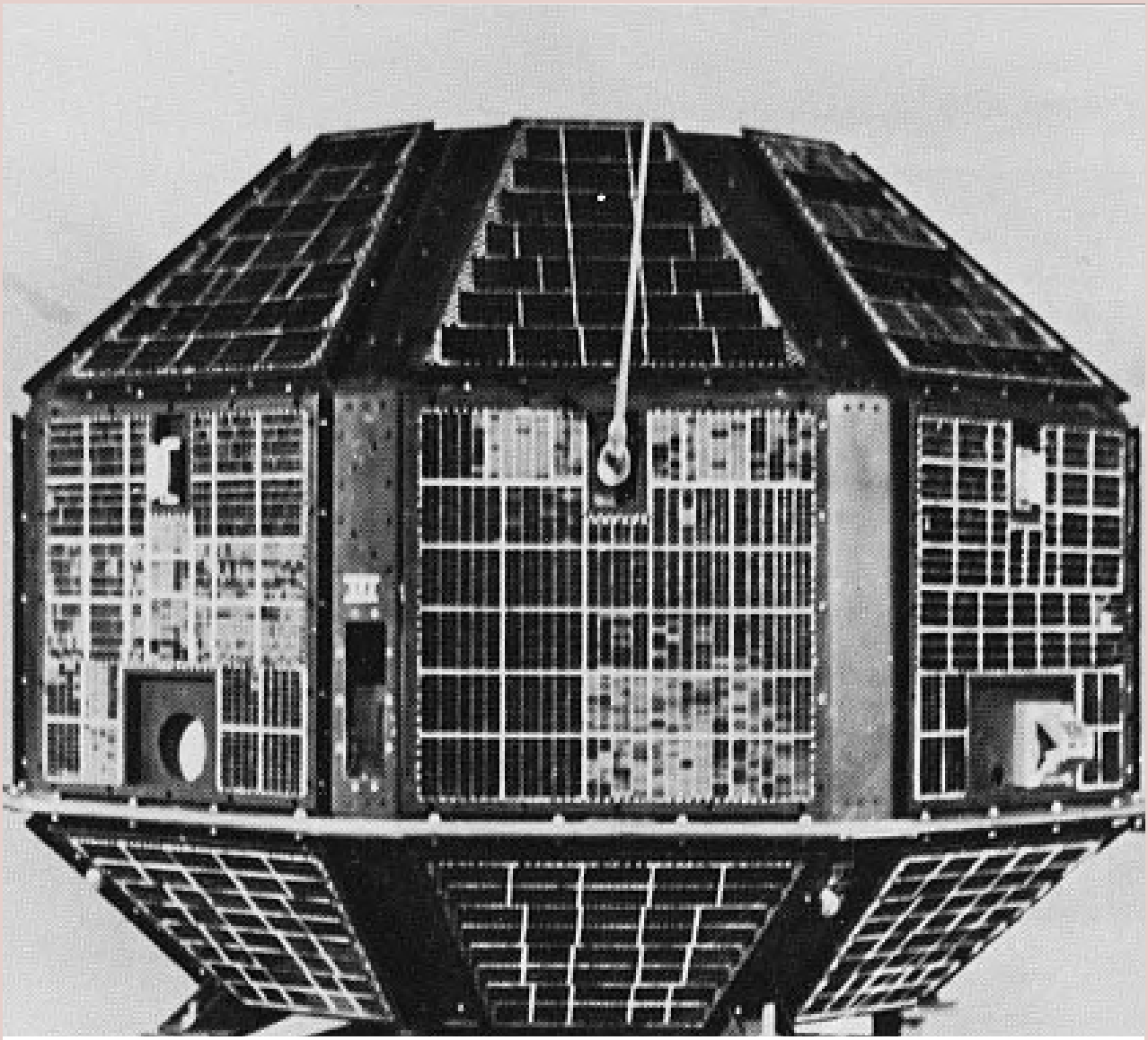
ISSUE 42 | 23 APRIL 2025

Space Beacon



Aryabhata: Remembering India's first satellite, launched back in 1975

Stay up-to-date with the latest in spacetech

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

Did you Know
Uranus spins on its side, unlike other planets, Uranus rotates on its side, with its axis tilted at a whopping 98 degrees relative to its orbit.

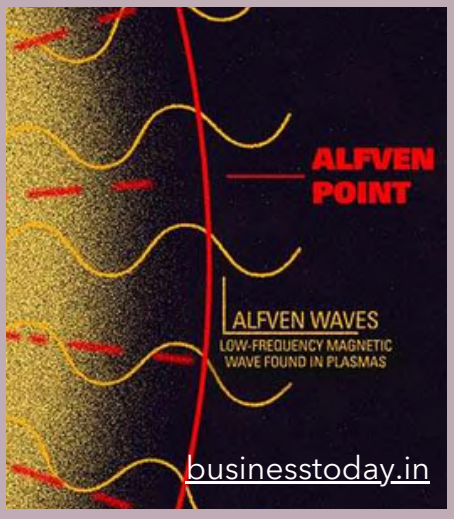
Perseverance Rover Explores Mars Crater Rim Rocks

The Perseverance rover is investigating Jezero Crater's rim, revealing diverse rock formations that may hold clues to Mars' geological past. The rover's observations suggest a complex history involving volcanic activity and water flow. By analyzing the composition and layering of the rocks, scientists hope to better understand the planet's ancient environment. These findings could also inform future missions, including sample return efforts. Perseverance explores sites that may reveal Mars' habitability.


spacedaily.com

Solar Wind may Unlock Water on the Moon

NASA's recent experiment has revealed an exciting possibility: solar wind might be able to generate water on the Moon. In a groundbreaking study, scientists demonstrated that particles from the solar wind could interact with the Moon's surface, potentially creating hydrogen and oxygen. These elements could combine to form water, making lunar exploration more sustainable in the future. The findings offer new hope for long-term missions and even the possibility of future human habitation.

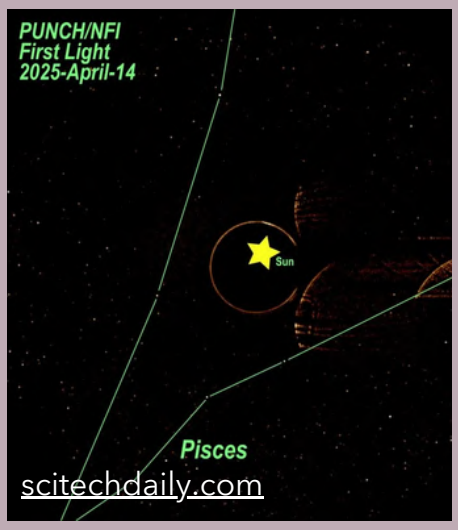


businesstoday.in

Jupiter's Storms Reveal Hidden Ammonia Mushballs

Juno spacecraft discovered that Jupiter's storms create slushy hailstones, known as mushballs, made of water and ammonia. These hailstones, formed in lightning-filled storms, descend deep into the planet's atmosphere, potentially removing ammonia from the visible clouds. This process could reshape our understanding of storm dynamics on gas giants and help scientists study exoplanets. The study, published in Science Advances, suggests a surprising mechanism that may apply to other gas giants too.


earth.com



scitechdaily.com

Unveiling the Sun's Hidden Halo in 3D

PUNCH (Polarimeter to Unify the Corona and Heliosphere) mission has successfully captured its first light, offering the first-ever 3D images of the Sun's elusive outer halo. This groundbreaking discovery allows scientists to better understand the Sun's atmosphere and its impact on space weather. By studying the Sun's corona, PUNCH aims to enhance our knowledge of solar winds and their influence on Earth. This vital information is crucial for predicting space weather and protecting satellite systems.


space.com

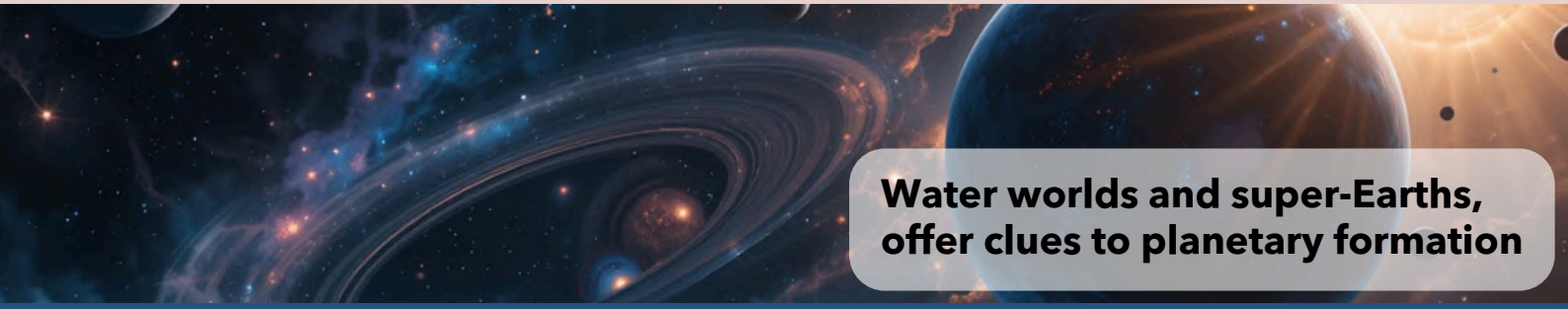
Gamma-Ray Bursts Reveal Largest Structure in Universe

Recent observations of gamma-ray bursts have unveiled a colossal cosmic structure that is closer to Earth and larger significantly than previously believed. This discovery, made possible by advanced space telescopes, challenges our understanding of the universe's scale. The structure, whose true nature is still uncertain, could provide critical insights into the fundamental workings of the cosmos. While scientists continue to analyze the data, this finding reshapes the way we think about large-scale cosmic formations.


techexplorist.com

Carbon-Rich Asteroids Rarely Become Earth Meteorites

A new study reveals that carbon-rich asteroids, which are abundant in the asteroid belt, rarely transform into meteorites that make their way to Earth. These asteroids are often rich in organic materials, which could potentially offer valuable insights into the origins of life. However, their transformation into meteorites is an unlikely event, as their size, velocity, and composition make them harder to penetrate Earth's atmosphere. These finding challenges earlier beliefs and opens up new avenues for research in planetary science and meteorite studies.



Water worlds and super-Earths, offer clues to planetary formation

Genspace

Cover broader space news not fitting into other categories

Did you Know
The Observable Universe, the diameter of the observable universe is about 93 billion light-years, but the entire universe might be even larger!

Multilateral Coordination for Commercial Space Stations

The transition from the ISS to commercial space stations requires continued multilateral coordination. Pam Melroy, former NASA deputy administrator, emphasized the importance of trust and international partnerships. As new commercial ventures emerge, harmonization of space law across countries will be vital. Collaboration among global players like Canada, Japan, and Europe will be key, as countries seek to balance domestic investments and international access.


spacenews.com

McMaster Researchers Lead High-Altitude Mission

Researchers, including PhD candidate Alex McCafferty-Leroux, contributed to NASA's groundbreaking Air-LUSI project. The mission utilized McMaster's HAAMR device to enhance the precision of Earth-observing satellites by using the Moon as a calibration tool. The data gathered is the most accurate lunar measurement ever, aiding satellite calibration and reducing model errors by 4%. This successful mission sets a new standard for scientific accuracy.


brighterworld.mcmaster.ca

DARPA's Autonomous Satellites for Cislunar Awareness

DARPA is developing autonomous, maneuverable satellites to enhance domain awareness in the cislunar region. The program aims to monitor space objects beyond Earth's orbit, improving national security and space exploration. These satellites will be capable of on-orbit maneuvering, providing real-time data on space debris and other assets. The initiative supports growing concerns over space safety and the need for advanced technologies in the expanding cislunar domain.


satellitetoday.com

losalamosreporter.com

Innovative Spacecraft Speedometer to Track Satellites

Los Alamos National Laboratory, alongside the U.S. Air Force Academy, has developed a breakthrough tool: the Spacecraft Speedometer. This compact device allows for accurate, real-time velocity measurements of satellites in orbit, even during challenging conditions like solar storms. By tracking ion flow via forward and rear sensors, it can provide critical data for space traffic management and maneuvering to avoid debris. This technology promises to enhance satellite operations and space sustainability.

moondaily.com

Voyager's New Dust-Resistant Coating Tested on Moon

Voyager Technologies has introduced a groundbreaking Clear Dust-Repellent Coating (CDRC) tested on the Moon. Delivered by Firefly Aerospace's Blue Ghost lander, the coating reduces lunar dust accumulation on various surfaces. Unlike powered systems, this passive solution offers benefits to both space missions and industries facing dust-related challenges. Key tests, including spacesuit fabric evaluation, aim to enhance the durability of lunar gear. This project supports NASA's Artemis program and long-term lunar exploration.

bbc.com

Lab-Grown Food in Space Reduces Astronaut Costs

ESA-funded research seeks to develop lab-grown food in space to lower the cost of feeding astronauts. The experiment, involving yeast-based bioreactors, aims to create proteins, fats, and carbohydrates from cells in space. By removing dependence on Earth-based food supplies, the process could revolutionize space missions. The research will continue with a larger bioreactor on a subsequent mission, potentially creating space kitchens for astronauts in orbit or on the Moon. This breakthrough could make journey to Mars and beyond more feasible.

Satellogy

Focus on recent and upcoming satellites and launches

Did you Know
Vostok 1 Capsule (1961 - Soviet Union), while technically not a satellite, it carried Yuri Gagarin, the first human, into orbit and proved humans could survive in space

New Satellite to Monitor Earth's Surface Changes

A groundbreaking collaboration between NASA and ISRO, the NISAR satellite, will launch soon to track Earth's surface shifts. This advanced mission will provide global coverage, mapping changes in ecosystems, land, and ice with high-resolution radar technology. NISAR can monitor areas affected by natural hazards, water movement, and even land displacements from earthquakes, all through all-weather, day-and-night capabilities. The satellite's dual radar system promises valuable insights for science and environmental monitoring.


eos.org

China's New Three-Satellite Constellation in Space

China has established the world's first three-satellite constellation in the Earth-moon region, known as the distant retrograde orbit (DRO). This constellation comprises the DRO-A, DRO-B, and DRO-L satellites, launched between February and March 2024. Key achievements include a first-of-its-kind low-energy insertion into the DRO using only one-fifth of the fuel required by traditional methods, and successful verification of a 1.17-million-kilometer K-band inter-satellite microwave measurement and communication link.

globaltimes.cn

Hughes and Eutelsat Expand LEO Broadband Access

Hughes and Eutelsat have partnered to provide low Earth orbit (LEO) satellite broadband services across Europe. Their collaboration combines OneWeb's LEO satellite network with Hughes' advanced ground equipment. Hughes' flat-panel antenna, designed for LEO, supports high-speed, low-latency connectivity for industries like energy, manufacturing, and retail. The service is also being explored by European government agencies for critical infrastructure. This solution promises reliable connectivity for remote deployments and demanding applications.


hughes.com

SPACE 4.0: A Celebration of Innovation and Collaboration in India's Space Front

National Seminar – SPACE 4.0: A Celebration of Innovation and Collaboration in India's Space Frontier, held on 11–12 April 2025, Dr MGR Educational and Research Institute (Dr MGR ERI) Chennai

The two-day event covered: Emerging Space Technologies and Innovations brought together visionaries, scientists, academicians, and students in an engaging celebration of India's strides. The colourful event commenced on a resonant note, echoing the spirit of India's space heritage and its aspirational future. The opening session set the tone with an inspiring invocation and welcome address, followed by a series of powerful speeches underlining the seminar's objective to "inform, inspire, and innovate".

Their addresses seamlessly blended technical depth with visionary outlooks, reaffirming the seminar's commitment to showcasing cutting-edge space research. A significant highlight of the seminar was the announcement of Dr MGR University's successful student participation in the Prime Minister's ambitious program, 75 Satellite Mission (75SSM). The university's student-developed CubeSat, designed to assist Indian fishermen with real-time communication and safety features, exemplified the transformative power of student-led innovation in addressing national challenges. Dr Madhan Bala's (Astitva Aerospace Tech Pvt Ltd, Alabama University, USA) session on integrated opportunities in the space economy bridged theory with practical insight. Drawing from his career

The inaugural address delivered by Shri M Sankaran, Director of the UR Rao Satellite Centre, ISRO (Blr), spotlighted India's achievements in the satellite domain and its robust trajectory toward becoming a global space power. Dr G Raja Singh Thangadurai, Program Director of PJ-10 BrahMos, DRDO, enriched the discourse with insights into Indo-Russian collaboration and the innovations fueling the BrahMos missile program and futuristic space innovation.

trajectory from chemical engineering to advanced aerospace propulsion; he emphasized interdisciplinary learning and the evolving aerospace job market. His message underscored adaptability, systems thinking, and lifelong learning as essential tools for young professionals navigating the new space age. The audience was equally captivated by Dr Prakasha Rao's session, which explored environmental factors affecting spacecraft including radiation, temperature extremes.

His detailed overview of spacecraft endurancechallenges–from intense radiation to vacuum conditions–highlighted the crucial intersection of environmental science and engineering design. Later, Shri SPM Moin, COO of Agnikul, showcased the practical applications of automation and additive manufacturing in launch vehicle development. His talk revealed how 3D-printed rocket engines and compact manufacturing workflows are shaping the future of India's private space sector. His presentation resonated deeply with students, particularly those involved in Agnikul's academic collaborations.

Equally inspiring were the student-led technical sessions. Presentations on CubeSat subsystems by Mr Pranava Kumar and Mr Dinesh Kumar, and the CanSat and rocketry design sessions by final-year and pre-final-year engineering students, demonstrated the immense potential of youth-driven innovation. The CanSat featured a servo-actuated parachute deployment system and a gimbal-stabilized payload using recycled components–blending sustainability with sophistication. The rocketry team detailed propulsion system integration, structural design, and telemetry modules, all built with a frugal engineering mindset. The seminar also featured forward-looking policy discussions. Dr Vinod Kumar from IN-SPACe provided an overview of the Indian Space Policy 2023, emphasizing regulatory frameworks and increased commercial participation. Dr A Rajarajan from Satish Dhawan Space Centre (SDSC) highlighted the "Small is the New Big" philosophy, urging institutions to embrace miniaturized technologies for global relevance.

systems were delivered by Shri Vikram Sivaprakasan. He examined the technical transition from GEO to LEO satellites and their potential in closing the digital divide. His talk covered phased array antennas, beamforming, and real-world applications in disaster relief and maritime communication. Vikram's remarks bridged theory with immediacy, offering attendees a glimpse into the future of global connectivity. Another key speaker, Mrs Kalpana Arvind, emphasized advancements in electro-optical sensor technology, while Shri B Vishnu Prakash delivered an inspiring call to empower women in the space ecosystem, encouraging broader participation and inclusivity in high-tech domains.

The seminar fostered an atmosphere of discovery and collaboration, highlighting hands-on learning, practical exposure, and global partnerships as keys to advancing small satellite applications. Dr Gopalakrishnan, Secretary General (ITCA) projected the role of academic alliances in shaping future space leaders. As he emphasized, the 75SSM exemplifies India's leap into the Space 2.0 era, empowering academic institutions to join the global space race and boost their institutional stature through hands-on satellite programs.

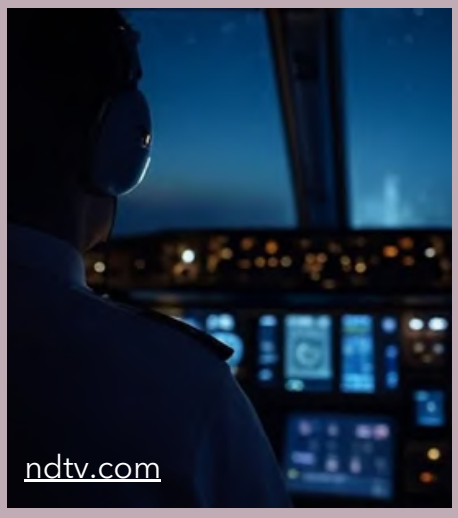
With strong support from Dr MGR ERI and the space science community, the seminar highlighted India's 2047 space vision, emphasizing student-led innovation, collaboration, and purpose-driven progress.

NRO Achieves Major Satellite Milestone in Two Years

The National Reconnaissance Office (NRO) has successfully deployed over 200 satellites into orbit in just two years. This milestone was achieved with the launch of the NROL-145 mission, marking SpaceX's 10th launch for the NRO's proliferated architecture. The agency continues to build a resilient network of smaller satellites, enhancing surveillance capabilities. With ongoing missions and plans for 2025, the NRO is set to further advance its satellite constellations, reinforcing U.S. national security and intelligence operations.

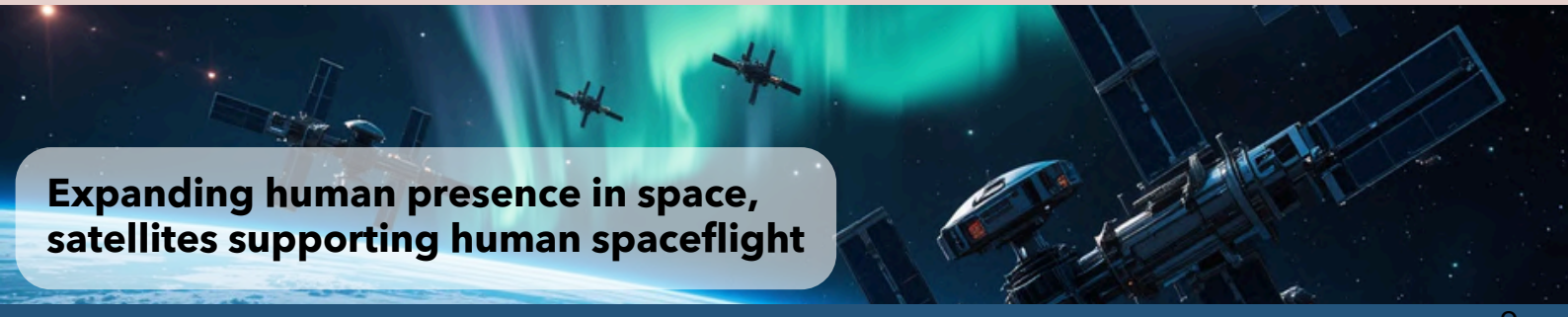
Spain Invests €1 Billion to Boost PAZ-2 Satellites

Spain's government has approved a €1.011 billion loan for Hisdesat to develop the PAZ 2 Earth observation satellites. This funding ensures Spain's radar imaging capabilities continue after the PAZ-1 satellite's lifespan ends. The loan will be distributed between 2025 and 2032, with the first instalment scheduled for 2025. The Spanish government holds a significant stake in Hisdesat, giving it greater influence in the project. The deal also highlights a unique level of state financing for such projects.

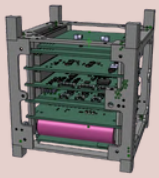


Finland Developing Device to Combat GPS Jamming

Finland is addressing the rise in satellite GPS jamming, likely attributed to Russia, which has disrupted aviation and military operations. Researchers are working on a device to identify and counteract the interference, particularly in regions along the Finnish Russian border. This initiative, part of an EU-funded project, aims to enhance national security by mitigating jamming risks impacting sectors like aviation, maritime, and forestry. The two-year project focuses on a region with frequent signal disruptions.



CubeTech



Showcase innovative CubeSat missions and unique payloads

Did you Know
Deep Space CubeSat – NEA Scout, NASA's Near-Earth Asteroid Scout CubeSat will explore an asteroid, proving the potential of CubeSats in deep-space missions.

Korea Revives CubeSat Launch for Artemis 2

South Korea is revitalizing its space ambitions by planning to launch a CubeSat as part of NASA's Artemis 2 mission. This initiative, led by the Korea Astronomy and Space Science Institute (KASI), aims to deploy a small satellite to study the Moon's surface and environment. The CubeSat will contribute to lunar exploration by collecting valuable data, enhancing international collaboration in space research. This endeavor signifies South Korea's commitment to advancing its space technology and participating in global space missions.

biz.chosun.com

MSU Students Launch CubeSat with Weather Balloon

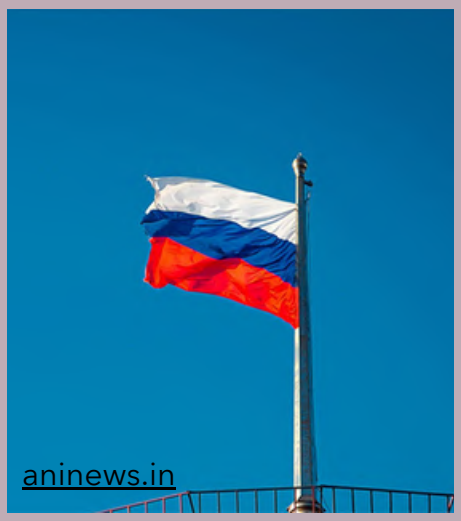
Mississippi State University students have successfully launched a CubeSat into near space using a weather balloon. This innovative project, led by MSU's High Altitude Ballooning team, reached over 100,000 feet in altitude. The CubeSat collected atmospheric data and tested onboard systems in preparation for future satellite missions. The launch serves as a major milestone for MSU's aerospace research and student-led engineering projects, offering hands-on experience in space science and technology. This effort boosts learning and strengthens MSU's space role.


reflector-online.com

Blue Skies Space to Design Lunar CubeSat Array

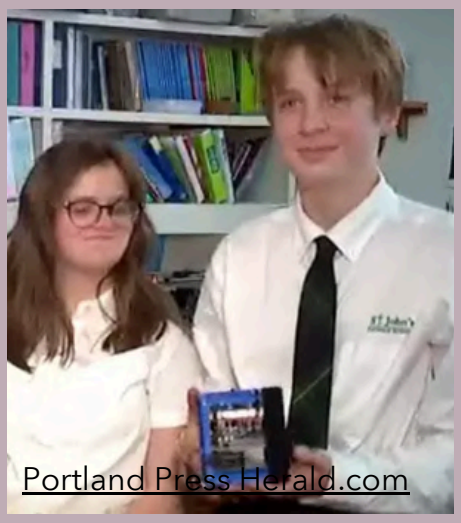
Blue Skies Space, backed by the Italian Space Agency, is developing "RadioLuna"—a CubeSat constellation to orbit the Moon's far side and detect faint radio signals from the universe's early "dark ages." Utilizing commercial off-the-shelf components, the project aims to overcome Earth's radio interference by leveraging the Moon's natural shielding. Partnering with OHB Italia, the initiative explores integrating with ESA's Moonlight and NASA's Artemis programs for infrastructure support.


payloadspace.com



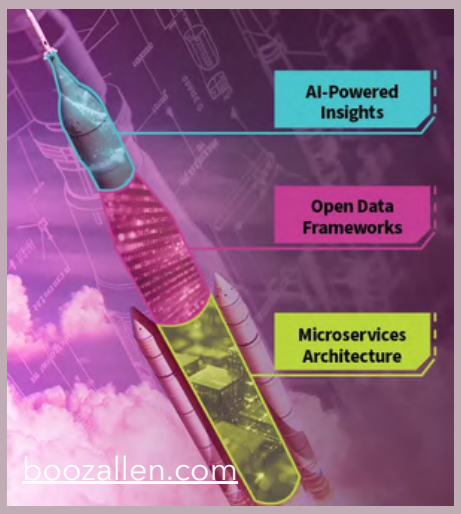
Russian Students Launch Stratospheric Satellite Probe

A team of Russian high school students has successfully launched a stratospheric probe carrying a satellite payload, marking a major step toward Yakutia's first mini-spacecraft, expected in 2025. The probe reached an altitude of 30 kilometers, collecting critical data for future satellite missions. This educational and scientific project was carried out with support from the Yakutia Technopark and Russia's Roscosmos space agency. The initiative showcases student innovation and boosts regional space tech, inspiring youth in aerospace.



Brunswick School Launch CubeSat into Space

Middle school students from St. John's Catholic School in Brunswick, Maine, sent their CubeSat experiment, "Atmosphere and Radiation Investigator," aboard Airbus Perlan Mission II. The mission aims to gather data on high-altitude flight and its effects on weather and climate. Designed to measure temperature, radiation levels, and sound, the CubeSat provides valuable insights into aerospace science. This project follows the students' previous Zero-G flight experience.



Reimagining Ground Systems for the Cloud Era

Traditional ground systems are being transformed by cloud-native architectures, enabling real-time, scalable, and cost-effective satellite operations. By shifting to cloud-based models, organizations gain flexibility, resilience, and faster mission support. Booz Allen explores how integrating advanced AI, automation, and cybersecurity into these systems allows for dynamic, on-demand control and analysis. This new paradigm is revolutionizing how space data is accessed and utilized, eliminating geographic limitations and enhancing global collaboration.

The 75SSM

SSM: Students' Satellites Mission

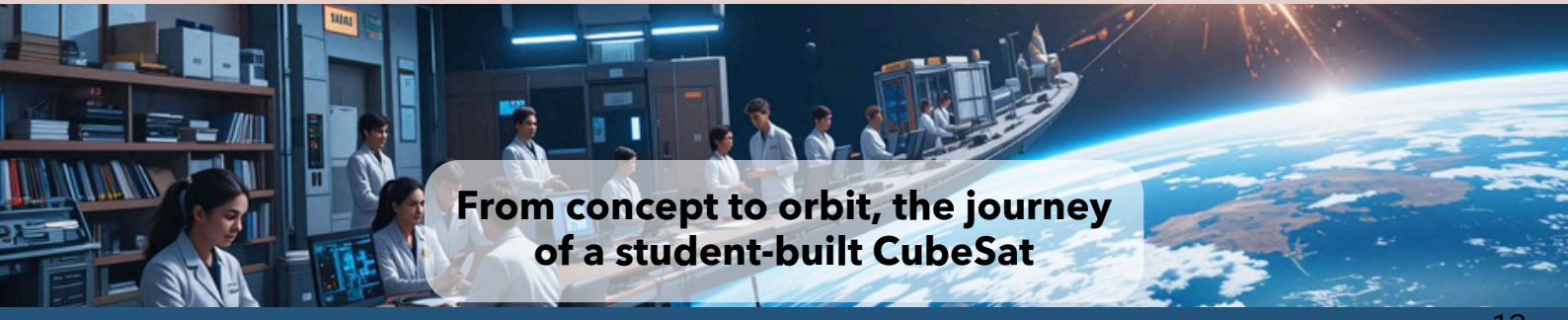
Update readers on our ITCA internal space-based innovations

Did you Know

CRSat uses the INA226 sensor to track voltage, current, and power–just like real CubeSats! It ensures efficient energy use and system reliability

SW200-D Roll Ball Switch: Compact, Reliable Tilt & Vibration Detection

CRSat gives students hands-on experience with satellite tech, mirroring CubeSats. It integrates solar power, sensors, and real-time data collection, bridging theory and practice to build skills in power management, data analysis, and communication for real-world space challenges. The SW200-D dual ball tilt switch, a compact, sealed sensor offering vibration detection. Designed as a mercury-free, RoHS-compliant component, it enables environmentally responsible and highly reliable tilt sensing for modern electronic applications. The SW200-D triggers at 15° angles, responding to tilt or vibration with a fast 2ms reaction time. Its low-power design (<12V, <20mA) makes it ideal for energy-conscious projects, while its rugged construction ensures waterproof and dustproof operation across a wide temperature range (-40°C to 80°C). The switch's three-terminal layout allows for simple integration into existing circuits, and its 100,000-cycle lifespan ensures long-term durability. Whether it's for smart devices, automotive systems, or IoT products, the SW200-D offers versatile, dependable orientation sensing with minimal design overhead.



From concept to orbit, the journey of a student-built CubeSat

Space@India

Glimpses into India's space chronicle, every week

Did you Know

IChandrayaan-1 (2008), India's first lunar probe discovered water molecules on the Moon– a landmark achievement in planetary exploration

Aryabhata: Celebrating 50 Years of India's Pioneering Leap into Space

On 19 April 1975, India launched its first satellite, Aryabhata, marking a historic leap into the space age. Developed by ISRO and launched from the Soviet Union under the Interkosmos program, the 360 kg, 26-sided satellite was designed for experiments in X-ray astronomy, aeronomics, and solar physics. Though a power failure ended experiments after four days, Aryabhata remained in orbit until 1992. Its successful launch showcased India's engineering prowess and laid the foundation for future space missions. Named after a 6th-century scholar, Aryabhata's legacy endured, featuring on the ₹2 note for over 20 years.

NSIL Enhances India's Space Infrastructure with Partnerships

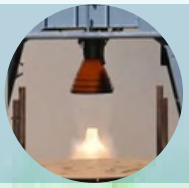
Read more at: thedefensenews.com

ISRO Achieves Milestone with Second SpaDeX Docking

Read more at: timesofindia.com

India's Push for Self-Reliant Space Technology

Read more at: indiandefensenews.in

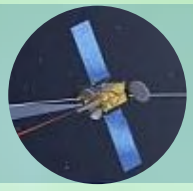


Revolutionizing Space Tech: India's Groundbreaking PSLV Upgrade

Read more at: wion.com

Gujarat Unveils New Spacetech Policy for Growth

Read more at:hindustantimes.com



India Boosts Military Satellite Launches with Private Sector

Read more at: bharatshakti.in

75 Students' Satellites Mission

ITCA's Engineering Prowess and Ingenuity

ITCA: Pioneering India's Tech Future

Innovating India's tech for 22 years, we pioneered the '75 Students' Satellites Mission' and made a global impact in space tech, precision agriculture, and Industry 4.0.

Events

Global Space Exploration Conference

07- 09 May 2025
New Delhi, India
gsec2025.org

SatelliteAsia Conference

27 - 29 May 2025
Singapore
sac2025.com

Space Tech Expo

03 -04 June 2025
California, United States
ste2025.com

Upcoming...

Launches

SpaceX | Falcon 9 Block 5 | Starlink Group 6-74

25 Apr 2025 07:02 IST
SLC-40, Cape Canaveral SFS, Florida, USA

Firefly | Alpha | Message In A Booster

27 Apr 2025 19:07 IST
SLC-2W, Vandenberg SFB, California, USA

ULA | Atlas V 551 | Project Kuiper (KA-01)

29 Apr 2025 04:30 IST
SLC-41, Cape Canaveral SFS, Florida, USA

SPACE BEACON
cosmic cadences on our radar

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