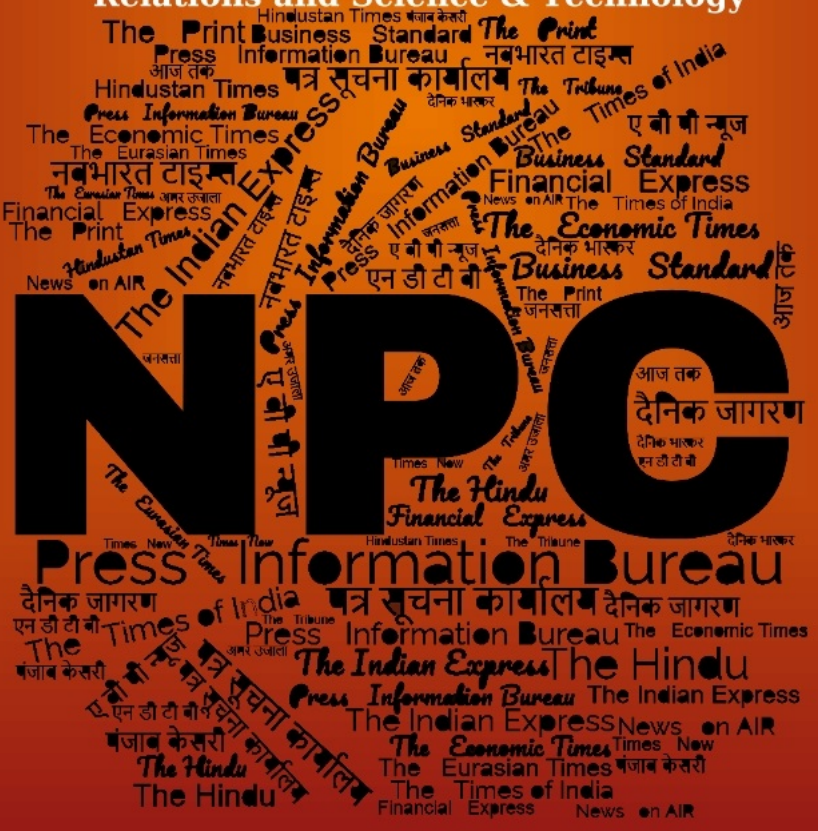
जनवरी
Jan
2025

खंड/Vol. : 50 अंक/Issue :18
24/01/2025

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

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



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENTS

DRDO News

With the theme 'Raksha Kavach - Multilayer Protection against Multi-domain Threats', DRDO to showcase path-breaking innovations during Republic Day Parade 2025

Source: Press Information Bureau, Dt. 23 Jan 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2095372

Defence Research & Development Organisation (DRDO), with a vision to empower India with cutting-edge technologies & a mission to achieve 'Aatmanirbharta' in defence, will display some of its path-breaking innovations for national security during the 76th Republic Day Parade at Kartavya Path, New Delhi on January 26, 2025.

The DRDO Tableau, with the theme 'Raksha Kavach – Multi-layer Protection against Multi-domain Threats' will feature Quick Reaction Surface-to-Air Missile; Airborne Early Warning & Control System; 155 mm/52 Cal Advanced Towed Artillery Gun System; Drone Detect, Deter & Destroy; Satellite-Based Surveillance System; Medium Power Radar – Arudhra; Advanced Light Weight Torpedo; Electronic Warfare System – Dharashakti; Laser-Based Directed Energy Weapon; Very Short Range Air Defence System; Indigenous Unmanned Aerial System; V/UHF Manpack Software Defined Radio for Land Forces; Indigenous Secure Satellite Phone and UGRAM Assault Rifle.

Apart from this, DRDO's major landmarks of 2024 will also be showcased in the tableau posters namely Long Range Hypersonic Anti-Ship Missile; Light Weight Bullet Proof Jacket 'ABHED'; Divyastra - Multiple Independently Targetable Re-entry Vehicle; 'Zorawar' Light Tank and the Dornier Mid-Life Upgrade with radar, Electronic Warfare System, Software Defined Radio and Electro-optic (Shyen).

Highlighting its unwavering commitment to precision, self-reliance & national security, DRDO will also display the equipment of Pralay Weapon System, a surface-to-surface tactical missile designed and developed with state-of-the-art technologies, which adds another layer of strength. Many other DRDO-developed systems - Nag Missile System, Pinaka, BrahMos, Short Span Bridging System 10m, and the Akash Weapon System will be displayed in various Armed Forces contingents during the parade.

DRDO is primarily engaged in system definition, design and development of many state-of-the-art military systems and technologies for realising the goal of 'Make in India and Make for the World'. DRDO is partnering with all stakeholders of the defence ecosystem, including academia, industry, start-ups and Services in developing critical systems, and to reinforce the spirit of 'Aatmanirbhar Bharat'.

*

How DRDO's recent scramjet test puts India firmly in the hypersonic weapons race

Source: The Indian Express, Dt. 23 Jan 2025,
URL: https://indianexpress.com/article/explained/explained-sci-tech/drdo-scramjet-test-hypersonic-weapons-9795405/

The Defence Research and Development Organisation (DRDO) recently demonstrated the scramjet combustor ground test for 120 seconds for the first time in India. The Ministry of Defence (MoD) has called it a crucial milestone in developing next-generation hypersonic missiles.

Hypersonic missiles are a class of advanced weaponry that travel at speeds greater than 'Mach 5' – five times the speed of sound.

We look at the journey of developing hypersonic technologies in India, and its strategic significance amidst a global race among military powers to develop these weapons.

The scramjet engine and its hypersonic abilities

Ramjets are air-breathing jet engines that use the vehicle's forward motion to compress inflowing air for combustion without a rotating compressor. The fuel is injected into the combustion chamber where it mixes with the hot compressed air and ignites. A ramjet-powered vehicle requires an assisted take-off like a rocket assist to accelerate it to a speed where it begins to produce thrust.

Ramjets work most efficiently at supersonic speeds around Mach 3, three times the speed of sound. However, the ramjet efficiency reduces once the vehicle reaches hypersonic speeds – above Mach 5.

This is where the Supersonic Combustion Ramjet or Scramjet engine comes in. It efficiently operates at hypersonic speeds and allows supersonic combustion.

The fundamental change in a scramjet is that the air does not slow down in its combustion chamber but stays supersonic throughout the engine. This makes the design, development and operation of the scramjet far more challenging.

The latest test, the date of which was not specified by the MoD, is a result of extensive work by the Defence Research and Development Laboratory (DRDL), a Hyderabad-based facility of DRDO. The facility has been working towards developing a long-duration Supersonic Combustion Ramjet or Scramjet-powered Hypersonic technology.

DRDL recently demonstrated a successful ground test of the Active Cooled Scramjet Combustor for 120 seconds for the first time in India, achieving a major milestone. The MoD said that the ground test of the scramjet combustor showcased several notable achievements, demonstrating its potential for operational use in Hypersonic vehicles like successful ignition and stable combustion.

The scramjet combustor incorporates an innovative flame stabilisation technique that holds continuous flame inside the combustor with an air speed of over 1.5 kilometres per second. The DRDO scientists explored many novel and promising ignition and flame-holding techniques over multiple ground tests, before arriving at the Scramjet Engine configuration.

Regarding the specialised fuel for the system, the MoD credited an indigenous endothermic scramjet fuel jointly developed for the first time by DRDL and its industry partners for this breakthrough. The fuel offers dual benefits of significant cooling improvement and ease of ignition.

Another key achievement amidst the development of hypersonic technologies is the development of Thermal Barrier Coating (TBC) which is designed to withstand extreme temperatures encountered during hypersonic flight. A new advanced ceramic TBC with high thermal resistance, capable of operating beyond the melting point of steel, has been jointly developed by DRDL and the Department of Science and Technology (DST).

Development of hypersonic technologies in India

The DRDO, the Indian Space Research Organisation (ISRO) and their partners in academia and industry have been working on hypersonic engines and other technologies required for hypersonic systems for over two decades.

An important development in ISRO's Air Breathing Propulsion Project occurred on August 28, 2016, when a successful flight testing of its Scramjet was held. This first experimental mission of ISRO's Scramjet Engine was successfully conducted from Satish Dhawan Space Centre SHAR, Sriharikota.

Another experimental flight for the demonstration of Air Breathing Propulsion Technology on July 22, 2024. The propulsion systems were symmetrically mounted on either side of a Rohini Sounding rocket. ISRO's focus is now on the Hypersonic Air Breathing Vehicle with Air Integration Systems (HAVA) project and the development of critical technologies.

ISRO also plans to use scramjet technology for its future vehicles as scramjet engines do not have to carry oxygen as oxidise. Thus rockets fitted with scramjet engines will be able to carry heavier satellites.

The DRDO started developing the hypersonic engine and its related systems in the early 2000s. On September 7, 2020, DRDO successfully demonstrated the hypersonic air-breathing scramjet technology with the flight test of the Hypersonic Technology Demonstration Vehicle (HSTDV) from Dr APJ Abdul Kalam Launch Complex at Wheeler Island, off the coast of Odisha.

In December 2020, the DRDO inaugurated the advanced Hypersonic Wind Tunnel (HWT) test facility in Hyderabad. It is a pressure vacuum-driven enclosed free jet facility that can simulate Mach 5 to 12 speeds. After the US and Russia, India became the third country in 2020 to have such a large facility in size and operating capability.

In February 2024, India's first Hypervelocity Expansion Tunnel Test Facility was successfully established and tested by the Indian Institute of Technology, Kanpur (IITK). This achievement put India in a handful of countries with this advanced hypersonic testing capability. The development of the facility was supported by the Fund for Improvement in S&T Infrastructure (FIST) of the Department of Science & Technology (DST).

The strategic significance of hypersonic weapons

Hypersonic weapons have the potential to beat the existing Air Defence Systems of major military powers worldwide, and can deliver rapid, high-impact strikes. Several nations including the USA, Russia, India and China are actively pursuing Hypersonic technology and have demonstrated various levels of development.

In August 2021, China tested a nuclear-capable hypersonic glide vehicle that circled the globe before speeding towards its target, as reported by *Financial Times* in October of that year. The *FT* report cited five people familiar with the test who said the Chinese military launched a rocket carrying a hypersonic glide vehicle which flew through low-orbit space before cruising downward to its target. The test demonstrated an advanced space capability and caught US intelligence by surprise, the report had said.

The US is said to have conducted the first successful test of scramjet engines in 2002 followed by Russia, European Agency, Japan and then China. The reason for the race in the hypersonic domain is that they enhance the ability of the armed forces to negotiate even the most advanced missile defence systems and hit targets with minimal warning. Their manoeuvrability and very high speeds make interception extremely difficult, giving a decisive strategic advantage in offensive operations.

Among various hypersonic technology projects that the DRDO has undertaken are Aero acoustic studies for hypersonic vehicles, Frequency Selective Surface (FSS) applications using artificial intelligence, Thermal barrier coatings, Reaction Control Systems for Hypersonic Glide Vehicles, and endothermic fuels for high-temperature applications.

*

Defence News

Defence Strategic: National/International

INS Sarvekshak Completes Hydrographic Survey At Mauritius

Source: Press Information Bureau, Dt. 23 Jan 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2095401

INS Sarvekshak completed the final phase of the hydrographic survey of Mauritius covering an extensive area of over 25,000 sq. nautical miles. During a reception ceremony held onboard, Shri Anurag Srivastava, High Commissioner of India to Mauritius, formally handed over the fair sheet of the hydrographic survey, along with newly prepared nautical charts and survey equipment to Mr. Dharambeer Gokhool, G.C.S.K. (Grand Commander of the Star and Key of the Indian Ocean), the Hon'ble President of the Republic of Mauritius. The creation of new nautical chart will enable

Mauritius to develop its maritime infrastructure, resource management and coastal development planning. This milestone event reflects enduring partnership between India and Mauritius in fostering maritime development and regional cooperation.

In addition to the operational commitment, the ship organised a joint India-Mauritius yoga session on 20 Jan 25, bringing together the ship's crew, personnel from the National Coast Guard, Mauritius and Indira Gandhi Centre for Indian Culture (IGCIC). Capt Tribhuvan Singh, Commanding Officer, INS Sarvekshak called on Mr. Shakeel Ahmed Yousuf Abdul Razack Mohamed, Minister of Housing and Lands, Mauritius and discussed the details of survey operations undertaken by the Indian Navy. The extant visit reaffirms continued commitment and wide-ranging partnership between the two countries in line with the vision of 'SAGAR'.

*

गणतंत्र दिवस: युद्ध निगरानी प्रणाली 'संजय', 'प्रलय' मिसाइल का पहली बार प्रदर्शन किया जाएगा

Source: Outlook Hindi, Dt. 23 Jan 2025,
URL: https://outlookhindi.com/country/republic-day-war-surveillance-system-sanjay-pralaya-missile-to-be-demonstrated-for-the-first-time-95292

ब्रह्मोस, पिनाका और आकाश समेत कुछ अत्याधुनिक रक्षा प्रणालियां कर्तव्य पथ पर 76 वें गणतंत्र दिवस समारोह का हिस्सा होंगी। सेना की युद्ध निगरानी प्रणाली 'संजय' और डीआरडीओ की सतह से सतह पर मार करने वाली सामरिक मिसाइल 'प्रलय' पहली बार परेड में प्रदर्शित की जाएंगी। अधिकारियों ने बृहस्पतिवार को यह जानकारी दी।

भारत 26 जनवरी को कर्तव्य पथ पर अपनी सैन्य शक्ति और जीवंत सांस्कृतिक विरासत का प्रदर्शन करेगा तथा फ्लाईपास्ट में भारतीय वायुसेना के 40 विमान और भारतीय तटरक्षक बल के तीन डोर्नियर विमान शामिल होंगे।

दिल्ली क्षेत्र के जनरल ऑफिसर कमांडिंग लेफ्टिनेंट जनरल भवनीश कुमार परेड कमांडर होंगे, जबकि 'परेड सेकंड-इन-कमांड' दिल्ली क्षेत्र के चीफ ऑफ स्टाफ (सीओएस) मेजर जनरल सुमित मेहता होंगे।

परेड की 'फुल ड्रेस रिहर्सल' पूरी होने के तुरंत बाद यहां मीडियाकर्मियों से बातचीत में मेजर जनरल मेहता ने कहा कि इस भव्य समारोह में अनेक अत्याधुनिक प्लेटफॉर्म, विभिन्न प्रकार की जीवंत झांकियों के साथ-साथ देश की समृद्ध विरासत के साथ भारत की सैन्य शक्ति का प्रदर्शन किया जाएगा।

टी-90 'भीष्म' टैंक, ब्रह्मोस और पिनाका मिसाइल प्रणाली, आकाश अस्त्र प्रणाली, शॉर्ट स्पैन ब्रिजिंग सिस्टम 10 मीटर, नाग मिसाइल प्रणाली, मल्टी बैरल रॉकेट लॉन्चर सिस्टम 'अग्निबाण' और 'बजरंग' (लाइट स्पेशलिस्ट व्हीकल) का परेड में प्रदर्शन किया जाएगा।

यह पूछे जाने पर कि 'अग्निबाण' और 'बजरंग' जैसे प्लेटफॉर्म को नाम देते समय किन कारकों को ध्यान में रखा गया था, दिल्ली क्षेत्र के सीओएस ने कहा, ''आत्मनिर्भर भारत के तहत पहले जो विशेष वाहन बनाए गए थे, उनमें उनकी क्षमताएं झलकती थीं। हमने उन्हें नाम दिए हैं, पहले उनका नामकरण नहीं किया गया था। जब उनका नामकरण किया जा रहा था, तो नामों के माध्यम से हमारी सांस्कृतिक विरासत को भी ध्यान में रखा गया।''

मेजर जनरल मेहता ने कहा कि युद्ध निगरानी प्रणाली 'संजय' और रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की 'प्रलय' शस्त्र प्रणाली पहली बार परेड में दिखाई देगी।

अधिकारियों ने बताया कि भारतीय सेना का प्रतिनिधित्व एक घुड़सवार टुकड़ी, आठ मशीनीकृत टुकड़ियां और छह मार्चिंग टुकड़ियां करेंगी।

घुड़सवार टुकड़ी का प्रतिनिधित्व 61 कैवलरी द्वारा किया जाएगा। मार्चिंग कॉलम में ब्रिगेड ऑफ द गार्ड्स, जाट रेजिमेंट, गढ़वाल राइफल्स रेजिमेंट, जेएंडके लाइट इन्फैंट्री (जेएकेएलआई) रेजिमेंट और कोर ऑफ इंजीनियर्स की टुकड़ियां शामिल होंगी।

इस वर्ष गणतंत्र दिवस समारोह का मुख्य विषय संविधान लागू होने की 75 वीं वर्षगांठ है तथा झांकी का विषय 'स्वर्णिम भारत: विरासत और विकास' है।

विभिन्न राज्यों और केंद्र शासित प्रदेशों की सोलह झांकियां और केंद्र सरकार के मंत्रालयों, विभागों और संगठनों की 15 झांकियां परेड का हिस्सा होंगी।

रक्षा मंत्रालय ने बृहस्पतिवार को बताया कि इसके अलावा डीआरडीओ की एक झांकी भी होगी, जिसका विषय 'रक्षा कवच - बहु-क्षेत्रीय खतरों के खिलाफ बहु-स्तरीय संरक्षण' होगा।

मंत्रालय ने कहा कि इसके अलावा, डीआरडीओ की 2024 की प्रमुख उपलब्धियों को भी झांकी के पोस्टरों में प्रदर्शित किया जाएगा।

परेड से पहले प्रधानमंत्री नरेन्द्र मोदी राष्ट्रीय समर स्मारक पर पुष्पांजलि अर्पित कर शहीदों को श्रद्धांजलि अर्पित करेंगे।

दिल्ली क्षेत्र के सीओएस ने संवाददाताओं को बताया कि परेड सुबह 10:30 बजे शुरू होगी और 90 मिनट तक जारी रहेगी, जो भारत की विरासत और विकास की यात्रा को दर्शाएगी।

उन्होंने बताया कि सी-130 जे सुपर हरक्यूलिस, सी-295, सी-17 ग्लोबमास्टर, पी-8 आई, मिग-29, एसयू-30 सहित अन्य विमान भी समारोह में भाग लेंगे।

*

Union Budget 2025: India, get ready for the modern warfare of tomorrow

Source: The Economic Times, Dt. 24 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/budget-2025-defence-armed-forces-modernization-get-ready-india-for-the-modern-warfare-of-tomorrow/articleshow/117503279.cms

As India turns the corner and moves to another Budget, the most pressing question for those within the defence industry is whether the new budget will meet the growing demands of its armed forces. The main issue is the pace at which the defence ministry is progressing toward establishing an armed force capable of addressing the modern challenges of the war chessboard. India was the fourth-largest defence spender globally in fiscal 2024. Yet, despite this, efforts to modernise our armed forces have made limited headway over the past five years, according to some experts.

This is especially crucial as we step into another year marked by contentious and unstable global security scenarios. While the 2024-2025 defence budget, with allocation of Rs 6.22 lakh crore, 4.79% higher than FY 2023-24, represents some progress, experts argue that it falls short in addressing the significant gaps that continue to plague India's defence sector.

"India needs to keep the goal of 'Viksit Bharat,' and this goal requires more allocation toward infrastructure development and employment generation. Under these circumstances, the only way forward for better utilisation of defence allocation is by encouraging indigenous innovation in modernisation and bringing more products into the import embargo," TV Chowdary, Managing Director of Premier Explosives Ltd, said.

Key Strides in Defence Modernisation

India has made significant progress on its path to defence self-reliance, particularly in capital expenditure and domestic production. The DAP-2020, which prioritises indigenous procurement, has been instrumental in advancing schemes like Make in India.

Defence production surged to Rs 1.27 lakh crore in FY 2023-24, an increase of 16.7% compared to the previous year. Furthermore, 75% of the Rs 1.4 lakh crore capital procurement budget for 2024-25 has been allocated to indigenous products, reinforcing the government's focus on reducing reliance on imports.

"The present geopolitical conditions have forced all nations, including those not involved in conflicts, to build up their stocks of munitions and weapons. This has caused a huge inflation in the defence market, driving up domestic manufacturing costs as well. Budget allocation must account for this. This effect is expected to persist for at least the next five years," Chowdary said.

Defence exports have also seen robust growth, reaching Rs 21,083 crore in FY 2023-24—a figure that has grown 31 times in just a decade. The BrahMos missile and the Pinaka rocket system are among the globally well-received products. India is targeting defence exports worth Rs 35,000 crore by 2025. Innovations in defence equipment production have also increased, supported by schemes like Innovations for Defence Excellence (iDEX).

"If India is to become the largest producer instead of the largest importer of defence products, a quick and efficient mechanism to attract foreign OEMs is needed. The current defence procurement policy requires total technology transfer within two years. This should be relaxed to allow phased technology transfer over up to 10 years, which would encourage confidence among foreign OEMs," Chowdary added.

Persistent Challenges in Modernising India's Armed Forces

Despite advancements, India faces significant hurdles in modernising its armed forces. A major concern is the country's heavy reliance on imports of armaments, machine parts, and other defence equipment. As one of the largest global arms importers, India is vulnerable to supply chain disruptions, as seen in the delays affecting the S-400 missile systems due to the Russia-Ukraine conflict.

Furthermore, inefficiencies in the bureaucratic system often exacerbate delays in crucial acquisitions, such as the Tejas Light Combat Aircraft and Project 75(I) submarines. These delays compromise operational readiness and weaken India's strategic deterrence, particularly as China continues to expand its military presence in the region.

T-72 tanks and Bofors howitzers are nearing five decades of service. While these systems have served India well, they lack the technology to counter modern threats, especially those posed by China.

“The recent wars have highlighted changes in strategies and war machinery. Emerging technologies like AI, robotics, electronics, and digital advancements must be prioritized. Several startups are already working in these areas, and I am confident they will make significant contributions,” Chowdary said.

India's defence budget for 2024-25, though increased by 4.8%, may be inadequate amid growing security challenges. At 1.91% of GDP, defence expenditure falls short of the 3% benchmark recommended by experts. Although it constitutes the largest central ministry allocation, over half of it is spent on personnel costs, including salaries and pensions, leaving limited funds for modernisation.

Chowdary said, “The announcement by the Honourable Defence Minister declaring 2025 as ‘The Year of Reforms’ has raised expectations in the defence industry. This is a welcome step toward preparedness for future wars. In view of this, higher budget allocations are anticipated for FY 2025-26. Reforms in military organization, starting with the introduction of the Agniveer Scheme, are expected to shift the focus from manpower-intensive forces to a technologically advanced and combat-ready younger generation.”

Speaking on the current defence spending, Laxman Kumar Behera, Associate Professor at JNU’s SCNSS, said, “At 1.9% of GDP, the budget is insufficient, particularly with two hostile neighbours. Indiamust aim for at least 2.5% of GDP in the next five years, with a long-term goal of 3%. A revenue-to-capital ratio of 60:40 is essential for balanced allocation.”

Amit Cowshish, former Financial Advisor (Acquisition) at the Ministry of Defence, also highlighted systemic challenges. “There’s virtually no comprehensive defence planning. For decades, we’ve known the allocated funds would never meet all demands, yet we fail to plan realistically. For instance, during my tenure, a defence plan was finalized, but it was financially unviable. Similarly, the Defence Planning Committee set up in 2018 has not produced concrete outcomes,” he said.

Cowshish noted that the fragmentation of responsibilities across various departments leads to inefficiencies and delays, making it difficult to utilise the allocated funds effectively.

How Budget Can Strengthening Defence Modernisation

Addressing these challenges will require a comprehensive approach, combining strategic funding with streamlined procurement processes. Experts agree that modernisation must remain a priority, but without adequate funding and organisational reform, progress will be slow.

First, the procurement process needs urgent reform. Streamlining procedures and potentially incorporating AI-driven systems could reduce delays, ensuring that acquisitions are processed promptly.

Second, increasing the capital expenditure portion of the budget is critical. Many experts advocate for a double-digit increase in the defence budget over the next decade, with a particular emphasis

on capital expenditure.Behera advocates for a significant increase in defence spending, suggesting that India should “prioritise national security over other sectors,” even if that means reallocating resources. His emphasis on the "Make in India" initiative reflects his belief that the country must continue to focus on self-reliance in defence.

“We still face challenges in manufacturing critical components like fighter jet engines. At least 10% of the defence budget should be earmarked for R&D to achieve true self-reliance. Defence spending must not only increase but also focus on emerging technologies like drones, loitering munitions, and ammunition stockpiles for sustained warfare,” Behera said.

Chowdhary also said, “India has academic institutions with a large pool of talent. This talent needs to be utilized by sponsorship from large corporations. This reduces the need for higher budget allocation for defence R&D.”

Third, expanding indigenous manufacturing must remain a focal point. Programs like “Make in India” and the Production Linked Incentive (PLI) schemes should continue to foster domestic manufacturing of critical technologies. Additionally, public-private partnerships should be strengthened, particularly in areas such as avionics and missile systems.

Both experts agree that private sector participation is crucial for bridging the modernisation gap. Behera highlighted the role of over 16,000 micro, small, and medium enterprises (MSMEs) in India’s defence sector, stating that “the private sector can bring much-needed efficiency, innovation, and R&D capabilities.” Cowshish echoed this sentiment, stressing the need to streamline procurement processes to encourage more private-sector involvement.

“We depended for a long time on DRDO for R&D efforts and modernization in defence requirements. This needs to change and large corporations including PSUs should get into defence R&D. This brings in the business drive which was experienced in the pharma sector a few years back,” Chowdhary said.

“The present DcPP scheme which is bringing Public and Private sectors together for developing and productionisation is found to be successful and more such projects should be initiated,” he added.On the other hand, Cowshish highlights the need for better planning and coordination. “The Defence Planning Committee was established to address these issues, but it has yet to produce tangible results,” he remarked. Cowshish also questioned the effectiveness of India’s reliance on the “Make in India” initiative, noting that while it boosts local manufacturing, it does not fully address the country’s dependency on foreign technology.

Fourth, India should deepen global partnerships for technology transfer. Collaborations with technologically advanced countries like the United States and France can help India co-develop and transfer cutting-edge defence technologies, which would greatly strengthen its technological base.

*

BSF and BGB hold border coordination meeting to strengthen ties

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/bsf-and-bgb-hold-border-coordination-meeting-to-strengthen-ties/articleshow/117495334.cms

The Border Security Force (BSF) on Thursday sad that a border coordination meeting was held between deputy inspector general (DIG), BSF, Malda Sector, and sector commander, Border Guard Bangladesh (BGB), Rajshahi Sector, at border outpost Sonamasjid in Bangladesh a day earlier to strengthen bilateral relations and ensure the sanctity of the international border.

The meeting came in the backdrop of the recent clashes between farmers on both sides of the India-Bangladesh border on January 18.Before that, the BSF had faced resistance while building fences in Malda's Sukdevpur.

Apart from discussion on ensuring effective border management, recent concerns, including the incident at Sukdevpur border in Malda district on January 18 were also discussed in the meeting, the BSF said.

“BSF reiterated its commitment to work closely with the BGB to maintain peace and security along the Indo-Bangladesh border. The meeting concluded on a positive note, with both forces expressing their continued commitment to bilateral cooperation and border security,” it said.

Several border management related issues of mutual interest were discussed in the meeting, according to people in the know.

“Strengthening bilateral cooperation, control of illegal activities in the border area, prevention of movement of people other than farmers near the international border were discussed and consensus was reached. Both sides emphasised on finding solutions to border related problems through mutual dialogue and consensus,” a BSF statement said.

The BSF delegation was led by DIG-sector headquarters (Malda) Tarun Kumar Gautam while the BGB delegation was headed by Colonel Mohammad Imran Ibne Rouf, the sector commander (sector headquarters, BGB)-Rajshahi. The delegation comprised respective battalion commanders and staff officers of both forces.

BSF South Bengal Frontier public relations officer, DIG NK Pandey, said, “These high-level meetings symbolise the strong partnership between India and Bangladesh. Both the forces reiterated their commitment towards maintaining security of the international border and resolving common issues through mutual dialogue and cooperation.”

He stressed that the “BSF is fully dedicated to its objective of ensuring peace and security of its borders and maintaining cordial relationships with its neighbouring countries is high on its priority”.

India shares a 4,096-km border with Bangladesh, of which a 2,216-km long stretch runs alongside West Bengal. In South Bengal, India shares a 913-km border with Bangladesh, out of which 424 km remains unfenced.

*

MDL-TKMS bid for Navy's P-75I submarine tender clears technical evaluation

Source: The Hindu, Dt. 24 Jan 2025,
URL: https://www.thehindu.com/news/national/mdl-tkms-bid-for-navys-p-75i-submarine-tender-clears-technical-evaluation/article69132738.ece

The compliance checks of the two bids received were completed in June 2024 as part of the field evaluation trials. FileThe multi-billion dollar deal for six advanced conventional submarines under project-75I has crossed a major milestone with the bid by Mazagon Dock Shipbuilders Limited (MDL), Mumbai, and Germany's TKMS (Thyssenkrupp Marine Systems) having cleared the technical evaluation conducted by the Defence Ministry. The bid by Larsen & Toubro in partnership with Navantia of Spain has not cleared the technical evaluation.

The benchmarked price of ₹43,000 crore for the deal was set a decade ago, and given the technological upgrades since and factoring in the inflation and currency fluctuations, the final cost is expected to see a major upward revision.

"MDL confirms that the commercial bid submitted by MDL has been opened by the Ministry of Defence (MoD) for further processing," MDL said on the P-75I bid in a disclosure statement on Thursday as per requirements of the market regulator Securities and Exchange Board of India.

The compliance checks of the two bids received were completed in June last year as part of the Field Evaluation Trials (FET) and the reports were since were under scrutiny in the Ministry. The bids were opened last week and the bid by MDL-TKMS was declared technically complaint, according to official sources.

"The commercial negotiations will now commence based on the price quoted in the bid submitted," a source stated.

The Request For Proposal (RFP) issued by the Navy for the programme detailing the specifications states that the first submarine should have indigenous content (IC) of 45% which should up to 60% for the sixth and last submarine. The key determinant, however, to qualify for P-75I is the Air Independent Propulsion (AIP) module, which enhances the endurance and stealth of a submarine. The AIP module became the real determinant for qualifying the technical criteria.

The design offered by TKMS, in partnership with MDL, is based on its highly successful Class 214 submarine as well as Class 212CD and has an operationally proven AIP module. Navantia, which has tied up with L&T, has offered a submarine based on its new S80 class of submarines, the first of which was launched in 2021 and was commissioned into the Spanish Navy as S-81 'Isaac Peral' in November 2023. However, the AIP module on offer by Navantia isn't fully operational yet, as required in the bid, and Navantia had demonstrated the AIP module fitted in a

submarine operating on the surface and not submerged and the submerged performance was to be demonstrated in due course, as reported by The Hindu earlier.

The TKMS has conveyed to the Indian Navy that the Lithium ion cell in its AIP module will be upgraded by the time the first submarine is delivered. The AIP module has a Polymer electrolyte membrane (PEM) based fuel cell and company officials had stated and that it has both fuel cell as well Lithium Ion based giving it enhanced performance.

As reported by The Hindu earlier, Germany has already presented a Government to Government proposal to India for the P-75I programme and Germany had also accorded a special status to India for approvals towards military purchases.The submarine deal was on top of the agenda during the visits of the German Chancellor Olaf Scholz and Spanish Prime Minister Pedro Sanchez to India in the last quarter of last year.

*

Defence Ministry invites MDL for negotiating India's biggest ever deal on January 27

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/defence-ministry-invites-mdl-for-negotiating-indias-biggest-ever-deal-on-january-27/articleshow/117492070.cms

Public sector shipyard Mazagaon Dockyards Limited (MDL) on Thursday said it has been invited by the Defence Ministry from January 27 for negotiating the over Rs 70,000 crore Project-75 India deal under which six suvtines have to be built.

Giving details of the firm to the Bombay Stock Exchange regarding the developments in the tender, the firm stated: "Opening of Commercial Bid by Indian Navy/ Defence Ministry on 16.01.2025. Indian Navy/ Defence Ministry today 23.01.2025 has now invited MDL for first round of commercial negotiations to be held on 27.01.2025."This deal expected to be worth over Rs 70,000 crore is the biggest ever defence deal in terms of value.

"MDL confirms that the Commercial bid submitted by MDL has been opened by the Ministry of Defence (MoD) for further processing. With respect to the 3 additional submarines of Scorpene class under Project 75, as earlier informed, commercial negotiations with respect to the project are in process," it said.

Earlier in the month, the Defence Ministry found the Indian firm Larsen and Toubro (L&T) bid non-compliant in the Rs 70,000 crore tender to acquire six submarines.

The Indian Navy is looking to buy six advanced submarines with the ability to stay underwater for three weeks under Project 75 India.

The proposal of the L&T in partnership with Spanish Navantia has been rejected by the Ministry for not being compliant with Indian Navy requirements, defence sources told ANI.

The L&T and its partner had showcased the functioning of its critical Air Independent Propulsion system in Spain to the Indian Navy team there on shore but the Indian Navy demanded a sea-proven system in its requirements in the tender document.

The latest development meant that the state-owned Mazagaon Dockyards Limited along with its partner ThyssenKrupp Marine Systems of Germany was the only vendor left in the race for making the six submarines.

Vendors involved in the programme have been making representations to the government and the Defence Ministry has been moving ahead as per procedures in the project and have vetted the process at all levels. There have also been suggestions made to the officials concerned to equally divide the project between the shipyards.

The Mazagaon Dockyards recently supplied the last of the six Project 75 Scorpene class submarine INS Vagsheer to the Indian Navy but is going to get orders for three more submarines under Project 75 (Additional Submarine) to be built with French Naval Group support.

Against the backdrop of the fast modernisation of the Chinese Navy, the Indian government has also cleared many submarine projects including both nuclear and conventional ones but India has to do a lot of catching up at a fast pace to develop the desired capabilities to tackle both China and Pakistan in its area of interest.

Larsen and Toubro have been deeply involved in the strategic submarine projects for the Indian Navy and have facilities on both the seaboards to mainly support defence forces' projects.

*

Defence Ministry rejects L&T bid in Rs 70,000 crore submarine deal

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/defence-ministry-rejects-lt-bid-in-rs-70000-crore-submarine-deal/articleshow/117475655.cms

The Defence Ministry has found the Indian firm Larsen and Toubro (L&T) bid non-compliant in the Rs 70,000 crore tender to acquire six submarines.

The Indian Navy is looking to buy six advanced submarines with the ability to stay underwater for three weeks under Project 75 India.

The proposal of the L&T in partnership with Spanish Navantia has been rejected by the Ministry for not being compliant with Indian Navy requirements, defence sources told ANI.

The L&T and its partner had showcased the functioning of its critical Air Independent Propulsion system in Spain to the Indian Navy team there on shore but the Indian Navy demanded a sea-proven system in its requirements in the tender document.

The latest development means that the state-owned Mazagaon Dockyards Limited along with its partner ThyssenKrupp Marine Systems of Germany would be the only vendor left in the race for making the six submarines.

Vendors involved in the programme have been making representations to the government and the Defence Ministry has been moving ahead as per procedures in the project and have vetted the process at all levels. There have also been suggestions made to the officials concerned to equally divide the project between the shipyards.

The Mazagaon Dockyards recently supplied the last of the six Project 75 Scorpene class submarine INS Vagsheer to the Indian Navy but is going to get orders for three more submarines under Project 75 (Additional Submarine) to be built with French Naval Group support.

Against the backdrop of the fast modernisation of the Chinese Navy, the Indian government has also cleared many submarine projects including both nuclear and conventional ones but India has to do a lot of catching up at a fast pace to develop the desired capabilities to tackle both China and Pakistan in its area of interest.

Larsen and Toubro have been deeply involved in the strategic submarine projects for the Indian Navy and have facilities on both the seaboards to mainly support defence forces' projects.

*

Paras Defence to invest Rs 12,000 cr to set up India's first optics park in Maharashtra

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/paras-defence-to-invest-rs-12000-cr-to-set-up-indias-first-optics-park-in-maharashtra/articleshow/117481785.cms

Paras Defence on Thursday said it is planning to invest Rs 12,000 crore to set up the country's first optics park in Maharashtra and signed an initial pact with the state government at the ongoing World Economic Forum in Davos. The project is expected to commence in 2028 and will continue till 2035 to ensure scalability and flexibility.

The investment is set to create a technology hub for defence, space, automotive, semiconductor and other applications, the company said in a statement.

It also reaffirms Paras Defence's commitment to the 'Make in India' initiative while advancing India's aspirations for technological independence in critical sectors, the company said, adding that the project is poised to generate over 2,000 direct employment opportunities.

Under the planned initial pact, the Maharashtra government has pledged its support to the company in securing land, various incentives and approvals to bring the ambitious project to fruition, it stated."

This revolutionary project will not only boost the domestic manufacturing ecosystem but also solidify India's position as a global innovation hub," Paras Defence & Space Technologies Ltd Managing Director Munjal Sharad Shah said.

"We are proud to collaborate with Paras Defence to drive innovation and foster technological leadership in Maharashtra for optical technologies for defence, space, automotive, semiconductor and other applications," the statement quoted a Maharashtra government spokesperson as saying.

*

Indian JV emerges as sole contender for $5 billion India submarine deal

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/indian-jv-emerges-as-sole-contender-for-5-billion-india-submarine-deal/articleshow/117492468.cms

German shipbuilder ThyssenKrupp and its Indian partner have cleared field trials for building six advanced conventional submarines for the Indian Navy, according to an exchange filing, emerging as the sole contender for the $5 billion project.

Their potential rival, Spanish state-held shipbuilder Navantia, which partnered with India's Larsen & Toubro (L&T), could not meet the navy's requirements in trials held in 2024 for testing key technologies, an Indian defence source said.

The project is crucial to India's effort to modernise its military and boost its naval capabilities in the face of China's growing presence in the Indian Ocean region.

ThyssenKrupp's Indian partner, state-owned Mazagon Dock Shipbuilders Ltd, said in an exchange filing on Thursday that its field trials for the project were successful and the Indian defence ministry had invited the company for commercial negotiations next week.

The defence ministry, L&T and its submarine partner did not respond to requests for comment.

A key requirement for the project was air-independent propulsion (AIP) technology, which would allow the diesel-electric attack submarines to stay underwater for over two weeks. A conventional submarine without AIP technology would have to surface every few days to charge its batteries.

Currently, the 17 conventional submarines operated by the Indian Navy do not have AIP technology, which India's neighbours China and Pakistan have, according to nonprofit Nuclear Threat Initiative.

Analysts say the project for the six new submarines has been delayed by more than a decade, with the first of them now expected three to five years after a contract is agreed.

About half of India's conventional submarines have undergone multiple upgrades and retrofits over the past few years and are nearing the end of their productive lives.

*

JSW Defence signs MoU with Telangana for Rs 800 crore UAV manufacturing plant

Source: The Economic Times, Dt. 23 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/jsw-defence-signs-mou-with-telangana-for-rs-800-crore-uav-manufacturing-plant/articleshow/117486433.cms

JSW Defence has signed an agreement with the Telangana government to set up a facility in the state for manufacturing Unmanned Aerial Systems. JSW UAV, a wholly-owned subsidiary of the company, would invest Rs 800 crore to set up the unit in Telangana through a technology arrangement with a leading US-based defence technology company, JSW Defence said in a statement.

The MoU was signed in the presence of Telegana Chief Minister Revant Reddy and Parth Jindal of JSW Group on the sidelines of the World Economic Forum (WEF) here.

"The MoU underscores our unwavering commitment to playing a key role in indigenizing defence technology in India," Jindal said.

Reddy said Hyderabad, and Telangana have been long positioned in the global market as software and pharma leader."With clear vision and diligent efforts, we are now establishing Telangana as a clear leader for investments in manufacturing across sectors, ranging from semiconductor, defence, private space to FMCG," he said.

JSW Defence, a part of the USD 24 billion JSW Group, has a strategic partnership with Shield AI, Inc, a leading US defence technology company, to indigenize and manufacture Shield AI's 'V-BAT', a Group 3 Unmanned Aerial System (UAS), the statement said.

*

Visit will strengthen bilateral cooperation in defence: Indonesian President

Source: Deccan Herald, Dt. 24 Jan 2025,
URL: https://www.deccanherald.com/india/visit-will-strengthen-bilateral-cooperation-in-defence-indonesian-prez-3370246

Indonesian President Prabowo Subianto on Thursday left Jakarta for New Delhi, stating that his visit to India would strengthen bilateral cooperation in defence, maritime security and digital technology. He will fly back on Sunday.

That he chose to fly back home after attending the Republic Day ceremony as the chief guest has brought relief to New Delhi. New Delhi in the past conveyed its reservations about foreign leaders clubbing visits to India and Pakistan.

“I will meet with the president and prime minister of India to strengthen strategic cooperation in areas such as security, maritime, and digital technology development,” Subianto said.

Islamabad was preparing to host the Indonesian President from January 26 to 28 with Pakistan Prime Minister Shehbaz Sharif constituting a committee, headed by his government's planning and development minister Ahsan Iqbal, to explore avenues of enhancing cooperation between the two nations and expand bilateral trade.

Jakarta has not yet clarified if Subianto would fly to Kuala Lumpur from New Delhi only to de-hyphenate his visits to India and Pakistan and would later fly from Kuala Lumpur to Islamabad.

His plan to fly to Islamabad from New Delhi had caused unease and delayed the formal announcement of his visit by the governments of India and Indonesia.

Subianto will be the fourth leader of Indonesia to be the chief guest at the Republic Day ceremony in India.India had hosted the Southeast Asian nation's first president Sukarno as the chief guest in 1950, Susilo Bambang Yudhoyono attended the ceremony as the chief guest in 2011, Subianto's predecessor Joko Widodo had come along with other ASEAN leaders in 2018 when New Delhi had hosted all 10 Southeast Asian leaders as the chief guests.

*

After Philippines, another country to soon acquire India's BrahMos missiles?

Source: The Week, Dt. 23 Jan 2025,
URL: https://www.theweek.in/news/defence/2025/01/23/after-philippines-another-country-to-soon-acquire-indias-brahmos-missiles.amp.html

During the visit of Indonesian President Prabowo Subianto to India for the Republic Day celebrations for which he is the chief guest, a major defence deal is likely to be announced.

According to media reports, even as Indonesia is engaged in a territorial dispute with China and amid the growing assertions of Beijing in the South China Sea, the country is looking to ramp up its defence capabilities and is reportedly planning to seal a deal for the purchase of BrahMos supersonic cruise missiles.

Developed through a joint venture between Defence Research and Development Organisation (DRDO) and Russia's NPO Mashinostroyeniya, BrahMos is a universal long-range supersonic cruise missile system that can be launched from submarines, ships, aircraft, or land platforms. The missile flies at a speed of 2.8 Mach or almost three times the speed of sound.

Indonesia's defence ministry recently sent a letter to the Indian embassy in Jakarta, with the details of a $450 million BrahMos deal, reported The New Indian Express recently. The two countries have been discussing the procurement deal for a few years even as Indonesia has been facing budgetary constraints for going ahead with the deal.

However, there is no official confirmation on the deal yet from both sides.

If the sale happens, Indonesia will be the second country after the Philippines to procure the missile from India.

India, in April, had delivered the first batch of BrahMos supersonic cruise missiles to the Philippines as part of a $375 million deal with the Southeast Asian nation to supply the weapon systems. A few other countries, including Argentina, have also shown interest in procuring BrahMos missiles from India.

*

AI and defence dynamics: Global trends and India's adaptation

Source: The Pioneer, Dt. 24 Jan 2025,
URL: https://www.dailypioneer.com/2025/columnists/ai-and-defence-dynamics--global-trends-and-india---s-adaptation.html

Cross-border terrorism and geopolitical tensions, such as the Russia-Ukraine conflict and Israel-Iran hostilities, have driven unprecedented defence spending since World War II. To counter these threats, nations are leveraging artificial intelligence (AI) to build resilient defence systems. AI enhances national security by enabling robust decision-making to detect, analyse, and address complex threats across multiple fronts.

The Shift Towards AI in Defence

AI is transforming defence strategies, reducing reliance on human personnel. The US military's active-duty personnel are at their lowest levels in eight decades, while the U.K. has seen a 30 per cent reduction since 2000, largely due to AI-driven tools replacing soldiers in high-risk operations. With advancements in IoT and data analytics, experts predict a significant increase in AI-based defence systems globally.

India's AI-Driven Defence Evolution

India, a leading G20 nation, is actively integrating AI into its defence framework to counter internal and external threats. Initiatives like the 2022 launch of 75 AI-enabled defence products highlight India's focus on cybersecurity, automation, and autonomous systems.

The Ministry of Defence (MoD) allocates $12.6 million annually for AI projects, including the establishment of an AI center at the Military College of Telecommunication Engineering (MCTE). Additionally, the 2024 launch of India's first AI Data Bank aims to enhance national security through real-time analytics and predictive capabilities.

AI in Security and Surveillance

AI aids investigation agencies in video surveillance and threat detection, analysing behaviour, communications and psychological patterns to identify risks. Using both Strong AI (mimicking human cognition) and Weak AI (focused tasks), intelligence agencies enhance security, mitigate breaches and safeguard civilians and public institutions.

Challenges and Future Prospects

Despite promising advancements, AI adoption in India's defence faces challenges, including data privacy, cybersecurity and ethical concerns surrounding autonomous systems. To remain competitive, India must increase investments in research, collaborate internationally and address accountability issues tied to AI-driven military operations.

Conclusion

By adopting a risk-based regulatory framework, India can ensure the ethical and effective deployment of AI in defence. While challenges persist, the ongoing innovations and strategic initiatives signal a future where India's defence capabilities transcend traditional methods, embracing AI as a cornerstone of national security.

*

Definite change in Kashmir. Violence exists only because terrorists have adapted, Army hasn't

- By Lt Gen H S Panag PVSM, AVSM (R)

Source: The Print, Dt. 23 Jan 2025,
URL: https://theprint.in/opinion/definite-change-in-kashmir-violence-exists-only-because-terrorists-have-adapted-army-hasnt/2457841/

Mixed signals are coming in from Jammu and Kashmir. On 2 January, Home Minister Amit Shah said that the Modi government has "completely dismantled the ecosystem of terror in Kashmir, thereby strengthening peace and stability in the region". An elected government in harmony with the central government is in power, and the restoration of statehood is on the cards. The degree of terrorist violence is, by far, lower than the violent crimes in metropolitan cities. Tourism is thriving and infrastructure development is progressing rapidly.

However, rather than a decrease in military deployment, 15,000 additional troops were inducted into the Jammu region in 2024, and emergency procurement of counter-insurgency equipment was sanctioned. The troop-to-terrorist kill ratio in 2023 and 2024 was 1:2.6—the lowest level in a decade. But in the Jammu region, from 2021 to 2024, the ratio was an alarming 1:1. Both Defence Minister Rajnath Singh and the Chief of the Army Staff General Upendra Dwivedi, have stated on record that Pakistan continues to wage a proxy war in J&K. The COAS has said that 80 per cent of the terrorists present in J&K and 60 per cent of those killed in counter-terrorism operations came from Pakistan.

So, what is the reality? By all yardsticks, violence has plateaued to the lowest levels ever. For once, politics is at centre stage to win the hearts and minds of the people. Per my assessment, the sporadic surge in violence is due to the changed tactics of the terrorists, necessitated by their small numbers, and the Army's failure to adapt. This is imposing disproportionate caution, both politically and militarily. Thus, political and military strategy remains unchanged and continues to focus on long-term conflict management. A review of this is in order.

An opportunity for India

Currently, Pakistan's capacity for a proxy war in J&K is at its lowest ever due to its poor economy, confrontation with Afghanistan and the Tehrik-e-Taliban Pakistan along the Durand Line and in Khyber Pakhtunkhwa, the insurgency in Balochistan, and the deteriorating security of the China-Pakistan Economic Corridor. That said, Pakistan's long-term strategy of attempting to usurp J&K —or at least its Muslim-majority areas—through a proxy war remains unchanged. Thus, it will endeavour to keep the pot of terrorism simmering by maintaining 100-150 terrorists.

At the tactical level, terrorists are likely to be based in forested areas and difficult terrain, direct confrontation with security forces will be avoided, and there will be a reliance on ambushes and surprise attacks. This strategic and tactical environment offers a unique opportunity for India to transition from 'conflict management' to 'conflict termination' in J&K. For this, a de novo political and military approach is required.

The present political environment in J&K is ideal for a bold initiative by the central government. The people have reconciled to the revocation of Article 370, and the National Conference government has gone out of its way to cooperate with the Centre. The restoration of statehood to J&K must be announced at the earliest, along with an economic package focused on development. This would set the stage for a military push to wipe out the terrorists.

Changed tactical environment

According to an *India Today* report based on "intelligence sources", there are 119 active terrorists in J&K: 79 (18 local and 61 Pakistani) operate north of the Pir Panjal range and 40 (6 local and 34 Pakistani) south of it. Since the operational lifespan of a terrorist is approximately one year, at least 100 terrorists with arms and ammunition must infiltrate every year to sustain current numbers. In addition, weapons, ammunition, and equipment required for local recruits have to be smuggled across the Line of Control. To reinvigorate the insurgency, the number of terrorists would need to go up by three to four times, which can only happen with increased infiltration.

Given their small numbers, the terrorists are not directly engaging the troops. They are also refraining from operating in villages and urban areas, where troop density is high. Instead, they are predominantly operating in forested and mountainous areas, relying on ambushing security forces by baiting them with planted information. Selective targeting of civilians and policemen is sometimes undertaken to make their presence felt. Apart from the formations deployed along the LoC to physically safeguard it and for counter infiltration, the counter-terrorist grid of Company Operating Bases, manned by the Rashtriya Rifles, primarily covers developed areas near villages and towns that were once used as terrorist bases.

Currently, only a limited endeavour is made to dominate forests and mountainous areas through patrols or need-based operations by security forces. And this is exactly what the terrorists want. They have freedom of action in these areas and bait the security forces who operate in unfamiliar terrain and suffer disproportionate losses. While relative peace prevails in developed areas, tactical reverses in forests and mountainous regions perpetuate the cautionary persistence with conflict management.

Review the operational strategy

For long, the Army has believed that the infiltration of terrorists, arms, and equipment can be controlled and reduced, but not completely stopped without committing disproportionate resources. However, if we want to eradicate terrorism, additional resources must be committed. With limited local recruitment, insurgency is being sustained by infiltration from Pakistan-Occupied Kashmir. By my assessment, at least 60 additional infantry companies are required to achieve zero infiltration. These additional resources can be obtained by redeploying 10 Rashtriya Rifles battalions. For detailed analysis, read my article on strengthening the counter-infiltration grid.

The second aspect of the revised operational strategy is modifying the counter-insurgency grid. This grid, manned by 62 Rashtriya Rifles battalions, has been the mainstay of counter-terrorist operations in the hinterland. Since terrorists previously operated from villages and towns, the grid was—and still is—focused on developed areas. But over the last two to three years, terrorist activities have shifted to forests and mountainous areas. Some Rashtriya Rifles battalions have not had any contact with terrorists for years. However, maintaining the grid is required as terrorists always gravitate toward voids.

Current terrorist tactics demand the extension of the grid to forests and mountainous areas. This should be done using 50 per cent of the Rashtriya Rifles battalions. The voids in the grid in developed areas must be filled by redeploying Central Armed Police Force battalions and State Armed Police battalions. If required, the Uniform Counter Insurgency Force headquarters and one Rashtriya Rifles sector with two battalions deployed in Eastern Ladakh must be brought back.

In addition to the redeployed grid, additional Special Forces battalions must be inducted to clean up the forests and mountainous areas. Per my assessment, the revised operational strategy can be implemented through bold reorganisation and redeployment of existing resources in J&K.

To reiterate, our current political and military approach in J&K is focused on conflict management. Conflict termination requires a bolder political and military strategy, and this is the opportune time to execute it.

*

China Emerges ‘World Leader’ In Hypersonic Missile Tech Ahead Of U.S. & Russia; India Goes Full Throttle To Catch-Up

Source: The EurAsian Times, Dt. 24 Jan 2025,
URL: https://www.eurasiantimes.com/china-emerges-global-leader-in-hypersonic-missile/

The test launch of the long-range hypersonic missile that can deliver various payloads for ranges over 1500 km was done on November 16, 2024. With this, India’s Defense Research and Development Organisation (DRDO) has demonstrated the capability to build an active cooled scramjet combustor that will be a key to hypersonic vehicles.

Hypersonic technology allows a country to fuse extreme speed, maneuverability, and low-altitude flight, making them harder to track and detect. Unlike ballistic missiles, hypersonic weapons do not follow a ballistic trajectory and can maneuver to their destination. Hypersonic cruise missiles can travel at speeds greater than Mach 5, which moves at five times the speed of sound or more than 5,400 km/hr.

There are two primary categories of hypersonic weapons: Hypersonic glide vehicles launched from a rocket before gliding to a target and Hypersonic cruise missiles powered by high-speed, air-breathing engines, or 'scramjets' after acquiring their target. Scramjets are air-breathing engines capable of sustaining combustion at supersonic speeds without using any moving parts. "The ground test of scramjet combustor showcased several notable achievements, demonstrating its potential for operational use in hypersonic vehicles, like successful ignition and stable combustion," DRDO stated.

India has also developed a new, advanced ceramic Thermal Barrier Coating (TBC) with high thermal resistance that can operate beyond steel's melting point. India's test of the hypersonic missile in November 2024 placed it in an elite club of countries comprising the US, Russia, China, and North Korea. The missile test and the scramjet engine test were preceded by China showcasing a new hypersonic glide vehicle, the GDF-600, at its flagship Zhuhai air show.

The tests are the result of many years of research to build a hypersonic missile. The idea had its genesis in 2007 when the Indian Army received the BrahMos Missile system. The then President, Dr. APJ Abdul Kalam, suggested that the Mark-II version of BrahMos should be a hypersonic cruise missile.

India and Russia signed a Memorandum of Understanding in 2009. The BrahMos-2 is intended to be based on hypersonic scramjet technology. Its main purpose is to target deeply buried enemy nuclear bunkers and heavily protected locations. Scramjet technology is one of the key elements of a hypersonic weapon. Unlike standard subsonic or ramjet engines, a scramjet uses an inlet force in supersonic compressed air before mixing it with hydrogen fuel, thus allowing the engine to achieve Mach 5 speeds and beyond. India began testing scramjet technology in 2016. On August 28, 2016, the ISRO successfully tested two indigenously developed scramjet engines.

To further enhance its scramjet capabilities, India, in 2019 and 2020, tested an indigenously developed hypersonic technology demonstrator vehicle (HSTDV). A scramjet engine powered the HSTDV. While the 2019 test was deemed failed, the 2020 test was successful. During the 2020 test, the scramjet-powered HSTDV flew for about 22-23 seconds at Mach 6 speed.

A ground run for a missile engine is important because it allows engineers to thoroughly test and evaluate its performance before launch, identifying potential issues with functionality, combustion, thrust, and overall health. Ignition in a scramjet engine is like 'keeping a candle lit in a hurricane,' the DRDO said. The DRDO statement said that the scramjet combustor uses a cutting-edge flame stabilization method that maintains a constant flame inside the combustor at air speeds of more than 1.5 km/s.

According to the statement, several innovative and promising ignition and flame-holding approaches were investigated through several ground tests to arrive at the scramjet engine layout.

"The indigenous development of endothermic scramjet fuel, the first time in India, jointly by DRDL and Industry, is central to this breakthrough. The fuel offers dual benefits of significant cooling improvement and ease of ignition," the DRDO said.

Catching Up With China – A World Leader In Hypersonic Technology

Globally, the race to get hypersonic weapons is heating up. China is touted as the world leader in hypersonic technology by the US Department of Defense as it surpasses the US and Russia in developing conventional and nuclear-capable hypersonic weapons. The People's Liberation Army successfully tested its DF-27 intermediate-range ballistic missile with a hypersonic glide vehicle in 2023, enabling it to effortlessly breach missile defense systems, according to a recent intelligence leak.

The DF-17 HGV-armed medium-range ballistic missile "will transform the PLA's missile force," according to the 2023 China Military Power Report. The DF-17 can carry nuclear weapons; however, it is designed for conventional missions. India's ambitions are fuelled by the advancement in China's hypersonic technology.

The US is also playing catch-up. On December 12, 2024, the US Army's Rapid Capabilities and Critical Technologies Office, along with the US Navy Strategic Systems Programs, conducted a successful end-to-end flight test of a conventional hypersonic missile. The Long-Range Hypersonic Weapon (LRHW), also known as Dark Eagle, marked the culmination of over two years of effort to deploy the weapon from its trailer-based launcher. The missile is designed to defeat advanced "anti-access/area denial capabilities," a key aspect of China's defensive strategy in the Pacific, according to the Congressional Research Service.

Unlike programs in China and Russia, US hypersonic weapons are to be conventionally armed. Because of this, the US Congressional Report titled 'Hypersonic Weapons: Background and Issues for Congress' contends that US hypersonic weapons will likely require greater accuracy and be more technically challenging to develop than nuclear-armed Chinese and Russian systems.

Russia loaded its Sarmat intercontinental ballistic missile (ICBM) with nuclear-capable Avangard HGV and was alleged to have used its Zicron hypersonic missile in its ongoing war in Ukraine.

North Korean state media reported a test of the Hwasong 16B hypersonic missile, described by President Kim Jong Un as a "key piece of the nuclear deterrent."

In this scenario, India's quest for hypersonic weapons is seen as a move towards diversifying its strategic capabilities. The DRDO has stated that the missile can carry "various payloads," indicating both conventional and nuclear variants.

*

Science & Technology News

New ISRO chief interview: 'We will have 3 uncrewed missions (before humans can go to space), of which first may be this year'

Source: The Indian Express, Dt. 23 Jan 2025,
URL: https://indianexpress.com/article/india/isro-chief-interview-dr-v-narayanan-space-missions-9794888/

Just before taking over as the chairperson of India's space agency, Dr V Narayanan visited the temple in his hometown, a small village called Melakattuvilai in Tamil Nadu's Kanyakumari district. He was surprised to be greeted by nearly 600 people, who had gathered to celebrate his successes.

Hailing from a farming family, he studied under the light of kerosene lamps till the ninth standard, when his house was first electrified. He excelled in all his examinations, going on to become one of the people who built the country's cryogenic engine programme from scratch. From the design board to the first flight, his team holds the record for the fastest development of a cryogenic engine. This engine continues to power India's heaviest launch vehicle, LVM3, which will also carry Indian astronauts to space.

On the day he would have completed seven years as the director of ISRO's Liquid Propulsion Systems Centre (LPSC), Narayanan spoke to The Indian Express about his journey and the space agency's key upcoming missions.

Could you tell us a little about your journey to the top of India's space agency?

I come from a very humble background. It was a great blessing that my parents gave me the opportunity to continue my education at a time when most children from my village used to drop out much earlier. Of course, I was doing well academically and even secured the first rank in my school. My father then asked somebody what I should be doing next. They said that a diploma from the polytechnic college was sure to get me a job.

After joining the course, I realised that I should have gone for an engineering course. Nonetheless, I continued studying and again secured the first rank. I was also fortunate to get a campus appointment. But then I had to decide whether to join the job or continue my education. While my father wanted me to continue my studies, there was a problem of finances, so I took the job. I was upset though.

It was a great blessing that my parents gave me the opportunity to continue my education at a time when most children from my village used to drop out much earlier.

So, when did you realise that aerospace engineering was your calling?

I was just trying to get a government job. I started out at TI Cycles, then Madras Rubber Factory, and finally Bharat Heavy Electricals Limited, before joining ISRO. Once I joined ISRO, however, I thought I must complete my engineering at the earliest. By God's grace, I was able to complete my PhD from IIT Kharagpur and start my journey with the cryogenic programme.

You have worked with the biggest rockets in India. Now, we are working on an even bigger Next Generation Launch Vehicle (NGLV) and the cabinet approved a new launch pad for it recently. Could you tell us about the significance of both?

We had the first launch of SLV-3 (an experimental rocket called Satellite Launch Vehicle) in 1979 and the first successful one in 1980. The capability of that vehicle was 35 to 40 kgs to low earth orbit. We have come a long way and developed six generations of launchers. And now, we are working on the seventh generation NGLV. It will have the capability of carrying 30,000 kgs to low earth orbit; our current capacity with the Bahubali Mark III (LVM3, previously called GSLV MK-III) rocket is around 8,500 kgs.When you look at the future programmes, we will have to have high capabilities.

The configuration of the vehicle will be very different. The NGLV will be 91 metres high — almost as tall as a 30-storey building — against 43 metres for Mk III. It will have a propellant tank of 5-metre diameter instead of the 4-metre we currently use. Its lift-off mass will be 1.5 times of the vehicles today.

It will be a three-stage vehicle with a new propulsion system, using liquid oxygen and methane as fuel. The first stage will have 450 tonnes of liquid propellant powered by nine clustered engines, each generating 110 tonnes of thrust. The second stage will have 120 tonnes of propellant powered by two engines. It will use the third version of the cryogenic engine under development called C32. The upper stage will be cryogenic stage C32, the third version of which is currently being developed. There will also be two solid strap-ons.

Keeping low-cost access to space in mind, we will recover the first stage and reuse it. Initially, we are looking at reusing it 15 to 20 times. Once it's completely developed, we will fully understand the capability of the vehicle and take a call on how many times it can be reused. Currently, the configuration is completed, design is in progress. Also, this vehicle will be developed along with private industries. The industries are going to invest in facilities for manufacturing and production.It will be a totally different level of capability, as you can imagine.

And what about the launch pad?

Today, we have two launch pads — one meant for PSLV vehicles, another for GSLV-MkII and LVM3 and, of course, if required it can be used for PSLV also. Now, there is a lot of demand for LVM3 launches, around six to eight vehicles a year because of commercial launches. To enhance the launch capability, we need to have another launch pad. Also, if something happens to this launch pad, we do not have anything else. We would also require a launch pad for the upcoming NGLV. Plus, the Prime Minister has already given directions for a crewed mission to the moon for which we need a new launch pad. So, in all the way, we need to have one more launch pad.

Another exciting mission for ISRO is the first human spaceflight. Where are we when it comes to the Gaganyaan mission?

Right now, I can say, the human rating of the vehicle is almost complete. We have done enough tests for all three stages of the launch vehicle. Then, we have done a couple of tests with respect to the crew escape system, but a lot more tests have to be done. As for the environment control and life support system, 600 to 700 control components have been acquired, such as pressure controls, temp controls, humidity controls.Work is also ongoing on the vehicle health monitoring system. If anything happens to the launch vehicle, it will automatically trigger the crew escape system.

Of course, humans cannot be sent in the very first mission, so we will have three uncrewed missions, of which the first may be scheduled for this year, maybe in the second quarter.India is also working on two missions to the moon, our own Chandrayaan-4 and LUPEX with Japan.

Can you tell us the difference between the two missions and what stage they are at?

The LUPEX mission will actually be like Chandrayaan-3, where we will have a lander and a rover. But these will be much heavier. Our Chandrayaan-3 rover weighed only 25 kg but for this mission, it would be 250 kg. For that, we have to develop new propulsion systems and engines.In Chandrayaan-4, we have to land and bring back samples. Currently, configuration has been completed, and the design phase is nearing completion.

What would be the next priority areas for ISRO?

We have been given a clear roadmap already. The 100th launch of ISRO is planned for later this month. It would be of NVS-02, the second satellite in the second generation of navigation satellites. Then, a PSLV completely manufactured by the industry is also in the final phase. We are going to have a launch of that. Then, of course, there are a lot of requirements for satellites in the country in terms of communication, navigation, and earth observation.Since we need to have a lot of satellites — currently we have 56 satellites in orbit – ISRO cannot do it alone. So, we will see more participation from the private sector. The PM has rolled out the reforms in the space sector and now it is our responsibility to handhold the private sector.

*

Nisar US lead scientist throws light on pioneering joint-mission withISRO

Source: The Times of India, Dt. 23 Jan 2025,
URL: https://timesofindia.indiatimes.com/science/nisar-us-lead-scientist-throws-light-on-pioneering-joint-mission-with-isro/articleshow/117492404.cms

Nasa’s Jet Propulsion Laboratory (JPL), which is spearheading the US side of the Nasa-Isro Synthetic Aperture Radar (Nisar) has made public the details of the collaborative mission through the project’s lead US scientist Paul Rosen. As per Nasa, the satellite is set to launch this spring.

The mission will observe Earth like no mission before, offering insights about our planet’s ever-changing surface. It’s a first-of-a-kind dual-band radar satellite that will measure land deformation from earthquakes, landslides, and volcanoes, producing data for science and disaster response. It will track how much glaciers and ice sheets are advancing or retreating and it will monitor growth and loss of forests and wetlands for insights on the global carbon cycle.

As diverse as Nisar's impact will be, the mission's winding path to launch — in a few months' time — has also been remarkable.

Here's how Rosen explains the details of the mission, which will track changes in everything from wetlands to ice sheets to infrastructure damaged by natural disasters:

How will Nisar improve our understanding of Earth?

The planet's surfaces never stop changing — in some ways small and subtle, and in other ways monumental and sudden. With Nisar, we'll measure that change roughly every week, with each pixel capturing an area about half the size of a tennis court. Taking imagery of nearly all Earth's land and ice surfaces frequently and at such a small scale — down to the centimeter — will help us put the pieces together into one coherent picture to create a story about the planet as a living system.

What sets Nisar apart from other Earth missions?

It will be the first Earth-observing satellite with two kinds of radar — an L-band system with a 10-inch (25-centimeter) wavelength and an S-band system with a 4-inch (10-centimeter) wavelength.Whether microwaves reflect or penetrate an object depends on their wavelength. Shorter wavelengths are more sensitive to smaller objects such as leaves and rough surfaces, whereas longer wavelengths are more reactive with larger structures like boulders and tree trunks.

So Nisar's two-radar signals will react differently to some features on Earth's surface. By taking advantage of what each signal is or isn't sensitive to, researchers can study a broader range of features than they could with either radar on its own, observing the same features with different wavelengths.

Is this new technology?

The concept of a spaceborne synthetic aperture radar, or SAR, studying Earth's processes dates to the 1970s, when Nasa launched Seasat. Though the mission lasted only a few months, it produced first-of-a-kind images that changed the remote-sensing landscape for decades to come.

It also drew me to JPL in 1981 as a college student: I spent two summers analysing data from the mission. Seasat led to Nasa's Shuttle Imaging Radar programme and later to the Shuttle Radar Topography Mission.

What will happen to the data from the mission?

Our data products will fit the needs of users across the mission's science focus areas — ecosystems, cryosphere, and solid Earth — plus have many uses beyond basic research like soil-moisture and water resources monitoring. We'll make the data easily accessible. Given the volume of the data, Nasa decided that it would be processed and stored in the cloud, where it'll be free to access.

How did the Isro partnership come about?

We proposed DESDynI (Deformation, Ecosystem Structure, and Dynamics of Ice), an L-band satellite, following the 2007 Decadal Survey by the National Academy of Sciences. At the time, Isro was exploring launching an S-band satellite. The two science teams proposed a dual-band

mission, and in 2014 Nasa and Isro agreed to partner on Nisar.Since then, the agencies have been collaborating across more than 9,000 miles (14,500 kilometers) and 13 time zones. Hardware was built on different continents before being assembled in India to complete the satellite. It's been a long journey — literally.

*

GalaxEye deploys GLX-SQ payload aboard ISRO's PSLV Orbital Experimental Module

Source: The Hindu, Dt. 23 Jan 2025,
URL: https://www.thehindu.com/news/cities/bangalore/galaxeye-deploys-glx-sq-payload-aboard-isros-pslv-orbital-experimental-module/article69131501.ece/amp/

Space start-up GalaxEye on Thursday announced the successful deployment of its GLX-SQ payload aboard ISRO's PSLV Orbital Experimental Module (POEM) platform which was launched on December 30, 2024.

Ground-breaking leap

The start-up said that this milestone marks a groundbreaking leap in space technology, as it features the world's first-ever fusion of Synthetic Aperture Radar (SAR) and optical imagery in orbit— a transformative achievement set to redefine remote sensing capabilities.

This first-of-its-kind integration of SAR and optical imagery addresses critical needs across sectors, including Defence, agriculture, and disaster response.

"By fusing these two technologies, the payload offers enhanced insights that go beyond the capabilities of traditional remote sensing methods. The ability to process and compress large volumes of data, converting analog signals into digital format in under 10 minutes, positions GalaxEye as a leader in delivering efficient, real-time solutions for real-world challenges," it said.

Earth observation

Suyash Singh, CEO & co-founder of GalaxEye, said: "By fusing SAR and optical imagery in orbit, we've set a new benchmark for earth observation. This mission showcases our commitment to innovation and our ability to deliver fast, actionable insights for critical sectors like Defence, agriculture, and disaster response. It's not just a technological milestone but the beginning of a journey to redefine the possibilities of remote sensing and space-based solutions."

It added that GalaxEye is gearing up for Mission Drishti, a flagship multi-sensor satellite delivering all-weather, high-resolution imaging, reinforcing its reputation as a pioneer in shaping satellite technology for space exploration and practical earth applications.

*