044075>

## THE ECONOMIC TIMES

*Sun, 11 Aug 2024*

### **India set to commission its second nuclear- missile submarine**

India is preparing to commission its second nuclear-powered submarine, the INS Arighat, which will be equipped with nuclear missiles for strategic deterrence, reported TOI.

This comes as the country also seeks final approval for a project to build two additional nuclear-powered attack submarines, which will be armed with conventional weapons.

The urgency behind these advancements is partly driven by China's expanding naval presence in the Indian Ocean Region.

The INS Arighat, a 6,000-ton submarine built at the Vizag shipyard, is ready for commissioning after thorough trials and upgrades. It will likely be commissioned in the next month or two and will join the INS Arihant, which has been operational since 2018, learned TOI from sources.

“The SSBN (naval parlance for nuclear-propelled submarines with nucleartipped ballistic missiles) will be commissioned within a month or two. She will then join her sister INS Arihant, which became fully operational in 2018,” a source told TOI.

INS Arighat will be equipped with 750-km range K-15 missiles, similar to those on the INS Arihant, but with the capacity to carry more. The upcoming third SSBN, the INS Aridhaman, will carry 3,500-km range K-4 missiles and is scheduled for commissioning next year.

Additionally, the fourth SSBN, part of the Rs 90,000 crore advanced technology vessel (ATV) project, is under construction and will be able to carry even more K-4 missiles.

Plans also include building 13,500-tonne SSBNs with advanced 190 MW reactors, according to the TOI report. Moreover, the Rs 40,000 c project to build two nuclear-powered attack submarines, equipped with torpedoes, anti-ship, and land-attack missiles, is awaiting final approval from the PM-led Cabinet Committee on Security.

Initially proposed as six 6,000-tonne "hunter-killer" submarines (SSNs) under Project-77, the plan has been scaled down to two vessels. These submarines are expected to be about 95% indigenous and will take at least a decade to complete, with further vessels to be considered later.

India aims to have 18 diesel-electric submarines, four SSBNs, and six SSNs to counter threats from China and Pakistan. Right now, India has one SSBN, the INS Arihant, which uses an 83 MW reactor, and 16 diesel-electric submarines.

This fleet includes six old Russian Kilo-class, four German HDW, and six new French Scorpenes submarines. Larger SSBNs with extended-range missiles will boost India's deterrence by providing secure platforms for guaranteed retaliatory strikes.

SSNs, known for their high speed and extended submerged operations, are also vital for targeting enemies effectively, unlike diesel-electric submarines that must surface regularly. Until India's own SSNs are ready, the country will lease an advanced Akula-class SSN from Russia in 2026 as part of a \$3 billion deal signed in March 2019.

In contrast, China has a fleet of around 60 submarines, including six Jin-class SSBNs armed with JL-3 missiles that have a range of 10,000 km, and six SSNs. The INS Arighat will bolster India's nuclear deterrent capabilities, complementing existing land and air-based systems.

<https://economictimes.indiatimes.com/news/defence/india-set-to-commission-its-second-nuclear-missile-submarine/articleshow/112438432.cms>

## **India on course to clock defence exports worth ₹50k crore by 2028-29: Officials**

India is on course to achieve its defence export target of Rs.50,000 crore in the next five years, defence ministry officials said on Sunday, citing export data shared by the government for the first quarter of financial year 2024-25.

The data shared a day earlier shows India's defence exports stood at Rs.6,915 crore during April-June. This is 78% higher than the figure of Rs.3,885 crore for the corresponding period in the previous FY. As was the trend last year, the share of the public and private sectors stood at 60% and 40%, respectively, the officials said.

In April, the defence ministry announced that India's defence exports grew 32.5% during the 2023-24 fiscal and crossed the Rs.21,000-crore mark for the first time as the country remained focused on boosting the indigenous defence manufacturing ecosystem as well as military exports.

The value of exports in FY 2023-24 was 32.5% more than that in the previous year when the figure was Rs.15,920 crore. Defence exports have grown 31 times in the last 10 years as compared to FY 2013-14, as previously reported by HT.

India is currently exporting military hardware to around 85 countries, with around 100 local firms involved in the effort. The hardware includes missiles, artillery guns, rockets, armoured vehicles, offshore patrol vessels, personal protective gear, a variety of radars, surveillance systems and ammunition.

Military exports have risen sharply, and imports have dropped on the back of policy initiatives and reforms during the last 10 years, the government has maintained.

<https://www.hindustantimes.com/india-news/india-on-course-to-clock-defence-exports-worth-50k-crore-by-2028-29-officials-101723382447065.html>

## **Indian Navy approaches government for two nuclear attack submarines**

With 'Project Delta', its plan to augment its submarine fleet, delayed beyond 2027 due to Russia's war with Ukraine, the Indian Navy has approached the government for approval to build two

nuclear-powered conventionally armed submarines or SSNs to deter the country's adversaries in the Indo-Pacific.

While the 30-year-old submarine plan approved by the Modi government in 2015 sanctions six SSNs in the Indo-Pacific, the first step is the acceptance of necessity (AoN) for two SSNs. The matter has been raised at the apex level and consultations are on to expedite the process.

As reported by Hindustan Times earlier, India's second nuclear-powered nuclear missile-armed submarine, SSBN (nuclear-powered submarines armed with ballistic missiles) INS Arighat, will be commissioned shortly with the first SSBN, INS Arihant, already patrolling the deep waters of Indo-Pacific. India's third SSBN, INS Aridaman, is also all set to be commissioned early next year as part of the country's formidable nuclear triad.

While the proposed lease of Russian Akula class SSNs (this is what was termed Project Delta) was delayed due to Russian preoccupation with the Ukraine war and technological sanctions that may last at least till 2028, the Indian Navy has taken a decision to build SSNs after building three more Kalveri (Scorpene) class diesel-electric submarines at Mazagon Dockyards in Mumbai.

The principal reason for Indian national security planners opting for SSNs is that a nuclear attack submarine's range is limited by crew endurance, supplies and waste disposal, while conventional attack submarines surface for recharging of batteries every second day. The speed of SSNs is 20 knots under water but the SSKs or diesel-electric submarines only register four to five knots even with air-independent propulsion.

Given that the Chinese Navy has plans to send long-range patrols to the Indian Ocean and has already equipped Pakistan with Yuan-class SSKs, India needs to build deterrence against these principal adversaries and counter them. A Chinese Song class submarine participated in a naval exercise with Pakistan last year with the submarine practising bottoming at Karachi harbour as part of an attack demonstration to the Pakistan Navy. Bangladesh has acquired two Ming-class submarines from China.

Another reason for the focus on SSNs is that SSBNs are only for nuclear deterrence and are part of India's second-strike capability. India's first four SSBNs, all Arihant class will be equipped with 750 km range K-15 ballistic missiles, while the next class will be equipped with 3000 km range K-4 ballistic missiles.

India also needs SSNs as the Chinese submarines are using Ombai-Wetar straits, off the coast of QUAD ally Australia, to enter undetected into the Indian Ocean and have been surveying the 90 degrees East Ridge as well as South Indian Ocean, as far as the west coast of Africa. While the Modi government understands the requirement for SSNs for India's deterrence, it is for the Indian Navy to convince Raksha Mantri Rajnath Singh and India's national security planners to take the next step.

<https://www.hindustantimes.com/india-news/indian-navy-approaches-govt-for-two-nuclear-attack-submarines-101723429873331.html>

## **MDL surges ahead in India's Rs 60,000 crore submarine project after clearing key trials**

In the Rs 60,000 crore project to build six advanced conventional submarines, government-owned Mazagaon Dockyards Limited (MDL) has got an edge as it has cleared crucial trials in the programme.

The Indian Navy had held trials for building six advanced submarines with sea-proven Air Independent Propulsion systems which can help the boats to remain underwater for at least two weeks without the need to resurface to charge batteries at regular smaller intervals.

Mumbai-headquartered MDL and Larsen and Toubro are the two contenders in the project with German ThyssenKrupp Marine Systems and Spanish Navantia as their respective partners.

The MDL has been informed by a Commodore-rank officer of the Indian Navy (Brigadier equivalent in the Army) that they have qualified for the trial requirements, defence sources told reporters.

Meanwhile, the Navy officer from the submarine acquisition directorate has communicated to Larsen and Toubro about deviations in their trials held in Cartagena in Spain in June this year where they demonstrated their system at a submarine base, they said.

The submarine programme is in the middle stages and it has to pass through various stages at higher level in the Defence Ministry and top level of the government for clearance, the sources said.

The government is also focusing on providing more strength to the underwater fleet of the force and has cleared multiple programmes for it. The Indian Navy's long-term submarine acquisition plan was modified post2014 to have 18 conventional and 6 nuclear attack submarines.

Project 75 with six Sciroene class boats has been extended to have three more boats from there while Project 75 India will see six conventional submarines getting built in an Indian shipyard. The next-gen Project 76 to build six conventional submarines with complete Indian design and construction has also been activated and was on the 100- day agenda of the Defence Ministry.

The futuristic project would be taken up by the DRDO and Navy together. The P-75 India has been in the making for the last few years and due to its stringent requirements, many international firms could not participate as they did not have the capabilities required for it.

<https://economictimes.indiatimes.com/news/defence/mdl-surges-ahead-in-indias-rs-60000-crore-submarine-project-after-clearing-key-trials/articleshow/112448280.cms>



## India's good bet: Quad in the Indian Ocean

The Indian Ocean Region (IOR), connecting the Pacific and Atlantic Oceans, is emerging as a critical axis of global trade, skilled young population and geo-economic prosperity. However, this region has witnessed significant transformations in recent years.

For instance, China's expanding influence from Bab-el-Mandeb to Strait of Malacca is posing new and unique challenges each passing day. This continues to pose challenges to the Quadrilateral Security Dialogue (Quad) group, whose sole aim is to create a cooperative bulwark against Chinese expansionism and aggressiveness.

China's economic and military might have increased, so has its interest in securing its maritime trade routes and expanding its influence across the Indian Ocean Region (IOR). Here, we are reminded of the quote by Admiral Alfred T Mahan, "whoever controls the seas controls the world".

Furthermore, China's Belt and Road Initiative (BRI) has seen significant investments in port infrastructure and maritime logistics, exemplified by projects like the Djibouti Port in the Horn of Africa, Gwadar Port in Pakistan, and the Hambantota Port in Sri Lanka among others.

These developments are raising global concerns, particularly for countries bordering the Indian Ocean and, even more critically, for those that border both China and the Indian Ocean. India is one such country. This situation is causing alarm within India's strategic community.

In response, India should consider adopting a strategy similar to that of the Philippines, which has engaged with and sought support from its allies to manage its relationship with China. India too should leverage its diplomatic relations to navigate these challenges.

Additionally, China's PLAN (People's Liberation Army Navy) surpasses India's naval capability in sheer numbers and technological advancement. However, India's geo-strategic position, growing alliances with like-minded countries and diplomatic heft give it significant leverage in regional maritime security and could help in maintaining balance in the region.

Given the sheer prowess of China's PLAN, India cannot do this alone and should deepen its partnership with countries like the United States, Japan, and Australia through initiatives such as the Quad to enhance its strategic presence in its surrounding. Just like how Philippines has 'Squad', India has the 'Quad'. The Quad, called as a "Force for Good" by the Indian PM during the Tokyo summit in 2022 could prove to be a good bet in this regard.

The seriousness could be witnessed in this year's Quad Leaders' Summit, held in Sydney where the leaders of the four countries highlighted the importance of the Indian Ocean Region (IOR) as a key area of strategic focus. This was reiterated at the Quad Foreign Minister's Meeting in Tokyo on July 29th. In Tokyo, the ministers announced plans to enhance regional maritime domain awareness through satellite data, training, and capacity building, and to expand the Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA) into the Indian Ocean Region. This

emphasis on Maritime Domain Awareness (MDA) aims to create a comprehensive understanding of maritime activities in the region.

This involves deploying advanced surveillance technologies, sharing real-time information, and establishing monitoring frameworks to detect and respond to any suspicious, spying and malicious activities. Such initiatives are crucial for countering China's expanding naval presence and preventing the establishment of a Chinese maritime hegemony. Born in the wake of the 2004 tsunami, the Quad aims to promote a free, open, and inclusive Indo-Pacific, emphasising principles of international law and respect for sovereignty. This was conceptualised in 2007 but gained renewed momentum in the late 2010s due to growing concerns over China's assertive maritime policies and expansionism.

Over the past two decades, the Quad has emerged as a strategic counterbalance and deterrent to the fuming dragon. And to understand the Quad's role in the IOR, it is important to examine its strategic objectives, key initiatives, combined strengths and implications for the region's stability and security.

Maritime security remains at the core of the Quad's strategy. The grouping's naval cooperation is designed to enhance interoperability and interchangeability, share intelligence, and conduct joint patrols to ensure the safety of sea lanes and deter potential traditional and non-traditional threats.

With Australia participating in the upcoming Malabar naval exercise this year, it will further exemplify this collaborative approach, showcasing their collective naval capabilities and readiness. These exercises enhance synergy, interoperability, and coordination among the four navies, reflecting their shared commitment to an open, inclusive Indo-Pacific and a rules-based international order.

The four countries understand the value of "Indo" in the Indo-Pacific, which serves as a vital channel for global trade, with major sea lanes facilitating the movement of energy supplies and commercial goods. Moreover, this region's strategic importance is highlighted by the presence of at least seven key chokepoints: the Mozambique Channel, the Bab el Mandeb, the Suez Canal, the Strait of Hormuz, the Malacca Straits, the Sunda Strait, and the Lombok Strait.

India, together with other countries in the region, recognises the crucial importance of these maritime chokepoints for global trade and commerce. It is essential for them to unite and collectively safeguard control over these strategic routes, as dominance over any of them can significantly impact international trade.

In light of this context, India should take a leading role in crafting a strategic roadmap for the region by incorporating insights from Quad members. This plan should focus on enhancing maritime safety and security, and ensuring freedom of navigation and overflight in line with international law.

India has previously demonstrated leadership in advancing the blue economy, vaccine diplomacy, and addressing climate change. It is now crucial for India to spearhead the development of a strategic framework that identifies key areas for action. Immediate priorities for cooperation in the IOR could include:

- Trade and Investment Facilitation

- Maritime Safety and Security
- Tourism and Cultural Exchange
- Fisheries Management
- Disaster Risk Management
- Academic and Science and Technology Collaboration

In conclusion, the Quad must play a larger role in safeguarding the chokepoints and ensure the stability of maritime trade routes in the IOR. By working together, the Quad can help maintain open sea routes and prevent any single country from dominating this youngest region sitting at the heart of the global trade, economic growth and prosperity.

<https://economictimes.indiatimes.com/news/defence/indias-good-bet-quad-in-the-indian-ocean/articleshow/112423931.cms>



*Fri, 09 Aug 2024*

## **Harnessing Innovation for Global Defence Leadership**

Innovation is one of the key factors that is driving the \$2,443 billion global defence industry to greater heights. The ongoing Russia-Ukraine war, in a way, is showing the way forward in the transformation of the defence sector. Take drones for example. It's clear how the weaponisation of commercial drones has posed significant challenges to large armies. This could be illustrated as one of the simple yet innovative ideas which will transform and disrupt the future of warfare.

Globally, the defence industry is on the threshold of rapid evolution, and it is time for the \$1.068 Trillion Indian defence industry to seize the opportunities and emerge as one of the leaders in the world market. How can this be achieved? The first priority should be given to the creation of Intellectual Property (IP). This will help industry develop new defence products for the country's armed forces as well as the global market. The second move should be to scrutinize the procurement processes and support indigenous defence designers/developers who are innovative and agile. Next is to change the mindset of the country's defence industry, which has been primarily dominated by public sector entities in the past decades. A paradigm shift is required in thinking to achieve the global dreams by embracing innovation.

Indian defence companies should pitch themselves as innovators who can add value to the existing technologies while entering into partnerships with foreign manufacturers from top markets such as the US, Europe, and Russia. This will help the companies to absorb and enhance the technology in India and offer the latest products to their customers too. Only through such strategic steps can India power ahead in the competitive global markets. To achieve this, an important step for the authorities will be to strengthen the Defence Intellectual Property Rights (DIPR) policy and patenting.

## **Getting a Grip Over IP**

It is heartening to note that the Indian government has recognised the value of IP and taken initiatives such as the DIPR policy to encourage organisations to file patents. Two important schemes that are moving in the right direction are— the Innovations for Defence Excellence (iDEX ) scheme and the Mission Raksha Gyan Shakti (MRGS). While the former focuses on innovation and technology development in the defence and aerospace sectors; the later aims to cultivate and promote an IP-driven culture in the defence sector.

However, all is not rosy on the patents and IP front. During the year 2023, India received a total of 90,300 patent applications. The Patent Office granted over one lakh patents between 2023 and 2024. While this is considered an all-time high for India, it is dwarfed in comparison with global leaders like China and US (1.58 million and 505,539 patents in 2023 respectively). Viewed in this background, much needs to be done to bridge this yawning gap.

## **Defence Innovation and its Challenges in India**

In the financial year 2023-24, India's defence exports touched approximately US\$ 2.63 billion, an all-time high. While this milestone places India among the top 25 global defence exporters, the gap to becoming a true global leader remains large. The bigger challenge to overcome are the roadblocks to reward and incentivise homegrown innovations.

To achieve global leadership, it is crucial to support companies/entities that develop cutting-edge technologies taking risks, investing and going through frustration and failures, resulting in a low success ratio.

How can the challenges be overcome? There are several ways for backing and funding these innovative projects. Let's look at two. The first is for the armed forces or government to fund and oversee product development. However, this process is typically long drawn and can be filled with bureaucratic hurdles, which need to be tackled.

The second approach is for companies willing to take risks to self-fund the research. Here, the armed forces can ask the company to fund projects and, in turn, place orders if the product meets the strict criteria laid out.

The onus will be on the companies to identify the need and develop products to meet the users requirements. These products can be groundbreaking and carry a high risk too. The larger objective should also be to reward the creators of the product/technology so that they in turn attract more innovations.

## **Relook the three-vendor policy**

The existing three-vendor policy needs to be tweaked. The issue in focus is the clause known as 'fair competition'. Innovative products often have only foreign counterparts or, in rare cases, are the only one of their kind in the world, making it difficult to meet this so-called "fair competition" requirement.

The armed forces typically require two-to-three vendors to ensure competitive pricing. However, this can be problematic when there are no comparable products. When alternative foreign products are available, price discovery can be straightforward through budget requests in the Request for

Information process. However, caution is necessary, as foreign companies may aggressively price their products with the intention to damage the benchmarking to the detriment of both the Indian industry and the armed forces. In cases where there are no foreign counterparts, cost benefits should determine pricing which ensures fair compensation for the innovation.

The overall goal should be to foster innovation and risk taking in development of cost effective and quality products. Indigenously developed products with no competition can be procured on a single-vendor basis. In many high-tech products, there are few or even one global vendor. The government should identify and place orders from domestic companies fulfilling these criteria.

Care must be taken to differentiate between companies genuinely developing IP and those merely manufacturing through Transfer of Technology. Sustained global leadership requires the ability to develop next-generation products, which is possible only with in-house IP development programmes.

If a defence designer or startup, for instance, creates a rare IP, they should be rewarded for their innovation with bulk orders and showcased at global markets. Currently, the focus of the Union government is on building a startup ecosystem, which is a welcome and right step.

<https://www.financialexpress.com/business/defence-harnessing-innovation-for-global-defence-leadership-3578556/>



*Sat, 10 Aug 2024*

## **China's frontier settlements: A strategic move with military implications**

In recent years, China has undertaken an extensive project to build new settlements along its frontiers, particularly in areas bordering India. These settlements, which Beijing refers to as “border guardians,” are part of a broader strategy to assert its territorial claims and enhance its security infrastructure along the Line of Actual Control (LAC).

Over 628 such “well-off villages” have been constructed along India's borders with the Tibet Autonomous Region, including Ladakh and Arunachal Pradesh. The dual-use nature of these villages—designed for both civilian and military purposes—has raised significant concerns within the Indian military and strategic community.

The nature of these settlements remains somewhat ambiguous. Although they have been described as civilian dwellings, their strategic locations and infrastructure suggest a military dimension. The buildings, mostly large and spacious double-storey structures, had remained unoccupied until recently.



In the past few months, Chinese nationals have begun moving into these villages. It remains unclear whether these occupants are civilians or military personnel, further adding to the complexity of the situation.

### **Expert View**

Maj Gen (Dr) Ashok Kumar, VSM (Retd), Kargil War Veteran, Defence and Media Analyst, offers a historical perspective on China's frontier strategy. He draws a parallel between the current developments and the construction of the Great Wall of China, which was initially built to protect the Chinese empire from external threats.

“The Great Wall of China, despite its massive fortifications, provided only partial success against invaders,” Maj Gen Kumar notes. He explains that while the Great Wall was a physical barrier, China's modern approach involves a more nuanced strategy that goes beyond mere fortifications.

“Today, China's frontiers extend into territories that it occupies, requiring a new approach to secure these areas,” he says. Unlike the Great Wall, which symbolized physical defence, the new settlements serve multiple purposes, blending civilian life with military readiness. He points out that these “model villages” are not only populated by civilians but are equipped with infrastructure that can support military operations, making them a “deadly combination” that complicates any potential adversary's military strategy.

He further highlights that these villages are predominantly populated by Han Chinese, with some inclusion of native populations. This demographic engineering serves to reverse the population profile in these sensitive border regions, further cementing China's control.

“This is a masterstroke of China in restructuring its security needs in sync with Sun Tzu's philosophy of winning the war without fighting,” Maj Gen Kumar opines.

China's strategy also includes legal measures, such as the Land Border Law, which empowers its citizens with national defence responsibilities. This law, coupled with the establishment of dual-use infrastructure, introduces a new dimension to border security that India must address with a strategic response.

India has introduced its own “vibrant villages” concept as a countermeasure, but as Maj Gen Kumar suggests, a more nuanced approach is necessary to create viable gaps in China's formidable village chain.

As tensions along the LAC continue to simmer, China's frontier settlements are likely to play a crucial role in its long-term strategic objectives. For India, understanding and countering this complex strategy will be vital to maintaining stability and security in the region.

<https://www.financialexpress.com/business/defence-chinas-frontier-settlements-a-strategic-move-with-military-implications-3579290/>

*Fri, 09 Aug 2024*

## **Malaysian Prime Minister to visit India; focus on strengthening defence and economic ties**

In the coming weeks, Malaysia's Prime Minister Anwar Ibrahim is set to visit India, marking a significant moment in the diplomatic relations between the two nations. This visit follows closely on the heels of Indian Prime Minister Narendra Modi's planned trips to Poland and Ukraine later this month.

The visit is expected to focus on a broad spectrum of issues, including trade, science and technology, education, agriculture, tourism, defence, and regional concerns such as the situations in Bangladesh, Myanmar, and West Asia.

### **Strengthening Bilateral Ties**

The forthcoming visit is an extension of the ongoing efforts to deepen the already strong ties between India and Malaysia. Recently, Indian External Affairs Minister S. Jaishankar visited Kuala Lumpur as part of his tour of Southeast Asia, where he met with Prime Minister Anwar Ibrahim. Their discussions covered a wide array of subjects, including trade, digital cooperation, defence, and regional issues like the crisis in Myanmar. One of the key outcomes of their meeting was Malaysia's commitment to facilitating the establishment of a branch campus of the Indian Institute of Technology (IIT) in Malaysia, a significant step towards enhancing educational collaboration between the two countries.

### **Revisiting the India-Malaysia Free Trade Agreement**

A critical issue likely to dominate discussions during the Malaysian Prime Minister's visit is the review of the India-Malaysia Free Trade Agreement (FTA), formally known as the Comprehensive Economic Cooperation Agreement (CECA). Implemented in July 2011, this agreement was designed to boost trade in goods, services, and investments between the two countries. However, despite the intentions behind CECA, India has seen a growing trade deficit with Malaysia, mirroring its experience with the broader India-ASEAN FTA.

In the fiscal year 2010-2011, when CECA was signed, India had a trade deficit of US\$2.65 billion with Malaysia. By 2023-24, this deficit had expanded to US\$5.49 billion, despite an increase in exports. India's exports to Malaysia stood at US\$7.26 billion, while imports from Malaysia reached US\$12.75 billion during the same period. This growing trade imbalance has prompted India to seek a review of the FTA, aiming to make the trade basket more balanced and mutually beneficial.

India's Commerce Department has already begun gathering input from various industry bodies and export promotion councils to identify tariff and non-tariff barriers that hinder trade with Malaysia. This input will form the basis of India's agenda in the upcoming joint commission meeting with Malaysia, where both sides are expected to discuss potential adjustments to the FTA. One area of

focus may be on Product Specific Rules of Origin (PSR), which determine the national source of a product and could offer more flexibility to certain Indian exports.

### **Expanding Defence and Maritime Cooperation**

Another crucial aspect of the visit will be discussions on defence and maritime cooperation, areas where both India and Malaysia see significant potential for growth. The two countries have already identified key areas for collaboration, including government-to-government engagement, tri-service cooperation, training, UN peacekeeping operations, and bilateral services engagement. Moreover, there is a strong interest in defence industrial cooperation, particularly in research and development, and regional engagements.

Malaysia has expressed confidence in India's defence industry capabilities and is keen to explore possibilities for co-design, co-production, and co-development in various sectors. One area of potential collaboration is in shipbuilding and maintenance, where India's expertise could complement Malaysia's needs. Additionally, both countries share common platforms in their armed forces, such as the Sukhoi fighter jets and Scorpene submarines, which could serve as a basis for deeper technical cooperation.

India's Hindustan Aeronautics Limited (HAL) has manufactured around 280 Sukhoi fighter jets in collaboration with Russian counterparts, and this experience could be invaluable for Malaysia's air force, which operates the same platform. Similarly, India's experience in building Scorpene submarines at Mazagon Dock Shipbuilders Ltd. could be of great interest to Malaysia, which also operates a fleet of these submarines. Furthermore, Malaysia is keen on leveraging Indian expertise in emerging technologies like cybersecurity, artificial intelligence, and the Maintenance, Repair, and Overhaul (MRO) sector, particularly for submarine parts.

### **Addressing Regional Concerns**

The visit is also expected to include discussions on regional issues, with a particular focus on the situations in Bangladesh, Myanmar, and West Asia. Both India and Malaysia share concerns about the ongoing crises in these regions and are likely to explore ways to collaborate more effectively in addressing them. The Rohingya refugee crisis in Bangladesh and Myanmar, in particular, is a matter of mutual concern, as both countries have been involved in providing humanitarian aid and seeking a peaceful resolution to the conflict.

### **Bottomline**

Prime Minister Anwar Ibrahim's visit to India comes at a critical juncture in the bilateral relations between the two countries. With a focus on enhancing trade ties, expanding defence cooperation, and addressing regional challenges, this visit is expected to further strengthen the strategic partnership between India and Malaysia. As both nations navigate the complexities of regional and global dynamics, their collaboration is likely to play a pivotal role in shaping the future of Southeast Asia.

<https://www.financialexpress.com/business/defence-malaysian-prime-minister-to-visit-india-focus-on-strengthening-defence-and-economic-ties-3578751/>

Sat, 10 Aug 2024

## Jaishankar meets Maldivian defence minister, discusses security ties amidst China's growing presence

Jaishankar is on a three-day official visit to Maldives to reset the bilateral relationship, the first high-level trip from India after the archipelago nation's pro-China president, Mohamed Muizzu, assumed office last year. On his second day here, he met Defence Minister Maumoon.

"A very good meeting with Defence Minister @mgmaumoon. Discussed defence and security cooperation, joint initiatives for maritime security and our shared interest in maintaining peace and stability in the region," Jaishankar said in a post on X.

His statement on X came amidst China's growing military ties with the Maldives since President Muizzu assumed office last year. A sophisticated Chinese research vessel docked at a Maldivian port and the two countries have also signed a bilateral military agreement.

Earlier in the day, Jaishankar jointly planted a sapling with his Maldivian counterpart Moosa Zameer and Climate Change, Environment and Energy Minister Thoriq Ibrahim.

"Pleased to jointly plant a Carambola (Star Fruit) sapling along with Foreign Minister @MoosaZameer and Climate Change, Environment and Energy Minister @Thoriqibrahim in Lonuziyaaraiy Park, Male today. The sapling symbolises our commitment to a sustainable future and the enduring IndiaMaldives ties," he said in a post on X.

On Friday, he met his Maldivian counterpart Zameer and discussed various aspects of the bilateral ties, including development partnership, defence and maritime cooperation, capacity building, economic and trade ties, and people-to-people linkages.

This is Jaishankar's first visit to the Maldives since the government of President Muizzu assumed office last year.

The ties between India and the Maldives came under severe strain since Muizzu, known for his pro-China leanings, took charge of the top office in November 2023. Within hours of his oath, he had demanded the withdrawal of Indian military personnel from his country. Subsequently, the Indian military personnel were replaced by civilians.

The Maldives is one of India's key maritime neighbours in the Indian Ocean region, and the overall bilateral ties, including in the areas of defence and security, witnessed an upward trajectory under the previous government in Male.

<https://www.deccanherald.com/india/jaishankar-meets-maldivian-defence-minister-discusses-security-ties-amidst-chinas-growing-presence-3145412>

*Fri, 09 Aug 2024*

## **Indian Army Conducts High-Altitude 'Parvat Prahaar' Exercise Close To China Border In Eastern Ladakh**

The Indian Army is conducting a complex corps-sized military exercise, 'Parvat Prahaar,' close to the China border in Eastern Ladakh.

Parvat Prahaar is a strategic military exercise primarily focused on high-altitude mountain warfare, developing and validating tactics to be used in a war-like situation against China in Eastern Ladakh.

The Northern Command's mountain strike corps, the 1st Strike Corps, now oriented towards operations against China at the Line of Actual Control (LAC), is participating in this exercise.

The exercise, expected to continue for about two weeks, will involve real-world scenarios that will train soldiers on how to efficiently operate in the harsh climate of the Himalayas.

Tanks like the T-72 and T-90, K-9 Vajra-T self-propelled howitzers, unmanned aerial vehicles (UAVs), swarm drones, loitering munitions, anti-air defence systems, and helicopters are participating in this exercise.

This exercise is primarily to train the re-oriented corps to get up to speed for mountain warfare.

The 1st Strike Corps, based in Mathura until three years ago, was oriented towards operations against Pakistan in the plains of Punjab and the deserts of Rajasthan and was part of the South-Western Command headquartered in Jaipur, Rajasthan.

In 2021, it was reorganised under the Northern Command to focus on China after the standoff with China in Eastern Ladakh.

The standoff began after a series of clashes between the Indian Army and Chinese soldiers at Pangong Tso Lake and Galwan Valley in May and June 2020. The clashes in Galwan, on the intervening nights of June 15-16 2020, left twenty Indian and an unknown number of Chinese soldiers dead.

Since then, India has deployed more than 50,000 additional troops, along with 500 tanks, artillery, and supporting infrastructure, in the mountains of Eastern Ladakh.

The standoff, which is now in its fifth year, shows no signs of easing since the Chinese do not seem interested in restoring the status quo before 2020, which has been a consistent demand of India in several military and civilian meetings held to defuse the standoff.

<https://swarajyamag.com/defence/indian-army-conducts-high-altitude-parvat-prahaar-exercise-close-to-china-border-in-eastern-ladakh#:~:text=Parvat%20Prahaar%20is%20a%20strategic,against%20China%20in%20Eastern%20Ladakh>.



# नवभारत टाइम्स

Mon, 12 Aug 2024

## एयरफोर्स को जल्द मिलेंगी 200 एयर टू एयर अस्त्र मार्क-1 मिसाइल, दुश्मनों का हवा में ही करेगी सफाया

इंडियन एयरफोर्स को जल्द ही 200 एयर टू एयर अस्त्र मार्क-1 मिसाइल मिलेंगी। इनके प्रॉडक्शन को एयरफोर्स ने मंजूरी दे दी है। ये मिसाइल फाइटर जेट सुखोई और स्वदेशी फाइटर जेट तेजस में फिट होंगी। अस्त्र मार्क-1 मिसाइल की खरीद को पिछले साल रक्षा अधिग्रहण समिति ने मंजूरी दी थी। जिसके बाद इसके कई टेस्ट किए गए और सभी टेस्ट में सफल होने के बाद अब एयरफोर्स ने इसके प्रॉडक्शन के लिए क्लियरेंस दे दिया है। इसे डीआरडीओ ने डिवेलप किया है और भारत डायनामिक लिमिटेड (बीडीएल) इसे बनाएगा।

टारगेट लॉक होने का बाद निशाना पक्का

पिछले साल इस मिसाइल को फाइटर जेट तेजस से 20 हजार फीट की ऊंचाई पर लॉन्च किया गया था और यह तय मानकों पर पूरी तरह खरा रहा। अस्त्र मार्क-1 अडवांस बियॉन्ड विजुवल रेंज एयर टू एयर मिसाइल है। इसमें यह तकनीक भी है जिससे यह मिसाइल उस टारगेट को भी आसानी से निशाना बना सकती है जो जैमर के आसपास होता है। अस्त्र मार्क-1 में स्वदेशी सीकर लगा है यानी यह लॉक करके सटीक निशाना लगा सकती है। अगर इस मिसाइल से टारगेट लॉक कर दिया तो ये उसे निशाना बनाकर ही छोड़ेगी। अस्त्र मार्क-1 मिसाइल की रेंज 100 किलोमीटर तक है। अस्त्र मार्क-2 डिवेलप करने पर भी काम हो रहा है। अस्त्र मार्क-2 की रेंज करीब 130 किलोमीटर होगी। जल्द ही इसके टेस्ट शुरू होने की उम्मीद है। इसके साथ ही लॉन्ग रेंज अस्त्र डिवेलप करने की योजना भी है। जिसकी रेंज 300 किलोमीटर तक हो सकती है। हालांकि अभी इस पर काम शुरू नहीं हुआ है।

पड़ोसी देशों के पास क्या है?

पाकिस्तान के फाइटर जेट F-16 में AMRAAM (AIM-120) अडवांस्ड मीडियम रेंज एयर टू एयर मिसाइल फिट है जिसकी मारक क्षमता 100 किलोमीटर से ज्यादा है। इसका इस्तेमाल पाकिस्तान ने बालाकोट स्ट्राइक के बाद किया था और उस वक्त इंडियन एयरफोर्स के विंग कमांडर अभिनंदन के मिग-21 पर पाकिस्तान के फाइटर जेट ने इसी से अटैक किया था। चीन के पास है PL-15 मिसाइल है। जिसकी रेंज 200 से 300 किलोमीटर बताई जाती है। इसे चीन ने अपने J-16 और J-20 फाइटर जेट में फिट किया है। इस मिसाइल के एक्सपोर्ट वर्जन PL-15 E मिसाइल चीन ने पाकिस्तान को भी दी है। इसकी रेंज 145 किलोमीटर बताई जाती है।

<https://navbharattimes.indiatimes.com/india/indian-airforce-will-soon-get-200-air-to-air-astra-mark-1-missiles/articleshow/112456438.cms>

# अमर उजाला

Sat, 10 Aug 2024

## Indian Army: भारतीय सेना खुद को कर रही भविष्य के लिए तैयार, 250 फ्यूचर रेडी डिफेंस टेक्नोलॉजी पर कर रही काम

भारतीय सेना प्रधानमंत्री नरेंद्र मोदी की 'आत्मनिर्भर भारत' पहल को आगे बढ़ाने के लिए कई नई योजनाओं पर काम कर रही है। सेना को पूरा जोर इन दिनों टेक्नोलॉजी पर है। इसके लिए सेना का आर्मी डिजाइन ब्यूरो (एडीबी) भारत के

टॉप एकेडमिक एजुकेशन इंस्टीट्यूशंस, रिसर्च एंड डेवलपमेंट इंस्टीट्यूशंस और स्टार्ट-अप्स के साथ मिल कर अपने ऑपरेशनल फ्रेमवर्क में स्वदेशी टेक्नोलॉजी को आगे बढ़ाने की योजना पर काम कर रहा है। वहीं इस सहयोग के जरिए न केवल सेना इनोवेशंस को बढ़ावा दे रही है, बल्कि अपनी तकनीकी क्षमता को भी मजबूत कर रही है।

आर्मी डिजाइन ब्यूरो ने 250 संस्थानों से किया करार

सेना की तकनीकी जरूरतों को पूरा करने के लिए आर्मी डिजाइन ब्यूरो ने अपने-अपने फील्ड के विशेषज्ञों को भी अपने साथ जोड़ा है। इसके लिए आर्मी डिजाइन ब्यूरो ने देश भर में 200 से अधिक टॉप एकेडमिक टेक्नोलॉजी इंस्टीट्यूशंस और 50 प्रमुख रिसर्च एंड डेवलपमेंट इंस्टीट्यूशंस के साथ करार किया है। इसका सेना को बड़ा फायदा यह हुआ है कि टेक्नोलॉजी इनोवेशंस हब (टीआईएच) बनाने से डुअल यूज टेक्नोलॉजी को लेकर सेना की समझ और गहरी हुई है

शिक्षण संस्थान भेज रहे प्रोजेक्ट

वहीं, सेना की इस सफल पहल के अब सकारात्मक परिणाम भी आने शुरू हो गए हैं। 15 फरवरी 2023 को रक्षा मंत्री की तरफ से जारी कंपोडियम ऑफ प्रॉब्लम डेफिनेशंस स्टेटमेंट्स (सीपीडीएस) के छठे एडिशन को काफी वाहवाही मिली थी। जबकि पिछले संस्करणों में शिक्षा जगत से केवल 30-40 प्रतिक्रियाएं मिली थीं। लेकिन इस साल 478 प्रतिक्रियाएं मिलीं, जिनमें से रिकॉर्ड तोड़ 210 प्रतिक्रियाएं अकेले शैक्षणिक संस्थानों से मिलीं। इसके अलावा, शिक्षा जगत ने भी सेना के साथ मिल कर रिसर्च एंड डेवलपमेंट में अपनी रुचि दिखाई है। शिक्षा जगत ने खुद से प्रेरित हो कर लगभग 35 रिसर्च एंड डेवलपमेंट के प्रोजेक्ट्स दिए हैं, जिनकी संख्या पहले मात्र 5 से 10 के आसपास ही होती थी।

आर्मी टेक्नोलॉजी बोर्ड भी नहीं है पीछे

सेना ने बताया कि आर्मी डिजाइन ब्यूरो के अलावा, आर्मी टेक्नोलॉजी बोर्ड (एटीबी) ने भी इस पहल को आगे बढ़ाने में अहम साझेदारी निभाई है। प्रमुख शैक्षणिक संस्थानों के साथ मिल कर एटीबी ने अपने रिसर्च प्रोजेक्ट पोर्टफोलियो को भी काफी आगे बढ़ाया है। 2022 में एटीबी के पास जहां केवल 17 प्रोजेक्ट थे, तो वहीं अब 13 तकनीकी क्षेत्रों में 62 प्रोजेक्ट चल रहे हैं, जिसमें रैमजेट प्रोजेक्टाइल, लो लाइट इमेजिंग और सेंसर फ्र्यूज्ड म्यूनिशन आदि शामिल हैं। लगभग 228 करोड़ रुपये की लागत वाली इन परियोजनाओं में 23 शैक्षणिक संस्थान शामिल हैं। वहीं, आर्मी टेक्नोलॉजी बोर्ड की बैठकें भी जल्दी-जल्दी हो रही हैं। इसका अंदाजा इसी से लगाया जा सकता है कि 25 वें एडिशन का आयोजन 24 वें के ठीक छह महीने बाद किया गया।

सेना के मुताबिक सेना की सातों कमानों में स्वदेशीकरण और अनुसंधान एवं विकास परियोजनाओं में भी उल्लेखनीय वृद्धि देखी गई है। स्वदेशीकरण और अनुसंधान एवं विकास परियोजनाओं की संख्या 2022 में 18 से बढ़कर 176 हो गई है, जिसकी लागत 59 करोड़ रुपये है, जिसमें 14 शैक्षणिक प्रौद्योगिकी संस्थान शामिल हैं।

भारतीय सेना में इनोवेशंस को बढ़ावा

इसके अलावा सेना अपने सैन्य कर्मियों को भी इनोवेशन के लिए प्रेरित कर रही है। सेना कर्मियों की बनाए गए इनोवेशंस को आगे बढ़ाने में शिक्षाविदों के साथ साझेदारी ने महत्वपूर्ण भूमिका निभाई है। जो पहले लोवर टेक्नोलॉजी रेडिनेस लेवल था, अब शैक्षिक संस्थानों की मदद से वह बढ़ कर फील्ड इंडक्शन के स्तर तक पहुंच चुका है। मौजूदा समय में विभिन्न शैक्षणिक संस्थानों की मदद से चार ऐसे इनोवेशंस को बढ़ाया जा रहा है, जो इस बात का प्रमाण है कि भारतीय सेना में इनोवेशंस का कल्चर डेवलप किया जा रहा है।

आईआईटी में इंडियम आर्मी सेल्स

सूत्रों ने बताया कि आईआईटी दिल्ली, आईआईटी कानपुर और आईआईएससी बंगलुरु जैसे प्रमुख संस्थानों में इंडियम आर्मी सेल्स बनाना बेहद पायदेमंद रहा है। ये सेल्स अब सेना मुख्यालय और फील्ड फॉर्मेशंस दोनों के साथ मिल कर 23 अत्याधुनिक प्रौद्योगिकी परियोजनाओं को आगे बढ़ा रहे हैं। इसके अलावा सेना ने प्रमुख सरकारी कंपनियों के साथ भी अपने सहयोग को मजबूत किया है। 15 मार्च 2024 को विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) के साथ हुए करार के बाद सेना को विभिन्न शैक्षणिक संस्थानों के 81 डोमेन एक्सपर्ट्स की तकनीकी विशेषज्ञता हासिल हुई है।

स्पेशल पर्पज व्हीकल बनाने की तैयारी

28 मई 2024 को सेंटर फॉर डेवलपमेंट ऑफ एडवांस्ड कंप्यूटिंग (सीडीएसी) के साथ हुए करार के बाद राष्ट्रीय सुरक्षा को देखते हुए एक स्पेशल पर्पज व्हीकल बनाया जाएगा। इसके अलावा, सेना ने पिछले तीन सालों में एआई, साइबर सुरक्षा और रोबोटिक्स जैसे क्षेत्रों में व्यापक सहयोग के लिए शैक्षणिक और अनुसंधान एवं विकास संस्थानों के साथ 38 समझौता ज्ञापनों पर हस्ताक्षर किए हैं। कुपवाड़ा, सिक्किम और लेह जैसे चुनौतीपूर्ण इलाकों में फॉरवर्ड एरिया टूर भी एकेडेमिशियंस के लिए आयोजित किए गए हैं। वर्तमान में 230 से अधिक प्रोजेक्ट्स भारत की रक्षा को क्षमताओं को नई ऊंचाइयों पर ले जाने के लिए तैयार हैं।

<https://www.amarujala.com/india-news/indian-army-is-preparing-itself-for-the-future-working-on-250-future-ready-defense-technologies-2024-08-10>

## नवभारत टाइम्स

Fri, 09 Aug 2024

### भारत को रूस बेचना चाहता है खास पनडुब्बी, पानी के अंदर से ब्रह्मोस मिसाइल भी कर सकेगी लॉन्च, चीन-पाकिस्तान की बढ़ेगी टेंशन

रूस और भारत लंबे समय से डिफेंस पार्टनर हैं। इस बीच रूस की रूबिन सेंट्रल डिजाइन ब्यूरो अगामी आर्मी-2024 प्रदर्शनी में अमूर-950 पनडुब्बी की पेशकश करने को तैयार है। यह पनडुब्बी बेहद खास है, जिसमें भारत को दिलचस्पी होगी। ऐसा इसलिए क्योंकि यह ऊर्ध्वाधर लॉन्च ट्यूबों से लैस है, जो ब्रह्मोस मिसाइल लॉन्च कर सकती है। यानी यह पानी के अंदर से आसमान की तरफ ब्रह्मोस मिसाइल लॉन्च करने में सक्षम है। यह पहली बार है कि इस उन्नत गैर-परमाणु पनडुब्बी को जनता के सामने प्रदर्शित किया जाएगा, जो समुद्र के भीतर युद्ध के भविष्य की एक झलक पेश करेगा।

पनडुब्बी की ब्रह्मोस मिसाइल को वर्टिकल तरीके से लॉन्च करने की क्षमता भारतीय नौसेना के लिए महत्वपूर्ण है। इससे पहले भारतीय नौसेना के प्रोजेक्ट 75I के तहत रूस ने भारत को अमूर 1650 पनडुब्बी खरीदने की पेशकश की थी। अमूर-950 किलो श्रेणी की पनडुब्बियों का एक आधुनिक विकास है, जिसे खास तौर पर इसे पानी में छिपे रहने और स्थायित्व के लिए माना जाता है। इस पनडुब्बी के पास उन्नत ध्वनिक स्टील्थ क्षमताएं हैं। यानी कि जब यह पानी के नीचे चलती है तो इसमें से बेहद कम आवाज आती है, जिससे दुश्मन को इसका पता नहीं चलता। यह पनडुब्बी एआईपी टेक्नोलॉजी से लैस है।

पानी के अंदर कम होती है आवाज

भारतीय नौसेना वर्तमान में 7 किलो-क्लास पनडुब्बियों का संचालन करती है। इसे भारत में सिंधुघोष श्रेणी कहा जाता है। इन्हें 1980 के दशक के अंत में रूस से लिया गया था और इसमें समय-समय पर कई अपडेट किए जाते रहे हैं। किलो क्लास पनडुब्बी अपनी कम आवाज के लिए जानी जाती है। उनके पास एक डबल पतवार डिजाइन है। इसके विपरीत अमूर क्लास पनडुब्बियां एकल पतवार वाली होती हैं। वे स्थायी चुंबकों का इस्तेमाल करके एक पूरी तरह से नए मुख्य इलेक्ट्रिक इंजन के जरिए संचालित होती हैं। परिणामस्वरूप अमूर 650 पनडुब्बी की ध्वनि क्षमता किलो क्लास पनडुब्बियों की तुलना में कई गुना कम है।

क्या है पनडुब्बी की खासियत?

अमूर-950 सतह पर आने पर 950 टन और पानी में डूबने पर 1300 टन वजन विस्थापित करता है। यह पनडुब्बी 56.8 मीटर लंबी है। पानी में डूबने पर यह 20 नॉट लगभग 37 किमी प्रति घंटे की स्पीड से चल सकती है। एआईपी सिस्टम

के साथ यह 350 नॉटिकल मील तक जा सकती है। यह पनडुब्बी आकार में छोटी मानी जाती है, फिर भी इसकी ताकत बड़ी है। ऐसा लगता है जैसे रूस ने इसे खास तौर से भारत के लिए तैयार किया है। इसमें ब्रह्मोस मिसाइल के लिए 10 साइलो हैं। इसमें चार 544 एमएम टॉरपीडो ट्यूब हैं। इसके अलावा माइन्स भी हैं।

<https://navbharattimes.indiatimes.com/world/rest-of-europe/russia-will-offer-submarine-to-india-amur-950-verticle-launch-brahmos-missile/articleshow/112406209.cms>

**THEWEEK**

Sun, 11 Aug 2024

## **Mission self-reliance is good, but also focus on overcoming indigenous deficiencies**

*- By Air Chief Marshal S.Krishnaswamy (Retd)*

I look back with pride on the day in 1962 when i joined my first squadron at ambala. It was a welcoming sight to see half a dozen shining Hunters neatly parked on the tarmac. Will I get a chance to fly those was the first question that came up on my mind. The Hunter-56 was one of the fastest fighter planes of that time in the IAF. My training to get operational on the aircraft went on at a slow pace and often we faced spare parts crunch. (No such difficulties exist in the IAF these days).

Post the 1962 war with China, there was a sense of fatigue all around. Yet, the attitude was positive—wondering about the next round. From then on, our military changed course steadily in the ways that they were organised, equipped, trained and fought. The 1965 war came a bit too soon—we were woefully short on military hardware and munitions. Our tactics were ancient, our aircraft lacked sensors and we had never even heard of Electronic Warfare Suit. My first air-combat was totally visual and our basic communication system gave me trouble.

In the 1970s, the government struggled to get the economy in order. The Pakistanis had the US supplied F-104 fully operational, whereas the MIG-21s of the IAF were newly inducted and their numbers were small. Our military fought gallantly in the 1971 war, defeated the Pakistanis and liberated Bangladesh.

In the mid 1990s, India changed gears on all fronts. Science and technology were given due space and importance. Yet, India remained a major importer of weapons. In the 2000s, the nation was yet to absorb the importance of self-reliance. Lack of skill combined with the urge to get government jobs made our work-force ineffective. Manufacturing sector was not given due importance. Probably it was the right time for the government to spell out its strategy of *atmanirbhartha* (self-reliance).

In a couple of decades, the Indian manufacturing machinery will be well established to cover the military segment as well. A positive connect has been established between the PSUs and the private sector to work on defence projects. This may encourage foreign designs and their production

facilities making a back-door entry into the private sector. But we expect *atmanirbhartha* to stabilise gradually. It is necessary to ensure seamless integration of work between PSUs, the Defence Research and Development Organisation, military engineering facilities like Air Force BRDs (base repair depots), naval dockyards, EME (electronics and mechanical engineers) workshops and the like.

The military taking on repair and production was initiated in the 1960s to cope with the lack of suitable facilities or capacity in the private sectors or PSUs. These decisions were taken during the early days of industrialisation. A large number of civilian employees work in the repair/refurbish and production facilities headed by the military. To improve the overall output and quality, we could consider 'civilianising' some of these military engineering establishments. That could help in reducing the number of men in uniform.

The Indian military is man-power intensive. Their teeth-to-tail ratio is poor compared with western countries. The western military calls themselves as 'expeditionary force'—the US alone has about 1.33 million men and women in uniform with a global commitment. India, on the other hand, has 1.4 million uniformed personnel, with the single objective to defend our country. There is scope to keep Indian military lean and mean. A target to keep manpower under a million would be worth exploring.

By 2047, India's GDP is expected to reach \$30 trillion. Besides weapon systems, there would be a compelling need to induct modern material handling equipment and advanced integrated logistics management. The military should avoid using the term 'technology' in a loose sense. They need to specify technology in detail for application in a specified area, the purpose and functional objective.

Tri-service integration would call for wider usage of weapon systems by the three services. A soldier in the field should be able to directly talk to fighter jets in the sky and guide them to the target. It should be feasible to take control of a missile launched from air by a ship or a tank in the battlefield. This calls for integration at all levels and groups of the military. Command, control, communication, computers and intelligence would commonly be shared by all the combat forces on a specific mission. We expect sensor-to-shooter time to compress to seconds from the current standard of minutes or even hours. If this can be done, there is a possibility that we can pull out troops from a few inhospitable areas. We need to find technology solutions to monitor in all-weather conditions and avoid placing troops 24x7. We expect global peace-keeping will take greater importance than defending one's own territory. Over the next two decades, we expect multiple countries to get involved in joint planning and execution to prevent local wars. This would call for aero-space effort for movement and towards launching operations that would impose considerable stress on command, control and communication among nations.

India also wants to enhance its interest and capabilities in space which is most exciting. The Indian Space Research Organisation (ISRO) and the Japanese Space Exploration Agency have joined hands on the Chandrayaan-4 mission. The Indian lander design will be able to deliver 350kg payload on the moon's south pole. The SPADEX docking experiment by ISRO will have three crew on board to work out modalities for future experiments. Besides, ISRO will collaborate with NASA in developing and operating space stations for commercial purposes.

Other than space, the altitude band of 20km to 100km termed near-space holds extraordinary interest. This band will have the effect of gravity and the air will be too thin for jet engines to function. Most of the communication satellites operate in the near-space zone and such networks are essential to support space programmes. NASA has already established near-space network that is essential for communication between earth and space. India would need to create a suitable network for this. It is also feasible that a manned or unmanned combat aircraft to be placed in near-earth orbit to be called up to perform missions on earth at very short notice.

Many uncertainties prevail when we explore programmes that should be in place 20 years from now. India could not predict disasters like Covid-19 or the twists and turns in international relations, like the Ukraine and Gaza wars. And there have been surprises like the evolution of UAVs (unmanned aerial vehicles), which India missed. The changes in our defence acquisition process were essentially a blow to the existing procurement chain. But it will take a long time for *atmanirbhartha* to bring the benefit to India, which badly lacks the knowledge of the art of design, know-hows and know-whys. These can accumulate only with experience that can take years.

To overcome current deficiencies in indigenous capabilities, many defence manufacturers, in the private and public sector, collaborate with design and production facilities abroad. In effect, critical work packages are being outsourced, but the cost risks are taken by Indian establishments. But it is not unusual. The US defence department has funded development programmes with the UK, France, Sweden and Israel and their defence industries. Of course, those partnerships are between institutions with near-equal capabilities. We sincerely hope that our own capabilities improve substantially. We have not been able to overcome the problems in developing an indigenous jet engine or operationalise UAVs that have been under design and development at the DRDO for the last 25 years.

Relatively, India's space programmes have done better. ISRO and NASA are cooperating on developing a synthetic aperture radar. India runs space collaborative agreements with 61 countries and five multilateral organisations, which are moving smoothly.

<https://www.theweek.in/theweek/specials/2024/08/10/efforts-for-military-modernisation-in-india-by-2047.html>



Sun, 11 Aug 2024

## **India's defence startup ecosystem is arguably the world's largest**

**- By Ajay Kumar (former Defence Secretary)**

India has the world's third largest startup ecosystem, but arguably the world's largest defence startup ecosystem. This amazing transformation happened in the last five to six years. In February 2018, the ministry of defence introduced a draft defence production policy with ambitious



goals—triple defence industry turnover to Rs1.75 lakh crore and increase defence exports nearly 15-fold to Rs25,000 crore by 2025. It is in this policy that startups were envisioned to foster an innovation ecosystem.

Very few believed that startups could significantly impact defence needs. Innovation for Defence Excellence (iDEX) was launched in April 2018 by Prime Minister Narendra Modi, marking a significant policy initiative. It established open startup challenges, later termed Defence India Startup Challenges (DISC), aligned with the requirements of the Indian armed forces. Startups were invited to offer solutions and the most promising ones received financial support of up to Rs1.5 crore, contingent on achieving milestones and matched or higher investment from the startups.

Around this time, an unexpected request arrived at the defence ministry from the US embassy—they sought collaboration with an Indian startup specialising in military swarms, a technology they found unique and compelling. This surprised the ministry, accustomed to being the seeker rather than the sought-after, especially with respect to the US.

As secretary, defence production, I delved deeper into the matter, consulting with ministry officials and armed forces officers who were equally unaware of this startup and its groundbreaking innovations. My curiosity led me to the founder, who was a retired Indian Air Force officer. He revealed his futile attempts to engage with the ministry and the IAF. Meeting him was enlightening—it reinforced my belief in the potential of startups and their inventive teams to drive India's defence innovation ambitions forward.

The results were beyond even the most optimistic estimates. The startups provided technological solutions that were previously only available through imports, with no prior prospects of domestic development for years. In one of the early challenges of DISC-1, startups were asked to develop a high-resolution, 100-megapixel camera for airborne platforms and missiles. Few countries possessed the capability to create such advanced camera sensors.

A startup from IIT-Delhi took on the challenge, mastering the complex chip-design. Within 12 months, they successfully delivered the sensor to general astonishment. Pushing further, they proposed developing a groundbreaking 1-gigapixel camera. Today, this startup collaborates with NASA and Lockheed Martin demonstrating their high competence. An incredible journey indeed!

Startups revolutionised defence innovation with unprecedented speed, scale and cost-effectiveness. Previously, defence R&D projects spanned years or decades, costing hundreds to tens of thousands of crores. Some iDEX startups delivered innovations in just 12 to 18 months, often with grants as low as Rs1.5 crore.

Startups came forward in hordes, partly driven by the thrill of solving military challenges and partly by a sense of national duty, enabling the armed forces to address a multitude of issues simultaneously. In August 2022, a whopping 75 challenges were introduced for underwater technologies, followed by another 75 in October 2022 for space-based technologies. These fields were new terrain for startups, yet the challenges attracted a significant number of participants.

Within a year, prototypes were developed in response to the naval challenges and showcased by the Indian Navy in September 2023. The scale and speed of the startup defence innovation ecosystem was so remarkable that it seemed surreal!

Defence startups have proven their solutions to be on par with, if not superior to, the best. A winner of an iDEX challenge in quantum communication achieved quantum key distribution over 150km on fibre, when the best achieved in the world was 90 km.

This breakthrough not only made their solution nearly 60 per cent cheaper but also significantly more efficient. Recognised among the world's top quantum communication companies, this startup attracted interest from global giants like Google and Amazon for integrating their technology into cloud platforms. Following the US government's move to adopt post-quantum cryptography solutions, this startup developed a compatible solution and started offering it in the US.

Several startups stemming from iDEX have already entered international markets or are poised to do so. The surge of defence innovation by Indian startups has been so impactful that the US department of defence collaborated with India for joint challenges. Within a year, two rounds of these collaborative challenges have already been initiated. Indian defence startups are now competing alongside their US counterparts, advancing cutting-edge technologies outlined in these challenges.

The remarkable success can be partly attributed to India's substantial talent and capabilities in digital technologies. But, iDEX's success is also because of the proactive policy support provided by the government. Major policy decisions like earmarking of 75 per cent of capital acquisition budget for domestic industry and positive indigenisation lists, which banned import of hundreds of platforms and thousands of sub-systems and components, increased the demand for startup-developed products.

Breaking from past norms where the government typically claimed ownership of intellectual property from public-funded research, iDEX allows startups to retain their IP, encouraging them to explore opportunities in civil and export markets.

Given that defence startups operate in a monopsonistic environment—the armed forces being the sole buyers—they needed a procurement mechanism to sell their innovations. The government introduced the Make-2 route within the defence acquisition process to facilitate this. The armed forces' adoption of spiral development and their active hand-holding of startups throughout the developmental cycle have significantly bolstered innovation.

While iDEX provides partial funding to startups, they need to secure the rest from other sources. Efforts were made to encourage venture capitalists to support defence startups at DefExpo 2022 in Gandhinagar. But, few VCs stepped forward.

To address this shortfall, the Mounttech Growth Fund was established. VC has been instrumental in driving innovation globally. If the Mounttech Growth Fund can inspire other VCs to invest in technology and IP creation, it could mark a pivotal moment in India's evolution into a product nation and a developed economy.

<https://www.theweek.in/theweek/current/2024/08/10/innovations-for-defence-excellence-startups-india.html>

## **Indian Military Bases At INS Baaz, CAR Nicobar See Renewed Infra Push As QUAD Nations Look To Counter ‘Hostile’ China**

With China’s unprecedented rise and belligerence, global geostrategic action has begun to shift from the South China Sea (SCS) to the larger Indo-Pacific region. The US already has a huge air asset presence at Andersen Air Force Base in Guam. The 18th Wing at Kadena Air Base, Okinawa, Japan, is the largest U.S. military installation in the Asia-Pacific region and the largest wing in the US Air Force (USAF).

Both are Island territories. On 18 March 2016, the United States and the Philippines signed a deal to allow US forces to use five bases in the country, including Antonio Bautista Air Base, to counter Chinese deployments in the Spratly Islands. However, there are other Island airfields in the Indian Ocean Region (IOR) that can greatly impact operations in SCS and north-eastern IOR. These are Diego Garcia (British Indian Ocean Territory), Cocos (Keeling) Islands (Australian external territory), INS Baaz at Campbell Bay, and the IAF airbase at Car Nicobar (Great Nicobar, India).

While Diego Garcia is a well-established US/UK joint military base housing US bomber aircraft, the others are strategic locations with runways and have great potential for becoming major military airbases. These airbases are territories of QUAD nations which are working to contain China’s aggressive designs. It is thus interesting to steady them.

### **Diego Garcia Military Base Evolves**

Archipelago: Chagos Archipelago

Diego Garcia is located in the northern half of the Indian Ocean, around 7 degrees south of the Equator, south of Maldives. The Island has an area of 30 sq. km. It is administered by the United Kingdom but claimed by Mauritius. Diego Garcia and the rest of the Chagos islands were uninhabited until the late 18th century. Diego Garcia became a colony of the UK after the Napoleonic Wars as part of the Treaty of Paris (1814), and from 1814 to 1965, it was administered from Mauritius. It is often referred to as “Fantasy Island” for its seclusion.

In 1942, the British opened RAF Station Diego Garcia and established an advanced flying boat unit. During World War II, both Catalina and Sunderland aircraft were flown in search of Japanese and German submarines and surface raiders. It was one of the “Dependencies” of the British Colony of Mauritius until the Chagos Islands were detached for inclusion in the newly created British Indian Ocean Territory (BIOT) in 1965. In April 1967, the BIOT Administration bought out Chagos-Agalega for £600,000, thus becoming the sole property owner in the BIOT. The total population today is a little over 4,000. Diego Garcia is a fully militarised atoll and the largest of the 60 small islands of the Chagos Archipelago.

In the early 1960s, when the UK was withdrawing its military presence from the Indian Ocean, the United States requested an unpopulated island, and ultimately, Diego Garcia was found suitable. Between 1968 and 1973, the Chagosian inhabitants were forcibly expelled from Diego Garcia by the UK Government so that a joint US/UK military base could be established. The United States built the large Naval Support Facility, which has been in continuous operation since then.

In 2019, the continued British administration of the archipelago was deemed illegal by the International Court of Justice in The Hague, a ruling the United Nations General Assembly supported. However, the British dismissed this ruling as not legally binding. In June 2020, a Mauritian official offered to allow the United States to retain its military base on the island as long as Mauritius was given sovereignty over the Chagos archipelago.

### **US-UK Agreement**

On 30 December 1966, the United States and the UK executed an agreement that permitted the United States to use the BIOT for defense purposes for 50 years until December 2016, followed by a 20-year extension (to 2036). No monetary payment was made.

### **Diego Garcia Strategic Location**

The United States saw the atoll as the “Malta of the Indian Ocean.” The atoll is located 3,535 km east of Tanzania’s coast, 1,796 km south-southwest of the southern tip of India (at Kanyakumari), and 4,723 km west-northwest of the west coast of Australia. The distance from Diego Garcia to Malacca Strait is 3,289 km and 6,292 km to Taiwan. Thus, it is a little far from SCS but is very centrally located to dominate the Indian Ocean.

The atoll continues to play a key role in America’s approach to the Indian Ocean as a flexible forward military hub that can facilitate a range of offensive activities. The US maintains significant forward logistics facilities and supply ships. There are around 20 ships, some of which provide rapid-response delivery of equipment to ground troops. There were logistics vessels to service the rapid delivery requirements of the USAF.

### **Diego Garcia Airbase**

In 1980s, Diego Garcia got its two 12,000-foot-long (3,700 m) parallel runways, expansive parking aprons for heavy bombers, 20 new anchorages in the lagoon, a deep-water pier, port facilities for the largest naval vessels in the U.S. and British fleets, aircraft hangars, maintenance buildings and an air terminal, a 1,340,000 barrels fuel storage area, and billeting and messing facilities for thousands of sailors, airmen, and support personnel. The island was designated as one of the emergency landing sites worldwide for the NASA Space Shuttle, though never used.

The closure of the U.S. bases in the Philippines in the early 1990s brought many workers from Subic Bay and Clark Airbase to Diego Garcia. At any given time, 3,000 to 5,000 US troops and civilian support staff live on the island. In 2020 Pentagon confirmed that three American B-2 Spirit stealth bombers had deployed from Whiteman Air Force Base in Missouri to Diego Garcia. In 2021, B-1B Lancer jets were once again deployed in Diego Garcia for the first time in more than 15 years. In April 2024, the United States deployed two B-52 bombers to the Indian Ocean as part of its Pacific Air Forces’ training program.

## **Increased Importance For Gulf Operations**

The base was important in view of the US setbacks in Vietnam and Cambodia, the closure of the Peshawar Air Station listening post in Pakistan and Kagnew Station in Eritrea, and the build-up of the Soviet naval presence in Aden and a Soviet airbase at Berbera, Somalia. Its importance increased further following the fall of the Shah of Iran and the Iran Hostage Crisis in 1979–1980. The West became concerned with ensuring the flow of oil from the Persian Gulf through the Strait of Hormuz.

The island provided an “unsinkable aircraft carrier” for the United States during combat operations from the atoll against Afghanistan (2001–2006) and Iraq (2003–2006). A number of allied militaries, including Australia, Japan, and the Republic of Korea, were based on the island. Since July 2006, the US facilities have been known as Camp Thunder Cove. In recent years, relations between India and the United States have improved dramatically. Diego Garcia has been the site of naval exercises between the United States and Indian navies.

## **Cocos (Keeling) Islands**

Cocos (Keeling) Islands is an Australian Indian Ocean External Territory comprising a small archipelago approximately midway between Australia and Sri Lanka and relatively close to the Indonesian island of Sumatra. The islands were discovered in 1609 by the British sea captain William Keeling, but no settlement occurred until the early 19th century. Name Cocos refers to the abundant coconut trees, while Keeling refers to the discoverer. The Island was annexed by the United Kingdom in 1857. In 1946, the administration of the islands reverted to Singapore, still under British rule.

Later, on 23 November 1955, it was transferred from Singapore to Australia. Until 1978, virtually all of the territory’s real estate still belonged to the Clunies-Ross family, the first settler, a Scottish merchant. Australia then forced the family to sell the islands for A\$6,250,000, using the threat of compulsory acquisition. It has a total area of 14 sq. km and a highest elevation of 5 m (16 ft). The territory consists of two atolls made up of 27 coral islands, of which only two—West Island and Home Island—are inhabited.

Much of the island’s current population of around 600 is descended from the Malay copra plantation workers. They mostly practice Sunni Islam and speak a dialect of the Malay language.

## **Military Activities On The Island**

During WW II, after the Fall of Singapore in 1942, the islands were administered from Ceylon and West and Direction Islands were placed under Allied military administration. The islands’ garrison initially consisted of a British infantry platoon. On 25 December 1942, the Japanese submarine I-166 bombarded the islands but caused no damage.

Later in the war, two airstrips were built, and three bomber squadrons were moved to the islands to conduct raids against Japanese targets in Southeast Asia and provide support during the planned re-invasion of Malaya and the re-conquest of Singapore. The first military aircraft to operate were the Royal Air Force’s Supermarine Spitfire Mk VIIIs and Liberator bombers.

## **Military Presence At The Airstrip**

The airstrip on West Island was around two kilometers long and designed to accommodate passenger Boeing 737s and small military planes. The United States had been using the airstrip for several decades as a stopover point between Diego Garcia and Guam and as a partial alternative to the Paya Lebar Airbase, Singapore. In 2016, the Australian Department of Defence announced that the West Island would be upgraded to support the Royal Australian Air Force's P-8 Poseidon maritime patrol aircraft. Until 2023, there were no active military installations or defense personnel on the island. In 2023, the Australian parliament approved plans to extend the airstrip.

Construction was scheduled to start in 2024 and be completed by 2026. The Royal Australian Navy and Australian Border Force also deploy Cape and Armidale-class patrol boats, and Arafura-class offshore patrol vessels to conduct surveillance and counter-migrant smuggling patrols in adjacent waters.

### **Strategic Importance Of Cocos (Keeling) Islands**

The Cocos Islands are strategically important because of their proximity to shipping lanes in the Indian and Pacific oceans. The islands could be used to monitor the Malacca, Sunda, and Lombok straits. The distance from the Cocos (Keeling) Islands to Malacca is 1,702 km, to Sunda Strait (1,208 km), and to Lombok Island (1601 km).

The United States and Australia have expressed interest in stationing surveillance drones on the Cocos Islands. Australia is now actively supporting increased American presence in Southeast Asia, even at the cost of upsetting China. It is part of the US "pivot" towards Asia, facilitating control of the sea lanes and potentially allowing US forces to enforce a blockade against China. Australia views the Cocos as a long-term strategic location. In 2023, Indian Navy and Air Force aircraft visited the islands. Australia hopes to further advance its relationships with India to grow its monitoring strength in the Indian Ocean.

### **Air Force Station Car Nicobar**

Car Nicobar is located in the Andaman and Nicobar Islands, in the Bay of Bengal, at roughly 9 degrees north of the equator. The Island is 15 km long and 12 km wide, has a 51 km coastline, a max elevation of 10 m (30 ft), and an area of 126.9 sq. km. The population is around 18,000. Car Nicobar is remarkably flat except for some cliffs in the north.

Car Nicobar is 270 km south of Port Blair. Normally, a ship is available twice a week to Port Blair. Indian Air Force (IAF) operates charter services between Port Blair's Veer Savarkar International Airport, Campbell Bay, and Car Nicobar Air Force Base. Pawan Hans helicopters also regularly service Car Nicobar, Port Blair, and other islands of the Nicobar district. Under a July 2024 agreement, a 19-seater fixed-wing aircraft will operate between Port Blair, Car Nicobar, and Campbell Bay with Flybig, a Gurugram-based private company under Big Charter Private Limited.

The 37 Wing, Air Force Station Car Nicobar, has an area of 204 hectares (504 acres). The 914-metre (3,000 ft) bitumen runway was built by the Japanese during their occupation of these islands between 1942 and 1945.

After 1945, it was used by the British Royal Air Force as a refueling base for regular flights between RAF Negombo (now Colombo International Airport) in Sri Lanka (then Ceylon) and RAF Changi in Singapore (& vice versa). The runway was extended to 2,717 meters (8,914) by the IAF



in 1967. The IAF airbase at Car Nicobar is at 2 m (5 ft) elevation. The runway length is being further extended by 150 m. The first Mi-8 helicopter arrived here in 1982.

The air station was devastated by the 2004 Indian Ocean earthquake and tsunami when 116 IAF personnel and family members died. Little remained of the air base. IAF personnel worked night and day: the runway was repaired, navigational aids were installed, and the basic infrastructure was restored. On 14 April, just three-and-a-half months later, the Car Nicobar Air Station resumed operations. IAF Jaguar (Maritime) and Su-30 MKI have operated from the airbase. The C-130J has landed. Infrastructure at the base is coming up, and one day, it will be possible to station a fighter squadron permanently.

Situated in the middle of 572 Island, 720 km long, A&N cluster, the Carnic airbase virtually straddles one of the major trade routes of the world. “Two strategic waterways, the six and ten-degree channels, pass through here. Though nearly 1,200 km from Kolkata and Chennai, the A&N are 200 km from Myanmar, and the Chinese military “listening” post at Coco Islands leased from Myanmar is just 45 km away from the northernmost islands. The distance from Car Nicobar to Malacca Strait is just 900 km. A Su-30 operating from Carnic can make a combat mission till the middle of SCS with just one aerial refueling.

### **Campbell Bay – INS Baaz**

Campbell Bay, INS Baaz, is India’s southernmost regular airstrip, located about 7 degrees north of the equator. The island’s Indira Point is famous for being the southernmost point of India. INS Baaz naval station was inaugurated on 31 July 2012. It is a full-fledged “forward operating base” of the Indian Navy. It overlooks the six-degree Channel, one of the most crucial shipping lanes in the world, a vital choke point. It will soon become India’s eye over the Malacca Strait and the Bay of Bengal. There is a 1,050m (3,445 ft) asphalt runway.

The Naval Air Station provides requisite logistic, communication, and administrative support for various aircraft undertaking surveillance, patrolling missions, and maritime air operations. The strategically located INS Baaz will enable India to extend its reach in the eastern Indian Ocean region.

Currently, only the Dornier 228 aircraft and some helicopters operate here regularly. The IAF C-130J Super Hercules transport aircraft can also operate. Plans are underway to extend the runway to 10,000 feet to accommodate the Indian Navy’s Boeing P8i Poseidon surveillance aircraft with anti-submarine capabilities. A separate international airport and harbor with a cargo terminal are also planned for Campbell Bay. Land acquisition is underway.

### **Way Ahead**

India formed the integrated tri-service Andaman and Nicobar Command (ANC) in 2001. It overlooks the critical trade routes and choke points through which over 94,000 merchant ships cross every year, carrying the world’s 40 percent freight trade to and from China, South Korea, and Japan. China has militarized reclaimed tiny islets in SCS and created major disputes with many ASEAN neighbors. China has also put into question the freedom of seas and navigation.

Australia is working towards expanding the Cocos Islands. India has been working on expanding military air and naval facilities in the Bay of Bengal. The IAF airbase at Car Nicobar is being

upgraded to hold fighter squadrons. The runway at INS Kohassa, Shibpur, North Andaman Island, will one day have new ammunition dumps and capacity upgrades for fighter jets and bigger planes like long-range maritime reconnaissance Boeing P-8I and anti-submarine aircraft.

INS Baaz at Campbell Bay will initially get a runway extension from 3000 to 6,000 feet, later to 10,000 feet. The IAF already maintains air defenses, fielding short and medium-range SAMs under ANC. The army's single brigade is planned to be increased by deploying a division-size force (about 15,000 troops) under ANC. The Indian Navy will increase berthing facilities for ships and submarines. A proposal to develop Lakshadweep islands with longer runways is also being considered.

<https://www.eurasiantimes.com/indian-military-bases-at-ins-baaz-car-nicobar/>



*Mon, 12 Aug 2024*

## **Pakistan's "Stealth Drones" Haunt India; Border Guards Say Chinese-Origin UAVs Hard To Intercept**

In response to anti-drone measures taken by India, Pakistani entities sending drones into Indian territory have leveled up their game. The Indian authorities have disclosed that since last year, the drones intruding from the Pakistan side have not only doubled in number, but they have become smaller in size, fly up to the height of 1 kilometer, and are not easily detectable. The Border Security Force (BSF), responsible for manning the India-Pakistan international border, recovered a total of 95 drones along with weapons, ammunition, and drugs they were smuggling across in 2023. The Indian drone problem has a China-Pakistan stamp as most of the drones violating the International Border along Pakistan are Chinese-made dual-purpose drones.

India tried making its air space impregnable by installing more anti-drone systems and CCTVs in vulnerable areas. However, the efforts have proved futile as during the half-yearly briefing, the BSF IG has said that the BSF has seized 137 drones since January 1, along with 28 weapons, including pistols and two AK rifles, and 160.28 kg of heroin. Land smuggling, even via underground pipes, has become negligible over the years, and the majority of the influx of weaponry and drugs is now being done by drones.

Inspector-General of BSF (Punjab Frontier) Atul Fulzele said in a press conference in Jalandhar that all drones were being tested in a drone laboratory and were Chinese-made Mavic. He said: "Earlier, the drones being flown had a payload capacity of 3-4 kg, had a detectable sound, and could even be viewed visually, but the newer versions of drones could carry only 500 g weight and emit no sound. For the new-age drones, we are deploying a different counter strategy as there is a higher chance of missing them."

The lab analysis of the drones also indicates the level of collaboration Pakistani authorities have in drone operations. Fulzele asserted that the launch pads of the drones were near the establishments

of the Pakistani Rangers. “We get the exact coordinates of the point from where they had taken off. Since the drones are being flown from points very close to the IB (International Border), it indicates that their use is state-sponsored. We have taken up the matter with the Rangers at all our meetings, but they have always been evasive in their response,” he said.

The IG said that the Punjab government alone plans to install 3,000 AI-enabled CCTV cameras along the border to boost surveillance significantly, but the project is still under implementation. Intelligence inputs have indicated that the drones drop packets of Afghan heroin, which is then used for financing terror operations in Kashmir and Punjab. Terror outfits like Lashkar-e-Taiba, which has camps across the international boundary, are using these Chinese-made drones for transporting weapons, explosives, and drugs across the border. The increase in the drone sector has been in sync with the spike in incidents of terrorism in Jammu and Kashmir.

In 2023, there were 514 drone sightings from 2022 till December 2023. As many as 121 drones (laden with drugs) were shot down in joint operations between the BSF and the Punjab Police. The seizure of drones has resulted in the recovery of a massive cache of narcotic substances. As of August 7, 2024, based on intelligence input, a joint search operation by the BSF troops in collaboration with the Punjab Police resulted in the recovery of a drone from the Taran Taran district.

The recovered drone has been identified as a China-made DJI Mavic 3 classic. DJI Mavic 3 is a powerful flagship camera drone made by the Chinese firm DJI, a global leader in drone manufacturing. The Mavic is equipped with a 4/3 CMOS Hasselblad camera that can capture professional-level imaging for surveillance and spying. It also has omnidirectional obstacle sensing for a smooth flight. It has a maximum flight time of 46 minutes and a transmission range of 15 km.

A February 2022 Parliamentary Standing Committee on Home Affairs Report stated, “Punjab has not drafted or articulated a separate police drone policy. However, specific area-based detection and neutralization of drone threats are available and being improved upon. However, larger areas like borders remain a challenge.”

### **Pakistan’s Drone Force**

Drones have been in use in combat for some years now. Pakistan moved swiftly to absorb the unmanned aerial vehicles in its arsenal. In 2015, it joined the United States, the United Kingdom, and Israel to use armed drones to strike targets after its ‘Burraq’ drone killed three senior leaders of Tehreek-e-Taliban. Apart from the Burraq, the Falco and GIDS Shahpur form Pakistan’s fleet of UCAVs. China and Turkey have also helped Pakistan in increasing its fleet of military UAVs. The western neighbor of India has imported Caihong (CH) 4 and Wing Loong UAVs from China and Bayraktar Akinci UCAVs from Turkey.

Both state and non-state actors from Pakistan can use drones to minimize the risks involved for human infiltrators and maximize the intended negative impact. This use of drones highlights the shift toward unmanned methods with reduced logistical costs.

According to the then Indian Army Chief, General MM Naravane, “The easy availability of drones allowed both state and non-state actors (in Pakistan) to use them, increasing the complexity of challenges faced by the security forces.”

This acknowledgment of the threat came following the twin-drone attack on the Jammu Air Force Station in June 2021, in which two unmanned aerial vehicles (UAVs) dropped two improvised explosive devices (IEDs), damaging a part of the building. This was the first reported use of drones to attack military facilities in India. The familiarity of Pakistan's military with drone technology meant that soon, the non-state actors had access to the commercial technology, and the drone intrusion into India spiked. BSF, the first line of India's defense, initially had to know how to address the menace.

### **Steps Taken To Rein In Pakistani Drones**

Punjab governor Banwarilal Purohit said in May 2024 that anti-drone equipment would be installed on the entire stretch of the Pakistan border within one year to prevent the smuggling of drugs and weapons. In September 2022, the BSF established a state-of-the-art laboratory in Delhi to deconstruct the drones crossing the border. As the organization started getting into forensics, it realized that the drones had chips similar to computation devices like computers and mobile phones. The chips gave an insight into the drone's flight paths, launching and landing points and timings, GPS coordinates, and even messages exchanged between their Indian cohorts.

The BSF Special Director General (DG) BSF Special Director General, Western Command, Yogesh Bahadur Khurania, said that the force is not only bringing down the drones but is also investigating further with the police to find out where the drone came from and who is involved in it.

The BSF is also planning to acquire more anti-drone equipment. Reports indicate that the Punjab and Jammu and Kashmir frontiers will soon receive indigenous anti-drone equipment developed by the Electronics and Radar Development Establishment (LRDE) of the Defence Research and Development Organisation (DRDO). This system was first tested in Punjab in 2020 and has been extensively tested. The equipment includes a 1,000-metre-range laser weapon, a radio frequency jammer, and a GPS jammer/spoofers. Bharat Electronics Limited will manufacture these anti-drone systems.

<https://www.eurasiantimes.com/chinese-made-pakistani-drone-minions/>



*Sat, 10 Aug 2024*

## **A Missile That China Fears — Australia Test Fires ‘Un-Interceptable’ SM-6 Missile That Can Deflate World’s Biggest Navy**

The Australian government announced on August 10 that it successfully test-fired a Raytheon (RTX.N) SM-6 missile — a crucial weapon that has recently been a source of contention with China. Australia's defense department stated that the HMAS Sydney carried out the test close to the US state of Hawaii as part of the 'Pacific Dragon 2024' military exercise. It was dubbed a

“significant milestone” in an agreement that was first made in 2021 and is believed to be a momentous step toward the acquisition and integration of the weapon in the country’s arsenal.

A video of the test was subsequently published by the Royal Australian Navy (RAN), showcasing the missile being fired from the Hobart-class vessel. Pat Conroy, Australia’s minister for defense industry and capability delivery, said in a statement, “This is another example of the acceleration in acquisitions of critical capabilities for the Navy.”

“The ability to deter an adversary from extended ranges and to deter attempts to project power against Australia is a core part of the National Defense Strategy,” he added without naming an adversary. The test comes as Australia has been striving to enhance its military prowess amid tensions with China. Enhancing its capability at sea is a key component of that strategy—as explained by its AUKUS partnership (a landmark defense and security partnership between Australia, the UK, and the US) that has paved the way for the purchase and development of nuclear submarines. However, Canberra has been equally invested in bolstering the firepower of its surface fleet, as demonstrated by the latest test.

For instance, the service successfully tested its new Naval Strike Missile (NSM) in July at the Rim of the Pacific (RIMPAC) exercise hosted by the US. Similar to the SM-6, the NSM was launched from HMS Sydney and was envisioned as a significant improvement in the RAN’s combat effectiveness. The SM-6 would essentially widen the area that a ship would defend, allowing the RAN to keep the adversary at a great distance while accruing the capability to penetrate deeper into disputed waters in the event of a conflict.

The multi-mission Standard Missile-6 (SM-6) is designed to perform anti-aircraft warfare, anti-ship strikes, and terminal ballistic missile defense missions. The weapon reportedly engages these threats in the endo-atmosphere by using a blast-fragmentation warhead.

In 2021, the United States approved the possible foreign military sale (FMS) of Defense Services Related to Future SM-6 and SM-2 production and related equipment. The government has not disclosed the number of SM-6 missiles that Australia intends to purchase from the US. However, the total estimated cost of SM-6 and the SM-2 (already in use by Australia) was previously pegged at \$350 million.

The Australian announcement stated that the SM-6 would be installed on Australia’s three Hobart-class destroyers; however, it did not specify when the system would be operational. They may each hold 48 missiles for air defense.

Besides testing its first SM-6, Australia has also assisted the US with SM-6 testing. For instance, the US Missile Defense Agency (MDA) and the US Navy conducted an intercept of an advanced medium-range ballistic Missile (MRBM) test target using the Standard Missile-6 (SM-6) Dual II with Software Upgrade (SWUP) in March 2024. Australia provided data gathering, communications, and tracking support for the test.

Australia’s test and future acquisition of the SM-6 missile come at a time when the rift with China is widening in the Indo-Pacific region. While the two sides have taken steps to reduce tensions, friction persists. Matters came to a head in May when Australia accused a Chinese fighter jet of

endangering its SeaHawk helicopters during an “unsafe” confrontation over the Yellow Sea—not an uncommon incident between the two militaries.

Australian Defense Minister Richard Marles alleged at the time that Chinese Air Force J-10 aircraft threw flares over and a few hundred meters ahead of an Australian MH60R Seahawk helicopter during a regular flight as part of enforcing sanctions against North Korea. There have been multiple such incidents over the last few years, forcing Canberra to upgrade its military. This also involves expanding the US’s influence to deter China and building alliances with nations such as Canada. The choice of the SM-6 missile, however, is particularly significant as it has become an irritant for China in recent times.

### **China Fears/Hates The SM-6 Missile**

The SM-6 missile was created for extended-range anti-air warfare (ER-AAW), which includes protection against unmanned aerial vehicles, fixed and rotary-wing aircraft, anti-ship cruise missiles in conflict over land and sea, and terminal ballistic missile defense. It is also a high-velocity anti-ship missile.

The missile is based on the earlier SM-2ER Block IV (RIM-156A) missile airframe, with the AIM-120C AMRAAM’s (Advanced Medium-Range Air-to-Air Missile) active radar homing seeker added instead of the former design’s semi-active seeker. Raytheon describes the SM-6 missile as “three missiles in one”. It’s the only weapon that can perform anti-air warfare, anti-surface warfare, and ballistic missile defense or sea-based terminal missions.” Analysts reckon the SM-6 missile has developed into a multi-role powerhouse. It is also a perfect example of how adding new technology to outdated weapons can produce amazing outcomes.

China has been wary of the missile due to the threat of a potential conflict with the US in the region. To add to its woes, US allies in the region, including Japan, Australia, and South Korea, have decided to buy the missile. Earlier this year, China expressed opposition to the deployment of a missile system in the Philippines, of which SM-6 is a part. The US Army Pacific announced in mid-April that for the first time, the US has stationed the Mid-Range Capability (MRC) missile system, or the Typhon, in the northern Philippines. The system is unique and lethal as it is capable of firing both Tomahawk and Standard Missile 6 (SM-6).

However, Chinese Defense Ministry Spokesperson Wu Qian warned at a press briefing on April 25 that the US deployment of an intermediate missile system in the Asia-Pacific could prompt China to respond with decisive measures. Without mincing words, Wu warned, “We resolutely oppose the US move to deploy intermediate-range ballistic missiles in the Asia-Pacific. Our position has been clear and consistent. US steps are posing a major threat to the security and stability of regional players and will inevitably prompt a decisive response from China.”

The SM-6 installed on Typhon is designed mainly as a short-range ballistic missile against land and sea targets. The army has described it as a “strategic” weapon system that would be used against more important targets such as air defense facilities and command and control centers—an important weapon given the prevailing tensions in the region. Nonetheless, the US was reported last month to be withdrawing the system.



The US has now also developed an air-launched variant of the SM-6, known as the AIM-174B affixed to a US Navy Super Hornet which broke cover during RIMPAC. The integration of these missiles, which can be fired quickly and from a high altitude to destroy ships and even incoming ballistic missiles at a distance equivalent to that of enemy aircraft hundreds of miles away, would strengthen the US Navy's combat capability when combined with its workhorse, the Super Hornet. This is regarded as a potentially valuable asset in a conflict with China or other adversaries.

<https://www.eurasiantimes.com/a-missile-that-china-fears-australia-test/>

## Science & Technology News

# THE ECONOMIC TIMES

Mon, 12 Aug 2024

## **Vikram Sarabhai: Here's all you should know about the father of Indian space programme, ISRO**

Vikram Sarabhai's birth date, August 12, 1919, is celebrated as the father of the Indian space programme. His contributions significantly shaped the country's scientific landscape, particularly in space exploration. On his birth anniversary, we reflect on his key achievements and lasting impact on India's space sector.

### **Vikram Sarabhai: Early Life and Education**

Sarabhai hailed from an affluent family of progressive industrialists and was one of eight children of Ambalal and Sarla Devi. His early education took place at 'Retreat,' a private school run by his parents. Post-matriculation, Sarabhai pursued higher education at Cambridge, earning a degree in Natural Sciences from St. John's College in 1940. The outbreak of World War II prompted his return to India, where he joined the Indian Institute of Science in Bengaluru as a research scholar under the guidance of CV Raman. His interest in solar physics and cosmic rays led to the establishment of several observation stations across India.

### **Vikram Sarabhai: Founder of the Physical Research Laboratory**

After completing his PhD at Cambridge in 1947, Sarabhai played a pivotal role in founding the Physical Research Laboratory (PRL) in Ahmedabad in November 1947. Initially set up in a few rooms at the MG Science Institute, PRL received crucial support from the Council of Scientific and Industrial Research and the Department of Atomic Energy.

### **Vikram Sarabhai Establishment Indian Space Research Organisation (ISRO)**

Sarabhai's influence extended across multiple scientific organizations. In 1962, he established the Indian National Committee for Space Research (INCOSPAR), which later evolved into the Indian

Space Research Organisation (ISRO). This was a critical milestone in India's space exploration ambitions. With the support of Dr. Homi Jehangir Bhabha, Sarabhai set up India's first rocket launching station at Thumba, near Thiruvananthapuram. The station's inaugural flight, carrying a sodium vapour payload, was launched on November 21, 1963.

### **Vikram Sarabhai's Contributions to Science Education**

In addition to his work in space exploration, Sarabhai was dedicated to science education. He founded the Community Science Centre in Ahmedabad in 1966, which is now known as the Vikram Sarabhai Community Science Centre. His contributions to science and education were recognized with the Shanti Swarup Bhatnagar Medal in 1962, the Padma Bhushan in 1966, and posthumously with the Padma Vibhushan in 1972.

### **Vikram Sarabhai Death Anniversary**

Vikram Sarabhai passed away on December 31, 1971, leaving behind a legacy that continues to inspire the nation's scientific community. His vision and efforts laid the foundation for India's space exploration program, making him a pivotal figure in the country's scientific history.

<https://economictimes.indiatimes.com/news/new-updates/vikram-sarabhai-heres-all-you-should-know-about-the-father-of-indian-space-programme-isro/articleshow/112457545.cms?from=mdr>



**Press Information Bureau**  
**Government of India**

**Ministry of Science & Technology**

*Sat, 10 Aug 2024*

## **Union Minister Dr. Jitendra Singh proposes a 'National Geospatial Data Repository' and PPP model**

Science and Technology Minister Dr. Jitendra Singh chaired a joint meeting of all the Science Ministries and Departments of Government of India

Union Minister Dr. Jitendra Singh proposes a National Geospatial Data Repository and PPP model today while chairing a joint meeting of all the Science Ministries and Departments of Government of India today at Prithvi Bhavan, here.

Addressing the meeting, Dr. Jitendra Singh instructed the Department of Space, Department of Science and Technology and Ministry of Earth Sciences to create a unified Geospatial interface for utilisation of industry and StartUp ecosystem in order to create innovative and indigenous products for the welfare of farmers, rural artisans and others.

Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, MoS PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr. Jitendra Singh emphasised on seamless connection of Geo-ICT infrastructure. He also shared the Mantra of sustainable ecosystem based on

pooling of knowledge and resources in collaboration with the non-governmental sectors in PPP mode.

The Minister highlighted the importance of early industry linkage and multiplication of benefits for common people when initiatives like these achieve scale and volume. He also assured that all the departments under ministry will act in coordination to achieve the common objective.

One of the highlights of the meeting was the review of the month-long National Space Day celebration and main event on 23rd August at the Bharat Mandapam. He also took stock of the other important events in the coming days.

Dr. Jitendra Singh also took stock of the progress on the proposed “Vigyan Shakti” portal and gave some insightful remarks based on his experience regarding the scientific portals .

The Unified Web repository of Indian Science and technology being made live and collection of feedback was shared with the minister. The department also sought his guidance of further integration and improvement of the portal to become a single nodal joint for all scientific departments.

Dr. Jitendra Singh reviewed the present status of ‘One common portal’ for all kinds of research under dept. Of Biotechnology.

Towards the conclusion of the meeting, Dr. Jitendra Singh recalled the Prime Minister’s vision of India @2047 and highlighted the pivotal role of Science and Technology in achieving the vision.

Dr. A.K. Sood, Principal Scientific Advisor to Government of India; Prof. Abhay Karandikar, Secretary, DST; Dr. Rajesh Gokhale, Secretary, Biotechnology; Shri. Ravi Chandran, Secretary Earth Sciences, Dr. N. Kalaiselvi, DG, CSIR were present for the meeting.

Dr. S. Somanath, Chairman ISRO joined the meeting online.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2044123>

## THE ECONOMIC TIMES

*Sat, 10 Aug 2024*

### **MEA, NSIL sign MoU to assist launch of Nepalese Munal satellite**

The Ministry of External Affairs and ISRO's commercial arm NewSpace India Limited (NSIL) signed an agreement on Saturday to grant assistance for the launching of the Nepal-built Munal satellite, according to an official statement.

Munal is an indigenous satellite developed in Nepal under the aegis of the Nepal Academy of Science and Technology (NAST), the MEA said. Antarikhya Pratishan Nepal (APN), a Nepalese space startup, has assisted Nepalese students in the design and fabrication of this satellite. The

satellite aims to build a vegetation density database of the earth's surface, the Ministry of External Affairs (MEA) said in the statement.

The MoU was signed by Anurag Srivastava, Joint Secretary (North) from MEA and Arunachalam A, Director from NSIL.

Rabindra Prasad Dhakal, Secretary, Nepal Academy of Science and Technology (NAST), Surendra Thapa, Chargé d'affaires of Nepali Embassy and Abhas Maskey, Founder, Antarikchya Pratishan Nepal (APN) were also present on the occasion.

During the visit of External Affairs Minister S Jaishankar to Nepal to co-chair the 7th Joint Commission meeting, he witnessed the exchange of this Launch Service Agreement for Munal Satellite between NSIL and NAST on January 4, it said. "This satellite is expected to be launched soon on NSIL's Polar Satellite Launch Vehicle," the statement said.

<https://economictimes.indiatimes.com/news/science/mea-nsil-sign-mou-to-assist-launch-of-nepalese-munal-satellite/articleshow/112429981.cms>



*Fri, 09 Aug 2024*

## **IIT-Guwahati researchers develop machine learning framework for semiconductor industry**

The development of this cutting-edge solution enhances the design process of Integrated Circuits (ICs), a critical component in the \$600 billion semiconductor industry that powers modern electronic devices, an official release said on Thursday.

Designing ICs involves navigating complex problems that can be challenging to solve and often yield less-than-ideal results.

A team of researchers, comprising Professor Chandan Karfa and Dr Sukanta Bhattacharjee of the Department of Computer Science and Engineering, along with BTech students Chandrabhushan Reddy Chigarapally and Harshwardhan Nitin Bhakkad, have leveraged machine learning to improve efficiency in IC design.

Another collaborator, Dr Animesh Basak Chowdhury of New York University, USA was also involved in the project.

The LEAP framework streamlines the technology mapping process within EDA, Karfa said.

"Rather than evaluating thousands of potential configurations, LEAP intelligently identifies and prioritises the most promising options, reducing the number of configurations the mapping tool must consider, by over 50 per cent," he said.

The framework not only speeds up the mapping process but also improves the performance of the circuits, he said. LEAP estimates the delay for various configurations and selects only the top ten options for each node in the design, as compared to the traditional method, which typically evaluates around 250 configurations, Karfa said.

This targeted approach streamlines the workflow and enhances overall efficiency. This research holds real-world implications for the semiconductor industry, which is essential for the development of electronic devices such as smartphones and computers.

It will lead to faster, more efficient electronic devices with lower energy consumption, ultimately benefiting consumers and driving innovation across various technology sectors. The results of this work have been published in the ACM/IEEE International Conference on Computer-Aided Design (ICCAD 2024), the release added.

<https://www.deccanherald.com/science/iit-guwahati-researchers-develop-machine-learning-framework-for-semiconductor-industry-3144007>



Sun, 11 Aug 2024

## Scientists propose warming up Mars by using heat-trapping ‘glitter’

The idea of transforming Mars into a world more hospitable to human habitation is a regular feature of science fiction. But could this be done in real life?

Scientists are now proposing a new approach to warm up Earth’s planetary neighbor by pumping engineered particles -similar in size to commercially available glitter and made of iron or aluminum – into the atmosphere as aerosols to trap escaping heat and scatter sunlight toward the Martian surface. The idea would be to augment the natural greenhouse effect on Mars to raise its surface temperature by roughly 50 degrees Fahrenheit (28 degrees Celsius) over a span of a decade. This alone would not make Mars habitable for people, but the scientists who developed the proposal see it as a potentially doable initial step.

“Terraforming refers to modifying a planet’s environment to make it more Earth-like. For Mars, warming the planet is a necessary, but insufficient, first step. Previous concepts have focused on releasing greenhouse gases, but these require large amounts of resources that are scarce on Mars,” said University of Chicago planetary scientist Edwin Kite, who helped lead the study published this week in the journal Science Advances.

“The key elements of our paper are a novel proposal to use engineered nanoparticles to warm Mars’ atmosphere, and climate modeling that suggests this approach could be much more efficient than previous concepts. This is important because it presents a potentially more feasible method for modifying Mars’ climate, which could inform future Mars exploration strategies,” Kite added.

NASA has sent robotic rovers to explore the Martian surface and the InSight Lander to study the planet's interior. The U.S. space agency's Artemis program aims to put astronauts in the coming years on the lunar surface for the first time since 1972 in preparation for potential future human missions to Mars. There are numerous challenges to human settlements on Mars: lack of breathable oxygen, harmful ultraviolet radiation due to its thin atmosphere, salty soil hostile to growing crops, dust storms that sometimes cover much of the planet and more. But its frigid temperatures are a serious impediment.

"We propose to show that the idea of warming Mars isn't impossible. We hope that our finding encourages the broader scientific community, and the public, to explore this intriguing idea," said study lead author Samaneh Ansari, a doctoral student in the electrical and computer engineering department at Northwestern University in Illinois.

The median Martian surface temperature is about minus-85 degrees Fahrenheit (minus-65 degrees Celsius). With its tenuous atmosphere, solar heat on the Martian surface readily escapes into space. The proposal would aim to allow liquid water to exist on the surface of Mars, which has water in the form of ice at its polar regions and its subsurface. The scientists proposed continuously releasing tiny rod-shaped particles – nanorods – into the atmosphere at a rate of about eight gallons (30 liters) per second for years.

"The idea is to either ship the material or better yet, ship the manufacturing tool and make the nanorods on the planet since iron and aluminum are abundant on the surface of Mars," Ansari said. The researchers are mindful of the possibility of unintended consequences in terraforming another world for humankind's benefit. Scientists, for instance, are eager to learn whether Mars has harbored life in the past – or perhaps currently, in the form of subsurface microbes.

"Although nanoparticles could warm Mars, both the benefits and potential costs of this course of action are currently uncertain. For example, in the unlikely event that Mars' soil contains irremediable compounds toxic to all Earth-derived life, then the benefit of warming Mars is nil," Kite said. "On the other hand, if a photosynthetic biosphere can be established on the surface of Mars, that might increase the solar system's capacity for human flourishing," Kite added. "On the costs side, if Mars has extant life, then study of that life could have great benefits that warrant robust protections for its habitat."

<https://indianexpress.com/article/technology/science/scientists-warming-up-mars-heat-trapping-glitter-9508061/>



*Fri, 09 Aug 2024*

## **Researchers use mayonnaise to unlock nuclear fusion secrets**

Scientists at Lehigh University are using an unexpected tool—mayonnaise—to help unravel the mysteries of nuclear fusion, a potential source of limitless and clean energy. This research is a



continuation of their previous work, published in 2019, where they also used mayonnaise to study the physics behind fusion.

### **Why mayonnaise?**

Mayonnaise behaves like a solid but starts to flow when subjected to pressure, mimicking the behavior of plasma, which is crucial in nuclear fusion.

“We use mayonnaise because it behaves like a solid, but when subjected to a pressure gradient, it starts to flow,” explains Arindam Banerjee, a professor at Lehigh University.

### **Nuclear fusion**

Nuclear fusion, the process that powers the sun, could provide limitless energy if replicated on Earth. However, achieving the extreme conditions necessary for fusion—millions of degrees and immense pressure—is incredibly challenging. One approach, called inertial confinement fusion (ICF), involves compressing and heating tiny hydrogen-filled capsules to create plasma, the state of matter that can generate energy.

A significant challenge in ICF is the formation of hydrodynamic instabilities, particularly Rayleigh-Taylor instability, which occurs when materials of different densities are subjected to opposing pressure and density gradients.

This instability can reduce the energy yield from fusion reactions. To study these instabilities in a controlled environment, Banerjee’s team used mayonnaise in their experiments. The team utilized a unique rotating wheel facility to simulate the flow conditions of plasma and observe how mayonnaise behaves under stress.

This helped them understand the transition between different phases, such as the elastic phase, where the material returns to its original shape after stress is removed, and the plastic phase, where instability begins.

### **Promising results for fusion design**

The team’s findings could be crucial in designing fusion capsules that are more stable, potentially preventing the instabilities that currently hinder the efficiency of fusion reactions. By maximizing elastic recovery, researchers hope to delay or completely suppress these instabilities.

Ultimately, Banerjee and his team are contributing to a global effort to make fusion energy a reality.

“We’re another cog in this giant wheel of researchers,” says Banerjee, “and we’re all working towards making inertial fusion cheaper and therefore, attainable.”

<https://indianexpress.com/article/technology/science/researchers-use-mayonnaise-nuclear-fusion-secrets-9503706/>

## **SSLV's I-Day launch beckons new era for India's satellite sector. All about ISRO's smallest rocket**

With the launch of the third and final development flight of the Small Satellite Launch Vehicle (SSLV) — the Indian Space Research Organisation's (ISRO's) smallest launch vehicle — the SSLV Development Project will finally be complete. This will allow the Indian industry and NewSpace India Limited (NSIL), a public sector undertaking under the Department of Space, to launch commercial satellites using the vehicle.

The SSLV development flight 3 (SSLV-D3) mission will lift off into space with Earth Observation Satellite EOS-08 at 9.17 am on 15 August from the Satish Dhawan Space Centre in Sriharikota, ISRO announced Tuesday. What are the capabilities of the SSLV and how many missions have been conducted so far? ThePrint explains.

### **A 3-stage vehicle that can 'launch on demand'**

SSLV is a three-stage launch vehicle. It has three solid propulsion stages and a terminal stage. The first three stages use solid propellants as fuel. The terminal stage is equipped with a liquid propulsion-based Velocity Trimming Module (VTM) and a payload adapter. The VTM helps reduce the velocity of the launch vehicle when necessary, while the payload adapter connects the payloads to the top stage of the rocket.

The rocket has a diameter of 2.1 metres and a length of 34 metres, with a liftoff mass of approximately 120 tonnes. It has multiple satellite mounting options for nanosatellites, microsatellites, and mini-satellites.

The SSLV can "launch on demand", which will help ISRO cater to the emerging small satellite launch services market.

The SSLV can carry a single satellite weighing up to 500 kg to a 500-kilometre planar orbit and launch six to eight missions every year. Also, it can also carry three different satellites ranging from 10 to 300 kg to a 500-km planar orbit. Meanwhile, the rocket can carry payloads weighing up to 500 kg till low-Earth orbit (LEO), and payloads up to 300 kilograms till Sun-synchronous orbit (SSO).

The rocket is different from other generations of launch vehicles developed by ISRO — Satellite Launch Vehicle-3 (SLV-3), Augmented Satellite Launch Vehicle (ASLV), Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV), and GSLV Mark III. This is because these mainly cater to national developmental needs and have enabled ISRO to develop and master critical technologies related to solid, liquid, and cryogenic propulsion systems.

The key features of SSLV are that it offers a low-cost option for space launches; flexibility in accommodating multiple satellites; 'launch-on-demand' capabilities; low turnaround time (the time

taken to complete the launch process); minimal launch infrastructure requirements; and faster production from industries. Also, the SSLV has minimum launch pad occupancy. The vehicle can be integrated and launched within 24 hours.

### **History of SSLV missions**

The first SSLV development flight, known as SSLV-D1, was launched on 7 August 2022 and carried satellites Microsat 2A and AzaadiSAT. However, it failed to place them into the intended circular orbit. This was because ground control teams had failed to identify a sensor failure, according to ISRO.

The second SSLV development flight, known as SSLV-D2, was launched on 10 February 2023 and successfully placed satellites EOS-07 (Earth Observation Satellite-07), Janus-1, and AzaadiSAT-2 into a 450-kilometre orbit.

### **Carrying EOS-08 into space**

The SSLV-D3 will carry EOS-08 to a 475-kilometre circular orbit with an inclination of 37.4 degrees. EOS-08 is equipped with three payloads that will perform surveillance, environmental monitoring, disaster monitoring, volcanic activity observation, fire detection, and industrial and power plant disaster monitoring.

The satellite weighs about 175 kg and can generate power of around 420W.

In June this year, NSIL and Australia-based aerospace firm Space Machines announced at the India Space Congress that the first dedicated commercial mission of SSLV will be conducted in 2026. As part of this mission, SSLV will place Space Machines's Optimus spacecraft, the largest spacecraft designed and built by Australia so far, into orbit.

The mission, called MAITRI (Mission for Australia-India's Technology, Research, and Innovation), will help strengthen ties between Australia and India in the space sector and focus on debris management and sustainability.

<https://theprint.in/science/sslvs-i-day-launch-beckons-new-era-for-indias-satellite-sector-all-about-isros-smallest-rocket/2216833/>



*Sun, 11 Aug 2024*

## **ISRO's Shukrayaan mission to Venus is in planning stage**

Space Minister Jitendra Singh has responded to a question posed in the Rajya Sabha on the status of the Shukrayaan mission by noting that the "study on Venus Orbiter Mission is in progress and project is in planning stage.

Timeline and Cost will be firmed up once the studies are completed and configuration is finalized.” Following the incredible success of the Chandrayaan 3 mission that demonstrated ISRO’s capabilities for delivering a payload to the lunar surface at the time and place of its choosing, ISRO’s planetary science missions became even more ambitious.

ISRO has announced plans for a follow-up mission to Mars, and its first mission to Venus, dubbed Shukrayaan-1.

Following the successful landing of the Chandrayaan 3 mission, Jagdeep Dhankhar, Vice President of India had remarked in the Rajya Sabha, “Following its successful missions to explore the Sun and the Moon, ISRO has an array of exciting future endeavours. I am delighted to know that it is now setting its sights on the second most scorching planet in our solar system, Venus. Shukrayaan-1, ISRO’s upcoming spacecraft, will likely be launched by the end of December 2024. Our scientists and engineers have meticulously crafted Shukrayaan-1 to withstand the extreme conditions of Venus and to operate under the most challenging circumstances.”

### **Goals of Shukrayaan**

ISRO is designing the Shukrayaan mission as an orbiter, that will explore the surface topography of Venus which is shrouded beneath a thick and toxic atmosphere, carefully examine Venusian dust, study the volcanism on the planet, and peer into the clouds of Venus to better understand the ongoing processes in the alien atmosphere.

The spacecraft will also track the superroration of the Venusian atmosphere, and capture data to better understand the impact of solar activity on Venus. As such, the spacecraft is being designed to conduct a comprehensive study of Venus.

<https://www.news9live.com/science/isros-shukrayaan-mission-to-venus-is-in-planning-stage-2652553>

