जनवरी
Jan
2026

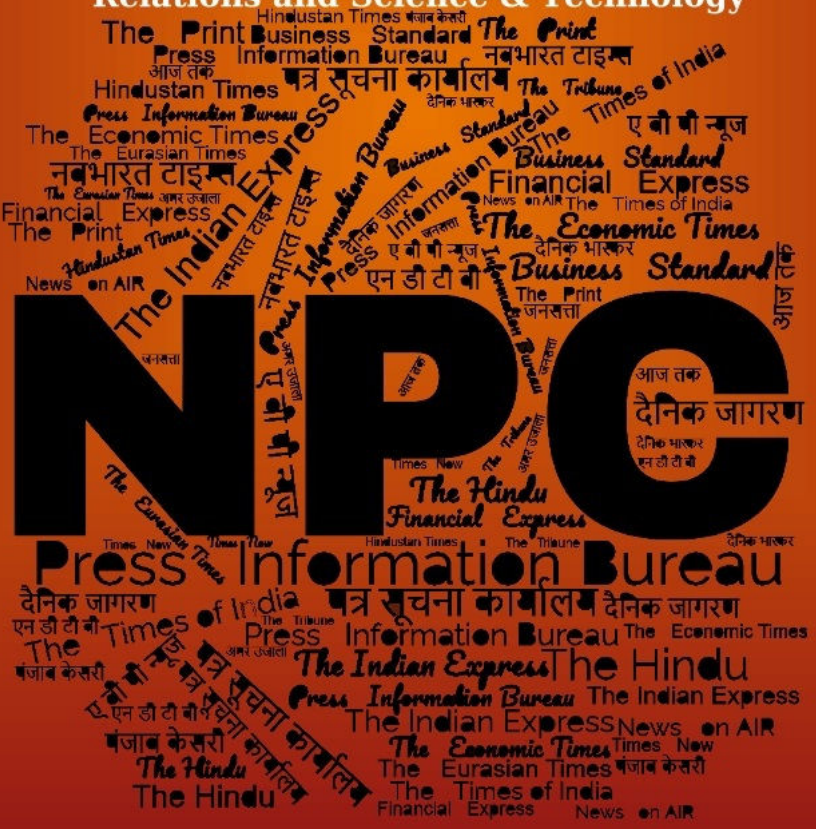
खंड/Vol. : 51 अंक/Issue : 002

02/01/2026

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

मिशन सुदर्शन चक्र रक्षा आत्मनिर्भरता की ओर निर्णायक कदम

Source: Dainik Jagran, Dt. 02 Jan 2026

नई दिल्ली, एएनआइः रक्षा मंत्रालय ने कहा कि पीएम नरेन्द्र मोदी द्वारा 2025 में अनावरण किया गया मिशन सुदर्शन चक्र भारत की रणनीतिक स्वायत्तता और रक्षा क्षेत्र में आत्मनिर्भरता की यात्रा में महत्वपूर्ण कदम है। इस पहल को देश के विकसित हो रहे सुरक्षा सिद्धांत की आधारशिला बताया।

लाल किले से प्रधानमंत्री के स्वतंत्रता दिवस भाषण के दौरान घोषित यह मिशन भगवान कृष्ण के सुदर्शन चक्र से प्रेरणा लेता है। इसका उद्देश्य शत्रु की घुसपैठ को नाकाम करना और भारत की आक्रमण क्षमताओं को बढ़ाना है। यह कार्यक्रम भारत की नीति में आए परिवर्तन और खतरों का तेजी, सटीकता और मजबूती से जवाब देने के उसके संकल्प को दर्शाता है। रक्षा मंत्रालय के अनुसार, मिशन सुदर्शन चक्र एक दूरदर्शी कार्यक्रम है जिसके तीन प्रमुख उद्देश्य हैं। रक्षा प्रणालियों का पूर्णतया अनुसंधान, विकास और निर्माण भारत के भीतर ही सुनिश्चित करना। भविष्योन्मुखी और उन्नत प्रौद्योगिकियों के माध्यम से भविष्य के युद्ध परिदृश्यों का पूर्वानुमान लगाना और त्वरित जवाबी कार्रवाई में सक्षम सटीक, लक्षित प्रणालियां तैयार करना। 2035 तक, इस मिशन का लक्ष्य सार्वजनिक स्थानों सहित रणनीतिक और नागरिक संपत्तियों को कवर करते हुए एक व्यापक राष्ट्रीय सुरक्षा कवच स्थापित करना है।

*

DRDO to play key role in Sudarshan Chakra air defence initiative: Rajnath Singh

Source: The Hindu, Dt. 02 Jan 2026

Union Defence Minister Rajnath Singh on Thursday (January 1, 2026) said the Defence Research and Development Organisation (DRDO) will play a pivotal role in the creation of Sudarshan Chakra, an ambitious air defence initiative announced by Prime Minister Narendra Modi during his Independence Day 2025 address from the Red Fort. Mr. Singh was addressing scientists and senior officials during his visit to the DRDO headquarters in New Delhi on the occasion of the organisation's 68th Foundation Day. Under the Sudarshan Chakra initiative, the DRDO will equip critical installations across the country with advanced air defence systems for comprehensive aerial protection over the next decade.

Highlighting the lessons from Operation Sindoor, the Minister said modern warfare underscores the importance of robust and reliable air defence capabilities. The DRDO would achieve the objectives of the Sudarshan Chakra initiative with dedication and urgency, strengthening India's preparedness against evolving aerial threats, he said. Weapon systems developed by the DRDO played a decisive role during Operation Sindoor, he said, underlining the organisation's professionalism and commitment to safeguarding national interests. Commending the DRDO for significantly bolstering India's indigenous defence capabilities, he said the state-of-the-art technologies and equipment supplied to the armed forces performed seamlessly during the operation. He noted that their reliable performance boosted the morale of soldiers and demonstrated the growing maturity of India's defence research ecosystem.

Mr. Singh praised the DRDO not only as a technology creator but also as a trust builder, stating that the organisation had emerged as a symbol of hope, certainty, and belief for the nation. He acknowledged the DRDO's expanding collaboration with the private sector, academia, start-ups, and MSMEs (micro, small and medium enterprises), which has contributed to the creation of a synergistic and vibrant defence ecosystem.

Visible improvements across processes — from procurement and project management to industry engagement— had made systems faster, easier, and more reliable, he said. Calling upon the DRDO to remain aligned with the rapidly evolving global technological landscape, Mr. Singh urged the organisation to continue focusing on innovation, deep tech, and next generation technologies.

Emphasising the need for continuous learning and development, he said technology scanning, capability assessment, and future readiness are essential to ensure India remains prepared for emerging warfare domains. During the visit, Samir V. Kamat, Secretary of the Department of Defence R&D and Chairman of the DRDO, briefed the Minister on the organisation's achievements in 2025, ongoing R&D activities, initiatives involving industry and start-ups, and the roadmap, key targets, and reforms planned for 2026 to further strengthen the organisation.

https://www.thehindu.com/news/national/drdo-to-play-key-role-in-sudarshan-chakra-air-defence-initiative-rajnath-singh/article70460797.ece

*

ऑपरेशन सिंदूर में डीआरडीओ के हथियारों की रही निर्णायक भूमिका

Source: Dainik Jagran, Dt. 02 Jan 2026

नई दिल्ली में गुरुवार को डीआरडीओ मुख्यालय में बैठक करते रक्षा मंत्री राजनाथ सिंह व केंद्रीय मंत्री संजय सेठ ● एएनआइ

- रक्षा मंत्री बोले, सुदर्शन चक्र के निर्माण में डीआरडीओ की महत्वपूर्ण भूमिका
- कहा, रणनीतिक स्वायत्तता इससे सुदृढ़ होगी

नई दिल्ली, प्रेट्र : रक्षा मंत्री राजनाथ सिंह ने कहा कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा विकसित हथियार प्रणालियों ने आपरेशन सिंदूर के दौरान निर्णायक भूमिका निभाई, जो राष्ट्रीय हितों की रक्षा के प्रति संगठन के पेशेवर तरीके एवं प्रतिबद्धता का प्रमाण है। उन्होंने कहा कि सुदर्शन चक्र के निर्माण में डीआरडीओ की अहम भूमिका रहेगी।

डीआरडीओ के 68वें स्थापना दिवस के अवसर पर नई दिल्ली स्थित मुख्यालय में राजनाथ ने कहा, "डीआरडीओ टीम ने सशस्त्र बलों को अत्याधुनिक तकनीकों और प्लेटफार्मों से लैस करके भारत की स्वदेशी क्षमताओं को मजबूत किया है।" उन्होंने विज्ञानियों के प्रयासों की सराहना की और उनकी अटूट प्रतिबद्धता, वैज्ञानिक उत्कृष्टता और राष्ट्रीय कर्तव्य की गहरी भावना की प्रशंसा की।

राजनाथ ने कहा, "इस पहल के तहत, डीआरडीओ अगले दशक में पूर्ण हवाई सुरक्षा सुनिश्चित करने हेतु हमारे महत्वपूर्ण प्रतिष्ठानों को वायु रक्षा प्रणाली से लैस करने के लिए जिम्मेदार है। आपरेशन सिंदूर के दौरान हमने आधुनिक युद्ध में वायु रक्षा के महत्व को देखा। मुझे विश्वास है कि डीआरडीओ इस लक्ष्य को जल्द से जल्द हासिल करने के लिए पूरी लगन से काम करेगा।" उन्होंने कहा कि स्वदेशी और भविष्य के लिए तैयार प्रौद्योगिकियों को विकसित करके डीआरडीओ हमारी रणनीतिक स्वायत्तता और हमारे सशस्त्र बलों के विश्वास को मजबूत कर रहा है।

सेना प्रमुख जनरल उपेंद्र द्विवेदी ने भी इस अवसर पर डीआरडीओ के सभी कर्मियों और उनके परिवारों को शुभकामनाएं दीं और कहा, 'भारतीय सेना एक दशक के परिवर्तन के दौर से गुजर रही है, जहां एकीकरण, आत्मनिर्भरता और नवाचार हमारी सामरिक शक्ति के मुख्य स्तंभ हैं।'

*

Weapon systems developed by DRDO played decisive role in Op Sindoor: Rajnath Singh

Source: The Times of India, Dt. 02 Jan 2026

Defence minister Rajnath Singh said on Wednesday that the “weapon systems developed by DRDO played a decisive role during Operation Sindoor, which serves as a testament to the professionalism and commitment of the organisation towards safeguarding national interests”. He also exuded confidence that DRDO will play a crucial role in the creation of anti-missile defence system ‘Sudarshan Chakra’, as announced by PM Narendra Modi during his independence day address in 2025.

Defence minister Rajnath Singh with DRDO chairman Samir V Kamat at the DRDO headquarters on its 68th foundation day on Thursday

During his visit to the DRDO headquarters here on the agency’s 68th foundation day, the minister commended DRDO for bolstering India’s indigenous capabilities by equipping the armed forces with state-of-the-art technologies, and said the agency’s equipment worked seamlessly during Operation Sindoor, boosting the morale of soldiers.

Learning lessons from the Pakistan conflict last year, when enemy forces launched an array of missiles and drones on India, the country is now developing a multi-layered integrated air and missile defence system ‘Sudarshan Chakra’ to create a comprehensive security shield against diverse threats like ballistic missiles, drones, and hypersonic weapons. “Under this initiative, DRDO is responsible for equipping our vital installations with an air defence system to ensure complete aerial protection over the next decade.

We witnessed the importance of air defence in modern warfare during Operation Sindoor. I am confident that DRDO will work wholeheartedly to achieve this goal soon,” Singh said.

The minister praised DRDO for becoming trust builders along with technology creators, which makes people look towards it with hope, certainty, and belief. Acknowledging DRDO’s collaboration with the private sector, he said the increased engagement with the industry, academia and start-ups has resulted in the creation of a synergetic defence ecosystem. “DRDO has consistently improved its systems, processes, and working methods. From procurement to project management, from industry engagement to collaborating with start-ups and MSMEs, there is a visible effort to make the work easier, faster, and more reliable,” he said.

Singh said, “The world is changing every day. Technology, innovation and new warfare domains are rapidly advancing, making yesterday’s knowledge obsolete. We must never assume that the learning process has ended. We must continue learning and challenge themselves, paving the way for the new generation.” He was apprised of the major targets set for 2026 and various reforms that the DRDO is taking for the betterment of the organisation.

https://timesofindia.indiatimes.com/india/weapon-systems-developed-by-drdo-played-decisive-role-in-op-sindoor-rajnath-singh/articleshow/126293849.cms

*

Pralay test

Source: The Tribune, Dt. 02 Jan 2026

India's successful test-firing of two Pralay missiles in quick succession from the same launcher off the Odisha coast marks more than a technological milestone. It signals a maturing of India’s conventional deterrence capability at a time when regional security uncertainties are deepening and rapid-response systems are becoming central to modern warfare.

Developed indigenously by the DRDO, Pralay is a quasi-ballistic, solid-fuel missile designed for high-precision conventional strikes. Unlike traditional ballistic missiles, it remains within the atmosphere and can manoeuvre mid-flight, complicating interception by enemy air defence systems. The latest salvo launch confirms operational readiness for battlefield deployment.

This capability fills a crucial gap in India’s strike arsenal. With a range that places key tactical and operational targets within reach, Pralay strengthens India’s ability to respond swiftly to conventional provocations without immediately escalating to strategic or nuclear thresholds. In an era where conflicts are increasingly calibrated below full-scale war, such systems provide policymakers with vital options.

Equally significant is what the test represents institutionally. The repeated success of user trials underscores the growing confidence of the armed forces in indigenous systems, reinforcing the broader push for self-reliance in defence manufacturing. From Pinaka to Pralay, India is steadily reducing its dependence on imported platforms in critical domains.

However, deterrence is not built by hardware alone. It requires clear doctrine, political restraint and robust crisis-management mechanisms to prevent miscalculation. As India enhances its conventional strike capabilities, it must also invest in diplomatic signalling and confidence-building measures to ensure stability. The Pralay tests demonstrate that India is better prepared than before. The challenge now lies in ensuring that this growing military capability is matched by strategic clarity and responsible statecraft.

https://www.tribuneindia.com/news/editorials/pralay-test

*

Defence News

Rs 3.35 lakh-crore greenlighted for defence modernization in 2025

Source: The Asian Age, Dt. 02 Jan 2026

AGE CORRESPONDENT
NEW DELHI, JAN. 1

Defence ministry approved capital acquisition proposals worth ₹3.84 lakh crore in 2025 to enhance the country's defence readiness, with focus on modernisation through indigenisation.

In the Financial Year 2025-26 till the end of December 2025, defence ministry has signed capital contracts amounting to Rs 1.82 lakh crore for the modernisation of the Armed Forces.

"Ministry of defence, under the leadership of defence minister Rajnath Singh, has recorded significant progress in implementing wide-ranging reforms aimed at strengthening jointness, enhancing defence preparedness, promoting self-reliance and improving welfare delivery mechanisms. These reforms, undertaken across the ministry, reflect a whole-of-government approach towards building a modern, integrated and future-ready defence ecosystem," said defence ministry in a statement on Thursday.

Defence ministry achieved 80 per cent (around ₹1.2 lakh crore) expenditure under Capital Acquisition Budget by the end of December 2025. The allocation under this is spent on modernisation of the Armed Forces. The overall capital expenditure of MoD has also reached upto 76 per cent which includes expenditure on infrastructure, land, and R&D among others in addition to capital acquisition.

Defence minister Rajnath Singh signs the condolence book during his visit to high commission of Bangladesh in New Delhi on Thursday. — PTI

To promote greater indigenisation in defence and secure supply chains, private sector participation has been increased.

This includes streamlining defence manufacturing licenses, mapping the competencies of MSMEs, and preparing market intelligence reports to enhance demand-supply analysis in defence procurement. Additionally, testing and trial infrastructure lab facilities are being shared with the private sector.

Around 25 per cent of defence research grants are also being allocated to them along with academic institutions and MSMEs to encourage innovation and strengthen collaboration in the defence sector.

The procurement processes have been streamlined to reduce timelines, including simplification of the iDEX manual, rationalisation of defence export permissions, revamping of the defence EXIM portal, simplification of technology transfer policy and decentralisation through revised delegation of financial powers and procurement manuals.

*

Air Marshal Nagesh Kapoor, Lt. Gen. Harpal Singh assume key appointments

Source: The Hindu, Dt. 02 Jan 2026

Air Marshal Nagesh Kapoor on Thursday (January 1, 2026) assumed charge as the Vice Chief of the Air Staff, succeeding Air Marshal Narmdeshwar Tiwari, who superannuated after 40 years of distinguished service to the nation. An alumnus of the National Defence Academy, Defence Services Staff College and National Defence College, Air Marshal Kapoor is an accomplished fighter pilot with over 3,400 flying hours on MiG-21 and MiG-29 aircraft.

He has held several key command, operational, instructional and staff appointments, including Air Officer Commanding-in-Chief of Training Command and South Western Air Command, and is a recipient of multiple gallantry and distinguished service awards.

In another significant development, Lt. Gen. Harpal Singh on Thursday assumed charge as the 29th Director General Border Roads, formally taking over the reins of the Border Roads Organisation (BRO). Commissioned into the Corps of Engineers in June 1991, he brings over three decades of experience across diverse command, staff and leadership roles.

Raised in 1960, the BRO has been instrumental in developing strategic infrastructure in some of the most challenging terrains, enhancing national security and border connectivity. On assuming charge, Lt. Gen. Singh lauded the professionalism of BRO personnel and conveyed New Year 2026 greetings to all ranks.

https://www.thehindu.com/news/national/air-marshal-nagesh-kapoor-lt-gen-harpal-singh-assume-key-appointments/article70460922.ece

*

Science & Technology News

अब मानवरहित गगनयान मिशन प्रक्षेपित करने की तैयारी

Source: Dainik Jagran, Dt. 02 Jan 2026

- मानवरहित मिशन के तहत अंतरिक्ष में भेजा जाएगा ह्यूमनाइड रोबोट व्योममित्र
- स्काईरूट एयरोस्पेस और अग्निकुल कासमास भी भेजेंगी उपग्रह

ईंधन की जरूरत 200 किलोग्राम तक कम हो जाएगी

एक अधिकारी ने बताया कि चार टन के कम्युनिकेशन सेटेलाइट में दो टन से ज्यादा तरल ईंधन होता है, लेकिन इलेक्ट्रिक प्रोपल्शन सिस्टम से ईंधन की जरूरत 200 किलोग्राम तक कम हो जाएगी। स्वदेशी टीडब्ल्यूटी एम्पलीफायर से सेटेलाइट ट्रांसपोंडर की तकनीक में आत्मनिर्भरता हासिल होगी। स्पेस-टेक स्टार्टअप गैलेक्सीआइ ने भी पहली तिमाही में दुनिया के पहले मल्टी-सेंसर अर्थ आब्जर्वेशन सेटेलाइट 'मिशन दृष्टि' को प्रक्षेपित करने की योजना बनाई है। यह अगले चार वर्षों में सेटेलाइट का एक समूह स्थापित करने की शुरुआत होगी।

नई दिल्ली, प्रेट्र : शुभांशु शुक्ला की अंतरराष्ट्रीय अंतरिक्ष स्टेशन (आइएसएस) की पहली यात्रा की सफलता के बाद भारत अंतरिक्ष में मानव भेजने के अपने पहले मिशन की दिशा में कदम बढ़ाने को तैयार है, जब इस वर्ष के आखिर में मानवरहित गगनयान मिशन को अंतरिक्ष में प्रक्षेपित किया जाएगा।

अंतरिक्ष क्षेत्र की निजी कंपनियां स्काईरूट एयरोस्पेस और अग्निकुल कासमास भी इस वर्ष अपने राकेट विक्रम-1 और अग्निबाण के जरिये उपग्रह प्रक्षेपित करने की तैयारी कर रही हैं। साथ ही हिंदुस्तान एयरोनाटिक्स लिमिटेड और लार्सन एंड टुब्रो द्वारा पूरी तरह निर्मित पोलर सेटेलाइट लांच व्हीकल (पीएसएलवी) भी प्रक्षेपित होगा, जिसका कांट्रैक्ट इसरो ने 2023 में दिया था।

विज्ञान और प्रौद्योगिकी मंत्री जितेंद्र सिंह ने पिछले माह संसद को बताया था कि गगनयान को कक्षा में भेजने का पहला परीक्षण (जी-1) इस वर्ष मार्च में किए जाने की उम्मीद है। इसमें एक ह्यूमनाइड रोबोट (मानव जैसे कार्य करने में सक्षम एआइ संचालित रोबोट) व्योममित्र को भेजा जाएगा। यह रोबोट एक अंतरिक्ष यात्री के कामों को प्रदर्शित करेगा और अंतरिक्ष यान पृथ्वी की निचली कक्षा में महत्वपूर्ण प्रणालियों का परीक्षण करेगा। इंडियन स्पेस एसोसिएशन (आइएसपीए) के महानिदेशक लेफ्टिनेंट जनरल एके भट्ट ने कहा, "2026 में पीएसएलवी-एन1 के जरिये क्वांटम तकनीक में सफलता, अग्निकुल के 3डी प्रिंटेड इंजन और पिक्सेल के हाइपरस्पेक्ट्रल कान्स्टेलेशन से भारत की वैश्विक स्थिति मजबूत होगी, साथ ही समर्पित निजी प्रक्षेपण केंद्रों जैसी बुनियादी ढांचे की जरूरतें भी पूरी होंगी।

आइआइटी-मद्रास में शुरू हुए स्पेस स्टार्टअप अग्निकुल कासमास ने दोबारा इस्तेमाल होने वाले राकेट प्रक्षेपित करने और लागत घटाने के लिए अपने राकेट के ऊपरी हिस्सों को कार्यशील सेटेलाइट में बदलने की योजना बनाई है। अग्निकुल कासमास के संस्थापक व सीईओ श्रीनाथ रविचंद्रन ने बताया कि कक्षा में अपने पहले प्रक्षेपण के बाद अग्निकुल ने हर महीने एक राकेट प्रक्षेपित करने की योजना बनाई है। स्काईरूट एयरोस्पेस ने पिछले महीने प्रधानमंत्री नरेन्द्र मोदी की वर्चुअल मौजूदगी में विक्रम-1 राकेट को प्रदर्शित किया था। कंपनी का लक्ष्य इस वर्ष की शुरुआत में इसे कमर्शियल पेलोड के साथ प्रक्षेपित करना है। बेंगलुरु स्थित दिगंतारा इंडस्ट्रीज ने पिछले वर्ष मार्च में दुनिया का पहला स्पेस सर्विलांस सेटेलाइट एससीओटी प्रक्षेपित किया था। इस वर्ष उसकी आठ और सेटेलाइट कक्षा में स्थापित करने की योजना है। कंपनी सात सेटेलाइट 2027 में स्थापित करेगी।

इसरो हाई थ्रस्ट इलेक्ट्रिक प्रोपल्शन सिस्टम (एचटीईपी), क्वांटम की डिस्ट्रीब्यूशन और स्वदेशी ट्रैवलिंग वेव ट्यूब (टीडब्ल्यूटी) एम्पलीफायर जैसी तकनीक प्रदर्शित करने के लिए टीडीएस-01 सेटेलाइट भी प्रक्षेपित करेगा। एचटीईपी से इसरो भविष्य में आल-इलेक्ट्रिक सेटेलाइट प्रक्षेपित कर सकेगा। यह तकनीक सेटेलाइट को हल्का बनाएगी और रासायनिक ईंधन पर निर्भरता कम करेगी।

*

From space to genes: The technologies to watch

-by TV Venkateswaran (Visiting Professor, IISER Mohali)

Source: The Tribune, Dt. 02 Jan 2026

TV VENKATESWARAN
VISITING PROFESSOR,
IISER, MOHALI

MANY of science's most transformative discoveries, beginning with X-rays, are serendipitous and the consequence of unplanned detours rather than meticulously drafted roadmaps. As a result, it is impossible to make accurate predictions about scientific breakthroughs. However, huge technology projects do not happen by chance. They are planned years in advance. Therefore, we can anticipate some developments that are in store.

Space technology: After a long pause since humans last walked on the Moon in 1972, NASA is again planning to send humans back to the Moon. As part of its Artemis programme, NASA intends to fly a crewed spacecraft around the Moon for the first time in 2026 after four decades.

China, meanwhile, is preparing Chang'e-7 to explore the Moon's south polar region, a site of intense interest because of its permanently shadowed craters that may harbour water ice. China is also expected to launch the Xuntian space telescope and conduct test flights of its next-generation crew vehicle, Mengzhou-1, and the Long March-10 rocket designed for human lunar missions.

Beijing is also working on a planetary defence experiment modelled on NASA's DART mission. It intends to send a spacecraft to collide head-on with the near-Earth asteroid 2015 XF261 to test the possibility of altering an asteroid's trajectory. Such experiments have a dual promise — protecting the Earth from future impacts, the kind that led to the extinction of dinosaurs. A special class of asteroids is rich in rare earth elements, said to be crucial for Industrial Revolution 4.0. These missions provide the necessary groundwork for capturing kilometre-scale asteroids rich in minerals for commercial extraction.

For India, 2026 will be pivotal for the Gaganyaan human spaceflight programme. ISRO has announced a series of uncrewed precursor missions, including tests of the Vyommitra humanoid robot, crew escape systems, parachute deployments and a full uncrewed orbital flight of the Gaganyaan capsule.

2026: This calendar year is a crowded one for both public and private space actors. REUTERS FILE

Commercial lunar landings and the maiden flights of new heavy launchers, such as Blue Origin's New Glenn, are also expected to take place in 2026, making the year a crowded one for both public and private space actors. With India entering this arena in earnest, the global space race is likely to intensify.

Nuclear technology: Indian nuclear efforts will reach a key milestone with the 500 MW Prototype Fast Breeder Reactor (PFBR) at Kalpakkam becoming operational. The reactor is expected to begin trial operations in early 2026 and move towards full commissioning by the end of the year. This reactor is a crucial stage in India's indigenous three-stage nuclear power programme, aimed at eventually using the country's abundant thorium reserves as fuel. If the PFBR performs as intended, it will mark a decisive step towards long-term energy security.

> For India, 2026 could mark decisive steps in spaceflight, nuclear energy and deep-sea exploration.

Deep-sea mission: India's deep-sea ambitions are also scheduled to move from the drawing board to the deep sea. Under the Samudrayaan Mission, the indigenously built Matsya-6000 submersible is expected to carry three researchers to depths of 6,000 metres. At such depths, pressure rises to about 600 times that at sea level, meaning that every square centimetre of the hull must withstand the equivalent of 600 kilograms of load. Designed using specialised titanium alloys, Matsya-6000 is intended to open a new window into the largely unexplored abyssal world.

Weather forecasting: By combining artificial intelligence and machine learning with traditional physics-based models, India plans to roll out the Bharat Forecasting System in complete earnest by the end of 2026. Using supercomputers such as Pratyush and Mihir, the aim is to deliver local weather forecasts at six-kilometre resolution up to 10 days in advance. Such forecasts will help fine-tune disaster preparedness, the tourism industry and agricultural planning.

Alternative energy: The pressure to move away from fossil fuels continues to shape the energy sector. India now ranks fourth globally in renewable energy capacity, fourth in wind power and third in solar power. Renewables account for just over half of India's installed capacity of 484.82 GW, enabling it to meet its COP26 commitment five years ahead of the 2030 deadline. Solar energy is expected to grow further and India's 'One Sun, One World, One Grid' objective as well as the International Solar Alliance (ISA) are expected to become more vigorous.

Artificial intelligence: The technology is likely to evolve beyond today's prompt-driven systems that rely on massive pre-existing datasets. Developers are working towards autonomous AI agents capable of planning and executing complex tasks, from booking tickets to managing logistics. Chinese efforts such as DeepSeek, built with relatively modest resources, point to a diversification of the AI landscape. Radical 'Small Language Models' perhaps will fructify. Systems that can operate fluently in languages beyond English, including Korean, are also expected to mature.

Biotechnology: In the past few years, the focus has shifted from detecting genetic errors to correcting them. Just as a single letter change can transform the meaning of a word, small mutations in DNA lie behind many inherited disorders. Gene-editing therapies designed to repair these faults are moving from experimental trials towards limited clinical use. Initially, this tech will address a narrow set of single-gene error diseases. CRISPR-based techniques are also being used to develop drought-tolerant crops, a prospect with implications for food security in a warming climate.

*

The Tribune

The Statesman

पंजाब केसरी जनसत्ता

The Hindu

The Economic Times

Press Information Bureau

The Indian Express

The Times of India

Hindustan Times

नवभारत टाइम्स

दैनिक जागरण

The Asian Age

The Pioneer