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Mon, 17 Jun 2024

### दुश्मन की खैर नहीं! दुर्गम पहाड़ों में भी घुसकर तबाही मचाएगी DRDO की ये मिसाइल, सेना जल्द करेगी इस्तेमाल

भारत रक्षा क्षेत्र में आत्मनिर्भरता लिए लगातार प्रयास कर रहा है। इसी सिलसिले में रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने कंधे से दागी जाने वाली स्वदेशी मिसाइल को विकसित किया है। डीआरडीओ अब इन मिसाइलों का परीक्षण करने जा रहा है।

रक्षा अधिकारियों ने बताया कि डीआरडीओ लद्दाख या सिक्किम जैसे पर्वतीय क्षेत्रों में स्वदेशी ट्राइपॉड-फायर्ड शॉर्ट-रेंज एयर डिफेंस मिसाइल का परीक्षण करना चाहता है। परीक्षणों के बाद मिसाइल को सेना को परीक्षण (यूजर ट्रायल्स) के लिए सौंप दिया जाएगा।

#### थलसेना-वायुसेना इन मिसाइलों को अपने बेड़े में शामिल करेंगी

परीक्षण के बाद थलसेना और वायुसेना इन मिसाइलों को अपने बेड़े में शामिल करेंगी। डीआरडीओ ने थलसेना और वायुसेना के लिए इन मिसाइलों को विकसित किया है। थलसेना और वायुसेना को सीमावर्ती क्षेत्रों में तेज गति से चलने वाले ड्रोन, लड़ाकू विमान और हेलीकॉप्टर जैसे हवाई लक्ष्यों से निपटने के लिए बड़ी संख्या में ऐसी मिसाइलों की आवश्यकता है। यह मिसाइल प्रणाली लक्ष्यों पर निशाना साधने और उन्हें नष्ट करने में सक्षम है।

#### कम दूरी के साथ साथ लंबी दूरी के लक्ष्यों को भेदने में सक्षम

डीआरडीओ का यह भी कहना है कि यह मिसाइल प्रणाली कम दूरी के साथ साथ लंबी दूरी के लक्ष्यों को भेदने में भी सक्षम है। कम दूरी के लक्ष्य भेदने वाली मिसाइल को तैयार कर लिया गया है। इसका नवीनीकरण भी किया जा रहा है। पाकिस्तान और चीन से हवाई खतरों से निपटने के लिए सेना को वैरी शार्ट रेंज एयर डिफेंस (वीएसएचओआरएडी) प्रणाली की जरूरत है।

<https://www.jagran.com/news/national-india-drdo-conduct-trials-of-shoulder-fired-air-defence-missiles-will-wreak-havoc-even-in-mountains-23740630.html>

## **DRDO To Test Shoulder-Fired Air Defence Missiles At High-Altitudes**

Amid the large-scale requirement for shoulder-fired air defence missiles, DRDO is going to carry out trials of the indigenous shoulder-fired air defence missiles before handing them over to the Indian Army for user trials.

The Defence Research and Development Organisation has been developing Very Short Range Air Defence missiles to meet the requirements of the Indian Army and Air Force to tackle aerial targets like fast-moving drones, fighter aircraft and helicopters in border areas. DRDO is looking to carry out high-altitude trials of the Indigenous tripod-fired short-range air defence missile in mountainous regions like Ladakh or Sikkim, defence officials told ANI.

After successful completion of the trials, the missile system will be handed over to the users for their trials and assessments, they said. The missile system has been able to lock on and take out both long-range and short-range targets.

The issues with the short-range targeting have been sorted out and the system is moving ahead progressively, the officials said. Indian forces, with the Indian Army in the lead, have been trying to fulfil the shortages of different types of very short-range air defence missiles in their inventory.

The Indian Army is progressing in two cases worth ₹6,800 crore for developing Very Short Range Air Defence (VSHORAD) systems indigenously, amid a lack of inventory of shoulder-fired missiles to tackle aerial threats from Pakistan and China.

The current VSHORAD missiles in the Army and Air Force's inventory are all equipped with IR homing guidance systems, while the Igla 1M VSHORAD missile system was inducted in 1989 and was planned for de-induction in 2013.

<https://www.ndtv.com/india-news/drdo-to-test-shoulder-fired-air-defence-missiles-at-high-altitudes-5904851>

## **Woman-led start-up develops AI tool that creates multi-faceted authentication system**

A woman-led start-up has successfully developed an AI-based tool that creates a “robust and multi-faceted authentication system” by combining facial recognition with gait analysis, the defence ministry said on Friday.

This innovative solution marks a “significant advancement” in biometric authentication technology, offering “enhanced accuracy and reliability” in identifying individuals, it said in a statement.

The start-up was established by woman entrepreneur Shivani Verma after winning the prestigious ‘Dare to Dream 2.0’, a pan India theme-based contest organised by the Defence Research and Development Organisation (DRDO), it said. Ingenious Research Solutions Pvt Ltd has successfully developed an AI tool ‘Divya Drishti’ that “integrates face recognition with immutable physiological parameters such as gait and skeleton,” the ministry said.

“‘Divya Drishti’ creates a robust and multi-faceted authentication system by combining facial recognition with gait analysis. This dual approach enhances the accuracy of identification, minimising the risk of false positives or identity fraud, and has versatile applications across diverse sectors including defence, law enforcement, corporate and public infrastructure,” it said.

The tool has been developed under the technical guidance and mentoring of the Centre for Artificial Intelligence & Robotics (CAIR), a laboratory of the DRDO based in Bengaluru.

Samir V Kamat, secretary, Department of Defence Research & Development and Chairman, DRDO, congratulated the start-up as well as team DRDO on this achievement. The development of ‘Divya Drishti’ under the Technology Development Fund (TDF) is a successful endeavour of the DRDO in promoting start-ups in defence and aerospace industry to achieve the vision of ‘Aatmanirbhar Bharat’, he said.

<https://indianexpress.com/article/india/woman-led-start-up-ai-tool-multi-faceted-authentication-system-9393284/>

## Defence News

## Defence Strategic: National/International

# THE ECONOMIC TIMES

Mon, 17 Jun 2024

## 'Surat' next major combatant to join the Indian Navy's arsenal

Constructed using cutting-edge technology, a naval ship named 'Surat' will be the next major combatant to join the Indian Navy's arsenal. The Navy in a post on X on Monday also shared some pictures of this new vessel. "#Surat will be the next major combatant to join the #IndianNavy's arsenal. The ship commenced her maiden sea trials prior induction.

Named after the vibrant city of #Gujarat, #Surat epitomizes its rich maritime heritage and pivotal role in India's nautical legacy. Constructed using cutting-edge technology by @MazagonDockLtd, #Surat stands as a glorious testament of #AatmanirbharBharat. @IN\_WNC," it posted on X.

It has been a maritime tradition to christen ships, boats and other vessels after cities. Surat, a historic city in Gujarat, is known for its centuries-old storeyed past and is located near the western India's coastline.

<https://economictimes.indiatimes.com/news/defence/surat-next-major-combatant-to-join-the-indian-navys-arsenal/articleshow/111064018.cms>

# THE ECONOMIC TIMES

Mon, 17 Jun 2024

## **9 nuclear-armed nations including India continued to modernise N-arsenals in 2023: SIPRI**

Nine nuclear-armed nations including the US, Russia, France, China, India and Pakistan, continued to modernise their nuclear arsenals and several of them deployed new nuclearcapable weapon systems in 2023, a Swedish think-tank said on Monday.

In its analysis, the Stockholm International Peace Research Institute (SIPRI) said China's nuclear arsenal increased from 410 warheads in January 2023 to 500 in January 2024, and it is expected to keep growing.

The report said some 2,100 of the deployed warheads were kept in a state of high operational alert on ballistic missiles, and nearly all of them belonged to Russia or the US. However, for the first time China is believed to have some warheads on high operational alert, it said.

The SIPRI said nine nuclear-armed states -- the US, Russia, the UK, France, China, India, Pakistan, North Korea and Israel -- continued to modernise their nuclear arsenals and several deployed new nuclear-armed or nuclear-capable weapon systems in 2023. Of the total global inventory of an estimated 12,121 warheads in January 2024, about 9,585 were in military stockpiles for potential use, it said.

An estimated 3,904 of those warheads were deployed with missiles and aircraft -- 60 more than in January 2023 -- and the rest were in central storage, it said. "Around 2,100 of the deployed warheads were kept in a state of high operational alert on ballistic missiles. Nearly all of these warheads belonged to Russia or the US, but for the first time China is believed to have some warheads on high operational alert," the report said.

According to the think-tank, India, Pakistan and North Korea are all pursuing the capability to deploy multiple warheads on ballistic missiles, something Russia, France, the UK, the US and more recently China already have. This would enable a rapid potential increase in deployed warheads, as well as the possibility for nuclear-armed countries to threaten the

destruction of significantly more targets, it said. The SIPRI said Russia and the US together possess almost 90 per cent of all nuclear weapons.

The sizes of their respective military stockpiles seem to have remained relatively stable in 2023, although Russia is estimated to have deployed around 36 more warheads with operational forces than in January 2023, it said. Transparency regarding nuclear forces has declined in both countries in the wake of Russia's full-scale invasion of Ukraine in February 2022, and debates around nuclear-sharing arrangements have increased in saliency, it added.

The report put India's 'stored' nuclear warheads at 172 in January this year while the number for Pakistan was 170. India slightly expanded its nuclear arsenal in 2023, it said, adding that both India and Pakistan continued to develop new types of nuclear delivery systems in 2023.

"While Pakistan remains the main focus of India's nuclear deterrent, India appears to be placing growing emphasis on longer-range weapons, including those capable of reaching targets throughout China," the report said.

It said depending on how it decides to structure its forces, China could potentially have at least as many intercontinental ballistic missiles (ICBMs) as either Russia or the US by the turn of the decade.

At the same time, the report said China's stockpile of nuclear warheads is still expected to remain much smaller than the stockpiles of either of Russia and the US. "China is expanding its nuclear arsenal faster than any other country," said Hans M Kristensen, Associate Senior Fellow with SIPRI's Weapons of Mass Destruction Programme and Director of the Nuclear Information Project at the Federation of American Scientists (FAS).

"But in nearly all of the nuclear-armed states there are either plans or a significant push to increase nuclear forces," Kristensen said.

<https://economictimes.indiatimes.com/news/defence/9-nuclear-armed-nations-including-india-continued-to-modernise-nuclear-arsenals-in-2023-sipri/articleshow/111061757.cms>

## THE ECONOMIC TIMES

*Mon, 17 Jun 2024*

### **HAL receives RFP from Defence Ministry for procurement of 156 Light Combat Helicopters worth Rs 45,000 crore**

In a bid to push *aatmanirbharta* in the defence sector, Hindustan Aeronautics on Monday announced that the Defence Ministry has issued a Request for Proposal (RFP) for 156 Light Combat Helicopters.

"We would like to inform that, Request for Proposal (RFP) has been issued by the Ministry of Defence for procurement of 156 Light Combat Helicopter," the official statement of the company said.



Of the 156 LCH requested by the Defence Ministry, 90 are being procured for the Indian Army (IA) while the remaining 66 are for the Indian Air Force (IAF), said HAL's official statement. The tender is expected to be worth over Rs 45,000 crore with helicopters to be acquired by the Indian Air Force and Indian Army.

Earlier, Defence Ministry Rajnath Singh after assuming charge again for the second straight time announced that the aim will be to further strengthen the security apparatus of the country, with focus on achieving self-reliance in defence manufacturing. "Armed Forces modernisation and the welfare of the soldiers, both serving and retired, will continue to be our main focus," he said.

### **Key features of Light Combat Helicopter:**

The LCH, also known as Prachand, has similarities with the Advanced Light Helicopter Dhruv. It has a number of stealth features, armoured protection systems, night attack capability and crash-worthy landing gear for better survivability.

The LCH is equipped with requisite agility, manoeuvrability, extended range, high altitude performance and all-weather combat capability to perform a range of roles including combat search and rescue (CSAR), destruction of enemy air defence (DEAD) and counter-insurgency (CI) operations.

The helicopter can also be deployed in high-altitude bunker-busting operations, counter-insurgency operations in the jungles and urban environments as well as for supporting ground forces.

Additionally, the helicopter can also be used against slow-moving aircraft and remotely piloted aircraft (RPAs) of adversaries. Several key aviation technologies like a glass cockpit and composite airframe structure have been indigenised.

<https://economictimes.indiatimes.com/news/defence/defence-ministry-issues-request-for-proposal-for-procurement-of-156-light-combat-helicopters/articleshow/111060293.cms>

## **ThePrint**

*Mon, 17 Jun 2024*

### **Stryker, predator drones, space, Pannun and Indo-Pacific dominate NSAs Doval & Sullivan's talks**

US National Security Adviser Jake Sullivan arrived in New Delhi Monday on a two-day trip with a multi-faceted agenda ranging from military to critical material cooperation, Indo-Pacific and the Gurpatwant Singh Pannun assassination plot. This is the first high-profile American visit to India within days of the Modi 3.0 government taking over.

Incidentally, he landed on the day news arrived from the US that Indian national Nikhil Gupta — accused of attempting to kill Sikh separatist Pannun — had been extradited from the Czech Republic.

Government sources told ThePrint that the Pannun issue was not officially on the agenda of talks, but said it was quite natural it could come up. They said the Indian side could brief Sullivan on what the high-level probe committee set up by the Modi government has found and action taken thereafter. Sources, however, would not elaborate on what the committee had unearthed so far.

Analysts saw the visit as important for the Joe Biden administration as it goes into election mode. What was at stake for both countries was bigger than differences and the effort was to work on convergences in the relationship, sources said.

Sources also said a stronger India-US partnership was in the best interest of the two countries and others amid rise in conflicts across the world and tensions in the Indo-Pacific continuing due to Chinese military coercion against neighbours. They said the India-US relationship should not be seen purely from a security and defence perspective but had a much larger canvass, showcasing human-to-human relations, space, technology, cyber and humanitarian domains.

Sullivan, who held talks with his Indian counterpart NSA Ajit Doval, also met with External Affairs Minister S. Jaishankar and will call on Prime Minister Narendra Modi. Talking about the official agenda, the sources said Sullivan's visit was at the invitation of Doval, as the duo have regular consultations on bilateral, regional and global issues. He was accompanied by a delegation of senior US government officials and industry leaders.

The current visit continues Doval and Sullivan's high-level engagement on the robust and multi-faceted agenda of the India-US global strategic partnership, sources said. Since May 2022, following the launch of the India-US Initiative on Critical and Emerging Technologies (iCET) by Modi and Biden on the sidelines of the Quad Summit in Tokyo on 24 May 2022, the two NSAs have driven a concerted effort to engage in identified areas of collaboration.

This pertained to diverse domains of new and emerging technologies, including semiconductors, AI, quantum computing, defence innovation, space and advanced telecommunications.

In subsequent meetings, the two sides have included new areas within the iCET framework, including biotechnology, critical minerals and rare earths processing technologies, digital connectivity and digital public infrastructure and advanced materials.

The ongoing visit has given the NSAs an opportunity to review the progress and set new priorities and deliverables for iCET, the sources said. The two NSAs also discussed bilateral issues and reviewed the India-US partnership on regional and global issues of mutual interest.

They also chaired the first annual review of iCET with an inter-departmental delegation from both countries. On Tuesday, the NSAs will address participants at an India-US iCET roundtable with industry CEOs, organised by the Confederation of Indian Industry.

Talking about projects under discussion, sources said a key agenda was the production of Stryker-armoured personnel carriers. Based on requirements proposed by the Indian side and on its own, the US had suggested a joint development and production of an extended range of ultra-light howitzers M777, precision-guided long-range munitions and setting up of a production facility for Stryker when it came to technology cooperation for the Army.

Sources said the Army zeroed in on the Stryker because Indian companies may have developed armoured-personnel carriers, but none of them matched the Stryker in terms of performance,

weight, advancements and ease of transporting. The US side is also pushing for the MQ-9B (predator drones) deal which is however not part of the iCET.

<https://theprint.in/diplomacy/stryker-predator-drones-space-pannun-and-indo-pacific-dominate-nasas-doal-sullivans-talks/2134730/>

# ThePrint

Sat, 15 Jun 2024

## **With an eye on China, IAF expands taxi track at Leh airport, new shelters being built**

Aiming to beef up its operational capability in Eastern Ladakh, the Indian Air Force (IAF) is expanding the taxi track at the Leh airport which will enable it to use it as a landing and take off strip for its fighters and transport aircraft.

This expansion, which includes new aprons and aircraft shelters, will act like a second operational surface other than the main runway which is also used by civilian aircraft.

The IAF is not calling the expanded taxi track as a runway because it is smaller than what the regulations say for civilian operations but is long enough for fighters and military transport aircraft.

This upgrade is part of the focus on at least 20 air bases along the Line of Actual Control (LAC).

In the imagery posted on social media platform 'X', satellite imagery expert Damien Symon stated that it will likely handle an increased military and civilian air traffic and ensure uninterrupted operations amid tensions with China.

“This development is crucial for maintaining India’s military posture along the Line of Actual Control and Siachen,” he added.

The new construction, he said, would allow the IAF to carry out “operations of various fighters, UAVs & helicopters, which have significantly increased due to current border tensions. The strategic air base also plays a key role during winter when road access is cut off by snow.”

The length of the taxi track would be approximately 2000-metres, according to the imagery.

The Leh airbase is of strategic importance as it was through this IAF asset that 68,000 soldiers, 90 tanks as well as several radars among others were deployed in the aftermath of the 2020 Galwan clash.

The air force has been ramping up its infrastructure in this strategic region. It finished blacktopping the Nyoma airfield early this year. As reported by ThePrint, upgradation of Eastern Ladakh’s Nyoma airfield, which is the world’s highest airfield, located at 13,700 ft, was to facilitate fighter jet operations along the LAC.

In addition, the IAF has in the last four years, constructed several facilities to boost its infrastructure. The Chabua air base, for instance, got a new apron in addition to the hardened aircraft shelters among other developments.

China, too, has been keeping infrastructure updated. As reported by ThePrint earlier, the Hotan airbase, which comes under the PLA's Western Theatre Command is crucial for air operations.

In April, the neighbouring country activated its second runway at Hotan as well as constructed several military buildings and aprons. The air base hosts several of the Chinese air force's aircraft including the J-11, 3-20, unmanned aerial vehicles (UAVs), and Advanced Early Warning & Control (AEW&C) and Electronic Warfare platforms.

<https://theprint.in/defence/with-an-eye-on-china-iaf-expands-taxi-track-at-leh-airport-new-shelters-being-built/2133006/>



*Tue, 18 Jun 2024*

## **China marshals ground forces near Indian border**

The People's Liberation Army Ground Force (PLAGF) deployed near the Rutog garrison in Tibet has likely departed for exercises, Umbra synthetic aperture radar (SAR) imagery shows.

Rutog is located less than 70 km from the Indian border and approximately 90 km from previous deployment positions around Pangong Tso, which Janes identified during the 2020 India-China stand-off.

Those departures are identified in the Umbra two-colour multiview change detection imagery by the 'red is fled' results, meaning equipment appearing in red is no longer present.

The imagery serves as an indicator of the size of the force China rotates near the Indian border to maintain an escalation advantage should tensions between the countries rise.

An estimated 539 pieces of equipment were pulled out of storage and marshalled at Rutog's western garrison in the 11 May imagery. Some of the equipment identified in SAR included a mix of probable tanks, infantry fighting vehicles/armoured personnel carriers, self-propelled howitzers, and trucks.

While it remains unclear to which exercise locations the PLAGF may have relocated, Umbra SAR imagery collected on 12 May showed ground forces travelling north along the G219. The highway runs through the disputed territory of Aksai Chin, where exercises often occur, and to exercise locations to the east of Rutog.

China also maintains a field garrison to the northeast of Rutog near 33.45435, 79.90483. The PLAGF presence at that site was expanded between March and June 2023 likely to support additional border rotations.

<https://www.janes.com/osint-insights/defence-news/defence/china-marshals-ground-forces-near-indian-border>

Tue, 18 Jun 2024

## Eurosatory 2024: Drones and Counter-Drone Systems Shape the future of Aerial Warfare

Eurosatory 2024 isn't just another defense expo. This year, the Parisian event has become a battleground for dominance in the skies, with drones and counter-drone systems taking center stage. This shift reflects a crucial turning point in modern warfare and security concerns, driven by several key factors in the present geopolitical environment.

“The proliferation of drones, both commercially available and state-developed, has created a new security challenge. Terrorist organizations and rogue actors can potentially weaponize readily available drones, posing a threat to critical infrastructure, military bases, and even civilian populations,” Cdr Rahul Verma (retd), Deputy General Manager (Technical) TASL tells FinancialExpress.com on the sidelines of the ongoing Eurosatory in Paris.

Eurosatory attendees are keenly aware of this growing threat, making counter-drone solutions a hot commodity. According to Cdr Verma, “Eurosatory isn't just about showcasing the latest hardware. The conference is also a platform for crucial discussions about the future of drone warfare and its ethical implications. Key questions to be addressed during various discussions and seminars include:

**Responsible Drone Use:** How can drone technology be utilized for legitimate military and security applications while mitigating the risks of misuse by rogue actors?

**The Ethics of Autonomy:** With advancements in artificial intelligence, the specter of autonomous drone warfare looms large. Eurosatory discussions will likely delve into the ethical considerations surrounding such developments.

**Adapting to the Threat:** As drone technology evolves, so too must counter-drone systems. The conference will explore how these systems can be designed to be effective against ever-evolving drone threats and tactics.”

Eurosatory 2024 isn't merely an expo; it's a glimpse into the future of aerial warfare shaping global security landscapes. The “drone dance” playing out in Paris represents a critical juncture, where technological advancements and ethical considerations collide. “The outcome of these discussions will determine how effectively we navigate the challenges and opportunities presented by this rapidly evolving domain. Our Indian companies are making a mark here and this could only increase with the emergence of Atamanirbhar Bharat,” states Cdr Verma.

[https://www.financialexpress.com/business/defence-eurosatory-2024-drones-and-counter-drone-systems-shape-the-future-of-aerial-warfare-3527585/#google\\_vignette](https://www.financialexpress.com/business/defence-eurosatory-2024-drones-and-counter-drone-systems-shape-the-future-of-aerial-warfare-3527585/#google_vignette)

*Mon, 17 Jun 2024*

## **Strong Indian presence at Eurosatory amid French ban on Israeli firms**

Indian defence companies have a very strong presence at this year's Eurosatory defence trade show in France.

The online exhibitor list features over thirty Indian firms including Defence PSUs, including Advanced Weapons and Equipment India Limited, Aeron Systems Pvt Ltd, Ashoka Manufacturing Pvt Ltd, Bharat Electronics Ltd, Bit Mapper Integration Technologies, Brahmastra Defence Techno Products Limited, Chanakya Aerospace, Defence Research and Development Organisation, Entremonde Polycoaters Limited, Futura Automation Pvt Ltd, Gliders India Limited, Honeywell, Hyderabad Precision Mfg. Co. Pvt. Ltd., MKU, Kusumgar Corporates Private Limited, and Zen Technologies Limited.

These companies will join over 1,740 exhibitors from 96 countries at one of the largest defence trade shows in Europe, running from June 17-21. Eurosatory, a significant event in the defence sector, provides an essential platform for these Indian firms to showcase their advanced technologies and products.

In contrast to the robust Indian participation, the French government has decided to ban Israeli defence firms from the event. This decision is linked to France's disapproval of Israeli actions in Gaza. According to reports in the public domain, the French Ministry of Armed Forces announced, "At the request of the French authorities, Israeli companies will not be present at Eurosatory." The ministry cited unsuitable "conditions" for welcoming Israeli companies while French President Emmanuel Macron called for an end to Israeli operations in Rafah.

Macron has been increasingly critical of Israeli operations in Gaza. Earlier this week, he called for an immediate cease-fire in Gaza, the release of all hostages, and unrestricted access to humanitarian aid. He bluntly stated that the Rafah operation "must stop" and emphasized the lack of safe areas for Palestinian civilians in Rafah, urging full respect for international law. Macron reiterated these points on his social media platform, X.

The initial exhibitor list for Eurosatory included nearly 70 Israeli firms, such as Israel Aerospace Industries and Rafael Advanced Systems, who will now be absent due to the ban.

While Indian defence companies have a strong presence and are set to make a substantial impact at Eurosatory, Israeli firms face exclusion due to political tensions, reflecting the complex dynamics of international defence trade.

<https://www.financialexpress.com/business/defence-strong-indian-presence-at-eurosatory-amid-french-ban-on-israeli-firms-3526851/>

## **FDI, R&D, manufacturing key to achieve \$5 bn defence export: Study**

Factors like streamlining foreign direct investment (FDI) as well as augmenting Research & Development (R&D) and manufacturing capabilities can help the country realise its \$5 billion defence export target by 2024-25, says a study.

Nexgen Exhibitions, organisers of International Police Expo, one of Asia's premier homeland security and defence expos, have released the findings of a comprehensive survey aimed at streamlining Foreign Direct Investment (FDI) and bolstering Defence Research & Development (R&D) and manufacturing capabilities, as per a statement.

According to the statement, this initiative aims to propel India towards its ambitious \$5 billion defence exports target by 2024-25.

The survey, conducted across 15 cities in India, saw participation from over 130 national and international arms, ammunition, and security equipment manufacturers, exporters, and startups.

The key highlights of the survey, underscored the need for streamlined FDI inflows, elevated technology integration with AI and other futuristic technologies, and a robust skill development ecosystem to create a large pool of industry-ready professionals.

By enhancing R&D and manufacturing capabilities, India's homeland security and defence sector is poised to emerge as a global manufacturing hub, it stated.

Additionally, it stated that increasing procurement categories is a significant step towards boosting domestic defence manufacturing. Currently, India exports defence equipment to over 75 countries, demonstrating its growing footprint in the global defence market.

The homeland security sector is crucial for maintaining internal stability and protecting national interests. Integrating advanced technologies and data analytics is paramount for effective threat detection, surveillance, and response.

By leveraging AI and machine learning, security agencies can predict and mitigate risks more efficiently. Moreover, it said that developing a robust disaster management mechanism ensures preparedness and swift response to emergencies, enhancing public safety and national resilience.

"Increase in procurement categories and emphasis on quality and innovation have positioned India as a reliable defence equipment supplier on the global stage. The government's supportive policies, coupled with strategic partnerships and collaborations, are driving the growth of India's defence exports, bringing the country closer to its \$5 billion target by 2024-25," Aadhar Bansal, Director, Nexgen Exhibitions said in the statement.

The International Police Expo facilitates connections between global and domestic manufacturers, suppliers, and innovators, fostering discussions on the key priorities shaping the future of policing and homeland security.

Scheduled for July 4-5, 2024 in New Delhi, the International Police Expo will see participation from over 25 countries, including the UK, USA, Israel, Poland, Croatia, UAE, Germany, Canada, Singapore, Brazil, Hong Kong, and Taiwan.

These countries will showcase their latest innovations and technologies, providing a platform for international collaboration and exchange of best practices.

[https://www.business-standard.com/external-affairs-defence-security/news/fdi-rd-manufacturing-key-to-achieve-5-bn-defence-export-study-124061700496\\_1.html](https://www.business-standard.com/external-affairs-defence-security/news/fdi-rd-manufacturing-key-to-achieve-5-bn-defence-export-study-124061700496_1.html)



*Fri, 14 Jun 2024*

## **Rafale ‘Battles’ Eurofighter Typhoon In Close Air Combat In Germany; India Evaluates Both Fighters For IAF Deal**

On June 6, the skies over Ramstein Air Base were alive with the thunder of jet engines as more than three dozen NATO fighters engaged in a day-long exercise that pitted some of the world’s most advanced military aircraft against each other.

Among the participants were the Eurofighter Typhoons and Dassault Rafales, both 4.5 generation jets that have earned a prominent place in global military arsenals.

The exercise featured 37 aircraft, including fourth—and fifth-generation fighters. The Typhoons and Rafales ‘battled’ in close proximity at altitudes exceeding 10,000 feet, a fight India might have been closely watching. This basic fighter maneuvers exercise was designed to test the capabilities of these jets in simulated dogfights, provide valuable experience for pilots, and showcase the prowess of these formidable aircraft.

In addition to the Typhoons and Rafales, the exercise included F-35s from the US, UK, Netherlands, and Norway. The presence of these fifth-generation fighters underscored the growing importance of the F-35 in European defense, with plans for 600 of them to be operational in the region by the end of the decade. The exercise harkened back to the Cold War era, featuring dissimilar training that brought together diverse aircraft and pilots in a unique display of multinational cooperation.

“This is something that is a learning experience that I haven’t seen in many, many years,” remarked Col. Michael “T-Man” Trautermann, the senior German national representative to NATO Allied Air Command. The event was significant for Ramstein Air Base and its personnel. Known as a hub for US military airlift capabilities and home to the American military hospital at Landstuhl, Ramstein also supports a large community of American service members, families, and contractors.

Maj. Gen. Paul D. Moga, the commander of the Third Air Force, oversees the roughly 50,000-strong Kaiserslautern Military Community, the largest cluster of US troops outside the United States.



The simulated combat took place within 50-by-70-mile airspace, divided into four quadrants, each hosting its own dogfight. Each fighter had a 30-minute window to engage and attempt a simulated kill, providing a realistic and challenging environment for all participants. Despite fighter pilots' competitive nature, strict measures were implemented to ensure aerial safety and prevent the exercise from becoming overly aggressive. There were no trophies, just the pursuit of excellence and honing combat skills.

### **India's Focus On Rafales & Typhoons**

The outcome of the dogfight between the Eurofighter Typhoon and the Rafale during the recent exercise remains classified as of now, but the competition between these two European fighters has always been fierce. Both Rafale and Typhoon share a common origin in their initial development and requirements-setting phases. However, France eventually left what became the Eurofighter consortium to develop the Rafale independently. When these jets first entered the export market, the Eurofighter Typhoon gained traction due to direct orders from the countries involved in its development. In contrast, the Rafale struggled initially to attract foreign buyers and was even dubbed the "cursed aircraft."

However, it has since become one of the most sought-after fighter jets worldwide. This rivalry often plays out in various export competitions. For example, the Rafale won a significant contract to supply 36 fighter jets to the Indian Air Force, outshining the Eurofighter Typhoon in the final selection. Recently, the Eurofighter Typhoon garnered attention again when Indian Air Force Chief Marshal V. R. Chaudhari visited Germany and flew a sortie in a Typhoon at a German airbase.

This event sparked speculation about efforts to persuade India to consider the Eurofighter Typhoon for its 'MMRCA 2.0' initiative, in which the Indian government plans to procure 114 fighter jets. While Indian military experts often favor the 'tried and trusted' Rafale, the Eurofighter Typhoon's proven technical capabilities from the original MMRCA competition mean its chances should not be outrightly dismissed.

### **Eurofighter Typhoon Vs. Dassault Rafale**

These fighter jets are regarded as successful projects and are among the most advanced today. While they are somewhat older 4.5-generation fighters and may not match the United States' 5th-generation F-35 and F-22 fighters, they continue to remain reliable in modern warfare.

Unsurprisingly, both aircraft have similar design philosophies to their global competitors. This is due to their origins in a collaborative European initiative from the Cold War era. However, as stated, France eventually split off to develop the Rafale independently, while the UK, Germany, Italy, and Spain collaborated to create the Eurofighter.

Yet, the main difference arises from the French requirement for the Rafale's basic airframe design to be suitable for CATOBAR carrier operations, necessitating high-alpha, low-speed handling, even with external stores attached. Additionally, unlike the Eurofighter, the Rafale was designed as a nuclear delivery system from the outset. These design philosophies influence the final aircraft: the Rafale emphasizes load carrying and exceptional handling at very low speeds, while the Typhoon focuses on maximum performance at altitude and agility at transonic and supersonic speeds.

In a detailed comparison of the Rafale and Eurofighter Typhoon, Justin Bronk, a Research Fellow at the Royal United Services Institute, explained that the Rafale excels in several areas due to its mature RBE2 radar system. Additionally, the Rafale F3R surpasses the Tranche 2 or 3 P3E standard Typhoon in load-carrying capacity, electronic countermeasures (ECM), subsonic agility, performance at low and medium altitudes, and overall cost efficiency.

However, Bronk also highlighted areas where the Typhoon holds an advantage. An RAF standard Tranche 3 Typhoon would likely outperform the Rafale in beyond visual range (BVR) performance, interceptor missions, and extreme rate of climb. Furthermore, the Typhoon shows superior performance in electronic support measures (ESM), terminal countermeasures, and low-collateral strike capabilities.

Moreover, both the Rafale and Typhoon incorporate low observable features, but neither qualifies as a truly low-observable aircraft. When configured without external stores or targeting pods, the Rafale likely has a lower frontal radar cross-section (RCS) compared to the Typhoon. However, this configuration would render both aircraft combat ineffective.

In practical combat scenarios, both aircraft are equipped with external pylons, fuel tanks, weapons, and targeting pods. This increases their RCS, making them detectable at long ranges by modern sensors. Bronk pointed out that advanced radar systems, such as the Irbis-E on the Su-35 and the Chinese AESAs on the J-10C, J-16, and J-20, as well as ground-based air defense radars, can easily spot them under these conditions.

<https://www.eurasiantimes.com/rafale-battles-eurofighter-typhoon-in-close-air-combat/>



*Sat, 15 Jun 2024*

## **S-400 Triumph: Indians Anxious As Russian AD System 'Struggles' In Ukraine War; Should IAF Worry?**

Ukraine claimed to have hit Russian S-400 and S-300 systems in Crimea in an overnight strike on June 10. The statement came after a series of explosions were reported in the peninsula at night. One S-400 air-defense missile unit was reportedly hit near Dzhankoi, and two more S-300 anti-aircraft missile units were attacked near Chornomorske and Yevpatoria. Russia's S-400 Triumph air defense system, which is globally recognized for its unmatched capability, has an estimated price tag of around \$1.2 billion.

On 15 October 2016, during the BRICS Summit, India and Russia signed an Inter-governmental Agreement (IGA) for the supply of five S-400 regiments to India. The US\$5.43 billion deal (₹40,000 crore) was formally signed on 5 October 2018, ignoring the threat of US sanctions. Commencing 2020, Russia was supposed to deliver the five squadrons by early 2024, but the supplies suffered delays due to the ongoing Russia-Ukraine war and payment complexities. Three systems have been delivered and have been operationally deployed by the Indian Air Force (IAF),

covering the threat from across the two borders. Russia will now deliver the remaining two S-400 air defense systems to India by August 2026.

Russia, China, Turkey, and Belarus already operate the S-400, and many more have shown interest. Even the American security establishment has acknowledged the effectiveness and lethality of this very potent air defense system. Any loss of the system in combat conditions requires a revisit to check operational effectiveness and defense capability.

### **Ukrainian Attack Against S-400**

Four S-400 launchers were destroyed in mid-April along with other equipment in an attack on a Russian military airfield in Crimea, Ukraine's military intelligence (HUR) reported. Ukraine reportedly also struck and significantly damaged a ferry crossing in Kerch with U.S.-provided long-range ATACMS missiles overnight on May 30. Moscow actively uses the ferry crossing to supply Russian troops in Crimea. The peninsula and ferries are defended by Russian Pantsir, Tor, and S-400 Triumph air defense systems.

Ukrainian strikes destroyed MiG-31 and Su-57 fighter jets, forcing Russia to recalibrate its strategy. Ukrainian drone strikes have also hit targets, even in Moscow. Clearly, Russia has not been able to defend a few important operational assets.

### **MGM-140 ATACMS**

The Lockheed Martin MGM-140 Army Tactical Missile System (ATACMS) is an American tactical ballistic missile that has been in service since 1991 and was recently supplied to Ukraine. This 1,670 kg weapon, solid propellant, Mach 3 missile has a range of 300 kilometers, and a launch system costs nearly \$1.4 million. It uses GPS-aided inertial navigation guidance. The precision attack missiles can be fired from the tracked M270 Multiple Launch Rocket System (MLRS) and the wheeled M142 High Mobility Artillery Rocket System (HIMARS).

In October 2023, a year and eight months after the Russian invasion, the United States delivered ATACMS to Ukraine. The use of these missiles threatened the entire Russian land corridor in southern Ukraine. It further placed within reach the vast majority of the airbases operated by Russia inside Ukraine (north of Crimea) and complicated Russia's use of attack helicopters against Ukrainian targets. On 17 April 2024, six explosions were reported at the Dzhankoi airbase in Crimea. Some of these missiles deployed cluster munitions.

On April 20, 2024, the U.S. House of Representatives approved an additional \$61 billion in foreign aid to Ukraine, which included the delivery of the longer-range version (300 km) of ATACMS. Shorter range variants have a 165 km range. In June 2020, the US Army tested a new multi-mode seeker—an upgrade for the Precision Strike Missile. The missile will enter service in 2024. Current operators of the ATACMS variants are the USA, Bahrain, Greece, South Korea, Romania, Poland, Turkey, Qatar, United Arab Emirates, and Ukraine.

### **S-400 Triumph Air Defence System**

The S-400 Missile System is a Russian mobile long-range surface-to-air/anti-ballistic missile system that entered service in August 2007. Its missiles and battery cost around \$1.2 billion. It has four radars and four missiles that cover a range of 40 to 400 kilometers, thus covering a huge AD

bubble. The system is the successor to the S-300, and the next version is the S-500. The S-400 Triumf and Pantsir missile systems can be integrated into a two-layer defense system.

The S-400 administrative complex can coordinate eight battalions. The mobile command and control center has a panoramic radar detection system with a 340 km range and is well protected against jamming. Eight battalions of surface-to-air missile (SAM) combat systems parked up to 40 kilometers apart are fully integrated and can track targets independently. A single system can manage 72 launchers, with a maximum of 384 missiles. The battalion's multi-functional radar can track 20 targets. A transporter-erector-launcher on a trailer can have 12 launchers.

The kill zone for a ballistic missile target (RCS < 0.4 square meters) is 200 km. For a target with an RCS of 4 square meters, it is 340 km. It is 400 kilometers for a strategic bomber-sized target. Due to their low-altitude flight paths, the S-400 can intercept cruise missiles at a range of about 40 km. The missiles use semi-active or active radar homing. A full unit can engage 36 targets simultaneously, and two missiles can engage a single target. The reaction time in case of target detection on the move is 5 minutes to launch. The service life is 20 years, and the time between major overhauls is 10,000 hours.

S-400s have protected Moscow since 2007. The Baltic Fleet in Kaliningrad received S-400 SAM systems in 2012. Russia's Northern Fleet's Coastal Forces had deployed S-400s. Six S-400 units had been activated for the air defense of Russia's Novosibirsk Oblast in South-East Russia. 56 battalions were operational by 2020. In November 2015, S-400s were deployed to Syria at the Khmeimim Air Base, and later, a second S-400 unit was activated near Masyaf.

In late December 2021, the Israeli Air Force flew military jets, including F-35I, over areas protected by S-400 and Pantsir SAM in Syria and bombed Iran-backed Hezbollah militia based in Latakia. But both sides chose not to attack each other due to a mutual understanding. Ukraine has claimed targeting Russian S-400 units since mid-2023. Finally, in April-June 2024, Ukraine launched ATACMS missiles and HIMARS rockets at a Russian military airfield in Crimea and Belgorod and destroyed a few S-400 launchers, a variety of radars, and a Fundament-M air surveillance system.

Russia has 57 batteries/battalions comprising 456 Transporter erector launchers deployed with at least 25 regiments. 28 Battalions are in the Western Sector facing Ukraine and NATO. S-400s are deployed in Belarus. Algeria has had them since 2012. China has six systems starting in 2018. As of 2020, Turkey had 4 batteries consisting of 36 fire units and 192 missiles. Turkey has tested the S-400 against drones and F-16 fighter jets at low altitudes and reportedly had some observations.

India received the first of the five units ordered in December 2021. The third squadron was formed in February 2023. Others who have shown interest include Iran, Egypt, Iraq, and Qatar. Deals have still to fructify.

### **S-400 Operational Engagements**

The S-400 is projected to be one of the best AD systems in the world. China bought the S-400 to take on the US threat in the Indo-Pacific and to cover its intended Taiwan invasion. They have all been closely watching the Ukraine war and the capability of the system to defend itself and other prospective targets. For a long time, even the US has been praising the S-400 system.

In fact, they decided not to sell the F-35 to Turkey because they had acquired the S-400 system, which has the means to record crucial aircraft electronic and other parameters. With a successful ATACMS attack in which it destroyed elements of the S-400 system, more analysis is required.

The S-400 was attacked in Mospyne in the Donetsk region, which lies less than 50 kilometers from the frontline. Some reports suggest that the S-400 system was deployed in the area just a day before the attack. Videos indicate that the S-400s did try to engage the attacking missiles.

The S-400's main long-range detection radar, the 92N6 (Grave Stone) radar, was struck. Destroying Russian AD Systems is important to carry out more surface attacks and to provide greater freedom of operations for inducting F-16s and other fighter aircraft. Ukraine has used the ATACMS with cluster warheads that can cover the area with munitions. If radar elements are hit, it can literally disable the whole system. If they hit missiles, then they can explode and cause further damage.

### **S-400 Operational Dynamics & Implications For India**

Any air defense system, including the famous Israeli Iron Dome, has operational dynamics and limitations when it comes to defense against low RCS ballistic or cruise missiles, rockets, or drones. While they have been designed to defend high-value targets, they themselves will be targeted first as part of the enemy's Suppression of Enemy's Air Defences (SEAD).

Any AD system has its own vulnerabilities. Despite being mobile, the S-400 requires around 5 minutes to launch a missile after detection when it has to stop. Modern satellite-based and airborne ISR platforms and ELINT systems can track location. S-400 is a large system, albeit well spread out, it will be difficult to hide. Also, many times the batteries are used at static locations.

The radar antennas, command post vehicles, and missiles on launchers are quite vulnerable to rocket, missile, or large drone swarm attacks. While the S-400 has redundancies, some damage will occur, and its effectiveness will be reduced. The level of degradation of the S-400 in the recent attacks is still not known. Often, the media backing each side tries to overplay the effects. Weapon systems manufacturers also have media on their payrolls. A platform's success in operations gives it great advertisement mileage and, in turn, sales. Even the success of AD's response to the Houthi and Iranian attacks on Israel was overplayed a little.

When India or China bought the S-400, it was based on known technical parameters and system tests under trial conditions. Actual combat has many variables, and trials cannot create all of these, however realistic they may be. This was the best and most comprehensible system available for the price.

The fact that the US had put sanctions on the purchase of the system also confirmed its capability. Notwithstanding the above, no knee-jerk actions are required. We should not fall into the social media and information warfare trap. Some of it may be to keep Ukrainian morale up. India and China will have a close look at the system vulnerabilities and capabilities.

Russia may also offer upgrades. India would have to exploit the system's mobility, well-spread-out layout, and redundancies. The systems would have to be camouflaged well. The full system will not be destroyed; at best, there will be some degradation. India acquired the systems to defend against attacks from China and Pakistan. Both will certainly target it using missile and rocket attacks, as well as drones.

India would do the same to their AD systems. We must remember that the S-400 will be a great deterrent for adversaries AEW&C, FRA, and fighters to come closer. That itself will be a significant bang for the buck. Wait and watch, and get facts first is the correct approach.

<https://www.eurasiantimes.com/ne-s-400-triumph-indians-anxious-as-russian-ad-system-struggles-in-ukraine-war-should-iaf-worry/>

## THE TIMES OF INDIA

*Sat, 15 Jun 2024*

### **PM Modi, Macron agree to boost defence ties, push 'Make in India'**

Calling for efforts to ensure that the benefits of technology reach all sections of society, unleashing the potential of every individual and helping eliminate social inequalities, PM Narendra Modi said at the G7 summit that the global community must turn monopoly in technology into mass usage. "This should not just be our desire, but our responsibility," he said.

For technology to be successful, it has to be underpinned by a humancentric approach, Modi said at the G7 outreach session on AI and energy as he cited India's success in leveraging digital technology for public service delivery. "We must make technology creative, not destructive. Only then will we be able to lay the foundation of an inclusive society," he said and also referred to India's AI Mission premised on "AI for All".

The PM also called for giving priority to the concerns of the Global South, in particular Africa. He recalled that it was a matter of honour for India that African Union was admitted as a permanent member of the G20 under its presidency. PM Narendra Modi's hectic bilateral schedule in Italy also saw him holding bilateral meetings with his UK counterpart Rishi Sunak and French President Emmanuel Macron. PM Modi had his first bilateral meeting of the day with Macron.

The leaders focused on 'Horizon 2047' Roadmap, which they adopted last year to set the course for bilateral ties, and cooperation in the Indo-Pacific where is a resident power. According to the MEA, they discussed cooperation in defence, nuclear, space, education, climate action, digital public infrastructure, connectivity and cultural initiatives such as the National Museum partnership and enhancing people-to-people ties.

They agreed to further intensify strategic defence cooperation with increased focus on Make in India, an initiative France has backed with liberal transfer of technology and with focus on joint development of next generation equipment.

"They also agreed to expand cooperation in the realms of AI, critical and emerging technologies, energy and sports, while working closely in context of the forthcoming AI Summit and United Nations Oceans Conference, both to be hosted in France in 2025," said an Indian govt readout, adding that a strong and trusted Strategic Partnership between India and France is crucial for a stable and prosperous global order.

In the meeting with Sunak, as the UK goes to polls next month, the leaders expressed satisfaction with the progress made in the Free Trade Agreement talks between the two countries, while discussing regional and multilateral issues. Sunak congratulated Modi on securing a third term in the world's largest democratic election and also thanked him for sending "high level" representatives to the Ukraine peace summit in Switzerland.

Sunak and Modi also discussed the implementation of the India-UK Roadmap 2030, which is about shared commitments on a range of issues, and expressed happiness on progress in all areas of the Comprehensive Strategic Partnership including regular high level political consultations, defence and security, trade and economic collaboration, critical and high technology sectors and people-to-people ties. Modi extended his best wishes to the people of the UK for the elections next month.

<https://timesofindia.indiatimes.com/india/pm-modi-macron-agree-to-boost-defence-ties-push-make-in-india/articleshow/111007862.cms>



Sat, 15 Jun 2024

## **Focus is on sea power, says Rajnath at Eastern Naval Command**

Defence Minister Rajnath Singh said Friday that the focus now will be on strengthening maritime security and making the presence of India's naval power in the Indian Ocean Region more robust.

He was speaking at the Eastern Naval Command in Visakhapatnam in his first official visit after he was sworn in as the Defence Minister for the second time. He said the Indian Navy is continuously becoming stronger, factored by growing industrial infrastructure. "Our shipyards are expanding, aircraft carriers increasing, and our Navy is emerging as a new powerful force. We will give momentum to our efforts in the second tenure as well," he said.

He said the government's focus on land borders and maritime security has a broader vision – "to bind the northern and southern parts of the nation in one thread." As part of reviewing the operational readiness of the Indian Navy, he embarked on INS Jalashwa for a day at sea, during which he was shown operational demonstrations by various ships, submarines and aircraft of the Command to showcase the combat capability and preparedness of the Indian Navy.

"Our Navy ensures that no nation suppresses another in the Indo-Pacific region or endangers its strategic autonomy on the basis of economic strength or military power," he said. He specially mentioned the Navy's daring rescue operation in the Arabian Sea in March 2024, when it freed 23 Pakistani nationals from Somali pirates. This operation, he said, was a demonstration of humanity as well as the values imbibed in the Naval personnel, who come to the aid of everyone, irrespective of nationality.

<https://indianexpress.com/article/cities/delhi/focus-is-on-sea-power-says-rajnath-at-eastern-naval-command-9393575/>

## India to host its first multinational air exercise Tarang Shakti in August

The Indian Air Force's first multinational air exercise, Tarang Shakti-2024, will be held in August, and is likely to see the participation of ten countries, in addition to a few others acting as observers.

“Enriched with the Red Flag exercise experience, the IAF keenly looks forward to hosting the participating contingents from other countries during Tarang Shakti-2024, which is the first ever Indian multinational air exercise to be held later this year,” the IAF said on Sunday in a statement on the just concluded Red Flag exercise hosted by the U.S. Air Force.

The plan is to invite friendly foreign countries with whom the IAF interacts regularly and has a certain degree of interoperability, officials said. Tarang Shakti was earlier planned to be held at the end of 2023, but got deferred.

### Two phases

The exercise is now scheduled to be held in two phases. The first will be held in southern India in the first two weeks of August and the second will be in the western sector from the end of August to mid-September, officials said. Some countries will participate in both phases, while others will join one of the two phases, it has been learnt. Among the countries sending contingents are Australia, France, Germany, Japan, Spain, the United Arab Emirates, the United Kingdom, and the United States. Germany will deploy fighter jets and also an A-400M transport aircraft, as reported by The Hindu earlier. The A-400M aircraft will be on showcase for the IAF, given that it is a contender for the open tender for medium transport aircraft.

### Simulating air combat

The Red Flag exercise, hosted by the U.S. Air Force (USAF) from June 4 to 14, concluded at the Eielson Air Force Base, Alaska. This was the second edition of Red Flag this year; the exercise is hosted four times a year by the USAF. Apart from the IAF, this edition saw the participation of the Singapore Air Force, the U.K.'s Royal Air Force, the Royal Netherlands Air Force, and the German Luftwaffe. The IAF deployed eight Rafale fighters, a first at Red Flag, supported by IL-78 mid-air refuellers for the transatlantic ferry, as well as C-17 Globemaster aircraft.

Red Flag is an air combat exercise conducted with multiple scenarios designed to provide realistic combat settings. A demarcation of forces is done to simulate the desired environment, with the Red Force simulating air defence elements, and the Blue Force simulating offensive composite elements, the IAF explained. In this edition, the Red Force was mainly made up of the USAF Aggressor Squadron, flying F-16 and F-15 aircraft.



## **Interoperability insights**

Indian Rafales operated alongside the Singapore and U.S. F-16s and F-15s, and USAF A10 aircraft. “The missions included beyond visual range combat exercises as a part of large force engagements, in offensive counter air and air defence roles. The IAF crew were actively involved in mission planning and also assumed the role of mission leaders for designated missions during the exercise,” the IAF said.

Over 100 sorties were flown as the maintenance crew ensured serviceability of all aircraft despite challenging weather and near zero temperatures. “Key takeaways from the exercise included insight on interoperability with international partners and a collaborative understanding of employment philosophy in a multinational environment,” the IAF said.

It added that the experience of ferrying long distances, while undertaking air-to-air refuelling enroute, was both an enriching and thrilling takeaway, especially for the younger crew. On the return journey, the contingent is planned to split enroute, along with the refuellers and transport aircraft, and participate in exercises with the air forces of Greece and Egypt, before landing back in India on June 24, the statement added.

<https://www.thehindu.com/news/national/india-to-host-its-first-multinational-air-exercise-tarang-shakti-in-august/article68296702.ece>



*Mon, 17 Jun 2024*

## **Sukhoi Su-57: Junked By India In 2018, IAF Likely To Evaluate Russian Stealth Fighters To Counter J-20**

Air forces of 19 countries of the world are already operating fifth-generation fighter aircraft. While China operates its own Chengdu J-20 ‘Mighty Dragon’, and Russia its Sukhoi Su-57 ‘Felon’, 17 countries are operating the Lockheed Martin F-35 Lightning II. The only other fifth-generation fighter, the Lockheed Martin F-22 Raptor, is operated by USA alone. Only three countries have been original designers of fifth-generation aircraft: the USA, China, and Russia. Though many countries are design and production partners of F-35.

Indian Air Force (IAF) is considered the fourth largest and most powerful air force in the world. The IAF does not have a fifth-generation fighter, despite joining the Sukhoi/HAL Fifth Generation Fighter Aircraft (FGFA) project based on the Russian Sukhoi Su-57. The completed FGFA was to include 43 improvements suggested by India over the Su-57, including advanced sensors, networking, and combat avionics. The Indian version was to be a two-seater with a pilot and a weapon systems operator (WSO). India withdrew from the FGFA program in 2018, but a small window for a revisit was left open.

Small numbers of the Russian Su-57 Felons have entered squadron service and have seen limited action in Syria and Ukraine. Chinese J-20 numbers are growing rapidly, and nearly 250 have

already been built. J-20 has been seen at airfields across the LAC (Line of Actual Control) in Xinjiang (Hotan) and Tibet (Shigatse). While India has decided to pursue its own fifth-generation fighter, the Advanced Medium Combat Aircraft (AMCA), Su-57 remains on offer. F-35 is currently not cleared for India since it purchased the Russian S-400 AD system. In the hypothetical condition that India was to acquire a few Su-57s as a stop-gap arrangement, Felon's comparison with the Mighty Dragon becomes relevant.

### **Sukhoi Su-57 'Felon'**

The Sukhoi Su-57 is a twin-engine stealth multirole fighter aircraft, the initial development of which was initiated in 1999 as Sukhoi's internal designation T-50. It was to be the first stealth aircraft to join the Russian military. In 2009, the aircraft's design was officially approved. The first flight took place on 29 January 2010. The T-50 was named Su-57 in July 2017. The formal Russian Aerospace Forces service induction was in 2020, with the numbers built to date: 32 (10 test and 22 serial aircraft).

The multi-role fighter aircraft is meant for air superiority missions and can take on surface and maritime targets. It incorporates stealth, super-maneuverability in all aircraft axes, super-cruise, integrated avionics, and large payload capacity. The aircraft is meant to succeed the MiG-29 and Su-27 in the Russian military and is being marketed for export. The project has seen both technological and funding delays. During initial testing, the prototypes were found to lack adequate fatigue life, with early structural cracks forming in the airframe. This required structural redesign.

### **Main Features Of Su-57**

The aircraft has a wide blended wing body fuselage with two widely spaced engines and all-moving horizontal and vertical stabilizers. It makes extensive use of composites, which comprise 22–26% of the structural weight and approximately 70% of the outer surface. Extensive work has been carried out to reduce radar cross-section (RCS) and IR signatures to make it stealthy. Even the aircraft canopy is coated with metal oxide layers for enhanced radar wave absorption. There is a greater emphasis on frontal stealth. The shaping of the aft fuselage is less optimized for radar stealth compared to its American counterparts.

The 'Integrated Modular Avionics Combat Systems' uses fiber optic channels. It consists of the main nose-mounted N036-1-01 X band active electronically scanned array (AESA) radar with 1,514 T/R modules and two side-looking N036B-1-01 X-band AESA radars with 404 T/R modules embedded in the cheeks of the forward fuselage for increased angular coverage. The nose antenna is tilted backward for stealth. It also has an N036L-1-01 L-band array on the leading edges. Onboard computers process the X- and L-band signals, significantly enhancing the system's information.

The aircraft's electro-optical system includes infrared search and track (IRST), directional infrared countermeasures (DIRCM), ultraviolet missile approach warning sensors (MAWS), a thermal imager for low-altitude flight and landing, and a navigation and targeting pod. The aircraft is capable of deploying countermeasures such as flares and radar decoys, as well as single-use programmable ECM transmitters. The Su-57 would also serve as a test-bed for advanced AI and man-unmanned teaming technologies.

The Su-57 is powered by a pair of NPO Lyulka-Saturn AL-41F1, augmented turbofans with 88.3 kN dry thrust, 142.2 kN in afterburner, and 147.1 kN in emergency power rating. The aircraft employs thrust vector control (TVC) in rotational axes like in the Su-30MKI. The Su-57 has two tandem main internal weapon bays, each approximately 4.4 m long and 0.9 m wide, and two side weapon bays with triangular section fairings under the fuselage near the wing root. Aircraft can carry four beyond-visual-range (BVR) missiles (R-37M) in its two main weapons bays and two short-range missiles (upgraded R-74) in the side bays. It can carry bombs and surface-attack missiles on each station in the main bay.

For missions that do not require stealth, the Su-57 can carry stores on its six external hardpoints, which could include the hypersonic Kh-47M2 Kinzhal air-launched ballistic missile. Combined with a high fuel load, the fighter has a supersonic range of over 1,500 km, more than twice that of the Su-27. An extendable refuelling probe is available to further increase its range.

### **Slow Production & Induction**

In 2011, Russia's MoD planned to buy the first 10 aircraft for evaluation and 60 production standard aircraft from 2015 onwards. These plans were refined to acquire 52 aircraft by 2020 and another 150–160 by 2025. These were further refined in June 2018 when an order for 12 aircraft was agreed upon. Deliveries to the Russian Armed Forces were pushed back to 2019 when the contract for the 76 aircraft was formally signed for deliveries by 2028. Serial production of the aircraft began in July 2019. In view of delays, additional Su-35 variants had to be inducted.

With the opening of a new production line in 2022, 12 Su-57s could be delivered to the Russian Air Force by the end of 2023. Another 20 aircraft are expected to be built in 2024, making the Su-57 the most-produced jet fighter in Russia.

### **Su-57 Deployments**

In 2018, two Su-57s deployed at the Russian Khmeimim air base in Syria. The fighters were deployed along with four Sukhoi Su-35 fighters, four Sukhoi Su-25s, and one Beriev A-50 AEW&C aircraft. A Su-57 reportedly fired a cruise missile in combat, likely a Kh-59MK2. They reportedly flew around 10 sorties in Syria. The first operational unit to be equipped with the Su-57 is the 23rd Guards Fighter Aviation Regiment, based in Dzyomgi in the Eastern Military District. Deliveries began in 2023, and all 24 aircraft will be delivered by 2025. Russians have reportedly used Su-57 fighters to strike targets in Ukraine with stand-off missiles but remained outside of the zone of Ukrainian air defenses. Su-57s were also used in the SEAD role.

They claimed that the low radar visibility was demonstrated in combat. They claimed kills in both air-to-air and air-to-ground roles, including shooting down a Ukrainian Su-27 with a long-range R-37 missile. By May 2024, Ukrainian sources reported that Russians had intensified the use of Su-57 fighters to strike targets in Ukraine. On 9 June 2024, Ukraine's Main Directorate of Intelligence released satellite images showing a purportedly damaged Su-57 at Akhtubinsk Airfield following a Ukrainian drone strike on the air base 600 kilometers from the border.

### **Future Developments Of Su-57**

Ukraine War-related sanctions did initially slow down imports of semiconductors and high-tech machining equipment from the European Union. The United Aircraft Corporation (UAC) reported that an upgraded Su-57 aircraft made its first flight on October 21, 2022.

The upgraded Su-57M will be equipped with an underdeveloped new engine designated AL-51F-1, with 107.9 kN dry thrust and 167 kN in the afterburner. Glass-fiber plastic IGVs and a new nozzle with serrated flaps will further reduce the rear radar and IR signatures. Work is on to integrate the Okhotnik UCAV as a 'loyal wingman' for uncrewed teaming. A carrier-based variant of the aircraft is also under development. Reportedly, a 'swarm' teaming experiment had been conducted with a group of Su-35s and a Su-57 acting as a command and control aircraft.

### **Fifth Generation Fighter Aircraft (FGFA)**

On 18 October 2007, Russia and India signed a contract between Sukhoi and Hindustan Aeronautics Limited (HAL) to jointly develop a derivative of the evolving Su-57, called the Fifth Generation Fighter Aircraft (FGFA). In September 2010, India and Russia agreed on a preliminary design contract in which each country would invest \$6 billion; a memorandum of understanding for the preliminary design was signed in December 2010, and the development of the FGFA was expected to take 8–10 years.

By 2014, however, the IAF began voicing concerns over performance, cost, and work share. India found that the aircraft did not meet its requirements and eventually left the partnership in 2018. Russia still hopes to get India on board. The reported base price of the aircraft is unbelievably as little as \$35 million.

### **The Chengdu J-20 'Mighty Dragon'**

The Chengdu J-20 "Mighty Dragon" is a Chinese twinjet stealth fifth-generation fighter aircraft. It is designed as an air superiority fighter with precision strike capability. The aircraft has three variants: the initial production model J-20A, the thrust-vectoring J-20B, and twin-seat aircraft teaming capable J-20S. The aircraft made its first flight in January 2011, and the first J-20 combat unit was formed in February 2018. Thus, China is the second country in the world and the first in Asia to field an operational stealth aircraft. Nearly 250 have been built as of date. The J-20 has a long and blended fuselage with a chiseled nose section and a frameless canopy. There are low-observable diverterless supersonic inlet (DSI) intakes. It has all-moving canard surfaces with pronounced dihedral.

The canard design is known to provide good supersonic performance, excellent supersonic and transonic turn performance, and improved short-field landing performance. The aft section has twin outward canted all-moving fins, short but deep ventral strakes, and conventional or low-observable engine exhausts. The aircraft reportedly has the Type 1475 (KLJ-5) active electronically scanned array (AESA) radar with 1856 transmit/receive modules. Some others feel that the radar is likely to contain 2000–2200 transmit/receive modules. Six electro-optic sensors called the Distributed Aperture System can provide omnidirectional coverage for the pilot with a sensor fusion system combining the radar signal with the IR image to provide better situational awareness.

Analysts believe that the aircraft's fins/strakes and axisymmetric rear areas may expose it to radar, but the J-20's overall stealth shaping is robust and considerably more capable than the Russian PAK-FA. For initial flight testing, the Russian AL-31FM2 engines were used. The aircraft is

currently powered by a Chinese WS-10C engine with a thrust of 142-147 kN and serrated afterburner nozzles for enhanced rear-aspect stealth. The final intended powerplant is the Shenyang WS-15 with a thrust of 180 kN, which is crucial for supercruise and enhanced maneuverability.

The main weapon bay can house both long-range air-to-air missiles (AAM; PL-12, PL-15 – PL-21) and precision-guided munitions. The two smaller lateral weapon bays behind the air inlets are intended for short-range AAMs (PL-10). The Pentagon reported that China planned to upgrade the weapons bay to accommodate six missiles. The aircraft also has four external hard points for non-stealthy missions/ferry flights. The estimated production rate was 40 to 50 airframes per year in 2022 and 100 to 120 airframes per year in 2023. The PLA Air Force (PLAAF) currently has around 240 aircraft. The aim is to match and counterbalance the increasing number of F-35 fighters deployed by the United States in the Western Pacific region. The J-20 fleet could reach 1,000 aircraft by the early 2030s.

Chinese media reported that the J-20S, a twin-seat variant, was under development for use in tactical bombing, electronic warfare, and carrier strike roles. Thus, the J-20S will be the first-ever two-seat stealth fighter. The twin-seat allows the second operator to coordinate attacks and reconnaissance missions and manage unmanned combat aerial vehicles (UCAVs) linked via “loyal wingman” systems and sensors. China is known to be developing AVIC Dark Sword and stealth Hongdu GJ-11 UCAVs that can fly in the “loyal wingman” role. Around ten brigades have completed the transition to the new fighter platform. J-20s have started regular patrols in the South China Sea. The J-20 has yet to leave Chinese soil, even for an air show. It has never been exercised with any foreign air force. J-20s have been seen at airbases across the India-China Line of Actual Control.

### Su-57 & J-20 Comparison

	<b>Su-57</b>	<b>J-20</b>
Country	Russia	China
Length	20.1 m	21.2 m
Wing Span	14.1 m	13.01 m
Empty weight	18,000 kg	17,000 kg
Max Take-Off Weight	35,000 kg	37,000 kg
Top Speed	Mach 2	Mach 2.0
Internal Bays and Payload	4 – 4xR-37M, & 2x R-74	3 – 4xPL-15 & 2xPL-10
Range Internal Fuel	3,500 km	2,500 km
Engine and Thrust	2 × Saturn AL-41F1 (147.1 kN)	2 × Shenyang WS-10C (147 kN)
Radar and Range	Byelka radar. AESA, (400 km)	Type 1475 (KLJ-5) AESA, 300 Km
AAM (Range)	R-37 (missile), 200-400 km	PL-15, 200-300 Km

## **Combat & Commercial Competition**

The J-20 is one example of how China has transitioned from being dependent on Russian technology to developing indigenous sensors and weapons that are superior to those of Russia. While the Su-57 has seen limited combat in Syria and Ukraine, the J-20 has yet to leave Chinese shores.

India remains Russia's most desired customer. However, India has not been responding to the overtures and is keen to develop its own AMCA. After the FGFA experience, India knows the Su-57's limitations. Also, India cannot put more eggs in the Russian arms basket. But in case of inordinate delays in AMCA and Pakistan acquires a fifth-generation fighter, India may have no choice but to take a fresh look. The Chinese and Russian aircraft will compete in the same markets in Africa, West Asia, and Southeast Asia. Both aircraft will be cost-competitive.

On 27 December 2019, Algeria signed a contract for 14 aircraft as part of a larger military deal that also includes the purchase of Su-34 and Su-35 fighters. Algeria is set to receive the first Su-57E in 2028. It has been reported that Vietnam may become a customer of the Su-57. Russia has offered Su-57E fighters to the United Arab Emirates, and Iraq has also shown interest in the Su-57. As of date, no Su-57 fighters have been exported. With China aggressively growing its fleet of J-20 stealth fighters and Pakistan indicating its interest in a Chinese stealth fighter (FC-31), India needs to act fast. Before AMCA arrives, India needs a stop-gap solution. The US F-35 could be a great option, but it is not officially on the table as of now.

The other option for the IAF is to explore the Su-57 and even the Su-75 Checkmate that Russia is proposing. Remember, India has kept all its options open!

<https://www.eurasiantimes.com/sukhoi-su-57-trashed-by-india-in-2018/>



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## **India “Bets Big” On Russia Despite US Lure & Chinese Fear; Here Is Why Delhi & Moscow Remain ‘Trusted Pals’**

The foundation of the China-Russia “no-limits” alliance is rooted in the evolving global power structure since the early 2010s. Both nations perceived a need to collaborate against the United States’ hegemonic, albeit declining, influence. Under President Vladimir Putin, Russia has skillfully maneuvered the international landscape to enhance its global standing. Utilizing its substantial hard power — conventional military strength, extensive nuclear deterrence, private militias, energy resources, and strategic geopolitical moves — Russia seeks to maximize its bargaining power and extend its influence.

The Russo-China alliance is visibly strengthening through joint military exercises and defense agreements. This military cooperation serves multiple purposes, such as enhancing capabilities and deterring Western military intervention in their respective spheres of influence.

Economically, the alliance is bolstered by robust trade relations, particularly in energy and natural resources, where Russia is a critical supplier to China. China's vast energy demands are met by Russian oil and gas exports, securing a stable supply while reducing dependency on potentially hostile Western sources. Moscow's strategy in the Russian war against Ukraine aims to disrupt the European security architecture. In Asia, China plans to focus on solidifying its dominance, including the strategic objectives of reunifying Taiwan, asserting control over the South China Sea and East China Sea, and ensuring unimpeded access to vital sea lanes in the Pacific and Indian Ocean.

A critical component of the China-Russia strategy is the concerted effort to undermine US-led global governance. This includes challenging American influence in international organizations like the United Nations Security Council (UNSC) and promoting alternative frameworks like BRICS+ and the Shanghai Cooperation Organization (SCO). By doing so, Russia and China aim to create a multipolar world order that dilutes Western dominance. Economic collaboration between the two nations is equally significant. By increasing bilateral trade using national currencies — currently 92% in yuan and ruble — Russia and China are countering Western sanctions and reducing their reliance on the US dollar. This economic strategy extends to advanced technological collaboration, particularly in areas like artificial intelligence, quantum computing, and telecommunications.

The strategic partnership between China and Russia, even if transactional, poses a significant challenge to the US. This alliance creates a two-front scenario for Washington, compelling it to navigate a belligerent Russia in Europe and an increasingly aggressive China in the Indo-Pacific region. The primary objective of the China-Russia alliance is to counterbalance US influence in international politics, compelling the US to divide its focus from a single theatre, be it in Europe or the Indo-Pacific.

### **Implications For India**

As the 21st-century global dynamics evolve, India finds itself navigating an increasingly unstable international landscape. It is evident that neither a unipolar world dominated by the United States nor a bipolar order centered around US-China rivalry is in India's strategic interest. Instead, a multipolar world with a diminished yet strategically relevant Russian pole presents the most favorable scenario for India's geopolitical aspirations.

However, Russia's increasing closeness to China over recent years has been a cause for concern in New Delhi. India views this relationship with caution, mainly due to its extensive military and defense ties with Russia and the ongoing standoff with China. For New Delhi, managing the Russia-China axis presents a significant foreign policy challenge, altering its strategic outlook in fundamental ways. Furthermore, a strengthened Sino-Russian economic collaboration might marginalize India in regional infrastructure projects and trade routes. Also, closer China-Russia cooperation on the global stage diminishes Indian influence in regional forums such as the SCO and BRICS.

This emerging configuration necessitates that India carefully recalibrate its foreign policy to maintain its space within these forums while safeguarding its national interests. It is understood that Russia, China, and India seek a multipolar world order that diminishes the post-World War II hegemony of the United States. However, while India's vision of a multipolar world is non-West, the one sought by Russia with China is anti-West.

This marks a significant divergence in their strategic interests. In forums like the SCO and BRICS, India aims to amplify the voice of the Global South, positioning itself as a bridge between the developed and developing worlds. This role was evident during the COVID-19 pandemic, where India partnered with the US, Australia, and Japan under the Quad framework to assist Indo-Pacific nations with vaccines.

Conversely, China and Russia seek to form an anti-Western bloc through their partnerships with the Global South, aiming to undermine the West. The differences between India and the China-Russia-Iran-North Korea bloc are fundamental. India emphasizes multi-alignment, strategic autonomy, and constructive mini-lateralisms through groupings like the Quad and BIMSTEC. In contrast, the China-Russia axis approaches values, norms, and institutions from an anti-West perspective, aimed at militarily and economically countering the US and its allies, which does not precisely align with India's approach.

Amidst these developments, the signs of a shifting India-Russia relationship are already evident. Despite Russia's initial offer to mediate between India and China during the Eastern Ladakh crisis, India opted to handle the situation independently. During the near-wartime mobilization against China in Galwan, India's emergency supplies of winter clothing, advanced gear, and weapons came from the West, not Russia. The Logistics Exchange Memorandum of Agreement (LEMOA) with the US was activated, facilitating these supplies. Moreover, most of the military intelligence during the skirmishes in Ladakh and Doklam was shared by the US.

Hence, India has been quietly addressing the issue of the China-Russia bonhomie. Historically, much of the India-Russia relationship revolved around military and security affairs. However, the centrality of Russia in these areas has diminished recently. According to the Stockholm International Peace Research Institute (SIPRI), Russia's share of India's military imports fell from 76% during 2009-13 to 36% in 2019-23. India is increasingly replacing Russia with Western partners (mainly France, the US, and Israel) for new orders or has begun sourcing it from domestic manufacturers.

It is important to note that, despite Russia's growing reliance on China, it has not taken any antagonistic steps against India, which might suggest that Russian proximity to China does not directly affect India. Moreover, there is still potential in India-Russia relations despite Moscow's increasing dependence on China. By investing further in its relations with India and strong growth in trade with India (Russia has become India's fourth largest trade partner), it is evident that Russia seeks to avoid putting all its eggs in one basket.

By having India as a second major partner, Russia aims to mitigate the risks of total dependence on China. This strategic diversification is crucial for Russia to maintain a balanced geopolitical stance. India, in turn, values Russian support as a means to avoid multisectoral (economic, defense, and technological) reliance on the US and the EU and thus aims to prevent entrenchment in the Western bloc.

The Indo-Russia alliance might not match the dimensions of the Sino-Russia partnership, but several initiatives indicate Russia's commitment to strengthening ties with India. These initiatives include enhancing trade through INSTC and exploring visa-free travel agreements, joint ventures, and collaborations across various sectors, particularly atomic energy. Such efforts underscore Russia's recognition of India as a vital partner. Russia's role in the international arena, though



diminished from its peak in the Cold War era, remains crucial. Its existence as a counterbalance to American and Chinese dominance aligns with India's strategic interests.

Russia's alignment with China is primarily aimed at countering American influence, much like India's strategic cooperation with the U.S. seeks to counterbalance China. However, the intricacies of these alliances suggest that Russia's support for India in a potential conflict with China would be limited or, at the most, covert or indirect. Russia would back India only to the extent that it does not compromise its own strategic relations with China. Despite these limitations, Russia remains a valuable partner for India; Russian engagement is devoid of moralistic judgments on India's actions in the international arena.

A pertinent example of this pragmatic partnership is the sale of the BrahMos missile, a joint Indo-Russian venture, to the Philippines—a move clearly aimed at countering Chinese influence. From a realist account, Russia should have vetoed this military deal since it compromises the security of its principal partner, China; however, Russia did not intervene. This underscores Russia's willingness to support India in ways Western powers might hesitate.

On the other hand, when it comes to defense cooperation with the US, it always has some strings attached. For example, it was observed that the US had deferred the 31 MQ-9B Predator drone deal with India after it suspected Indian involvement in a plot to assassinate the Khalistani terrorist Gurpatwant Singh Pannun. Nonetheless, India's dependence on Russian weapon systems and spare parts is a vital pillar of the Indo-Russian relationship. Russia remains not only a steadfast supplier but has also emerged as a source of those critical defense technologies that the West has been reluctant to offer.

For example, there have been reports of Russian (although muted) assistance in developing India's nuclear ballistic missile submarines (Arihant class SSBNs), sharing of critical rocket motor technology of Zircon hypersonic missiles for the BrahMos 2 variant, transfer of technology of jet engines such as RD-33 that power Mig-29, AL-31FP which powers Su-30 MKI, along with the successive lending of Akula class (SSN) nuclear attack submarines to the Indian Navy (Rechristened as Chakra I, Chakra II, and the awaited Chakra III). Joint development and sharing of such critical defense equipment and technologies demonstrate the level of cooperation and mutual trust between India and Russia, unseen and incomparable in scope and depth to India's defense cooperations with the West. This mutual trust reinforces the strategic importance of maintaining strong ties with Russia.

### **Conclusion**

India's strategic path lies in fostering a multipolar world where no single power, whether the U.S. or China, can dominate the global order. This involves maintaining balanced relations with multiple powers, leveraging convergences where they exist, and managing divergences pragmatically. Russia's role as a counterbalance to the China-US bipolarity is indispensable despite its limitations. India's foreign policy thus hinges on a realistic appraisal of international relations, eschewing idealistic notions of permanent alliances in favor of flexible, interest-based partnerships.

This approach ensures that India retains strategic autonomy, minimizing risks and maximizing opportunities in an increasingly unstable world order marked by increasing great-power competition. A multipolar world offers India the best global environment to secure its national

interests. By balancing relations with the U.S. and Russia, along with successfully managing China, India can navigate the current challenges and seize the opportunities of the 21st-century geopolitical landscape.

<https://www.eurasiantimes.com/with-brics-sco-karan-sharma-unpacking/>



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## **China's 'Blue Dragon' Threatens India, Japan & ASEAN's Territorial Integrity; PLA Now Claims 90% Of SCS**

Chinese efforts to scale up their intrusions and aggressive intent in the Indo-Pacific are causing further consternation. Recent action around Taiwan, around the Senkaku islands in the East China Sea, against the Philippines in the South China Sea and in the Indian Ocean region show a rising intensity and an unwillingness to follow the tenets of a code of conduct, which they have been negotiating with ASEAN for over two decades.

The Indo-Pacific strategies of India, Japan, Australia, and the US want to keep the region free and open for international navigation and commerce. The US Indo-Pacific strategy also tries to restrain Chinese influence in the region. This includes using diplomatic and economic measures to challenge China's hegemony and efforts to prevent China from establishing permanent bases in the region. This strategy has not been entirely successful. With the November election quickly approaching, the Biden administration's dedication to the Indo-Pacific will face opposition from a larger number of Chinese activities that challenge the region's freedom and openness.

These efforts emerge from China's Blue Dragon strategy. The Chinese aim to expand their influence and strategic reach across land, seas, and oceans through this strategy. This strategy has military connotations and complements the Belt and Road Initiative (BRI), an economic and infrastructure challenge. It involves increased connectivity, a rising Blue Water Navy, and a willingness to intrude into the countries and waters of the region. China seeks to dominate the security of the Indo-Pacific, restrict freedom of navigation, and consequently impact trade across the region. The Blue Dragon strategy includes challenges to Taiwan, Japan, the ASEAN countries within the 9-dash line, India, and the Indian Ocean region.

While this appears to be a well-thought-out overarching strategy, each of the targeted countries is approached independently and according to local circumstances. Professor Patrick Mendis, US diplomat-turned-academic, explained the Blue Dragon strategy succinctly: "The blue dragon, *Glaucus atlanticus*, is a type of mollusk or sea slug. It is found in the Atlantic, Pacific, and Indian oceans in temperate and tropical waters throughout the world. They may be small and beautiful to behold but have a vicious sting. Not exactly the Chinese strategy, but the viciousness towards fellow sea creatures defies comparison."

According to Mendis, Chinese interest is in the East China Sea, where it clashes with Japan; the South China Sea, where it opposes claims by ASEAN countries, and the Indian Ocean, where it copes with Indian influence. China raised claims through reclaimed and artificial islands, which it tried to claim larger exclusive economic zones and prevent the transit of normal trade and commerce in violation of the United Nations Convention on the Law of the Sea (UNCLOS).

China has armed small islands in the South China Sea and developed them into military bases. Their infrastructure includes coastal radar, missile bases, and runways. These bases have made the deployment of China's aircraft carriers in the South China Sea redundant because these fixed bases can undertake the same activity. The Blue Dragon strategy involves China's claim over islands and waters within its conception of the nine-dash line, now referred to as the 10-dash line, since the release of new maps in August 2023. This has led to China claiming almost 90% of the South China Sea as its own. Armed with its Coast Guard law, China supports vessels undertaking IUU (illegal, unreported, and unregulated) fishing in the EEZ (exclusive economic zone) of other countries forcibly, if necessary, with the backing of the Coast Guard.

Further, the aggressive Chinese Coast Guard intrudes into areas where ASEAN countries may want to service their maritime outposts. In the case of Vietnam, the contention has been contained by Vietnam undertaking quiet diplomacy and not challenging China. In recent years, President Ferdinand Marcos has reversed the docile policy of the Rodrigo Duterte period and now challenges Chinese intent in its islands. The Philippines has also renewed its alliance with the United States and strengthened its partnership with Japan.

The 10-dash line also covers waters around Malaysia and Brunei. However, they do not challenge China in the least and comply with Chinese flotillas going in and out of their waters without challenge or protest. Taiwan is the fifth claimant of certain islands in the region. It conflicts with China because it believes that Taiwanese leaders are seeking independence backed by the USA, a tendency that China aims to curb aggressively. Indonesia was not traditionally a victim of the 9-dash line. Its efforts to pretend that there was no problem with China in the early years of President Joko Widodo Jokowi's first term were met with Chinese intrusions by fishing fleets backed by the Coast Guard in the Natuna Sea, though not onto their islands.

Indonesia took symbolic measures, such as Jokowi holding a cabinet meeting on a warship in the Natuna Sea. The fledgling Indonesian Navy's efforts to curb Chinese fishing in its waters have not been effective, and China remains dominant. Sri Lanka and Maldives are other segments of the Blue Dragon strategy, as they provide avenues for China to go through the South China Sea to the western Indian Ocean. While Chinese bases in Myanmar are anticipated, Gwadar, at the end of the China-Pakistan Economic Corridor in the Arabian Sea, is not yet fully ready. It is the ports of Sri Lanka and Maldives where Chinese ships, submarines, and 'research vessels' frequently dock, particularly around the time when India is undertaking missile or rocket tests.

The facilities granted by Sri Lanka and Maldives are too close for comfort for India and diplomatic efforts to get these countries to see India's point of view have not always been successful. India prefers fair economic opportunities from these countries instead of aligning with China. At the same time, Sri Lanka and the Maldives should not become overly reliant on China to the extent that it threatens Indian security interests.

How Sri Lanka and the Maldives respond to India and China is largely a function of the government of the day. President Ranil Wickremasinghe of the interim government of Sri Lanka tries not to annoy India without really stopping Chinese activity. The Maldives government, on the other hand, not only allows Chinese activity but uses it to spite India. It is to the credit of Indian diplomacy that reactions have been mature. One example is Prime Minister Narendra Modi's invitation to President Ranil Wickremasinghe of Sri Lanka and President Dr Mohamed Muizzu of Maldives to India for his swearing-in.

<https://www.eurasiantimes.com/chinas-blue-dragon-strategy-eats-into-india/>



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## **China Unveils World's 1st Virtual Military Commander; Participates In Computer Wargames To Prepare For Future**

Even as the world is still debating the pitfalls and ethics of handing over the decision of war to Artificial Intelligence (AI), Chinese scientists have already claimed to create an AI commander, the first and highest-level role given to AI in military research. For now, the “virtual commander” is already participating in war games at the country's Joint Operations College of the National Defense University.

The AI commander is already learning and mimicking the thought patterns of a real military commander. It has been granted “unprecedented supreme command authority” in the large-scale computer wargames at the University in Shijiazhuang, Hebei province. In the US Army the AI serves as a “commander's virtual staff” providing decision support, the ultimate decision rests with the Human commander. The AI-piloted fighter jets the US is developing will participate in the wars or training missions; they will not be calling shots in the war room whether to wage war or a particular battle.

Chinese-language journal Common Control & Simulation unraveled the Virtual Commander in May 2024. The peer-reviewed research paper contends that in China, the Party is supreme, and “The Party Commands the Gun.” In the absence of an adequate number of commanders to participate in simulated wargames, the AI commander can stand in for human commanders. Within the confines of the laboratory, it can freely exercise this power without any interference from humans. The team, led by senior engineer Jia Chenxing, contends that as China braces for conflicts in areas such as Taiwan and the South China Sea, the simulations will give a good insight into how it will play out in real life. An essential task for scientists is to test these plans in simulations, to “weigh the good with the bad and gain insight into the chaos of battle,” Jia and his colleagues wrote.

During the simulations, a military commander is often expected to make on-the-spot decisions in the face of unexpected odds. “The current joint operations simulation system suffers from poor simulation experiment results due to the lack of command entities at the joint battle level,” the

researchers said. This is where the Virtual Commander comes into the picture. The Virtual Commander has various avatars and mimics the combat styles of different senior PLA commanders. General Peng Dehuai, for instance, is aggressive and will not be averse to taking risks to emerge victorious. He wreaked havoc on US forces through unexpected swift strikes and infiltrations during the Korean War.

General Lin Bao, known for his wins against the Japanese and Kuomintang armies, has a contrasting leading style. He eschewed risks in favor of meticulous decision-making. Jia's team said that the AI commander's initial setting mirrored that of a seasoned and brilliant strategist, "possessing sound mental faculties, a poised and steadfast character, capable of analyzing and judging situations with calmness, devoid of emotional or impulsive decisions, and swift in devising practical plans by recalling similar decision-making scenarios from memory." The Virtual Commander's outline can be tweaked as per requirement.

The team asserts that while autonomous fighting units like drones and robotic dogs deployed at the country's border will have more freedom of movement in the future, the command will remain in human hands. To simulate the real-life limitations that human commanders face, the researchers limited the AI commander's decision-making knowledge base. When the memory reaches its limit, some knowledge is deleted. While simulating the military wargames with "human-out-of-the-loop," the AI commander has been able to identify new threats and devise new plans to thwart the enemy.

### **The AI Commander Problem**

AI will play a greater role in the wars to come as military AI systems are infinitesimally better at processing large data sets than humans. The human-machine integration is expected to not only be a force multiplier for the existing weaponry but is also expected to be a "de-facto strategic actor" (planner, warfighter, tactician) in warfare. AI technologies are already being used to assist in high-stakes decision-making. There have been debates in the military community about the AI gaining control over nuclear weapons.

In May this year, a USAF F-16 piloted by AI and with USAF Secretary Frank Kendall in the cockpit went against a human-piloted fighter jet. It marked one of the biggest advancements in military aviation since the introduction of stealth technology. It was termed one of the world's first AI aircraft. The software first learns from millions of data points in a simulator and then tests its conclusions during actual flights. The real-world performance data is fed into the simulator, and the AI processes it to imbibe the learnings. The first dogfight of an AI-controlled aircraft was in 2023. Since then, there have been many dogfights, but the AI has learned tremendously, and some versions of Vista are already ready to beat human pilots in air combat.

China has AI, but there has been no indication that it has managed to run tests outside the simulator. But the unveiling of the Virtual Commander poses a conundrum that the militaries around the world are grappling with. Apprehensions linger over giving AI the autonomy to use lethal weapons without sufficient human oversight. Humanitarian groups have been advocating for stricter regulations on AI use in warfare.

<https://www.eurasiantimes.com/china-unveils-worlds-1st-virtual-military/>

## **China's 'Cutting Edge' GJ-11 UCAV Dummy Snapped In Latest Satellite Images; Could Be Deployed On PLAN's Type 076 LCD**

On June 14, the internet was abuzz with mockup images of China's advanced GJ-11 Sharp Sword unmanned combat aerial vehicle (UCAV) at a training site on Changxing Island in Shanghai. The images, captured via satellite, depict two green-colored UCAVs resembling the GJ-11, strategically placed on a newly constructed apron-like area. Satellite imagery shows a recently built expansive apron at the location, measuring about 405 feet long and 200 feet wide.

This area is accompanied by three distinct structures, one of which appears to be a jet blast deflector. That suggests preparations for flight operations. Of particular interest is the proximity of these mockups to the construction site of China's newest amphibious warship, tentatively known as the Type 076.

The Type 076, described as a landing helicopter dock (LHD), is set to feature a significantly large flight deck capable of supporting fixed-wing flight operations through electromagnetic catapults, also called EMALS (electromagnetic aircraft launch system), and arresting gear. This positions the Type 076 as a potential CATOBAR (Catapult Assisted Take-Off But Arrested Recovery) carrier, a rarity among amphibious assault ships worldwide.

Experts speculate that through these new efforts, China aims to simulate the operational environment for GJ-11 unmanned combat aerial vehicles aboard its future Type 076 landing helicopter dock. Previous reports suggested that the Type 076 could accommodate a fleet of unmanned aerial vehicles (UAVs), including the GJ-11 UCAV, first showcased during China's 70th anniversary National Day parade in 2019.

Despite these developments, analysts point out discrepancies in size between the apron on Changxing Island and Type 076's projected deck dimensions. The Type 076 is expected to measure approximately 864 feet long and 141 feet wide. This presents the challenges in directly correlating the mockup site to the ship's capabilities. Nonetheless, the emergence of these images has intensified global interest in China's evolving naval capabilities, particularly its integration of advanced UAV technology into its maritime strategies.

### **GJ-11 Unmanned Combat Aerial Vehicle**

The GJ-11 unmanned combat aerial vehicle (UCAV) was unveiled during China's October 2019 military parade, marking the 70th anniversary of the People's Republic of China.

Developed by the Aviation Industry Corporation of China (AVIC), initial images showed the drone mounted on a truck, offering top and side views. Earlier photographs from 2013 depicted a version with a larger top air intake and a conical exhaust nozzle, contrasting with subsequent models.

At the September 2021 air show in China, a scale model revealed the GJ-11's distinctive features, including two internal belly weapons bays positioned between side landing gears. Each bay was observed to house four precision-guided air-to-ground glide bombs, hinting at its versatile combat capabilities beyond what was displayed.

According to Chinese military aviation expert Zhang Xuefeng, the GJ-11 boasts a flying wing design with high stealth characteristics and subsonic cruising capabilities bolstered by an extended operational range. Further, narrators during the past parade broadcast highlighted its primary role in conducting deep-penetration strikes against critical targets, aligning with its designation "GJ," derived from the Chinese word "gonji," meaning 'attack.'

Speculation has been widespread about the GJ-11's integration into the Chinese Navy, especially regarding its potential deployment on aircraft carriers and large amphibious assault ships. Latest satellite images showing mockups of the drone on Changxing Island add weight to these speculations, suggesting preparations for its inclusion in future naval aviation wings. Evidence has surfaced in the past suggesting the GJ-11's future integration into naval operations. In December 2023, Chinese military aviation expert Andreas Rupprecht shared a photograph revealing a land-based mock aircraft carrier facility in Wuhan. This facility featured replicas of various aircraft, including the J-15, J-35/J-31/FC-31 Gyrfalcon, KJ-600, and, notably, a GJ-11 positioned on the flight deck.

This sighting led People's Liberation Army (PLA) expert Rick Joe to assert as a "near confirmation" that a "flying wing UAV/UCAV is intended for carrier aviation," suggesting that the GJ-11 could already be undergoing operational testing. Another potential role for the GJ-11 involves operating with the J-20 stealth fighter as part of a manned-unmanned teaming concept.

Screenshots from an October 2022 digital representation aired on China Central Television (CCTV) depicted J-20s and H-6K strategic bombers controlling drones as wingmen, specifically identified as GJ-11s in the video. These instances underscore ongoing developments and speculation surrounding the GJ-11's versatility and strategic importance within China's military modernization efforts, particularly in enhancing aerial capabilities through unmanned systems and integrated operations.

<https://www.eurasiantimes.com/chinas-stealthy-gj-11-ucav-dummy-snapped/>



*Sat, 15 Jun 2024*

## **Philippines Sets Up BrahMos Missile Base In South China Sea Amid 'High Tensions' With Beijing – Reports**

In a move that could significantly raise the stakes with an overtly aggressive Beijing, the Philippines is constructing the first BrahMos anti-ship missile base at a naval facility that faces the contested South China Sea. The construction was revealed by Naval News in an exclusive report,

which obtained satellite imagery of the facility. The publication analyzed that the country was building a BrahMos site at the Philippine Naval Station Leovigildo Gantioqui in Zambales, on the coast of Western Luzon.

According to the report, the satellite imagery shows a new camp built south of the Philippine Merchant Marine Academy on a stretch of land where the nation's armed forces previously trained for amphibious assault and coastal defense. Before the construction started, the only other building in the vicinity was a shed for a few Marine amphibious assault vehicles. The report further claimed that the excavation for the base had started shortly after Manila ordered BrahMos. As of May 2, 2024, the location had structures resembling those seen at BrahMos facilities used by the Indian Armed Forces, including a protected magazine bunker to store missiles and a high-bay facility supporting system testing and maintenance.

It further stated that the Philippine Navy's installation seemed smaller than Indian BrahMos bases. That is probably due to Manila's procurement of BrahMos systems with two missiles per launcher instead of the three like the Indian launchers. EurAsian Times could not independently verify the report. However, if the claims are true, it could significantly raise the stakes in a region where hostilities between Manila and Beijing have massively increased. The Chinese Navy uses the Luzon Strait, a choke point for passage between the South China Sea and the Philippine Sea, to maneuver carrier strike groups and destroyers into the Pacific.

The BrahMos anti-ship missiles, which have a range of about 290-300 kilometers, will be stationed just 250 kilometers away from the Scarborough Shoal, a disputed site between the two states and also a location where regular hostilities between Filipino and Chinese forces occur. As reports started doing the rounds, some military bloggers on X suggested that the Philippines could fire an anti-ship missile on a hostile Chinese vessel in the "problem zone" from Luzon.

This, however, is likely to invite China's ire. As part of the Balikatan 2024 military exercises, the US deployed its Typhon armament system in Luzon, capable of firing both Tomahawk Land Attack Missiles and SM-6 Anti-Aircraft Missiles. China took a strong exception to the deployment and accused the US of attempting to destabilize the region.

A Philippines-based military analyst, Miguel Miranda, told the EurAsian Times, "This year saw the rollout of the Comprehensive Archipelagic Defense Concept (CADC), which is a new medium-term doctrine for orienting the entire Philippine military to territorial defense. It must be pointed out that the territory at stake here is maritime routes around the Philippines.

When considering the deployment of BrahMos batteries, the Philippine Navy, along with the Marines (they are subordinate to the Navy), in particular, have an enormous challenge ahead of them. China's aggressive and suspicious behavior in Philippine waters is now impossible to contain and deter. The events of the past year are hard to dismiss. There's Chinese aggression against Filipino ships trying to reach the BRP Sierra Madre. The Chinese are creeping around the Scarborough Shoal again. There are Chinese naval ships encircling the Philippines regularly."

Additionally, Luzon is close to Taiwan, which China considers a renegade Chinese province. In the event of a potential conflict between China and Taiwan, the People's Liberation Army (PLA) would require access to the strait to threaten Taiwan's eastern coastlines or to encircle the self-ruled island.



While the Philippines has made no bones about its non-interest in entering any conflict involving Taiwan, it has been ramping up its defenses to protect itself against a Chinese threat. Manila does not even recognize Taiwan as an independent state. Thus, the deployment is most likely part of a much larger attempt to build deterrence amid burgeoning tensions in the region.

### **BrahMos For The Philippines**

The acquisition of the BrahMos anti-ship missile is part of Manila's significant military modernization program aimed at enhancing its combat capability. In 2013, the Philippines started the program amid China's increasing assertiveness in the South China Sea. However, because of financial constraints, the progress was sluggish.

In December 2021, the Philippines Ministry of Defense announced that it had awarded BrahMos Aerospace Pvt Ltd a notice of award, approving its bid to provide the \$374 million shore-based anti-ship missile system. The missile was delivered to Manila in April this year, at the height of military confrontation between the two sides.

In light of the escalating tensions in the West Philippine Sea, the BrahMos missile system was purchased as part of the "Horizon" 2 Priority Projects to modernize the Philippine armed forces.

The BrahMos is the world's fastest supersonic cruise missile and it can be launched from submarines, ships, aircraft, or land platforms. It cruises at three times the speed of sound, making it difficult for the enemy to bring it down.

The BrahMos missile flies at Mach 2.8 to 3.0 speeds but its upgraded hypersonic version will travel faster than Mach 5.0. One of its notable features is its ability to fly extremely close to the ground to avoid missile defense systems. During the terminal phase, the missile can fly as low as 10 meters to the ground, and in the final phase, it relies on active radar seeker or inertial guidance.

The Marine Coastal Defense Regiment will use the missile system, which costs US\$374,962,800, or around P18.9 billion, to "provide deterrence against any attempt to undermine the country's sovereignty and sovereign rights, especially in the West Philippine Sea".

Twenty-one Philippines Marines finished practical training on February 17, 2023. The Marines learned to use and maintain the BrahMos anti-ship supersonic cruise missile.

As previously explained by EurAsian Times in a detailed article, the missile system in the Philippines will address the country's military weaknesses and vulnerabilities in sea control, anti-access/area-denial (A2/AD), and coastal and island defense operations, as guided by the PN Active Archipelagic Defense Strategy and the Philippines Marine Corps Archipelagic Coastal Defense Concept.

Although the Philippines' government is yet to officially announce the site of the deployment of these anti-ship missiles, it will likely raise the stakes in a region that remains engulfed with regular confrontations between Filipino forces and China's Coast Guard vessels.

<https://www.eurasiantimes.com/tg-editedin-a-warning-to-china-philippines-readie/>

## **China's 'Most Powerful' Type-055 Destroyers Hold Synchronized Drills In SCS Amid Boiling Tensions With US**

In a rare demonstration of maritime strength, three of China's state-of-the-art Type 055 destroyers have participated in extensive military drills in the contentious South China Sea. This strategic region remains a focal point of rising tensions between China and the United States.

A destroyer detachment affiliated with the navy of the Chinese People's Liberation Army (PLA) Southern Theater Command, which manages operations in the South China Sea, recently organized an intensive training task force. This force conducted round-the-clock, long-endurance combat exercises, underscoring China's efforts to enhance its naval capabilities in the area. The training task force included the Type 055 destroyers Xianyang, Zunyi, and Yan'an, as well as the Type 052C destroyer Haikou.

The report said that over six days, the fleet engaged in various complex maneuvers and drills, including main gun firing at land targets, anti-submarine warfare, sea assaults, and replenishment-at-sea operations. This exercise marks the first publicly known instance of three Type 055 destroyers participating in the same drill, highlighting their growing prominence in China's naval strategy.

As of 2024, the PLA Navy has commissioned eight Type 055 destroyers, four of which are assigned to the Southern Theater Command, which is responsible for the South China Sea. The first of these advanced ships entered service in 2020. The exercises involved the task force swiftly reaching their target region and maneuvering into defensive formations before transitioning to offensive sea attack formations to launch precision strikes on simulated targets.

Upon encountering multiple unidentified aerial objects, the fleet shifted into anti-aircraft formations to intercept these mock air threats. Additionally, a shipborne helicopter was deployed to coordinate with the warships in conducting comprehensive submarine searches. However, as Chinese media described, the most visually striking aspect of the drills was the synchronized movement of the three Type 055 destroyers. The ships advanced side by side, then aligned in a single file to simulate a replenishment-at-sea operation, showcasing their operational coordination.

Meanwhile, the report characterized the latest exercise as routine and not directed at any third party. However, it comes after a series of incidents in contested areas of the South China Sea, particularly around the Philippine-held Second Thomas Shoal. These incidents have involved China using water cannons on Philippine ships and vessel collisions.

### **China's Lethal Type 055 Warship**

The People's Liberation Army Navy (PLAN) Type 055 destroyers rank among the world's most powerful warships. They are the pinnacle of China's efforts to develop advanced long-range surface combatants for power projection and to escort the PLAN's expanding aircraft carrier fleet.

These destroyers trace their lineage through several generations of increasingly advanced PLAN warships, including the Luyang III (Type 052D) guided-missile destroyers. Initially conceptualized in the late 1960s, the PLA Navy began exploring the design for a new and larger destroyer. A formal program named “055” was established a decade later but was subsequently shelved in the early 1980s due to technical and industrial constraints.

In 2014, a full-scale mock-up of the destroyer was unveiled at the Chinese naval electronic testing range in Wuhan. The lead ship of the class, Nanchang, was launched in 2017 and officially commissioned into service in 2020. Since then, an additional seven vessels of this class have entered operational service with the PLA Navy, including Lhasa (pennant number 102), Anshan (104), Wuxi (107), Dalian (105), and Yan’an (106). These ships were constructed at the Jiangnan Shipyard in Shanghai and Dalian Shipbuilding in Dalian.

Furthermore, China continues to expand its fleet of Type 055 destroyers. In May, reports indicated the launch of the 10th Type 055 destroyer, with production efforts accelerating. Carl Schuster, a former director of operations at the US Pacific Command’s Joint Intelligence Center, estimated that China intends to build approximately 20 of these advanced destroyers. These will complement smaller Type 054 frigates and the expanding fleet of aircraft carriers, aiming to field up to four carrier battle groups by 2030. Meanwhile, the recent display of these warships in the latest exercise underscores their significance in bolstering China’s naval capabilities.

In early 2024, China lauded its Type 055 destroyer as a “role model” following its performance in multiple military drills. The warship was deployed to counter simulated barrages from foreign forces, earning praise from the Chinese Communist Party committee of the PLA Navy, as reported by the EurAsian Times. The Type 055 is prominently focused on surface warfare. It ranks among the world’s most formidable vessels and serves as a highly lethal platform designed for modern warfare. Several key attributes highlight the significance of the Type 055 destroyer. Propulsion is driven by four gas turbines arranged in a combined gas turbine and gas turbine configuration, marking China’s first major combat ship to utilize full gas turbine power.

Moreover, its primary armament comprises missiles housed in 112 universal vertical launch cells (VLS), the largest such complement among Chinese combat ships. These universal cells enable simultaneous operations against diverse threats and support a variety of missile types, including surface-to-air, anti-ship cruise, anti-submarine rockets, and land-attack cruise missiles. The Type 055’s electronics and sensor suite depart from previous classes, having transitioned entirely from Russian-derived subsystems to indigenous Chinese research and development. This includes advanced air search, fire control, and over-the-horizon targeting radars integrated into an indigenous mast structure.

The ship’s deckhouse features four active electronically scanned array (AESA) panels and Multifunction Integrated Radio Frequency Systems (MFIRFS), consolidating radar, communications, and electronic capabilities within a unified electronic superstructure.

<https://www.eurasiantimes.com/chinas-most-powerful-type-055-destroyers/>

## ISRO's reusable launch vehicle, made to cut down mission costs, set for 3rd test landing this week

The Indian Space Research Organisation (ISRO) will likely attempt the third landing experiment of its Reusable Launch Vehicle (RLV) — Pushpak — by the end of this week.

The landing test, initially scheduled for the first week of June, was rescheduled because of poor weather, officials from the space agency confirmed.

“We are waiting for good weather. The test may happen by the end of this week,” ISRO chairperson S. Somanath told ThePrint Monday.

The RLV-LEX-03, or the third landing experiment for ISRO's reusable launch vehicle, will be carried out in Karnataka's Challakere on board the Indian Air Force's Chinook chopper.

The landing test aims to improve the launch vehicle's performance and landing capabilities.

### What an RLV is

ISRO's RLV-TD (technology demonstrator) is one of the most challenging endeavours towards developing essential technologies for a fully reusable launch vehicle to enable low-cost access to space. The configuration of RLV-TD is similar to that of an aircraft and combines the complexity of both the launch vehicle and the aircraft.

The winged RLV-TD — configured to act as a flying test bed to evaluate various technologies, including hypersonic flight, autonomous landing and powered cruise flight — will be scaled up in the coming years to become the first stage of India's reusable two-stage orbital launch vehicle. The RLV-TD, however, is not the first such launch vehicle. Government and private players worldwide have experimented with partial and fully reusable technology for their launchers for cost-effectiveness and efficiency.

Blue Origin's New Shepherd is an example of a functional reusable launcher that undertook a sub-orbital flight in 2015. SpaceX's Falcon 9 is a two-stage reusable rocket capable of transporting crew and cargo to the International Space Station. The Indian launcher has a fuselage (body), a nose cap, double delta wings, and twin vertical tails. It also features symmetrically placed active control surfaces — elevons and rudder.

This technology demonstrator was boosted to Mach-5 by a conventional solid booster (HS9) designed for a low burn rate. Senior ISRO scientists said that selecting materials like special alloys, composites, and insulation materials for developing an RLV-TD and crafting its parts is a complex process demanding highly skilled manpower.

## Earlier tests

In May this year, the Indian space agency conducted the second landing experiment for Pushpak, RLV-LEX-02, at the Aeronautical Test Range (ATR), Chitradurga, Karnataka. The RLV-LEX-02 demonstrated the autonomous landing capability of RLV from off-nominal initial conditions at release from the helicopter. In the test flight, the RLV undertook challenging manoeuvres with dispersions. After corrections of the cross-range and downrange, it landed on the runway in fully autonomous mode.

The space agency conducted the first landing experiment, RLV-LEX-01, with a scaled-down version of the RLV-TD last year. Once the aircraft attained the predetermined pillbox parameters covering position, velocity, altitude, etc., during the demonstration, based on the RLV's mission management computer command, it was released mid-air at a down range of 4.6 km.

“Developing a technology from scratch takes time. We are progressing at a good pace, and in a few years, we will be able to launch missions on an Indian-made RLV,” Somanath said.

<https://theprint.in/science/isros-reusable-launch-vehicle-made-for-low-cost-space-missions-set-for-3rd-test-landing-this-week/2134892/>



*Tue, 18 Jun 2024*

## **India, US working for training ISRO astronauts at NASA's Johnson Space Center**

India and the US on Monday said they concluded the Strategic Framework for Human Spaceflight Cooperation to deepen interoperability in space and are working toward commencing advanced training for ISRO astronauts at the NASA Johnson Space Center.

A fact-sheet issued by the US and India after the iCET Dialogue between US National Security Adviser (NSA) Jake Sullivan and National Security Advisor Ajit Doval said the two sides are also exploring opportunities to participate in the Lunar Gateway Programme.

The Lunar Gateway Programme aims to build a space station around the moon as part of the collaborative Artemis programme spearheaded by the US. The fact-sheet said the talks between the two NSAs explored opportunities for India's participation in the Lunar Gateway Programme, as well as joint avenues for collaboration in other space technologies.

The two leaders also exchanged views on securing a carrier for the first-ever joint effort between NASA and Indian Space Research Organisation (ISRO) astronauts at the International Space Station, which will mark a significant milestone in the India-US space partnership and space exploration.

They noted the strengthening defence space cooperation through the second Advanced Domains Defense Dialogue held at the Pentagon in May that featured an India-US space table-top exercise and included bilateral expert exchanges on emerging domains including artificial intelligence.

They also noted that the space agencies of the two countries are preparing for the launch of the NASA-ISRO Synthetic Aperture Radar, a jointly developed satellite that will map the entirety of the Earth's surface twice every 12 days as part of efforts to combat climate change and other global challenges together.

The iCET talks also saw the launch of a new partnership between the US Space Force and the Indian startups — 114ai and 3rdiTech — including on advancing space situational awareness, data fusion technologies, and infra-red sensor semiconductor manufacturing.

The two sides welcomed India's observation of the US Space Command's Global Sentinel Exercise at Vandenberg Space Force Base in February and its return as a participant in the exercise in 2025.

<https://indianexpress.com/article/technology/science/india-us-working-for-training-isro-astronauts-at-nasas-johnson-space-center-9398085/>



*Mon, 17 Jun 2024*

## **IN-SPACe announces pre-incubation programme for aspiring space startups**

Indian National Space Promotion and Authorisation Centre (IN-SPACe) has launched the Pre-Incubation Entrepreneurship (PIE) development programme to support and nurture early-stage space startups. IN-SPACe is an autonomous nodal agency under the Department of Space.

According to IN-SPACe, the PIE development programme will cultivate and empower the next generation of space tech innovators, providing them with the tools and guidance necessary to transform their space dreams into reality. The 21-month programme will guide aspiring entrepreneurs through a comprehensive journey divided into distinct phases of ideation, innovation, and prototype development.

The programme will ensure that budding entrepreneurs receive structured support at each critical stage of development. Dr. Pawan Goenka, chairman, IN-SPACe said, "India's space sector is poised for exponential growth, and young entrepreneurs are crucial to driving this expansion. The PIE programme will provide a launchpad, equipping them not only with technical expertise but also with the business acumen needed to navigate the complexities of the space industry. The early-stage support will help to unlock the potential of innovative minds and contribute to India's leadership in the global space industry."

The PIE programme will help young entrepreneurs transform their innovative ideas into prototypes by fostering a collaborative learning environment giving participants an opportunity to connect with and learn from seasoned mentors, handpicked from leading research institutions, incubators, academia, and prominent space industry players. This direct access to industry veterans and subject matter experts will provide invaluable insights, feedback, and networking opportunities.

It will inculcate a culture of innovation in entrepreneurs, propelling scientific advancements that generate socioeconomic benefits, contribute to broader economic development and create new job opportunities in India's space sector.

As per guidelines of the programme, applicants must be Indian citizens graduating in 2024, or already graduates, they should not have received any grants, funding, or monetary support from private or government schemes, and all submissions must be original work. Start-ups registered with the Department for Promotion of Industry and Internal Trade (DPIIT) on or after July 1, 2022, are classified as early-stage start-ups.

<https://www.thehindu.com/sci-tech/science/in-space-announces-pre-incubation-programme-for-aspiring-space-startups/article68299618.ece>



*Sat, 15 Jun 2024*

## **India's first Space Observatory 'AstroSat' sheds light on Neutron Star Structure**

A groundbreaking study by researchers from the Indian Institute of Technology Kanpur (IIT Kanpur), the Inter-University Centre for Astronomy and Astrophysics (IUCAA) Pune, and Ashoka University has provided new insights into the internal structure of neutron stars. This research, published in the *Astrophysical Journal*, marks a significant advancement in the use of neutron stars as natural laboratories for studying General Relativity in extreme environments.

Neutron stars, the remnants of massive stars that have exploded in supernovae, are incredibly dense objects. They cram more mass than the Sun into a sphere only about 10 kilometers across. This immense density creates powerful gravitational fields and results in a complex and poorly understood relationship between pressure and density within the star, known as the equation of state.

The research team utilized data from AstroSat, India's first astronomical observatory, specifically its Large Area X-ray Proportional Counter (LAXPC) instrument. The LAXPC, a domestically developed achievement of Indian engineering, was employed to study X-rays emitted by the binary star system 4U 1728-34. In this system, a neutron star is accreting matter from a companion star, producing X-ray emissions.

The scientists analyzed the X-ray data from 4U 1728-34 and identified several instances of quasi-periodic oscillation (QPO) triplets. They found that the frequencies of these QPO triplets evolve continuously over time while maintaining a specific relationship with each other. This discovery allowed the researchers to interpret the QPOs in terms of three oscillations predicted by Einstein's General Theory of Relativity: orbital motion, precession of the perihelion, and Lense-Thirring precession.

Furthermore, the researchers discovered that the observed relationship between the QPO frequencies depends sensitively on the neutron star's mass, moment of inertia, and equation of state. This dependency provides a new method to probe these parameters in detail, a feat that was not possible previously.

The research team includes Kewal Anand (Ph.D. Scholar, IIT Kanpur), Ranjeev Misra (Senior Professor, IUCAA), JS Yadav (Visiting Professor, IIT Kanpur; Retired Professor, TIFR Mumbai; Ex-PI LAXPC onboard AstroSat), Pankaj Jain (Professor, IIT Kanpur; Head of the SPASE Department, IIT Kanpur), Umang Kumar (Ph.D. Scholar, Ashoka University), and Dipankar Bhattacharya (Professor and Head of the Physics Department, Ashoka University; Ex-Senior Professor, IUCAA).

Commenting on the findings, Pankaj Jain, Head of the SPASE Department at IIT Kanpur, said, "This discovery advances our understanding of neutron stars and opens new avenues for exploring the fundamental principles of physics in extreme environments. The insights gained from this study will have a lasting impact on astrophysics and related fields."

This study not only enhances understanding of neutron stars but also paves the way for future explorations into the fundamental laws governing the universe. The use of AstroSat has proven instrumental in uncovering these cosmic mysteries, showcasing India's growing capabilities in space research and astronomy.

<https://www.financialexpress.com/business/defence-indias-first-space-observatory-astrosat-sheds-light-on-neutron-star-structure-3525808/>



Mon, 17 Jun 2024

## **Voyager 1 is back: 46-year-old NASA spacecraft sends data from all 4 instruments after going dark for months**

After nearly eight months, there is finally some good news! Nasa's Voyager 1, which went silent in November 2023, is now fully operational again. All of its four science instruments are reportedly returning usable data to Earth.

Last year in November, Voyager 1 began sending unintelligible data to Earth in place of its usual 0s and 1s binary code. Voyager 1 was launched on September 5, 1977, and it comes with no surprise that the 46-year-old spacecraft may have begun malfunctioning. The spacecraft is in an entirely uncharted interstellar territory, some 15 billion miles from Earth. That is 24 billion kilometers!

However, Voyager 1's team was persistent and determined to find out what was wrong with the spacecraft. Now, they have succeeded, and the controllers have reportedly identified where the issue was located – the flight data subsystem (FDS). The FDS is used to package data that is to be sent to Earth.



A deeper probe revealed the exact chip that was causing the issue and this has allowed the team to find a work around. After they spotted the code to a new location in the FDS, the Voyager 1 sent back intelligible data on April 20, 2024. However, this data was only from two of its four science instruments. Now, it seems the Voyager 1's two remaining science instruments are running fine, and are communicating effectively with mission control on Earth.

According to experts, even if Voyager 1 went dark forever, it would still be deemed a successful mission. In 1977, when it was launched, the main objective was to study Jupiter and Saturn and this was accomplished by 1980. Regardless, Voyager 1 has been on an unstoppable path, on a trajectory further drifting away from the Earth. In 2012, the spacecraft entered interstellar space relaying some crucial information about this deep realm.

Now that the spacecraft is back, the Voyager 1 team will continue to revive it which will include resynchronising its timekeeping software, performing maintenance on the digital tape recorder measuring plasma waves.

<https://indianexpress.com/article/technology/science/voyager-1-is-back-46-year-old-nasa-spacecraft-sends-signal-after-going-dark-for-months-9394333/>



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## **Earth's inner core 'unambiguously' slowing down, could change day's length, study finds**

A new study has provided "unambiguous evidence" that the Earth's inner core began to slow down its rotation in 2010, compared to the planet's surface.

Researchers said that the slowing down could change the length of one day on the Earth by fractions of a second. The Earth's inner core, a solid sphere made of iron and nickel, is suspended within the liquid outer core (made of molten metals) and anchored in its place by gravity. Together, the inner and the outer core, form one of the planet's three layers – the other two being mantle and crust.

Being physically inaccessible, researchers usually study the core by analysing the recordings of waves sent out by earthquakes – seismograms.

"When I first saw the seismograms that hinted at this change, I was stumped," said John Vidale, a professor of Earth Sciences at the University of Southern California, US.

"But when we found two dozen more observations signalling the same pattern, the result was inescapable. The inner core had slowed down for the first time in many decades," said Vidale, also the corresponding author of the study published in the journal Nature.

The slowing down of the inner core is hotly debated in the scientific community, with some studies even suggesting that it rotates faster than the Earth's surface. It is known that the spin of the inner

core is influenced by the magnetic field generated in the outer core and the gravitational effects within Earth's mantle.

However, it is considered that the inner core is reversing and backtracking relative to the surface, because of rotating slower than the mantle for the first time in about 40 years. "Other scientists have recently argued for similar and different models, but our latest study provides the most convincing resolution," Vidale said.

A study published earlier this year, in the journal Nature, had found that climate change-driven melting of ice in Greenland and Antarctica was affecting global timekeeping by slowing down Earth's rotation.

The author, Duncan Agnew, a geophysicist at the University of California San Diego, showed that the Earth's liquid core was slowing down in its rotation. To counter the effects of this, the solid Earth was rotating faster, said Agnew.

However, this has resulted in fewer 'leap seconds' being needed to be added to the Coordinated Universal Time (UTC) in recent decades, according to Agnew. Since 1972, once every few years, a 'leap second' has been required to be added, owing to irregularities in the UTC arising out of the fact that the Earth doesn't always rotate at the same speed.

For the latest study, the researchers looked at seismic data recorded from 121 repeating earthquakes – multiple quakes occurring in the same location – between 1991 and 2023 in the South Sandwich Islands, a remote archipelago in the South Atlantic Ocean. The islands are prone to violent earthquakes.

Data from twin Soviet nuclear tests between 1971 and 1974, along with multiple French and American nuclear tests from other studies of the inner core, were also included in the analysis.

<https://indianexpress.com/article/technology/science/earth-inner-core-slowng-could-change-days-length-9395129/>

