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SECTOR SPECIFIC REPORT

SPACE

SEPTEMBER 2025 EDITION

01 | INDIA'S GLOBAL SPACE LEADERSHIP AT GLEX 2025

India reaffirmed its global leadership in space exploration at the **Global Space Exploration Conference (GLEX 2025)**, hosted in New Delhi from May 7 to 9. The event themed **"Reaching New Worlds: A Space Exploration Renaissance,"** was jointly organized by the International Astronautical Federation (IAF), the Indian Space Research Organisation (ISRO), and the Astronautical Society of India (ASI). It drew more than 1,700 participants from 36 countries, including astronauts, researchers, scientists, and policymakers.

GLEX2025
GLOBAL SPACE EXPLORATION CONFERENCE

Source: https://www.news9live.com/science/india-to-host-12th-edition-of-global-space-exploration-summit-glex-2025-2848300

Source: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2127901

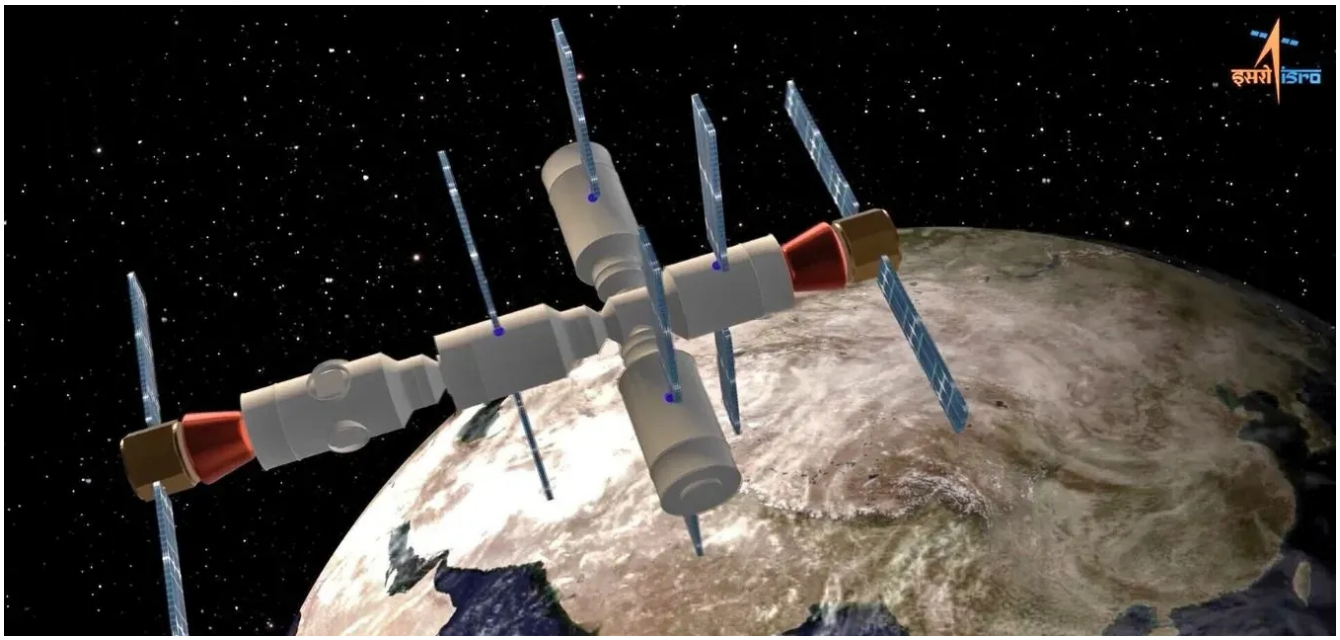
The conference highlighted India's ambitious vision for space exploration, focussing on advancing national development through space technologies while fostering global collaboration across diverse sectors. **India's roadmap includes sending an astronaut to the International Space Station and achieving a Moon landing by 2040, with future missions planned for Mars and Venus.** These efforts demonstrate India's enduring dedication to advancing science, driving innovation, and building impactful global collaborations.

GLEX 2025 highlighted the fast-growing Indian space economy, which is expected to reach $44 billion by 2033. This impressive growth is being driven by downstream services such as satellite-based navigation, remote sensing, and communication. It is also supported by innovative applications in agriculture, disaster management, climate monitoring, urban planning, and sustainable resource management. Supportive government policies and a dynamic private sector, including over 190 emerging space startups in recent years, are strengthening India's position as a global space power.

The conference demonstrated India's capacity for strategic planning, technological advancement, and peaceful international cooperation in space exploration. It highlighted the **country's vital role in providing innovative space solutions that benefit both society and the broader global community**. It also emphasized the importance of inspiring young talent, encouraging private innovation, and strengthening international networks that will actively shape the future of humanity's enduring and sustainable presence beyond Earth.

THEMATIC AREAS

1. International Cooperation, Challenges, and New Horizons
2. Lunar, Mars, Near-Earth Asteroids, Deep Space Exploration
3. Space Vehicles for Exploration & Propulsion for Deep Space
4. System Engineering and Long-Term Space Travel
5. Space Bioastronautics, Space Medicine, Life Support Systems
6. Space Finance, Investment and Insurance
7. Navigation, Guidance and Control for Deep Space Missions
8. Sustainable Space Logistics & Key Technologies
9. Space Resources Utilisation and Space Economy
10. Microgravity Science and Experiments
11. Space Policy, Sustainability and Legal Aspects
12. Space Stations & Challenges
13. Ground-Based Preparatory Activities
14. AI Impact & Autonomy on Space Exploration
15. Empowering the Next Generation of Space Explorers



Source: https://www.dsalert.org/article/indias-cosmic-leap-glex-2025/

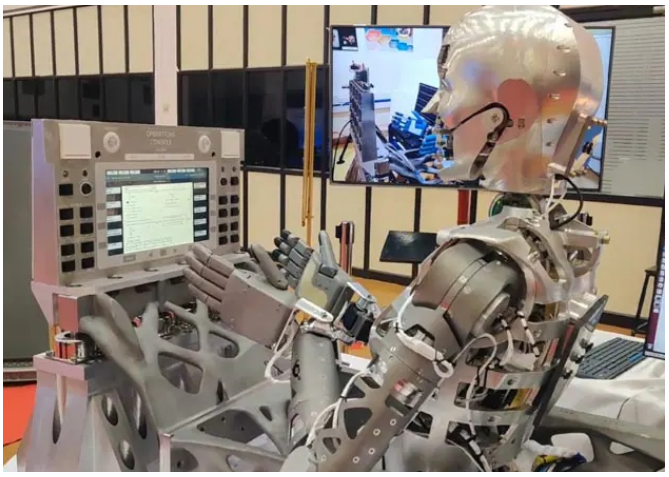
Thus, GLEX 2025 underscored India's emergence as a leading force in space exploration, combining scientific progress, economic growth, and collaborative partnerships. It also projected **a vision of innovation and excellence that positions the nation at the forefront of the rapidly evolving space domain**.

02 FIRST UNCREWED GAGANYAAN TEST FLIGHT SLATED FOR DECEMBER 2025

India's Gaganyaan human spaceflight project is poised to reach a key landmark with the scheduled **launch of its maiden uncrewed test flight, Gaganyaan-1 (G1), in December 2025**. This mission will serve as a proving ground for spacecraft systems and safety protocols, forming the foundation for **India's first human space mission targeted for 2027**.

Source: https://www.newsonair.gov.in/isro-gaganyaan-to-begin-test-flights-in-december/

The G1 mission will be launched aboard the **human-rated LVM3 rocket, also known as GSLV Mk III, and will carry Vyommitra, a half-humanoid robot designed by ISRO**. Vyommitra will simulate astronaut functions by monitoring cabin environment, life-support systems, avionics, and communication modules. Data gathered from the mission will be essential in validating the reliability of onboard systems before astronauts are placed on board.



Source: https://www.ndtv.com/india-news/isros-gaganyaan-g1-set-to-launch-with-half-humanoid-in-december-9130713

ISRO Chairman V. Narayanan recently reaffirmed the December timeline, highlighting that **more than 80 percent of the nearly 9,000 technical tests required for the programme** have already been completed. The remaining trials are likely to conclude by March 2026. He stressed that human spaceflight demands stringent safety measures, particularly after incidents such as the oxygen leak during the international Axiom-4 mission, which underscored the risks of space travel.

In preparation for the G1 flight, **ISRO has collaborated with DRDO's Agra-based Aerial Delivery Research and Development Establishment (ADRDE)** to design and deliver indigenous parachute recovery systems. These parachutes have undergone successful trials and will play a critical role in ensuring the safe re-entry and landing of the crew module after its orbital journey.

The December mission is the first of three planned uncrewed flights. Gaganyaan-2 and Gaganyaan-3 are scheduled for 2026, paving the way for the crewed launch in early 2027. Together, these missions represent a systematic and phased approach to testing.

Source: https://www.etvbharat.com/en/!technology/isro-begins-assembly-of-human-rated-lvm3-for-gaganyaans-first-uncrewed-flight-enn24121804312

Source: https://www.drdo.gov.in/drdo/technology-cluster-links/labs-products-detail/1195/172

TIMELINE OF G1

December 2025 — 1 — First uncrewed test flight (Gaganyaan-1) with Vyommitra onboard

Second and third uncrewed test flights — 2 — **2026**

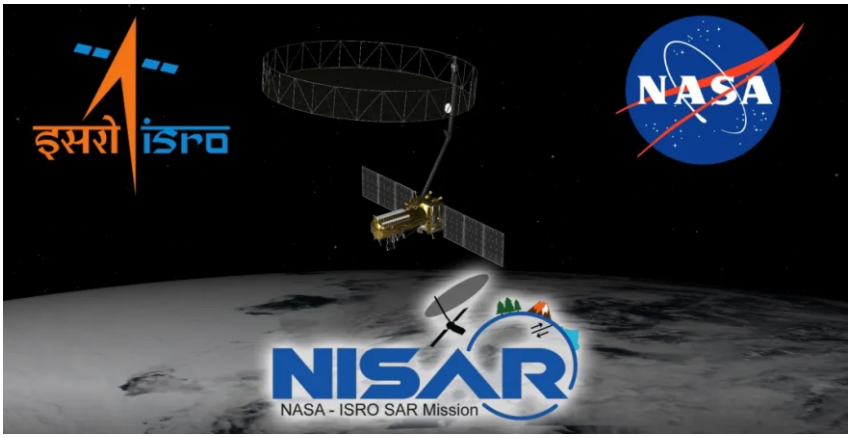
Early 2027 — 3 — Planned first crewed Gaganyaan mission

The G1 mission represents a key achievement in the nation's space exploration efforts. It will **validate the technologies needed to safeguard astronauts in orbit**. Thus, the mission will bring India nearer to becoming part of the select nations that can carry out human spaceflight independently.

03 NISAR EARTH-OBSERVATION SATELLITE SUCCESSFULLY DEPLOYED BY NASA AND ISRO

On July 30, 2025, ISRO and NASA marked a major milestone in international space cooperation. The two agencies successfully launched the highly advanced **NISAR (NASA-ISRO Synthetic Aperture Radar)** satellite from the renowned Satish Dhawan Space Centre in Sriharikota, Andhra Pradesh.

The launch took place at 5:40 p.m. IST using ISRO's GSLV-F16 rocket. After a 19-minute flight, the satellite was placed into a Sun-synchronous polar orbit at an altitude of 747 kilometers. This mission marked the **first time GSLV successfully deployed a satellite into this type of orbit**, reinforcing India's growing capability in space exploration.



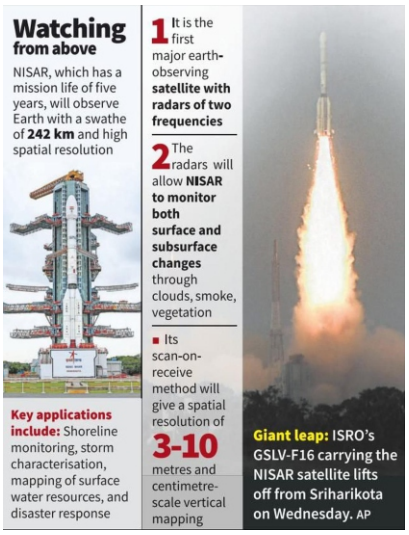
Source: https://www.opindia.com/2025/07/nisar-the-first-joint-satellite-mission-of-nasa-and-isro-to-be-launhed-soon/

Source: https://www.isro.gov.in/Mission_GSLVF16_NISAR_Home.html

NISAR is the **first Earth-observation satellite equipped with dual-frequency radar imaging systems**. It is equipped with NASA's L-band radar and ISRO's indigenously developed S-band radar. This advanced design enables the satellite to capture high-resolution images through cloud cover, haze, and even at night. With a revisit cycle of 12 days, NISAR will systematically track changes across land, vegetation, water bodies, glaciers, and urban landscapes.

The applications of NISAR are vast and transformative. It will **support disaster management** by improving early warning systems for floods, earthquakes, and volcanic eruptions. The satellite will also help monitor crop growth, manage water resources, and track ice sheet dynamics in polar regions. In addition, its data will **strengthen climate studies and guide urban planning, coastal management, and infrastructure development**.

Source:https://ddnews.gov.in/en/nisarsatellite-launchonjuly30tomarkmajorleapin-global-space-collaboration-jitendrasingh/



Source:https://www.thehindu.com/scitech/science/gslvf16withnisarsatelliteonboardliftsofffromsriharikota/article69873660.ece

According to the Department of Space, NISAR is among the **most significant collaborations between India and the United States in advanced Earth science**. Its valuable data will be made openly accessible, allowing researchers, agencies, and communities across the world to benefit meaningfully from its insights. This initiative reflects a **shared global commitment to using space technology for addressing common environmental challenges**.

ROADMAP OF NISAR MISSION

1. **2014** – India-US agreement signed
2. **2019** – L-band and S-band radar work begins
3. **2021-22** – Payloads tested in both countries
4. **March 2023** – Payload shipped to ISRO, Bengaluru
5. **2024** – Final integration and environmental tests
6. **July 30, 2025** – Launch from Sriharikota on GSLV-F16
7. **2025 - 2030** – Five-year Earth observation mission

As **NISAR begins its five-year mission**, it promises to redefine global Earth observation. The satellite will **provide reliable data for science, governance, and society**. It is expected to play a crucial role in tackling environmental challenges, strengthening resilience, and promoting sustainable development.

04 ISRO LAUNCHES BHARATIYA ANTARIKSH HACKATHON 2025 FOR PROMOTING INNOVATION AMONG YOUTH

The Indian Space Research Organisation (ISRO) has officially unveiled the second edition of the **Bharatiya Antariksh Hackathon (BAH) 2025, a flagship outreach program aimed at nurturing creativity and problem-solving among India's youth**. Introduced in 2024, the hackathon is held annually ahead of National Space Day, celebrated on August 23 to commemorate the successful landing of Chandrayaan-3.

Source: https://hindi.newsbytesapp.com/news/science/isro-launches-indian-space-hackathon-2025-what-is-it-and-how-to-participate/story

BAH 2025 was launched on June 18, 2025, by Dr. V. Narayanan, Secretary of the Department of Space and Chairman of ISRO. This year's edition **comprised 14 challenging problem statements** across various domains. Participation was open to teams of three to four students enrolled in undergraduate, postgraduate, or PhD programs from institutions across India.

More than 61,000 students registered for the event, forming 8,744 teams, which highlighted the nationwide enthusiasm for space-tech innovation. After an initial evaluation round, **30 teams were shortlisted for the 30-hour grand finale, which took place from August 7 to 8, 2025, at the National Remote Sensing Centre (NRSC) in Hyderabad**. The hackathon not only tested technical skills but also encouraged teamwork, critical thinking, and the practical application of classroom knowledge to real-world challenges.

Source: https://www.isro.gov.in/BAH2025_NRSC_Hyderabad.html

ISRO's leadership emphasized the transformative potential of the hackathon. Dr. Narayanan noted that **projects emerging from BAH could inspire new technologies and contribute to future space applications**. The final teams presented their refined solutions to a jury comprising senior ISRO scientists, directors of various ISRO centers, and subject-matter mentors, ensuring rigorous technical guidance and evaluation throughout the process. Such mentorship helps **students align their ideas with larger goals of India's space program while gaining exposure to professional research practices**.

By fostering competition, mentorship, and hands-on problem solving, **BAH 2025 underscores ISRO's commitment to engaging the next generation in India's ambitious space journey**. In doing so, it not only nurtures young talent but also strengthens India's ecosystem for space innovation. Further, it ensures that students become active contributors to the nation's long-term scientific and technological aspirations.

Source:https://www.isro.gov.in/Launching_Bharatiya_Antariksh_Hackathon2025.html

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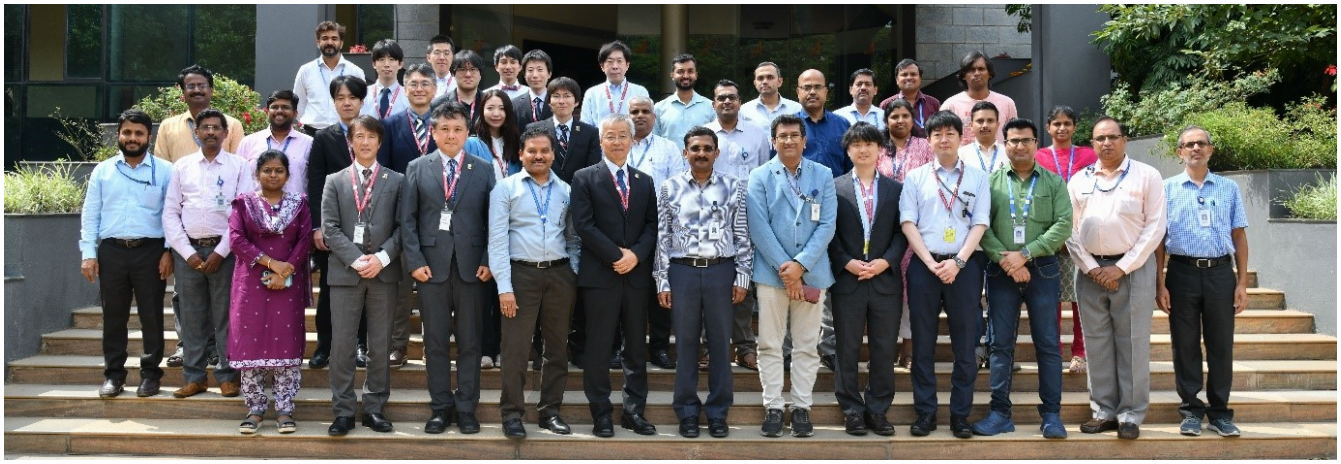
05 CHANDRAYAAN-5 MISSION TO BE LED BY ISRO-JAXA SPACE MISSIONS

The forthcoming **Chandrayaan-5**, also termed the **LUPEX (Lunar Polar EXploration)** mission, marks an unprecedented partnership between India's Indian Space Research Organization (ISRO) and Japan's Japan Aerospace Exploration Agency (JAXA) to explore the Moon's south pole and its elusive volatiles. The project builds upon the technological legacy of Chandrayaan-1, -2, -3, and the planned Chandrayaan-4, which aims to return lunar samples to Earth.

Source: https://organiser.org/2025/08/30/313162/bharat/isro-japans-jaxa-to-collaborate-for-chandrayaan-5-pm-modi-says-will-symbolise-mankinds-progress-in-space/

The mission received financial sanction on **March 10, 2025**, formalizing its pivotal role in India's lunar odyssey. Further progress was made in a **Technical Interface Meeting** held on **May 13–14, 2025** at ISRO Headquarters in Bengaluru, jointly attended by senior members of ISRO, JAXA, and Mitsubishi Heavy Industries. Discussions focussed on mission design, payload optimization, ground segments, potential landing zones, and coordination of technical interfaces.

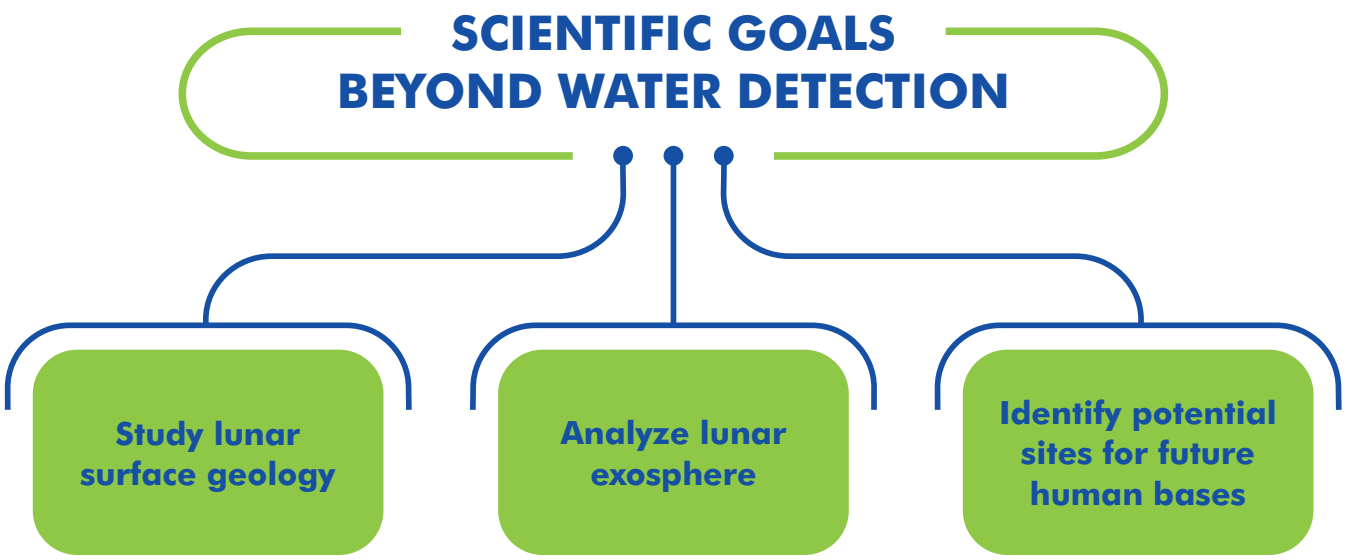


Source: https://www.isro.gov.in/ISRO_JAXA_CH5_Technical_Interface_Meet.html

The collaboration was formally announced during the **15th India-Japan Annual Summit**, where both sides highlighted that the joint lunar mission symbolizes the fusion of Japanese technology and Indian ingenuity. The project reflects how bilateral partnerships in infrastructure and science are now extending into the realm of deep space.

Source: https://www.pmindia.gov.in/en/news_updates/15th-india-japan-annual-summit-joint-statement-partnership-for-security-and-prosperity-of-our-next-generation/

In terms of technical design, Chandrayaan-5 will launch aboard **JAXA's H3-24L rocket**, carrying an **ISRO-built lander** and a **rover developed by MHI/JAXA**. The mission's payload — estimated around **6.5 tonnes**, including a **250 kg rover** — is significantly larger than Chandrayaan-3's rover. The rover will be equipped with water analyzers, spectrometers, ground-penetrating radar, and a 1.5-meter drill. Using these tools, it will **probe Permanently Shadowed Regions** of the lunar south pole to detect water ice and other volatile compounds. Instruments provided by **ISRO, JAXA, National Aeronautics and Space Administration (NASA), and European Space Agency (ESA)** will further enhance the mission's global scope.



This mission represents a new chapter of international cooperation, fusing national strengths to unlock critical insights about the Moon's polar environment — vital for future sustainable lunar bases. Backed by scientific ambition and diplomatic goodwill, Chandrayaan-5 is poised to deepen our understanding of lunar resources and strengthen India–Japan space collaboration.

06 | EXPERT INSIGHT

"Achieving milestone after milestone in the space sector has become a natural trait of India and its scientists"

Shri Narendra Modi
Prime Minister
India

RESOURCES

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