



Space Beacon

Notable Space Missions to Watch in 2025

The year 2025 promises to be a landmark year for space exploration, with several groundbreaking missions from India and globally. India's space agency ISRO is set to launch its first crewed mission, **Gaganyaan**, which will send Indian astronauts into space, marking a significant leap for India's human spaceflight program. Additionally, ISRO's **Chandrayaan-3** will continue lunar exploration, focusing on the Moon's south pole. The **Astrosat-2** mission will advance India's astrophysics capabilities, and SSLV-2 will provide a faster and cost-effective solution for launching small satellites.

Globally, NASA's **Europa Clipper** mission will explore Jupiter's icy moon Europa, while ESA's **ExoMars** rover aims to uncover signs of life on Mars. **SpaceX's Starship** will continue its test flights for deep space exploration, and **China's Chang'e-7** mission will explore the Moon's south pole, studying its ice deposits.

2025 will be a year of exciting space exploration that will expand our understanding of the universe and propel humanity towards future missions in deep space. These missions will not only enhance scientific knowledge but also push the boundaries of technology and international collaboration in space. As nations and private companies continue to innovate, 2025 will serve as a pivotal year in shaping the future of space exploration. With advancements in **reusable technology** and **deep space exploration**, the year will set the stage for even more ambitious missions in the coming decades. The discoveries and breakthroughs from these missions could significantly impact our understanding of life beyond Earth and the **potential for human settlement on other planets**. The growing collaboration between nations and private companies will also foster new partnerships, driving innovation and expanding space opportunities worldwide. As the space race intensifies, 2025 will mark a new chapter in humanity's quest to explore and inhabit the cosmos. The technological advancements and discoveries from 2025 will also have far-reaching applications, benefiting industries on Earth and pushing the boundaries of **human achievement**.

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Searching for Life on Mars: Following Methane Clues

Scientists believe that if life exists on Mars, it may be found beneath its surface, where methane fluctuations suggest the presence of methanogens—microbes that produce methane. By studying similar environments on Earth, such as deep fractures, subglacial lakes, and saline basins, researchers identified the best locations for Martian life. Acidalia Planitia, a Martian plain, offers promising conditions, with liquid water potentially supporting microbial life at depths between 2.7 to 5.5 miles. It's time to dig deeper.



[space.com](https://www.space.com)

DECam Captures Stunning Image of Antlia Cluster

Astronomers have captured a breathtaking image of the Antlia Cluster, located 130 million light-years away. Using the Dark Energy Camera (DECam) on the Blanco Telescope, this image showcases thousands of galaxies within the Hydra-Centaurus Supercluster. DECam, originally built for the Dark Energy Survey, aids in studying dark energy and dark matter by observing galaxy clusters. These observations help scientists understand cosmic forces and the evolution of galaxies, inching closer to unraveling the universe's mysteries.



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Neutron Stars Confirmed as Sources of FRBs

An international team, led by McGill University, has confirmed that neutron stars are responsible for fast radio bursts (FRBs). Using the CHIME radio telescope, researchers discovered a striking link between FRBs and pulsars. The study revealed that the radio emission originates closer to the neutron star than previously thought, challenging existing models. Further findings also indicated that the FRB's emission site is extremely small, highlighting the intense magnetic environment around neutron stars. This discovery could greatly enhance our understanding of the extreme physics behind these cosmic phenomena.



[spacedaily.com](https://www.spacedaily.com)



Moon to Become Humanity's First Space Hub

In 2025, humanity takes key steps toward a permanent lunar presence. SpaceX's Starship and Blue Origin's Blue Moon will lay the foundation for lunar exploration, with reusable rockets and infrastructure. NASA's Artemis II mission will carry humans around the Moon, and the Lunar Gateway will support long-term missions. Innovations like lunar fuel stations will lower costs and turn the Moon into a crucial launch point for Mars and beyond. These advancements will pave the way for sustainable space exploration and the potential for future lunar settlements.



Black Holes Suppress Star Formation, James Webb Finds

NASA's James Webb Space Telescope discovered that supermassive black holes slow star formation in galaxies. In the Spiderweb protocluster, 19 galaxies with active black holes produced stars at a slower rate, supporting the theory that black holes strip gas from galaxies. This challenges previous theories of star formation in older galaxies and highlights the role of black holes in halting star creation and influencing galaxy evolution, deepening our understanding of the relationship between black holes and galaxy growth.



Citizen Scientists Unveil Key Details of Jupiter's Clouds

Citizen scientists and astronomers have discovered that Jupiter's clouds are primarily composed of ammonium hydrosulphide mixed with smog, not ammonia ice as previously thought. Dr. Steven Hill of Colorado used commercial telescopes to map ammonia levels, revealing that clouds form in warmer layers, making ammonia ice condensation unlikely. Further analysis by Professor Patrick Irwin confirmed this. This collaborative effort highlights the significant contribution of citizen scientists in advancing planetary research.



Charting the cosmos, from
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Genspace



Cover broader space news not fitting into other categories

Astranis Satellites Pass Initial Tests, Begin Orbiting

Astranis announced that all four of its recently launched Block 2 broadband satellites have successfully passed initial commissioning tests. Launched on December 29 via Falcon 9, the satellites are now using electric propulsion to reach geostationary orbit. These satellites feature upgraded systems, including new software-defined radios and improved operational lifespans. Services for customers like Anuvu, HTechCorp, and Apco Networks are expected to go live by mid-2025, marking significant progress for Astranis' regional satellite services.



Researchers Propose UN Goal to Address Space Debris

An international group of scientists, including NASA researchers, proposes adding space sustainability to the United Nations' Sustainable Development Goals (SDGs). With over 12,500 satellites in orbit and growing risks of collisions, the group stresses the need for global collaboration to mitigate space debris. Drawing inspiration from marine debris management, the report advocates for strategies like reusability, recycling, and international cooperation to protect Earth's orbit, a vital resource supporting \$469 billion in human activity annually.



India to Launch World's Most Expensive Satellite

India's ISRO, in collaboration with NASA, will launch the world's most expensive satellite in March 2025. The Rs 12,505 crore earth-imaging satellite will scan nearly all land and ice every 12 days with high resolution, designed to monitor environmental changes and natural disasters. NASA will provide key components like radar and communication systems, while ISRO will handle spacecraft, radar, and launch services. The satellite will be launched via ISRO's GSLV Mk-II rocket. This collaboration marks a significant step forward in global space cooperation and environmental monitoring.



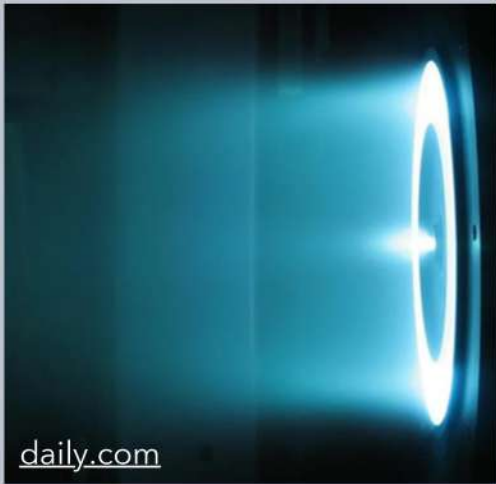
Big Rockets, Telescopes, and Space Missions in 2025

2025 will feature major space milestones, including the first launches of Blue Origin's New Glenn and SpaceX's Starship, with 25 planned flights. NASA's Rubin Observatory will begin mapping the Southern sky, and the US moon mission will include multiple lunar landers. India targets human spaceflight, with Gp. Capt. Shubhanshu Shukla flying to the ISS. New rockets like Rocket Lab's Neutron and Sierra Space's Dream Chaser will debut. Blue Origin's New Glenn may launch national security satellites and Amazon's Project Kuiper.



Electric Thrusters Transform Space Exploration

The University of Virginia's research on electric propulsion (EP) thrusters is shaping the future of space travel. By studying electron behavior in plasma beams, researchers aim to improve spacecraft efficiency and safety for long-term missions, like NASA's Artemis program. EP systems, offering better fuel efficiency than chemical rockets, enable deeper space exploration. However, understanding plasma plume dynamics is crucial to preventing potential damage to spacecraft components, ensuring smooth operations over extended missions.

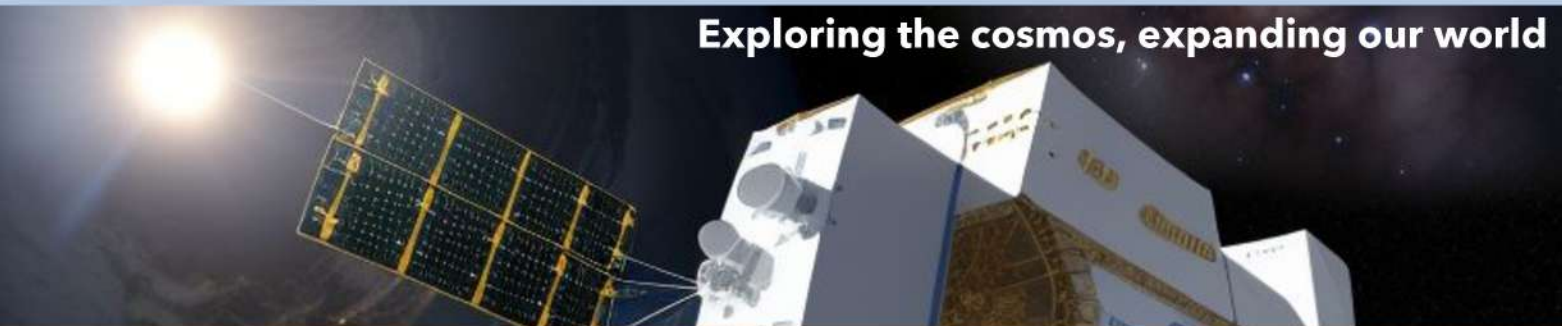


Photonics Revolutionizing Satellite Communications

Photonics is transforming satellite networks, enabling faster, more secure communication through optical and laser links. Innovations like free-space optical communication boost data transfer speed and reduce latency in satellite constellations like SpaceX's Starlink. Advanced technologies, such as multi-plane light conversion, overcome atmospheric interference, ensuring more reliable global communication. These advancements also enhance security by making data transmission harder to intercept compared to traditional radio frequencies.



Exploring the cosmos, expanding our world



Satellogy



Focus on recent and upcoming satellites and launches

China's New Rockets to Boost Space Launches in 2025

China is set to debut several new Long March and commercial rockets in 2025, increasing the country's space launch capabilities. The Long March 8A, Long March 12A, and Zhuque-3 are among the key launches, offering higher payload capacities and reusability. These rockets will support China's satellite projects, including mega constellations and space station missions. Commercial companies like Land space and Galactic Energy also plan to launch innovative rockets to meet growing demand for low-cost, frequent space access.



SpaceX's V3 Satellites to Boost Starlink Internet Speeds

SpaceX is launching its next-gen V3 Starlink satellites, set to revolutionize satellite internet. Each V3 satellite will offer 1 Tbps downlink and 160 Gbps uplink speeds, significantly improving Starlink's performance. With enhanced technology, including advanced beamforming and laser communication, the V3 satellites will increase capacity, speed, and network efficiency. This upgrade promises faster downloads, smoother streaming, and greater reliability, making Starlink an even more powerful solution for global, high-speed internet access.



Talos Partners with Max Planck for Animal Tracking

Talos, a German space startup, has signed a four-year agreement with the Max Planck Society to launch ICARUS 2.0, a cubesat constellation for animal tracking. The fleet of at least five cubesats will provide GPS-level precision, daily location updates, and environmental data, supporting research on biodiversity, climate change, and disease spread. ICARUS 2.0 will operate independently of the ISS, enabling global, high-resolution tracking of animal movements and ecosystems.





Global 3D Printed Satellite Market to Reach \$1.9B

The global 3D printed satellite market is expected to grow from \$0.51 billion in 2023 to \$1.9 billion by 2033, at a CAGR of 14.06%. Advancements in 3D printing technology offer cost-effective, lightweight, and customizable satellite components. This trend is driven by demand for small satellites, communication, Earth observation, and navigation services. Government agencies, including NASA and ESA, are leading in adoption of the 3D printing technology. North America dominates, while Asia Pacific is seeing the fastest growth due to expanding space programs.



Satellai Launches Satellite-Powered Dog Tracker for Pets

Satellai, an AI-integrated pet solution startup, launched its Satellite-enabled Dog Tracker on 7 January. Designed for outdoor activities like hiking and camping, the tracker uses Qualcomm's 9205S Modem and 3GPP Release 17 standards for global satellite connectivity. Partnering with Skylo, it provides access to 680 networks worldwide. The device offers precise tracking with dual antennas, virtual boundaries, and weather-resistant design. It helps pet owners ensure their dogs' safety, with AI and satellite technologies for real-time updates.



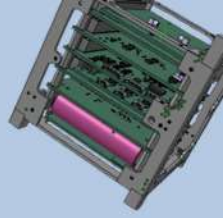
ISS Crew Prepares for Spacewalks and Experiments

The Expedition 72 crew aboard the ISS is preparing for spacewalks to service scientific instruments, including the NICER X-ray telescope and Alpha Magnetic Spectrometer (AMS). They're also conducting space agriculture experiments, with Flight Engineer Don Pettit working on growing Red Romaine lettuce. Cargo operations are being managed by Flight Engineer Butch Wilmore, while Russian cosmonauts focus on microbial research and equipment inventory. The crew's efforts continue to support scientific research and future space exploration missions.

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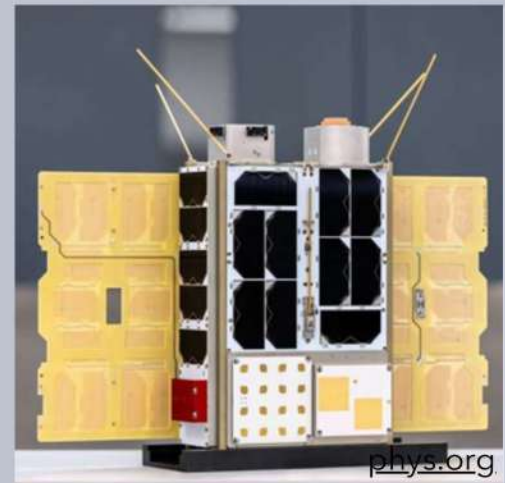
Japan to Launch Satellites for Hypersonic Detection

Japan is set to launch three small satellites for detecting and tracking hypersonic vehicles, such as Russia's Avangard and China's DF-17. These satellites, positioned in low Earth orbit at 400km, will use observation cameras and sensors to monitor fast-moving targets. The project, costing around \$525 million, is part of Japan's efforts to improve early detection of hypersonic threats. Future launches may expand the satellite network, with potential collaboration with the U.S. for cost-effective coverage. Japan's satellites will provide early warning against hypersonic threats.



HYPSO-2 Enhances Algae Monitoring from Space

HYPSO-2, a small satellite launched by NTNU, monitors harmful algae blooms and ocean phenomena from space. Equipped with hyperspectral cameras, it captures detailed images of water quality, helping researchers track algae, plankton, and climate-related processes. The satellite provides up to ten times more data than its predecessor, HYPSO-1. As part of Norway's growing space ambitions, HYPSO-2 supports ocean research and paves the way for future satellites like HYPSO-3, focused on lakes and rivers.



Sweden Invests in Satellite Integration for 6G

Sweden is launching a research project in 2025 to integrate satellite and mobile communication for 6G. The Swedish Foundation for Strategic Research (SSF) awarded a 60 million krona grant to the project, led by KTH. Participating organizations include Ericsson, Saab, and the Swedish Space Corporation, alongside international partners like Airbus and Eutelsat-OneWeb. The project aims to improve hardware, signal processing, and network technologies for sustainable, reliable, and intelligent 6G communication systems, ensuring global connectivity.



Wooden Satellite Deployed from ISS

Japan's LignoSat, a wooden satellite, has been deployed into orbit from the International Space Station. LignoSat aims to demonstrate the viability of wood as a sustainable material for spacecraft. Researchers will study how wood reacts to space conditions, including cosmic radiation and geomagnetic interference. Constructed from honoki magnolia using traditional Japanese joinery, LignoSat is part of a mission to explore environmentally friendly alternatives to conventional spacecraft materials.



Skykraft Leads Australia-India Collaborative PNT Project

Skykraft has partnered on the "Collaborative Position Navigation and Timing (PNT) in Low Earth Orbit" project, backed by Australia's ISI India Projects grant. The initiative aims to develop advanced PNT systems, enhance satellite navigation, and improve environmental sensing. Partners include RMIT University, IISc Bangalore, and Curtin University, boosting Australia-India space collaboration. The project will also demonstrate large-scale LEO constellations to address vulnerabilities in current GNSS systems.



Glasgow Engineers Drive Innovation in Space Industry

Steve Greenland, managing director of Craft Prospect, leads a thriving space engineering firm in Glasgow's historic Fairfield Shipbuilding building. Specializing in small satellite technology, the company works on cutting-edge projects like the €19m OPS-SAT VOLT mission, testing new communication technologies. With a growing presence in the city's space ecosystem, Craft Prospect's contributions, including collaborations with the European Space Agency, are placing Glasgow at the heart of Europe's satellite industry.



CubeSat constellations, a new era of global connectivity

The 75SSM

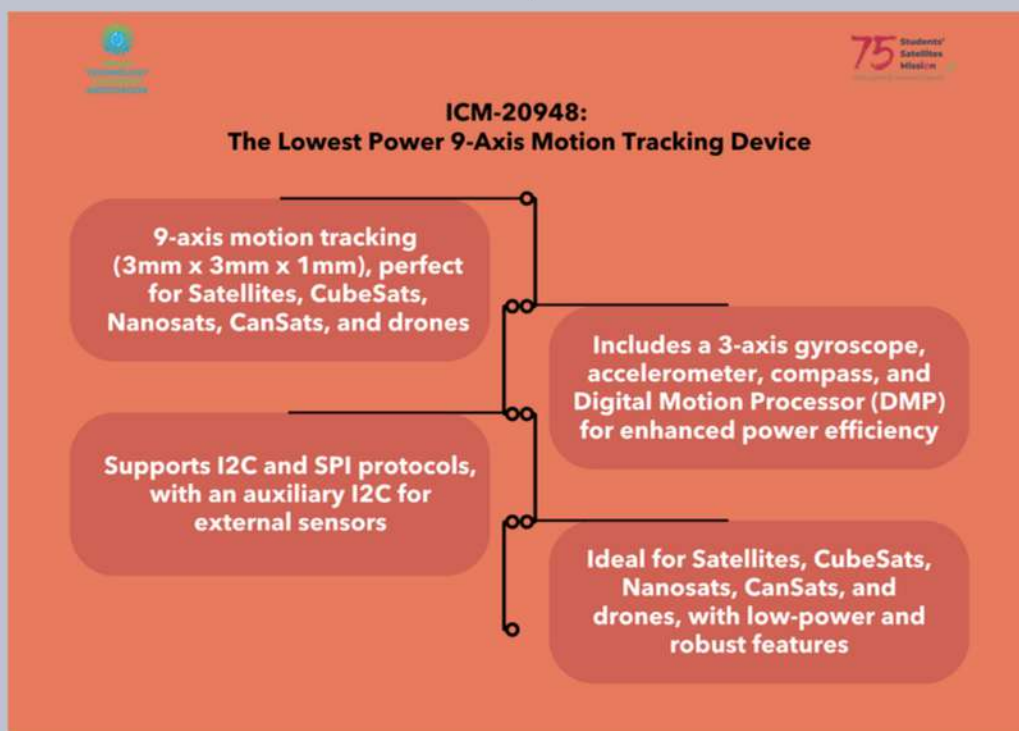
SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

ICM-20948: Leading the Way in Low-Power 9-Axis Motion Tracking

Performance and Precision

The ICM-20948 delivers exceptional performance with its integrated three-dimensional MEMS gyroscope, accelerometer, and magnetometer. These sensors work together to provide high-precision motion tracking with 16-bit resolution, making it ideal for applications requiring sensitive and accurate motion detection. Its programmable gyroscope ranges (± 250 , ± 500 , ± 1000 , ± 2000 degrees per second) and the accelerometer's independent proof masses ensure customizable and reliable data capture.



Robust Monitoring and Control

The ICM-20948 includes a register map that offers detailed control over its configuration and performance. Users can customize interrupt settings, sensor outputs, and monitor the device's status in real-time, ensuring optimized operation for specific use cases. The device's auxiliary I2C bus allows for easy communication with additional external sensors, further expanding its versatility. This makes the ICM-20948 an essential component for complex systems where multiple sensors must be integrated into a single platform for comprehensive data collection.



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Dr. V. Narayanan has been named the new Space Secretary and takes on the role of ISRO Chief, an expert in rocket and spacecraft propulsion.

[Read more at: hindu.com](http://hindu.com)



The space economy is set to grow fivefold in the next decade, fueled by advances in satellite tech, commercial space travel, and emerging industries.

[Read more at : spacedaily.com](http://spacedaily.com)



India plans 10 space launches in 2025, including missions to the Moon, Mars, and low Earth orbit.

[Read more at: spacenews.com](http://spacenews.com)



ISRO will launch a US satellite to enable voice calls via smartphones from space, improving global connectivity, especially in remote regions.

[Read more at: livemint.com](http://livemint.com)



ISRO's space docking experiment on 7 January will demonstrate, advancing future crewed and interplanetary missions.

[Read more at: Indiatimes.com](http://Indiatimes.com)



India is set for a busy 2025 with missions like the launch of a female robot into space and the NISAR satellite, boosting its space capabilities.

[Read more at : Indiatimes.com](http://Indiatimes.com)



India will launch the world's most expensive satellite to scan land and ice, offering crucial data for climate monitoring and resource management.

[Read more at: india.com](http://india.com)



'Life sprouts in space': ISRO successfully germinates cowpea seeds, advancing space farming for long-duration missions.

[Read more at : indiatvnews.com](http://indiatvnews.com)



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SmallSat Symposium 2025

4-6 February 2025
Silicon Valley Mountain View, CA
<https://smallsatshow.com/>

Space Technology Conference 2025

24-25 April, 2025
Boulevard Hotel Marriott in Baku, Azerbaijan
<https://www.spacetechnologyconference.com/>

SpaceCom

Conference: 29-30 January, 2025
Expo: 28-30 January, 2025
Orange County Convention Center, Orlando, FL
<https://www.spacecomexpo.com/>

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Compiled by

Er. Srinivas Durvasula

Er. S. Shanmugam

Er. Moses Denny Veliath

Er. K. Devi Sri Meenakshi

#3, First Main, BDA Layout, HAL 2nd Stage, Bangalore 560008.
www.itca.org.in; contact@itca.org.in



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