

जुलाई  
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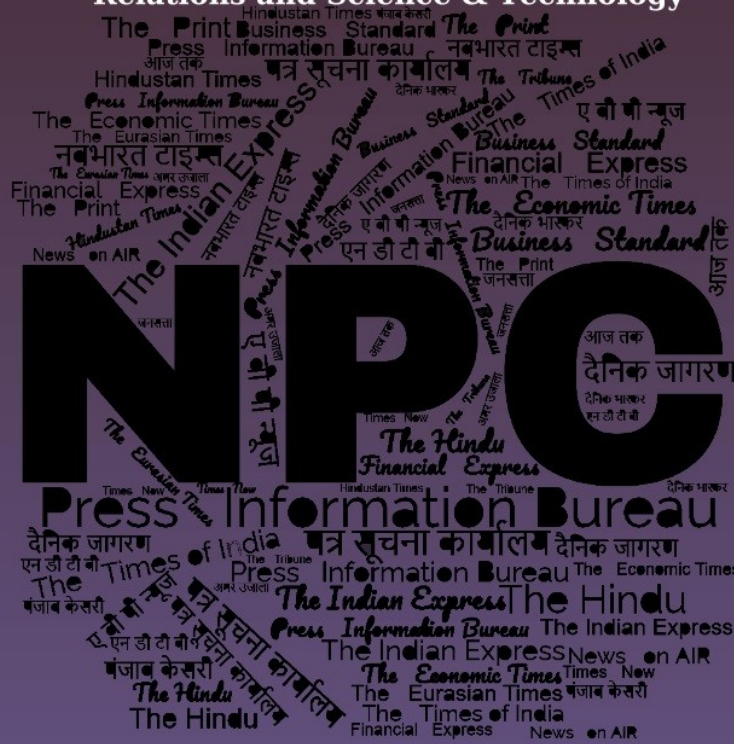
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# समाचार पत्रों से चयनित अंश Newspapers Clippings

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

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



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# CONTENTS

S. No.	TITLE	Page No.
<b>DRDO News</b>		<b>1-4</b>
<b>DRDO Technology News</b>		
1	Explainer: DRDO ने नेवी को सौंपी MOC रॉकेट, जानिए कितना घातक है ये हथियार, चीन को मिलेगी कड़ी टक्कर!	1
2	DRDO takes up preliminary study on development of indigenous conventional submarine	2
3	IIT startup excels in DRDO's innovation contest on drones	3
<b>Defence News</b>		<b>4-42</b>
<b>Defence Strategic: National/International</b>		
4	General Dwivedi takes over as chief of Army, faces China, J&K tests	4
5	India develops new explosive, SEBEX 2, 2.01 times more lethal than TNT	5
6	Indian Army inducts first-ever indigenous chipbased made in India 4G base station from Signaltron	6
7	Chief Of The Naval Staff Visits Bangladesh	8
8	Why the Indian Army needs to deploy tanks at high altitude	8
9	Supply chain issues delay deliveries of LCA-Mk1A jets	10
10	Delivery Of Third 25t Bollard Pull Tug, Bajrang (Yard 307)	11
11	INS Ranvir Arrives At Chattogram, Bangladesh	11
12	INS Shivalik Reaches Pearl Harbour To Participate In Rim Of The Pacific Exercise (RIMPAC) – 24	12
13	Indian Navy Bids Farewell To UH – 3H Helicopter	13
14	Bharat Electronics Limited receives orders worth Rs 3,172 crore	13
15	A (meaningless) defence budget for Pakistan	14
16	Indian Navy's growing footprint — foreign deployment, training allied personnel, 'backyard' aid	16
17	The Indian Air Force- One Wing to Rule Them All	20
18	हाइपरसोनिक मिसाइल दागने वाली रिवॉल्वर... क्या भारत के लिए वरदान साबित हो सकता है बोईंग का नया हथियार?	22
19	From Paris To Pune, French Defense Giant Thales Aggressively Forges Ties With Key Firms Under 'Make	23

	In India'		
20	India's Plan To Develop "China Chokepoint" At Strategic Andaman & Nicobar Islands, In The Eye Of Storm	<i>The EurAsian Times</i>	26
21	Lockheed Eyes "Biggest Ever" Indian Air Force Deals; Looks To Beat Airbus, Embraer For IAF's MTA Contract	<i>The EurAsian Times</i>	28
22	As North Korean and Chinese threats rise, US looks to lock in defense partnerships with Asian allies	<i>The Economic Times</i>	32
23	North Korea test-launches 2 ballistic missiles, after end of new US-South Korea-Japan drill	<i>The Economic Times</i>	35
24	Russia's "Super-Maneuverable" Aircraft On Way As Engineers Claim Developing Innovative Wing With Movable Skin	<i>The EurAsian Times</i>	36
25	Germany, Spain 'Battle' For Indian Navy's Massive AIP Submarine Deal; Madrid Eats Into Berlin's Advantage	<i>The EurAsian Times</i>	37
26	Pitched To Indian Navy, Germany Developed AIP Submarine Navigates Below Arctic Ice For The First Time	<i>The EurAsian Times</i>	40

### Science & Technology News

42-48

27	Camouflaging as a dead enzyme VEGFR1 holds key to medical solutions for colon and renal cancers	<i>Press Information Bureau</i>	42
28	Scientists find naturally existing DNA editing tool in all life, say it increases scope beyond CRISPR	<i>The Print</i>	43
29	inStem's fabric offers protection from pesticides	<i>The Hindu</i>	45
30	यूपी के इस शहर में तैयार हो रहा गगनयान मिशन के लिए स्पेशल शूट, खास पैराशूट से धरती पर सॉफ्ट लैंडिंग करेंगे अंतरिक्ष यात्री	<i>Zee News</i>	46
31	ISRO will launch first dedicated SSLV commercial mission in 2026	<i>The Hindu</i>	47

Fri, 28 Jun 2024

## Explainer: DRDO ने नेवी को सौंपी MOC रॉकेट, जानिए कितना घातक है ये हथियार, चीन को मिलेगी कड़ी टक्कर!

भारतीय नौसेना की ताकत में लगातार इजाफा हो रहा है. अब उसके सैन्य बेड़े में एक घातक हथियार शामिल हो गया. डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गेनाइजेशन (डीआरडीओ) ने इंडियन नेवी को ऐसा रॉकेट सौंपा है, जो राडार को चकमा देने में माहिर है. यह रॉकेट कितना घातक है, जिसके मिलने से भारतीय नौसेना की कितनी ताकत बढ़ेगी. साथ ही समंदर में बढ़ते चीन के दबदबे से निपटने के लिए सेना की क्या तैयारियां हैं. आइए इसके बारे में जानते हैं.

डीआरडीओ ने जो रॉकेट भारतीय नौसेना को सौंपी है, उसका नाम माइक्रोवेव ऑब्स्क्यूरेंट चैफ रॉकेट (Microwave Obscurant Chaff Rocket) है, जिसे शॉर्ट में MOC रॉकेट भी कहा जा सकता है. भारतीय नौसेना को मिला यह एक ऐसा हथियार है, जो पलक झपकते ही दुश्मन का खेल तमाम कर सकता है. इस रॉकेट के प्रहार से दुश्मन का बच पाना बिल्कुल नामुमकिन है. अब आइए इस रॉकेट की खूबियां जानते हैं.

एमओसी रॉकेट की खूबियां

- ये मिडिल रेंज का रॉकेट है, जो दुश्मन के राडार में नहीं आता है, इसीलिए ये राडार के चकमा देकर हमला करने में सक्षम है. ये रॉकेट अब भारतीय नौसेना की ताकत बन चुका है. शुरुआती दौर के सभी टेस्ट पूरे होने के बाद इस रॉकेट को इंडियन नेवी में शामिल किया गया है, जिसके बाद भारतीय नौसेना की ताकत और बढ़ गई है.

- इस रॉकेट में खास तरह के फाइबर का इस्तेमाल किया गया है. जब इस रॉकेट को दागा जाता है तो अपने चारों तरफ माइक्रोवेव ऑब्स्क्योर क्लाउड का निर्माण करता है. मतलब ये खास तरह का कवच होता है, जो रेडियो फ्रीक्वेंसी पकड़ने वाले उपकरणों को चकमा देता है. इसी वजह से ये दुश्मन के राडार को धोखा दे सकता है.

इंडियन नेवी के पास हैं कौन-कौन से रॉकेट?

भारतीय नौसेना की रॉकेट ताकत की बात करें तो उसके पास कई तरह के घातक रॉकेट हैं. ये रॉकेट इतने घातक हैं कि पलभर में दुश्मन का खात्मा करने की ताकत रखते हैं.

1. RGB-60 रॉकेट: यह सबसे घातक रॉकेट है, जो पानी के अंदर 10 से 500 मीटर तक मार कर सकता है. इसकी रेंज 1500 से 5500 मीटर है. इसे 23 किलोग्राम वॉरहेड से लैस किया गया है. इसी सीरीज के 2 और रॉकेट हैं, जिनके नाम RGB-12 और RGB-10 हैं. इसमें RGB-10 को 100 किलोग्राम वॉरहेड से लैस किया गया है.

2. 90R रॉकेट: ये रॉकेट 1000 मीटर पानी के अंदर तक सबमरीन को निशाना बना सकता है. इसकी रेंज 600 से 4300 मीटर है. इसे 19.5 किलोग्राम वॉरहेड से लैस किया गया है.

इनके अलावा भी भारतीय नौसेना पर कई तरह के रॉकेट हैं.

चीन से मुकाबले की क्या तैयारी?

समंदर के मोर्चे पर जिस तरह की चुनौतियां मिल रही हैं और चीन जैसा दुश्मन समंदर में अपना दबदबा बढ़ा रहा है. उसे देखते हुए भारतीय नौसेना भी तैयारी कर रही है ताकि दुनिया के मोर्चे पर अगर समुद्री मोर्चे पर जंगी नौबत आई तो भारत भी अपनी समुद्री सीमाओं की रक्षा कर सके और दुश्मन को धूल चटा सके, इसीलिए युद्धपोत से लेकर सबमरीन जैसा हथियारों नौसेना में शामिल किए जा रहे हैं.

<https://www.newsnationtv.com/specials/explainer/drdo-handed-over-moc-rocket-to-navy-know-how-lethal-is-this-weapon-what-is-preparation-to-compete-with-china-478020.html>



*Mon, 01 July 2024*

## **DRDO takes up preliminary study on development of indigenous conventional submarine**

As the procurement of new submarines under P-75I goes on, the Defence Research and Development Organisation (DRDO) has taken up a preliminary study on the design and development of an indigenous conventional submarine under Project-76.

“DRDO got a go ahead from defence ministry to carry out a preliminary study to determine the project contours. It is expected to take upto a year after which a formal case will be put up to the Cabinet Committee on Security (CCS) for project sanction,” a defence source in the know said. This will be a continuation of the Advanced Technology Vessel (ATV) project, to build a conventional submarine, under which the Arihant series of nuclear ballistic missile submarines (SSBN) are being built and another project for building nuclear-powered submarines (SSN) is currently underway, the source stated.

Under P-76, there will be substantial indigenous content, including weapons, missiles, combat management system, sonars, communications, Electronic Warfare suite, mast and periscope, sources said.

The Navy has a 30-year submarine building programme and after the P-75I, it intends to design and build conventional submarines indigenously, senior officials had stated on several occasions.

### **Air Independent Propulsion**

An Air Independent Propulsion (AIP) module designed and developed by DRDO is now awaiting fitment on the Scorpene class submarines. The first Scorpene-class submarine Kalvari is expected to go for refit in 2025 when the fitment process would begin and is expected to take 2-3 years, 2027 or 2028, sources said. This is being done in collaboration with Naval Group, the original manufacturer of Scorpenes.

An AIP module acts as a force multiplier as it enables conventional submarines to remain submerged for longer duration thereby increasing their endurance and reducing chances of detection.

The AIP is currently being continuously run on shore, and as there is no submarine, a simulated hull has been created to have near-sea conditions and also run the same cycles, the source stated.

An AIP module is inside a submarine so there is no corrosion issue and the only aspect to be checked in a submarine is the reliability of the AIP module.

The DRDO-developed AIP module is phosphoric acid based which is widely available, officials noted. An AIP module has a stack of fuel cells generating hydrogen. The power output of each fuel cell in the DRDO AIP is 13.5 kW. It is being so asked up to 15.5 kW and will eventually be scaled up to 20 kW which will meet future submarine requirements like the P-76, sources said.

The final configuration of the AIP is a stack of 24 fuel cells and the overall output will be higher than the requirement, to build in redundancy and optimise performance, another source explained.

<https://www.thehindu.com/news/national/drdo-takes-up-preliminary-study-on-development-of-indigenous-conventional-submarine/article68352888.ece>

# The Tribune

*Mon, 01 July 2024*

## **IIT startup excels in DRDO's innovation contest on drones**

The deep tech startup SAP Aerospace of the India Institute of Technology (IIT) has won 'Dare to Dream 4.0 innovation contest' to develop engines for combat drones, officials on Friday said.

Led by Dr Shanmugasdas KP and graduates Ayush Divyansh and Preetam Jamod, the startup has emerged victorious in the open category of DRDO's TDF Dare to Dream 4.0 Innovation Contest, an official spokesman said.

This prestigious win marks a significant milestone for SAP Aerospace and their groundbreaking work in the field of combat drone technology, he added.

The DRDO's Dare to Dream 4.0 innovation contest is designed to support promising ventures with innovative solutions, providing them with the crucial resources needed to advance their technologies. SAP Aerospace's win is a testament to its cutting-edge aero-engine technology, specifically engineered for Unmanned Combat Aerial Vehicles (UCAVs), the official said.

Dr Shanmugasdas and his team at SAP Aerospace are at the forefront of developing next-generation aero engines, with the potential to revolutionize the capabilities and functionalities of combat drones.

Their innovative engine solutions promise to enhance the performance, efficiency and operational capabilities of UCAVs, paving the way for a new era in unmanned aerial combat, he said.

"We are honoured and thrilled to have won the DRDO's Dare to Dream 4.0 Innovation Contest," said Dr Shanmugasdas, Founder of SAP Aerospace.

"This achievement is a validation of our team's hard work and dedication to developing state-of-the-art aero engines for combat drones. The support and resources from DRDO will be instrumental in bringing our revolutionary engine technology to fruition," he added.

The victory in the Dare to Dream 4.0 innovation contest propels SAP Aerospace into the spotlight as a leading innovator in aero-engine technology.

With this win, the company is well-positioned to accelerate the development of their next-generation engine solutions, bringing their vision of advanced combat drones closer to reality, he added.

[https://www.tribuneindia.com/news/j-k/iit-startup-excels-in-drdos-innovation-contest-on-drones-635353#goog\\_rewarded](https://www.tribuneindia.com/news/j-k/iit-startup-excels-in-drdos-innovation-contest-on-drones-635353#goog_rewarded)

## Defence News

## Defence Strategic: National/International

# THE TIMES OF INDIA

*Mon, 01 July 2024*

## **General Dwivedi takes over as chief of Army, faces China, J&K tests**

An aggressive and expansionist China, which continues to forward deploy around 1.4 lakh troops and heavy weapon systems along the frontier from eastern Ladakh to for the fifth year running now, will be the primary operational challenge for new Army chief General Upendra Dwivedi. Gen Dwivedi, who took over the reins of the over 11-lakh strong force as the 30th chief from Gen Manoj Pande on Sunday, will also have to contend with the spike in militancy in J&K, especially the series of military-style ambushes by well-trained terrorists that have caused setbacks to his force in the densely-forested and hilly Poonch-Rajouri region.

Gen Dwivedi is no stranger to the threats posed by China and Pakistan, which are often collusive. Commissioned into the J&K Rifles in 1984, Gen Dwivedi had a two-year tenure as the GoC-in-C of the crucial Northern Command before becoming the vice-chief in Feb this year. “While China has mastered salami-slicing and grey zone warfare,

Pakistan continues with its proxy war,” a top official said. In a statement announcing Gen Dwivedi’s taking over the top post, the Army said, “The global geo-strategic environment remains dynamic, with the challenges in the security domain becoming more pronounced due to technological advancements and ever-changing character of modern warfare.”

“Operational preparedness to counter security threats to a rising nation, therefore would figure prominently, as a key focus area for the chief. Concurrently, a focused response strategy to myriad non-traditional security challenges, too, shall be a priority towards augmenting the nation’s defence,” it added.

Gen Dwivedi, an alumnus of Sainik School at Rewa like Navy chief Admiral Dinesh Tripathi, will have to push hard to fast-track modernisation and transformation of the Army during his two-year tenure.

Despite emergency procurements, the force is still grappling with major operational voids in several areas, ranging from modern air defence weapons and fourth-generation anti-tank guided missiles to attack and light utility helicopters and night-fighting capabilities. This is especially critical for the Northern and Eastern Commands along the 3,488-km Line of Actual Control.

There are 50,000 to 60,000 Chinese troops with heavy weaponry deployed along the western (Ladakh) and central sectors (Uttarakhand, Himachal) of the LAC. China has upped the ante in the eastern sector (Sikkim, Arunachal) as well, with another 90,000 soldiers deployed there.

Then, there is the entire question of the short-term recruitment of soldiers under the controversial Agnipath scheme rolled out in June 2022. The armed forces want the retention rate of Agniveers to be raised from the existing 25% after their four-year tenures to at least 50%.

The over-stretched Army is already facing a shortage of combat-ready soldiers, which will get further accentuated with each passing year without tweaks in the Agnipath scheme. The force, of course, also certainly needs to slash its non-operational flab.

The government is also yet to formally approve the long-pending restructuring of some Army formations into self-contained ‘integrated battle groups (IBGs)’ that can mobilize fast and hit hard, as was reported by TOI earlier.

<https://timesofindia.indiatimes.com/india/general-dwivedi-takes-over-as-chief-of-army-faces-china-jk-tests/articleshow/111387334.cms>

## THE ECONOMIC TIMES

Sun, 01 July 2024

### **India develops new explosive, SEBEX 2, 2.01 times more lethal than TNT**

India has successfully developed and certified a new explosive that is 2.01 times more lethal than standard TNT (Trinitrotoluene). The high-performance explosive is one of the most powerful non-nuclear explosives in the world.

The new formulation, which has been certified after extensive testing by the Navy, has the potential to revolutionise bombs, artillery shells and warheads by significantly improving their destructive power without increasing weight. It is also likely to have tremendous export potential as forces across the world look to add lethality to existing weapon systems.



SEBEX 2 has been evaluated, tested and certified by the Navy under its Defence Export Promotion Scheme. "The development of the explosive will enhance the potency and efficiency of weapons and ammunition in use," officials said, adding that final certifications were completed last week. The performance of explosives is measured in terms of TNT equivalence.

Explosives with higher TNT equivalence have more lethality. At present, the most potent conventional explosive being used in India - for filling the Brahmos warhead - is graded at TNT equivalence of about 1.50. Most explosives around the world used in conventional warheads have a TNT equivalence of 1.25-1.30.

Developed by Economic Explosives Limited under the Make in India initiative, the composition based on high-melting explosive (HMX) will greatly improve the "lethality of warheads, aerial bombs, artillery shells and other munitions which utilise blast and fragmentation effects to inflict damage to targets", sources said.

EEL is also working on another variant that will have an explosive power graded at 2.3 times of TNT and is confident it will be ready within six months.

#### **SITBEX 1**

The Navy has also certified the company's first thermobaric explosive, which has been used in recent conflicts to generate large-scale damage in the battlefield. SITBEX 1 has a prolonged blast duration with intense heat generation, which makes it ideal to take down enemy bunkers, tunnels and other fortified positions.

#### **SIMEX 4**

The third explosive certified by the Navy is SIMEX 4, an insensitive munition that is much safer to store, transport and operate than standard explosives. The new formulation is much less prone to accidental igniting and has applications where safety is paramount, like in torpedo warheads housed in the confined spaces of a submarine.

<https://economictimes.indiatimes.com/news/defence/india-develops-new-explosive-2-01-times-more-lethal-than-tnt/articleshow/111386902.cms>

# THE ECONOMIC TIMES

*Sun, 30 Jun 2024*

## **Indian Army inducts first-ever indigenous chipbased made in India 4G base station from Signaltron**

Indian army has inducted the firstever indigenous chip-based 4G mobile base station, which it procured from Bangalore-based firm Signaltron through the government emarketplace portal, a top company official said. Signaltron founder Himamshu Khasnis told PTI that the chip used in the Sahyadri LTE base stations has been developed by Signalchip.

Earlier in 2010, Khasnis and his team founded a fabless semiconductor company Signalchip to make chips for 4G and 5G networks. "Signaltron has built the entire system indigenously using India's first chips for 4G and 5G networks developed by Signalchip. This is the first time an Indian system running on an Indian chip for complex communication technology has been inducted into the army. Using indigenous chips gives a high degree of control on the security of the system in its operation," Khasnis said.

He said the Indian Army had posted a bid on GeM (Government eMarketplace) for the supply of 4G LTE NIB (Network In a Box) solution last year. "Signaltron proposed the Sahyadri NIB solution and came out successful in stringent technical trials. Subsequently, Signaltron also won the competitive bid to supply the equipment. Weighing just 7 kgs, Sahyadri Network In a Box (NIB) systems provide high-quality secure wireless communication for audio, video and data applications," Khasnis said.

He said the Sahyadri NIB is capable of working in both standalone and cellular modes and capable of seamless inter-operation with legacy analogue and IP telephony systems. The majority of the base stations deployed in India are not made in India. Even the few that are made in India do not have indigenous chips inside, which is the most strategic and important component of modern electronic devices and equipment.

Signaltron has supplied 20 units to the army and the deployment of the base stations depends on their strategic requirement, Khasnis said. "We have supplied 20 units to the army. The Army takes its own call on when and where to deploy base station. Since they are light and mobile units, it gives them the flexibility to change the location as per their requirement," he added.

At present, there is no fabrication facility in India for modern semiconductor chips. Signalchip has designed the chip indigenously and owns the entire technology that the chips deliver. In a model similar to leading semiconductor companies like Nvidia, Qualcomm, Mediatek etc, Signalchip also gets its chips fabricated through third-party wafer fabs.

Khasnis said the Indian base station market is expected to be about USD 24 billion by 2029. "With the use of indigenous systems, there could be significant savings to forex and also boost GDP. There are sizeable market volumes available in India and worldwide. Modernisation targets of different sectors like defence, railways etc. are excellent opportunities for indigenous solutions," he said.

Khasnis said that the CNPN (Captive Network-Private Network) 4G/5G market worldwide is expected to cross USD 30 billion by 2030, which will enable large possibilities for the local chip-based base stations, thereby providing economies of scale.

<https://economictimes.indiatimes.com/news/defence/indian-army-inducts-first-ever-indigenous-chip-based-made-in-india-4g-base-station-from-signaltron/articleshow/111378731.cms?from=mdr>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Sun, 30 Jun 2024*

## **Chief Of The Naval Staff Visits Bangladesh**

Admiral Dinesh K Tripathi, Chief of the Naval Staff (CNS), Indian Navy arrived in Bangladesh for a four-day official visit from 01 – 04 Jul 24. The visit is aimed to consolidate bilateral defence relations between India and Bangladesh and to explore new avenues for Naval cooperation.

The CNS is scheduled to hold bilateral discussions with his counterpart Admiral M Nazmul Hassan, Chief of the Naval Staff, Bangladesh Navy in Dhaka, as also review the Passing Out Parade scheduled at Bangladesh Naval Academy (BNA) at Chittagong on 04 Jul 24.

During the visit, the CNS would also hold bilateral discussions with General Waker-Uz-Zaman (Chief of the Army Staff, Bangladesh Army), Air Marshal Hasan Mahmood Khan (Chief of the Air Staff, Bangladesh Air Force), Lt Gen Mizanur Rahman Shameem (Principal Staff Officer, Armed Forces Division) and senior leadership of the Bangladesh Government. The CNS would also address participants at the National Defence College, Dhaka and visit a few key defence facilities.

Naval cooperation between India and Bangladesh has been traditionally strong, encompassing a wide span which includes operational interactions through Port Calls, Bilateral Naval Exercises, along with Capacity Building, Capability Enhancement and Training initiatives. The visit of the Chief of the Naval Staff, Indian Navy will further strengthen the strong bonds of friendship between the navies of both countries.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029697>



*Sun, 30 Jun 2024*

## **Why the Indian Army needs to deploy tanks at high altitude**

An Indian army T-72 battle tank was swept away while crossing Ladakh's Shyok river on June 29. Five jawans were killed in the accident. The tragic incident once again illustrated the perilous operational conditions along India's northern frontiers with China where troops and tanks are deployed at altitudes of over 11,000 feet above sea level. But it also underlines the fact that the Indian army has no option but to keep up with this deployment. Both India and China have been locked in a Himalayan standoff in Ladakh since 2020 with both sides yet to disengage in at least two locations. At the peak of the standoff four years ago, both sides deployed battle tanks literally a few hundred feet away from each other.

The T-72 which was washed away is one of over 400 tanks and Infantry Combat Vehicles deployed by the Indian army in Ladakh. These deployments will remain and perhaps even increase in the years ahead, making them the world's first sustained deployment of armoured vehicles at high and super high altitudes.

But why are battle tanks deployed at such extreme heights? The question is moot since the T-72 and the T-90 that make up over 90 per cent of the Indian army's armoured fleet were designed by the Soviet Union for operations in the plains of Europe. Majority of the Indian army's tank battles in the 1965 and 1971 wars have been with Pakistan, along the plains of the Punjab, the deserts of Rajasthan and the riverine regions of Bangladesh. But with China presenting itself as a military threat in recent years, the army has had to reorient its mechanised forces.

Nearly all of India's disputed 3,440 km boundary with China is along the Himalayas at heights of over 10,000 feet. Tanks can be used across the cold deserts of Ladakh to engage enemy infantry, armour and fortifications. But this comes at a cost. The rarefied mountain air degrades armoured vehicle performance— their diesel engines have to gasp for air, lubricants freeze over in temperatures that fall to as low as thirty below zero. Tanks hence need to be housed in temperature controlled shelters and supplied with special anti-freeze fuel and lubricants. The rock strewn open terrain also impacts tank performance. Yet, as history has shown, there is no alternative to the troika of speed, mobility and firepower that tanks bring to the theatre especially for infantry advancing along open ground.

The Indian army has deployed tanks at high altitude to great effect in the past. In 1948, Stuart tanks of the Indian army's 7th cavalry recaptured the vital Zoji La pass from the Pakistan Army. In 1962, AMX-13 light tanks were used to backstop a potential Chinese thrust towards Chushul. With the Chinese infrastructure build up in the late 1990s, the army foresaw enemy tanks being deployed along the LAC.

A 2009 study by the Indian army's directorate of mechanised forces drew up a sector-by-sector deployment of light and medium tanks. Based on this study, the Indian army deployed a regiment of T-72 medium tanks to Ladakh and Sikkim over a decade ago. After the 2020 standoff, the service revived a 2009 requirement for light tanks. The first prototype of the Zorawar light tank produced by Larsen & Toubro and the DRDO will be handed over to the army this year. Over 300 such light tanks will eventually be produced.

But why light tanks? It has to do with their speed of deployability. The IAF's fleet of C17 transport aircraft can carry two 25-ton light tanks in place of a single T-72 tank. They can be moved between sectors in Ladakh using Class 24 bridges instead of the Class 40 or Class 50 bridges medium tanks like the T-72 would need. Light tanks can also be used exclusively for infantry support roles, leaving medium tanks to perform tasks like engaging enemy tanks.

<https://www.news9live.com/india/why-the-indian-army-needs-to-deploy-tanks-at-high-altitude-2599077>

## Supply chain issues delay deliveries of LCA-Mk1A jets

After some delay, the deliveries of the Light Combat Aircraft (LCA)-Mk1A by Hindustan Aeronautics Limited (HAL) to the Indian Air Force (IAF) are now expected to begin by end of July with officials stating that the delay is due to supply chain issues, including at HAL and General Electric (GE) in delivering the engines.

One jet is now expected to be handed over to IAF by end of July, two officials independently confirmed. In February 2021, the Defence Ministry had signed a ₹48,000 crore deal with HAL for 83 LCA-Mk1A jets, a more capable fighter jet than the current LCA-MK1 in service.

As per contract, three LCA-MK1A planes were to be delivered to the IAF in February 2024 and 16 aircraft per year for subsequent five years. Like the present LCA, these fighter jets will also be powered by the GE F-404 engines.

There have been significant supply chain delays that have delayed the manufacture and deliveries, HAL and defence officials said while expressing confidence that the process would be speeded up once deliveries begin with plans lined up to scale production rate to 18 aircraft per year and eventually to 24 aircraft per year rolling out of three manufacturing lines.

To questions from The Hindu on delay in engine deliveries to HAL, a GE Aerospace spokesperson said: “The aerospace industry continues to experience unprecedented supply chain pressures. GE Aerospace is working with our partner HAL and suppliers to resolve constraints and deliver F404-IN20 engines.”

The LCA is going to constitute a bulk of the IAF in the next few decades. In addition to the 83 Mk1A aircraft on order, the Defence Ministry has given preliminary approval for procurement of another 97 LCA-Mk1A jets. This would eventually make 180 LCA-MK1 jets and 220 jets of the MK1 variant.

The combined cost of the 180 Mk1As is an estimated of ₹1.15 lakh crore. In addition, a larger and more capable LCA-Mk2 is under development that will be powered by the GE F-414 engines. A deal for HAL to license manufacture the engines in India is in advanced stages.

As of now, the IAF has committed to procuring around 120 LCA-Mk2 jets. The IAF has two MIG-21 squadrons, No. 3 squadron ‘Cobras’ and No. 23 squadron ‘Panthers’ remaining in service, one of which will be phased out this year and the other next year, and they will convert to LCA-Mk1A aircraft. Timely induction of LCAs is crucial to keep the number of fighter squadrons from falling below 30.

<https://www.thehindu.com/news/national/supply-chain-issues-delay-deliveries-of-lca-mk1a-jets/article68348732.ece>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Sun, 30 Jun 2024*

## **Delivery Of Third 25t Bollard Pull Tug, Bajrang (Yard 307)**

Third 25T Bollard Pull (BP) Tug, Bajrang has been delivered to Indian Navy on 29 Jun 24 in presence of RAdm DK Goswami, ASD (Mbi). This Tug is a proud flag bearer of “Make in India” initiative of Govt of India.

Contract for construction and delivery of three 25T BP Tug was concluded with M/s Shoft Shipyard Pvt Ltd (M/s SSPL), an MSME, in consonance with ‘Aatmanirbhar Bharat’ initiative of the Government of India. These Tugs are being built under the classification rules of Indian Register of Shipping (IRS). The availability of Tugs will provide impetus to Operational commitments of IN by facilitating assistance to Naval ships and submarines during berthing and un-berthing, turning and manoeuvring in confined waters. The Tugs will also provide afloat firefighting assistance to ships alongside, at anchorage and will also have capability to conduct limited Search and Rescue Operations.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029732>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Sun, 30 Jun 2024*

## **INS Ranvir Arrives At Chattogram, Bangladesh**

Indian Naval Ship INS Ranvir, of the Eastern Fleet under the aegis of the Eastern Naval Command arrived at Chattogram, Bangladesh on 29 Jun 24 as part of an Operational Deployment. The ship was accorded a warm welcome by the Bangladesh Navy. The visit by the ship comes just after the state visit of Ms Sheikh Hasina, Prime Minister of Bangladesh to India from 21 - 22 Jun 24.

During the visit, personnel from the Indian and Bangladesh navies will engage in wide range of professional interactions including Subject Matter Expert Exchange (SMEE), cross-deck visits, community outreach and friendly sports fixtures aimed at further strengthening existing mutual cooperation and maritime linkages between both navies and nations.

On completion of harbour phase, INS Ranvir will participate in a Maritime Partnership Exercise (MPX)/ PASSEX with ships of the Bangladesh Navy.

The visit will further strengthen the longstanding friendship, cooperation as also the robust interoperability between both nations through a series of engagements and activities aligned with Government of India's focus on Security and Growth for All in the Region (SAGAR).

INS Ranvir is a Rajput Class Guided Missile Destroyer which has undergone upgrade with state of art weapons and sensors, majority being indigenous reiterating the Indian Navy's steadfast focus on Aatmanirbharta.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029739>



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

**Ministry of Defence**

**Sat, 29 Jun 2024**

## **INS Shivalik Reaches Pearl Harbour To Participate In Rim Of The Pacific Exercise (RIMPAC) – 24**

Indian multi-role stealth frigate INS Shivalik, mission deployed in South China Sea and North Pacific Ocean, has reached Pearl Harbour in Hawaii to take part in the Rim of the Pacific (RIMPAC) exercise, which is world's largest naval exercise. INS Shivalik sailed into Pearl Harbour on Thursday on completion of JIMEX 24, a bilateral exercise between India and Japan.

The harbour phase of the exercise from 27 Jun to 07 Jul 2024 will see participation in multiple symposiums, exercise planning discussions, sports competitions and reciprocal deck visits. The sea phase of RIMPAC – 24, divided into three sub-phases will witness ships undertaking basic and advanced level integration exercises during the first two sub-phases.

The event will conclude with a theatre level large force tactical exercise. The exercise will witness the participation of an Aircraft Carrier Battle Group, submarines, maritime reconnaissance aircraft, unmanned aerial vehicles, remotely piloted surface ships and also an amphibious force landing operations including joint operations with special forces of multinational navies.

RIMPAC-24, spanning over six weeks of intense operations and training is aimed at enhancing interoperability and building trust among the navies of friendly foreign countries. Led by the US Navy, approx 29 countries are participating in the current edition of the multi-dimensional exercise. The world's largest international maritime exercise, RIMPAC-24 provides a unique training opportunity while fostering and sustaining cooperative relationships among participants, critical to ensuring the safety of sea lanes and security of world's oceans.

INS Shivalik's participation in RIMPAC-24, 9000 Nautical Miles away from Indian coast Stands testimony to the Indian Navy's capability to operate in any part of the world.

INS Shivalik is an indigenously designed and built 6000 tonnes guided missile stealth frigate.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029512>



## **Indian Navy Bids Farewell To UH – 3H Helicopter**

Indian Navy bid farewell to the UH-3H helicopter after 17 years of glorious service during a de-induction ceremony held at INS Dega, Visakhapatnam on 28 Jun 24. The event was presided by Vice Admiral Sameer Saxena, Chief of Staff, Eastern Naval Command. Veteran officers and sailors of the UH3H squadron graced the event with families reminiscing the yeoman service of the Helicopter. The UH-3H helicopter will be replaced by Sea King 42C helicopter at INAS 350, to continue and deliver operational power and capability.

The de-induction ceremony of UH-3H helicopter marks the end of a remarkable era that introduced innovative capabilities in Special Operations and Search and Rescue (SAR) missions. The operational role of the UH-3H in the constantly evolving and dynamic maritime environment will remain forever etched in the history of Indian Naval Aviation.

Brought to Indian shores in 2007 along with INS Jalashwa, the UH-3H helicopter was inducted into INAS 350 christened 'Saaras' on 24 Mar 09 at INS Dega, Visakhapatnam. This versatile helicopter played a crucial role in Humanitarian Assistance and Disaster Relief (HADR) operations, security of offshore installations and special operations. Its advanced Search and Rescue (SAR) capabilities and logistical support were vital during natural disasters, often making the difference between despair and relief, and saving countless lives. The mighty 'Saaras' adorns the squadron crest embodying the motto "Strength, Valour and Perseverance." The Helicopter diligently upheld its commitment, maintaining a vigilant watch, ensuring the security of our nation's maritime boundaries with unwavering dedication.

As it comes to the end of service life, one UH-3H will be permanently displayed at prominent location in 'City of Destiny', Visakhapatnam, inspiring future generations. The Chief of Staff, ENC handed over a commemorative plaque to the State Government. The plaque was received by Shri K. Mayur Ashok, IAS, Joint Collector, Visakhapatnam to mark the transfer of aircraft.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029416>

## **THE ECONOMIC TIMES**

### **Bharat Electronics Limited receives orders worth Rs 3,172 crore**

Bengaluru: Navratna Defence Public Sector Undertaking, Bharat Electronics Limited (BEL) has signed a contract valued at Rs 3,172 crore with Armoured Vehicles Nigam Limited (AVNL) on Friday at AVNL Headquarters in Chennai.



According to an official statement, BEL, which is headquartered in Bengaluru, stated the project entails the supply and installation of an advanced, indigenously designed and developed Sighting and Fire Control System (FCS) for the upgrade of BMP 2/2K tanks of the Indian Army, along with a comprehensive engineering support package.

"Additionally, BEL has secured other orders valued at Rs 481 crore following the last disclosure on May 22, 2024 which comprises doppler weather radar, classroom jammers, spares and services etc. With these, BEL has received accumulated orders totaling Rs 4,803 crore in the current financial year," it stated.

<https://economictimes.indiatimes.com/news/defence/bharat-electronics-limited-receives-orders-worth-rs-3172-crore/articleshow/111347772.cms>



*Sun, 30 Jun 2024*

## **A (meaningless) defence budget for Pakistan**

**- By Bhartendu Kumar Singh**

For its geographical size and population, Pakistan is an overtly powerful military country. It ranks ninth in the military power ranking on globalfirepower.com website, despite its GDP size being forty-sixth and its per capita income \$1,680 in 2024 (way behind Bhutan, Sri Lanka, India and Bangladesh). Liberal budgetary allocations (often at the cost of neglecting other vital sectors) have contributed in the past to Pakistan's rise as a recognised military and nuclear power. The huge rise of 17.6 per cent in Pakistan's defence budget (24-25) a few days ago is just a continuation of pampering Pakistan's military after a few years' gap.

When the SIPRI Fact Sheet on 'Trends in world military expenditure, 2023' was published this April, Pakistan gave an impression of restraining its defence budget. Pakistan's decadal growth rate of defence expenditure was only 13 per cent, an impressive figure by all standards. In 23-24, it was supposed to have spent \$8.5 billion. Its global ranking in defence spending came down from 24 in 22-23 to 30 in 23-24. Now that Pakistan's defence budget for the year 24-25 has gone up, strategic experts in Pakistan may have readymade excuses like threat from India, disturbances on Afghanistan front and so on.

Pakistan may be a respectable military power but it masks a sense of hollowness when the usage pattern of defence budget is subjected to scrutiny. First, Pakistan still has an under-developed domestic military industrial complex (MIC) with the exception of nuclear and missile technology. It does not have a single company in the top 100 arms producing companies. There is complete militarisation of defence production business wherein the generals preside upon the destiny of most weapons companies. For example, a serving military officer always leads the Pakistan Ordnance Factories Board (POF) in Wah area. So is the case of most of its 14 production units. Collectively, they supply to the domestic market and export around \$100 million abroad. The performance is, however, much below their potential.

Second, Pakistan has always had a high share of imported weapons. Presently, it is the fifth largest arms importer in the world. As per SIPRI Fact Sheet ‘Trends in international arms transfers, 2023’ published in March 2024, Pakistan accounted for 2.9 percent of global arms imports during 2014-19, which increased to 4.3 per cent during 2019-23. Pakistan imports almost half of what India does, despite having only one-tenth defence budget than the latter. Given the precarious foreign exchange reserves, high imports do strain other sectors.

Third, Pakistan’s arms imports are completely monopolised by China. As per SIPRI estimates, 82 per cent of its arms imports came from China during 2019-23, as against 69 per cent during 2014-18, and 51 per cent during 2009-13. While Pakistan may declare these rising figures as an attestation to its friendship with China, it also implies that Pakistan is not able to diversify its imports basket and does not have an import-substitution policy. Imported weapons make only hollow military powers since supply-chain logistics get disturbed during war or crisis times. In Pakistan’s case, there is also the problem of poor-quality weapons supplies from China that do not have many takers elsewhere in the world.

Fourth, for its geographical size and population, Pakistan maintains an elephantine armed force. It has the world’s seventh largest armed force, numbering around 6,50,000 active personnel, almost half of India’s force size. Unlike many other countries, Pakistan still has an armed force in colonial mold that refuses to reform itself. The garrison state attitude in Pakistan ensures that external reforms in other countries’ armed forces are not readily accepted and replicated. Consequently, Pakistan spends a huge portion of its defence budget merely on salaries and maintenance.

Pakistan generals are the biggest culprits behind this reality-bite in Pakistan’s so-called military prowess. They are a ‘state within a state’. A career in the Army is considered as a dream career for any youngster in Pakistan. While they themselves live a lavish life both during and after the service due to heavy subsidization by the Government, they do not care much about Pakistan’s hopeless defence economy. For instance, the Military Accountant General (MAG) in Pakistan, despite being a civilian officer, is under the complete control of the generals in Rawalpindi. He is placed quite low in the warrant of precedence at 19th position, whereas even a Brigadier is placed above him at 15th position. The MAG is, therefore, not able to perform his accounting or audit functions in an independent manner. Consequently, Pakistan’s entire military accounting and audit system is in shambles!

The MAG’s inefficiency has allowed the generals to make a mess of the defence budget. The Transparency International has placed Pakistan’s defence budget in the ‘least transparent’ category. Many aspects of Pakistan’s defence budget are not transparent. For example, defence pensions are as high as 31 per cent of the defence budget and kept separate from the defence budget under a civil head. It will soon rise beyond manageable proportions. There is also a very high level of corruption. Often, funds from the defence budget are diverted to a number of companies being operated by and for the Pakistan armed forces. Ayesha Siddiqi, a Pakistani defence economist, has called these thriving entities as ‘milbus’ that have defied all reform attempts so far!

The ongoing economic crisis was an opportunity for the Pakistan generals to do a course correction by putting a cap on their defence budget until things ease out and the economy improves. However, the self-serving generals do not care for Pakistan or for that matter, the other pressing economic issues in their country. Unfortunately, the people of Pakistan do not have a way out of these

generals who thrive on public money as parasites in an endemic and perpetual manner. Probably, they will have to wait for some remote possibility of reforms in Pakistan's defence economics to optimise the defence budget.

<https://www.financialexpress.com/business/defence-a-meaningless-defence-budget-for-pakistan-3539557/>

# ThePrint

Mon, 01 July 2024

## **Indian Navy's growing footprint — foreign deployment, training allied personnel, 'backyard' aid**

With an aim to bolster maritime regional ties, enhance security, promote international cooperation and counter piracy, the Indian Navy has escalated its efforts in forging maritime partnerships through naval diplomacy.

In 2023 and 2024, the Navy carried out deployments of over 80 ships and submarines at more than 50 foreign ports. Between 2001 and 2010, 80 Indian warships visited 155 foreign ports, and 246 warships from 33 countries visited our shores.

From 2011 to 2021, the Indian Navy visited nearly 72 foreign countries. The foreign regions it visited also included the French Reunion Islands. During that decade, the Indian Navy carried out a total of 982 foreign visits, including repeat visits.

Similarly, India recorded a total of 248 ports of call by foreign navies to different ports across the country.

At present, the Indian Navy has deployed four warships to different countries. As part of the Navy's long-range deployment in the southwestern Indian Ocean Region (IOR), INS Sunayna is at Port Victoria in Seychelles.

INS Tabar, as part of its ongoing deployment to Africa and Europe, is on a visit to Egypt.

The multirole stealth frigate INS Shivalik has been deployed to South China Sea (SCS) and North Pacific Ocean. It has reached Pearl Harbour in Hawaii to take part in the Rim of the Pacific (RIMPAC) exercise – the world's largest naval exercise with 29 countries participating in the current edition. The warship reached Hawaii after a bilateral exercise with Japan – JIMEX (Japan India Maritime Exercise).

INS Ranvir, a Rajput-class guided-missile destroyer, has been sent to Bangladesh for operational deployment, and is set to take part in a Maritime Partnership Exercise (MPX) with the ships of Bangladesh Navy.

“The reach also has gone up. With the intensification of naval activities, geographic reach and naval activities are expanding. This gives the Navy the experience of operating far away from home waters and expanding its reach. The overall aim is gradual expansion and increasing strategic footprint via naval diplomacy,” Sankalp Gurjar, a strategic analyst from Pune, told ThePrint.

“Naval cooperation carried out by India currently includes partners such as Tanzania, Japan, Indonesia and Mozambique, while strategic naval cooperation with bigger countries such as the US, Russia and France has also deepened.”

Malabar naval exercises and the Quad initiative with the US, Japan and Australia, to expand maritime domain awareness in the Indo-Pacific, are also important components of the naval diplomacy.

With the Indo-Pacific Maritime Domain Awareness (IPMDA) initiative announced by the Quad in 2022, the countries seek to provide near-real-time, integrated and cost-effective maritime domain data to maritime agencies in Southeast Asia and the Pacific, and will expand coverage to partners in the IOR in the coming months. This initiative is aimed at combating illicit maritime activities and responding to climate-related and humanitarian events.

In November, the Indian Navy carried out an exercise in the Bay of Bengal with Russian destroyers from its Pacific Fleet.

### **Other strategies to boost maritime ties**

Foreign deployment, while an important aspect of boosting ties, is not the only tool used by the Indian Navy.

The Navy also offers training opportunities foreign nationals. At present, 76 trainees from Saudi Arabia’s Royal Saudi Naval Forces are training with the First Training Squadron of the Indian Navy at the Southern Naval Command in Kochi. This is the second batch of trainees, and the first batch underwent similar training in 2023.

Basic cadet training is offered at the Naval Academy in Kerala’s Ezhimala and professional training for officers as well as sailors is offered in INS Venduruthy, INS Shivaji, and INS Valsura.

India’s immediate neighbours including Bangladesh, Sri-Lanka, Maldives, Mauritius and Myanmar regularly send their personnel for these courses, a navy source told ThePrint.

Overall, more than 1,100 foreign nationals have arrived for training, which is given mainly to junior and mid-level professionals.

The curriculum ranges from basic seamanship activities to simulator-based training during the harbour phase. The sea phase includes an actual exposure at sea. This training is carried out in tandem with Indian naval personnel.

Moreover, the Indian Navy has established naval training teams in Bangladesh and Myanmar.

The Indian Navy also engages in Coordinated Patrols (CORPATs) with different countries, playing a crucial role in safeguarding the large and unmonitored Exclusive Economic Zones (EEZ) of island nations. Bangladesh, Thailand, Mozambique, and Indonesia are other countries with which Indian warships regularly engage in CORPATs.

Deployment of potent Indian warships and aircraft to IOR littorals such as Mauritius and Seychelles, which face challenges of illegal, unreported and unregulated fishing, helps these countries in securing their EEZ.

The Indian Navy's increasing camaraderie with foreign nations, especially its immediate littoral neighbours, stems from the 'Neighbourhood First' and 'Security and Growth for All in the Region' (SAGAR) initiative as part of the country's foreign policy.

Neighbourhood focus emphasises the significance of the IOR to ensure safe transit of trade, especially energy, keeping in check an increasing Chinese influence, and overall security of the region.

The Indian Navy launched P-8I MPA from the French territory of Reunion Islands in the Southwest Indian Ocean and has worked regularly with France in a bilateral as well as trilateral format.

### **How Navy has provided aid in IOR during disasters**

The Indian Navy has come a long way since 2004 when an Indian Ocean earthquake triggered a major tsunami. At that time, Indian aircraft and ships arrived within 24 hours to provide aid and conduct relief operations.

It was also the first responder after Cyclone Nargis struck Myanmar in 2008.

In December 2014, a desalination plant which provided drinking water to Maldives, was damaged in fire. INS Sukanya, which was on patrol off the coast of Kochi, was diverted to Male immediately with 35 tonnes of fresh water. It reached Male the next day.

The ship has the capacity to produce 20 tonnes of water every day. Within the first three days, it generated 65 tonnes of fresh water for Male. In addition to this, INS Deepak, a large fleet tanker with 900 tonnes of water, also sailed from Mumbai and reached Male within three days.

The Indian Ocean is generally touted as the Indian Navy's 'backyard'. It has been India's long-standing policy to prioritise the IOR.

The Indian Navy considers the entire Indian Ocean, from the eastern coast of Africa to the Andaman Sea, as its area of responsibility. Throughout many decades, it has carved an image for itself as the first responder in the region. In accordance with the foreign policy, the Indian Navy plays a role of 'net security provider' in the region.

Recently, the Navy has taken steps to help regions beyond eastern and southern Africa.

"In Africa, the Indian Navy has been reaching out to important powers located in the northern and western part of the continent (Africa) such as Egypt and Nigeria. In 2022, it sent one of its ships on a port visit to Gabon in Central Africa too. With the Navy's reach growing, it is trying to engage 'a lot more partners, a lot more frequently'," Gurjar told ThePrint.

In an article for Manohar Parrikar Institute for Defence Studies and Analyses (IDSA), Gurjar wrote, "India–Africa relationship is built on the solid foundations of shared struggle against colonialism, imperialism, and racism. India particularly shared a close relationship with the East and Southern African states. These states were a part of the British Empire and were linked to India due to the intra-imperial network of trade, commerce, migration and security."

The article further adds that as the IOR attains growing geopolitical importance, India's engagement with the region assumes greater strategic relevance. "India is the resident naval power in this region and is directly affected by the expanding Chinese military presence in the Western Indian Ocean."

The Navy is also deploying warships to the Gulf of Guinea and the Mediterranean. These deployments are not linked with security concerns, but help in expanding the naval footprint.

Moreover, the Navy's efforts stood out on a global stage in recent times, after it relentlessly deployed warships as part of maritime security operations against missile attacks and hijacking incidents in the Red Sea and Gulf of Aden, and amid sudden resurfacing of piracy off the East Coast of Somalia and drone attacks in the Arabian Sea, which are close to Maritime Zones of India.

While the operations were meant to deter and thwart attacks, they also provided assistance to the crew who were affected by the attacks, and belonged to different nationalities.

In the last decade, approximately 20 ships and craft, which include OPVs, Fast Attack Crafts, Fast Interceptor Boats, INS Kirpan and INS Sindhuvir, have been gifted to various countries in the IOR.

For instance, India leased out INS Sindhuvir, which has been in service with the Indian Navy since 1988, to Myanmar in October 2020.

The submarine was refitted before being handed over to the Myanmar Navy. The Navy also gave ab-initio training to Myanmar personnel to teach them how to operate the submarine.

Technical support is another tool to strengthen maritime ties with neighbours. Six ships from foreign countries have undergone repairs and refit assistance in India in the last two years. Instances include the Seychelles Coast Guard Ship (SCGS) Zoroaster in Garden Reach Shipbuilders & Engineers Ltd (GRSE), and Mauritius Coast Guard Ship (MCGS) Victory in Naval Dockyard, Visakhapatnam.

The Indian Navy also conducts coordinated patrols and joint EEZ surveillance with various maritime countries including Bangladesh, Thailand, Indonesia, Mauritius, Seychelles and Mozambique.

In the field of intelligence gathering, large area reconnaissance by Indian maritime patrol aircraft, in conjunction with platforms that are donated by New Delhi to different littoral countries, enable sharing of maritime data through mechanisms such as White Shipping Information Exchange.

This helps neighbouring countries fill their surveillance gaps. "This is being optimally supported by Coastal Surveillance Radar chains that have been installed through the Indian government's funding at various significant locations in the littoral countries," a Navy source told ThePrint.

The source also said that reciprocal postings of subject matter experts for maritime data analysis are currently being conducted at operation centres.

"The highly subscribed positions for International Liaison Officer at India's Information Fusion Centre – Indian Ocean Region (IFC-IOR) at Gurugram, and appointment of Indian Naval officers to the Regional Maritime Information Fusion Centre (RMIFC) in Madagascar indicate acceptance and legitimacy to Indian Navy's aspiration of being the 'Preferred Security Partner' in the IOR," the source told ThePrint.

IFC-IOR hosts officers from foreign countries and builds bridges with key navies in the region and beyond.

“Naval diplomacy continues to guide and support the delicate intricacies of power posturing in the volatile geopolitical environment constrained by the ongoing Russia-Ukraine and Israel-Hamas conflicts,” the source added.

<https://theprint.in/defence/indian-navys-growing-footprint-foreign-deployment-training-allied-personnel-backyard-aid/2154505/>



*Sun, 30 June 2024*

## **The Indian Air Force- One Wing to Rule Them All**

It is true that human curiosity has been responsible for fueling innovation across disciplines and fields. However, it would be naive to downplay the role of capitalism, competition and exigent situations; whether man-made, like war or otherwise, like an epidemic in pushing humankind above and beyond its limits.

Consequently, contemporary technological innovation is granted traction in large part by capitalism or since it is viewed as integral to geopolitical strategy. While soft power and diplomacy have cemented their status in international relations, hard power and military might still remain the most primal and oftentimes the primary source in deciding cross border strategy for states.

With the coming of the World War, aerial technology for military use gained unprecedented momentum. Previously, it had been used solely for civilian and transport purposes. In the first World War, the aircrafts used were ordinary machines that had been retrofitted with mounted guns and their use was limited mostly to aircraft to aircraft dogfighting.

The Germans possessed bombers, which long proved to be a thorn in the side of the British, who had no countermeasures or bombers of their own and therefore remained inferior to the Germans. However, World War II proved to be a completely novel war, which was decided by a combination of brute force, strategic improvisation and rapid and inspired innovation. Many would assume that it was the nuclear bomb that decided the outcome of the war but, notably, the Third Reich had fallen even before the first of the two bombs did.

In the buildup to World War II, the Allied powers realised that the key to victory lay not in the ground forces or the navy, but in strategic bombing, which meant securing aerial superiority. Consequently, the second war saw real, tangible and truly relevant advancement in, as well as utilisation of, military aviation.

To provide some intriguing context, the development of the Norden Bomb Sight was almost as heavily guarded a secret as the Manhattan Project, with a budget amounting to 2/3rd of the total expense of the latter. However, the bomb sight failed to deliver on its promises and the American military high-command decided to shift to strategic bombing and combat box formations. Consequently, for their bombing tactic and new formation to succeed they had to spend immense amounts of money in developing the leading bomber of the war, the B-29 Superfortress.

The development of the Superfortress far outweighed the budget of the Manhattan Project but proved to be instrumental in shifting the tide of the war. Without the strategic and unrelenting bombing by the Allied forces, the historic storming of the beaches of Normandy would have remained at best a pipe dream and at worst an absolutely demoralising failure.

Moreover, the need for continually improving upon aircraft technology of the Allies was due to the fact that the Germans possessed arguably the best anti-aircraft artillery in their 88mm Flak. While the British and the Americans heavily relied on strategic bombing, the German Luftwaffe failed to appreciate its potential. The uncomplicated yet effective strategy translated marvelously into practice as the Axis powers were deprived of reinforcements and essential supplies. It also reaffirmed the theory that ground forces can only be mobilised once occupation is guaranteed i.e. for the purposes of clearing.

Markedly, the largest war in modern history is testament to the significance of having supremacy in aerial military technology. Therefore, it is important to bring out radical transformation in the Indian Air Force, IAF, as far as innovation and procurement is concerned.

While the importance of possessing future-proof military aviation technology cannot be stressed enough, the current Indian situation remains alarming. Presently, the sanctioned strength of the Indian Air Force is 42 squadrons with only 31 being operational with 18 fighter jets on average in each squadron.

It is imperative that India begins to either manufacture indigenous and capable aircrafts or switch to western technology. Historically, India has relied on Russia to be its major supplier for fighter jets with the Sukhoi Su-30MKI dominating in terms of numbers.

Russia has been generous enough to transfer technology too for its aircrafts, however, Indian metallurgy has proved impotent in even producing quality spare parts. Furthermore, the S-400 defence missiles to be delivered by Russia lack interoperability with western technology that India possesses, which impedes efficient integration of defence systems. Russia has also become unreliable as a supplier since it is preoccupied with fighting its own battles and cannot afford to divert resources no matter how deep and ancient the Indo-Russian ties run.

Additionally, the recent procurement of the 4.5th generation Rafales has bolstered the fire power of the IAF. Although the LCA Tejas is also a 4.5th generation aircraft, it cannot be claimed to be entirely native as the most important component of the machine, the engine, is manufactured by the American corporation General Electric.

The AMCA, Advanced Medium Combat Aircraft, being developed by HAL is meant to be a 5th generation vehicle, however rollout is only expected by 2030, whereas in contrast China, Russia, America and even Turkey already possess 5th generation fighters.

This goes to highlight the issue that by the time India is able to produce its own 5th generation fighter, it would probably be obsolete technology. The Chinese Chengdu J-20 is considered especially lethal and impressive in its stealth capabilities.

China also recently went on to place a squadron of J-20s just 150km off the border of Sikkim, which is extremely problematic as even detecting these fighters, were they to be deployed, would prove a gargantuan task in itself. The relevant Indian authorities in-charge are also prone to making



borderline insubstantial claims that impact the dissemination of information about the status of national security.

Recently, they claimed that India could easily detect if the J-20s were on the move, while analytical experts around the globe have categorically stated that such a statement is a gross overestimation of the limits of radar technology.

All in all, the current environment requires that procurement and innovation of military aviation technology command the respect it demands and deserves. Perhaps bureaucratic and administrative adaptability is also necessary.

The two arms of procurement and innovation could be placed with a Minister of State, who would report exclusively to the PMO just as the Atomic Energy Commission and ISRO function directly under the Premier. This administrative transition would also eradicate the need to await approval from multiple different departments and ministries, which, in turn, would further reduce delays.

The amount of red tape that each project would bypass if it were under the direct supervision of the PMO would greatly reduce costs and also ensure that the technologies being acquired are competitive and not archaic.

<https://www.dailypioneer.com/2024/state-editions/the-indian-air-force--one-wing-to-rule-them-all.html>



*Fri, 28 June 2024*

## हाइपरसोनिक मिसाइल दागने वाली रिवाँल्वर... क्या भारत के लिए वरदान साबित हो सकता है बोईंग का नया हथियार?

भारतीय वायुसेना (Indian Air Force) के पास 11 बोईंग C-17 ग्लोबमास्टर स्ट्रैटेजिक एयरलिफ्टर विमान हैं। हाल ही में बोईंग कंपनी ने इस विमान को लेकर एक नया आइडिया पेश किया है। उसने एक वीडियो में दिखाया है कि कैसे इस विमान के अंदर हाइपरसोनिक मिसाइल का रिवाँल्वर सेट किया जा सकता है। यानी कार्गो और परिवहन के लिए इस्तेमाल किया जाने वाला विमान कैसे एक स्ट्रैटेजिक मिसाइल बॉम्बर बन सकता है। इस वीडियो को देखते ही दुनिया भर में खलबली गई। क्योंकि ये किसी आम रिवाँल्वर की तरह काम नहीं करता। इस रिवाँल्वर की खासियत ये है कि इसमें पीछे से मिसाइल निकलेगी। अगर भारत यही तकनीक अपने सी-17 ग्लोबमास्टर विमानों में लगवाए तो भारतीय वायुसेना की ताकत में कई गुना इजाफा हो सकता है। चीन और पाकिस्तान की तो हालत खराब हो जाएगी। पहले ये जानते हैं कि बोईंग ने इस प्लेन में किस मिसाइल को दिखाया है, और यह हाइपरसोनिक मिसाइल रिवाँल्वर कैसे काम करता है।

क्या है हाइपरसोनिक मिसाइल रिवाँल्वर?

आमतौर पर रिवाँल्वर से गोलियां बाहर निकलती हैं। लेकिन ये बोईंग के इस रिवाँल्वर से मिसाइलें बाहर की तरफ निकलेंगी। यह ड्यूल ड्रम डिजाइन वाली इलेक्ट्रोमैग्नेटिक कैटापॉल्ट मैकनिज्म है। यानी प्लेन के अंदर ऐसी रिवाँल्वर जो इलेक्ट्रोमैग्नेटिक गुल्ले की तरह काम करेगी। इसमें लगी मिसाइलें तेजी से पीछे की तरफ निकलेंगी।

प्लेन से बाहर निकलने के बाद ये मिसाइल एक्टिव हो जाएंगी, और पहले से तय टारगेट की तरफ तेजी से बढ़ जाएंगी. ये नजारा इस वीडियो में स्पष्ट तौर पर दिखाया गया है. बोईंग ने इस मैकेनिज्म में X-51A Waverider हाइपरसोनिक क्रूज मिसाइलों का इस्तेमाल करके दिखाया है. यह मिसाइल मैक-5 या उससे ऊपर की स्पीड तक जाती है.

क्या है **X-51A Waverider** हाइपरसोनिक क्रूज मिसाइल?

इस मिसाइल को बोईंग कंपनी ने ही बनाया है. यह एक प्रायोगिक मिसाइल है. जिसकी स्पीड 5300 किलोमीटर प्रतिघंटा है. यह अधिकतम 70 हजार फीट यानी 21 किलोमीटर की ऊंचाई तक जा सकती है. इसकी पहली सफल उड़ान 26 मई 2010 को हो चुकी है. इस मिसाइल को पहले अमेरिकी वायुसेना इस्तेमाल करती थी. लेकिन 2013 में इसे रिटायर कर दिया गया था. बोईंग ने सिर्फ ऐसी चार मिसाइलें ही बनाई थीं. खैर यहां मिसाइल जरूरी नहीं बल्कि रिवॉल्वर सिस्टम है. इस सिस्टम से किसी भी तरह की मिसाइल दागी जा सकती है.

भारत को इस तकनीक से क्या फायदा हो सकता है?

भारत के पास 11 सी-17 ग्लोबमास्टर 3 विमान हैं. भारतीय वायुसेना के पास लंबी दूरी के बमवर्षक नहीं है. जबकि चीन के पास है. रूस के पास है. चीन तो अब स्टेल्थ बॉम्बर बना चुका है. अगर यह रिवॉल्वर सिस्टम भारत के सी-17 ग्लोबमास्टर विमानों में लगा दिया जाए तो इससे काफी ज्यादा फायदा होगा. लंबी दूरी पर हमला करना आसान हो जाएगा. भारत को विदेश से मिसाइल खरीदने की जरूरत नहीं है, क्योंकि DRDO खुद हाइपरसोनिक मिसाइल बना चुका है. यानी रिवॉल्वर सिस्टम विदेशी हो सकता है लेकिन उसमें स्वदेशी मिसाइल लगेगी.

[https://www.aajtak.in/defence-news/story/how-indian-air-force-could-get-benefit-from-boeing-hypersonic-missile-revolver-system-fitted-in-c-17-globemaster-strategic-airlifter-aircraft-1974578-2024-06-28](https://www.aajtak.in/defence-news/story/how-indian-air-force-could-get-benefit-from-boeing-hypersonic-missile-revolver-system-fitted-in-c-17-globemaster-strategic-transport-aircraft-1974578-2024-06-28)



Mon, 01 July 2024

## From Paris To Pune, French Defense Giant Thales Aggressively Forges Ties With Key Firms Under ‘Make In India’

Adani Defence & Aerospace has joined forces with French powerhouse Thales Group to light up skies with homegrown rockets. Announced at the buzzing Eurosatory 2024 event, this partnership isn't just another business deal—it's a rocket-fueled boost for India's ambitious "Make in India" program.

### Thales & Adani Defence Join Hands

Adani Defence & Aerospace, the defense arm of Adani Group, has signed an agreement with Thales Group to manufacture rockets in India. This marks a significant advancement for the government's "Make in India" program. The partnership was announced at 'Eurosatory 2024,' with both Thales and Adani Defence & Aerospace highlighting their commitment to strengthening their presence in India's 70mm rocket market.

Ashish Rajvanshi, CEO of Adani Defence & Aerospace, described the partnership as a crucial step in expanding their offerings for the Indian Armed Forces and international markets.

## Thales Group

Thales Group is a French multinational company specializing in designing, developing, and manufacturing electrical systems and devices for the aerospace, defense, transportation, and security sectors. The company is headquartered in Paris' business district, La Défense. Thales Defense and Security is renowned as one of the leading manufacturers of tactical communications equipment.

### Expanding Footprint: From Paris To Pune

Just last year, Thales announced their plans to expand their presence in India. Thales, the French multinational known for its electrical wizardry in aerospace and defense, has been quietly conquering Indian hearts since 1953. The company's Indian headquarters is located in Noida, with additional operational offices and sites in Bengaluru, Hyderabad, Mumbai, and Pune.

Thales employs 2,200 people in India, including those working in joint ventures. The company operates two engineering competence centers in India: one in Delhi NCR focused on digital identity and security, and another in Bengaluru focused on defense and aerospace, employing over 1,500 engineers. In April 2024, Thales announced plans to establish a Maintenance, Repair, and Overhaul (MRO) facility in Delhi-NCR by March 2025, with a 'multi-million-euro' investment.

Pascale Sourisse, CEO of Thales International, stated, "Thales is investing multi-million Euros in an MRO set up in Gurgaon, India, to provide world-class service efficiency to its airline customers."

### Strategic Collaborations

Thales has been actively forming partnerships, teaming up with major Indian public sector undertakings (PSUs) and private players such as Hindustan Aeronautics Limited (HAL), Bharat Electronics Limited (BEL), Reliance, and more. From jointly developing radars to producing precision-strike rockets, Thales is dedicated to solidifying its position as India's preferred French collaborator.

- Hindustan Aeronautics Limited (HAL):** Thales has been working closely with HAL for over 50 years, providing high-end avionics for HAL-designed platforms. French engine manufacturer Safran is expanding its partnership with HAL to transfer more technology for the Shakti engine and jointly develop a new power plant for the Indian multi-role helicopter program.

- BEL-Thales Systems Limited:** Incorporated in August 2014 as BEL-Thales Systems Limited (BTSL), this joint venture focuses on civilian and select ground-based military radars for both Indian and international markets. Currently, the company is co-developing a multi-target tracking radar with Thales Netherlands to meet upcoming Indian weapon systems projects and global needs. Additionally, BTSL provides technical and product support for Air Traffic Management Radars.

- Thales Reliance Defence Systems (TRDS):** This is a 51:49 joint venture between Thales and Reliance Aerostructure Limited. Located in Nagpur, it is Thales' only facility outside France with full integration capabilities for AESA Radar, Spectra EW Suite, and

maintenance support for Front Section Optronics (FSO) for Rafale aircraft. It also serves as the Group's global production center for airport navigational aids.

•**Bharat Dynamics Limited (BDL):** In February 2023, Thales and BDL, a Government of India enterprise, signed a Memorandum of Understanding to set up manufacturing facilities in India for precision-strike 70mm laser-guided rockets (FZ275 LGR). This agreement enables BDL to offer a 'Make in India' 70mm laser-guided rocket solution for the existing fleet of Advanced Light Helicopters (WSI) and Light Combat Helicopters of the Indian Government.

•**Kalyani Group:** In April 2019, Kalyani Group and Thales formalized a new collaboration to design, develop, and manufacture next-generation weapons systems for the defense and law enforcement sectors in India and abroad. This partnership leverages Thales's over 100 years of experience in designing and manufacturing leading defense systems in Australia.

•**MKU:** In February 2020, Thales and MKU, headquartered in Kanpur, announced the co-development of the ELFIE Night Vision Device (NVD) for armed forces in India and worldwide. This collaboration builds on an MoU signed in 2018 for strategic cooperation on developing optronic devices, which are being co-developed at MKU's facility in Kanpur, Uttar Pradesh.

Thales is also exploring the Indian market for drones. In June 2023, it was reported that Thales was in preliminary discussions with Indian conglomerates Adani Group and Reliance Industries Ltd to collaborate on an unmanned air traffic management system for drones.

### **Adani Group**

Enter Adani Defence & Aerospace, the muscular arm of the Adani Group that's flexing its way through India's defense sector since 2015. Its key offerings span missiles and weapons for airborne, surface, infantry, ammunition, and air defense applications. The company also specializes in platforms and systems such as unmanned aerial systems (UAS), loitering munitions, counter-drone systems, unmanned ground vehicles (UGV), electronic warfare (EW), and cyber technologies.

The Adani Group has allocated \$2-2.5 billion for acquisitions in the defense sector over the next 2-3 years. It collaborates with the Defence Research and Development Organisation (DRDO) on various projects, including naval anti-ship missiles. The group has partnered with leading defense technology companies in the Middle East, Eastern Europe, Africa, and Southeast Asia to bring advanced technologies into the defense sector. Adani plans to increase investments in unmanned systems, small arms, and missiles while venturing into the production of indigenous artillery guns. The group is also focused on establishing maintenance, repair, and overhaul (MRO) solutions in India.

Earlier this month, Adani Defence and Aerospace signed a landmark agreement with EDGE Group, a leading advanced technology and defense company based in the UAE. This partnership aims to create a global platform that leverages the combined defense and aerospace capabilities of both companies. The focus will be on integrating their product portfolios to meet the needs of both global and local markets. The Adani-EDGE agreement includes plans to establish research and development facilities in India and the UAE. It will also explore setting up development,

production, and maintenance facilities for defense and aerospace solutions, targeting not only the domestic markets of India and the UAE but also Southeast Asian and global markets.

### **Adani's Focus On Drone Technology**

Adani is targeting drone technology companies in Bengaluru and Hyderabad as potential acquisition targets for reconnaissance in hostile environments. Talks are ongoing with these firms, and a deal is expected in the coming months. Adani's range of counter-drone systems is designed for challenging and hostile territories to minimize human casualties, enabling defense forces to conduct remote reconnaissance activities. Adani is actively seeking advanced technologies and anticipates acquisitions to bridge gaps in its offerings. The company has announced a ₹1,000 crore investment in Telangana to establish counter-drone and missile facilities.

Last year, Adani Defence launched the indigenously manufactured Drishti 10, an advanced intelligence, surveillance, and reconnaissance platform, in Porbandar. It also inaugurated a serial production line for missile systems in Hyderabad. The partnership between Adani Defence & Aerospace and Thales Group marks a significant milestone for India's defense manufacturing capabilities under the "Make in India" initiative. By collaborating to manufacture rockets locally, these two industry leaders are not only bolstering national defense but also advancing technological prowess in aerospace.

<https://www.eurasiantimes.com/from-paris-to-pune-french-defense-giant/>



*Sun, 30 June 2024*

## **India's Plan To Develop "China Chokepoint" At Strategic Andaman & Nicobar Islands, In The Eye Of Storm**

Sitting at the entrance of the Malacca Straits, a chokepoint for China connecting the South China Sea and the Indian Ocean Region (IOR), the Andamans and Nicobar Islands will be converted into a shipping hub and tourist destination under a US \$9 billion project. The 572-item Island chain is emerging as an essential part of India's strategy to balance China's burgeoning dominance in the Indo-Pacific.

Over the past decade, the Chinese Navy's surface ships and submarines in the Indian Ocean have become ubiquitous with their presence. In 1962, when India and China fought their first and bloody war, a Chinese submarine was sighted in the IOR, the Indian government had sanctioned a 150-sailor garrison on the islands. Chinese submarines coming to the Indian Ocean are forced to surface in the narrow Malacca Strait. Considering only 37 of the 572 islands are inhabited, calls for beefing up security measures around the islands have only increased.

Later, after the Kargil War, when intruders got into Indian territory and occupied the unoccupied posts, the Indian forces realized that the islands, many of which are uninhabited, would be vulnerable to "surreptitious occupation" by a belligerent neighbor. Thus, India's first tri-service

command was established on the archipelago. Located at the confluence of the Indian and Pacific Oceans, the Andaman and Nicobar Islands are said to be one of the world's most strategically located island chains. The northernmost point of the 572 islands is only 22 nautical miles away from Myanmar, and its southernmost point is a mere 90 nautical miles from Indonesia. The islands control the Bay of Bengal, the Six Degree, and the Ten Degree channels, which over 60,000 commercial vessels use.

A trans-shipment hub planned for Campbell Bay will be close to the Malacca Strait and the East-West shipping route connecting Europe, Africa, and Asia. The biggest advantage of the island chain located over 1200 kilometers away from mainland India is that it controls important choke points like the Malacca Straits, one of the busiest shipping lanes in the world. Hence, India is on a quest to strengthen its position in the archipelago and maintain a stable Indo-Pacific. The project scale can be gauged by the promotional video posted by the Ministry of Ports, Shipping, and Waterways on its handle on X. In March 2021, NITI Aayog unveiled a ₹72,000 crore plan called 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands.'

It includes the construction of an international transshipment terminal, an international airport, a power plant, and a township. The project will be implemented by the Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO), a government undertaking. The clearance of the project has sparked concerns among environmentalists that the project will adversely impact the fragile ecosystem of the region. The rainforests and beaches host numerous endangered and endemic species, including the giant leatherback turtle, the Nicobar megapode, the Great Nicobar crane, the Nicobar crab-eating macaque, and the Nicobar tree shrew. It has an area of 910 sq km with mangroves and Pandan forests along its coast.

It is home to two tribes—the Shompen and the Nicobarese. These were the sole inhabitants of the island until the government set up seven revenue villages by settling 330 ex-servicemen families on the islands from 1969 to 1980. Presently, the population of Southern Nicobar, comprising Great Nicobar Island, Little Nicobar, and other small islands, is over 8,000. The mega project would bring nearly 400,000 people to the island in 30 years. An estimated 8.5 lakh trees will be cut down in GNI's prehistoric rainforests for the project.

### **Militarising The Archipelago**

India already had two airports at Port Blair and Car Nicobar, and the Indian Navy is building a longer runway at Shibpur (commissioned as INS Kohassa) in the north. The Indian government is developing the islands' military assets as part of a 10-year infrastructure development. The Campbell Bay (INS Baaz) runway in the south will be extended to 10,000 feet to support operations by larger aircraft. Another 10,000-foot runway is planned at Kamorta.

India has been deploying its Sukhoi Su-30MKI and Jaguar Maritime fighter jets in the islands. The Indian Navy's Poseidon submarine hunters P-8Is also operate from here. The military infrastructure development is to enable the permanent deployment of these assets from here. Former Indian Navy Chief Admiral DK Joshi was appointed as the Lieutenant Governor of the islands in 2017 to promote the security, economic, and commercial potential and limitations of the islands' development.

Talking about the strategic importance of the isles, former Indian Navy chief Admiral Arun Prakash wrote that the military assets stationed here need to be beefed up as “the frequent transits of PLA Navy (PLAN) warships, submarines, and research/intelligence-gathering vessels in these waters portend a sustained Chinese naval presence, including nuclear attack submarines.” “This would require the IN to maintain a substantial anti-submarine warfare capability in the A&N,” the former Indian Navy chief contended.

“To obviate the possibility of intrusions by state and non-state entities, ANC (Andaman and Nicobar command) will need to maintain three-dimensional maritime domain awareness through networked assets, including radars, aircraft, satellites, and unmanned vehicles. The command must be invested with adequate defensive and offensive firepower, as well as rapid-reaction forces with amphibious and airlift capabilities,” he further added.

The Andaman and Nicobar Command periodically conducts joint maritime exercises such as SIMBEX, the Singapore-India Maritime Bilateral Exercise. The Indian forces also conduct MILAN, the largest naval exercise in the region. Most recently, India inaugurated the Chennai-Andaman and Nicobar undersea internet cable to provide a high-speed internet connection to seven remote island chains.

The naval vessels of partner countries often make a pit stop in the Andaman and Nicobar Islands before entering or exiting the South China Sea. The Quad countries and France have been working with India to develop Andamans and Nicobar to answer China’s increasing footprint in the surrounding waters. There have been reports that India will be installing the Japan-US “fishhook” SOSUS (Sound Surveillance System, a chain of sensors designed to track submarines), creating a counter-wall against Chinese submarines loitering in the Andaman Sea and deep South China Sea.

It will be a crucial collaboration, as it is said that once up and running, Japan will share intelligence with the United Kingdom, Australia, and India. Japan, which controlled these islands till World War II, understands the strategic importance of these isles. In 2022, the Japan International Cooperation Agency (JICA) decided to provide aid of up to 4,016,000,000 Japanese Yen (approximately US \$133 million) for a power supply project in India’s Andaman and Nicobar Islands. Once completed by February 2024, this project will provide clean, renewable energy to the islands.

<https://www.eurasiantimes.com/indias-plan-to-develop-china-chokepoint-at-strategic-andaman-nicobar-islands-in-the-eye-of-storm/>



*Sun, 30 June 2024*

## **Lockheed Eyes “Biggest Ever” Indian Air Force Deals; Looks To Beat Airbus, Embraer For IAF’s MTA Contract**

US defense giant Lockheed Martin is engaged in a massive “battle” for the Indian Air Force’s transport and fighter jet aircraft. For the transport aircraft fleet, Airbus and Embraer are challenging

Lockheed Martin for the IAF contract. Indian Air Force's (IAF) transport aircraft fleet has been the country's real workhorse. They have played a stellar role in Humanitarian Assistance and Disaster Relief (HADR) within the country and regions far and beyond and earned global appreciation. They also play a critical role in the intra and inter-theater movements of the Indian armed forces and the sustenance of the Indian Army in the Himalayas, both in the north and northeast. The fleet has been the IAF's logistics backbone. For nearly 40 years, the Ilyushin Il-76MD and the Antonov An-32 aircraft were the main workhorses. The induction of the C-17 Globemaster and C-130J-30 increased India's global reach and payload capacity.

India is fast becoming the third-largest economy. Its global stature and commitments require that the IAF transport fleet capability be enhanced. Older aircraft will eventually retire. The selection and induction processes take time. Therefore, the IAF has started looking for a new transport aircraft with an 18 to 30-ton cargo-carrying capacity. This mid-range covers the payload zone between IL-76 and An-32. The contenders showing interest include Embraer's C-390, Lockheed Martin's C130J, and the Airbus A400M Atlas.

### **IAF Current Transport/Cargo Fleet**

The IAF has a 17-aircraft fleet of Ilyushin Il-76MDs with a load capacity of 48 tons. They began inducting in early 1985. The aircraft conducted its first flight in 1971. A popular design, nearly 970, were produced, and they still have takers. The IAF bought 125 Antonov An-32 aircraft with a 6.7-ton payload capacity. The aircraft first flew in 1976 and joined the IAF in 1984. 105 are still in service. The fleet has been upgraded recently. Both these aircraft have seen nearly 40 years of service with the IAF. IAF also bought nearly a dozen 77.5-ton payload Boeing C-17 Globemaster III, deliveries for which began in June 2013. IAF inducted 12 four-engine Lockheed Martin C-130J-30 Super Hercules turboprop military transport aircraft with nearly 19-ton payload capacity. IAF's 56 HS-748 aircraft (max 5-ton payload) are being replaced by 56 Airbus C-295MW aircraft (7 to 9-ton load) in about a decade. Indian armed forces and Coast Guard also operate the Dornier 228 (19 passengers) in large numbers.

### **Indo-Russian MTA Project**

The United Aircraft Corporation (UAC) of Russia and Hindustan Aeronautics Limited (HAL) of India began a joint venture in 2009 to build a Medium Transport Aircraft (MTA). Each side pitched US\$300 million for the project. The aircraft was intended to replace the IAF's Antonov An-32 transport aircraft. India would acquire 45 aircraft, and Russia 105. Both governments agreed to produce the aircraft for their respective armed forces and for friendly third-party countries and to develop a civilian variant of the MTA in the form of a 100-seater passenger airplane, for which HAL will be the lead partner and principal integrator. The Indian portion of the MTA's serial production would take place at HAL's Transport Aircraft Division in Kanpur.

In October 2012, HAL signed a preliminary design contract with UAC, stipulating that joint design work would begin in Moscow, involving 30 Indian engineers as well as UAC's design team. The aircraft was being called an Il-214. In February 2015, India cancelled its existing international tender on medium-lift military transport aircraft, formalizing its intent to purchase the joint MTA. The 20-ton payload twin-engine aircraft was an Il-76 lookalike but smaller in size. Its maximum range was expected to be 2,500 kilometers. In January 2016, it was announced that, due to



technical reasons, India's HAL would no longer be involved in the project and that Russia was proceeding with the project alone.

The aircraft designated as Ilyushin Il-276 is now being developed by UAC. It is designed to perform regular transport duties and also to deploy up to 150 paratrooper soldiers or up to 20 tons of cargo. According to the Russian press, the Il-276 is expected to begin flight testing in 2023 and deliver the first units in 2026. Ilyushin intends to achieve an annual production rate of 12 units by 2029. Russia needs around 55 aircraft initially, and induction is planned in 2026. In February 2023, on the sidelines of the Aero India 2023 air show, a Russian delegation from Rostec held talks with Indian officials on the possibility of the joint development of the Il-276. However, India would prefer the aircraft to come with a European engine instead of a Russian engine, which is unlikely to be possible for Russia to propose.

### **IAF's Requirement As Per RFI**

The IAF needs a new transport aircraft with an 18 to 30-ton cargo-carrying capacity. The numbers could be significant. The information IAF is seeking from the original equipment manufacturers (OEM) includes technical specifications, the scope of technology transfer, methods to enhance indigenization and to set up a dedicated manufacturing line, including design, integration, and manufacturing processes in India; capability to undertake indigenous manufacture of systems, subsystems, components, and spares; and making India a regional or global hub for manufacturing and maintenance, repair and overhaul (MRO) of the equipment. Companies will have to identify local firms for a possible partnership to bid for the project.

The Request for Information (RFI) was issued in December 2022, and the submission deadline was extended till 31 March 2024. The contenders are the Airbus A-400, Lockheed Martin C-130, and Embraer C-390. Responses have reportedly been received. The 'Make in India' component is part of the potential deal, along the lines of the C-295 transport aircraft. The RFI requires that aircraft deliveries commence within 36 months of the contract signing. It seems that the actual numbers required will be spelled out later. The vendors have been asked to provide a 'Rough Order of Magnitude (ROM) cost of aircraft and associated equipment' for a batch of 40, 60, and 80 aircraft, respectively. The IAF could procure between 40 and 80 aircraft.

### **Airbus A400M Atlas**

The Airbus A400M Atlas is a European four-engine turboprop military transport aircraft. It is a tactical airlifter with strategic capabilities. It is sized between the C-130 and the Boeing C-17 Globemaster III. It can carry heavier loads than the C-130 and can use rough landing strips. In addition to its transport capabilities, the A400M can perform aerial refueling and medical evacuation when fitted with appropriate equipment. More than 30 percent of the airplane's structure is made of composite materials. Its carrying capacity is 37 tons, which translates to 116 fully equipped troops or paratroopers.

The range is 3,300 km with a max payload and 4,500 km with a 30-tonne payload. The tactical takeoff distance is 980 m. It can operate from short and unpaved airstrips. Typically, the aircraft will be able to carry the Indian Army's light tank with a maximum weight of 25 tons. The service ceiling is 12,200 m (40,000 ft). The aircraft made its maiden flight in December 2009. Service inductions began in 2013 with the French Air and Space Force. 124 were produced until 31 March

2024. It has 178 orders from 10 countries, with the order book going up to 2030. Germany, France, the UK, Spain, Belgium, Turkey, Indonesia, Kazakhstan, and Malaysia, among a few others, have placed orders for this aircraft. India has been exposed to it during air exercises in India and abroad.

**Embraer C-390 Millennium**

The Embraer C-390 Millennium is a medium-size, twin-engine, jet-powered military transport aircraft. It is the heaviest aircraft the company has built to date. Work on the project began at Embraer in the mid-2000s. The E190 jetliner is similar in size to the Lockheed C-130 Hercules. Embraer initially planned to launch a stretched version of the aircraft as a civilian freighter. The final military cargo variant flew in February 2015. In September 2019, the first production aircraft was delivered to the Brazilian Air Force.

With a capacity of 26 tons of payload, the aircraft can be configured to carry troops, VIP and cargo transportation, and aerial refueling tankers. 80 soldiers or 66 paratroopers with full gear and loads of up to 19 tons can be air-dropped. The aircraft’s range is 2,000 km with 26 tons and 5,020 km with 14 tons. The service ceiling is 11,000 m (36,000 ft). Brazil and Portugal are its current customers, and potential buyers include Hungary, the Netherlands, Austria, the Czech Republic, Egypt, India, Rwanda, South Africa, South Korea, and Sweden. Embraer claims that C-390 has the advantages of being a newer aircraft with the latest technology, multi-mission capability, operational flexibility, and low operating costs. Embraer and India’s Mahindra group announced collaboration on the C-390 Millennium MTA in India.

**Lockheed Martin C-130J Super Hercules**

IAF is already operating the Special Operations variant of the C-130J. India is very conversant with its performance and limitations, if any. The Cargo variant need not have the special equipment required for penetration into enemy territory. The C-130J Super Hercules is a four-engine turboprop military transport aircraft. The original C-130 variant was first flown in 1954, and more than 2,500 have been built. It C-130 J is a comprehensive update of the base C-130 Hercules, with new engines, flight deck, and other systems. The C-130J is the newest version and the only model currently in production. Since the variant first flew in April 1996, over 500 C-130J aircraft have been delivered to 26 operators in 22 countries. India acquired the aircraft as part of the US Government’s Foreign Military Sales (FMS) program.

The 19-ton payload could include 92 passengers or 64 airborne troops. At a max normal payload of 15.4 tons, the range is 3,300 km. With a 19-ton payload, the service ceiling is 28,000 ft (8,500 m), and the absolute ceiling is 40,386 ft (12,310 m).

**Comparative Chart**

Attribute	Airbus A400M	Embraer C-390	Lockheed C-130J
First Flight	December 2009	February 2015	April 1996
Max payload	37 ton	26 ton	19 ton
Airborne Troops	116	66	64
Range with Max load	3,300 km	2,000 km	3,300 km (15.4 ton)
Ceiling	12,200 m	11,000 m	12,310 m

## Conclusion

The process will start only after acceptance of Necessity (AoN) by the Defence Acquisition Council (DAC) and issuance of a request for proposal (RFP). After the bids are received, will start the technical evaluation by IAF. The aircraft will have to meet the technical specifications and operational requirements for which it is being procured. Basic and life cycle costs will be next. Another important issue will be the level of technology transfer. Also, whether the package can be laced with some accruements, such as other technologies, independent of the project.

Enhancing indigenization, setting up a dedicated manufacturing line, supporting international sales, securing spare supply chains, and making India a regional or global hub for manufacturing and maintenance, repair, and overhaul (MRO) of the equipment would be important criteria. The IAF has to airlift not just troops but combat vehicles and other odd-sized equipment, including radars and surface-to-air guided weapons, to forward locations. Short-field landing and take-off capability will be important. The ability to operate from advanced landing grounds (ALG) with high mountains on approach paths would require steep climb and descent capability.

Undoubtedly, the competitors are good and have their own advantages. Embraer, Lockheed, and Airbus have known India well. India flies the Embraer EMB135 Legacy in the VIP squadron. DRDO Airborne Early Warning and Control System (AEW&CS) is based on Embraer ERJ-145 aircraft. Airbus and Lockheed have a long-term presence in India, including manufacturing facilities. Both these are much larger companies and can then perhaps wield greater influence.

Lockheed is the world's largest defense contractor. It builds the F-16 wings, C-130J empennage, and more than 5,000 precision components that compose each S-92 cabin, which is 100 percent indigenous and made in India. Lockheed Martin has integrated 70 Indian suppliers into the global defense supply chain. C-295W is an Airbus project. Airbus has a huge presence in the civil aviation sector and can provide support in that regard. Airbus Helicopters are working to become big in India.

IAF's greatest importance remains the fighter squadron numbers where Lockheed Martin is pitching its F-21 aircraft. They are also the firm behind much sought-after F-35 stealth fighters. The next priority is quickly obtaining additional AEW&C and FRA. The MTA is the next but important priority. India is known for long bureaucratic processes and often long-drawn delays in military acquisitions. It is time to get going, lest India be saddled with a capability gap.

<https://www.eurasiantimes.com/lockheed-eyes-biggest-ever-indian-air-force/>

# THE ECONOMIC TIMES

*Sat, 29 Jun 2024*

## **As North Korean and Chinese threats rise, US looks to lock in defense partnerships with Asian allies**

The United States wrapped up its first multidomain exercise with Japan and South Korea in the East China Sea on Saturday, a step forward in Washington's efforts to strengthen and lock in its

security partnerships with key Asian allies in the face of growing threats from North Korea and China.

The three-day Freedom Edge increased the sophistication of previous exercises with simultaneous air and naval drills geared toward improving joint ballistic-missile defense, anti-submarine warfare, surveillance and other skills and capabilities. The exercise, which is expected to expand in years to come, was also intended to improve the countries' abilities to share missile warnings - increasingly important as North Korea tests ever-more sophisticated systems.

Outside of Australia, Japan and South Korea are the only U.S. partners in the region with militaries sophisticated enough to integrate operations with the U.S. so that if, for example, South Korea were to detect a target, it could quickly relay details so Japanese or American counterparts could respond, said Ridzwan Rahmat, a Singapore-based analyst with the defense intelligence company Janes.

"That's the kind of interoperability that is involved in a typical war scenario," Rahmat said. "For trilateral exercises like this the intention is to develop the interoperability between the three armed forces so that they can fight better as a cohesive fighting force."

Such exercises also carry the risk of increasing tensions, with China regularly denouncing drills in what it considers its sphere of influence, and North Korea already slamming the arrival of the USS Theodore Roosevelt carrier group in the port of Busan - home to South Korea's navy headquarters and its Gimhae Air Base - in preparation for Freedom Edge as "provocative" and "dangerous."

On Wednesday, the day after South Korean President Yoon Suk Yeol visited the Roosevelt in Busan, becoming the first sitting South Korean president to board a U.S. aircraft carrier since 1994, North Korea tested what it said was a multiwarhead missile, the first known launch of the developmental weapon, if confirmed.

South Korea's military said a joint analysis by South Korean and U.S. authorities assessed that the North Korean missile launch failed. The defense cooperation involving both Japan and South Korea is also politically complex for both Yoon and Japanese Prime Minister Fumio Kishida, due to the lingering resentment over Imperial Japan's brutal occupation of Korea before and during World War II.

The two countries have the largest militaries among American allies in East Asia - and together host some 80,000 American troops on their territories - but the U.S. has tended to work with them individually rather than together due to their history. Kishida's increase of defense spending and cooperation with South Korea have generally been well received by the Japanese public but has caused friction with the right wing of his own party, while Yoon's domestic appeal has weakened, but he has stayed the course.

"South Korea's shift under the Yoon administration toward improving its relations with Japan has been extremely significant," said Heigo Sato, international politics professor and security expert at Takushoku University in Tokyo. Both leaders are seen to be trying to fortify their defense relationships with Washington ahead of the inauguration of a new president, with South Korean officials saying recently that they hope to sign a formal security framework agreement with the U.S. and Japan this year that would lock in a joint approach to responding to a possible attack from North Korea.

U.S. President Joe Biden's administration has also long been working to increase cooperation between South Korea and Japan - something that many didn't think was possible at the start of his presidency, said Euan Graham, a defense analyst with the Australian Strategic Policy Institute. "Credit where it's due - the fact that it's happening is a significant achievement from the administration's regional policy," he said.

Former U.S. President Donald Trump caused friction with both allies during his time in office by demanding greater payment for their hosting of U.S. troops while holding one-on-one meetings with North Korea's Kim Jong Un. Under Biden, Washington is seeking to solidify its system of alliances, both with increasingly sophisticated exercises and diplomatic agreements, Graham said. "It's obviously a U.S. attempt to try and mesh their alliances as positively as possible, not just given the challenge of their adversaries, but also the uncertainty around a second Trump administration," he said. "They're trying to institutionalize as many of these habits of cooperation while they can."

Tensions with North Korea are at their highest point in years, with the pace of Kim Jong Un's weapons programs intensifying, despite heavy international sanctions. China, meantime, has been undertaking a massive military buildup of both nuclear and conventional weapons, and now has the world's largest navy. It claims both the self-governing island of Taiwan and virtually the entirety of the South China Sea as its own territory, and has increasingly turned to its military to press those claims.

China and North Korea have also been among Russia's closest allies in its war against Ukraine, while Russia and China are also both key allies for North Korea, as well as the military leaders of Myanmar who seized power in 2021 and are facing ever-stiffer resistance in that country's civil war. In Pyongyang this month, Russian President Vladimir Putin and Kim concluded a mutual defense pact, agreeing to come to the other's aid in the event of an attack, rattling others in the region.

Despite a greater number of ships overall, China still only has three aircraft carriers compared to the U.S. fleet's 11 - probably the most effective tool a country has to bring vast amounts of power to bear at a great distance from home. China's advantage, however, is that its primary concern is the nearby waters of the Indo-Pacific, while Washington's global focus means that its naval assets are spread widely.

Following the exercises in the East China Sea with Japan and South Korea, the Roosevelt is due to sail to the Middle East to help protect ships against attacks by Yemen's Houthi rebels. That has made strong security partnerships all the more important, not only with Japan and South Korea but with Australia, the Philippines, Taiwan and others in the region, and building those up has been a priority for the Biden administration. "One of the weaknesses of the Chinese navy, despite the number of hulls that they have compared to the Americans, is the fact that they don't have a network of friendly ports from which they can operate in the event they need to launch a campaign," Rahmat said. "One of the strengths of the U.S. Navy is not just its ships and its technology, but its ability to call on a vast network of friendly ports and, aware of this strength, they are doubling down by increasing partnerships across the region."

<https://economictimes.indiatimes.com/news/defence/as-north-korean-and-chinese-threats-rise-us-looks-to-lock-in-defense-partnerships-with-asian-allies/articleshow/111356772.cms>

## **North Korea test-launches 2 ballistic missiles, after end of new US-South Korea-Japan drill**

North Korea test-fired two ballistic missile Monday, South Korea's military said, a day after the North vowed "offensive and overwhelming" responses to a new US military drill with South Korea and Japan. The Joint Chiefs of Staff said the missiles were launched 10 minutes apart in a northeastern direction from the town of Jangyon in southeastern North Korea.

It said the first missile flew 600 kilometres (370 miles) and the second missile 120 kilometres (75 miles), but didn't say where they landed. North Korea typically test-fires missiles toward its eastern waters, but the second missile's flight distance was too short to reach those waters. South Korean media said an unidentified South Korean military source reported that it was highly likely the second missile crashed in an inland area of the North. Possible damages on the North's ground weren't immediately reported.

The reports said the first missile landed in the waters off the North's eastern city of Chongjin. South Korea's Joint Chiefs of Staff, which did not comment on the media reports, said South Korea maintains a firm readiness to repel any provocations by North Korea in conjunctions with the military alliance with the United States.

The launch came two days after South Korea, the US and Japan ended their new multidomain trilateral drills in the region. In recent years, the three countries have been expanding their trilateral security partnership to better cope with North Korea's evolving nuclear threats and China's increasing assertiveness in the region. The "Freedom Edge" drill was meant to increase the sophistication of previous exercises with simultaneous air and naval drills geared toward improving joint ballistic-missile defence, anti-submarine warfare, surveillance and other skills and capabilities.

The three-day drill involved a US aircraft carrier as well as destroyers, fighter jets and helicopters from the three countries. On Sunday, North Korea's Foreign Ministry issued a lengthy statement strongly denouncing the "Freedom Edge" drill, calling the US-South KoreaJapan partnership an Asian version of NATO. It said the drill openly destroyed the security environment on the Korean Peninsula and contained a US intention to lay siege to China and exert pressure on Russia.

The statement said North Korea will "firmly defend the sovereignty, security and interests of the state and peace in the region through offensive and overwhelming countermeasures." Monday's launch was the North's first weapons firing in five days. On Wednesday, North Korea launched what it called a multiwarhead missile in the first known launch of a developmental, advanced weapon meant to defeat US and South Korean missile defences.

North Korea said the launch was successful, but South Korea dismissed the North's claim as deception to cover up a failed launch. In recent weeks, North Korea has floated numerous trash-carrying balloons toward South Korea in what it has described as a tit-for-tat response to South

Korean activists sending political leaflets via their own balloons. Last month, North Korea and Russia also struck a deal vowing mutual defense assistance if either is attacked, a major defence pact that raised worries that it could embolden Kim to launch more provocations at South Korea.

Meanwhile, North Korea opened a key ruling party meeting Friday to determine what it called "important, immediate issues" related to works to further enhance Korean-style socialism.

<https://economictimes.indiatimes.com/news/defence/north-korea-test-launches-2-ballistic-missiles-after-end-of-new-us-south-korea-japan-drill/articleshow/111390717.cms>



*Sun, 30 June 2024*

## **Russia’s “Super-Maneuverable” Aircraft On Way As Engineers Claim Developing Innovative Wing With Movable Skin**

Russian design engineers have claimed a groundbreaking advancement in aerospace technology: an innovative wing with a movable skin that promises to create super-maneuverable aircraft. This innovative design is expected to revolutionize flight dynamics and aircraft performance, according to Izvestia. The key innovation lies in a specialized mechanism that allows the wing’s bearing surface to change shape while maintaining smoothness. This flexibility enables more precise control of flight modes. Ivan Amelyushkin, head of the Department of Aerophysics of multiphase flows, rarefied gases, and plasma at the Central Aerohydrodynamic Institute, detailed the mechanism: “The wing contains a chain of lever mechanisms connected and linked to the sheathing with special spokes. Altering the geometry of one chain link triggers corresponding changes in the others, creating a smooth curve in the wing surface. The angles between the lever mechanisms remain consistent, allowing the skin to bend without stretching or wrinkling.”

This innovative wing design will facilitate a range of flight maneuvers, enabling aircraft to reduce and increase speed efficiently and perform smooth takeoffs and landings. “Our design integrates the wing, flaps, and ailerons into a single unit, combining fixed and movable parts. This geometry allows for effective placement of fuel tanks, drives, wiring, and other essential components, resulting in a lightweight, strong, and functional wing,” explained Oleg Druzhinin, a TsAGI (Central AeroHydrodynamic Institute) engineer and co-author of the development. During the development phase, engineers constructed a full-size model of the wing and a demonstrator of one of its segments. Testing revealed that changing the curvature of the wing profile could alter the angle between the nose and tail segments of the mechanical chain by up to 80°.

One of the major challenges in aerospace engineering has been maintaining the aerodynamic properties of bearing surfaces with variable wing geometry. According to the researchers, this new design effectively addresses that issue. The proposed wing mechanism allows for better speed control during flight. It also enhances the ability to glide in atmospheric currents at speeds

comparable to that of a car. Aircraft equipped with this mechanism can maneuver gracefully and achieve smooth takeoffs and landings. This revolutionary development in aircraft wing design holds the potential to significantly enhance the performance and versatility of both aerial and underwater vehicles.

### **Potential Application and Challenges**

Despite its apparent simplicity, the wing is one of the most complex elements of any aircraft. It generates the primary lift, determines flight dynamics, and endures the highest loads. So, it is designed for specific operating conditions. Alexey Rogozin, Director of the Center for the Development of Transport Technologies, said, “The idea of altering the wing for different flight modes could theoretically enhance the aerodynamic characteristics of the airframe significantly.”

The potential demand for this new invention depends on its reliability and safety. Initially, it needs to be tested on unmanned aircraft. If the design and mechanisms prove effective, they can be considered for manned aviation. According to the developers, these features could be valuable in various aerial tasks, such as spraying fertilizers over fields or conducting search operations. Another potential application is the creation of safe and cost-effective individual air mobility devices, like hang gliders. The device’s low speed would allow pilots to take off and land safely on their feet. The versatility of this mechanism extends beyond aviation. The designers believe it could greatly benefit underwater gliders, which adjust their immersion level by altering their density. Movable skin wings would enable these gliders to perform complex underwater maneuvers.

Boris Berkovsky, an aircraft engineering expert and adviser to the director of the Faculty of Engineering at the National University of Mongolia, noted that while the proposed solution was intriguing, it was technically challenging to implement. It requires extensive developments in materials science and microelectronics, as well as comprehensive testing and fine-tuning. In unmanned aviation, military needs are driving many developments, providing an opportunity for integration into this trend. However, as Oleg Pantelev, Executive Director of the Aviaport Agency, pointed out, many such inventions might be short-lived, only meeting immediate needs. In manned aviation, proving the consistency and applicability of design solutions can take many years. Nonetheless, experience shows that new developments can be introduced quickly when necessary. For instance, the Russian expert noted that saber-shaped wingtips designed for the Superjet-100 commercial aircraft five years ago are now part of its main import-substituted version.

<https://www.eurasiantimes.com/russian-engineers-develop-innovative/>



*Fri, 28 June 2024*

## **Germany, Spain ‘Battle’ For Indian Navy’s Massive API Submarine Deal; Madrid Eats Into Berlin’s Advantage**

The Indian Navy’s quest for fuel cell-based Air Independent Propulsion (AIP)- equipped conventional submarines is progressing, albeit a bit slowly. The Navy is assessing two submarines for its requirement of advanced diesel-electric submarines, but only one has a proven and validated



technology. The Indian Navy team is conducting field evaluation trials of the AIP technology developed by Spanish shipbuilder Navantia at Cartagena.

The technology is yet to be fitted into the S80 submarine offered to the Indian Navy. One of the submarines of the offered class has already been inducted into the Spanish Navy without AIP technology. Navantia has been asserting that its submarine design meets ‘almost’ all the technical requirements of P-75I without any redesign.

“The AIP designed for S80 produces more than 300 kW of power and, therefore, can be directly used for P75(I) without any redesign or scaling up. This would substantially mitigate major risks of the Indian Navy with respect to the P75(I) project,” Spanish shipyard Navantia’s Chairman Ricardo Dominguez Garcia-Baquero was quoted by the Indian Media. So far, Navantia has completed factory testing of its AIP technology for its S-80 program. During the tests, Navantia evaluated the system’s performance in a simulated environment that replicated the conditions the system would encounter during actual submarine missions. The facilities at Cartagena Shipyard allowed for this environment, with capabilities to simulate submarine operations and test entire sections of the submarine.

This is where the Indian Navy will be conducting its field evaluations. The Navantia Chairman stated that the S80 offered to the Indian Navy has the most contemporary features and incorporates the latest technologies, such as Generation BEST AIP (Bio-ethanol stealth Technology) and an advanced sensor suite. The proprietary technology Navantia uses in the AIP BEST system is based on fuel cells and is part of the so-called third-generation systems, i.e., those that use hydrogen produced on board from a fuel—bioethanol, in this case—instead of pure stored hydrogen for their operation. This evolution allows Spanish submarines to have a greater amount of onboard energy, being able to sail for up to three weeks in immersion with signatures comparable to those of pure electric navigation with batteries.

As the EurAsian Times understands, the Indian Navy requires efficient energy systems onboard. Another requirement for the Indian Navy has been to have fuel cell AIP technology combined with a Lithium-ion battery, which will give them the capability to lurk in the ocean depths for a longer duration and, when required, race to their target at high speeds while not giving up their position.

Navantia and its Indian partner Larsen and Toubro (L&T) are not tying up with another partner to provide a proven Lithium-ion battery technology for the project, Navantia’s Chairman revealed. The fuel-cell AIP gives the submarine long-range endurance at low speed, whereas the Lithium-ion battery allows it to cruise at high speed to reach its desired destination. The first Navantia submarine equipped with the AIP BEST technology is expected to roll out by 2026.

Requesting anonymity, a source told the EurAsian Times that their AIP system is still at least three years from being exploited on an operational submarine. Until then, laboratory tests and simulations are the only means to make these claims. There can be a slip between the cup and the lip.

The other submarine on offer to India is already proven and is part of many frontline navies. Recently, the submarine created ripples by completing a rare voyage under the Arctic Ice. The Portuguese Navy’s first-of-its-kind mission was accomplished by the Arpão (S161), built by Howaldtswerke-Deutsche Werft (HDW) in Germany and based on the export-optimized Type 214

design. The German shipbuilder ThyssenKrupp has offered its 214-class submarines. These combine the advanced technological aspects of 212 CD submarines with the latest developments in AIP technology. The 212 CD class submarines are built exclusively for the Norwegian Navy and are tailored to their operating requirements in the Baltic Sea.

The 214 being offered to India will be tailored to the requirements of the Indian Navy. It will be a derivative of the 214 class of submarines, with the latest enhancements in AIP technology. It will be equipped with a Lithium-ion battery, have an advanced sensor and combat system, and not compromise on stealth features. Also, the new 212 and 214-class submarines' hydrogen-powered fuel cell-based AIP technology allows them to remain submerged for three weeks at a time.

The 212 or 214 submarine class can operate silently without emitting exhaust heat, increasing its stealth. Fuel cells offer the lowest noise levels because almost no sound is produced by an electro-chemical reaction. It can launch torpedoes stealthily with a water ram expulsion system. It also comes with countermeasures against torpedoes like underwater effector jammers and has minimized acoustic, thermal, and magnetic signatures to provide more stealth. AIP-enabled submarines have increased mobility. They can "bottom" or sit on the ocean floor with only critical systems running to preserve energy and extend the operational time while using passive sonar to detect targets. Since fuel cells operate with greater efficiency at lower loads, bottoming could extend the endurance of a particular mission.

### **Indian Navy's Quest For Undersea Deterrence**

On March 25, the Indian Navy released stunning photographs of a pod of its submarines on the western seaboard. The eight submarines operated together in a recently concluded exercise in the Arabian Sea. Before this, Indian Navy Chief Admiral Hari Kumar revealed that the Indian Navy had simultaneously deployed 11 conventional submarines for operations in different parts of the Indian Ocean Region.

This has been the highest number of operational submarines for the Indian Navy in the last two decades. The submarine arm has been facing dwindling strength, accidents, and write-offs. As against the required 24 conventional submarines, the Indian submarine fleet has only 16 submarines, and apart from the six recently-built submarines, the rest are over 30 years old and approaching their decommissioning date.

The Indian conventional submarine fleet includes five Scorpene class (French), four HDWs (German), and seven Kilo-class (Russian). An additional Scorpene class is still to be commissioned. The Indian Navy has to be wary of the Chinese Navy, which is not only forging ahead with the induction of submarines into its fleet but also equipping India's neighbor Pakistan with state-of-the-art technology.

The Indian Navy's adoption of AIP technology will put its fleet in a better position than Pakistan's. All three of its French Agosta-90B (PNS Khalid, Saad, and Hamza) are powered by AIPs. Pakistan is also expected to receive eight 39 A Yuan-class AIP-powered submarines by the end of 2023 under a US\$5 billion deal with China. By next year, the Indian Navy will have 17 conventional submarines in its fleet. However, the older Kilo-class submarine's availability ratio is low.

The Chinese undersea fleet has been growing exponentially in quantity and quality. For the first time, China has been able to deploy at least one nuclear-armed submarine constantly at sea.

Compared to this, the Indian submarine program has been growing steadily, albeit a tad bit slower, making it difficult to catch up with its giant assertive adversary in the East. The Indian Navy plans to construct six more conventional diesel submarines under Project-75 I.

Considering it took 11 years for the first Scorpene class submarine to enter the Indian Navy's fleet after signing the deal, the subs to be built under Project 75I are at least a decade away from entering operations. It remains to be seen if the Indian Navy will proceed with an operational technology or wait to see the AIP BEST technology deployed on an active submarine before awarding the contract.

<https://www.eurasiantimes.com/aip-submarines-for-indian-navy-germanys/>



*Sat, 29 June 2024*

## **Pitched To Indian Navy, Germany Developed AIP Submarine Navigates Below Arctic Ice For The First Time**

A conventionally-powered Portuguese attack submarine manufactured by Germany's Howaldtswerke-Deutsche Werft (HDW) recently concluded its first voyage under the Arctic ice. A German submarine has also been pitched to India for its Project 75I. As per an official release from NATO, the Portuguese Tridente-class attack submarine, 'Arpão,' returned to her home base in Lisbon, Portugal, following a successful deployment under NATO's Operation Brilliant Shield. The release noted, "Arpão is the first Portuguese submarine to navigate below Arctic ice, in a mission aimed at deterrence and defense of the Euro-Atlantic area."

Arpão departed the Lisbon Naval Base on April 3 and spent 70 days on deployment, underscoring the utility of diesel-powered submarines. The deployment is significant since such missions are usually undertaken by nuclear-powered submarines. The NATO statement noted that Arpão's mission involved maintaining a vigil on military platforms operating in the Euro-Atlantic zone, including both surface and submarine platforms. The deployment, notably, comes as Russia has indicated it plans to expand its presence and influence in the Arctic region.

Portuguese Navy Cdr. Taveira Pinto said in a statement, "We have successfully achieved our objectives of surveillance and patrol in the North Atlantic, demonstrating the capabilities of this type of conventional submarine in Arctic conditions."

Part of the two-strong Tridente class, Arpão (S161) was constructed by Howaldtswerke-Deutsche Werft in Germany. It was the export-optimized Type 214 design. The Tridente class is powered by an air-independent propulsion (AIP) system, which uses liquid oxygen and hydrogen fuel cells to charge its batteries. It has a submerged displacement of 2,020 tons and an arsenal of eight 533mm tubes for Black Shark torpedoes.

These submarines can stay underwater for extended periods — up to several weeks, depending on speed — because the AIP system doesn't need fresh air to recharge its batteries. These submarines

are believed to be just as stealthy as nuclear-powered submarines and can pack torpedos for combat that are just as deadly as the ones carried by nuclear-powered submarines. Germany leads globally in constructing small, stealthy submarines for coastal sea monitoring. These submarines offer significant cost savings compared to nuclear-powered submarines. The latest mission undertaken by Arpão may have just established their efficacy.

A dozen-odd German Type 214 export submarines have been licensed and constructed by shipyards worldwide. Countries like Greece, Portugal, and South Korea operate the Type 214, whereas Turkey has been building the submarines locally. The submarine was also pitched to Indonesia and Pakistan, but both bids failed. Indonesia chose the French Scorpene-class submarines, and Pakistan dithered for a while and eventually went with its closest ally, China, choosing the Type 039A with AIP technology.

The submarine has since found a new potential customer: India. Similar to the previous two bids, the Indian bid also faces competition from Navantia, a Spanish company offering the S80 submarine with AIP technology.

### **German AIP Submarine For India**

In November 2023, ThyssenKrupp AG offered India the bigger 214 version of HDW-class submarines. Six conventional diesel submarines are on offer for a \$4.8 billion deal under Project 75I. At that time, ThyssenKrupp official told the EurAsian Times: “The existing 214 is a standard design, which will need some modification to meet the (Indian) Navy’s requirements. It is not unusual. The Type 209s that India got from Germany in the mid-80s and built two of it in India were also modified to Indian specifications.”

The emphasis placed by the Indian government on “Made in India” suggests that the Indian Navy will select the bidder offering substantial technology transfer. The Indian Ministry of Defence (MoD) announced the tender in July 2023. It pointed out that in addition to providing the Air-Independent Propulsion (AIP) submarines, significant technology transfer to Indian shipyards was expected. Spain’s Navantia, with its S80 submarine, is competing in the race. The Indian Navy team is conducting field evaluation trials of the AIP technology developed by Navantia at Cartagena.

The technology is yet to be fitted into the S80 submarine offered to the Indian Navy. Both manufacturers have teamed up with Indian firms: Navantia has teamed up with private shipyard Larsen and Toubro, while ThyssenKrupp has teamed up with Mumbai-based Mazagon Dock Shipbuilders Limited. Navantia has asserted that its submarine design meets ‘almost’ all the technical requirements of P-75I without any redesign.

The Indian Navy has yet to conduct its field evaluations of the submarine. The Navantia Chairman has said that the Spanish submarine offered to the Indian Navy had contemporary features and incorporated the latest technologies, such as Generation BEST AIP (Bio-ethanol stealth Technology) and an advanced sensor suite. However, an anonymous source told the EurAsian Times that their AIP system is still at least three years from being exploited on an operational submarine. Until then, laboratory tests and simulations are the only means to make these claims.

This is where the German submarine has a clear advantage. The 214 being offered to India will be tailored to the requirements of the Indian Navy. It will be a derivative of the 214 class of

submarines, with the latest enhancements in AIP technology. It will be equipped with a Lithium-ion battery, have an advanced sensor and combat system, and not compromise on stealth features.

Last month, reports indicated that the German government was planning to take stakes in Thyssenkrupp Marine Systems. Indian Navy representatives visited the manufacturer earlier this year for Field Evaluation Trials. Several sources confirmed to the Indian media that the trials satisfied all criteria.

<https://www.eurasiantimes.com/offered-to-indian-navy-germany-developed/>

## Science & Technology News



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

**Ministry of Science & Technology**

*Fri, 28 Jun 2024*

### **Camouflaging as a dead enzyme VEGFR1 holds key to medical solutions for colon and renal cancers**

Researchers have decoded the molecular mechanism in which a cell surface receptor belonging to the family of enzymes that bind growth factors, regulate cell differentiation, proliferation, survival, metabolism, and migration, prevents cancers.

This enzyme called VEGFR1 withholds self-expression (autoinhibited) in the absence of a ligand—for example hormones. The research can show the way for developing medical solutions for colon and renal cancers by using molecules that preferentially stabilises the inactive state of VEGFR1.

Cell surface receptors like Receptor Tyrosine Kinases (RTK) are crucial for converting extracellular signals (from chemical cues like growth factors, generally referred to as ligands) to tightly regulated cellular response. Ligand binding to extracellular receptors activates intracellular coupled enzymes (tyrosine kinases). The activated enzyme, in turn, adds phosphate group to several tyrosine molecules that function as an adaptor for assembling a signalling complex. The formation of the signalling complex regulates diverse cellular functions like cell growth, development, and host immune response. Spontaneous activation of RTKs, in the absence of ligands, is often linked to multiple human pathologies like cancers, diabetes, and autoimmune disorders. Researchers are exploring how a cell maintains an autoinhibited state of the enzyme and why such autoinhibition is breached during the progression of human pathology.

Researchers at the Indian Institute of Science Education and Research (IISER), Kolkata, investigated one such RTK called Vascular Endothelial Growth Factor Receptor (VEGFR). The VEGFR family of receptors is the key regulator of the process of generating new blood vessels.

This process is essential for functions like embryonic development, wound healing, tissue regeneration, and tumor formation. Various malignant and non-malignant diseases can be treated by targeting VEGFRs.

The researchers were intrigued by the fact that two members of family VEGFR 1 and VEGFR 2 behaved quite differently. While VEGFR 2, the primary receptor regulating process of formation of new blood vessels, could be spontaneously activated, without its ligand, the other member of the family VEGFR 1 cannot be spontaneously activated even when overexpressed in cells. It camouflages as a dead enzyme VEGFR1 and binds with ten-fold higher affinity to its ligand VEGF-A than VEGFR2. This ligand binding induces a transient kinase (speeding up chemical reactions in the body by an enzyme) activation.

Activation of VEGFR1 has been found to lead to cancer-associated pain, tumor cell survival in breast cancer, and migration of human colorectal cancer cells.

Probing into why one member of the family is so spontaneously activated and the other autoinhibited, Dr Rahul Das and his team from IISER Kolkata found that a unique ionic latch, present only in VEGFR1, keeps kinase autoinhibited in the basal state. The ionic latch hooks the juxtamembrane segment onto the kinase domain and stabilizes the autoinhibited conformation of VEGFR1.

Exploring the mechanism of the autoinhibited state of VEGFR 1 the researchers proposed a crucial role for cellular tyrosine phosphatase in modulating VEGFR1 activity. The research carried out at the Analytical Biology Facility at IISER Kolkata with its DST-FIST supported ITC and stopped-flow fluorimeter, highlighted the therapeutic potential of phosphatase modulators in regulating VEGFR1-mediated pathological formation of new blood vessels (angiogenesis) which takes place in cancer.

This discovery published in the journal Nature Communication may open new avenues for developing therapeutic interventions against pathological conditions due to the spontaneous activation of VEGFR signalling. The small molecules targeting the autoinhibited state will have a higher potential for treating cancers like human colorectal carcinoma and renal cancer, where VEGFR1 is overexpressed.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2029236>

# ThePrint

*Fri, 28 Jun 2024*

## **Scientists find naturally existing DNA editing tool in all life, say it increases scope beyond CRISPR**

Genetic engineering researchers have discovered a powerful tool that can be used to edit genes on a larger scale. This tool will allow researchers to rearrange, recombine, invert, duplicate, move, and

perform other editing operations on very long DNA sequences. In the future, this is expected to lead to more advanced gene editing therapeutics and treatments for diseases.

This next generation genomic design method, called the bridge recombinase mechanism, exists naturally in our genetic machinery, and can be used to program and edit DNA.

This gene editing method, which exists naturally and has now been discovered, enhances the human ability to edit genomes beyond the capabilities and scope of CRISPR (clustered regularly interspaced short palindromic repeats), a technology that can be used to modify the DNA of living organisms. It utilises mobile genetic elements or “jumping genes”, which cut and paste themselves into genomes and are present in all forms of life, performing on-the-go DNA manipulation through all living beings.

The findings are reported in the form of two papers characterising the discovery and the working of a ‘bridge’ RNA molecule which can then be reprogrammed as needed, and the structural mechanism behind the discovered recombination ability of these genes. Both papers were published June 26 in the journal Nature. The study announcing the discovery was led by Matthew G. Durrant of the University of California, Berkeley, and the one describing the structural mechanism of the recombination was led by Masahiro Hiraizumi of the University of Tokyo.

### **Jumping genes, and how they act as bridges**

Jumping genes are minimal segments of DNA that have the recombinase enzyme, which binds this DNA to other DNA, along with extra DNA segments at the ends of the genes. The team discovered that these bits of extra DNA at the ends of jumping genes get joined together and convert the DNA double helix structure into a single-stranded RNA molecule that folds into two loops.

This can then bind to two sets of DNA, the donor and the target, with each loop of the element binding independently to the donor segment and target segment. The target DNA segment is the one that needs to be modified, and the donor segment is the one whose parts will be used to modify the target sequence. Thus, this jumping gene then functions as a bridge that recombines two bits of unconnected DNA.

The researchers also made the important discovery that the donor loop and the target loop can be programmed independently, offering great flexibility in inserting or recombining sequences to DNA.

The name of the jumping gene is IS110, which stands for Insertion Sequence, and such sequences are found in ample quantities in bacteria, which were used for the study (*E. coli*). They roam around the body, cutting and pasting themselves, repairing DNA and modifying it daily.

“The IS110 bridge recombination system expands the diversity of nucleic-acid-guided systems beyond CRISPR and RNA interference, offering a unified mechanism for the three fundamental DNA rearrangements — insertion, excision and inversion — that are required for genome design,” write the authors on the paper.

DNA insertion is a genetic process in which a segment of DNA is added to a different DNA segment, excision is a mechanism in which a damaged DNA segment is removed, and inversion is a method in which a piece of DNA in a chromosome gets reversed.

The role of the flanking DNA (sequences found on either side of the DNA fragment of interest) present around the recombinase genes of these mobile sequences has been understood for the first time. One of the authors on the paper compared bridge RNA to a universal power adapter that makes the IS110 compatible with any outlet or DNA segment.

The second paper outlines the mechanism reports results from cryo-electron microscopy (a technique in which samples are cooled to cryogenic temperatures to determine three-dimensional structures of internal fragments), which indicate that the recombination occurs in three steps.

### **How RNA bridge differs from CRISPR, RNAi**

Both CRISPR and RNA Interface (RNAi), another form of gene editing, work by blocking gene expression or activating it. RNAi does so by targeting RNA molecules, which then do the work of editing genes, while CRISPR edits DNA directly.

The RNA bridge, on the other hand, modifies large sequences of DNA instead of just a tiny segment consisting of a handful of genes. This greatly expands the scope of changes that can be brought about by the technique, which is also a limitation of the method.

This is because the technique modifying large chunks of DNA sequences increases the risk of unintentional consequences.

A limitation of the findings is that the studies were performed in vitro or in the lab on bacteria. To apply to any humans, they would need to be tried on animal models, and specifically mammal models, first.

<https://theprint.in/science/scientists-find-naturally-existing-dna-editing-tool-in-humans-say-it-increases-scope-beyond-crispr/2151758/>



*Sat, 29 Jun 2024*

## **inStem's fabric offers protection from pesticides**

Researchers at the Institute for Stem Cell Science and Regenerative Medicine (inStem), in Bengaluru have developed an anti-insecticide fabric that effectively neutralises organophosphate-based pesticides. In an earlier work published about six years ago, the team had developed a gel for topical dermal application to deactivate the pesticides.

But considering that compliance might be poor, the researchers looked at another alternative that is as effective in deactivating the insecticide but at the same time does not reduce compliance. When esters present in organophosphate-based pesticides enter the body they bind and inhibit an enzyme (acetylcholinesterase or AChE) critical for neuromuscular function from working.

Therefore, inhibition of this important enzyme is implicated in learning deficits, suffocation, paralysis, muscle weakness among others. In a paper published recently in Nature Communications, the team led by Dr. Praveen Kumar Vemula from inStem coated the cotton fabric with small molecules, rendering the final product the ability to deactivate the insecticide. "The



small molecules are covalently bonded with the cellulose of the fabric making the cloth not only breathable but also durable,” says Dr. Vemula.

The small molecules that are covalently bonded with the fabric are nucleophile in nature, and can detoxify the pesticides upon contact through nucleophile-mediated hydrolysis, says Dr. Vemula. “The fabric attacks the pesticide molecule and breaks it into non-toxic products. The pesticide is deactivated even before it reaches the skin surface,” he says. The fabric with covalently-bonded small molecules was developed in collaboration with Sepio Health Pvt Ltd, a spin-off company from inStem.

“The fabric retains the anti-insecticide property even after washing 150 times.” Though the reusability after 50 cycles was reported in the paper, the researchers continued the reusability testing and found the effectiveness to last up to 150 cycles of washing. “Unlike the gel, the reusability will make the fabric an affordable solution to prevent insecticide-induced toxicity to farmers. It will also increase compliance,” he says. According to Dr. Vemula, the small molecule-coated fabric does not act as a physical barrier to organophosphate-based insecticide. Instead, the fabric hydrolytically deactivates the insecticides, causing the prevention of insecticide-induced AChE inhibition.

To investigate the efficiency of the fabric containing the small molecules, the active AChE in the blood before and three days after exposure to the insecticide was measured in rats. While direct exposure or when normal cloth did little to halt the drop in active AChE in blood, no reduction in blood active AChE level was observed in the presence of the fabric coated with small molecules.

Several organs from the exposed and unexposed rats were studied and compared, and the researchers found that the active AChE levels in the organs did not drop in the case of rats that were exposed to the insecticide in the presence of the fabric coated with small molecules. Also, while rats that were repeatedly and directly exposed to ethyl paraoxon (an activated organophosphate insecticide) or through the normal fabric died within four days, none of the rats exposed to the insecticide in the presence of the special fabric died. Farmers get repeatedly exposed to the insecticide due to frequent usage, and this can cause chronic toxicity and severe adverse health effects.

The animal study results show promise that the fabric containing the small molecules can prevent chronic toxicity in farmers, he says. “The design of one nucleophile that can deactivate a wide range of organophosphates and carbamates was challenging. Subsequently, optimising the industry-friendly chemistry to covalently attach on the fabric was the key in developing anti-pesticide fabric,” says Dr. Ketan Thorat, a former research student at inStem and coauthor of the paper.

<https://www.thehindu.com/sci-tech/science/instems-fabric-offers-protection-from-pesticides/article68344723.ece>



Sun, 30 Jun 2024

यूपी के इस शहर में तैयार हो रहा गगनयान मिशन के लिए स्पेशल शूट, खास पैराशूट से धरती पर सॉफ्ट लैंडिंग करेंगे अंतरिक्ष यात्री

यूपी का फिरोजाबाद जिला यूं तो कांच की चूड़ियों के लिए देश विदेश में जाना जाता है, लेकिन अब जिले को नई पहचान मिलने वाली है. दरअसल, भारतीय स्पेस एजेंसी (इसरो) की ओर से गगनयान मिशन की तैयारी की जा रही है.

फिरोजाबाद के हजरतपुर स्थित आयुध फैक्ट्री द्वारा हाई टेक्नोलॉजी वाले पैराशूट तैयार किए जा रहे हैं, जो गगनयान मिशन को पूरा करने के बाद अंतरिक्ष यात्रियों की पृथ्वी पर सॉफ्ट लैंडिंग कराएंगे. हाई क्वालिटी की लॉयलोन से तैयार ये पैराशूट एकदम सुरक्षित हैं. इनसे पृथ्वी पर लैंडिंग करने में न केवल मदद मिलेगी, बल्कि कोई जनहानि भी नहीं होगी. फिरोजाबाद में तैयार हो रहे इन पैराशूटों को जल्द ही इसरो को सौंप दिया जाएगा.

गगनयान मिशन में होगा इस्तेमाल

फिरोजाबाद के हजरतपुर में 135 हेक्टेयर में फैले आयुध उपकरण निर्माणी में गगनयान मिशन के लिए हाई टेक्नोलॉजी के साथ पैराशूट बनाए जा रहे हैं. अभी तक भारत में इस तरह के पैराशूट का किसी भी मिशन में इस्तेमाल नहीं किया गया है. गगनयान के जरिए अंतरिक्ष यात्री स्पेस में जाएंगे और उनकी रीएंट्री के लिए इन पैराशूट को तैयार किया जा रहा है. पृथ्वी के वायुमंडल में आने के बाद अंतरिक्ष यात्रियों की लैंडिंग फिरोजाबाद में बनने वाले इन पैराशूट के जरिए की जाएगी.

तीन एजेंसियां चेक करेंगी क्वालिटी

अभी तक तैयार होने वाले सभी पैराशूट्स में सबसे उच्च कोटि के यह पैराशूट्स तैयार किए जा रहे हैं. पैराशूट के बनने के बाद उनकी क्वालिटी को तीन एजेंसियां चेक करेगी. इनमें सबसे पहले कंपनी की इंटरनल टीम चेक करेगी, उसके बाद डीआरडीओ की शाखा एआरडीओ आगरा द्वारा चेक किया जाएगा. फिर अंतिम में इसरो टीम द्वारा इन पैराशूट्स को चेक किया जाएगा.

तीन महीने में इसरो को सौंपे जाएंगे पैराशूट

जीएम अमित सिंह ने बताया कि यह सभी पैराशूट अगले 3 महीने में बनाकर इसरो को दे दिए जाएंगे. अंतरिक्ष से जो कैप्सूल नीचे आता है वह हाई स्पीड से आता है. इसके वायुमंडल के घर्षण के कारण उसमें हीट जनरेट होती है. इसके लिए इन पैराशूट्स में हीट रेजिस्टेंट नायलॉन 66 फेब्रिक का इस्तेमाल किया गया है. इसके अलावा इन पैराशूट्स में स्पेशल टेप्स भी प्रयोग किए गए हैं. इनके कारण हम अंतरिक्ष यात्रियों को पूरी तरह सुरक्षित धरती पर उतार पाएंगे.

अमेरिका, रूस और चीन के बाद अब भारत के पास टेक्नोलॉजी

उन्होंने कहा कि अभी तक यह टेक्नोलॉजी केवल अमेरिका, रूस और चीन के पास थी, लेकिन अब भारत भी उनकी बराबरी कर सकेगा. फिरोजाबाद में इस तरह के पैराशूट बनाए जा रहे हैं जो भारत में कहीं पर भी नहीं बन रहे हैं. फिरोजाबाद से लगभग 100 पैराशूट तैयार कर इसरो को सौंपे जाएंगे.

<https://zeenews.india.com/hindi/india/up-uttarakhand/kanpur/firozabad-ordnance-factory-prepared-special-parachutes-for-isro-gaganyaan-mission-2025-helping-soft-landing/2315374>

**THE**  **HINDU**

Sun, 30 Jun 2024

## **ISRO will launch first dedicated SSLV commercial mission in 2026**

ISRO's commercial arm NSIL said on June 26 that its newest rocket, the Small Satellite Launch Vehicle (SSLV), will have its first dedicated commercial launch when it puts into orbit the Optimus -- a satellite built by Australia-based Space Machines Company. The announcement was made jointly by NewSpace India Limited (NSIL) and Space Machines Company at the India Space Congress, organised by the Satcom Industry Association-India.

This pioneering collaboration sets the stage for the launch of Space Machines Company's second Optimus spacecraft, weighing 450 kg, the largest Australian-designed and built spacecraft so far, a statement from NSIL said.

"This will be the first dedicated commercial launch for SSLV. The first commercial launch was Janus, a 10-kilogramme nanosatellite on board the SSLV-D2 mission," NSIL Chairman and Managing Director Radhakrishnan Durairaj told PTI.

The satellite is slated for a dedicated launch in 2026 onboard the SSLV, a mission that will mark a defining moment for India and Australia in the area of space collaboration.

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This mission, named Space MAITRI (Mission for Australia-India's Technology, Research and Innovation), marks a significant milestone in the strategic partnership between Australia and India in the space domain, fostering closer ties between commercial, institutional and government space organisations from both nations, the NSIL said.

"By combining our innovative spacecraft capabilities with India's proven launch expertise, we are not only strengthening the ties between our nations' space sectors but also demonstrating our shared commitment to sustainable space operations," said Rajat Kulshrestha, CEO and co-founder of Space Machines Company.

By focusing on debris management and sustainability, the mission aligns with the core values and objectives of both countries, promoting responsible space operations and mitigating the growing threat of space debris.

<https://www.thehindu.com/sci-tech/science/isro-will-launch-first-dedicated-sslv-commercial-mission-in-2026/article68351875.ece>

