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समाचार पत्रों से चयनित अंश
Newspapers Clippings

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

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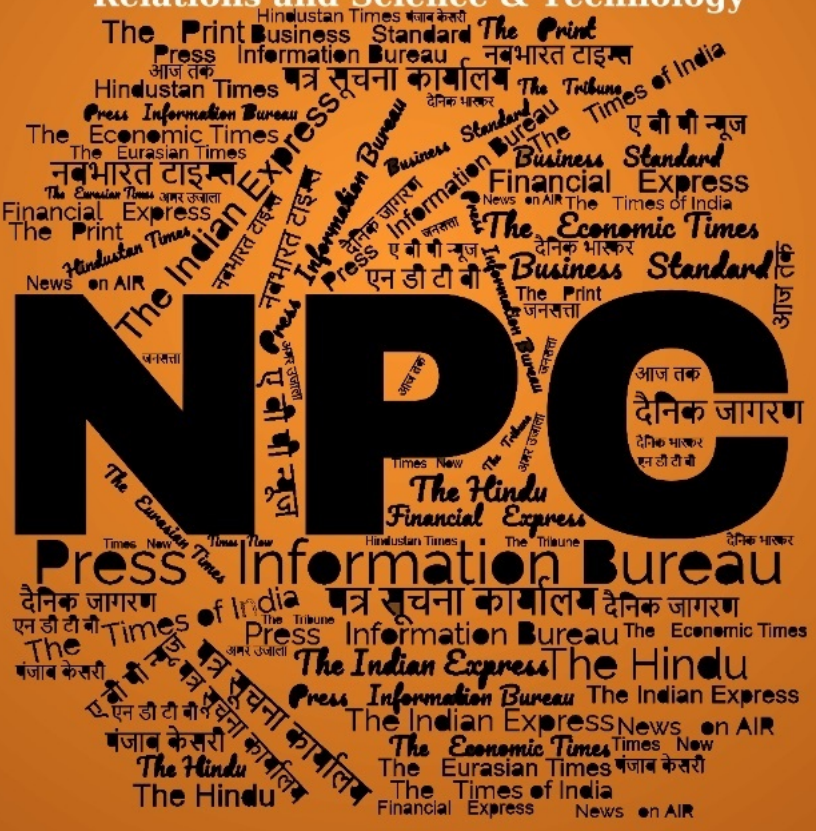

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CONTENTS

DRDO News

अब ट्रेन से आग बरसाएगी अग्नि प्राइम मिसाइल

Source: Punjab Kesari, Dt. 26 Sep 2025

पंजाब केसरी/नई दिल्ली

- डीआरडीओ ने सफल परीक्षण कर हासिल की नई उपलब्धि
- 2000 किलोमीटर तक है मारकक्षमता

भारत ने रेल आधारित मोबाइल प्रक्षेपण प्रणाली से 2,000 किलोमीटर की मारक क्षमता वाली अग्नि-प्राइम मिसाइल का सफलतापूर्वक परीक्षण किया है, जिससे देशभर में इस मिसाइल को तैनात करने की इसकी क्षमता प्रदर्शित हुई है। अगली पीढ़ी की मिसाइल के परीक्षण के एक दिन बाद रक्षा मंत्री राजनाथ सिंह ने बृहस्पतिवार को कहा कि इससे भारत उन चुनिंदा देशों के समूह में शामिल हो गया है जिनके पास रेल नेटवर्क से मिसाइल प्रक्षेपण करने की क्षमता है। रक्षा मंत्रालय ने कहा कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने सामरिक बल कमान (एसएफसी) के सहयोग से बुधवार को मध्यम दूरी की अग्नि-प्राइम मिसाइल का ''सफल'' प्रक्षेपण किया।

इसने हथियार प्रणाली के प्रक्षेपण के स्थान का खुलासा नहीं किया है। सिंह ने कहा कि विशेष रूप से तैयार रेल-आधारित मोबाइल प्रक्षेपण प्रणाली से किया गया यह अपनी तरह का पहला प्रक्षेपण है। उन्होंने कहा कि इसमें रेल नेटवर्क पर चलने की क्षमता है, जिससे उपयोगकर्ता समूचे देश में कहीं भी बेहद कम समय में कम दृश्यता में भी प्रतिक्रिया करने में सक्षम होंगे।उन्होंने 'एक्स' पर कहा, ''इस सफल उड़ान परीक्षण ने भारत को उन चुनिंदा देशों के समूह में शामिल कर दिया है, जिनके पास रेल नेटवर्क से प्रक्षेपण प्रणाली विकसित करने की क्षमता है।''

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Agni Prime test-fired from rail-based mobile platform

Source: Hindustan Times, Dt. 26 Sep 2025

India has successfully tested the Agni-Prime nuclear capable missile from a rail-based launcher for the first time, entering an exclusive club of countries that possess such capability, the defence ministry said on Thursday. The next generation missile is equipped with a raft of advanced features and can hit targets at a range of up to 2,000 km.

Agni Prime

“The Defence Research and Development Organisation (DRDO), in collaboration with the Strategic Forces Command (SFC), has carried out the successful launch of intermediate range Agni-Prime missile from a rail-based mobile launcher system, under a full operational scenario on 24th Sep 2025,” the defence ministry said in a statement.

The successful flight test has propelled India into a group of select nations that have developed a canisterised launch system from the rail network, defence minister Rajnath Singh said. The US, Russia and China possess this capability.

The road mobile variant of the missile has already been inducted by the military, and the latest launch will enable the induction of futuristic rail-based systems into the services. The first-of-its-kind launch was carried out from a specially designed rail-based mobile launcher with the capability to move on the rail network without any pre-conditions, the ministry said.

“It provides for cross-country mobility and has the capability to launch within a short reaction time with reduced visibility. It is self-sustained and is equipped with all independent launch capability features including the state-of-the-art communication systems and protection mechanisms.”

The missile trajectory was tracked by various ground stations. The other variants of the Agni missiles developed by DRDO include the 700-km Pakistan-specific Agni-I, the 2,000-km range Agni-II, the 3,000-km range Agni-III, 4,000-km range Agni-IV and the 5,000-km range Agni-V missile.

The latest test comes a month after India has successfully tested a new integrated air defence system consisting of a variety of weapons that shot down three targets at different altitudes and ranges. The maiden test of the integrated air defence weapon system (IADWS), which is expected to be a part of the bigger national defence shield under Mission Sudarshan Chakra, was conducted by the DRDO. The IADWS is a multi-layered air defence system consisting of quick reaction surface-to-air missiles (QRSAM), very short range air defence system (VSHORADS) and a laser-based directed energy weapon.

India unveiled a locally produced laser weapon that can knock out drones in April, putting the spotlight on defence technologies that the country has demonstrated during the last two to three years. The successful trial of the directed energy weapon (DEW) system with a 30-kilowatt laser came three months after India for the first time carried out a ground test of a scramjet engine, an air breathing engine capable of sustaining combustion during supersonic flights. The development was seen as a crucial milestone in developing next-generation hypersonic missiles that can travel at speeds of more than Mach 5 or five times the speed of sound.

The few countries that have mastered the technology to disable missiles, drones and smaller projectiles using a laser weapon include the US, Russia, China, the UK, Germany and Israel. Similarly, only the US, Russia and China have developed technologies to field fast-manoeuvring hypersonic missiles that fly at lower altitudes and are extremely hard to track and intercept.

Notable achievements last year included the trial of the 3,500-km range K-4 nuclear capable ballistic missile from a submarine and developing the Agni-5 missile with multiple independently targetable reentry vehicle (MIRV) technology.

https://www.hindustantimes.com/india-news/agni-prime-test-fired-from-rail-based-mobile-platform-101758826194689.html

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Agni-P missile test: All you need to know about the successful rail-based launch

Source: The Indian Express, Dt. 26 Sep 2025

Defence Minister Rajnath Singh congratulated the DRDO and the Strategic Forces Command for the test, stating that it had put India in a “group of select nations” who have developed “canisterised launch systems” that can operate out of the railway network.

Thus far, only Russia, the US, China, and possibly North Korea had the capability of launching long range ballistic missiles from rail-based platforms.

Capability to strike back

Mobile launch platforms are crucial to a country’s second strike capabilities: that is, a country’s ability to survive a nuclear attack and then launch its own counterattack. This is especially important for India, which has a declared “no first use” nuclear doctrine, meaning that it will only use nuclear weapons in retaliation to an enemy nuclear attack.

Developments in satellite imagery, mobile sensing, and missile technology have made stationary launchers vulnerable to enemy attacks. “Silos are increasingly vulnerable to both nuclear and conventional strikes due to improvements in missile accuracy,” Thomas MacDonald, of the Nuclear

Policy Program, Carnegie Endowment for International Peace, wrote in his paper 'Tracking mobile missiles'.

This has put a premium on mobile launch platforms, which are seen by military strategists as much more survivable in case of all out war. Such platforms include submarines, aircraft, and ground-based mobile launchers that can be operated on roads or rail.

Why rail-based launchers for missiles?

Rail-based platforms come with certain specific benefits.

- Road-based systems can only be operated in certain routes, where the dimensions of the road and its quality allow heavy missiles and launchers to be transported. While railway systems too are limited by the extent of a country's rail network, India's roughly 70,000-km route can carry missiles to all corners of the country without the need for preparation, like fixing potholes or widening bottlenecks.
- There are thousands of tunnels in India's railway network. These can be used by rail-based launchers to hide from enemy satellite surveillance. In fact, the capability to launch from the tracks means that the launcher can be kept in hiding till the very last moment before the missile is deployed.
- Compared with submarine launched ballistic missiles (SLBMs), rail-based platforms are significantly cheaper to construct and maintain. As such, it is far more efficient to scale up such platforms than to maintain a fleet of ballistic missile submarines.

Agni-P: upgrade to Agni I

India's hailed Agni series of medium to intercontinental range ballistic missiles was initially developed in the late 1980s. Agni-I, a medium range ballistic missile (MRBM) with a range of 700-1,000 km, was tested in 1989.

While the Agni-I platform continues to serve a specific use case, defence planners have long felt the need to upgrade some of its systems. Thus was born the Agni-P, which combines Agni-I's range with propulsion and navigation technologies borrowed from the Agni-IV and Agni-V missiles.

With a mass of 11,000 kg, Agni-P is a two-stage solid-fuel propelled missile with an operational range of 1,000 km to 2,000 km. It can carry high explosive, thermobaric or nuclear warheads.

After the testing of a nuclear-capable version in 2021, Defence Minister Singh had said: "The Agni P missile would further strengthen India's Credible Deterrence capabilities".

https://indianexpress.com/article/explained/launched-from-train-why-agni-p-missile-test-is-significant-10271032/

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Defence News

वायुसेना के लिए 97 तेजस लड़ाकू विमान का बूस्टर डोज

Source: Dainik Jagran, Dt. 26 Sep 2025

नई दिल्ली, प्रेट्र: केंद्र सरकार वायुसेना को 97 तेजस लड़ाकू विमानों का बूस्टर डोज देने जा रही है। रक्षा मंत्रालय ने गुरुवार को हिंदुस्तान एयरोनाटिक्स लिमिटेड (एचएएल) के साथ 62,370 करोड़ रुपये के सौदे पर हस्ताक्षर किया। इस समझौते के तहत वायुसेना के लिए 97 तेजस एमके-1ए हल्के लड़ाकू विमान खरीदे जाएंगे। यह सरकारी क्षेत्र की एयरोस्पेस कंपनी को दिया गया दूसरा ऐसा अनुबंध है। फरवरी 2021 में रक्षा मंत्रालय ने 83 तेजस एमके-1ए लड़ाकू विमानों की खरीद को एचएएल के साथ 48,000 करोड़ रुपये का समझौता किया था।

इन विमानों की डिलीवरी 2027-28 से शुरू होगी और छह साल में आपूर्ति पूरी कर ली जाएगी।

बेंगलुरु में उड़ता तेजस एमके-1ए श्रेणी का पहला लड़ाकू विमान एलए5033 ● फाइल/आइएएनएस

तेजस की खासियत

रफ्तार : 2205 किलोमीटर प्रति घंटा

लंबाई :13 .20 मीटर

ऊंचाई :4 .40 मीटर

उड़ान भरने की ऊंचाई : 50 हजार फीट

भार : 6,500 किलो

3,000 किलोमीटर तक एक बार में उड़ान भर सकता है तेजस

प्रधानमंत्री नरेन्द्र मोदी भर चुके हैं उड़ान

प्रधानमंत्री नरेन्द्र मोदी ने 25 नवंबर, 2022 को बेंगलुरु में तेजस लड़ाकू विमान में उड़ान भरी थी। किसी भारतीय प्रधानमंत्री की लड़ाकू विमान में यह पहली उड़ान थी। तेजस में उड़ान भरने से पहले मोदी बेंगलुरु स्थित एचएएल मुख्यालय भी गए थे।

एमके-1ए में पुराने तेजस से ज्यादा फीचर

- एमके-1ए में ज्यादा रेंज वाला एक्टिव इलेक्ट्रानिक स्कैन एरे रडार लगा है।
- इसमें मिड एयर रिफ्यूलिंग क्षमता है। इससे फाइटर जेट की रेंज बढ़ाने में मदद मिलेगी।
- इसमें अपग्रेडेड रडार वार्निंग सिस्टम लगाया गया है। इससे यह विमान खतरों का जल्दी पता लगाने में सक्षम है।
- इसमें डिजिटल मैप जेनरेटर, स्मार्ट मल्टी फंक्शन डिस्प्ले और एडवांस रेडियो अल्टीमीटर भी दिया गया है।

यह सिंगल-इंजन जेट भारतीय वायुसेना के पुराने पड़ चुके मिग-21 विमानों की जगह लेगा। भारतीय वायुसेना में शामिल रूसी मूल के मिग-21 लड़ाकू विमान शुक्रवार को आखिरी उड़ान भरेंगे। वायुसेना के पास वर्तमान में केवल 31 स्क्वाड्रन बचे हैं, जबकि अधिकृत संख्या 42 स्क्वाड्रन की है। ऐसे में तेजस की एंट्री वायुसेना के लिए गेमचेंजर साबित हो सकती है। तेजस कई भूमिकाओं वाला लड़ाकू विमान है। यह उच्च जोखिम वाले वातावरण में भी काम करने में सक्षम है।

स्वदेशी अभियान को मिलेगा बढ़ावा : तेजस रक्षा उत्पादन में आत्मनिर्भर भारत के लक्ष्य को गति देगा। तेजस एमके-1ए विमानों में 'स्वयम रक्षा कवच' व आधुनिक कंट्रोल एक्ट्यूएटर्स जैसे एडवांस फीचर होंगे। इनमें 64% स्वदेशी पुर्जे होंगे।

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Defence Ministry signs Rs 62,000-crore deal with HAL for 97 light combat jets

Source: The Indian Express, Dt. 26 Sep 2025

The Ministry of Defence Thursday signed a Rs 62,370-crore deal with the state-owned Hindustan Aeronautics Ltd (HAL) for the procurement of 97 Mk1A Light Combat Aircraft (LCA) for the Air Force. The order comprises 68 fighters and 29 twin-seaters, along with associated equipment.

In a statement, the Defence Ministry said the delivery of these aircraft would begin during 2027-28 and be completed over a period of six years. The signing of the contract comes a month after the Cabinet Committee on Security (CCS) had cleared this procurement.

The deal marks the additional order for the LCA Tejas Mk 1 A. The government in 2021 signed a Rs 48,000-crore deal with HAL to procure 83 LCA MK 1 A jets. The deliveries of these jets are yet to begin and have been delayed for over a year-and-a-half. While the deliveries of the two aircraft are slated to take place in October, it is yet to be finalised.

The reasons for the delay were a delay in the delivery of the GE F404 engine from the US defence major GE Aerospace, and also in weapons and radar integration into the aircraft. According to the Defence Ministry, the aircraft will have an indigenous content of over 64 percent with 67 additional items incorporated, over and above the previous LCA Mk1A contract signed in January 2021.

The integration of advanced indigenously developed systems such as the UTTAM Active Electronically Scanned Array (AESA) Radar, Swayam Raksha Kavach, and control surface actuators will further strengthen the Atmanirbharta initiatives, the ministry said.

“The project is being supported by a robust vendor base of nearly 105 Indian companies directly engaged in the manufacture of detailed components. The production is expected to generate close to 11,750 direct and indirect jobs per year for the duration of six years, giving a major boost to the domestic aerospace ecosystem,” the statement said. It said that the acquisition, under the ‘Buy (India-IDDM)’ category of Defence Acquisition Procedure 2020, is in line with the government’s thrust on indigenisation.

“The LCA Mk1A is the most advanced variant of the indigenously designed and manufactured fighter aircraft and will serve as a potent platform to meet the operational requirements of the IAF,” it said.

https://indianexpress.com/article/india/tejas-jets-iaf-hal-govt-contract-10271051/

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'20 इंजन देने का वादा कर चुकी है जीई'

Source: Dainik Jagran, Dt. 26 Sep 2025

नई दिल्ली, एएनआइः हिंदुस्तान एयरोनाटिक्स लि. (एचएएल) के चेयरमैन डीके सुनील ने गुरुवार को विश्वास जताया कि अमेरिकी कंपनी जनरल इलेक्ट्रिक (जीई) एमके-1ए लड़ाकू विमानों के लिए इंजन की आपूर्ति बढ़ाएगी और इस वित्तीय वर्ष के अंत तक 12 इंजन डिलीवर किए जाने की उम्मीद है। जीई ने अगले साल 20 इंजन की आपूर्ति करने का वादा किया है। बताते चलें, तेजस लड़ाकू विमान में अमेरिकी कंपनी का जीई-404 इंजन लगाया जाता है।

डीके सुनील ने एक साक्षात्कार में कहा, हम उत्पादन क्षमता बढ़ा रहे हैं। उधर, एचएएल के चेयरमैन डीके सुनील ने स्पष्ट किया कि एमके-2 विमानों के लिए फ्रांसीसी इंजन पर कोई चर्चा नहीं हुई है।

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Tejas deal takes off, but imports stay key

Source: The Economic Times, Dt. 26 Sep 2025

The Tejas contract that MoD signed with Hindustan Aeronautics Limited on Thursday for 97 Mk-1A jets, valued at over ₹62,370 cr, is a high-profile bid to boost domestic armaments production. Two-thirds of the fighter jets will be indigenous, which should contribute to strategic autonomy. Global uncertainty over supply chains requires increased local defence procurement, and there are positive externalities in terms of economic growth and technological advancement. Indigenisation and combat-readiness share a complex relationship, but are on the whole complementary processes. Both need to be enhanced to adapt to the country's changing strategic needs. Domestic industry must be allowed to grow into the role of a reliable supplier while operational capability can be ensured through imports.

India faces a delicate balance in defence import substitution, having to match slow-moving domestic capability with rapid changes in the technology of war. Its ambition is to reach an acceptable level of indigenisation that is supportive of combat readiness. This mixed model for defence purchases defines India's strategic interests, alongside its need for food and energy security. It also has spillover effects on India's trade strategy that permits arms and oil to work as balancing agents as the country widens its export footprint.

The Tejas deal brings out some of the conflict between indigenisation and operational efficiency. Delay in delivery of an earlier order for the jets has been mitigated by raising the technical threshold in the latest order. Dependence on foreign suppliers for parts such as engines has also been addressed partially. Tejas remains a work-in-progress. The navy and army have had a head start over the air force in indigenisation because of the weapons platforms involved. This has to change due to the evolving role of air power in combat. India has progressed to export competitiveness in missile production. With a stronger push, larger platforms will eventually yield to the strategic need for local development.

https://economictimes.indiatimes.com/opinion/et-editorial/tejas-deal-takes-off-but-imports-stay-key/articleshow/124128013.cms?from=mdr

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Why SPEED is crucial for India’s defence procurement

Source: Hindustan Times, Dt. 26 Sep 2025

India’s defence innovation ecosystem faces a hidden but critical internal threat — procurement delays. In an industry where timelines can determine technological edge and superiority, slow decision-making is not simply an inconvenience — it drains private capital investments, national capabilities, and strategic readiness.

The ministry of defence (MoD) has introduced promising initiatives such as Buy Indian - Indigenously Designed, Developed and Manufactured (IDDM), Make-II, and iDEX — all intended to foster robust private-sector participation. But the speed of execution remains the Achilles’ heel. Without measurable improvements in how quickly approvals move from Acceptance of Necessity (AoN) to actual orders being placed and timely payments being realised, innovators, especially self-funded R&D businesses, risk being forced out of the market.

Why focus on self-funded R&D businesses? Because they have skin in the game. SpaceX rockets flew because all payments were milestone-linked until rockets actually flew, while NASA-funded

projects by Lockheed Martin and Boeing languished. We need to encourage more companies to do self-funded R&D for successful development. That will happen only if the procurement cycle is compressed. This requires incentivising government officers to process the files faster — by assigning a value to every day of delay.

We estimate each day of delay on a ₹100-crore defence project translates into an estimated ₹10 lakh in real lost value. For a ₹100-crore defence project, a cumulative 24-month delay — unfortunately not uncommon — translates into losses exceeding ₹72 crore, capital that could have funded multiple new R&D programmes. This cost is borne by the innovating company (₹2.4 lakh/day as interest on loans, payroll, operational overheads), the armed forces (₹1.8 lakh/day from delayed capability deployment, using outdated technology), the larger economy (₹4.2 lakh/day in missed GDP impact, tax revenues, export potential), and the innovation ecosystem (₹1.6 lakh/day with talent migration, company shutdowns).

Meanwhile, a TERI study revealed a startling statistic: A mere 15% penetration of the Crew Gunnery Simulator could result in conservatively estimated annual savings of ₹1,123 crore for India's armed forces. And the total capital investment required to generate such savings is just ₹61 crore.

A relatively easy solution lies in implementing SPEED (Savings and Penalties for Early or Delayed Decisions), a framework for tracking the financial and operational impact of procurement timelines. Savings will be quantified benefits of decisions made on or ahead of schedule, with clear metrics on funding freed up for R&D reinvestment. SPEED system will assign and publish daily costs of delays, with estimated losses apportioned to the company, Armed Forces, broader economy, and innovation ecosystem.

A SPEED score for every active procurement file — updated automatically in real-time — would give policymakers, industry, and the public clear visibility of performance across the procurement value chain. Currently, there are no costs to the government. By providing approximate delay costs, it alerts all decision makers to process files faster as there is quantified cost to holding them back. This SPEED score can also be criteria for assigning future projects to officers. Automatic approval after default periods may also be considered.

The ease of using SPEED lies in automation: A file moving forward means progress, minus penalties and probably savings. When files are sent back or additional questions raised, delay costs automatically accumulate at that decision point. This means no subjective interpretation, no gaming — just objective, transparent accountability for costs of inaction or unnecessary delays. For security reasons, if not made public, they should be internally tracked at least at defence ministry and armed forces levels.

Procurement speed is not only about efficiency; it's a growth engine for indigenous technology. Timely decisions release trapped capital back to innovators for R&D reinvestment without waiting for external funding. Accelerated R&D brings cutting-edge systems to market sooner, strengthening the Armed Forces. The resulting operational advantage boosts India's credibility in global defence markets, opening high-value export opportunities. This is the virtuous cycle that nations with agile procurement systems already leverage. While conceived for defence procurement, SPEED can transform many government projects where private companies invest substantial resources during approval processes, creating a time-conscious decision-making culture across India's economy.

For effectiveness, SPEED must be institutionalised through publicly accessible dashboards showing real-time SPEED scores for every procurement under IDDM, Make-II and iDEX projects; SPEED-linked KPIs for defence ministry officers and review boards tied directly to timelines; and escalation protocols when project clearance windows lapse. In business terms, this is like tracking project delivery metrics in the private sector. In strategic terms, it could mean deploying capability in 18 months versus losing edge to foreign suppliers due to avoidable delays, or worse.

India's self-funded defence innovators operate in high-risk, capital-intensive environments. They commit significant private funds without guaranteed buyers, often matching or outpacing global competitors in technology readiness. What they cannot afford is risk-averse inertia delaying orders by months or years.

The SPEED framework gives MoD a tool to make every day count. By turning time into a quantifiable resource — one that can be saved, reinvested, and multiplied — it aligns national security priorities with economic and industrial growth, motivating decision makers who are constantly fearful of taking timely action by institutionalising penalties for delayed decisions and savings for early decisions.

Critics may question the methodology for determining delay costs. But the fundamental truth remains undeniable: Delays cost money. Stakeholders should assign their own cost estimates and proceed with the framework using those numbers, as delay costs are all too real. The per-day loss calculation approach remains valid regardless. Every day that defence procurement stalls, we lose more than just money—we undermine our nation's confidence, put the lives of our soldiers at risk, stifle homegrown innovation, and deepen our dangerous reliance on foreign equipment. Can we truly afford to let this cost mount? The stakes could not be higher. If we fail to act now in this favourable environment, the opportunity for change may be lost forever.

https://www.hindustantimes.com/opinion/why-speed-is-crucial-for-india-s-defence-procurement-101758815456332.html

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सेना और नौसेना ने दो चरणों में किया संयुक्त सैन्य अभ्यास 'जल प्रहार 25'

Source: Dainik Jagran, Dt. 26 Sep 2025

नई दिल्ली : भारतीय सेना और नौसेना ने पूर्वी समुद्री तट पर संयुक्त द्विवार्षिक युद्धाभ्यास 'जल प्रहार 25' को सफलतापूर्वक संपन्न किया। दोनों सेनाओं का यह अभ्यास दो चरणों में हुआ। पहला चरण हार्बर फेज 16 से 20 सितम्बर तक विशाखापत्तनम में आयोजित किया गया। इसके बाद दूसरा चरण सी फेज 21 से 23 सितम्बर तक कोच्चि के काकीनाड़ा तट पर चला। (प्रेट्र)

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आज इतिहास का हिस्सा बन जाएगा पहले सुपरसोनिक फाइटर जेट

Source: Navbharat Times, Dt. 26 Sep 2025

आज इतिहास का हिस्सा बन जाएंगे पहले सुपरसोनिक फाइटर जेट

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मिलिट्री एविएशन के इतिहास में मिग-21 को हमेशा याद रखा जाएगा। क्योंकि इसके जैसा कोई दूसरा फाइटर जेट नहीं बना। आज (26 सितंबर) मिग-21 इतिहास का हिस्सा बन जाएंगे। दुनिया भर में करीब 11500 मिग-21 इस्तेमाल हुए और सबसे ज्यादा मिग-21 इंडियन एयरफोर्स ने इस्तेमाल किए। इंडियन एयरफोर्स में कुल 874 मिग-21 शामिल हुए और इन मिग-21 ने कुल 16 लाख घंटे से भी ज्यादा की उड़ान भरी। इन पहले सुपरसोनिक फाइटर जेट को विदाई देने के लिए वही जगह चुनी गई है जहां सबसे पहले यह आए थे यानी चंडीगढ़।

60 साल से ज्यादा वक्त तक रहे इंडियन एयरफोर्स का हिस्सा

मिग-21 है सिंगल इंजन फाइटर जेट, स्पीड 2 मैक से भी ज्यादा

मल्टी-रोल लड़ाकू विमानों मिराज और एफ-16 के सामने डटा रहा

मिसाइल के साथ ही बॉम्ब, रॉकेट का भी इस्तेमाल किया गया

- इस हाईस्पीड सुपरसोनिक इंटरसेप्टर को सोवियत संघ ने अमेरिका के बी-52 बॉम्बर को इंटरसेप्ट करने के लिए बनाया था
- मिग-21 को मूल रूप से हाई एल्टीट्यूट पर उड़ान भरने वाले लड़ाकू विमान के रूप में बनाया गया था, जिसमें जमीनी हमले की क्षमता नहीं थी। लेकिन इंडियन एयरफोर्स में रहते हुए मिग-21 ने वे भूमिकाएं भी निभाई, जिन्हें उसके निर्माताओं ने असंभव माना था।

1960 का है मिग-21 का डिजाइन लेकिन भारत ने इन्हें अपग्रेड किया और 2002 से मिग-21 अपग्रेड होकर मिग-21 बाइसन हो गए।

मिग-21 की विदाई के बाद अब क्या

- एयरफोर्स के पास मिग-21 की दो स्क्वॉड्रन बची थी, स्क्वॉड्रन नंबर 23 (पैंथर्स) और स्क्वॉड्रन नंबर 3 (कोबरा)।
- पैंथर्स स्क्वॉड्रन की नंबर प्लेटिंग होगी। नंबर प्लेटिंग का मतलब होता है कि वह स्क्वॉड्रन सक्रिय नहीं हैं और वक्त आने पर उसे नए एयरक्राफ्ट के साथ फिर से एक्टिव किया जाएगा।
- कोबरा स्क्वॉड्रन बनी रहेगी क्योंकि यह जल्द ही एयरफोर्स को मिलने वाले LCA- मार्क-1A के साथ आगे जारी रहेगी।

मिग-21 का सफर

1962 में हुए भारत- चीन युद्ध के तुरंत बाद इंडियन एयरफोर्स को मिग मिले।

1971 14 दिसंबर को मिग-21 ने ढाका गवर्नमेंट हाउस पर रॉकेट बरसाए थे। पाक को युद्ध में आत्मसमर्पण करने पर मजबूर होना पड़ा था।

1965 1965, 1971 की जंग और 1999 के करगिल युद्ध में भी हुआ इस्तेमाल।

2019 मिग-21 का आखिरी शिकार बना एफ-16 फाइटर जेट। एयरस्ट्राइक के बाद उस वक्त ग्रुप कैप्टन अभिनंदन ने मिग-21 से ही एफ-16 को मार गिराया था।

जब कहा गया फ्लाइंग कफन

मिग-21 फाइटर जेट क्रैश होने की इतनी घटनाएं हुई कि इन्हें फ्लाइंग कॉफिन कहा जाने लगा था। 2013 में उस वक्त के रक्षा मंत्री एके एंटनी ने बताया था कि 1963 से 2012 तक 482 बार मिग-21 क्रैश हुए जिसमें 171 पायलट की जान गई।

मिग 21 सुपरसोनिक फाइटर जेट को विदाई देने के लिए वही जगह चुनी गई है जहां सबसे पहले यह आए थे, यानी चंडीगढ़।

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रक्षा क्षेत्र में तेजी

Source: Dainik Jagran, Dt. 26 Sep 2025

देश में पहली बार ट्रेन से अग्नि-प्राइम मिसाइल दागने का सफल परीक्षण इसका सूचक है कि भारत अपनी रक्षा तैयारियों को लेकर सजग है। अग्नि-प्राइम न्यूक्लियर बैलिस्टिक मिसाइल है और यह दो हजार किमी से अधिक मार कर सकती है और तीन हजार किलोग्राम तक विस्फोटक वहन कर सकती है। इस मिसाइल को ट्रेन से लांच करने में महारत हासिल करने का मतलब है कि भारत अब कहीं से भी परमाणु हथियारों से लैस मिसाइलें दाग सकता है। ऐसी क्षमता दुनिया के चंद देशों के पास ही है। भारत ने ट्रेन से दागी जाने वाली मिसाइल के सफल परीक्षण के साथ एक बार फिर अपनी सामरिक और तकनीकी श्रेष्ठता सिद्ध की। भारत किस तरह रक्षा के हर मोर्चे को मजबूत करने में लगा हुआ है, इसका परिचायक रक्षा मंत्रालय की ओर से हिंदुस्तान एयरोनाटिक्स लिमिटेड यानी एचएएल के साथ किया गया 62 हजार करोड़ रुपये का करार भी है। इस समझौते के तहत वायुसेना को 97 तेजस लड़ाकू विमान मिलेंगे। ये उन मिग-21 लड़ाकू विमानों का स्थान लेंगे, जिन्हें वायुसेना से विदा किया जा रहा है। इससे बेहतर और कुछ नहीं कि विदेशी लड़ाकू विमानों का स्थान स्वदेशी लड़ाकू विमान लें। रक्षा मंत्रालय और एचएएल के बीच हुए समझौते के अनुसार वायुसेना को तेजस लड़ाकू विमानों की आपूर्ति 2027-28 में शुरू होगी। चूंकि एचएएल सरकार के स्वामित्व वाली कंपनी है, इसलिए उसे यह देखना होगा कि आपूर्ति तय समय पर हो। उसे यह इसलिए सुनिश्चित करना होगा, क्योंकि अतीत में तेजस विमानों की समय पर आपूर्ति को लेकर सवाल उठ चुके हैं। ये सवाल स्वयं वर्तमान वायुसेना प्रमुख उठा चुके हैं।

तेजस लड़ाकू विमानों को समय पर तैयार करने में एक बड़ी बाधा उसके इंजन हैं। हालांकि तेजस स्वदेशी लड़ाकू विमान है, लेकिन वह अपने इंजन और कुछ अन्य उपकरणों के लिए दूसरे देशों पर निर्भर है। यह निर्भरता एक समस्या है। इसकी अनदेखी नहीं की जा सकती कि तेजस लड़ाकू विमानों के लिए अमेरिका से पर्याप्त संख्या में इंजन मिलने में देरी हो रही है। भारत का अगला लक्ष्य लड़ाकू विमानों के इंजन खुद बनाना होना चाहिए। चूंकि तेजस चौथी पीढ़ी का लड़ाकू विमान है और अमेरिका, रूस, चीन आदि पांचवीं पीढ़ी के लड़ाकू विमानों के बाद छठी पीढ़ी के विमान बनाने की कोशिश में हैं, इसलिए भारत को भी तेजी दिखानी होगी। यह अच्छा है कि भारत निजी कंपनियों के सहयोग से पांचवीं पीढ़ी के लड़ाकू विमानों को तैयार करने में जुट गया है, लेकिन वह इससे अनभिज्ञ नहीं हो सकता कि चीन छठी पीढ़ी के लड़ाकू विमान का परीक्षण कर चुका है। अब जब भारत आत्मनिर्भरता पर जोर दे रहा है, तब फिर उसे अपनी जरूरत की रक्षा सामग्री भी खुद बनाने के लिए कमर कसनी चाहिए।

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Why 'bodyguard satellites' are necessary

Source: The Tribune, Dt. 26 Sep 2025

TV VENKATESWARAN
VISITING PROFESSOR,
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SAMPLE return missions to the Moon, a second mission to Mars, the imminent launch of Indians into space and the steady progress towards a permanent space station were, until recently, the tide of optimistic news coverage of the Indian Space Research Organisation (ISRO). However, this positive hum of the news cycle was suddenly interrupted by a ripple of strategic speculation.

An incident reportedly occurred in mid-2024 when a satellite from an unnamed neighbouring country executed a manoeuvre, bringing it within 1 km of a crucial Indian spacecraft in low-Earth orbit. While a collision was avoided, the unusually close approach was perceived as a possible test of capabilities, a silent 'show of strength' in the increasingly contested domain of space.

In 2023, the then ISRO Chairperson, S Somanath, delivering Air Chief Marshal PC Lal's 38th Memorial Lecture titled 'Strategic Capability Development in Space', said that ISRO has "observed spacecraft from friendly nations manoeuvring around Indian space assets, monitoring them."

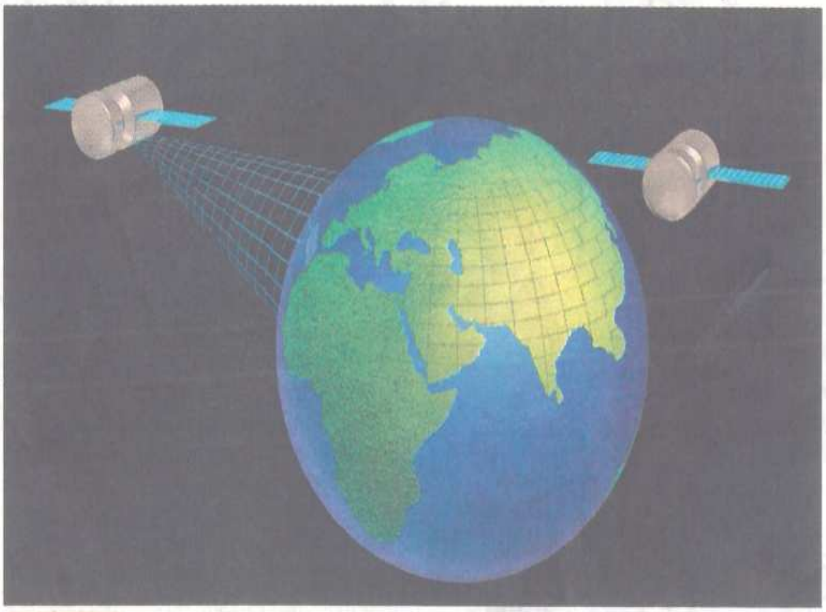
In the wake of these incidents, reports have emerged citing unnamed sources that India is considering the design, construction and launch of dedicated 'bodyguard satellites'. India is not alone in the emerging concern for the vulnerability of space assets.

The security of satellites, which form the backbone of modern communication, navigation and surveillance, came to the fore with a notable event involving the French-Italian Athena-Fidus satellite, which was approached multiple times by a Russian Luch (Olymp) satellite between late 2017 and early 2018. The French government labelled the Russian satellite's close approach an "act of espionage."

The US' Geostationary Space Situational Awareness Program (GSSAP) satellites conducted a series of close approaches to several non-US satellites between 2016 and 2018, raising concerns about the nature of the manoeuvres.

At the heart of these incidents is a tech capability called Rendezvous and Proximity Operations, or RPOs. RPOs refer to the set of manoeuvres that allow a spacecraft to closely approach and maintain a specific relative position to another space object.

Initially developed for peaceful purposes, such as docking with space stations or servicing aging satellites, RPO tech has advanced in recent decades. With improvements in robotics, autonomous guidance systems and propulsion, these operations have become easier and more precise. A satellite can now be programmed to autonomously navigate towards a target satellite in a different orbital plane, match its velocity and hold a position a few hundred metres away, all with minimal intervention from ground controllers.



PROTECTION: These satellites are a viable option to save a country's space assets during a conflict. ISTOCK

The recent Indian SpaDEX technology demonstrator mission of ISRO, which successfully docked two small satellites (SDX01 and SDX02) and later undocked them, involves similar technology.

While this technology holds immense promise for the space sector, enabling in-space servicing and manufacturing, its dual-use nature is stark. The same capabilities that could repair a satellite could also be used to eavesdrop on its communications, inspect it for vulnerabilities, or, in a worst-case scenario, deliberately render it non-operational.

This potential to jeopardise space assets during a conflict, leaving a nation blind and deaf, has triggered a global scramble for defensive solutions.

In the scramble for solutions, the concept of bodyguard satellites has emerged as a viable option. The principle is analogous to its terrestrial counterpart: a dedicated, smaller satellite would be deployed to escort and protect a high-value asset, such as a military, communications or reconnaissance satellite. This bodyguard would be equipped with advanced sensors to continuously monitor the space around its charge, identifying and tracking any object that makes a suspicious approach. The measures could involve physically interposing itself between the threat and the protected satellite, using non-kinetic jamming techniques to disrupt a hostile spacecraft's sensors, or even possessing the capability to disable or destroy an aggressor.

This bodyguard would be equipped with advanced sensors to continuously monitor the space around its charge, identifying and tracking any object that makes a suspicious approach.

This is no longer theoretical. Japan recently unveiled its defence guidelines, announcing plans to build bodyguard satellites by 2029, citing the development of anti-satellite weapons by other nations.

Following its unsettling experience with the Luch satellite, France commenced the YODA programme, an acronym for 'Eyes in Orbit for an Agile Demonstrator'. It aims to test the very technologies required for a bodyguard satellite. Initially planned for a launch in 2023, then 2024, the demonstrator is now scheduled for 2025.

The EU announced in 2023 a 6.5 million-euro project named 'Bodyguard' under the European Defence Fund. This programme aims to develop an autonomous system capable of tracking threatening satellites and neutralising them.

India's current fleet of operational satellites, numbering around 60, is a vital national resource. It includes 19 communication satellites in geostationary orbit, a large constellation consisting of 30 remote-sensing and Earth-observation satellites in lower orbits, such as the recently launched EOS-09 and NISAR, four NavIC navigation constellation satellites and seven other spacecraft, including AstroSat (astronomy) and SARAL (oceanography, jointly developed with CNES (Centre National d'Etudes Spatiales, French national space agency).

While the concept of dedicated bodyguard satellites remains officially unconfirmed, India's broader strategy for securing its orbital assets is in motion. Anchored by ISRO's Network for Space Object Tracking and Analysis (NETRA) project, this Rs 400-crore initiative is designed to provide crucial Space Situational Awareness (SSA) by tracking objects up to 36,000 km in geostationary orbit.

The urgency of such measures is clear in an increasingly congested space environment. The low earth orbit is becoming crowded with hundreds of nano- and mini-satellites. Concerns are pronounced regarding mega-constellations like Starlink, which prompted ISRO to adjust the orbit of its assets to 574 km. Despite this, more than 80 close approaches of less than 1 km were reported in 2021 alone.

Compounding this is the threat of space junk, with millions of objects travelling in chaotic orbits, any one of which could permanently damage a satellite. NETRA, a network of six radars and 12 optical telescopes distributed across the Indian region, is slated to address the dual challenges of debris and proximity risks. The optical telescope facilities established at the Satellite Photometry, Laser Ranging, and Optical Communication (SPROC) facilities in Ponmudi and Mt Abu, with a third planned for Shillong, can detect objects as small as 40 cm in geostationary orbit, about 36,000 km away, enabling vital Collision Avoidance Manoeuvres. India shares SSA data with global partners and participates in the Inter-Agency Space Debris Coordination Committee (IADC).

The Space-Based Surveillance-III Programme, approved by the Cabinet Committee on Security in October 2023, aims to fast-track the deployment of 52 military satellites for enhanced border surveillance, building on critical lessons from operations like Sindoor, where satellite intelligence proved invaluable. This, too, perhaps will contribute to the safety and protection of India's space assets.

While ISRO has not directly confirmed plans for bodyguard satellites, its 2022 report to the United Nations Office for Outer Space Affairs (UNOOSA), which mentioned the "possibility of establishing 'space-based platforms' for SSA alongside ground-based sensors", is curious and can be construed as a veiled indication that planning for India's own protective sentinels is underway.

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Adieu, MiGhty Fighter

Source: The Times of India, Dt. 26 Sep 2025

Arjun Subramaniam

Retd Air Vice Marshal

It was an uncompromising teacher of fighter pilots, a nimble "bird" with handling comparable to a sportscar, but as MiG-21 flies into the sunset today after 60 years of service with IAF, what will be remembered most is its formidable record of keeping the country safe.

Sabres rattled in '65

Inducted in 1963, the first MiG-21 variants – Types 74 and 76 – from 28 Squadron were deployed on the western front in Sept 1965, after the first wave of Pakistani strikes, and caused significant damage. Operating primarily in the Combat Air Patrol (CAP) role at bases such as Adampur and Pathankot, they were a counterweight to Pakistan's F-104 Starfighter. In internal messages, PAF advised its F-86 Sabre pilots not to engage the MiGs. 28 Squadron's commanding officer, Wing Commander 'Mally' Wollen, almost took out an F-86 Sabre with his heat-seeking K-13 missiles.

Pak grounded in '71

By the 1971 war, the MiG-21 fleet had expanded to about eight and a half squadrons. More importantly, it had been inducted into the IAF's Tactics and Combat Development & Training Squadron (TCDTS). The fleet was divided between Eastern and Western air commands. In the east, 28 Squadron, 30 Squadron and 4 Squadron were based at Tezpur, but also operated from Guwahati, which was closer to the Bangladesh theatre of operations, and Kalaikunda in West Bengal. Of these, 28 Squadron and 4 Squadron repeatedly attacked Tezgaon, the only airfield in East Pakistan from which PAF fighters operated freely, and delivered the hammer blow on Dec 14, 1971 by attacking Government House in Dhaka, precipitating the surrender of Lt Gen Niazi along with 93,000 troops.

On the western front, five MiG-21 squadrons operated out of Adampur, Amritsar, Halwara, Hindon, Jamnagar, and a few other airfields in both air defence and ground attack roles. They scored 13 aerial kills in dogfights against PAF's Starfighters, Sabres, MiG-19s and Mirages. MiG-21s from TCDTS participated in night bombing missions and night combat air patrols (CAPS) in the war's second week. Several MiG-21 pilots were awarded the Vir Chakra for their exploits over East Pakistan, Punjab and Rajasthan.

Raining fear in '99

Almost two decades later, during the Kargil conflict that lasted from May to July 1999, MiG-21s were the first into action. Three squadrons – 108, 17 and 51 – played a critical role, quickly adapting to the requirements of operating at high altitude. 108 Squadron, in which I cut my flying teeth in the early 1980s, had the MiG-21 M, a variant meant for simple ground attack missions. 17 Squadron also had MiG-21 M, but operated both in ground attack and a complex photo-recce role. 51 Squadron, which had the MiG-21 Bis – the latest version at the time – largely performed an air defence role from Srinagar.

108 Squadron was among the first over Tiger Hill. Taking off from Awantipur and routing via Ganderbal, Sonmarg and Zojila Pass, its MiGs pulled up to well over 20,000ft and targeted Tiger Hill even though they had little idea about the precise location of the bunkers, snow tents and gun positions. The squadron flew over 150 operational missions in strike role by day and night, targeting enemy positions around Tiger Hill, Tololing and in the Batalik Sector.

Air Chief Marshal BS Dhanoa was CO of 17 Squadron during the Kargil conflict. He recollects that following the initial days of uncertainty and the complexities of targeting barely visible targets at such high altitudes, his squadron was among the first to attempt GPS-assisted level-bombing, both by day and night. The move paid off, not in terms of destruction of targets but psychological degradation, keeping the Pakistani intruders guessing when the next attack was coming.

5 minutes' notice

On Aug 10, 1999, 45 Squadron (Flying Daggers), a MiG-21 Bis squadron based at Naliya in Kutch, had just returned from its deployment in the Kargil conflict and was busy preparing for the impending visit of the air chief. Suddenly, a pair of Bisons, which was at five-minute readiness at the Operational Readiness Platform (ORP), was scrambled to intercept a target that turned out to be a Pakistan Navy Atlantique Maritime Reconnaissance aircraft in Indian air space over Kutch. Surprised that the aircraft ignored all warnings to turn back, the leader of the Bison formation, Squadron Leader Bundela, sought permission to engage, and shot down the intruder by firing an R-60 missile. Years later, one of the pilots reflected, "While there is no remorse on a job done in the line of duty, one can't but help call the incident an unfortunate one for the lives lost on board the Atlantique. If it indeed was a probing mission, it was a foolhardy move just a few weeks after cessation of the Kargil hostilities."

Fighting fit at 54

Fast forward two more decades, when Wing Commander Abhinandan Varthaman, flying a MiG-21 Bison, was scrambled from Srinagar on Feb 27, 2019 to intercept a formation of PAF fighter aircraft that was attempting to target a few Indian Army installations following the Balakot attacks by India the previous day. Forcing the enemy aircraft to 'pedal back', he was shot down in enemy territory after downing an enemy aircraft. That action in 2019 completed 54 years of active operations by various variants of the MiG-21 in IAF. No other aircraft in the history of military aviation can claim such longevity in combat operations.

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ऑपरेशन सिन्दूर में इस्तमाल किये गये स्वदेशी ड्रोन बने मेले का आकर्षण

Source: Jansatta, Dt. 26 Sep 2025

हर्ष मिश्रा
नोएडा, 25 सितंबर।

आपरेशन सिंदूर के दौरान पाकिस्तान के नापाक मंसूबों को ध्वस्त करने वाले स्वदेशी ड्रोन अब उत्तर प्रदेश अंतरराष्ट्रीय व्यापार मेले-2025 में लोगों के आकर्षण का केंद्र बने हुए हैं। इन हाईटेक ड्रोनों की प्रदर्शनी को देखने के लिए स्टाल पर भारी भीड़ उमड़ रही है। खास बात यह रही कि प्रधानमंत्री नरेंद्र मोदी ने भी उद्घाटन से पूर्व स्वयं इस स्टाल पर पहुंचकर ड्रोन निर्माता कंपनी की टीम का उत्साहवर्धन किया और उन्हें बधाई दी।

इन अत्याधुनिक ड्रोनों का निर्माण नोएडा सेक्टर-80 स्थित राफे एम फाइबर नामक स्वदेशी कंपनी द्वारा किया गया है। कंपनी की उपाध्यक्ष पूजा मिश्रा ने जानकारी देते हुए बताया कि हमने शुरुआत से ही यह संकल्प लिया था कि देश की रक्षा को प्राथमिकता देते हुए पूरी तरह स्वदेशी तकनीक से कार्य करेंगे। आपरेशन सिंदूर में हमारे ड्रोन की निर्णायक भूमिका ने यह साबित कर दिया कि भारत अब रक्षा क्षेत्र में आत्मनिर्भर हो चुका है। उन्होंने आगे कहा कि उनकी टीम लगातार रिसर्च एवं डेवलपमेंट पर काम कर रही है, जिससे भारत की सेना की ताकत को और अधिक तकनीकी मजबूती प्रदान की जा सके। वर्तमान में इन ड्रोनों की मांग राष्ट्रीय ही नहीं, अंतरराष्ट्रीय स्तर पर भी तेजी से बढ़ रही है। कंपनी टीम के एक सदस्य ने कहा, यह हमारे लिए गर्व का क्षण था। जब प्रधानमंत्री स्वयं आकर हमारी मेहनत को सराहते हैं, तो उससे बड़ा पुरस्कार और क्या हो सकता है।

ड्रोन की कई खूबियां

मेले में प्रदर्शित राफे एमफिबर कंपनी के अत्याधुनिक ड्रोन खासतौर पर सीमा और दुर्गम इलाकों में दवाइयां, राशन और हथियार जैसी आवश्यक सामग्री पहुंचाने में सक्षम हैं। कंपनी की उपाध्यक्ष पूजा मिश्रा ने बताया कि प्रधानमंत्री नरेंद्र मोदी स्वयं उनके स्टाल पर पहुंचे और रोबोट वर्ल्ड ड्रोन समेत अन्य तकनीकों की जानकारी ली। प्रदर्शनी में एमआर-20 ड्रोन विशेष आकर्षण का केंद्र रहा। यह एक पूरी तरह आटोनामस ड्रोन है, जो एक बार प्रोग्राम करने के बाद स्वत: गंतव्य तक पहुंचकर मिशन पूरा करता है और वापस लौट आता है। यही ड्रोन आपरेशन सिंदूर के दौरान भी प्रयोग में लाया गया था। स्टाल पर एमआर 10-एक्स8, एमआर-20, और भारत सर्विलेंस यूएवी सहित कई अन्य अत्याधुनिक ड्रोन प्रदर्शित किए गए हैं।

'टीवी पर देखा था, अब असली में देख रहे हैं'

स्टाल पर पहुंचे लोगों में भारी उत्साह देखा गया। कई आगंतुकों ने कहा कि उन्होंने इन ड्रोनों को टीवी पर देखा था, लेकिन पहली बार इन्हें इतने करीब से देखने का मौका मिला है। ड्रोन की सटीक मारक क्षमता, रियल-टाइम निगरानी क्षमता, और स्वदेशी तकनीक ने लोगों को गहरी छाप छोड़ी। बच्चों से लेकर युवाओं और बुजुर्गों तक सभी ने इस तकनीकी नवाचार को सराहा।

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