जुलाई
July
2025

खंड/Vol. : 50 अंक/Issue : 136

23/07/2025

समाचार पत्रों से चयनित अंश

Newspapers Clippings

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

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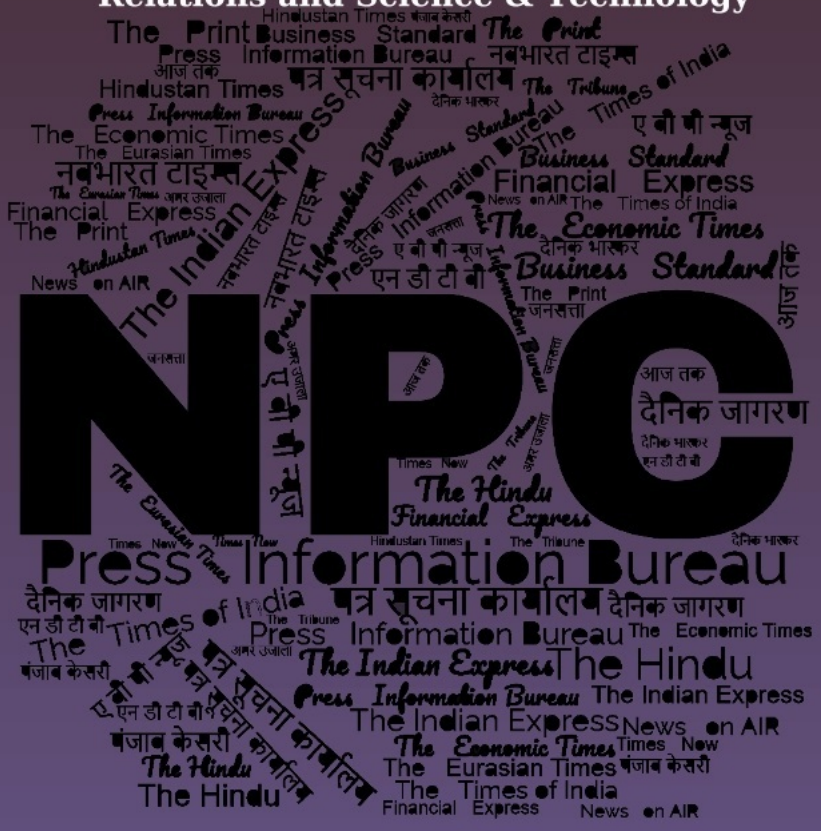

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भारतीय सेना को मिले अटैक अपाचे हेलीकॉप्टर

Source: Punjab Kesari, Dt. 23 Jul 2025

पंजाब केसरी/नई दिल्ली

अमेरिका से खरीदे गए अटैक अपाचे हेलीकॉप्टर भारतीय सेना में शामिल होने जा रहे हैं। मंगलवार को गाजियाबाद स्थित वायुसेना के हिंडन एयरबेस पर भारतीय थल सेना के लिए अपाचे हेलीकॉप्टर्स की पहली खेप पहुंची। यहां तीन अपाचे अटैक हेलीकॉप्टर की पहली खेप हिंडन एयरबेस पर सफलतापूर्वक उतारी गई है। ये अटैक हेलीकॉप्टर सेना के एविएशन विंग का हिस्सा होंगे। रक्षा विशेषज्ञों के मुताबिक भारतीय थल सेना के लिए यह दिन एक ऐतिहासिक उपलब्धि लेकर आया है। भारतीय सेना को ऐसे कुल छह हेलीकॉप्टर मिलने हैं। माना जाता है कि अमेरिका से शेष तीन हेलीकॉप्टर्स की डिलीवरी इस वर्ष के अंत तक हो जाएगी। अपाचे हेलीकॉप्टर को 'फ्लाइंग तोप' भी कहा जाता है। ये दुनिया के सबसे उन्नत अटैक हेलीकॉप्टर में शुमार हैं। सेना के एविएशन कोर को मिलने वाले अपाचे हेलीकॉप्टर की यह पहली खेप है, जोकि मंगलवार को भारत पहुंची है। सेना का मानना है कि अत्याधुनिक तकनीक से लैस ये हेलीकॉप्टर भारतीय सेना की संचालन क्षमता को उल्लेखनीय रूप से बढ़ाएंगे। सेना का कहना है कि इन अपाचे हेलीकॉप्टरों की तैनाती से थल सेना को आधुनिक युद्धक अभियानों में तेज, सटीक और शक्तिशाली हवाई समर्थन मिलेगा। भारतीय सेना ने इसे एक मील का पत्थर करार दिया है। भारतीय थल सेना की मारक क्षमता को बढ़ावा देने की दिशा में उठाया गया यह एक अहम कदम है।

एक साथ कई लक्ष्यों को भेद सकते हैं

अपाचे हेलीकॉप्टर में 30 एमएम चेन गन, रॉकेट पॉड्स, लेजर और रडार-निर्देशित हेलफायर मिसाइलें हैं। ये घातक हेलीकॉप्टर एक साथ कई लक्ष्यों को भेद सकते हैं। यह पहाड़ी व जटिल इलाकों में उड़ान भरने में सक्षम है। साथ ही इसमें सीमा पार जबरदस्त हमला करने की क्षमता है। ये अटैक हेलीकॉप्टर पहाड़ी युद्ध क्षेत्रों में बने दुश्मन के बंकर और आतंकवादी ठिकानों को नष्ट करने में भी सक्षम हैं। यही कारण है कि भारतीय थल सेना को अटैक अपाचे हेलीकॉप्टर मिलने से सेना की शक्ति में तो जबरदस्त इजाफा हुआ है, इसके साथ ही सेना के रिस्पांस टाइम में भी तेजी आएगी।

गौरतलब है कि अपाचे हेलीकॉप्टर की गिनती एडवांस कॉम्बेट हेलीकॉप्टरों में होती है। सेना अपने इन अटैक हेलीकॉप्टर्स को पाकिस्तानी सीमा के करीब जोधपुर में तैनात कर सकती है। अपाचे हेलीकॉप्टर के रूप में भारतीय सेना को एक और घातक हथियार मिला है। इस हथियार के लिए सेना लंबे समय से इंतजार कर रही थी।

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Army gets first batch of Apache helicopters from U.S.

Source: The Hindu, Dt. 23 Jul 2025

Indian Army on Tuesday (July 22, 2025) received the first batch of Apache Helicopters from United States at Hindon Airbase. The induction of first batch of three advanced combat helicopters Apache AH-64E will bolster Army operational capabilities along Western Border. It will be deployed in Jodhpur with Army Aviation Corps.

Before induction in Jodhpur, the helicopters will undergo a Joint Receipt Inspection before being handed over for immediate operational deployment, as per the protocol.

A view of the Apache helicopters which arrived at the Hindon Airbase on July 22, 2025.

“Apache for Indian Army. Milestone moment for Indian Army as the first batch of Apache helicopters for Army Aviation arrive today in India. These state-of-the-art platforms will bolster the operational capabilities of the Indian Army significantly,” posted ADG PI on X.

‘Will enhance operational effectiveness’

“The arrival of the first batch of Apache helicopters for the Indian Army is a significant step towards strengthening India’s defence capabilities. These advanced helicopters will enhance the Army Aviation wing’s operational effectiveness, especially in challenging terrains. A proud moment reflecting our commitment to modernising the Armed Forces,” Defence Minister Rajnath Singh posted on X.

The development comes after Mr. Singh recently held a phone conversation with U.S. Defence Secretary Pete Hegseth, when the two reviewed ongoing and upcoming initiatives to enhance defence cooperation between the two countries.

During the talks, the U.S. had assured India of delivering the first batch of three Apache AH-64E attack helicopters in two weeks and the next batch of three by November this year.

The first batch has been delivered after a delay of 15 months from the original delivery schedule of May 2024 due to a disruption in supply chain. The Indian Army signed a $600 million deal with the United States in 2020 for six Apache attack helicopters.

https://www.thehindu.com/news/national/army-gets-first-batch-of-apache-helicopters-from-us/article69841572.ece

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मिग-21 की विदाई, तेजस का इंतजार

Source: NavBharat Times, Dt. 23 Jul 2025

इस फाइटर जेट ने 1971 की जंग का बदल दिया था रुख

■ NBT रिपोर्ट, नई दिल्ली

इंडियन एयरफोर्स से मिग-21 बाइसन इस साल सितंबर में रिटायर हो जाएंगे। मिग-21 बाइसन की दो स्क्वॉड्रन हैं, कोबरा और पैंथर्स। इनकी नंबर प्लेटिंग के बाद एयरफोर्स में फाइटर जेट की सिर्फ 29 स्क्वॉड्रन रह जाएंगी। नई स्कवॉड्रन बनाने के लिए एयरफोर्स को तेजस (LCA MK1-A) फाइटर जेट का इंतजार है।

1960 के दशक के सबसे बेहतरीन फाइटर जेट हैं मिग-21, इन्हें अपग्रेड कर इनका नाम रखा गया मिग-21 बाइसन। अभी एयरफोर्स के पास मिग-21 बाइसन की दो स्क्वॉड्रन हैं। मिग फाइटर जेट का भारत सबसे बड़ा ऑपरेट रहा। 1961 में पाकिस्तान को ध्यान में रखते हुए इसे खरीदने का प्लान बना और साल 1964 में एयरफोर्स को यह मिलने लगा। मिग-21 का इस्तेमाल 1965 की और 1971 की जंग में किया गया और ढाका के गवर्नर हाउस पर 14 दिसंबर 1971 को मिग-21 फाइटर जेट से ही अटैक किया गया। यह 1971 की जंग का एक बड़ा टर्निंग पॉइंट था। कारगिल युद्ध में भी मिग-21 फाइटर जेट की काबिलियत दिखी थी।

कमाल दिखाया

- मिग-21 बाइसन की दो स्क्वॉड्रन हैं, कोबरा और पैंथर्स, जिनकी होगी नंबर प्लेटिंग
- एयरफोर्स में रह जाएंगी 29 स्क्वॉड्रन, नई स्कवॉड्रन बनाने को फाइटर जेट का इंतजार
- कारगिल युद्ध में भी मिग-21 की काबिलियत दिखी

42 फाइटर स्कवॉड्रन होनी चाहिए एयरफोर्स के पास

एयरफोर्स के पास 42 फाइटर स्क्वॉड्रन होनी चाहिए। ये सेंगशंड स्ट्रेंथ है। टू फ्रंट वॉर के खतरे को देखते हुए फाइटर स्क्वॉड्रन की यह संख्या सेंगशंड हुई थी। टू फ्रंट यानी पाकिस्तान और चीन। इस वक्त एयरफोर्स के पास फाइटर एयरक्राफ्ट की 31 स्क्वॉड्रन हैं। एयरफोर्स के पास जगुवार फाइटर जेट की 6 स्क्वॉड्रन, मिराज की तीन, मिग-29 की तीन, सुखोई की 13, मिग-21 बाइसन की दो स्क्वॉड्रन हैं। दो स्क्वॉड्रन तेजस फाइटर जेट की हैं जो स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट हैं। दो स्क्वॉड्रन रफाल फाइटर जेट की हैं।

क्या होती है नंबर प्लेटिंग?

स्क्वॉड्रन कोबरा और 23 स्क्वॉड्रन पैंथर्स की नंबर प्लेटिंग होगी। नंबर प्लेटिंग का मतलब होता है कि वह स्क्वॉड्रन सक्रिय नहीं है और वक्त आने पर उसे नए एयरक्राफ्ट के साथ फिर से एक्टिव किया जाएगा। जिस स्क्वॉड्रन की नंबर प्लेटिंग हो रही होती है, उसके पास जो एसेस्ट्स हैं जैसे इक्विपमेंट और मैन पावर उन्हें दूसरी स्क्वॉड्रन में दे दिया जाता है। जिस स्क्वॉड्रन की नंबर प्लेटिंग की जाती है वह अपना इतिहास संजो कर रखती है। जब नए एयरक्राफ्ट आएंगे तो उस स्क्वॉड्रन को उसके इतिहास और ट्रेडिशन के साथ फिर उसी नाम से नए एयरक्राफ्ट के साथ शुरू किया जाएगा।

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MiG 21 fleet set to retire in September after 6 decades of service

Source: The Indian Express, Dt. 23 Jul 2025

After protecting the Indian skies through all major conflicts over more than six decades, the legendary MiG-21 fighter jets are set to retire in September. Sources in the military told The Indian Express that the Indian Air Force (IAF) is set to retire the remaining Russian-origin MiG-21 fleet in a ceremonial decommissioning on September 19 at the Chandigarh airbase. Two squadrons of the MiG-21 Bisons are currently active.

India procured more than 700 MiG-21 aircraft of different variants, such as the Type-77, Type-96, BIS and the Bison, since the aircraft's induction in the IAF in 1963. Between 2017 and 2024, at least four MiG-21 squadrons were phased out. India has a sanctioned fighter squadron strength of 42, but has 31 active squadrons. The phasing out of the MiG-21 fleet will further bring down IAF's active fighter squadrons.

The MiG-21 Bison, which comprises the last two squadrons to be retired, is one of India's six fighter jets. The single engine, single-seater multi-role fighter/ground attack aircraft has been a key fighter jet with the IAF. The Bison is the latest upgrade of the MiG-21 jets. Over 100 MiG-21s of the IAF have been upgraded to Bison in the last nearly three decades.

The MiG-21 Bison upgrades included avionics and communication systems, electronics, multi-function display cockpits, the Kopyo light-weight multi-mode radar, radio sets, electronic warfare suite, inertial navigation system/GPS, a helmet-mounted display and a better windshield, among others. However, the engine performance and load carrying capacity of the jet could be not enhanced as part of the upgrades, with its airframe being the major limitation.

With a maximum speed of 2230 km/hr, the jet carries one 23mm twin-barrel cannon with four R-60 close combat missiles. Initially developed as an interceptor, the supersonic jet was eventually upgraded to perform as a multi-role combat aircraft, including ground attacks. Despite its stellar performance in all wars and conflicts fought by India, the MiG-21 jets had earned a mixed reputation due to several crashes, although it can happen due to a multitude of reasons. Some estimates say that India lost over 400 MiG-21 jets, including its variants and trainer versions, since its induction, and the crashes killed over 100 pilots and some civilians.

A MiG-21 fighter jet of the IAF crashed on May 8 near Rajasthan's Suratgarh in May 2023 while it was on a routine operational training sortie, killing three civilians. In July 2022, a MiG-21 trainer Type 69 aircraft crashed, killing Wing Commander M Rana and Flight Lieutenant Adivitiya Bal.

https://indianexpress.com/article/india/mig21-fighter-jets-phase-out-september-2025-tejas-mark1a-10141975/

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FTA, defence cooperation high on agenda of PM's UK visit

Source: The Statesman, Dt. 23 Jul 2025

Formalising the much-awaited and historic India-UK Free Trade Agreement (FTA) and defence cooperation will be high on agenda during Prime Minister Narendra Modi's two-day visit to London, starting Wednesday. Mr Modi will leave for the UK on Wednesday and on the second leg of his

visit, he will undertake a state visit to the Maldives from July 25 to 26. During his visit to the UK, the prime minister will highlight the issue of cross-border terrorism, Pahalgam terror attack, and India's response through Operation Sindoor. Addressing a special briefing by the Ministry of External Affairs (MEA) on the Prime Minister's visit to the United Kingdom and Maldives, Foreign Secretary Vikram Misri on Tuesday said this would be PM Modi's fourth visit to the UK.

"This visit, though a short one, will give both leaders the opportunity to review the entire gamut of the bilateral relationship," Misri said. He said the visit to the UK is at the invitation of Prime Minister Keir Starmer, while the state visit to the Maldives is at the invitation of President Mohamed Muizzu. On a media query on the India-UK Free Trade Agreement, Misri said, "There was a conversation on the sixth of May, between the Prime Minister Modi and the Prime Minister of the UK, where an announcement had been made that the two sides had concluded negotiations on Free Trade Agreement and other issues. Since then, the two sides have been in very close touch with each other…We will update you on the final details related to this at the appropriate time."

The foreign secretary said PM Modi would hold wide-ranging discussions with his counterpart from the United Kingdom, Keir Starmer, including on further strengthening of the Comprehensive Strategic Partnership (CSP), during his two-day visit to London, starting Wednesday. "This will be the Prime Minister's fourth visit to the United Kingdom since assuming office. He has visited previously in 2015, 2018 and he was there in 2021 for the COP26 Summit in Glasgow. Within the last year itself, Prime Minister Modi and Prime Minister Starmer have already met twice, first on the sidelines of the G20 Summit in Rio de Janeiro last year and more recently, just last month in June in Kananaskis in Canada on the sidelines of the G7 Summit and they have also been in touch on the phone a number of times," said Misri.

Besides exchanging views on issues of regional and global importance, Prime Minister Modi and Starmer will review the entire gamut of India-UK bilateral relations with a specific focus on trade and economy, technology and innovation, defence and security, climate, health, education and people-to-people ties. PM Modi will also call on King Charles III and interact with the business leaders and the Indian community in the United Kingdom.

"Apart from the Summit level engagements, there are regular engagements at the level of the External Affairs Minister and his counterpart, the British Foreign Secretary. There are several other institutional mechanisms at ministerial level, dealing with strategic issues, financial, economic, energy related issues as well as science and technology. In contemporary times, the sectors of business, technology, research, education, innovation, the knowledge economy have emerged as key pillars of our bilateral cooperation. The Technology-Security initiative (TSI) for instance, which is coming up to its one year anniversary, was signed last year and is a major indicator of where we are taking our ties in critical and emerging technologies," Foreign Secretary Misri said.

On trade ties between India and the UK, the foreign secretary said, "Our bilateral trade crossed USD 55 billion in 2023-24. The UK is also the sixth largest investor in India with an cumulative investment of USD 36 billion and interestingly, India itself is a large source of foreign direct investment in the UK with a cumulative of USD 20 billion. There are close to 1000 Indian companies in the UK that provide employment to nearly 100,000 people and have a cumulative revenue of USD 91 billion." Mentioning the defence ties between India and the UK, Misri said, "In the defence sector, we are seeing regular interactions and exercises among all three branches of the armed forces. We have placed military instructors at each other's military academies and one of the more significant partnership projects we have embarked on in recent times is the agreement to look at electric propulsion capability between the two countries."

The foreign secretary further said the Serum Institute of India and UK's Oxford University have agreed to co-develop a malaria vaccine which was approved by the World Health Organisation (WHO) in 2023. He also recalled how the two partners had previously developed the Covishield vaccine during the Covid-19 pandemic. He said the University of Southampton has opened a campus in Gurugram under new education policy and several other UK universities are also considering opening campuses in India under the same policy. The foreign secretary emphasised the role of the Indian diaspora in the UK, which he said has contributed to strengthening bilateral ties and made valuable contributions to the society and economy of the UK.

"One of the most important, probably the foundational aspect of this relationship is the Living Bridge that connects India and the UK, nearly 1.8 million strong Indian diaspora, which has contributed to strengthening bonds of friendship between our two countries but has also made extremely valuable contribution to the UK economy and society," Misri said. On PM Modi's visit to Maldives, the Foreign Secretary said, "The Prime Minister's visit to Maldives will take place on 25th and 26th July. He will be embarking on a state visit at the invitation of President Dr. Mohamed Muizzu of Maldives…The Prime Minister, on this occasion, will be the guest of honour at celebrations to commemorate the 60th anniversary of the independence of the Maldives…This will be Prime Minister's third visit to Maldives, and the first state visit of a head of government that President Muizzu is hosting since he assumed office in November 2023."

In the Maldives, the prime minister will also meet Mohamed Muizzu and hold discussions on issues of mutual interest. The two leaders will also take stock of the progress in the implementation of the India-Maldives Joint Vision for a 'Comprehensive Economic and Maritime Security Partnership,' adopted during the State Visit of the President of Maldives to India in October 2024. The visit reflects the importance India attaches to its maritime neighbour, Maldives, which continues to hold a special place in India's 'Neighbourhood First' policy and Vision MAHASAGAR. The visit will provide an opportunity for both sides to further deepen and strengthen the close bilateral relationship.

https://www.thestatesman.com/india/fta-defence-cooperation-high-on-agenda-of-pms-uk-visit-1503461065.html

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ISRO-backed IIT Ropar project aims to support Indian Army operations in no-network zones

Source: The Statesman, Dt. 23 Jul 2025

iming to facilitate long-range communication and radar applications in remote areas with no communication infrastructure, a team of researchers at the Ropar-based Indian Institute of Technology is working on a completely indigenised drone that will operate using swarm-based beamforming technology. The Indian Space Research Organisation-backed project is being led by Dr Shashi Shekhar Jha (Principal Investigator), Dr Satyam Agarwal (Principal Co-Investigator), Vaasu Gupta (Junior Research Fellow), and Ishaan Chhabra (Junior Research Fellow). Work on the drone swarm-based beamforming is underway at the institute's Centre of Drones and Autonomous Systems (CoDRAS).

Speaking to The Statesman, Dr Jha, Coordinator of CoDRAS, stated that while ISRO is funding the project, it has also garnered interest from the Indian Army. "Both imported drones and those

assembled in India using foreign technology or components have a high risk of interception. This poses a threat to communication channels, especially during war-like situations or natural calamities," he said. Divulging the details of beamforming, Dr Jha said that it is a technique used in wireless communication and other fields to focus signal energy in a specific direction. "Instead of broadcasting signals in all directions, beamforming uses multiple antennas to transmit or receive signals, and by adjusting the phase and amplitude of these signals, it creates a directional 'beam' of focused energy," he said.

Vaasu Gupta, a PhD in Computer Science, shared the details of the ongoing project, stating that under the project, a swarm of drones equipped with software-defined radios is deployed to conceive a phased array radar for beamforming applications. "However, a major challenge in distributed beamforming using a drone swarm is the accurate estimation of communication channel parameters and near-perfect coordination and synchronisation of drone antenna elements. The problem is further increased because of the continuous motion and noisy flight dynamics of multiple drones in the swarm," he said.

Dr Satyam Agarwal explained that the project approaches beamforming using a drone swarm as a combined problem, aiming to get the best signal quality while keeping the drones accurately positioned, all within certain frequency and phase limits. "To handle this complex task, the team used advanced learning models that help the drones learn how to work together in a way that boosts signal strength," he said, adding that the project is being tested in real-world conditions using a small group of mini-drones, each capable of carrying 0.5 to 1 kg of payload.

The project is likely to be completed by next year; the team is hopeful. "Apart from helping the ISRO, which will use this technology primarily during the launches, and the Indian Army, it will also be helpful for those industries working in remote corners in the absence of any communication channel," said Dr Jha. The team is hopeful of completing the project by next year. "Apart from helping the ISRO, where the technology will be primarily used during the launches, and the Indian Army, it will also benefit industries operating in remote areas without any communication channel," said Dr Jha.

https://www.thestatesman.com/india/isro-backed-iit-ropar-project-aims-to-support-indian-army-operations-in-no-network-zones-1503461016.html

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India-Brit Pop in Defence

Source: The Economic Times, Dt. 23 Jul 2025


Rahul Roy-Chaudhury & Rajiv Roy-Chaudhury

Narendra Modi's 2-day visit to Britain to sign the India-Britain FTA starts today. Discussions will take place on the 'next steps' to elevate the comprehensive strategic partnership (CSP) between the two countries. The most significant of these will be on boosting defence industrial cooperation.

Britain's June 2025 Strategic Defence Review emphasises a 'Nato First' but not a 'Nato only' policy. While there is to be no 'tilt' towards the Indo-Pacific, hallmark of the previous Conservative government, the Keir Starmer government seeks to continue to develop the bilateral defence relationship. This is emphasised by the June National Security Strategy that states that 'India is a country with which we seek a genuine strategic partnership, reflecting its growing importance in the international system'.

Bilateral defence cooperation through investments includes next-gen air defence weapons. These include the start of delivery of high-velocity STARStreak very short-range air defence (VSHORAD) missiles and launchers, and collaboration to establish an advanced short-range air-to-air missile (ASRAAM) assembly and testing facility in Hyderabad.

India sources only 3% of its arms and equipment from Britain. The last major British platform sale to India was the second tranche of Hawk advanced jet trainers ($1 bn) 15 years ago, followed by purchase of ASRAAM missiles ($0.4 bn) 11 years ago.

India-UK defence industrial cooperation can be boosted through several changes.

▶ A bilateral G2G agreement that India favours, but Britain does not have. Recent purchases of French Rafale and Rafale-Marine fighter jets, American M777 ultra-light howitzers and MQ-9B predator drones, Russian S-400 missile defence systems, and Israeli Heron UAVs are all G2G direct imports. French, Russian and Israeli companies have also localised production within a government wraparound, aligning with India's goal of Atmanirbhar Bharat in defence.

France's Naval Group has built Scorpene submarines at Mazagon docks. Russia's United Aircraft Corporation (UAC) has set up a production line for Sukhoi Su-30 MKI fighter jets at HAL, Bengaluru. Russian BrahMos missile JV and Israeli Barak-8 medium-range surface-to-air missile (MRSAM) partnership exemplify joint development of weapon systems in India. British defence companies are denied these opportunities.

▶ It is less about platform sales and more about technology transfers (ToT), co-design, co-development and co-production to build long-term indigenous capabilities. France's Safran and HAL are collaborating to co-design and produce new-generation helicopter engines for the Indian multi-role helicopter (IMRH) and deck-based version (DBMRH) for the navy.

Spanish arm of Airbus has partnered with Tata on the C-295 transport aircraft programme to set up the first private sector final assembly line (FAL) for military aircraft in India. America's General Dynamics and Lockheed Martin, in partnership with Raytheon, are exploring co-production arrangements for the Stryker infantry carrier vehicle (ICV) and Javelin anti-tank guided missile (ATGM), respectively.

France, the US, Russia and Israel have become India's top strategic defence partners as they are willing to share technology and develop local partnerships, something the British government and defence companies have been hesitant to do.

War in Ukraine, and opportunities in other profitable 'low risk' defence markets, have reduced British business appetite to engage with India. Defence companies often view India as a 'high risk' country to do business in. The local defence acquisition policy, DAP 2020, heavily favours procurement from Indian firms. Challenges posed by restricted FDI, high indigenous content and stringent IP requirements often make foreign OEM bids unviable and equal partnerships difficult.

Yet, Sweden's Saab has been granted the first-ever approval for 100% FDI to manufacture the Carl-Gustaf M4 shoulder-fired weapon system. Next-gen India-Britain defence collaboration may involve smaller, deeptech, tier-1 companies.

British defence firms should see India not simply as a market but as a strategic partner in global supply and talent chains. Lockheed Martin plans to set up a maintenance, repair and overhaul (MRO) facility for 12 C-130J transport aircraft operated by IAF. This, along with its existing JV with Tata to manufacture C-130J tail assemblies, positions it favourably for the medium transport aircraft (MTA) programme.

Similarly, France's Dassault recently announced the setting up of an MRO, and has partnered with Tata to produce Rafale fuselages in India, positioning itself well for the multi-role fighter aircraft (MRFA) programme.

Britain could also offer collaboration opportunities that others cannot. The recent announcement permitting foreign defence OEMs to participate in India's 5th-gen advanced medium combat aircraft (Amca) programme alongside Indian partners could be a game changer. Future success requires deepening mutual trust between the two governments, and balancing India's self-reliance goals with Britain's business interests.

So, maybe, after all...

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Keel Laid for First Next Generation Offshore Patrol Vessel of ICG at MDL Mumbai

Source: Press Information Bureau, Dt. 22 Jul 2025

The keel-laying ceremony of Yard 16401, the first of six Next Generation Offshore Patrol Vessels (NGOPVs) for the Indian Coast Guard (ICG), was held at Mazagon Dock Shipbuilders Ltd (MDL), Mumbai on July 22, 2025. The 117-meter-long vessel will have a range of 5,000 nautical miles, a crew capacity of 11 officers & 110 personnel, and a top speed of 23 knots. They will be equipped with advanced technologies such as AI-based predictive maintenance, Remote Piloted Drones, Integrated Bridge System (IBS), and Integrated Platform Management System (IPMS).

Chief Staff Officer (Tech), ICG Regional Headquarters (North West) Deputy Inspector General RH Nandodkar, presided over the ceremony in the presence of Executive Director (Ship Building), MDL, A Vinod and senior officials from the ICG & MDL. The NGOPVs are being constructed under a contract signed on December 20, 2023 and are fully indigenous under the Buy (Indian-IDDM) category, aligned with the Government's vision of Aatmanirbhar Bharat.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2146825

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Indian Navy To Host Shipbuilding Seminar – "Nation Building Through Shipbuilding"

Source: Press Information Bureau, Dt. 22 Jul 2025

The Warship Design Bureau (WDB), a premier warship design organization under Naval Headquarters in New Delhi, is hosting a one-day 'Shipbuilding Seminar on Nation Building Through Shipbuilding' on 23 July 2025 at the Manekshaw Centre, New Delhi.

WDB, which began its journey as the Central Design Office in 1964 to achieve self-sufficiency in warship design, evolved into the Directorate of Naval Design in 1970. Over the past six decades, WDB has played a pivotal role in the design and construction of 20 types of warships, ranging from Seaward Defence Boats to Aircraft Carriers. The recent delivery of Y12652 (Udaygiri) on 01 July 2025 marked a historic milestone as the 100th warship delivered to the nation by the Indian Navy and WDB.

To commemorate this landmark achievement, the seminar will bring together key stakeholders from the Government of India, Indian Navy, shipyards, industry, classification societies, and academia. The event aims to facilitate cohesive and progress-oriented discussions on various policy aspects related to shipbuilding. Participants will also explore futuristic technologies being implemented globally and address the challenges faced by Indian shipyards and industry in delivering ships that meet global standards.

The delivery of the 100th indigenously designed warship is a significant accomplishment for WDB. Shipbuilding is crucial for national defence and security, serving as a foundation for strategic military capabilities and economic stability. A robust shipbuilding sector fosters technological innovation, strengthens national industries, and creates job opportunities, contributing to the nation's long-term prosperity and growth. The positive outcomes of the shipbuilding project include self-reliance, economic development, employment generation, and the growth of MSMEs and the ancillary ecosystem in the country.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2146753

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Science & Technology News

World's most expensive Indo-US joint sat mission NISAR to lift off on July 30

Source: The Times of India, Dt. 23 Jul 2025

The world's most expensive earth observation satellite, NISAR, which has been jointly developed by Nasa and Isro, will be launched after much delay from the Sriharikota spaceport at 5.40pm on July 30, the Indian space agency has said. Both India and the US have been working on the Nasa-Isro SAR Mission (NISAR) for over a decade and it has cost them over $1.5 billion.

Preparations for NISAR mission

"Historic Launch Ahead... NISAR will scan the entire globe every 12 days, providing high-resolution, all-weather, day-and-night data. It can detect even subtle changes in Earth's surface like ground deformation, ice sheet shifts, and vegetation dynamics," Isro posted on X.

Speaking to TOI on Tuesday, space minister Jitendra Singh said, "NISAR will open a new horizon in Indo-US collaboration. The satellite will take images of every piece of Earth. It will not only have scientific applications but also provide new earth science".

The minister, who wanted to witness the crucial launch but may not be able to go to Sriharikota due to Parliament being in session, said that "crucial data generated from NISAR will, besides being beneficial for the US and India, help other countries in disaster management. Thus, it will live up to PM Modi's dream of Bharat playing the role of Vishwa Bandhu."

India's GSLV-F16 rocket will inject the satellite into a 743-km sun-synchronous orbit with an inclination of 98.4 degrees. NISAR will observe Earth with a swath of 242 km and high spatial resolution, using SweepSAR technology for the first time. The satellite, weighing 2,392 kg, will be the first one to observe the Earth with a dual frequency synthetic aperture radar, with one each provided by Isro (S-band) and Nasa (L-band). The NISAR mission is designed to observe and measure some of the planet's most complex natural processes, including ecosystem disturbances and natural hazards like quakes, tsunamis, volcanoes and landslides.

https://timesofindia.indiatimes.com/india/worlds-most-expensive-indo-us-joint-sat-mission-nisar-to-lift-off-on-july-30/articleshow/122845896.cms

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Smart Nano-Materials Could Help Detect Explosives With Layers Of Innovation

Source: Press Information Bureau, Dt. 22 Jul 2025

A novel sandwich of smart nano-materials could now help detect harmful chemicals including explosives like TNT and RDX even at trace levels. It holds promise in areas like airport security and environmental pollution monitoring. In recent years, numerous methods have emerged to detect harmful chemicals that impact our daily lives. Among them, surface-enhanced Raman

spectroscopy (SERS) has stood out for its exceptional sensitivity and reliability. SERS works by amplifying the molecular “fingerprint” signals of chemicals, allowing for precise identification even at extremely low concentrations.

Noble metals like gold and silver have traditionally been vital for signal enhancement. However, the high cost of gold and the poor long-term stability of silver and remain significant obstacles to their commercial viability. Researchers from the Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, an autonomous institute under the Department of Science and Technology (DST), have developed an innovative multi-layer nanomaterial combining reduced graphene oxide (rGO), silver nanoparticles (Ag) and cerium oxide (CeO_2) on a glass substrate. Each layer contributes a specific function. The team fabricated the composite material using physical vapor deposition techniques, resulting in a uniform and scalable sensing platform.

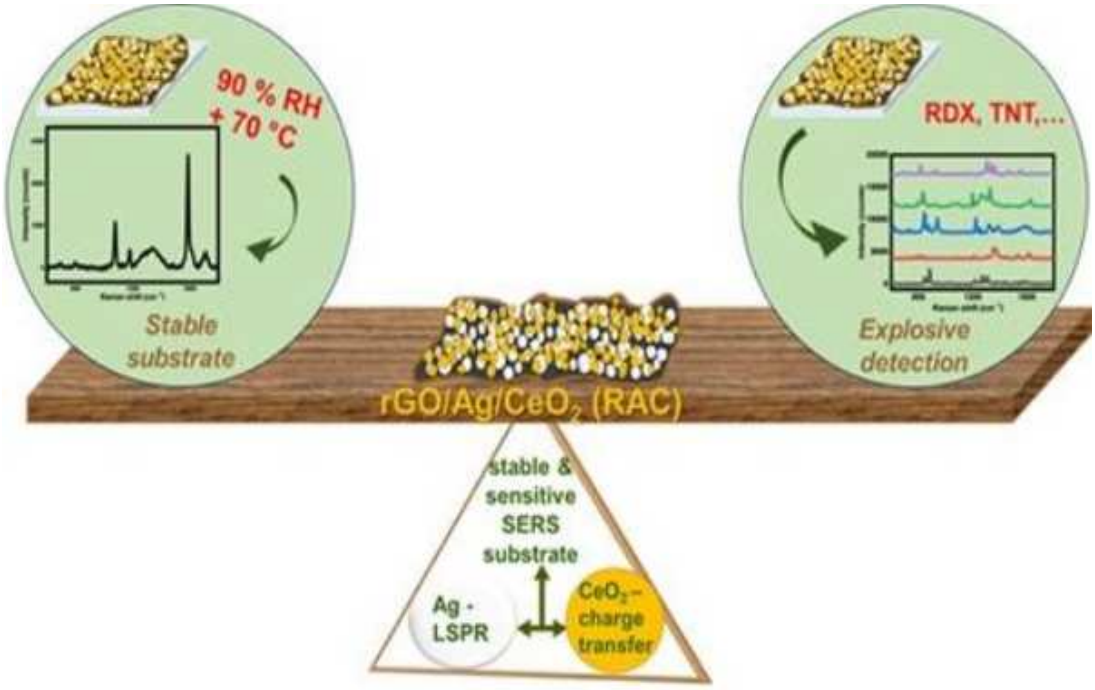

Fig: The rGO/Ag/CeO2 substrate offers a balanced performance of long-term stability and sensitive explosive detection, driven by the synergistic interplay between Ag-based plasmonic enhancement and CeO2-mediated charge transfer

While silver nanoparticles are excellent at amplifying Raman signals, they are highly prone to oxidation, especially in humid or warm conditions—reducing their effectiveness over time. The coating of a thin layer of cerium oxide brings two key advantages. It enhances charge transfer between the material and the analyte, further boosting the fingerprint Raman signal of the analyte molecule and also acts as a protective barrier, shielding silver from humidity and temperature-induced degradation and ensuring long-term stability.

Environmental chamber tests revealed that the substrate maintained its high performance even under extreme conditions—90% humidity and 70 °C—proving its exceptional stability and reliability. Meanwhile, the rGO layer plays a crucial role, effectively quenching the overwhelming fluorescence emitted by silver nanoparticles, which would otherwise drown out the distinct Raman fingerprints of the analyte. This clever suppression ensures that the true detection signals shine through with clarity and precision.

The researchers demonstrated the material’s high performance using 4-mercaptobenzoic acid (MBA) as a model analyte, achieving a detection limit as low as 10 nM. More impressively, the

substrate demonstrated the ability to detect a wide range of explosives, including TNT and RDX, at nanomolar concentrations, highlighting its broad potential for trace-level contaminant detection. With its excellent sensitivity, durability, and simple fabrication process, this advanced SERS substrate holds strong promise for real-world applications such as airport security and environmental pollution monitoring where detecting chemicals quickly and accurately can make all the difference.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2146787

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Science at the Final Frontier

Source: The Hindu, Dt. 23 Jul 2025

THE AXIOM MISSION 4 (Ax-4), which returned to Earth on July 15, marked a pivotal moment in India's space exploration journey. Launched on June 25, this international collaboration carried astronauts from the US, India, Hungary and Poland, marking a return to space for the latter three after decades. Group Captain Shubhanshu Shukla, the mission pilot, became the first Indian astronaut to live and work on the International Space Station (ISS), and the second Indian in space since Rakesh Sharma's 1984 mission. The mission generated a lot of excitement in the country, but was not merely inspirational. It was also invaluable for India's aspirations as India gained real human spaceflight experience, validated crucial experiments in space, strengthened global partnerships and advanced commercial space collaboration.

While at the ISS, Shukla and the astronauts worked on 60 experiments, seven of which were proposed by India and ISRO. What makes the ISS a unique space lab? It is placed at an altitude of 400 km, in Low Earth Orbit. Its proximity makes it habitable as crews and supplies can be easily ferried. It is an ideal space laboratory as it operates in "microgravity" and has trained astronauts — this enables research not possible on Earth. It helps simulate deeper space conditions, without going that far.

Pictures of astronauts floating around in space wrongly suggest there is no gravity on the ISS. At this altitude, gravity decreases but still exists. "Microgravity" conditions are achieved because the astronauts and everything within the ISS travel with the space station at the same speed, leading to a "free fall". It's like falling in an elevator if the cables snap — you and the elevator are falling together and accelerating downward at the same rate, so you feel weightless.

Experiments in microgravity yield important results as the effects of gravity are removed so one can see the effects of other forces that are hard to reveal on Earth. Matter behaves differently than on Earth. For example, fluids do not display buoyancy (floating) and sedimentation. Microgravity research spans several fields, including the study of fluids, materials science, combustion, biology — the lack of gravity and change in fluid behaviour affect cell growth, gene expression, and plant development. Human physiology and how the body adapts to microgravity, as well as possible solutions, are also studied.

Notably, India has contributed to seven out of the 60 microgravity experiments on Axiom-4. The results will contribute to long-term space exploration. Additionally, the Indian human-crewed mission Gaganyaan may also take these experiments forward.

The Indian experiments included studying the effects of space exposure on microalgae and cyanobacteria, which are being explored as sustainable food sources for long-duration missions, while germination

and the genetic yield of crops like moong and fenugreek, among others, will be evaluated to understand the effects of space exposure on plants. Studying the behaviour of tardigrades, tiny microorganisms that can withstand extreme conditions on Earth, will help understand extreme resilience in space. Metabolic supplements to combat muscle atrophy have been studied for astronaut health and can also suggest therapies for Earth-based muscle deterioration. Interestingly, one of the experiments involved cognitive performance in space. Studying how microgravity affects gaze, eye movement and stress when astronauts use screens in space may influence ergonomic spacecraft systems design, reducing stress for future crews.

Shukla carried back experiment samples to Earth where scientists will further explore the effects of space exposure. He also participated in outreach and connected to students at his own school in Lucknow. He found a favourite perch on an ISS cupola and talked about the beautiful view of Earth from space. This kind of interaction can inspire the next generation.

What does this successful and widely followed mission mean for India's space aspirations?

India has lofty plans for space exploration. The Gaganyaan Mission, slated for 2027, plans to send a manned mission to the Low Earth Orbit of 400 km with a crew of three members and bring them back to Earth. As announced by the Prime Minister, India's own space station, Bharatiya Antariksh Station, is also planned for 2035.

Shukla and his backup, Group Captain Prasanth Balakrishnan Nair, both selected as astronauts for Gaganyaan, have now completed astronaut training. Shukla, as the mission pilot, has gained hands-on experience in spacecraft navigation, docking and crew coordination aboard the ISS. His insights can help refine mission planning for Gaganyaan. ISS operations will also serve as a template for India's space station plans. The experience gained will suggest strategies for future Moon and deep space exploration missions.

The Ax-4 mission, a multinational collaboration between NASA, Axiom Space, SpaceX, European Space Agency and ISRO, reinforced India-US-Europe relations in the space sector, opening doors for future joint missions and collaborations. "As space becomes a key arena for commercial and scientific efforts," said Matt Ondler, president of Axiom Space, "India, with its rich history in space exploration and clear leadership in technology and entrepreneurship, will be crucial in shaping the domain and advancing humanity's presence in space."

The Ax-4 mission was not merely symbolic, it was a strategic launchpad for India's continued success in space.

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