

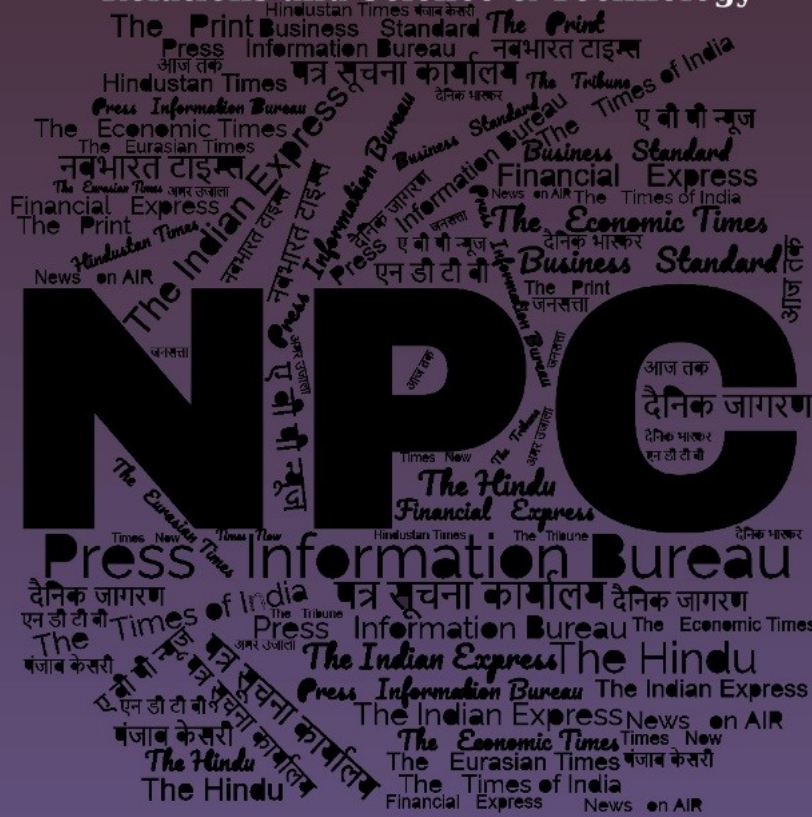
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# समाचार पत्रों से चयनित अंश Newspapers Clippings

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

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# नवभारत टाइम्स

Tue, 30 July 2024

## नई एंटीबायोटिक की खोज में जुटा DRDO, सोनभद्र राजकीय इंजीनियरिंग कॉलेज गार्डेनिया पर कर रहा रिसर्च

राजकीय इंजीनियरिंग कॉलेज में सोनभद्र में पाए जाने वाले औषधीय पौधों पर रिसर्च की जा रही है। इस रिसर्च का उद्देश्य नई एंटीबायोटिक दवाओं की खोज करना है। ये रिसर्च डीआरडीओ की तरफ से कराई जा रही है।

राजकीय इंजीनियरिंग कॉलेज के असिस्टेंट प्रोफेसर ने बताया कि सोनभद्र में पाए जाने वाले औषधीय पौधे फाफड़ा (गार्डेनिया) पर नई एंटीबायोटिक दवाओं की खोज के उद्देश्य से रिसर्च हो रही है। इसके सकारात्मक रिजल्ट मिले हैं। जल्द ही डीआरडीओ को रिपोर्ट सबमिट की जाएगी।

सोनभद्र में डिफेंड रिसर्च एंड डेवलपमेंट आर्गेनाइजेशन (डीआरडीओ) की वित्तीय सहायता से एक शोध की जा रही है। इस शोध का उद्देश्य नई एंटीबायोटिक दवाओं की खोज सोनभद्र में पाए जाने वाले औषधीय पौधों की मदद से करना है। रिसर्च के बारे में रसायन विभाग के सहायक प्रोफेसर हरिशंकर उपाध्याय ने बताया कि प्रोजेक्ट का नाम 'एक्सप्लोर एथनो मेडिसिन नॉलेज ऑफ लोकल ट्राइब्स ऑफ डिस्ट्रिक्ट सोनभद्र, फॉर डिस्कवरी एंड डेवलपमेंट ऑफ एंटीबायोटिक्स' है।

उन्होंने बताया कि बाजार में जो एंटीबायोटिक उपलब्ध हैं, वह कुछ ही समय में रेजिस्टेंस डेवलप कर लेते हैं, इसलिए नई एंटीबायोटिक की जरूरत पड़ती रहती है।

### गार्डेनिया पर हुई रिसर्च

सोनभद्र के आदिवासी जिन औषधि पौधों का प्रयोग करते हैं, उनमें एंटीबायोटिक तत्व भी होते हैं। डीआरडीओ के ड्रग डेवलपमेंट रिसर्च विंग द्वारा यह शोध कराया जा रहा है, ताकि सैनिकों के लिए नई एंटीबायोटिक को डेवलप किया जा सके। डीआरडीओ न सिर्फ रक्षा क्षेत्र में बल्कि ह्यूमन डेवलपमेंट के क्षेत्र में भी कार्य करता है। कोविड के समय में डीआरडीओ ने इस तरह के कई प्रोजेक्ट पर काम किया था।

डीआरडीओ ही इस प्रोजेक्ट को आर्थिक सहायता उपलब्ध करा रहा है। सोनभद्र में पाई जाने वाली औषधीय पौधे फाफड़ा पर यह रिसर्च की जा रही है, ताकि नई एंटीबायोटिक का विकास किया जा सके। इसका रिजल्ट भी काफी सकारात्मक रहा है। जल्द ही डीआरडीओ को रिपोर्ट सबमिट कर दी जाएगी।

<https://navbharattimes.indiatimes.com/state/uttar-pradesh/sonbhadra/new-antibiotic-research-on-gardenia-plant-in-government-engineering-college-sonbhadra-with-drdo-help/articleshow/112138538.cms>

## **DRDO Advances 'Active' Armour for Indian Army Tanks; BrahMos Missile Sales Expand Globally**

From "passive" steel plates to a more "active" defensive system for tanks and armoured personnel carriers of the Indian Army. This is what the Defence Research and Development Organisation (DRDO) is now working on. The Indian Army has over 3,500 tanks in 65 armoured regiments (the largely indigenous Arjun and the Russian designed T-72 and the T-90) and the DRDO plans to equip them with new "active" armour in the future.

Working on the new armour has already begun. The "active" armour will consist of "sensors that will detect the incoming anti-tank missile, fired from the air or from on ground, and react to the threat," highly placed sources said.

"This is going to be an automated system dependent on electronic software and once the sensors pick up the incoming threat, it will launch the weapons to neutralize the anti-tank missile. This is, of course, a project under development and the design process has begun. This being an "agnostic system," can work for the tanks, armoured personnel carriers (the Russian designed BMPs) with the Indian Army and other tracked vehicles, but also the futuristic infantry combat vehicles being designed.

Currently, tanks have reactive armour of different types, including explosive reactive armour, which can counteract, to a large extent, the impact of incoming missiles. But "active" armour will be a step forward and protect tanks in a better way.

### **Brahmos Sale**

Apart from The Philippines, India is in talks with at least four other countries for the sale of the 300-km BrahMos supersonic cruise missile, jointly designed by India and Russia.

Two other Southeast Asian countries-- Indonesia and Vietnam-- are interested as are the United Arab Emirates and Saudi Arabia, but negotiations are still going on, sources said and in all four cases, India is some distance from signing a contract.

There is considerable competition from other countries though India has said that the BrahMos is "unique" in a way. There is also the possibility of The Philippines buying more missiles, but again, that is still a long way off. The Indian Navy was the first to get the BrahMos, a successful joint Indo-Russian project over two decades old.

<https://www.timesnownews.com/india/drdo-advances-active-armour-for-indian-army-tanks-brahmos-missile-sales-expand-globally-article-112152862>



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

**Ministry of Defence**

*Tue, 30 July 2024*

### **MoD signs MoU to set up testing facilities in Unmanned Aerial System, Communications and Mechanical & Material domains under UP Defence Industrial Corridor**

Ministry of Defence (MoD), on July 30, 2024, inked a Memorandum of Understanding (MoU) to set up three state-of-the-art testing facilities under the Uttar Pradesh Defence Industrial Corridor (UPDIC). Under the MoU, one facility will be established in Lucknow in Mechanical & Material (M&M) domain, and two in Kanpur - one each in Unmanned Aerial System (UAS) and Communications domains. The MoU, under the Defence Testing Infrastructure Scheme (DTIS), was exchanged between senior officials of MoD and Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) in New Delhi.

The DTIS was launched by Raksha Mantri Shri Rajnath Singh in May 2020, with an outlay of Rs 400 crore, to set up state-of-the-art testing facilities in collaboration with private industry and Central/State Government, promoting indigenous defence production, reducing imports and enhancing self-reliance. To provide impetus to the defence and aerospace sectors within the Defence Industrial Corridors, seven testing facilities were approved - four in Tamil Nadu and three in Uttar Pradesh. While the MoU to establish three testing facilities in UPDIC has been signed today, the agreement to set up three facilities under the Tamil Nadu Defence Industrial Corridor in the domains of UAS, Electronic Warfare and Electro Optics in Chennai was inked on July 02, 2024.

The DTIS provides up to 75% government funding as 'Grant-in-Aid', with the remaining 25% funded by the Special Purpose Vehicle (SPVs), comprising Indian private entities and State/Central Governments.

For the M&M facility, MIDHANI is the lead SPV member, with some private sector companies being the consortium members. Hindustan Aeronautics Limited and Bharat Electronics Limited are the lead SPV members in the UAS and Communications testing facilities respectively.



Upon the completion of the project, these facilities will provide advanced testing equipment and services to both government and private entities, with revenue reinvested to enhance testing capabilities & processes, thereby giving a boost to Aatmanirbharta in defence.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2039035>



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

**Ministry of Defence**

*Tue, 30 July 2024*

## **iDEX & AFMS sign MoU for developing cutting-edge technologies to deal with medical challenges faced by the Armed Forces**

Innovations for Defence Excellence-Defence Innovation Organisation (iDEX-DIO), the flagship initiative of Ministry of Defence, has signed an MoU with Armed Forces Medical Services (AFMS) for the launch of Medical Innovations and Research Advancement (MIRA). The MoU was signed by Additional Secretary (Defence Production) & CEO, DIO Shri Anurag Bajpai, and Director General of Armed Forces Medical Services Lt Gen Daljit Singh in New Delhi on July 30, 2024.

The MoU aims to foster innovation and research in developing novel medical technologies and their induction into the Armed Forces. The initiative will be propelled by the launch of the Defence India Start-up Challenge (DISC) edition MIRA, targeting the critical medical challenges faced by the Armed Forces. It will leverage the unique strengths and expertise of both organisations to foster cutting-edge advancements in medical technologies.

The Additional Secretary (Defence Production) & CEO, DIO termed the partnership with AFMS as a testament to the Ministry's commitment to fostering innovation in every aspect of defence and security. "Together, we will work towards creating a robust healthcare ecosystem that not only meets the current needs of the Armed Forces but also anticipates future challenges," he said.

The DG, AFMS stated that the collaboration with DIO marks a significant milestone in the ongoing efforts to provide the highest quality of medical care and induct new cutting-edge medical technologies. "By harnessing the innovative capabilities through iDEX, we are poised to make substantial advancements in medical science and technology," he said.

### **About iDEX**

iDEX, the recipient of the esteemed Prime Minister's Award for Excellence in Public Administration in Innovation Category in 2021, has emerged as a game-changer in the defence ecosystem. Established by the DIO under Department of Defence Production, iDEX has launched 11 editions of DISC, and recently unveiled the Acing Development of Innovative Technologies with iDEX (ADITI) scheme to promote innovations in critical and strategic defence technologies.

In a brief period, iDEX has successfully gained momentum, fostering a burgeoning community of start-ups within the defence sector. It is currently engaged with over 400 start-ups and MSMEs. Till now, procurement of 37 items, worth over Rs 2,000 crore, has been cleared. iDEX has facilitated the creation of numerous job opportunities and played a pivotal role in the development of the defence ecosystem.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2039097>



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

**Ministry of Defence**

*Tue, 30 July 2024*

## **ICG launches ‘Suvidha Software Version 1.0’ to enhance training protocols & ensure consistency across its platforms**

Indian Coast Guard (ICG) launched ‘Suvidha Software Version 1.0’ during its maiden ‘Annual Operational Sea Training Conference’ at Visakhapatnam, Andhra Pradesh on July 30, 2024. This software is a cutting-edge tool designed to enhance training protocols and ensure consistency across all ICG platforms.

Deputy Director General (Sea Training) Inspector General Anupam Rai delivered the keynote address on the occasion. He emphasised the importance of fostering a culture of excellence and adaptability within the ICG.

The conference saw active participation from senior officers from various ICG regions, underlining the need for a unified approach to complex operations. It provided a valuable platform for discussing best practices, sharing insights, and aligning strategies to address the dynamic maritime security landscape. The event underscores the ICG's commitment to excellence and innovation in operational training.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2038972>



*Wed, 31 July 2024*

## **Thales and Garuda Aerospace collaborate to enhance drone ecosystem in India**

Thales, a global leader in aerospace technology, and Garuda Aerospace, have signed a Memorandum of Understanding (MoU) to advance the development of the drone ecosystem in

India. This partnership aims to foster innovation and secure drone operations, supporting India's ambitions to become a global hub for drones by 2030.

### **Key Aspects of the MoU**

Under the agreement, Thales will contribute its expertise in Unmanned Traffic Management (UTM) solutions, UAV detection, and system integration. These technologies are crucial for the seamless management of drone operations, ensuring safe and secure airspace. Thales has a strong track record in designing and developing end-to-end solutions for drone integration, working closely with civil aviation authorities and air navigation service providers. Their capabilities include managing UAV flight authorizations, providing radar and sensor technology for UAV detection, and developing advanced UTM systems.

Garuda Aerospace, established in 2015, one of the UAV manufacturers in India has a strong market presence. And specializes in developing high-tech drone solutions for various industries, including the armed forces, and has significant expertise in the Indian market. Their collaboration with Thales will enable the integration of cutting-edge UTM technology into Garuda's drone operations, enhancing the company's service offerings and operational efficiency.

### **Transforming India's Drone Landscape**

The collaboration aims to transform India's drone landscape by promoting technological advancements and innovation in drone-based applications. The MoU will come into effect in August 2024, with both companies working together to develop advanced UTM systems tailored to India's unique requirements. This partnership aligns with the Indian government's vision of Aatmanirbhar Bharat (Self-Reliant India) and seeks to position India as a major player in the global drone industry.

Ashish Saraf, VP and Country Director of Thales in India, expressed enthusiasm for the partnership, highlighting the government's support for the drone ecosystem. He stated, "We are proud to partner with Garuda Aerospace in paving the way for the development of advanced UTM systems in India by leveraging our extensive global experience and expertise in aeronautical solutions. This collaboration aligns well with the Aatmanirbhar Bharat vision and seeks to support India in realizing its ambition to become a major global hub for drones by 2030."

Agnishwar Jayaprakash, Founder CEO of Garuda Aerospace, echoed this sentiment, emphasizing the potential impact of the partnership on the Indian drone sector. "We are thrilled to partner with Thales in driving technological innovations for the development of drones and drone-based applications in India. Equipped with the largest fleet in India coupled with Thales' UTM technology and their worldwide experience, Garuda Aerospace will aim to revolutionize the drone sector and play a key role in the transformation of India into a global drone powerhouse," he said.

This strategic collaboration between Thales and Garuda Aerospace is poised to significantly enhance India's drone capabilities, paving the way for safer and more efficient drone operations and positioning the country as a leader in the global drone industry.

<https://www.financialexpress.com/business/defence-thales-and-garuda-aerospace-collaborate-to-enhance-drone-ecosystem-in-india-3569183/>



# The Tribune

Wed, 31 July 2024

## Indigenous fighter programme remains a work in progress

-By Abhijit Bhattacharyya

*(Life Member, Aeronautical Society of India)*

WHEN the Vice Chief of the Indian Air Force (IAF), Air Marshal AP Singh, publicly states that “Aatmanirbharta (self-reliance) shouldn’t be a buzzword at the cost of the nation’s defence and should be pursued holistically in letter and spirit”, the matter needs a close look. The Air Marshal has tried to bring to the nation’s notice the acute shortage of fighters and consequential under-strength of the IAF — 31 squadrons against the sanctioned strength of 42.

So, where does the problem lie? How to sort things out? What are the options for the government and the IAF? Since the focus is on Aatmanirbharta, it points to a deficiency in indigenous fighter production and a diminishing fleet resulting in reduced fighting capability of the Air Force. One, therefore, has to link indigenous fighter production to the big picture.

The most critical aspect of the indigenous fighter programme of any country is the engine/power plant of the flying machine, without which it is a non-starter. There are broadly nine manufactured sub-units/instruments which need to be interfaced to make a machine fly; fuselage, flying controls, structure, landing gear, power plant (engine), systems, avionics, equipment and armament. With the modern computer-aided design and computer-aided maintenance, Indian engineers and technologists surely can do eight out of nine jobs efficiently.

Nevertheless, it’s the power plant which constitutes the most challenging task, requiring sustained research and development by the best of brains and test-flying. Thus, just as no Rolls Royce is Rolls Royce without a matching engine, a fighter without a power plant at best could be an exciting item on display in a park or a museum for those aspiring to be pilots.

India, therefore, has its task cut out with regard to an aero-engine. India does have a full-fledged fighter engine-manufacturing Gas Turbine Research Establishment in Bengaluru. However, going by the list of fighter users, as gleaned from the last 50 years’ editions of the annual Jane’s All the World’s Aircraft (JAWA) and the recently launched Janes Aero-Engines, it transpires that no single-engine fighter today can be considered useful if its thrust is less than 30,000 pounds static and without additional power generated by the afterburner during critical air-to-air missions.

Unfortunately, JAWA reports that the ‘performance ratings’ of “India’s first indigenously produced jet engine” Kaveri are “maximum dry 11,462-pound static thrust” and “maximum 19,000-pound static thrust with afterburner” (static thrust is the thrust developed by an airplane engine that is at rest with respect to the earth and the surrounding air). That would certainly pose problems pertaining to aerial power-to-weight combat for IAF pilots, being below par by modern fighter standards, notwithstanding different roles for different fighters.

The IAF squadron’s single-engine Mirage-2000, imported from France in 1985, has the Snecma M53 power plant’s 21,385-pound static thrust, making it a potent “single-seat interceptor and air

superiority fighter”. What helped America’s General Dynamics F-16 with one Pratt & Whitney F100-PW-200 engine succeed in the military market and combat missions was essentially the generation of 25,000-pound static thrust, which has gone up exponentially to ensure its longevity and durability — having been in ops for almost 50 years. F-16 production changed hands from General Dynamics to Lockheed Martin, but it now has two engine makers: the 29,100-pound static thrust Pratt & Whitney F100-PW-229 and General Electric’s 29,588-pound static thrust F110-GE-129 power plant.

Fast-forward to the 21st century. Lockheed Martin’s multirole F35 single Pratt & Whitney power plant generates 40,000-pound-plus thrust, making it one of the heaviest ‘maximum take-off weight’ fighter of 15.785 tonnes in the single-engine category with an impressive maximum payload of 8.165 tonnes. The quality and efficiency of the engine make the machine airworthy and a potential victor.

The fundamental feature of the fighter, therefore, is the engine. The superiority of the single power plant’s thrust and quality enhance the craft’s payload, range, armament and avionics, and give it the ability to out-endure the weaker and feebler engine in the air. This is the reason no country parts with its high-tech engine for any customer, however big the order of the fighters.

The Air Marshal must have been in agony because without doubt India has missed the fighter tech bus. Yet, the vision of Jawaharlal Nehru, India’s first Prime Minister, had helped India make a splendid start as famous German aeronautics expert Kurt Tank was invited to design and develop HF-24 Marut, the first indigenous single-seat twin-engine ground attack fighter in 1956 at Hindustan Aeronautics Ltd, Bengaluru.

It was one of the finest chapters for the IAF, which formed three squadrons of HF-24 Marut- 10, 31 and 220 and operated during the 1971 India-Pakistan war without a single loss. Subsequently, the slide began. After the 1977 election defeat of Indira Gandhi, her successor shut India’s promising combat craft programme. Consequently, it took six long years for an indigenous fighter enterprise to re-emerge in 1983 as the ‘Light Combat Aircraft’ during Indira’s tenure as PM. If the government of the day pushes back India’s indigenous fighter programme, don’t blame outsiders.

Today, India’s indigenous fighter engine enterprise has reached a ‘now or never’ stage. But then, who will cooperate with India? Theoretically, though, there are 23 aviation engine-producing countries; let’s not count the US and China — the former for imposing impossible terms and the latter for being hostile since the 1950s.

That leaves only Europe and Russia as potential partners for the fighter engine. The latter has its own priorities amid the Ukraine war, but Europe is bound to be a tough customer. Hence, the combat aero engine has to be linked with any Free Trade Agreement between the West and India. Nothing else could be of any use to India, especially if one takes Delhi for granted for one-way trade traffic.

<https://www.tribuneindia.com/news/comment/indigenous-fighter-programme-remains-a-work-in-progress-644946>

## **New advanced Chinese submarine may be in the works.**

### **Here's what we know**

China has developed and built a new type of conventionally-powered submarine, which is the first crewed Chinese design to possess X-shaped rudders that could make it quieter than previous People's Liberation Army Navy (PLAN) conventional undersea vessels, The War Zone has reported, citing satellite images and expert analysis.

According to the report by the online defence news portal, the new Chinese submarine also features a longer hull, along with being possibly equipped with vertical launch cells for submarine-launched cruise missiles (SLCMs) and smaller ballistic missiles (SLBMs). The report added that the new submarine design was evidence of China's rapid developments in the field.

#### **How was the new Chinese submarine spotted?**

The new Chinese crewed, conventionally-powered submarine features X-form rudders for the first time, with the report adding that it is not known yet whether the vessel is an entirely new design or a further iteration of an existing class.

China's fleet of submarines features both increasingly advanced nuclear and conventionally-powered vessels.

According to the report, retired US Navy submarine warfare officer Tom Shugart, who is currently an adjunct senior fellow at the Center for a New American Security (CNAS), was first to notice the new submarine at the Wuchang Shipyard in Wuhan. The Wuchang Shipyard is known for constructing variants of China's Type 039A conventionally-powered submarines.

An April 26, 2024, satellite image of the shipyard acquired by Shugart reportedly shows the new submarine, along with what appears to be a Hangor-II class submarine that is being built for Pakistan.

Satellite imagery from June 15 shows that the new Chinese submarine had left its berth. According to the report, it was possible that by July, the new submarine had been completed and could even have commenced sea trials. The other possibility was that the submarine had been moved elsewhere for other trial work.

#### **Why is the new Chinese submarine special?**

A comparison of the Hangor-class and earlier Type 039A-class submarines with the new vessel appears to indicate that the latter is "substantially longer" and has an "X-stern", which is a feature not seen before on any other Chinese submarine, reveals Shugart's analysis, which was cited by the report.

Employing imagery analysis, Shugart also estimates that the new Chinese submarine's length stands at about 272-279 feet, compared to the Type 039A Yuan class' overall length of around 253 feet. The Type 039 boats have a displacement of approximately 3,600 tonnes.

The report explains that an X-form rudder configuration provides a number of advantages over previous designs. The most significant one being that compared to the more traditional cruciform design, it helps reduce the submarine's acoustic signature. Basically, it makes the submarine more stealthy and harder to detect by sonar across significant parts of its operating envelope.

Additionally, the x-form configuration also provides the vessel with improved maneuverability, safety, and efficiency. The configuration is also reportedly suited for operations in the South China Sea and other littoral areas.

Before this new submarine, only select Chinese extra-large uncrewed underwater vehicles have featured such a rudder design.

According to the report, the new submarine could either be the first of a new class of boats or another iteration of the Type 039 or Yuan class of vessels, which already includes several subclasses, with the most recent one being the Type 039C.

The Type 039A/B submarines are believed to already be some of the quietest submarines in Chinese service, while the Type 039C could be even quieter.

According to the US Navy, China already has 21 of the preceding Type 039A/B-class boats in service, while modified versions of the vessels are also being built for export to Thailand and Pakistan.

The Type 039A/B submarines are also believed to be equipped with air-independent propulsion (AIP) technology. Compared to other diesel-electric submarines, an AIP-equipped submarine can remain submerged for much longer -- up to multiple days at a time -- without needing to surface or use a snorkel to charge its batteries.

### **What weapons will the new Chinese submarine carry?**

After analysing the new submarine's extended hull length, independent naval analyst H I Sutton reportedly suggested that one of the reasons for this could be the addition of a vertical launch system (VLS), which is a feature not usually found on conventionally-powered submarines.

The possible inclusion of VLS cells would allow the new submarine to launch larger cruise missiles.

However, The War Zone could not verify that the new submarine's lengthened hull is actually meant to house VLS cells or not.

Another reason for the additional hull length, along with the new rudder configuration, could be a new type of propulsion arrangement, potentially based on the kind of lithium batteries used by Japan's Soryu class submarines.

[https://www.business-standard.com/external-affairs-defence-security/news/new-advanced-chinese-submarine-may-be-in-the-works-here-s-what-we-know-124073001249\\_1.html](https://www.business-standard.com/external-affairs-defence-security/news/new-advanced-chinese-submarine-may-be-in-the-works-here-s-what-we-know-124073001249_1.html)



*Tue, 30 July 2024*

## **Study of Kindlins reveal novel pathways to cancer treatment**

A new study has investigated the influence of Kindlins-- adapter proteins that exist inside cells of vertebrates, in various cancers. Since this protein is central to many signaling pathways, targeting it could lead to new cancer treatments that address multiple aspects of the disease at once.

Kindlins are adapter proteins that exist inside the cells attached to the cell membranes of almost all types of cells in vertebrates. They transfer extracellular mechanical cues to biochemical signals inside the cells and play a pivotal role in conveying extracellular signals by physically interacting with structural proteins, receptors and transcription factors, triggering a cascade of chemical signals within the cell.

Structural disruptions in these proteins can have a global impact on mechano chemical signaling, leading to disruptions in the state of balance among all the body systems needed for the body to survive and function correctly. This balanced state of the body is called homeostasis.

Kindlins may undergo mutations under the influence of innumerable chemical and physical carcinogens like nicotine, ultraviolet rays and many more. Mutated Kindlin can potentially disrupt global mechanical homeostasis within cells. Therefore, understanding the consequences of genetic alterations in Kindlins holds the key to unraveling the intricate mechanisms leading to the growth of cancer cells.

A team from S. N. Bose National Centre for Basic Sciences in Kolkata, an autonomous institute of the Department of Science and Technology (DST) collected data of 10,000 patients with 33 cancer types from The Cancer Genome Atlas, to understand the role of Kindlins in turning normal cells into cancerous ones.

The researchers led by Debojyoti Chowdhury working under the guidance of Prof. Shubhasis Haldar found that Kindlin 1 (belonging to Kindlin family) regulates the immune microenvironment in breast cancer and that cancer-specific metabolic regulation, such as TCA cycle and glycolysis, is governed by Kindlin 2.

Kindlin family of proteins contains three members: Kindlin 1, 2, 3 with distinct amino acid sequences and tissue distribution. "Hippo signaling is a kind of signal in cancer cells that tells the cell to migrate and invade other tissues. Kindlin 2 can also regulate HIPPO signaling," explained Debojyoti Chowdhury.

The researchers employed structural and functional genomics tools on this data to investigate the influence of Kindlin family proteins on mechano chemical signaling in various cancers. The results highlighted the role of Kindlins in processes related to tumor progression, metastasis and epithelial-mesenchymal transition (EMT). In EMT, cells shift from being more like tightly packed, organized epithelial cells (like those lining our skin) to becoming more free-moving and flexible mesenchymal cells (like those in our muscles). This process happens when cancer cells spread to different parts of the body.

The study strongly suggests that Kindlins participate in essential mechano sensitive pathways. This study also suggests a potential link between Kindlin dysfunction and adverse survival outcomes.

This structural genomics approach establishes associations with clinical parameters, providing evidence for the potential mechanochemical importance of Kindlins across diverse cancer stages and subtypes. “By studying all Kindlin family members collectively, we can gain a comprehensive understanding of their potential complementary and synergistic roles in cancer biology”, says Debojyoti. “This includes examining the interaction of different Kindlin proteins with each other or with other cellular components to influence cancer cell behavior, tumor progression, and response to therapy”.

“The data related to Kindlin family alternations and mutational and stability analyses presented in our work strongly coincide with those of previous experimental studies. We found that Kindlin 2 expression is elevated in breast cancer, and it activates epithelial-mesenchymal transition (EMT)” asserts Chowdhury. Similar results had been obtained in earlier experiments too.

The study published in the journal *Communications Biology* has helped in deciphering the intricate interplay between tumors and their micro-environment. It has brought out the potentiality of Kindlins as promising targets for innovative mechano-modulatory cancer therapeutics, offering context-dependent avenues for intervention and treatment strategies.

Chemoresistance and tumor relapse are two major challenges faced by oncologists. The present study will serve as a beacon for developing future therapeutic strategies, targeting the roles of Kindlins in cancer treatment. This will open a new strategy in the 4000 years old war against cancer.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2039090>

## THE ECONOMIC TIMES

*Wed, 31 July 2024*

### **One year on 'Mars' : Inside NASA's ultra-realistic isolation study**

Sealed inside a habitat in Texas and cut off from the outside world for over a year, Kelly Haston was the commander of a first-of-its-kind simulation for NASA to prepare for a future mission to Mars.



From conducting mock "Marswalks" to tending to a vertical garden, and occasionally grappling with boredom -- Haston expressed pride in advancing the cause of space exploration while admitting the experience made her reconsider the reality of life on the Red Planet. "Going to space would be an amazing opportunity," the 53-year-old biologist told AFP. "But I would say that it would be harder having experienced this, to know how it feels to leave your people."

The overarching goal of the experiment, called CHAPEA (Crew Health and Performance Exploration Analog) Mission 1, is to better understand the impacts of isolation on a crew's performance and health. The project lasted 378 days and concluded in early July. After all, a round-trip to Mars could easily take more than two years, factoring in the transit time of six-to-nine months and the time NASA hopes to spend on the planet.

For Haston, the hardest part was clear: "I could have been in that habitat for another year and survived with all of the other restrictions, but your people -- you miss your people so much." Communications with the outside world were delayed by twenty minutes each way, simulating how long it takes a radio signal to travel between Earth and Mars. They were also some limits on sending and receiving videos, to account for bandwidth restrictions. The worst feeling was when relatives or friends were experiencing rough times, said Haston. "You couldn't be there for them in real time." Her only direct human contacts were her three teammates and fellow Mars colonists -- but she insists they never went stir-crazy.

"Of course, there were times where you had crabby days, or something was bothering us, either as a crew or as an individual," she explained. "But the communication was extremely good in this group," she said and besides, such problems were few and far between. "Up until the very end, we ate meals together." Their 1,700-square-foot (160-square-meter) home included crew quarters, common areas and even an area for crops like tomatoes and peppers. Called "Mars Dune Alpha" the 3D-printed habitat was installed inside a hangar at the NASA Johnson Space Center in Houston. Simulated "Marswalks" took place in an exterior area that recreated the Martian environment with red soil and cliffs painted along the walls. Crew members donned spacesuits and passed through an airlock to reach the "sandbox," as it was nicknamed, with tasks coordinated by their colleagues inside.

### **Boredom**

"There were days where you did really wish you were outside, I can't lie," says the Canadian who now lives in California. But, to her surprise, these pangs only intensified towards the end. Periods of boredom are an inevitable part of long space expeditions, and it was precisely this extended isolation that set CHAPEA apart from most prior "analog" missions. Halston staved off ennui by embroidering mission symbols and images of Mars. Of course, "analogs can't address all problems or all issues of an eventual mission to Mars," she said, though the lessons learned will aid in planning.

Each team member's food intake was meticulously documented, their blood, saliva and urine samples were collected, and their sleep habits, physical and cognitive performance analyzed. "The food system is one of the greatest mass drivers on a human mission for human logistics, and we are going to be resource-constrained on these missions," NASA scientist Grace Douglas said on a podcast. This makes it critical to determine the minimum necessary provisions to maintain astronauts' health and ensure the mission's success. For now, NASA is keeping the details of the

crew's tasks under wraps to preserve the element of surprise for the next two iterations of the mission. CHAPEA 2 is set for 2025.

<https://economictimes.indiatimes.com/news/science/one-year-on-mars-inside-nasas-ultra-realistic-isolation-study/articleshow/112152368.cms>



*Tue, 30 July 2024*

## **Nasa finishing work on Nisar mission but Isro can't launch it till February 2025**

Nasa's work on the radar antenna reflector for the Nasa-Isro Synthetic Aperture Radar (Nisar) satellite is nearing completion in California.

The American space agency said that the testing is currently underway to ensure that this critical hardware component will deploy correctly following its launch from India.

Nisar mission represents a significant collaboration between Nasa and Isro, combining the expertise and resources of both organizations to advance our understanding of Earth's dynamic systems.

The drum-shaped reflector, measuring about 39 feet (12 meters) across, is one of Nasa's key contributions to this joint mission with the Indian Space Research Organisation (Isro).

The reflector is designed to transmit and receive microwave signals to and from Earth's surface, enabling Nisar to scan nearly all the planet's land and ice surfaces twice every 12 days to gather essential scientific data.

This capability will provide valuable insights into various Earth processes, including ecosystem disturbances, ice-sheet collapse, and natural hazards such as earthquakes, tsunamis, and landslides.

In March, the reflector was transported back from India to a specialised facility in California. There, reflective tape was applied, and other precautionary measures were taken to mitigate temperature increases that could potentially affect the deployment of the reflector from its stowed configuration before beginning science operations.

After the successful completion of testing, Nasa plans to transport the reflector to an Isro facility in Bengaluru, India.

At this facility, the reflector will be reintegrated with the radar system by teams from Nasa's Jet Propulsion Laboratory in Southern California and Isro. During this period, a launch readiness date will be determined by Isro in coordination with Nasa.

However, it is important to note that the Nisar launch cannot occur between early October 2024 and early February 2025. Nasa said that launching during this window would subject the satellite to

periods of alternating sunlight and shadows due to the Sun's position, causing temperature fluctuations that could affect the deployment of Nisar's boom and radar antenna reflector.

Once operational, Nisar will provide unprecedented data to help scientists monitor and respond to environmental changes and natural disasters, ultimately contributing to global efforts in climate science and disaster management.

<https://www.indiatoday.in/science/story/nasa-finishing-work-on-nisar-mission-but-isro-cant-launch-it-till-february-2025-2573696-2024-07-30>

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