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समाचार पत्रों से चयनित अंश
Newspapers Clippings

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

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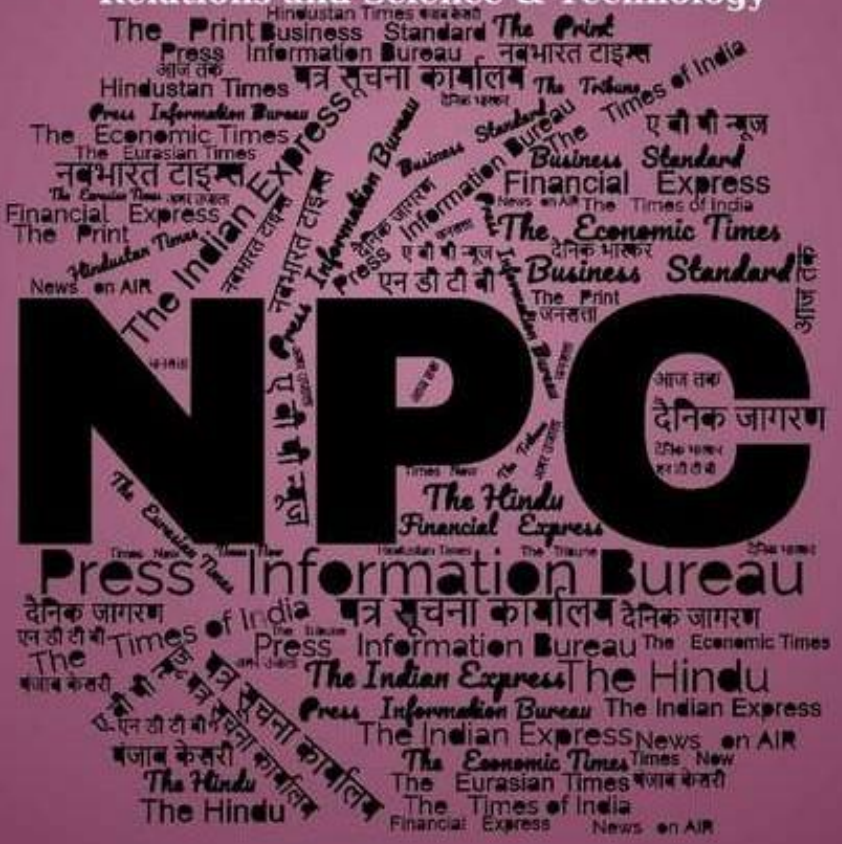

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DRDO News

Raksha Mantri Shri Rajnath Singh visits DRDO's Dr APJ Abdul Kalam Missile Complex in Hyderabad

Source: Press Information Bureau, Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2106988

Raksha Mantri Shri Rajnath Singh visited DRDO's Dr APJ Abdul Kalam Missile Complex, the nerve centre for design and development of indigenous missile systems, in Hyderabad, Telangana on February 28, 2025. He was briefed about the missile technologies and related programmes being carried out by Research Centre Imarat (RCI). Secretary, Department of Defence R&D and Chairman DRDO Dr Samir V Kamat and senior scientists & officials of RCI were present on the occasion.

Shri Rajnath Singh also felicitated the team of the Long-Range Hypersonic Anti-Ship Missile project, successful flight-trials of which took place in November 2024. The successful testing positioned India among the select group of nations with hypersonic missile capabilities.

Interacting with the scientists, Raksha Mantri commended them for their unparalleled contribution to India's defence capabilities and exuded confidence that, with concerted efforts, India will find itself among the top-three economies by 2027. He called upon them to continue factoring-in the rapidly-evolving technological transformation into their projects while working with dedication and honesty.

Shri Rajnath Singh also paid glowing tributes to Dr APJ Abdul Kalam on the occasion. He stated that the former President's contributions to science & technology, missile development in particular, can never be forgotten.

In his address, the DRDO Chairman reiterated the organisation's commitment towards developing critical technologies and ensuring that India becomes 'Aatmanirbhar' as well as a technology leader. "DRDO will strive to realise Prime Minister Shri Narendra Modi's vision that defence systems are made in India and made for the world," he said.

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Excel in frontier tech by making best use of internationally-competitive infrastructure being set-up in India: Raksha Mantri to youth during National Science Day celebrations in Hyderabad

"India can remain strong & secure in adverse situations if it has solutions to critical technological challenges"

Govt's endeavour is to harness the potential of India's youth to achieve the goal of Viksit Bharat by 2047, says Shri Rajnath Singh

Source: Press Information Bureau, Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2106896

Raksha Mantri Shri Rajnath Singh has called upon the youth to inculcate scientific temper and excel in frontier technologies by making best use of the internationally-competitive infrastructure being established in the country due to the Government's efforts. He was inaugurating *Vigyan Vaibhav*, a two-day science and technology extravaganza organised in Hyderabad, Telangana as part of National Science Day celebrations on February 28, 2025.

"War is increasingly moving from hardware to software-oriented. New technological breakthroughs are on the horizon and we have to take a lead in transformative technologies such as Artificial Intelligence, Quantum Computing, Machine Learning and Clean-tech. India can remain strong and secure in adverse situations if it has solutions to critical technological challenges. Our youth must adopt scientific outlook & critical thinking and try to go beyond the ordinary," said Shri Rajnath Singh. He recalled the words of former President Dr APJ Abdul Kalam who said *"Science is a beautiful gift to humanity; we should not distort it but use it for betterment of society".*

Raksha Mantri reiterated Prime Minister Shri Narendra Modi-led Government's commitment to harness modern technology for the safety and security of the nation, terming education in the field as crucial for the future. India's youth possesses tremendous potential and it is the Government's endeavour to harness their capabilities to achieve the vision of *Viksit Bharat* by 2047, he said.

Shri Rajnath Singh threw light on the New Education Policy 2020 which aims to transform science education in the country by encouraging creativity, critical thinking and innovation. He added that the theme of this year's National Science Day *i.e. 'Empowering Indian youth for global leadership in Science and Innovation for Viksit Bharat'* reflects the same approach. He described the theme as a reflection of New India's aspiration for progress through innovation and global scientific leadership.

Speaking on the occasion, Telangana Chief Minister Shri A Revanth Reddy stated that Hyderabad has long been a hub of scientific excellence and technological innovation. He urged the young minds participating in *Vigyan Vaibhav 2025* to dream big and embrace innovation with passion.

As part of the event, a grand exhibition has been organised which welcomed over 30,000 students. Featuring 200+ exhibition stalls, it provided a rare opportunity for students to witness cutting-edge defence and aerospace technologies developed by DRDO and leading Indian industries. The exhibition aimed to ignite curiosity, inspire innovation, and encourage young minds to pursue careers in STEM fields, fostering the next generation of scientists, engineers, techno-preneurs who will propel India towards global technological leadership.

Secretary, Department of Defence R&D and Chairman DRDO Dr Samir V Kamat; President, Aeronautical Society of India (AeSI) Dr G Satheesh Reddy; Director Generals and Directors of DRDO; CMDs of PSUs and heads of industries attended the event.

Vigyan Vaibhav is jointly organised by DRDO, AeSI, and Kalam Institute of Youth Excellence to commemorate National Science Day in honour of legendary scientist Sir CV Raman and his ground-breaking contributions to science. The event brings together policymakers, scientists, industry leaders, academicians, and young innovators to discuss and showcase advancements that will shape the nation's future. As India advances towards *Viksit Bharat* by 2047, it serves as a reminder that the path to self-reliance is paved with scientific excellence, innovation, and collaboration.

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India tests anti-ship missile's features, datalink

Source: Jane's Dt. 28 Feb 2025,
URL: https://customer.janes.com/display/BSP_84916-JDW

In the latest round of trials of the domestically developed Naval Anti-Ship Missile-Short Range (NASM-SR), India's Defence Research & Development Organisation (DRDO) and the Indian Navy have tested the weapon's onboard datalink system and the 'human-in-the-loop' feature.

Using an Indian Navy Leonardo (AgustaWestland) Sea King Mk 42B helicopter, the trials assessed the ability of the missile to strike a ship target. The testing was conducted on 25 February at the DRDO's Integrated Test Range (ITR) in Chandipur in eastern India, according to the Indian Ministry of Defence (MoD).

The NASM-SR conducted its first test flight in May 2022. According to the ministry, the latest February trials assessed the effectiveness of the missile's 'human-in-the-loop' feature. During the trial, the missile scored "a direct hit on a small ship target" while "in sea-skimming mode at its maximum range", the MoD said.

According to the ministry, the missile was launched in 'bearing-only lock-on after launch' mode with several ship targets in close vicinity to each other. "The missile initially locked on to a large target within a specified zone of search and during the terminal phase," the ministry said, adding that the pilot then used the 'human-in-the-loop' feature to send more accurate targeting co-ordinates to the missile.

This allowed a "smaller, hidden target" to be hit, the MoD added.

An Indian Navy Sea King Mk 42B helicopter prepares to launch a Naval Anti-Ship Missile-Short Range during trials off the coast in eastern India on 25 February 2025. (DRDO) *(2066876)*

The NASM-SR is a helicopter-launched variant of the NASM family of missiles. Powered by a two-stage solid-propellent rocket motor, the sea-skimming missile has an average cruise speed of Mach 0.8. *Janes* has previously reported that the missile has a maximum range of 55 km.

“The mission also demonstrated the [NASM-SR's] high-bandwidth two-way datalink system, which is used to transmit the live images from the [missile] seeker back to the pilot for in-flight retargeting,” the MoD said.

According to the ministry, the missile is equipped with a domestically developed imaging infrared (IIR) seeker for terminal guidance. The missile has a fibre-optic gyroscope-based inertial navigation system (INS), and a radio altimeter for mid-course guidance. The missile is also equipped with an integrated avionics module, electromechanical actuators for aerodynamic and jet vane control, and thermal batteries, and is armed with a penetration cum blast (PCB) warhead, the ministry added.

With an overall length of 3.6 m and a diameter of 300 mm, the NASM-SR weighs about 380 kg. According to the MoD, the missile uses a solid-fuel powerplant with an in-line ejectable booster and a long-burn sustainer.

The ministry added that the latest trial had further “demonstrated” the missile's capability to hit naval targets while launched from a Sea King helicopter.

Analysis

The NASM-SR's ‘human-in-the-loop' feature enables pilots to issue commands to the missile in real time after launch. With this capability, in the ‘bearing-only lock-on after launch' mode, pilots can fire the missile on a roughly estimated bearing. The helicopter flight crew can subsequently guide the NASM-SR with more accurate bearings to the target in its terminal phase.

The NASM-SR is in advanced stages of development and testing, with recent successful flight trials highlighting its capabilities. However, an induction date has not yet been announced.

The latest test demonstrates the missile's in-flight retargeting, flexibility, and precision in dynamic combat scenarios, adding a layer of adaptability and precision to the existing arsenal. The NASM-SR will replace the legacy Sea Eagle missiles in the Indian Navy. The navy's Sea King Mk 42Bs are due to be replaced by Sikorsky MH-60Rs. This indicates that the NASM-SR will be integrated into the new helicopter in future.

In addition, a medium-range variant of the NASM is in development for fixed-wing platform applications.

Defence News

Defence Strategic: National/International

Raksha Rajya Mantri meets Commissioner for Defence & Space, European Commission in New Delhi

Source: Press Information Bureau, Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2093018

Raksha Rajya Mantri Shri Sanjay Seth held a meeting with the Commissioner for Defence and Space, European Commission Mr Andrius Kubilius in New Delhi on February 28, 2025. They comprehensively discussed the India-European Union bilateral defence and security cooperation with focus on maritime engagements & information sharing in the Indo-Pacific.

Shri Sanjay Seth and Mr Andrius Kubilius also explored ways & means to enhance defence industrial cooperation, particularly the participation of European defence companies in joint projects and co-production opportunities in India. They considered the modalities of Indian participation in the European Union's Permanent Structured Cooperation and other European developmental projects.

Mr Andrius Kubilius is visiting India as a part of the President European Commission-led delegation along with the College of Commissioners.

Dr Mayank Sharma takes charge as Controller General of Defence Accounts

Source: Press Information Bureau, Dt. 01March 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107296

Dr Mayank Sharma assumed the office of Controller General of Defence Accounts (CGDA) on March 01, 2025. He is a 1989-batch officer of the Indian Defence Accounts Service (IDAS) and has had a distinguished career in the government spanning more than three decades.

Dr Mayank Sharma has served in various capacities within the Government of India, including the Defence Accounts Department. He has also held key positions in the Cabinet Secretariat and represented India as the Alternate Permanent Representative at the United Nations Office on Drugs and Crime (UNODC), UN Commission on Crime Prevention and Criminal Justice, and the United Nations Commission on International Trade Law.

Additionally, the IDAS officer has represented India at the International Anti-Corruption Academy and the Diplomatic Academy of Vienna. As the Head of the Consular Division at the Indian Embassy in Vienna, he was responsible for all consular affairs and handled high-level Indian delegations at UNODC.

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IAF FOSTERING CIVILIAN MILITARY CO-OPERATION WITH PROJECT UDAN

Source: Press Information Bureau, Dt. 01 March 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107321

In a landmark move to strengthen regional connectivity the Civilian Aviation Ministry, launched its aircraft BOEING-737 flight from Kolkata- Hindon - Goa on 01 March 2025. The project was inaugurated by Hon'ble Civil Aviation Minister Mr Kinjarapu Rammohan Naidu at Hindon, showcasing exemplary civilian military coordination.

Hindon airport is located in Ghaziabad, Uttar Pradesh. Due to its strategic location dual use capabilities, military infrastructure and capacity to handle diverse air traffic, it is a crucial asset for the nation. Introduction of flights from Hindon will go a long way in decongesting air traffic in NCR.

This flight under UDAN (Ude Desh Ka Aam Naagrik) project is a testament to the Indian Air Force's commitment to supporting both military and civilian air operations, facilitating improved access to varied locations.

Beyond its core mission of safeguarding the nation's skies, the Indian Air Force actively contributes to nation-building by supporting initiatives like Project UDAN, aimed at enhancing regional air connectivity across India.

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CDS Gen Anil Chauhan embarks on an official visit to Australia

Source: Press Information Bureau, Dt. 03 March 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107630

Chief of Defence Staff (CDS) Gen Anil Chauhan will embark on an official visit to Australia from 04-07 March 2025, reflecting the deepening ties between India and Australia in the realm of defence cooperation. During his visit, he will engage in wide-ranging discussions with senior officials from the Australian Department of Defence and military leadership of Australian Defence Force, including Australia's Chief of Defence Force General Admiral David Johnston, their Secretary of Defence Mr Greg Moriarty and the Chiefs of the three Services.

CDS will visit the Force Command Headquarters to gain insights into Australia's operational command structure and discuss potential avenues for joint operations. General Chauhan will also interact with the Australian Fleet Commander and the Joint Operations Commander. In furtherance to India's commitment to professional military training and education, the CDS is set to visit prestigious Australian Defence College where he will address senior officers on strategic challenges in the Indo-Pacific region. The CDS will also chair a round table discussion at the Lowy Institute, Australia's premier think tank.

This visit underscores the growing engagement between the two nations which share a commitment towards strengthening diplomatic and military collaboration under Comprehensive Strategic Partnership and fosters greater cooperation in the Indo-Pacific region.

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Why Indian Navy chief thinks India won half the battle despite Chinese Navy's growing presence in Indian Ocean Region

Source: The Week, Dt. 01 March 2025,
URL: https://www.theweek.in/news/defence/2025/03/01/why-indian-navy-chief-thinks-india-won-half-the-battle-despite-chinese-navys-growing-presence-in-indian-ocean-region.html

Although China has been increasing its presence in the Indian Ocean Region over the past few decades with 6-8 naval ships of the People's Liberation Army Navy present there at any point of time, India is aware of what is happening. According to India Navy Chief Admiral Dinesh K. Tripathi, this is more than half the battle won.
Speaking at The Chanakya Dialogues conclave in New Delhi on the theme 'Bharat 2047: Aatmanirbhar in War', the Navy chief said India has not allowed China to come anywhere where "we don't want them to come".

"China has been increasing its presence in the Indian Ocean Region (IOR) for some decades now, not only in the oceans but even on land. And the PLA Navy, which is now the largest navy going by numbers, has been putting 6-8 very capable combatants at any point of time in the IOR, despite piracy having been obliterated. It is no longer there," Admiral Tripathi said.

"A lot of things are happening. The good part is that we as the Indian Navy are fully aware of what is happening, and who is doing what, where and why," he added.

Admiral Tripathi observed that India has the kind of maritime domain awareness where both manned and unmanned technologies are being used, along with space-based monitoring and international linkages with various agencies through which information is received. "And that is more than half the battle won because we know who goes where," he said.

Pointing out that China had been claiming that their ships were in the Indian Ocean Region for anti-piracy operations, Admiral Tripathi said, "Their initial ruse of coming to the Indian Ocean Region was that 'we are fighting the anti-piracy battle'. But all that is history. Apart from that, they have also been putting a large number of research vessels."

"Again, we know what they are doing. Satellite tracking vessels, deep-sea fishing vessels... All of us are aware that they are doing something which they should not be doing, such as unregulated, irregular fishing. But all that we cannot stop," the Navy chief said.

He added that India can only ensure China doesn't do anything in "our areas of interest".

"And that we have been doing very effectively. We have not allowed them to come anywhere where we don't want them to come."Admiral Tripathi said China has been supplying maritime

equipment and systems to Pakistan for over two decades now. "Since 2009, China has supplied Pakistan with three frigates, F-22s, Type 054....Four of them they supplied. They also supplied a satellite tracking ship, among others," the Navy chief said, adding that a recent deal between the two nations for eight submarines was a continuation of the process.

"We are certainly aware of the threat which the submarines can pose to our maritime security and trade...And we are devising means and measures,"he said.
"India is doing all that is required to ensure that no harm comes to us due to this maritime collusion between China and Pakistan," he added.

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Indian Air Force needs serious firepower! IAF chief highlights urgent need to produce 35-40 fighter jets every year

Source: The Week Dt. 01 March 2025,
URL: https://www.theweek.in/news/defence/2025/03/01/indian-air-force-lacks-firepower-iaf-chief-highlights-urgent-need-to-produce-35-40-fighter-jets-every-year.html

India needs to develop the capability to produce at least 35-40 fighter aircraft every year to meet the requirements of replacing ageing fleets, Air Chief Marshal AP Singh said even as he pitched for developing indigenous capabilities for defence manufacturing.

Speaking at the Chanakya Dialogues conclave in New Delhi on Friday on the theme of 'Bharat 2047: Atmanirbhar In War', the Indian Air Force chief clarified that it is not impossible to meet the target of producing 35-40 fighter jets a year.

Reiterating that the Indian Air Force prefers "homegrown" systems even if they offer "slightly lesser performance"," he said, "I am very convinced in my mind that even if a homegrown system gives me a slightly lesser performance... if it is 90 per cent or 85 per cent of what I get in the world market, we will go for homegrown system because that is the only way we can get over with always looking outward to get our systems."

He, however, observed that a homegrown system cannot just happen overnight and said there is a need to support the ecosystem to produce them. "So for that, the Indian Air Force is fully committed to any R&D project," the IAF chief said.

"So those capacities, I understand, cannot come up overnight. But we need to start pushing ourselves towards that. Now like the LCA Mk1A production, HAL has promised that from next year onwards, we will have 24 aircraft being made per year... plus some Sukhoi or some other aircraft... we are looking at numbers like 30 per year possible by HAL alone," he said.

"If some private industry comes in for a make in India, let us say, we add another maybe 12-18 aircraft per year from their side. So we are reaching that number. So that is possible," the IAF chief said.

Further, he stressed the importance of domestic defence equipment to fight long wars, saying, "We need to be able to take on this long protracted war, for which we need the capacity to be able to come up with a production rate that will be required for the weapons during war."

He pointed out that in case of a long war, India will have to rely on a mix of what is there in store and should have the confidence that the industry can produce the weapons required.

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Memoir in limbo over 'sensitive' revelations, Gen Naravane has a cantonment thriller up his sleeve

Source: The Print, Dt. 01 March 2025,
URL: https://theprint.in/defence/memoir-in-limbo-over-sensitive-revelations-gen-naravane-has-a-cantonment-thriller-up-his-sleeve/2520386/

AEven as his first book awaits clearance from the government, former Chief of Army Staff (COAS) General Manoj Mukund Naravane has come up with a second book, *The Cantonment Conspiracy: A Military Thriller. The book, set for release on 17 March, is a fictional story of two officers from the National Defence Academy (NDA).*

According to publisher Penguin's website, two young officers, Rohit and Renuka, face challenges at a quiet riverside garrison. A woman is assaulted at the officers' mess and Rohit is suspected. But when a witness due to depose in court is murdered, Rohit is absolved. Joined by a local village girl, Rohit and Renuka race to catch the killer before they strike again, revealing links to past events. The narrative delves into themes of duty, integrity, and the challenges faced by the armed forces, especially the Army.

In December 2023, a controversy erupted around General Naravane's upcoming memoir *Four Stars of Destiny*, which is facing delays due to the need for clearances. The book was supposed to be released in April 2024, however, it has yet to see the light of day.

As of now, the book is said to be undergoing reviews by the Ministry of Defence. While it is a standard procedure for books containing sensitive information from former high-ranking military officials, General Naravane's book courted controversy for having revealed discussions of 'sensitive issues' such as the Agnipath Scheme.

According to reports, the book also gives details of the matters related to the Chinese troop movements along the Line of Actual Control (LAC) in 2020 when the India-China border standoff occurred. General Naravane was the COAS at the time.

General Naravane's autobiography seeks to give readers a peek into the officer's life and military career, which spanned nearly four decades.

The book talks about the workings of the Indian Army and lessons on leadership and management with universal applicability through an insider's perspective. It also speaks about what needs to be done to make the forces a more potent instrument of national power, ready to meet the challenges of the 21st century, according to the publisher.

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Persian Gulf to South China Sea, mapping India's maritime diplomacy through naval deployments

Source: The Print, Dt. 01 March 2025,
URL: https://theprint.in/defence/persian-gulf-to-south-china-sea-mapping-indias-maritime-diplomacy-through-naval-deployments/2518313/

The Indian Navy carried out at least 221 deployments across the Indo-Pacific in 2023-2024 till November 2024, displaying more than 60 warships and its aircraft—Dorniers and P8Is.

The aim was to demonstrate the Navy's operational versatility and fleet readiness for safeguarding India's interests, contributing to regional stability, and fostering international maritime cooperation.

Submarines were among the 60 warships used for various types of deployments, such as port visits, operational deployments, and joint exercises. At least nine warships were destroyers, eight frigates, ten corvettes and six submarines. Smaller naval ships included patrol vessels, fleet tankers, landing craft utility ships, research survey vessels, and training ships.

The Navy's eastern and western fleets deployed the ships in their respective areas of operations. The countries that the two fleets covered were Australia, Bahrain, Bangladesh, Egypt, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Oman, Saudi Arabia, Seychelles, Singapore, Sri Lanka, Tanzania, and UAE.

The Navy's western fleet is responsible for deployments in regions such as the Persian Gulf, Arabian Sea, Red Sea, and Western Indian Ocean. In contrast, the eastern command takes care of regions such as the Bay of Bengal, Indo-Pacific, South China Sea, and Pacific Islands.

The purpose of the deployments varied. Some ship visits were only for conducting exercises, whereas others were for Operational Turnaround, including replenishing supplies and essential maintenance at friendly ports. Still, others were region-specific, need-based deployments of submarines, region-specific patrols, return passages and operational deployments, including fleet-specific ones, and for Exclusive Economic Zone surveillance and operations.

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Zen Tech gets patent for autonomous target detection and engagement system

Source: The Buisness Line, Dt. 28 Feb 2025,
URL: https://www.thehindubusinessline.com/companies/zen-tech-gets-patent-for-autonomous-target-detection-and-engagement-system/article69274394.ece

Zen Technologies Limited has secured a patent grant for its automated hard kill firearm mounting system. The system enhances defence capabilities through autonomous target detection and engagement, which reduces response time significantly and improves operational efficiency in combat scenarios.

The Hard Kill Firearm Mounting System is patented up to October 15, 2042, under the Indian Patents Act.

This latest grant marks Zen Technologies' third patent in the calendar year 2025 and the 13th in FY 2024-25. The system is an advanced defence platform integrating AI-powered target acquisition, automated firing and real-time threat response capabilities.

The system can be integrated into anti-drone systems and Battlefield Surveillance Radars (BFSRs), providing speedy and accurate target acquisition by electronic means.

"Designed for border security, counter-drone operations and automated perimeter defence, the system is tailored for both military and law enforcement agencies, ensuring enhanced security and rapid threat neutralisation," the Hyderabad-based company informed the Bombay Stock Exchange on Friday.

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Science & Technology News

CSIR -Indian Institute of Petroleum celebrates National Science Day

Source: Press Information Bureau, Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107070

National Science Day is celebrated in India every year on 28thFebruary to celebrate discovery of the Raman effect by Sir C.V. Raman. The day also commemorates contributions of scientists towards the development of the nation. This year, the theme of National Science Day is "Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat."

On this occasion, the AcSIR Science Club of CSIR-IIP organized an event “AAGAZ 3.0”. The event was graced by Shri Gopal Joshi, ED & Head, KDMIPE, ONGC as Chief Guest and Dr. Bharat Newalkar, Chief General Manager (R&D), BPCL as Guest of Honour. The inaugural programme was initiated by lamp lighting followed by Saraswati Vandana. Ms.Ekta, Student Coordinator-Science Club gave an overview of the activities of the AcSIR Science Club of CSIR-IIP. Dr. Sanat Kumar, Chairman, Organizing Committee of AAGAZ 3.0 welcomed all on this occasion and informed about the importance and significance of National Science Day.

Dr.Harender Singh Bisht, Director CSIR-IIP, informed the august gathering that this year's theme focuses on encouraging young minds, recognizing ground-breaking contributions, and celebrating India's scientific achievements towards the Viksit Bharat. He mentioned that this required a different thinking way beyond laboratory-bound scientific research if we have to go and serve society and deliver a sustainable solution for the planet.

Dr. Bharat Newalkar, Chief General Manager (R&D), BPCL, the Guest of Honour of the event, mentioned societal challenges like health issues, climatic change, clean and efficient energy, security, etc., and the role of every citizen to take the societal challenges as we all are eligible, capable, responsible. He also mentioned that Womenshould be given more opportunities to participate in research and innovations.

Shri Gopal Joshi, Chief Guest of the event addressed audience and emphasized need of three qualities in our scientific endeavours: persistence, deep observation and revalidation. He gave the example of WD-40, anti-dust spray, which was successfully launched after 40 attempts. He also discussed the oil and gas exploration and well drilling in the Himalayas, West Bengal, and across India which requires a lot of persistence and adaptability. While discussing current energy scenario, he remarked that Petroleum is going to stay for a long and stressed the importance of buddingyoung scientists in solving nation`s problem and leading towards Viksit Bharat.

On this day the doctorate students showed immense enthusiasm in the celebration. More than 200 students participated in different events like Rangoli on Visksit Bharat theme, photography based on natural beauty of Uttarakhand, graphical abstract competition based on lab safety theme, etc.

Later in the day, the Oil Marketing Companies (OMC) organized the valedictory function of the 15-day SAKSHAM programme in the CSIR-IIP auditorium. SAKSHAM programme, initiated by Ministry of Petroleum and Natural Gas is aimed at creating awareness among masses for conserving petroleum resource. On this occasion, Hemant Rathore, ED, IOCL, stressed upon the need for circular economy, Dr H S Bisht, Director , CSIR-IIP expressed that the requirement of fossil fuel is bound to increase in coming years and there is a dire need to improve energy efficiency while simultaneously focusing on renewable energy. The chief guest of Valedictory session Mr Amit Kumar Sinha, IPS and ADG (UK police) stressed upon the importance of the general masses in driving energy conservation efforts. The Chief Guest also administered an energy conservation pledge on this occasion. This was followed by a Nukkad Natak depicting the need to save energy and prize distribution to the Winners of the Energy Conservation Quiz conducted at CSIR-IIP by SAKSHAM team.

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"India's Science Budget witnessed quantum leap under visionary leadership of Prime Minister Narendra Modi: Testimony of his patronage to innovation and Science" says Dr. Jitendra Singh

Union Minister Dr. Jitendra Singh recalls Prime Minister Modi's clarion call in Man Ki Baat to celebrate this year's National Science Day with festive fervour

S&T Minister Dr. Jitendra Singh, launches Electric Vehicle Solutions led by Startups Under the DST's new initiative

India embarked on a bold and transformative journey to establish itself as a global hub for research, innovation, and scientific excellence to become Viksit Bharat@2047

India's 5352 Scientists feature in Top 2 percent of Scientific Minds according to a survey shares Dr. Singh

Source: Press Information Bureau, Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107056

Union Minister Dr. Jitendra Singh states the quantum budgetary increase to science departments highlighting the Government's commitment to the progress of Science Technology and innovation. He calls it the patronage of Prime Minister Narendra Modi to innovation and Science during his speech at the National Science Day 2025 celebrations at Vigyan Bhavan, New Delhi.

Dr. Jitendra Singh stated that the budget allocations for various departments have seen significant growth over the years. The Department of Science and Technology (DST) received an allocation of ₹2777 crore in 2013-14, which has surged to ₹28,509 crore in 2024-25, marking a 926% increase. Similarly, the Department of Science and Industrial Research (DSIR) saw its budget rise from ₹2013 crore in 2013-14 to ₹6658 crore in 2024-25, reflecting a 230% increase. The Department of Space (DOS) experienced a budget growth from ₹5615 crore in 2013-14 to ₹13,416 crore in 2024-25, resulting in a 139% increase.

Addressing the celebration, Dr. Jitendra Singh recalls Prime Minister Modi's clarion call in Man Ki Baat to celebrate this year's National Science Day with festive fervor.

The National Science Day is celebrated on February 28th each year in India to honor the discovery of the Raman Effect by Indian physicist C.V. Raman in 1928. This discovery was a groundbreaking achievement in the field of light scattering, for which C.V. Raman was awarded the Nobel Prize in Physics in 1930.

During the programme, The Science and Technology Minister, Dr. Jitendra Singh, launched the DST's new initiative for **Electric Vehicle Solutions**, which is led by startups for component manufacturing in collaboration with the Ministry of Heavy Industries and ACMA.

Dr. Jitendra Singh, Union Minister of State (Independent Charge) for Science & Technology, Earth Sciences, PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space said "India embarked on a bold and transformative journey to establish India as a global hub for research, innovation, and scientific excellence to become Viksitbharat@2047".

Reflecting on the past decade of India's scientific journey, the minster emphasized that India has transformed into the third-largest startup ecosystem globally, with a growing base of innovative, youth-led deep-tech startups. These startups are not only addressing domestic challenges but are also creating solutions for global issues such as communication, cybersecurity, data privacy, sustainable energy, healthcare advancements, and smart manufacturing.

Dr. Singh shared that according to the survey with a cutoff date of 31st December has found that 5352 Indian Scientific Minds feature in Top 2 percent. Referring to India's progress in the Global Innovation Index, Dr. Singh said, "In just ten years, India has ascended from 80th to 39th position, cementing its place among the world's most innovative nations."

Dr. Singh touched upon India's groundbreaking scientific breakthroughs that have been a source of national pride, most notably the successful landing of Chandrayaan-3 on the moon's south pole—making India the first country to achieve this extraordinary feat. He also highlighted the successful launch of ISRO's SPADEX mission on December 30, 2024, a pioneering project in spacecraft rendezvous, docking, and undocking.

Dr. Singh underscored that India is poised to make its mark in the global quantum technology landscape, with a focus on quantum computing, quantum communication, and quantum cryptography. Indian youth-led startups in deep-tech are at the forefront, developing solutions for global challenges.

Emphasizing on this year's theme i.e. **"Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat,"** was emphasized by Dr. Singh as a reflection of India's growing investment in its young scientists. He also dedicated the National Science Day to the youth of the country and seeks to enable the youth to undergo capacity building and prepare them to be the architects of 2047.

In his presence, nine new institutes were included in **NIDHI- iTBIs Inclusive Technology Business Incubators** with 50 Institutes already present

1. National Engineering College, Kovilpatti, Tamil Nadu
2. GITAM, Visakhapatnam, Andhra Pradesh
3. Indian Institute of Management, Jammu, J&K
4. Sri Sri University, Cuttack, Odisha
5. Sanskriti University, Mathura, UP

6. AIIMS, Patna, Bihar
7. Sona College of Technology, Salem, Tamil Nadu
8. Assam Down Town University, Assam
9. Sangam University, Bhilwara, Rajasthan

An MoU was exchanged between **IIT Kanpur** and **HAB Biomass Pvt. Ltd.** on a **Green Corrosion Inhibitor from Manure** developed by the SHRI Cell of DST. The celebration also witnessed a **technology transfer** between **CSIR-NBRI** and **Ankur Seeds**, Nagpur. Dr. Singh also released the **Compendium of Selected Projects of the 31st NCSTC**.

Today 9 more Universities under PURSE were supported on diverse scientific themes and different geographical regions with Rs 75 Cr

1. Central University of South Bihar
2. Central University of Tamil Nadu
3. Guru Ghasidas Vishwavidyalaya, Chattisgarh
4. Hemvati Nandan Bahuguna Garhwal University, Uttarakhand;
5. Maharshi Dayanand University Rohtak, Haryana
6. Punjab Engineering College, Chandigarh
7. Rashtrasant Tukadoji Maharaj Nagpur University; Maharashtra
8. Tezpur University; Assam
9. Veer Bahadur Singh Purvanchal University, Uttar Pradesh

In another landmark initiative, Dr. Singh shared that ₹1,000 crore venture capital fund exclusively for the space sector. Approved by the Cabinet, this fund aims to foster India's growing base of nearly 300 space startups, positioning India as a leader in the space industry.

The government has also allocated Rs 2,000 crore for Mission Mausam, a national program focused on enhancing weather forecasting capabilities. Additionally, the launch of the Anusandhan National Research Fund (NRF) with a corpus of ₹50,000 crore marks a giant leap toward ensuring that India's scientific advancements are driven by research excellence and innovation.

Dr. Singh reiterated the government's commitment to fulfilling the vision of 'Atmanirbhar Bharat' by developing indigenous technologies tailored to India's unique needs. The Ministry of Science and Technology is working relentlessly to ensure that innovations move from the lab to land, benefiting local communities while positioning India as a global leader in science and technology.

Dr. Jitendra Singh emphasized the importance of collaboration between various departments of science and the private sector. The government's efforts are focused on creating an enabling environment for scientific innovation, ensuring that research and development align with the needs of both the public and private sectors.

The celebration was graced by Prof. A.K. Sood, Principal Scientific Advisor to the Government of India; Dr. N. Kalaiselvi, DG-CSIR and Secretary of DSIR; Prof. Ashutosh Sharma, President of INSA; Prof. Abhay Karandikar, Secretary of DST; Dr. Rajesh S. Gokhale, Secretary of DBT; Sh. V. Narayanan, Chairman, ISRO and Secretary, Department of Space; along with Dr. Rashmi Sharma, Head, NCSTC. Senior Officials of State S&T Councils, School & College students from 22 States across India joined the Science Day celebrations in Online mode.

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Union Minister Dr. Jitendra Singh hosted a high-level European Union delegation led by Commissioner Andrius Kubilius and Space Sector experts

India – EU interactions in the field of space has a long history and is growing strong, says MoS, Dept. Of Space

Dr. Singh hails India's achievements in Space as a global benchmark, acknowledging its growth in space sector

India would be a major player in 21st century's Space exploration announces S&T minister

Dr. Jitendra Singh credits Prime Minister Modi for the Space Vision 2047 which aligns with the objectives of Viksit Bharat@2047

ISRO to host the Global Conference on Space Exploration (GLEX) in association with the International Astronautical Federation in May 2025 in NewDelhi informs Dr. Singh

Source: Press Information Bureau Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107054

Union Minister Dr. Jitendra Singh hosted a high-level European Union delegation led by Commissioner Andrius Kubilius, along with space sector experts, in New Delhi today. The delegation engaged in discussions regarding ongoing and future cooperation between India and Europe in the field of space exploration. On the Indian side, Shri V. Narayanan, Chairman of ISRO

and Secretary of the Department of Space, along with other senior space scientists, attended the meeting.

Addressing the EU delegation, Union Minister of State (Independent Charge) for Science and Technology; Earth Sciences and Minister of State for PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr. Jitendra Singh said “India – EU interactions in the field of space has a long history and is growing strong”. Tracing India’s space journey, which spans over six decade she hailed India’s achievements in Space as global benchmark, acknowledging its growth in space sector in the last decade.

"India has acquired independent capabilities in building, launching, and operating satellites, as well as deriving applications from these satellites to benefit society," said Dr. Singh. He further emphasized recent successes, such as the Chandrayaan-3 mission, the SPADEX mission, and the ongoing progress of the Gaganyaan mission. Dr. Singh announced that India would be a major player in 21st century’s Space exploration.

Highlighting India’s dynamic space vision under the leadership of Prime Minister Narendra Modi, which is aligned with the broader goal of making India a Viksit Bharat@2047. Dr. Singh credited Prime Minister Modi’s leadership for laying the foundation of India's ambitious space agenda, which includes the continuation of the Gaganyaan program, India’s human spaceflight mission, the establishment of India’s space station – "Bharatiya Antariksh Station," and an Indian landing on the Moon.

Highlighting the long-standing cooperation between India and Europe in space exploration, Dr. Singh stated that the collaboration has been vast and enriching. The Indian Space Research Organisation (ISRO) collaborates with the European Space Agency (ESA), space agencies of individual European nations, and entities like EUMETSAT. European industries have also contributed to India’s space program, with notable examples of support, including the development of liquid engines, the launch of India’s first experimental communication satellite, and ESA’s assistance in the Aditya and Chandrayaan-3 missions.

Dr. Singh also drew attention to the rapid expansion of India’s space program, noting that from the late 2000s, India’s space missions have included studies of the Moon, Mars, and the Sun, with plans for human spaceflight missions.

Dr. Jitendra Singh informed the delegation that, earlier, the Indian Space Research Organisation (ISRO) was the sole entity responsible for space activities. However, under the leadership of Prime Minister Narendra Modi, space sector reforms were introduced in 2020 to open the sector for private investment. A new entity, the Indian National Space Promotion and Authorization Center (IN-SPACe), was established to promote and authorize space activities by non-governmental entities.

The Science and Technology Minister also highlighted the burgeoning startup revolution in India's space sector. With more than 200 startups engaging in rocket building, satellite manufacturing, ground segment operations, and application development, the sector is rapidly growing. Many of these startups have also established a presence in Europe, marking a new chapter in global space collaboration.

Reflecting on future missions, Dr. Singh emphasized that India's expanded space program, which includes human spaceflight, space stations, and advancements in rocket technologies, alongside the emerging private space industry, offers a strong foundation for deepening India-Europe space relations.

Dr. Jitendra Singh informed the delegation that ISRO will be hosting the Global Conference on Space Exploration (GLEX) in association with the International Astronautical Federation in May 2025 in New Delhi. He extended a warm invitation to all stakeholders in the European space ecosystem to participate in this landmark event.

Along with Commissioner Andrius KUBILIUS; Mr. Benjamin HARTMANN, Cabinet Expert;Capt (N) Mr. Fabrizio FALZI, EU Defence Attache were part of the delegation.

The high-level meet also witnessed participation of Dr. Rajiv Jyoti, Director, IN-SPACe; Mr. M. Ganesh Pillai, Scientific Secretary, ISRO; Dr. D. Gowrisankar, Director, Office of International and Inter-agency Cooperation (OIIC), ISRO HQ; Mr. Prashant Jha, OSD, MOS Office; Mr. M. S. Anurup, Director, Space Transportation Programme Office, ISRO HQ.; Dr. Rajeev Jaiswal, OSD, DOS and Ms. Seema Pujani, Deputy Secretary, D&ISA, MEA

Concluding the discussions, Dr. Jitendra Singh expressed his delight at hosting the EU delegation and acknowledged the significant interest shown by Commissioner Andrius Kubilius in strengthening space cooperation. He emphasized that space is the future, and the collaboration between India and Europe will continue to drive progress and innovation in this critical field.

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"TDB-DST supports M/s APChemi Pvt. Ltd., Navi Mumbai to Advance Plastic Circularity with Indigenous Pyrolysis Oil Purification Technology"

Source: Press Information Bureau Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107018

The Technology Development Board (TDB) has signed an agreement with M/s APChemi Pvt. Ltd., Navi Mumbai, for their project titled "Production and Commercialization of Purified Pyrolysis Oil to Enable Downstream Production of Circular Plastics and Sustainable Chemicals." Under this

agreement, TDB has sanctioned financial assistance, reaffirming its commitment to fostering indigenous technological advancements in sustainability.

APChemi, a pioneer in plastic and biomass pyrolysis with 12 patents (including five granted), has developed a transformative technology that converts non-recyclable, end-of-life plastic waste into high-value, refinery-grade pyrolysis oil. Their patented PUREMAX™ technology offers an innovative and cost-effective method for purifying pyrolysis oil, making it suitable for producing PUROIL™, a feedstock validated by leading global petrochemical and FMCG companies for food-grade circular plastics.

With the global plastic waste crisis escalating—where less than 10% of the 350 million metric tonnes generated annually is effectively recycled—this project is poised to accelerate plastic circularity by processing 1.2 to 6 kilotonnes of waste per year. Additionally, it is expected to generate approximately 100 jobs while significantly curbing plastic pollution and lowering carbon emissions associated with incineration and landfilling.

One of the key strengths of this technology lies in its capability to process complex multi-layer packaging waste containing PET and PVC, with an impurity removal efficiency of up to 99.7% for chlorine. This breakthrough has already garnered interest from eight global corporations, including Shell, BASF, Unilever, and PepsiCo, which have issued Letters of Intent for integrating PUROIL™ into their supply chains to advance circularity in plastics.

Sh. Rajesh Kumar Pathak, Secretary, TDB**,** emphasized the project's alignment with national priorities, stating, *"*APChemi's innovative approach exemplifies the kind of indigenous solutions that TDB is dedicated to supporting—technologies that not only address pressing environmental challenges but also strengthen domestic capabilities and create economic opportunities. This initiative will significantly contribute to establishing a sustainable and self-reliant circular economy for plastics in India, reducing reliance on imported crude oil and fostering employment generation."

Mr. Suhas Dixit, CEO, APChemi, highlighted the significance of this initiative, stating, "The partnership with TDB marks a significant milestone in our mission to turn the plastic waste crisis into an economic opportunity while restoring environmental balance. Our technology bridges a crucial gap in plastic circularity by eliminating corrosives and catalyst poisons from pyrolysis oil, enabling the production of high-value circular plastics from waste that would otherwise contribute to pollution."

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Modi Govt. promoting and acknowledging Grassroots Innovators for the First Time in India: Union Minister Dr. Jitendra Singh

Unsung Heroes Get Their Due Recognition as Padma Awards Become the 'People's Padma' Under PM Modi's Vision

Emphasized Prime Minister Modi's commitment to 'Virasat Bhi aur Vikas Bhi,'

integrating India's exclusive traditional knowledge with cutting-edge technology.

Stressed that innovations originating in remote villages will be scaled up, ensuring equal opportunities and resources as available in urban areas.

Breaking Barriers: Private Participation highlights Dr. Singh

Source: Press Information Bureau Dt. 28 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107585

The Modi government is promoting and acknowledging grassroots innovators for the first time in India, said Union Minister Dr. Jitendra Singh.

Addressing the Silver Jubilee celebration of the National Innovation Foundation (NIF) an autonomous institute under Department of Science and Technology, Government of India. of India via virtual mode, Dr. Jitendra Singh emphasized Prime Minister Modi's commitment to 'Virasat Bhi aur Vikas Bhi,' integrating India's exclusive traditional knowledge with cutting-edge technology. Dr. Jitendra Singh also released a postal stamp, followed by a Magazine titled 'Innovation frontline' and a coffee table book.

Highlighting the critical role of rural innovation in India's economy, Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, Minister of State in the Prime Minister's Office, Department of Atomic Energy, Department of Space, and Personnel, Public Grievances, and Pensions, Dr. Jitendra Singh stressed that innovations originating in remote villages will be scaled up, ensuring equal opportunities and resources as available in urban areas.

He applauded India's transformation from the 'Fragile Five' to the 'First Five' and its soon-to-be fourth place in the global economy. He called for a scientific approach to harnessing underexplored sectors, including those in the rural areas, that were neglected under previous regimes.

Dr. Jitendra Singh also recalled PM Modi's clarion call to celebrate National Science Day with a festive fervour, as mentioned in last week's 'Mann Ki Baat' program. He described it as unprecedented for a Prime Minister to extend such patronage to science and technology.

Expressing his delight after speaking to the Padma Awardees who fostered innovation, Dr. Jitendra Singh questioned the long delay in recognizing these unsung heroes, many of whom began their work as early as the 1990s. He credited PM Modi for transforming the Padma Awards into 'People's Padma' in the truest sense.

The Minister highlighted the Micro Venture Innovation Fund (MVIF)—a pioneering initiative by NIF with SIDBI that has provided necessary risk capital to 238 innovation-based enterprise projects. Calling it a novel initiative, he debunked the myth that only elite scientists with fancy degrees can drive innovation and startups. He cited the success of the Lavender Revolution, backed by CSIR-IIIM Jammu, and the Floriculture Revolution, driven by CSIR-IHBT Palampur.

'India's Techade' Vision: Affordable and Globally Appealing Technology, Dr. Singh reiterated that India's technology is inherently affordable and cost-effective, making it globally appealing. Celebrating NIF's 25-year journey, he announced that 713 patents have been granted in India and 5 in the USA, underscoring NIF's role in fostering grassroots innovations. He also highlighted that

NIF was one of the early institutions in India to host a Technology Business Incubator (TBI), now known as NIF Incubation and Entrepreneurship Council (NIFientreC). Over 25 grassroots startups and several hundred enterprises, some with ₹10+ crore annual turnover, are thriving under its support, creating rural employment opportunities.

The S&T Minister emphasized that under PM Modi's visionary leadership, India has unlocked the space sector for private participation. He also noted that, for the first time, the nuclear energy sector has been opened to private players, as announced in the recent budget.

Building Viksit Bharat @ 2047 Dr. Singh called upon all innovators to contribute towards making India a 'Viksit Bharat' by 2047. Concluding his address, he described NIF's 25-year journey as a testament to inclusivity, shaping India's innovation landscape by successfully identifying, supporting, and disseminating grassroots innovations—reaching even the most remote border villages.

"With science and technology thriving under PM Modi's leadership, these are indeed the best times for innovation and research in India" concludes Minister Dr. Singh.

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Blue Ghost makes a soft landing on Moon: 5 facts about 'Ghost Riders in the Sky'

Source: Hindustan Times Dt. 02 March 2025,

URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107018

Firefly Aerospace's Blue Ghost lander successfully touched down near Mons Latreille, a volcanic feature within Mare Crisium, a large basin in the Moon's northeastern quadrant, on Sunday.

As part of NASA's Commercial Lunar Payload Services (CLPS) initiative, Blue Ghost Mission 1 delivered 10 scientific and technological instruments to the lunar surface.

With NASA's backing and support from the Artemis program, private companies are taking on a bigger role in lunar exploration, aiming to develop a sustainable lunar market.

Firefly became the second private company to achieve a soft Moon landing, following Houston-based Intuitive Machines, whose Odysseus lander made an uneven but successful touchdown last year. Previously, only five nations—the Soviet Union, the U.S., China, India, and Japan—had accomplished soft lunar landings.

Mare Crisium, once an ancient asteroid impact site, formed around 3 billion years ago when volcanic eruptions filled the basin with basaltic lava. Firefly's payloads gathered crucial data on the Moon's regolith, geophysical properties, and interactions between solar wind and Earth's magnetic field.

5 facts about 'Ghost Riders in the Sky'

1. **Journey and landing:** Launched on January 15, Blue Ghost spent around 45 days travelling to the Moon, conducting system health checks and initiating scientific operations. It successfully landed in Mare Crisium on Sunday and will operate its payloads for a full lunar day (14 Earth days).
2. **Eclipse and lunar sunset observations:** On March 14, Firefly will capture high-definition images of a total eclipse, where Earth blocked sunlight from reaching the Moon. On March

16, Blue Ghost will record the lunar sunset, gathering data on how solar activity causes lunar dust to levitate, a phenomenon first observed by Apollo 17 astronaut Eugene Cernan.

3. **Scientific contributions:** Blue Ghost's payloads will contribute to lunar research through groundbreaking experiments, including testing regolith collection, Global Navigation Satellite System capabilities, radiation-resistant computing, and lunar dust mitigation. These studies aimed to support future lunar missions and provide insights into space weather's effects on Earth.
4. **Design and stability:** Standing 2 metres tall and 3.5 meters wide, Blue Ghost was engineered for stability with shock-absorbing feet, a low centre of mass, and a broad footprint. It incorporated flight-proven technologies from Firefly's launch and orbital vehicles, ensuring cost efficiency and reliability.
5. **Final descent and landing:** In its last hour of descent, Blue Ghost used vision-based terrain navigation and hazard avoidance to assess its position, identifying craters, slopes, and rocks before selecting a safe landing spot. Its Reaction Control System (RCS) thrusters fired as needed, ensuring a controlled and smooth landing.

What instruments will NASA's Lunar Trailblazer use to search for water on Moon?

Source: Hindustan Times Dt. 28 Feb 2025,

URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2107018

NASA launched the Lunar Trailblazer spacecraft on Wednesday aboard a SpaceX Falcon 9 rocket, sending it on a mission to explore the Moon's south pole. The spacecraft aims to determine the presence of different forms of water on the lunar surface.

In this undated image released by NASA, Intuitive Machines' newest lunar lander is seen attached to a SpaceX Falcon rocket.

As part of the mission, Intuitive Machines' lunar lander is set to land on March 6 at Mons Mouton, a plateau near the Moon's south pole.

The lander carries scientific instruments under NASA's CLPS (Commercial Lunar Payload Services) initiative and the Artemis campaign. The IM-2 mission will collect critical data about the Moon, supporting future astronaut exploration and advancing space exploration for humanity's benefit, according to NASA.

What is the aim?

- NASA's CLPS missions will conduct one of the first on-site demonstrations of resource utilisation on the Moon by measuring the potential presence of volatiles or gases in lunar soil.
- A passive Laser Retroreflector Array mounted on the lander's top deck will reflect laser light, providing future orbiting or incoming spacecraft with a permanent reference point on the lunar surface.
- The mission will also test a surface communications system and deploy a propulsive drone capable of hopping across the lunar surface for exploration.
- NASA's Lunar Trailblazer spacecraft, launched with the IM-2 mission, will enter lunar orbit to map the distribution of water in various forms and track how it changes over time.
- The mission aligns with NASA's Artemis campaign, aiming to study planetary processes, search for lunar water and resources, and support long-term human exploration on the Moon.

Key instruments aboard the IM-2 mission

Polar Resources Ice Mining Experiment-1 (PRIME-1): This experiment aims to explore the Moon's subsurface and identify potential resources. It consists of two key instruments: the Regolith and Ice Drill for Exploring New Terrains (TRIDENT), which drills into the lunar surface to collect soil samples, and the Mass Spectrometer Observing Lunar Operations (MSolo), which analyses the samples to detect volatile compounds that turn into gas. The data collected will help scientists understand the Moon's surface composition and guide future resource utilisation.

Laser Retroreflector Array (LRA): This instrument includes a set of eight retroreflectors designed to enable precision laser ranging, which measures the distance between the spacecraft and the lander. The LRA is a passive optical device that will serve as a permanent location marker on the Moon, aiding future missions in navigation and scientific studies for decades.

Micro Nova Hopper: Developed under NASA's Space Technology Mission Directorate Tipping Point initiative, this autonomous drone, Grace, is designed for high-resolution surveying of the lunar surface. It will hop into a nearby crater to collect scientific data and send it back to the lander. The hopper is expected to explore permanently shadowed regions, offering new insights into areas that could hold key information for sustaining human presence on the Moon.

Nokia Lunar Surface Communications System (LSCS): This advanced 4G/LTE communication system, developed with NASA funding, will facilitate connectivity between the Intuitive Machines lander, a Lunar Outpost rover, and the Micro Nova hopper. The LSCS is engineered to transmit high-definition video, command messages, and telemetry data. It aims to demonstrate a compact, efficient communication network that could support future lunar missions and space infrastructure.

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Isro to resume SpaDeX mission from March 15: All you need to know

Source: India Today Dt. 03 March 2025,
URL: https://www.indiatoday.in/science/story/isro-to-resume-spadex-mission-from-march-15-all-you-need-to-know-2688080-2025-03-03

The Indian Space Research Organisation (Isro) is set to resume experiments on its SpaDeX mission in mid-March.

The SpaDeX mission involved two satellites: SDX01 (Chaser) and SDX02 (Target), each weighing approximately 220 kg as they navigated their way in the coldness of space, aligning together for the docking.

This mission, launched on December 30, aims to develop and refine docking technologies crucial for future projects like Chandrayaan-4 and the Bharat Antariksha Station.

Isro successfully docked the satellites on January 16 after multiple attempts. The unified satellite is currently in an elliptical orbit, providing a 10 to 15-day window every two months for conducting experiments.

WHAT'S NEXT FOR SPADEX?

The Indian space agency will now focus on the separation and re-docking of two satellites, SDX01 and SDX02.

Isro will first perform the undocking manoeuvre, separating the two satellites from each other above the planet. Undocking will be crucial for the operations of the Indian space station proposed to begin assembly by 2035 in Low Earth Orbit (LEO).

Isro Chairman V Narayanan confirmed that the next experimental window begins on March 15, during which the organisation will attempt to separate and re-dock the satellites.

Prior to the mission's launch, Isro planned to demonstrate electrical power transfer between the satellites before undocking and separation.

With ample propellant onboard, Isro intends to conduct multiple experiments, including those scheduled for a third operational window that will be available after two months.

The SpaDeX mission is a precursor to several ambitious Isro projects, emphasising the importance of mastering docking technologies.

The docking experiment also opens the path for the Chandrayaan-4 mission, which will be conducted in multiple launches with a significant technical challenge being docking above the Moon to return rocks and soil samples from the lunar surface.

Isro is currently conducting simulation experiments to prepare for the separation and re-docking processes, with actual experiments commencing on March 15.

This mission marks a significant step towards enhancing India's capabilities in space exploration and technology development.

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Solar flare 'kernel' captured by ISRO's Aditya-L1 spacecraft

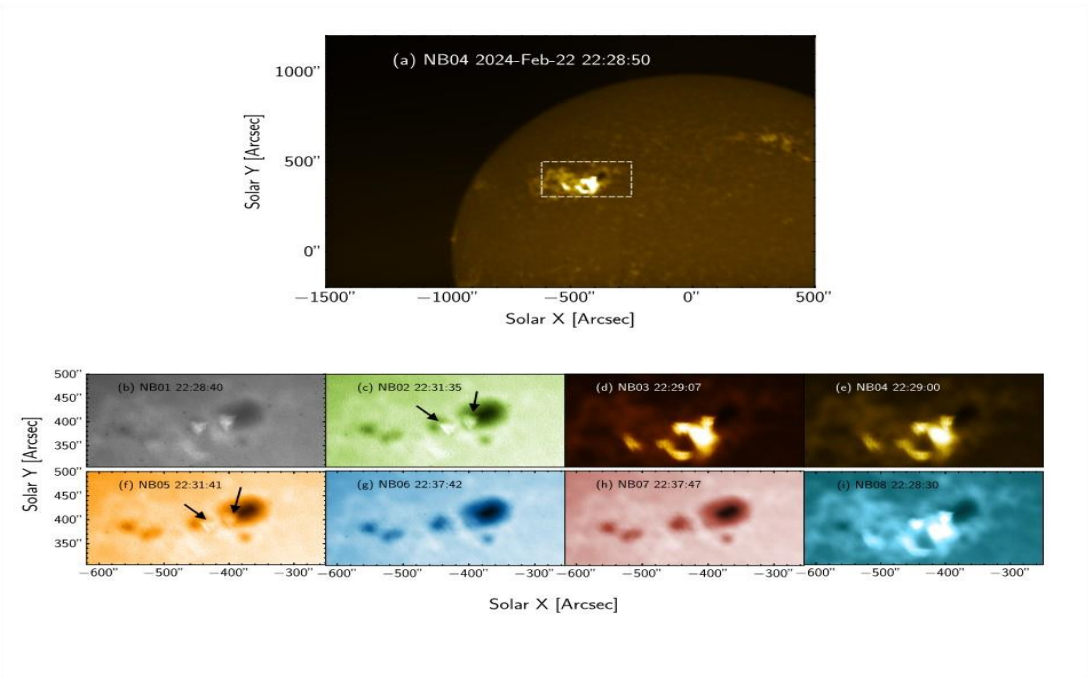
Source: News Nine Dt. 01 March 2025,

URL: https://www.news9live.com/science/solar-flare-kernel-captured-by-isros-aditya-l1-spacecraft-2829399

The Solar Ultraviolet Imaging Telescope (SUIT) instrument on board ISRO's Aditya-L1 spacecraft has captured the initial moments of a solar flare in unprecedented detail. An X6.3-class solar flare that occurred on 22 February, 2024, and was imaged in the near ultraviolet wavelength range. The solar disc has not previously been imaged in such detail in these wavelengths, providing valuable insights into the ongoing processes on the photosphere and chromosphere, the 'surface' and lower atmosphere of the Sun. The observations provide valuable insights into the process by which heat is injected into the corona or outer atmosphere of the Sun, which can paradoxically be millions of degrees hotter than the lower atmosphere.

Tangled magnetic fields trap the plasma on the solar surface, that can be suddenly released in the form of solar flares. The wave of charged particles sweeps across the solar system, and can cause geomagnetic storms on encountering the Earth. The atmosphere of the Earth absorbs the ultraviolet radiation from the Sun, so only a space telescope such as Aditya L1 can peer into the Sun in the UV wavelengths. The increase in luminosity detected by the instrument corresponds to a rise in temperature in the corona, demonstrating a link between energy deposition by a solar flare and the heating of the plasma in the upper atmosphere. A paper describing the findings has been published in *The Astrophysical Journal Letters*.

Observations of the flare by SUIT. (Image Credit: ISRO).



The Aditya L1 Spacecraft

ISRO's Aditya L1 mission was launched by the ISRO PSLV-C57 flight from Sriharikota in September 2023. The spacecraft is at a distance of 1.5 million kilometres from the Earth, in a halo orbit around the first Lagrange point (L1) in the Sun-Earth system. This is a point in space between

the Earth and the Sun, where the gravitational influences of the two objects balance each other out, allowing a spacecraft to remain in position with minimal expenditure of fuel. The regime also provides an uninterrupted view of the Sun.

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