

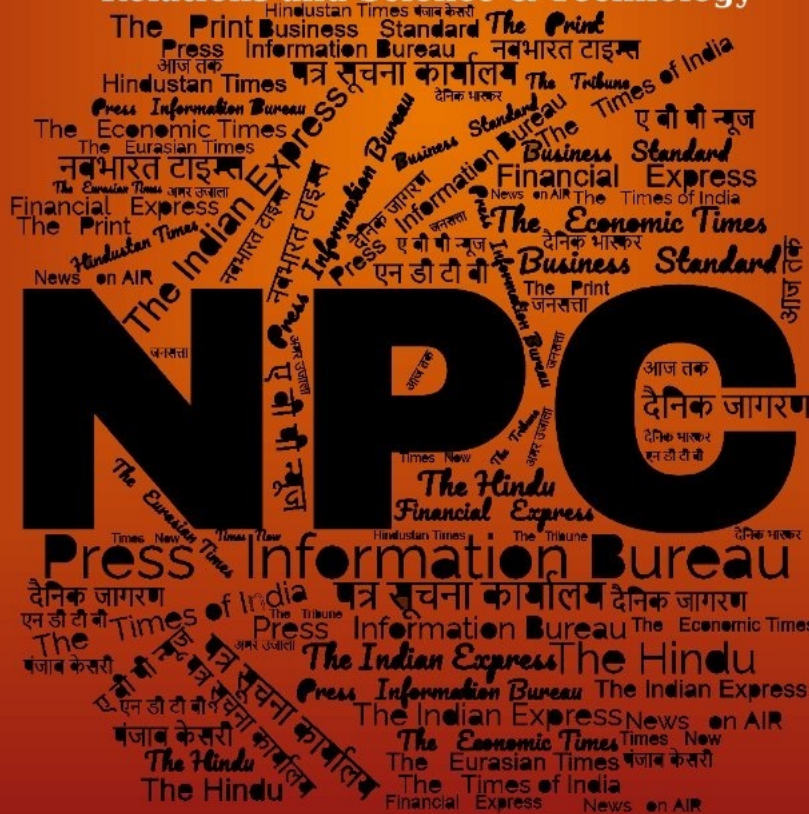
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# समाचार पत्रों से चयित अंश Newspapers Clippings

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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**Press Information Bureau**  
**Government of India**

**Ministry of Defence**

*Mon, 29 Jan 2024*

### **India-Saudi Arabia Joint Military Exercise ‘Sada Tanseeq’ Commences in Rajasthan**

The inaugural edition of India-Saudi Arabia Joint Military Exercise ‘SADA TANSEEQ’ commenced today at Mahajan, Rajasthan. The Exercise is scheduled to be conducted from 29<sup>th</sup> January to 10<sup>th</sup> February 2024.

The Saudi Arabian contingent comprising 45 personnel is being represented by Royal Saudi Land Forces. The Indian Army contingent also comprising 45 personnel is being represented by a Battalion from the Brigade of the Guards (Mechanised Infantry).

Aim of the Exercise is to train troops of both sides for Joint Operations in Semi Desert terrain under Chapter VII of the United Nations Charter.

The Exercise will enable both the sides to share their best practices in the tactics, techniques and procedures of conducting operations in sub-conventional domain. It will facilitate developing interoperability, bonhomie and camaraderie between troops from both the sides.

The Exercise will involve Establishment of Mobile Vehicle Check Post, Cordon & Search Operation, House Intervention Drill, Reflex Shooting, Slithering and Sniper Firing. The Exercise will provide an opportunity to both the contingents to strengthen their bond.

It will act as a platform to achieve shared security objectives, enhance the level of defence cooperation and foster bilateral relations between the two friendly nations.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2000315>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Tue, 30 Jan 2024*

## **INS Sumitra Carries out 2nd Successful Anti-Piracy Ops – Rescuing 19 crew members and Vessel from Somali Pirates**

Indian Naval Ship Sumitra, having thwarted the Piracy attempt on FV Iman, has carried out yet another successful anti-piracy operation off the East Coast of Somalia, rescuing Fishing Vessel Al Naeemi and her Crew (19 Pakistani Nationals) from 11 Somali Pirates.

INS Sumitra, Indian Navy's indigenous Offshore Patrol Vessel had been deployed for Anti-Piracy and Maritime Security Operations East of Somalia and Gulf of Aden. The warship on PM 28 Jan 24 had responded to a distress message regarding hijacking of an Iranian flagged Fishing Vessel (FV) Iman, which had been boarded by pirates & the crew taken as hostages.

The FV was intercepted by INS Sumitra and following the SOPs and coercive posturing the vessel and her Crew (17 Iranian Nationals) were safely rescued in the early hours of 29 Jan 24. FV Iman was sanitised and released for onward transit.

Subsequently, INS Sumitra was again pressed into action, to locate and intercept another Iranian flagged fishing vessel Al Naeemi, which had been boarded by pirates and her Crew (19 Pakistani Nationals) taken hostage.

Responding swiftly to the developing situation Sumitra intercepted the FV on PM 29 Jan 24 and through coercive posturing and effective deployment of her integral helo and boats compelled the safe release of the crew and the vessel. The ship also undertook confirmatory boarding to sanitise and also to check on the well-being of the crew who were held captive by the Somali pirates.

INS Sumitra, over the course of less than 36 hours, through swift, persistent and relentless efforts has rescued two hijacked Fishing Vessels along with 36 Crew (17 Iranian and 19 Pakistani) in Southern Arabian Sea approximately 850 nm West of Kochi, and prevented misuse of these Fishing Vessels as Mother Ships for further acts of Piracy on Merchant Vessels.

The Indian Navy has once again proved its commitment in the region to act against all maritime threats in order to ensure safety of all mariners and vessels at sea.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2000473>



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Mon, 29 Jan 2024*

## **Defence Secretary to visit Oman on January 30 & 31, 2024**

### **To co-chair 12th Joint Military Cooperation Committee meeting with Secretary General, Ministry of Defence, Oman**

Defence Secretary Shri Giridhar Aramane will pay a visit to Oman on January 30 & 31, 2024. During the visit, the Defence Secretary will co-chair the 12<sup>th</sup> Joint Military Cooperation Committee meeting with the Secretary General, Ministry of Defence, Oman Dr Mohammed bin Naseer bin Ali Al-Zaabi.

During the bilateral talks, Shri Giridhar Aramane will review defence cooperation between the two countries and explore new initiatives like industry collaboration to further strengthen bilateral engagements. The two leaders will also exchange views on regional and global issues of shared interest.

The visit will further consolidate defence cooperation and strategic partnership between the two countries spanning every sphere of military collaboration, such as bilateral exercises, staff talks, training as well as new and emerging areas

India and Oman have a robust and multifaceted relationship which has expanded into several strategic areas, including defence and security.

Both the countries are committed to work under the vision of strategic partnership. The two countries have a common interest in peace and prosperity of the entire region.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2000303>

**INDIA  
TODAY**

*Mon, 29 Jan 2024*

## **Situation along LAC stable but sensitive: Army Chief General Manoj Pande**

Army Chief General Manoj Pande on Monday said the situation with China at the Line of Actual Control (LAC) is stable but sensitive and expressed hope that issues would be resolved in the near future.



In an exclusive interview with India Today, General Manoj Pande said the Army is significantly strengthening its infrastructure on the borders.

He further said no more "friction areas" have cropped up in the last year and the deployment of troops in the region is "robust and balanced".

"In terms of our resolution efforts, talks and dialogue at both military and diplomatic levels with the adversary continue. We're hopeful to find a resolution to the remaining issues," added the Army Chief.

On counter-terrorist operations, General Manoj Pande said the Army killed 71 terrorists in Jammu and Kashmir last year.

He also said two batches of Agniveer have been deployed in the Army and some troops are at the Line of Control (LoC) and the LAC.

"We have also prepared a system for those who will remain in the Army after four years. The Army is moving in the right direction with Agniveer," the Army Chief added. Protests had erupted across the country in 2022 after the central government announced the Agniveer scheme.

The protesters were against the four-year service provision of the scheme and the age limit set for those seeking to join the force under it.

On new weapons for the forces, General Manoj Pande said light tanks made by the Defence Research & Development Organisation (DRDO) will undergo trials by May or June.

"A light tank is crucial for the army, and we have provided many weapons and systems in eastern Ladakh. Numerous domestically-made systems, like the All Train Vehicles, Special Mobility Vehicle, and drones were given to the Army," he added.

<https://www.indiatoday.in/india/story/situation-along-line-of-actual-control-china-stable-sensitive-army-chief-general-manoj-pande-exclusive-2494956-2024-01-29>

## THE TIMES OF INDIA

*Tue, 30 Jan 2024*

### **Supply Chains hit due to Wars, IAF pins hope On Desi Firms for Spares**

From a pin to open the pilot's emergency box, to a target seeker mechanism facing snags, and even batteries of latest French Rafale jets or Apache helicopters, these spares were among the 101 items on display at the Indian Air Force's pavilion at Advantage Vidarbha event. This was not a showcase of prowess, rather the IAF is scouting for private industries who can make these spares for them on a war footing.

Most of these items were of Russian or Israeli make.

With both the countries at war, the supplies of components for the IAF has been hit. In a bid to avoid a similar situation for its latest assets, there are plans to indigenise spares like the battery of Rafale or Apache much in advance before the initial contract for maintenance and get supplies from a foreign supplier or a hefty amount may be needed. The batteries supply power to the aircraft The private sector is being roped in for the normal course of indigenization too.

As per officials manning the IAF pavilion, the list of items for which help of the private sector is needed is much longer. A screen flashed names of such items which were not brought for display. The IAF is ready to even fund the research and development (R&D), said officials. The teams from different base repair depots (BRDs) of the IAF's maintenance command have been setting up tents at exhibitions like Advantage Vidarbha across the country.

In Nagpur, the stall was mainly visited by students as there was a rather cold response from the industries, said officials manning the IAF pavilion. "A number of pieces of the target seeker mechanism from Israel have been rendered unserviceable and there has been no support from the foreign original equipment manufacturer.

A know-how is being sought from the private sector for it. On the brighter side, the IAF has indigenized 70,000 spares," said the maintenance command's chief Air Marshal Vibhas Pandey in an earlier session at the event. What appeared like a bracelet was a bearing used in one of the Russian made aircraft which the IAF has not been able to indigenise yet.

"Tenders were issued twice, yet there was no response. A bracket used in a Russian plane was also on display. The very material used in it has been a trade secret of Russian which the private sectors' is expected to decode or come up an alternative," officials said.

"Industries find it tough to participate in the indigenization process because of the tough procedures. Getting a certification is a long process and ultimately one has to be the lowest bidder bid to get the order. In some cases, the quantity is too less to make it viable for a private industry," said Pravin Lonkar, president of the Butibori Manufacturers' Association.

<https://timesofindia.indiatimes.com/city/nagpur/supply-chains-hit-due-to-wars-iaf-seeks-indigenous-solutions/articleshow/107245587.cms>

## **Business Standard**

*Mon, 29 Jan 2024*

### **Rolls-Royce, Azad Engineering partner to make Defence Aero-Engine Parts**

Power and propulsion solutions provider Rolls-Royce on Monday said it has signed an agreement with Azad Engineering for making complex defence aero-engine components in India.

Under the long-term agreement, Hyderabad-based Azad Engineering will manufacture and supply complex components for defence aircraft engines and thus join the global supply chain for complex

category components for Rolls-Royce's technologically advanced aero-engines, the company said in a statement.

"Strong collaboration has been at the heart of Rolls-Royce's journey of success in India. As we work towards strengthening the defence ecosystem, we are happy to expand our supply chain in India in partnership with Azad Engineering," Rolls-Royce Executive Vice President Business Development and Future Programmes and Head of Global Networks, Alex Zino, said.

The sourcing of complex components from India for aero-engine programmes further advances the goal of capability creation in the country, he added.

Azad Engineering Founder and CEO, Rakesh Chopdar said, "Bringing these critical components to India not only showcases the capabilities of Azad Engineering, but also represents a pivotal moment for India's aerospace and defence industry, demonstrating the country's growing prowess in advanced manufacturing." Rolls-Royce said its ecosystem in India encompasses strategic local partnerships, joint ventures, robust supply chain, rich talent pool, engineering capability, digital solutions and service delivery capabilities.

[https://www.business-standard.com/companies/news/rolls-royce-azad-engineering-partner-to-make-defence-aero-engine-parts-124012900620\\_1.html](https://www.business-standard.com/companies/news/rolls-royce-azad-engineering-partner-to-make-defence-aero-engine-parts-124012900620_1.html)



*Tue, 30 Jan 2024*

## **India Closes in on Self-Reliance in Defence**

- **By Prakash Chandra**

The Republic Day Parade on Kartavya Path in New Delhi on January 26 showcased India's cultural diversity, women power, and military strength. The occasion was also a tacit display of efforts to indigenise India's military hardware in line with the Aatmanirbhar Bharat (self-reliant India) slogan, which now defines India's defence production and weapons acquisition programmes.

The missiles, radar systems, and weapons platforms such as the Main Battle Tank Arjun, K-9 Vajra howitzers, and Nag anti-tank guided missiles which rolled past the saluting dais represented India's homegrown defence capabilities.

This reflects the confidence of a nation ready to shrug off the tag of being a net importer of weaponry, and realise its potential of becoming a global defence manufacturing hub. It intends to do this by promoting indigenous manufacturing, while simultaneously cheerleading foreign original equipment manufacturers (OEMs) to set up shop in the subcontinent.

The idea of acquiring Indigenously Designed, Developed, and Manufactured (IDDM) platforms now echoes in the corridors of the MoD, and is the new 'normal' for the armed forces. Industry players have become key stakeholders in this with the private defence manufacturing sector



undertaking projects denied to it till recently. Curiously, India did have a rudimentary defence industrial base for almost 90 years, but it operated on ideas which suited the needs of the British Indian Army during World War II.

Later, even after India nationalised its 220-year-old OFB to oversee all defence production, a big question mark hung over its performance and efficiency. It was only in 2021 that New Delhi decided to bite the bullet and restructure the 41 factories of the OFB as seven separate Defence Public Sector Undertakings (DPSUs): Advanced Weapons and Equipment India Limited; Armoured Vehicles Nigam Limited; Gliders India Limited; India Optel Limited; Munitions India Limited; Troop Comforts Limited and Yantra India Limited).

Shorn of the lengthy red tape which hamstrung the OFB earlier, the new DPSUs could hit the ground running, bringing in much-needed innovation and forging partnerships with industry to boost indigenous manufacturing. This is encouraging private players to step into a space that was offlimits for them till recently and gain expertise in developing new-age weapons systems for the three services. Tata Advanced Systems Ltd and Bharat Forge, for instance, have joined hands with the DRDO to design and produce state-of-the-art towed howitzers.

Such tie-ups not only help private industry gain new expertise on frontier technologies, but also provide a chance to contribute to the MoD's decision-making process. The guiding philosophy of all major militaries in the world is to beware of obsolescence creeping in on their core combat capabilities and the Indian armed forces are no exception.

To achieve this objective, the Defence Planning Committee, set up in 2018, made indigenisation in the defence sector a priority while addressing the military's capability development needs. Following this, its Defence Acquisition Procedure (DAP) emphasised the military exclusively acquiring indigenously-produced arms.

The DAP of April 2022 hails the 'Buy Indian-IDDM' category which recommends the 'acquisition of products from an Indian vendor that have been indigenously designed, developed and manufactured with a minimum of 50% Indigenous Content (IC) on cost basis of the base contract price, i.e. total contract price less taxes and duties in consonance with the Defence Capability Development Strategy.'

Private participation in the defence sector in the three financial years from 2018-2019 to 2021-2022 has been remarkable: during this period, private vendors cornered 72 deals from a total of 127 capital acquisition contracts signed with the erstwhile OFB, DRDO, and PSUs. The Strategic Partnership Model (SPM) is a good example of this. It helps Indian companies form joint ventures with foreign OEMs to make military hardware in India along with technology transfer. The SPM's ambit includes fighter aircraft, helicopters, submarines, and armoured fighting vehicles.

With robust backing from the government, the armed forces should be able to draw from a steady supply of homegrown defence technologies sooner rather than later. The MoD's Innovations for Defence Excellence (iDEX) scheme is a good example: it encourages MSMEs, startups, innovators, research and development institutes, and academia to foster innovation and technology development in the defence and aerospace sector.

iDEX assesses the new technologies developed and helps the military adopt them. Similar schemes include the Technology Development Fund which enables MSMEs and startups to design and

develop various defence technologies and the DRDO's Dare to Dream Innovation contest which helps startups become a part of the defence ecosystem.

Measures like these, along with increasing foreign direct investment (through the direct route) to 74 per cent, have already shown results with the value of defence production in 2022-2023 crossing the figure of Rs 1 lakh-crore for the first time ever. If the MoD persists with this synergistic approach to arms manufacturing, India is on the right path towards becoming a world leader in the global defence industry market.

<https://www.deccanherald.com/opinion/india-closes-in-on-self-reliance-in-defence-2870437>

## Science & Technology News



**Press Information Bureau**  
**Government of India**

**Ministry of Science & Technology**

*Mon, 29 Jan 2024*

### **Dignitaries trace the evolution of Quantum Mechanics on 100 years of S N Bose's colossal work**

Distinguished scientists and scientific administrators, brought together on the occasion of the celebration of 100 years of the historic occasion when Satyendra Nath Bose authored the last of the four revolutionary publications that led to new quantum mechanics, traced the evolution of quantum mechanics through the years.

Professor Ajay Sood, Principal Scientific Adviser to the Government of India, speaking at the inauguration of the 5-day long International Conference on Photonics, Quantum Information and Quantum Communication organised by the S N Bose National Centre for Basic Sciences (SNBNCBS) in Kolkata, pointed out that we are passing through the second revolution in Quantum Mechanics and that the gap between fundamental science and technological intervention is closing.

“A total of 750 million USD are being applied in four verticals. It is a wonderful time for all of us to be a part of this new mission. The right problems that are solvable and have wide applications will have to be addressed by researchers. Quantum sensing, satellite-based quantum communications and post quantum cryptography are some of the areas that need to be focused on,” he added.

He stressed that 23 countries have set up National Quantum Missions and India has a substantial contribution to make at an international level, specially in the field of quantum algorithms.

“After 100 years we are witnessing that the concepts of fundamental science are being deployed in a big way in areas of communication, computing, and other applications. With the National Quantum Mission (NQM) gathering steam, we have an opportunity to play at the global scale. The Mission will open the quantum science and technology domain for international collaboration. Four mission hubs will be set up across the country.

Each hub is expected to bring together all technical experts in a consortium mode,” Secretary, Department of Science and Technology (DST), Prof. Abhay Karandikar emphasised.

He added that the students and the experts could also make significant contributions to the NQM through ecosystem of startups that has developed in the country and through the four mission hubs to be established across the country to bring together all technical experts in a consortium mode to work on accelerating the working of the NQM.

He also highlighted the role of the Anusandhan National Research Foundation for creating a congenial atmosphere for research in the country.

This international conference is the first programme of the yearlong celebration of the 100 years of the historic occasion. The yearlong celebration will include three International Conferences and several Outreach Programmes which SNBNCBS, an autonomous institution of DST, will be organizing throughout the year.

Prof. Tanusri Saha-Dasgupta, Director of S.N. Bose National Centre, said that Satyendranath Bose’s seminal paper was published in 1924 after it was translated in German by Einstein.

She added that scientists from different parts of the world and from different states of India, students and media persons are participating in the programme to exchange their views, share their research findings and draw inspiration from each other.

Satyendra Nath Bose’s pioneering work on quantum statistics has paved the way for development of modern quantum technologies including Bose-Einstein condensation, quantum superconductivity, and quantum information theory.

In 1924, Bose authored the last of the four revolutionary publications that led to the new quantum mechanics (the others being those of Planck in 1900, Einstein in 1905, and Niels Bohr in 1913). Half the fundamental particles in the Universe are named after him – BOSON. He derived Planck’s law in a revolutionary way which impressed Einstein, and subsequently they continued to collaborate.

Their partnership resulted in new physical theories, including Bose-Einstein statistics and the Bose-Einstein condensate. Several Nobel Prizes were later awarded for work related to the boson; the force-carrying particles named after Bose himself.

Along with developing the new quantum statistics, Bose’s work also constitutes the foundation of novel technologies which also finds applications in the Second Quantum Revolution.

S. N. Bose National Centre for Basic Sciences, an Autonomous Research Institute established under Department of Science and Technology (DST), Government of India in 1986 to honour the life and work of Professor S. N. Bose, is celebrating the centenary of Bose’s colossal work in theoretic-

cal physics in 2024 by organizing International Conferences and Outreach Programmes throughout the year. While the Conferences will provide opportunities for experts, including Nobel laureates, across the globe to come together and exchange their ideas, the Outreach Programmes will create momentum towards popularising science.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2000435>



*Mon, 29 Jan 2024*

## **Bengaluru to host Largest Annual Gathering of Astronomers from India**

Bengaluru will host the largest annual gathering of astronomers from India when the 42nd meeting of the Astronomical Society of India will be held in the capital of Karnataka. According to the Astronomical Society of India, scientific discourses focussing on the Sun, planets, black holes and beyond will be held from January 31 to February 4. About 750 astronomers will be in attendance. Many events have been separately planned keeping in mind visitors and school students who will be able to engage in various activities throughout the week.

Special attractions this year include the release of the decadal astronomy vision document, which is the culmination of a nationwide exercise to imagine the future of cosmic exploration from India, a workshop on the recently launched AdityaL1 mission – India’s first space based solar observatory, plenary lectures highlighting India’s planetary exploration program and pulsar timing array initiatives, and recognition of students and scientists for outstanding contribution to astronomy and astrophysics research and capacity building activities. More details are available at this site.

The Public Outreach and Education Committee of the Astronomical Society of India is partnering with local organisers and astronomy industries to host popular lectures on themes ranging from space exploration to the role of astronomy in defining time and calendars. Lectures have been planned on astrophotography with a special showcase on the night skies of the Indian Himalayas, and the need to preserve the heritage of the skies.

Solar and night sky observation events have been organised, and a star party is being planned at the J.N. Planetarium. A detailed agenda of events open to the public is available at this site.

The meeting of the Astronomical Society of India is being jointly organised by the Indian Institute of Science (IISc.), Indian Space Research Organisation (ISRO), and the J.N. Planetarium. The formal inauguration of the event will take place on February 1 at 9 a.m. at J.N. Tata auditorium, IISc.

<https://www.thehindu.com/sci-tech/science/bengaluru-to-host-largest-annual-gathering-of-astronomers-from-india/article67788273.ece#:~:text=Scientific%20discourses%20focussing%20on%20the,January%2031%20to%20February%204&text=Bengaluru%20will%20host%20the%20largest,in%20the%20capital%20of%20Karnataka>.

## **What is INSAT-3DS? The weather satellite ISRO is set to launch**

India is set to enhance its meteorological monitoring capabilities with the launch of INSAT-3DS, an advanced weather satellite developed by the Indian Space Research Organisation (ISRO).

Scheduled for a February liftoff aboard the GSLV-F14 rocket, this state-of-the-art satellite will play a pivotal role in weather forecasting and disaster management.

The satellite has been sent to the Satish Dhawan Space Centre to be integrated with the rocket for a launch from Sriharikota.

INSAT-3DS is designed as a successor to the existing in-orbit satellites INSAT-3D and INSAT-3DR, aiming to provide uninterrupted services and significantly improve the overall capabilities of the INSAT system.

INSAT stands for the Indian National Satellite System that provides various services, including telecommunications, broadcasting, meteorology, and search and rescue operations.

The INSAT-3DS satellite was recently flagged off to the Satish Dhawan Space Centre (SDSC) SHAR in Sriharikota on January 25, following the successful completion of assembly, integration, and testing at the U R Rao Satellite Centre in Bengaluru.

This mission is a user-funded project in collaboration with the Ministry of Earth Science (MoES), and it showcases the substantial contributions made by Indian industries in its development.

### **What will INSAT-3DS carry to space?**

Built around ISRO's reliable I-2k bus platform, INSAT-3DS has a lift-off mass of 2,275 kg and is equipped with cutting-edge payloads for enhanced meteorological observation.

The satellite's sophisticated instruments include a 6-channel Imager and a 19-channel Sounder, which are meteorological payloads designed to monitor land and ocean surfaces. These tools will provide critical data for accurate weather forecasting and early warning systems for natural disasters, thereby bolstering India's preparedness and response strategies.

Additionally, INSAT-3DS carries communication payloads such as the Data Relay Transponder (DRT) and the Satellite Aided Search and Rescue (SAS&R) transponder. The DRT will receive data from automatic Data Collection Platforms and Automatic Weather Stations (AWS), enhancing the country's weather forecasting capabilities. The SAS&R transponder is a vital component for global search and rescue operations, as it is designed to relay distress signals and alert detections from beacon transmitters.

The launch of INSAT-3DS marks a significant milestone for India's space program and its commitment to leveraging space technology for societal benefits.

With its advanced features, INSAT-3DS is set to fortify India's position in meteorological observation and disaster management, providing invaluable support to both national and international communities.

<https://www.indiatoday.in/science/story/what-is-insat-3ds-the-weather-satellite-isro-is-set-to-launch-2494850-2024-01-29>



*Tue, 30 Jan 2024*

## **Japanese Moon Probe back to Work after Sun reaches its Solar Panels**

A Japanese moon explorer is up and running Monday after several tense days without the sunlight it needs to generate power.

Japan's first lunar mission hit its target in a precision touchdown on January 20, but landed the wrong way up, leaving its solar panels unable to see the sun. But with the dawn of the lunar day, it appears that the probe has power. The Japan Aerospace Exploration Agency, or JAXA, said Monday that it successfully established communication with the probe Sunday night, and the craft has resumed its mission, taking pictures of the Moon's surface and transmitting them to the Earth.

After a last-minute engine failure caused the Smart Lander for Investigating Moon, or SLIM, to make a rougher-than-planned landing, JAXA used battery power to gather as much data as possible about the touchdown and the probe's surroundings. The craft was then turned off to wait the sun to rise higher in the lunar sky in late January.

With power, SLIM has continued work to analyze the composition of olivine rocks on the lunar surface with its multi-band spectral camera, seeking clues about the Moon's origin and evolution, the agency said.

Earlier observations suggest that the moon may have formed when the Earth hit another planet. A black-and-white photo posted by JAXA on social media showed the rocky lunar surface, including a rock the agency said it had named "Toy Poodle" after seeing it in initial images. The probe is analyzing six rocks, all of which have been given the names of dog breeds.

SLIM is expected to have enough sun to continue operations for several earth days, possibly until Thursday. JAXA said it's not clear if the craft will work again after another severely cold lunar night.

The SLIM landed about 55 meters away from its target, in between two craters near the Shioli crater, a region covered in volcanic rock. Previous moon missions have typically aimed for flat areas at least 10 kilometers wide.



SLIM carried two autonomous probes, which were released just before touchdown, recording the landing, surroundings and other lunar data. The landing made Japan the world's fifth country to reach the moon surface, after the United States, the Soviet Union, China and India.

<https://www.thehindu.com/sci-tech/science/japanese-moon-probe-back-to-work-after-sun-reaches-its-solar-panels/article67791554.ece>



*Mon, 29 Jan 2024*

## **Europe has greenlit the deployment of a Gravitational-Wave Detector larger than Earth**

The Science Programme Committee of the European Space Agency (ESA) has approved the Laser Interferometer Space Antenna (LISA), which will be the first gravitational wave detector in space. Work on the realisation of the instruments and assembly of the spacecraft is expected to begin in January 2025, once a suitable European industrial contractor has been identified. The instrument will be made up of three spacecraft trailing the Earth in its orbit around the Sun, flying in a precise triangular formation. Laser beams will bounce between the three satellites, with a precise measurement of the timings revealing the presence of any passing gravitational waves.

Here is the interesting bit: Each side of the triangle will be 2.5 million kilometres in length, that is six times the distance between the Earth and the Moon. The spacecraft will only be ready for launch by 2035, on an Ariane 6 rocket. LISA will be able to dwarf any gravitational wave detector that can ever be constructed on Earth. LISA will be able to address a gap in gravitational wave astronomy, where ground based detectors capture high-frequency gravitational waves, while pulsar timing arrays (PTAs) allow astronomers to probe low frequency gravitational waves, using a network of distant pulsars as astronomical instruments.

Lead project scientist for LISA, Nora Lützendorf says, “LISA is an endeavour that has never been tried before. Using laser beams over distances of several kilometres, ground-based instrumentation can detect gravitational waves coming from events involving star-sized objects – such as supernova explosions or merging of hyper-dense stars and stellar-mass black holes.

To expand the frontier of gravitational studies we must go to space. Thanks to the huge distance travelled by the laser signals on LISA, and the superb stability of its instrumentation, we will probe gravitational waves of lower frequencies than is possible on Earth, uncovering events of a different scale, all the way back to the dawn of time.”

### **NASA to support ESA in its LISA gravitational wave observatory**

While ESA will be leading the mission, NASA will be providing scientific and technical support for the mission. NASA will also be contributing hardware to the mission, including lasers, telescopes and protective shields to minimise disturbances from stray electromagnetic charges. Gravi-

tational waves were famously predicted by Einstein, with the subsequent confirmation by observations of stars during a Solar Eclipse resulting in the scientist becoming world famous overnight.

<https://www.news9live.com/science/europe-has-greenlit-the-deployment-of-a-gravitational-wave-detector-larger-than-earth-2422439>



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## **First Human successfully receives Neuralink Implant**

Elon Musk has announced that the first human patient has successfully received a Neuralink implant, and is recovering well. Initial tests of the implanted device has resulted in promising spike detection. The first product from Neuralink will be called Telepathy, and will allow controlling a computer or smartphone through a paired smartphone, just by thinking. Initially, the device will only be made available to those who have lost the function on any of their limbs. Elon Musk is the founder of Neuralink, but does not hold an executive position in the company. The implants are about the size of a large coin, and are implanted directly into the brain using a specially developed robotic surgical device, which can access deeper reaches of the brain.

Neuralink approached US regulators to begin clinical trials on humans in December 2022, which was granted in May 2023. The company had previously conducted extensive testing of the device on monkeys, who were able to play simple games using the implant. The technology has the potential to restore vision and mobility in humans, including restoring mobility to those with paralysis. The Neuralink Brain-Computer Interface (BCI) is being tested on humans with the Precise Robotically Implanted Brain-Computer Interface (PRIME) study, which is expected to take six years to complete.

The participants of the study will be compensated for participating, and Neuralink is not selling the devices or the technology. The implant is invisible on the surface, and wirelessly transmits signals from the brain to a paired smartphone app, which decodes the intentions after a period of training. The study is a preliminary step in using BCIs to restore mobility. Neuralink has the eventual goal of reducing the risk of AI to human civilisation by essentially melding the two together, the soft matter of human brains with the hard silicon that makes up the brains of computers.

<https://www.news9live.com/science/first-human-successfully-receives-neuralink-implant-2422946>

