SPACE BEACON

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Beyond every week | 26 November 2025 | Issue 71



Earth and Theia were neighbors before collision

New research suggests Earth and the proto-planet Theia shared a nearby orbit before colliding, forming the Moon. This discovery reshapes our understanding of early solar system dynamics.

Weekly signals from the edge of innovation

ORBITAL

YOUR WEEKLY ORBIT THROUGH THE COSMOS' BOLDEST UPDATES

Space trivia alert

Saturn is less dense than water—if placed in a giant bathtub, it would float!



nasa.gov

ESCAPADE sends home its earliest mission selfies

About a week after liftoff, NASA's ESCAPADE mission already made history – the twin spacecraft sent back their first "selfies." On November 21, one ESCAPADE probe used its visible-light and infrared VISIONS cameras to photograph part of its solar panel while drifting away from Earth. The visible shot captures the panel's metallic edge against deep space; the infrared view shows temperature variations, hinting at the spacecraft's readiness for Mars aurora imaging. The twins launched were launched on Nov 13 on a Blue Origin New Glenn rocket and are on track for Mars arrival in September 2027.



nasa.gov

MRO redefines mysterious Martian subsurface signal

Mars Reconnaissance Orbiter's new radar technique—tilting the spacecraft 120°—reveals that a once-suspected underground lake beneath Mars' south pole is likely just rock and dust, not liquid water. This overturns earlier interpretations from 2018 but strengthens confidence in improved radar methods that can better detect hidden layers below the surface. While the finding dims hopes for a buried Martian lake, it sharpens the tools scientists use to search for subsurface ice and resources crucial for future exploration.



livescience.com

Alien meteorite discovered on Mars by Perseverance rover

The Perseverance rover has spotted a strange 80-cm rock in Jezero Crater that scientists believe is not native to Mars. Named Phippsaksla, the rock contains unusually high levels of iron and nickel, matching the composition of meteorites rather than typical Martian geology. This marks Perseverance's first confirmed meteorite-like discovery in four years on Mars. The find offers new clues about cosmic material landing on the Red Planet, adding to a growing list of unusual Martian rock formations.



universetoday.com

Mars hides evidence of long-ago ice ages in its valleys

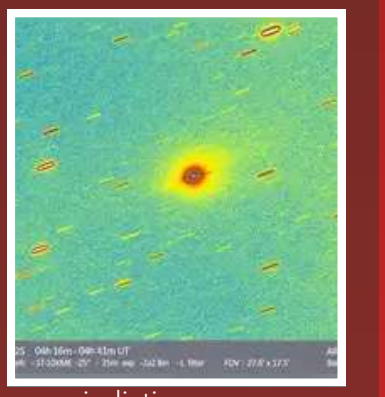
New images from ESA Mars Express reveal that Mars once experienced repeated ice ages – much like Earth. These images show swirling patterns on the floors of canyons and craters in the Coloe Fossae region, evidence of glaciers flowing across mid-latitude terrain. Known as "lineated valley fill" and "concentric crater fill," these formations suggest glaciers once extended far from the poles. Scientists say these features show Mars gradually lost much of its surface water over time as the climate shifted.



universetoday.com

Ancient water prolonged Mars' habitability

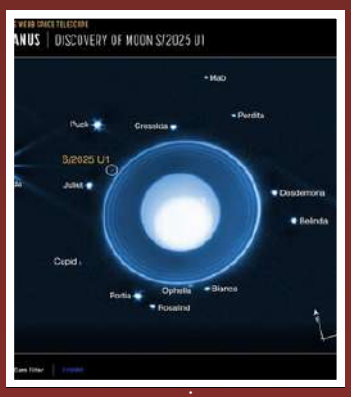
New findings based on Curiosity rover data reveal that ancient sand dunes in Gale Crater once absorbed underground water, transforming into rock and leaving minerals like gypsum as evidence. This suggests that even after Mars lost its surface lakes and rivers, subsurface water persisted far longer than expected, potentially creating sheltered environments capable of supporting microbial life. The discovery reshapes our understanding of Mars' climate history and strengthens the case for long-lasting habitability beneath its surface.



indiatimes.com

Interstellar object might skim Jupiter's gravity edge

3I/ATLAS – an interstellar wanderer – could pass extremely close to Jupiter on March 16, 2026, potentially skimming the outer boundary of its gravitational influence – the Hill radius. Calculations show its closest approach (≈ 53.445 million km) nearly matches Jupiter's Hill radius (≈ 53.502 million km), within a margin of just 0.06 million km. Scientists are keenly watching to see if non-gravitational forces nudged 3I/ATLAS into this path – a trajectory so precise it fuels speculation about its origin.



newsonair.gov

Uranus gets a tiny new moon – S/2025 U1 sighted

Using the powerful James Webb Space Telescope, astronomers at Southwest Research Institute confirmed a new, 29th satellite of Uranus – provisionally named S/2025 U1. Detected on 2 February 2025, the moon spans roughly 10 kilometres in diameter and orbits about 56,000 km from Uranus' center. Despite its small size, the discovery is significant: it adds to our understanding of the complex ring-moon system around this distant ice-giant.

GENSPACE

EXPLORING HUMANITY'S REACH BEYOND EARTH'S PAST, PRESENT, AND POTENTIAL

Space trivia alert

Jupiter's Great Red Spot is a storm bigger than Earth and has been raging for centuries.



indiatimes.com

US says space-based missile shield is now possible

A top US US Space Force general says the country now has the technology needed to build a space-based missile defence system. The ambitious project, Golden Dome, is meant to intercept hostile missiles in orbit or mid-flight – a long-standing dream now deemed achievable. Though the physics and sensors exist, integrating various military systems and teaming up with private companies remains the challenge. Still, proponents argue this marks a dramatic leap in homeland defence strategy.



popularmechanics.com

Harvesting space cold for endless energy power

Scientists are reimagining Stirling engines, centuries-old devices, to capture energy from the extreme temperature difference between cold space and Earth's radiative warmth. This breakthrough enables tiny engines to generate consistent milliwatts of power day or night, potentially powering small devices in orbit or remote locations. While the output is modest, it represents a revolutionary step toward sustainable energy in space environments, offering new possibilities for satellites and long-duration missions. The approach could transform how we think about energy harvesting beyond Earth.



space.com

Webb spots monster black hole feeding fast in early universe

Astronomers using the James Webb Space Telescope have discovered a supermassive black hole chowing down on gas within a tiny galaxy just 570 million years after the Big Bang. The galaxy, dubbed CANUCS-LRD-z8.6, belongs to a mysterious class known as "Little Red Dots," which defy expectations by hosting an enormous black hole nearly 100 million times the mass of the sun – far too big for such a small, early galaxy. This finding suggests black holes in the infant universe may have grown far faster than their host galaxies, rewriting our ideas of cosmic evolution.



livescience.com

Moss survives nine months outside ISS successfully

Scientists exposed moss to the harsh environment outside the International Space Station for nine months, testing its resilience to radiation, microgravity, and temperature extremes. Remarkably, over 80% of the moss spores survived and continued reproducing once returned to Earth. The findings, published in iScience, reveal that Physcomitrium patens can endure space conditions and may survive up to 15 years in orbit. This research sheds light on how plants adapt to extreme environments, offering insights for future long-term space missions.



blueorigin.com

Blue Ring launches first commercial GEO mission

Blue Origin has partnered with Optimum Technologies to fly its Caracal optical sensor aboard Blue Ring's inaugural mission. Launching in 2026, the spacecraft will enter Geostationary Transfer Orbit then move to Geostationary Orbit to provide "space domain awareness" – tracking, custody, and characterization of orbital objects. Caracal's storage, detection algorithms, and thermal controls will monitor activity during the year-long mission. The flight also includes a sensor from Scout Space, highlighting Blue Ring as a strong commercial platform for future GEO monitoring.



spaceglobalnews.com

DARPA and Redwire develop air-breathing VLEO satellite

DARPA awarded Redwire $44 million to build the first air-breathing satellite for very low Earth orbit (VLEO). The Otter mission will use upper-atmosphere molecules for propulsion, enabling sharper imaging, faster data links, and longer orbital life. Redwire's SabreSat platform merges airborne and satellite systems, boosting military and government surveillance. This innovative approach could transform low-orbit operations and advance sustainable, high-revisit VLEO missions, offering a new edge in intelligence and space technology.



spacedaily.com

Smarter satellite teamwork speeds global connectivity

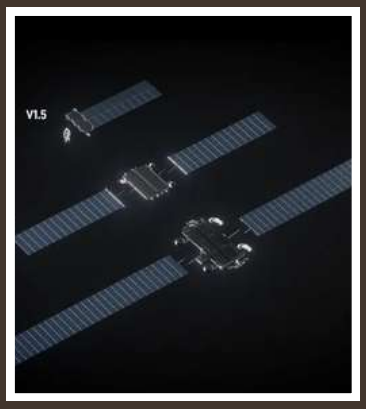
Mega-constellations of LEO satellites promise faster communications and better Earth monitoring, but managing thousands from the ground is tough. Researchers propose satellites self-organize into "management domains," each led by a central satellite controlling data flow. Tests with Starlink data cut communication delays to milliseconds and balanced network workloads. This dynamic, intelligent setup could revolutionize space-based internet and global connectivity.

SATELLOGY

TRACKING THE PULSE OF SATELLITE INNOVATION AND ASCENT

Space trivia alert

Canada's ANIK A1 (1972) was the first domestic geostationary communications satellite.



spacenews.com

Europe urged to expand space-based data centers

A recent think tank report calls on Europe to accelerate the development of space-based data centers to enhance digital infrastructure and support cloud computing from orbit. These space data hubs could improve data security, reduce latency, and enable faster, more efficient processing for industries across the continent. By leveraging satellite technology, Europe aims to strengthen its technological sovereignty while addressing growing demands for energy-efficient and resilient computing solutions. Strategic investments and collaboration with private and public sectors are key to achieving this vision.



aboutamazon.com

Amazon Leo launches ultra-fast satellite internet service

Amazon Leo, formerly Project Kuiper, has unveiled its new Ultra antenna, offering enterprise-grade satellite internet with download speeds up to 1 Gbps and uploads of 400 Mbps. Designed for businesses and government operations in remote areas, Leo Ultra provides secure, reliable, and weather-resistant connectivity, seamlessly integrating with cloud and on-premise networks. Select enterprises can now preview the service ahead of its wider rollout next year, helping close connectivity gaps across industries like energy, transportation, and media. Experience next-level satellite internet with Amazon Leo.



indiatimes.com

Oman launches its first national communications satellite

Oman has made history with the launch of its first-ever communications satellite, OmanSat-1, developed in partnership with Airbus Defence and Space. This fully digital Ka-band satellite will enhance secure, high-speed communications across Oman and the region, support critical sectors, and strengthen technological sovereignty. Managed by Space Communications Technologies, it will empower local expertise, integrate national companies, and align with Oman Vision 2040 for a knowledge-based economy. OmanSat-1 marks a major leap in the nation's space capabilities and digital independence.



eumetsat.int

Europe greenlights advanced polar satellite system

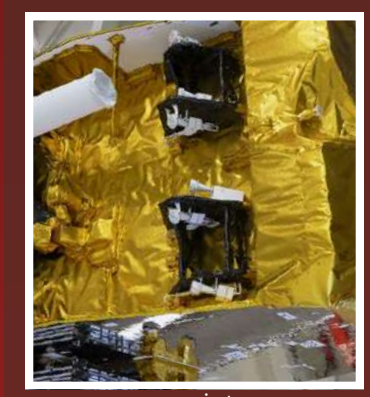
EUMETSAT is set to launch the EPS-Sterna constellation of polar-orbiting microsatellites by 2029, offering rapid microwave measurements of atmospheric temperature, humidity, and clouds. With 29 of 30 member states supporting the programme, EPS-Sterna aims to deliver global observations within hours, improving forecasts, storm tracking, and climate monitoring. Building on proven Arctic Weather Satellite technology, it will reduce forecast errors by up to 9% in critical regions. Over its operational life until 2042, the mission promises €30 billion in economic benefits and enhanced resilience across Europe.



satellitetoday.com

BlackSky unveils stunning new Gen-3 satellite images

BlackSky has released the first high-resolution images from its new Gen-3 satellite, capturing the Port of Jebel Ali in Dubai less than a day after launch. Delivered by Rocket Lab's Electron mission, the satellite showcases accelerated automated tasking and rapid image delivery, sharply reducing commissioning time. Built for 35-centimeter resolution and frequent sub-hour revisit rates, Gen-3 captures detailed visuals capable of identifying vehicle types and tracking activity patterns. As the constellation grows, BlackSky aims to further enhance operational life and imaging performance.



esa.int

Spain's next-gen satcom now fully in orbit

Europe's secure communications received a major boost with the launch of SpainSat NG II, completing the SpainSat NG programme. Both satellites now provide the Spanish Armed Forces, European agencies, allied nations, and humanitarian missions with advanced secure communications. Built on Airbus's Eurostar Neo bus with flexible X- and Ka-band antennas, the constellation delivers high-capacity, resilient coverage across Europe, the Americas, Africa, the Middle East, and parts of Asia. Joint operations are planned for 2026, enhancing Europe's strategic autonomy and crisis-response capabilities.



indiatimes.com

Russia boosts military space capabilities with launch

Russia has successfully launched a set of undisclosed military satellites from the Plesetsk Cosmodrome using an Angara-1.2 light launch vehicle. The defence ministry confirmed the mission, emphasizing that the satellites serve strategic defence interests. This classified launch, conducted by the Aerospace Forces, highlights Russia's push to modernize its space infrastructure and expand its military space capabilities with the latest modular rockets, replacing older Soviet-era systems. The move underscores Moscow's ongoing investment in space-based defence technology.

CUBETECH

PIONEERING THE FUTURE WITH COMPACT COSMIC INNOVATION

Space trivia alert

NASA and Stanford's EcAMSat CubeSat studied how spaceflight affects bacterial antibiotic resistance.



newsnetwork.com

Mantis satellite delivers big results from small frame

The MANTIS mission, led by Open Cosmos and backed by the UK Space Agency and European Space Agency, has concluded after two years of pioneering Earth-observation work. Launched in November 2023 aboard SpaceX Transporter-9, this compact 12U CubeSat completed over 10,000 orbits, capturing daily high-resolution imagery across half a million square kilometres. Its onboard AI and advanced multispectral imaging turned raw data into near-real-time, actionable insights that aided decision-making in energy, mining and environmental sectors. Designed with sustainability in mind, MANTIS safely de-orbited at end of mission – leaving no space debris behind.



satelliteevolution.com

Wales boosts innovation with six new space projects

Space Wales has selected six standout projects for funding under the Wales Space Cluster Catalyst Fund, supporting advancements in space education, quantum-secure communications, satellite technology, workforce development, and healthcare connectivity. The initiatives include rocket and cubeSat training programmes, early-stage quantum key distribution research, improved digital support for social-care workers, semiconductor-substrate production enhancements, a space awareness CPD programme, and a student satellite challenge. These projects collectively strengthen Wales growing space ecosystem and future-ready talent pipeline.



duke.edu

Duke lab's new satellite tech closer to real orbit than ever

A decade-long project at Duke has moved from theory to real-world orbit, thanks to a startup spun from the university. The new antennas developed by the lab behind Extellis enable satellites to capture up to 10,000 images per day – 100× more than current systems – using a novel synthetic-aperture radar design that works through clouds and at night. The $6.8 million seed funding now backs the launch of Extellis' first satellite, targeting industries like agriculture, energy and disaster response. The tech could soon scale Earth-monitoring from rare snapshots to continuous coverage.



winnipegfreepress.com

U of M readies bold lunar satellite mission

The University of Manitoba is set to make history with a small CubeSat slated for a 2027 lunar-orbit launch under a CA$6.9 million Canadian Space Agency contract. Built by U of M's STARLab, the milk-carton–sized spacecraft will deploy a dart-like device to the lunar surface to return valuable scientific data. This marks the university's first mission beyond Earth orbit and highlights Canada's growing role in deep-space innovation, strengthened by academic expertise and Indigenous guidance in mission design.



investor.co

Imdang boosts KAIST space research

The Imdang Foundation has donated W500 million to KAIST to advance its rapidly expanding space-research programs. The funding will support new aerospace studies, strengthen research capabilities, and encourage innovative technology development within the university. This contribution also reflects Imdang's commitment to nurturing scientific talent and accelerating South Korea's growing presence in global space innovation. The support is expected to create meaningful opportunities for breakthrough research and long-term academic progress.



nasa.gov

NASA advances cost-efficient satellite innovation

NASA is set to launch its R5-S7 CubeSat on SpaceX's Transporter-15 mission, showcasing a faster and more affordable approach to satellite development. Built using commercial off-the-shelf components, the CubeSat will test critical technologies, including a post-deployment proximity maneuver. The mission aims to cut design costs, reduce development timelines, and accelerate access to essential space systems, helping NASA pave the way for quicker, smarter, and budget-friendly future missions.



upi.com

Mexico launches first homegrown Earth-observation satellite

Mexico's Alvaro Obregón borough is sending its first locally assembled microsatellite, MXÁO-1, into orbit this week aboard SpaceX's Transporter-15 mission. Developed in collaboration with local universities and firm Macrolab, the satellite will ride a Falcon 9 rocket from Vandenberg and deliver multispectral Earth-observation imagery. Once in low Earth orbit, MXÁO-1 will help monitor landslide risk, green areas, illegal dumping and housing conditions – data will be freely available to students and researchers.

THE 75SSM

FROM LAB TO LAUNCH: INSIDE ITCA'S VANGUARD VISION

Space trivia alert

GSAT satellites boost India's communication, internet, and broadcasting services, supporting socio-economic growth.

"Space Batteries: Precision Thermal Control Powers Mission Success"



The 1U CubeSat, flagship of the 75SSM, marks a major leap in student-driven space innovation. It shows that when students are equipped with tools, mentorship, and ambition, they can redefine the frontiers of space technology. With its compact 10 cm^3 frame, the 1U CubeSat delivers capabilities rivaling larger satellites–making launches more accessible and affordable for educational institutions and emerging space nations. Battery thermal management in space is mission-critical. Lithium-ion cells operate safely only within a narrow temperature range, and without air, heat transfer occurs solely via conduction and radiation. During eclipse, batteries rapidly cool, while solar charging can overheat them, risking lithium plating or thermal runaway. Spacecraft maintain stability using insulation, heaters, thermal straps, and EPS-controlled charging algorithms. Proper thermal regulation prevents capacity loss, voltage instability, and catastrophic failure, ensuring reliable power and extending mission life.

SPACE@INDIA

TRACKING INDIA'S INDOMITABLE SPIRIT, RISING THROUGH SPACE

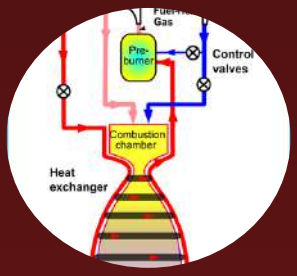
Space trivia alert

India's SRE-1 mission in 2007 successfully demonstrated safe recovery of an orbiting space capsule.

Indian Space Research Organisation (ISRO) says it will provide satellite support to Indian Railways – offering spare transponder capacity to improve real-time connectivity and signalling systems across the network. Read more at: thehindu.com



A German delegation led by State Secretary Dr. Silke Launert met ISRO in Bengaluru, discussing cooperation in human spaceflight, quantum communication, and industry partnerships. Read more at: **isro.gov.in**



ISRO successfully tested the CE20 Cryogenic Engine in bootstrap mode under vacuum, enabling smoother restarts and supporting future Gaganyaan and LVM3 missions. Read more at: **visionias.in**



ISRO is set to launch BlueBird-6, the heaviest US commercial satellite, on December 15, marking a major milestone in international space collaboration and satellite deployment. Read More: indianexpress.com



ISRO's LVM-3 will carry BlueBird 6 by AST SpaceMobile, enabling space-based cellular broadband accessible via regular smartphones. Read more at:(indiatoday.in)



ISRO plans to increase satellites from 57 to around 170 in the next three years, boosting space capabilities and future missions.
Read more at: newindianexpress.com/

75 Students' Satellites Mission

ITCA's Engineering Prowess and Ingenuity

ITCA: Pioneering India's Tech Future

Innovating India's tech for 23 years, we pioneered the '75 Students' Satellites Mission' and made a global impact in space tech, precision agriculture, and Industry 4.0.



Upcoming events

International Conference on Astronomy and Space Sciences (ICASS)
26 Jan 2026- Bengaluru, India
conferenceindex.org

International Conference on Aeronautical and Aerospace Engineering (ICAAAE)
Dec 11 2025 - Goa, India
conferenceindex.org

International Conference on Astronomy and Space Sciences (ICASS)
Dec 11 2025- Goa, India
conferenceindex.org

Slogan of the week

Explore It. Engineer It. Elevate It – The ITCA Way

Compiled by

Er. S. Shanmugam

Er. Nishanth S Kotian

Er. Anvitha Lokipalli

Er. Sofia Vengeti

SPACE BEACON

3rd Floor, First Main,
BDA Layout, HAL 2nd Stage,
Kodihalli, Bengaluru,
Karnataka 560008

www.itca.org.in
contact@itca.org.in

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