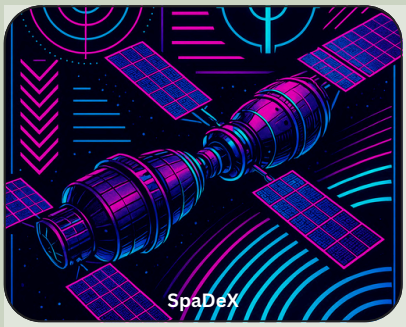
ISSUE 45 | 14 MAY 2025

Space Beacon


SpaDeX

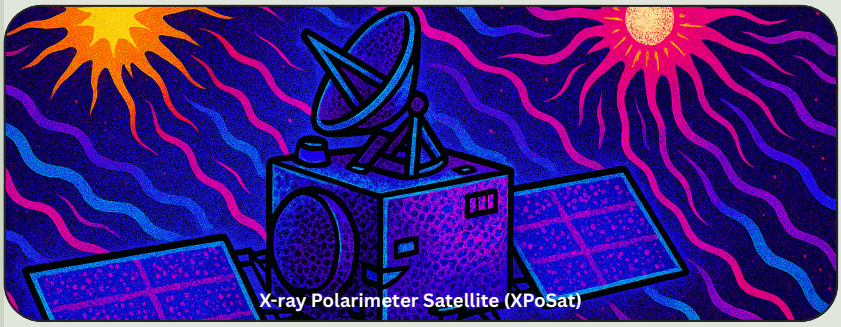
NISAR Satellite


Indian Astronaut Set for Historic ISS Mission

Gaganyaan-1

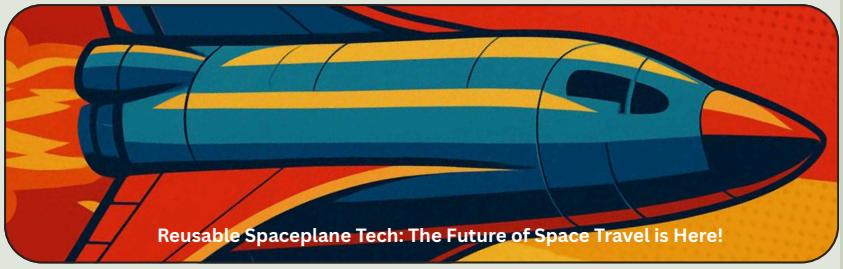

Navigation with Indian constellation series-02 (NVS-02) launch


Test Vehicle - Development Flight 2 (TV-D2) Mission


X-ray Polarimeter Satellite (XPoSat)


Launch Vehicle Mark-3, Mission 5 (LVM3-M5)


Earth Observation Satellite-09 (EOS-09)


Reusable Spaceplane Tech: The Future of Space Travel is Here!

India's Space Milestones: Pioneering Satellites, Astronauts, and Reusable Tech in 2025

Stay up-to-date with the latest in spacetech

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

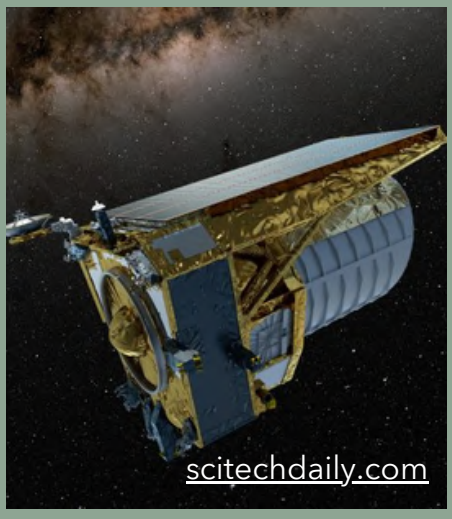
Did you Know
Mercury experiences extreme temperature swings, the smallest planet has the most drastic temperature variations, from -180°C at night to 430°C during the day

China's laser hits moon—precision from earth achieved

In a remarkable feat, Chinese scientists have successfully fired a laser beam from Earth that struck the Moon with pinpoint accuracy. This technological milestone was achieved by researchers from the Shanghai Institute of Optics and Fine Mechanics, showcasing China's growing capabilities in space science and quantum communications. The laser, directed at retroreflectors left on the Moon, marks a crucial step in future Earth-Moon communications and navigation systems. The achievement highlights China's advanced stage for deeper lunar exploration.

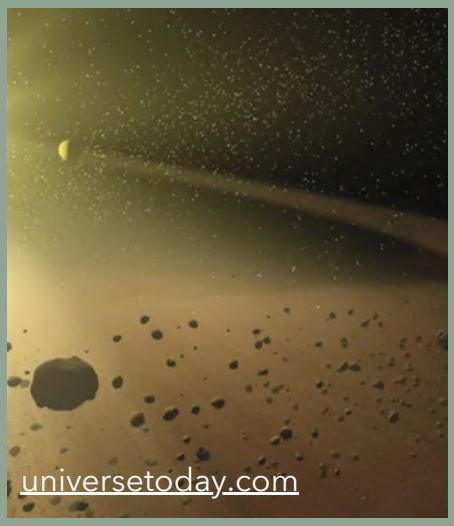
Euclid's mission challenging the uniformity theory

Is the universe truly the same in all directions? New research suggests otherwise—and ESA's Euclid telescope may soon deliver the answer. Scientists have detected hints that the universe might not be as uniform as long assumed. If confirmed, this could challenge the Cosmological Principle, a foundation of modern cosmology. Euclid, designed to map billions of galaxies, could uncover directional differences in cosmic expansion. Such a revelation would reshape our understanding of space-time and the Big Bang.



Scientists reveal uranus' secrets in rare glimpse

A team of planetary scientists has unlocked new secrets about Uranus by analyzing decades-old Voyager 2 data with modern techniques. This rare look into the ice giant's atmosphere revealed a strange haze layer, turbulent storms, and dynamic processes deep within its cloud cover. Surprisingly, Uranus may have more in common with Neptune than we thought. These findings pave the way for future exploration, offering critical insights for upcoming missions to the outer solar system. Understanding ice giants better, also enhance our knowledge of distant exoplanets.


universetoday.com

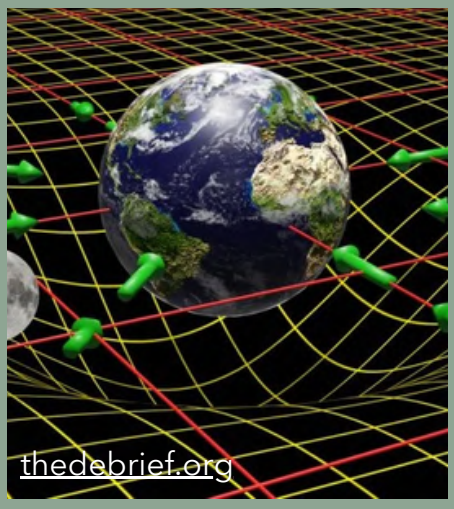
Moons love fast-spinning asteroids the most

Asteroids that spin the fastest are the most likely to have moons, according to a fascinating new study. These celestial speedsters may fling off material due to centrifugal force, forming companion satellites in the process. The findings suggest a clear link between high rotational speed and moon formation. Scientists believe this discovery could reshape how we understand asteroid evolution and the formation of binary systems in space. Such insights may also help refine planetary defense strategies. Curious how spin influences space rock companionship?


interestingengineering.com

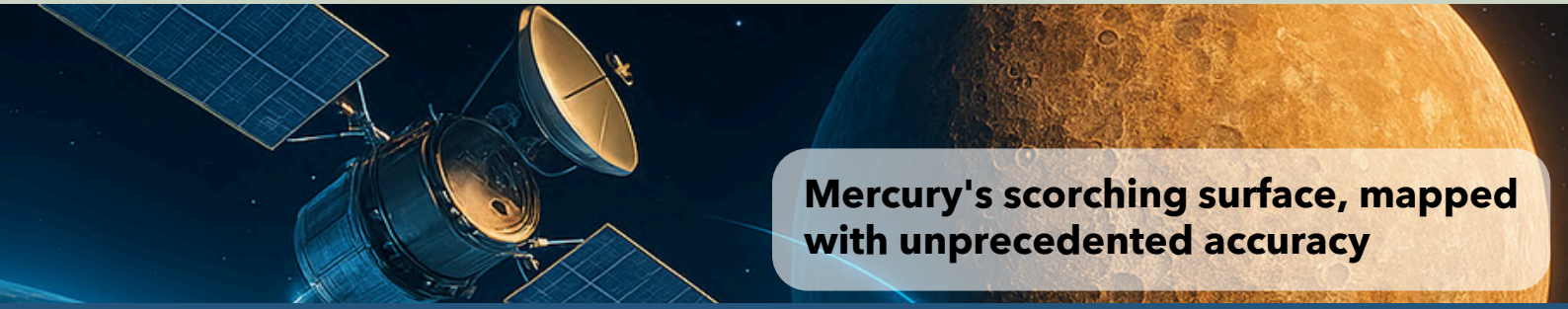
Shipping container becomes moon habitat prototype

Imagine living on the Moon—in a converted shipping container. This is now a reality, thanks to the European Space Agency and French startup Interstellar Lab. They've transformed a standard container into a self-sustaining habitat prototype designed for future lunar missions. The habitat includes life-support systems, a hydroponic farm, and radiation protection, all within a compact, modular structure. It's engineered for both off-world living and Earth-based sustainability research. This innovation merges space tech with sustainability, reshaping life on Earth and beyond.


thedebrief.org

Quantum gravity clue helps uniting nature's four forces

A bold new theory could unlock a long-sought "Theory of Everything" by linking quantum mechanics and gravity. Physicists suggest that gravity might not be a fundamental force, but an emergent phenomenon arising from quantum entanglement. This idea could unify all four known forces—gravity, electromagnetism, and the strong and weak nuclear forces—under a single framework. If proven, this breakthrough would revolutionize our understanding of the universe's very fabric.



Mercury's scorching surface, mapped with unprecedented accuracy

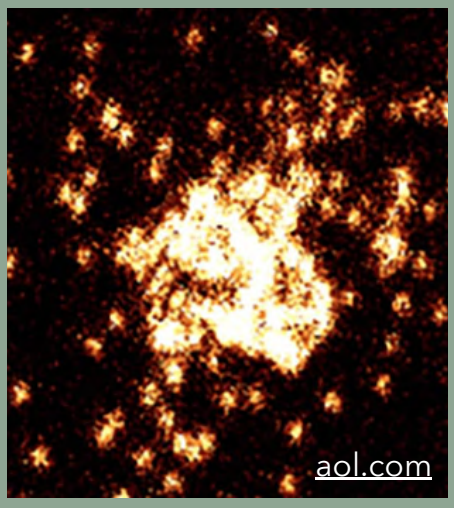
Genspace

Cover broader space news not fitting into other categories

Did you Know
The Cosmic Speed Limit, the speed of light, about 300,000 km/s, is the ultimate speed limit for everything in the universe

MIT captures first-ever atom interactions in space

MIT scientists have captured the first-ever images of atoms interacting in open space – a feat long thought nearly impossible. Using a cutting-edge quantum gas microscope, the team observed lithium atoms exchanging energy and momentum outside of a confined trap. This advancement could transform our understanding of quantum interactions and atomic behavior, paving the way for innovations in quantum computing and fundamental physics. The ability to "see" atoms collide in such detail is a major milestone in atomic science and experimentation.



Raytheon unlocks remote sensing with digital tech

Raytheon is transforming remote sensing by adopting digital engineering techniques that accelerate development, boost payload performance, and reduce risk. With tools like digital twins and advanced modeling, the company is streamlining the creation and testing of next-gen space payloads. These innovations enhance mission accuracy and adaptability for both government and commercial clients. Raytheon's strategy focuses on early virtual prototyping, enabling rapid iteration and optimization.

Leonardo revamps small satellite business focus

Leonardo is strategizing a major shift in its small satellite business, looking to expand and diversify its offerings. This move aligns with the company's broader goal of transforming its aerostructures division to meet the growing demand for advanced space technologies. The new focus includes increasing satellite production and exploring international collaborations, positioning Leonardo as a key player in the competitive small satellite market.

space.com

New satellite, 28 US cities sinking data reveals

Its alarming twenty eighy major US cities, including New York City and Chicago, are sinking at concerning rates. The study, conducted by NASA, shows the land is slowly sinking, putting infrastructure at risk. This unnoticed phenomenon poses a significant threat to urban areas, as vital structures and systems, such as transportation and utilities, could become compromised without warning. The data highlights the importance of monitoring the effects of climate change and urbanization on our cities.

sivers-semiconductors.com

New consortium of satellite interoperability

Sivers Semiconductors has joined the Digital Intermediate Frequency (IF) Interoperability (DIFI) Consortium, aiming to enhance interoperability within satellite and ground system networks. This collaboration focuses on establishing open, standards-based interoperability for digital IF and RF systems. Sivers' participation adds to a growing community of industry leaders working to advance the digital transformation of satellite communications and related technologies.The company's technologies drive connectivity and innovation through DIFI.

luftfahrtmagazin.de

DLR launches Berlin space research institute

The German Aerospace Center (DLR) inaugurated its new Institute of Space Research in Berlin-Adlershof. This strategic move consolidates expertise from the former Institutes of Optical Sensor Systems and Planetary Research. With a team of approximately 300 professionals, the institute covers the entire space research spectrum—from conceptualization and design to data analysis. Its mission is to develop technologies with partners, addressing global challenges like climate change and space safety.

A global effort, an International collaboration in space exploration

Harnessing Space for Security and Growth

Dr Y S Rajan's Vision for India's Future

On 12 May 2025, the Indian Technology Congress Association (ITCA) hosted a keynote lecture by Padma Shri Dr Y S Rajan, titled "Space Technology: Serving Humanity and Securing the Future". Dr K Gopalakrishnan, Secretary General of ITCA, welcomed the audience and introduced

Dr Rajan as a distinguished space scientist of ISRO, technologist, administrator, and co-author of India Vision 2020. With a career spanning over six decades, Dr Rajan has played a pivotal role in shaping India's space and science policy. His lecture focused on India's space legacy and the transformative power of space technologies in national security and development.

Opening with a tribute to the victims of recent terror attacks, Dr Rajan highlighted space technology's role in defense, using tools like GPS and data analytics in operations like Sindhoor. He encouraged youth, especially women, to pursue careers in space. With the global space economy expected to reach $944 billion by 2033, he urged India to expand its $8.4 billion share, focusing on satellites, launch services, and applications in agriculture and disaster management. Civil applications were also emphasized satellite satellite-based cyclone alerts have reduced casualties dramatically, while initiatives like FASAL help predict crop yields. Urban infrastructure and planning have also benefitted through advanced cartographic data. He stressed the need for multidisciplinary education, integrating physics, engineering, biology, and data science.

In the Q&A, Dr Rajan cited disaster alerts and secure communications as the most impactful technologies. He called for a balanced approach to ethics in space exploration and dismissed the idea that space programs are unaffordable, emphasizing long-term national benefits. He also noted that space careers welcome diverse backgrounds, provided there is a strong foundational understanding of core sciences. Dr Wooday P Krishna closed the session by acknowledging space technology's transformative impact and thanked Dr Rajan for his visionary guidance. Key messages included space as a security and development tool, India's growth potential in the space economy, and the importance of multidisciplinary learning for future technologists.

Satellogy

Focus on recent and upcoming satellites and launches

Did you Know
Luna 2 (1959 - Soviet Union), the first human-made object to impact the Moon, paving the way for future lunar exploration

Rocket Lab's next Mission, 'The Sea God Sees'

Rocket Lab has scheduled its next Electron launch for 17 May 2025, UTC from Launch Complex 1 in New Zealand. This mission, dubbed 'The Sea God Sees,' will deploy the QPS-SAR-10 satellite—nicknamed WADATSUMI-I after the Japanese sea god—into a 575 km orbit. This launch is part of a multi-launch contract with iQPS, aiming to build a 36-satellite synthetic aperture radar (SAR) constellation for global Earth observation. The mission marks Rocket Lab's 64th Electron launch and its sixth of 2025.


stocktitan.net

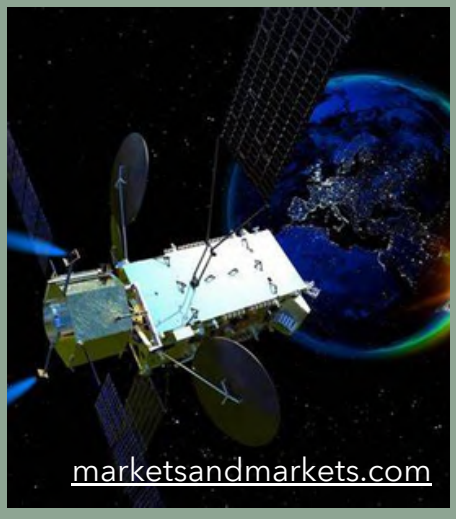
Phase 2 ignites, the laser terminals advance space links

The U.S. Space Force's Space Systems Command (SSC) has initiated Phase 2 of its $100 million Enterprise Space Terminal (EST) program, awarding contracts to CACI, General Atomics, and Viasat. This phase focuses on developing low-size, weight, power, and cost (SWaP-C) laser communication terminals to enable standardized crosslink compatibility among future space systems. These terminals are pivotal for establishing a resilient space mesh network, enhancing long-range, secure communications beyond Low Earth Orbit (bLEO).


spacewar.com

AI revolutionizes on-orbit satellite servicing market

Artificial Intelligence is rapidly transforming the on-orbit satellite servicing industry. From real-time fault detection to autonomous repairs, AI enables smarter decision-making and enhanced mission efficiency. According to Markets and Markets, the integration of AI is expected to cut costs, improve satellite longevity, and minimize risks in space operations. This tech-driven evolution supports satellite refueling, debris removal, and modular upgrades with increased precision.


marketsandmarkets.com


economictimes.com

26 Satellites launched for global internet

In another powerful display of orbital prowess, SpaceX launched 26 Starlink satellites aboard a Falcon 9 rocket from Vandenberg Space Force Base. This mission, part of the company's growing broadband constellation, reinforces Elon Musk's vision of global satellite internet coverage. The reusable first-stage booster returned successfully, continuing SpaceX's legacy of cost-effective access to space. With each launch, Starlink's network strengthens, promising faster, more reliable internet in remote corners of the globe.


railwaynews.com

ScotRail trials satellite internet on rural routes

ScotRail has launched a six-month trial of Elon Musk's Starlink satellite internet on six Class 158 trains serving rural routes between Inverness, Thurso, Wick, Kyle of Lochalsh, and Aberdeen. In partnership with Clarus Networks, this initiative aims to overcome connectivity challenges in the Scottish Highlands by providing high-speed passenger Wi-Fi, GPS tracking, live CCTV, and real-time diagnostics. Supported by the Scottish Government and regional agencies, the project could expand to other rural lines if successful.


business-standard.com

Bold leap toward deep space exploration begins

India is charting a bold course to extend its space capabilities with a focus on satellites, navigation systems, and deep space exploration. The country is enhancing its satellite infrastructure, with an emphasis on advanced satellite communication and earth observation systems. India's navigation plans aim to bolster both military and civilian use, increasing self-reliance in geospatial data. The country's growing space program aligns with global trends in space exploration, positioning India as a key player in the international space community.

Unveiling the secrets of the universe scientific satellite missions

India's Vision for a Collaborative Space Future

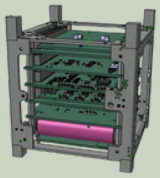
Prime Minister Narendra Modi's Global Conference Address

Prime Minister Narendra Modi, in a video message at the Global Conference on Space Exploration, 7 May 2025, reaffirmed India's commitment to peaceful and collaborative space exploration. He emphasized India's emergence as a global space power, grounded in innovation, inclusion, and international cooperation. Highlighting achievements like Aryabhata, Chandrayaan, and the Mars Orbiter, he noted that space represents humanity's quest for knowledge and progress. India views space exploration not just as technology, but as a tool to ensure a better future, particularly for the developing world. Space applications empower sectors like agriculture, disaster management, education, healthcare, and digital connectivity through satellites.

Modi emphasized India's space approach, driven by the ethos of Vasudhaiva Kutumbakam –the world is one family–aiming to bridge inequalities. He highlighted India's willingness to share satellite data and build ground stations for small nations, ensuring space technology benefits all. He also pointed out the growing relevance of Global South cooperation and India's role as a voice for emerging economies in space governance.Modi stressed the importance of sustainability, inclusivity, and peaceful use as space exploration advances. He raised concerns about space debris, orbital congestion, and the lack of a universal regulatory framework, calling for shared responsibility and governance.

He urged responsible space behavior to avoid conflict and promote trust, highlighting India's readiness for global partnerships. India aims to address challenges like climate change through shared technologies for a sustainable future. With progressive space policies, India is positioning itself as a leader, emphasizing collaboration over national interests.

CubeTech



Showcase innovative CubeSat missions and unique payloads

Did you Know
Genesat-1, this CubeSat conducted biological experiments in space, demonstrating that even the smallest satellites can contribute to cutting-edge science

Quantum threats loom over satellite security systems

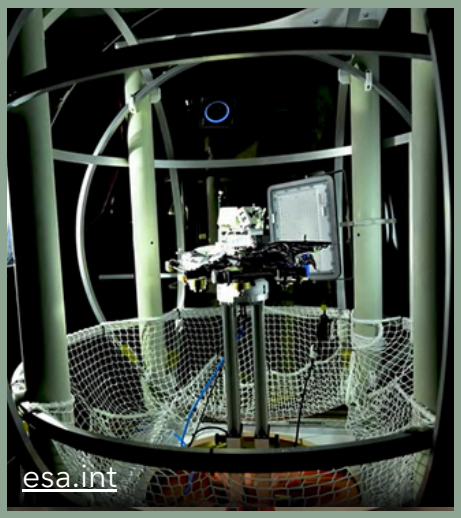
Quantum computers are poised to revolutionize computing –but they also threaten current satellite security. Today's satellites rely on cryptographic protocols vulnerable to quantum decryption, potentially compromising communication, navigation, and military systems. Researchers are urgently developing quantum-safe encryption to counter this risk. Without swift upgrades, satellites could be wide open to espionage and cyberattacks in the quantum age.

AI boosts arctic satellite emissivity mapping accuracy

A new study introduces an advanced ANN-based algorithm to estimate microwave emissivity and emission temperature over Arctic sea ice, marking a leap in satellite remote sensing accuracy. The model utilizes satellite radiance and atmospheric profiles to enhance temperature and emissivity retrievals, crucial for climate monitoring and cryospheric research. The artificial neural network (ANN) technique outperforms traditional methods by effectively capturing nonlinear interactions in the Arctic's complex environment.

Russian engineers launch next-gen small satellite tech

Russian engineers are advancing the global satellite landscape with a new generation of compact, cost-effective small satellites. Built for versatility, these spacecraft are being developed for applications in Earth monitoring, communications, and scientific research. Their compact design reduces launch costs while offering enhanced functionality for both civilian and commercial use. This innovation reflects Russia's growing commitment to accessible space technologies and positions the country as a significant player in the small satellite market.


esa.int

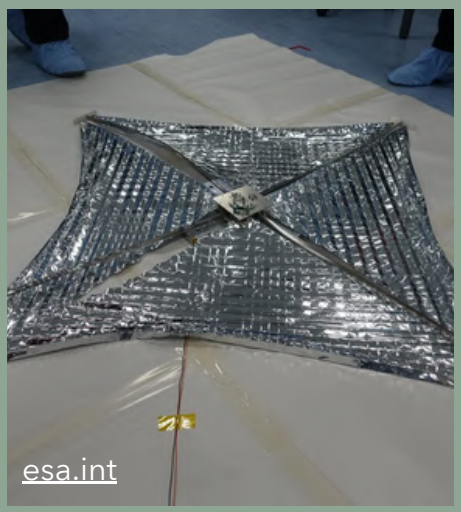
Mini satellites, big tests on earth lab simulates space

Testing satellites in space is costly and complex, so ESA is bringing space to Earth. At ESA's CubeSat Support Facility in Belgium, engineers are simulating the harsh environment of space to test miniature satellites—called CubeSats—before launch. These simulations include vacuum chambers, thermal extremes, and vibration tests to ensure mission success. The facility accelerates innovation and mission readiness for universities and startups working on small satellite technology.

umb.edu

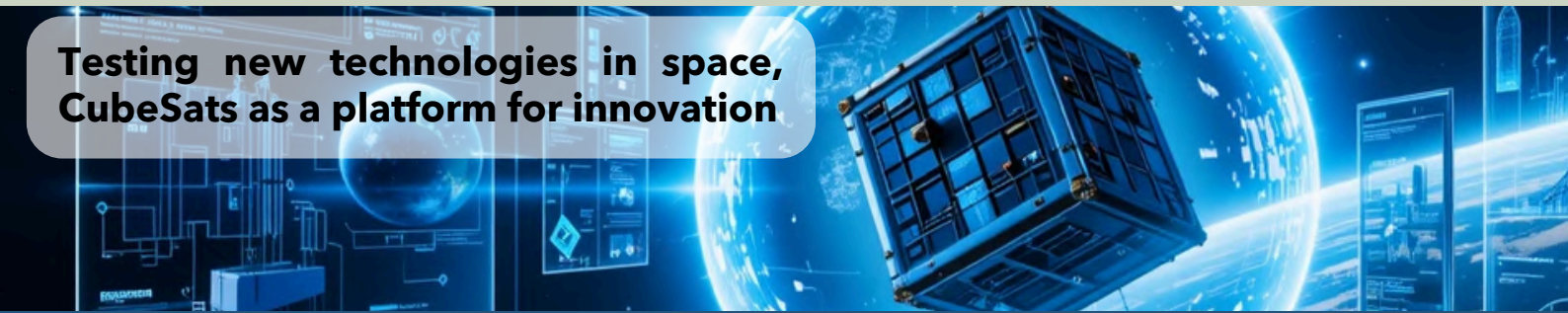
UMass Boston students to launch CubeSat for NASA

A team of engineering students from UMass Boston has been selected to participate in the High Altitude Student Platform (HASP) mission. This marks the university's first involvement in the esteemed program. Their CubeSat payload, named StratoSentinel, will be launched into the stratosphere aboard a NASA balloon in July 2025. The mission aims to collect data and test new technology in near-space conditions, analyzing the effects of extreme high-altitude conditions on low-cost, commercially available electronics.


esa.int

Clean space mission, FINIX-1 CubeSat drag sail

The University of Athens is leading an exciting CubeSat mission, testing a drag sail aboard the FINIX-1 CubeSat to tackle space debris. The drag sail is an innovative solution designed to reduce the time satellites spend in Earth's orbit, helping to lower the risk of collisions and debris buildup. This crucial test, carried out at the CubeSat Support Facility, marks an important step toward sustainable space operations. The success of this project could pave the way for future debris removal technologies.



The 75SSM

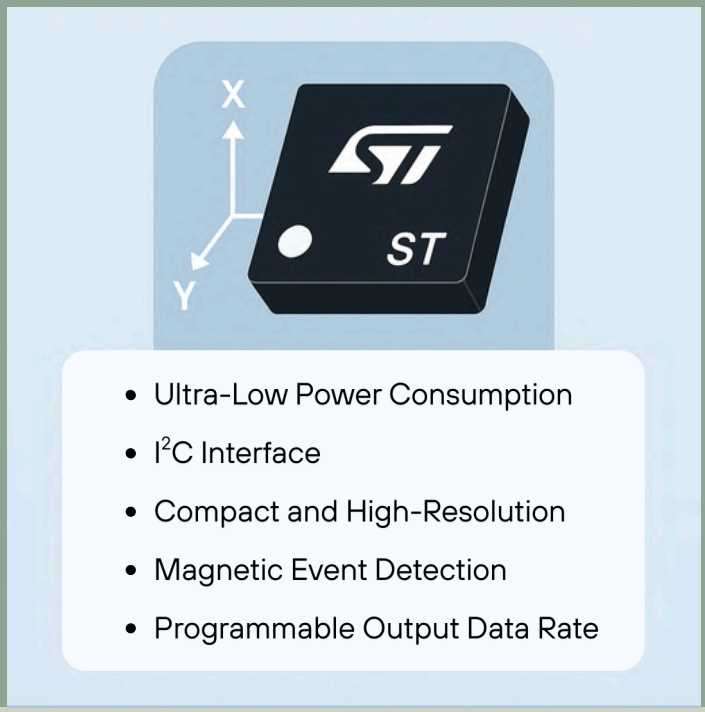
SSM: Students' Satellites Mission

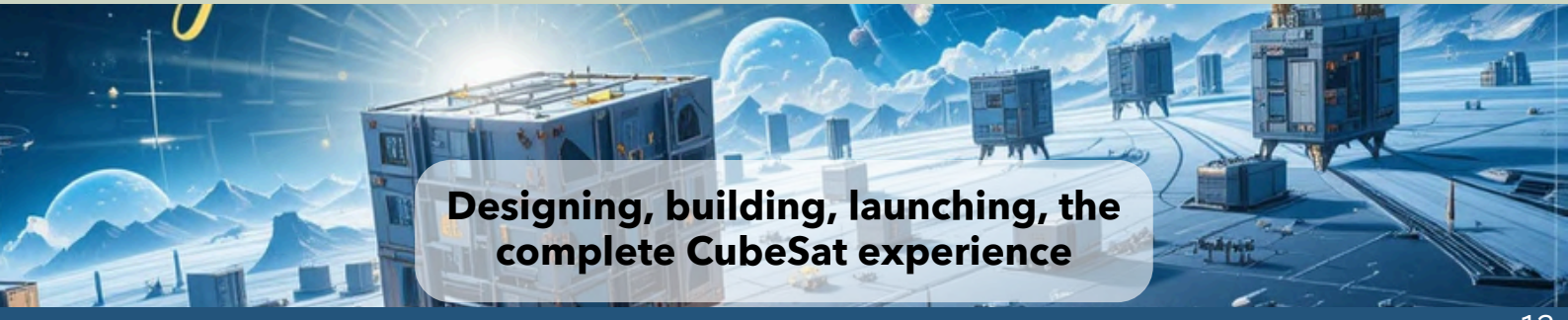
Update on our ITCA internal space-based innovations

Did you Know
With 75SSM, you're not merely sending satellites into orbit–you're experiencing the full CubeSat adventure. Create, assemble, and launch alongside us for an immersive journey into the future of space innovation!

LIS2MDL – 3-Axis Magnetometer Sensor: High-Performance Navigation & Sensing

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 LIS2MDL is an ultra-low-power 3-axis magnetometer from STMicroelectronics, designed to provide accurate magnetic field measurements along the X, Y, and Z axes. This digital magnetometer, with its I^2C interface, is perfect for CRSat satellite applications where precision navigation and heading detection are crucial. By sensing Earth's magnetic field, it helps maintain optimal orientation in space. Its compact design, low power consumption, and high-resolution measurements make it ideal for integration into battery-powered devices such as satellite payloads, sensors, and motion tracking systems in space missions. This is widely used in aerospace systems like electronic compasses, wearables, and navigation devices. Its I^2C interface simplifies integration with onboard systems, while its ability to detect magnetic events and temperature fluctuations ensures reliable CRSat navigation. With features like programmable output data rate, self-test, and embedded interrupt logic, the LIS2MDL is crucial for efficient real-time data acquisition and sensor management in space missions.

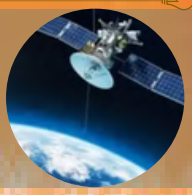




Space@India

Glimpses into India's space chronicle, every week

Did you Know
PSLV known as the "Workhorse of ISRO," the PSLV has launched hundreds of satellites, including many from other countries, demonstrating India's capability in satellite deployment.



EOS-09 Satellite, set for launch on 18 May, will significantly enhance India's border surveillance and national security capabilities

Read more at: timesofindia.com

Gaganyaan mission sets sights on early 2027 launch window, marking a strategic step toward a safe and successful human spaceflight

Read more at: indiatvnews.com

Indian Space agency launching first indigenous geostationary orbit (GSO) communication satellite by 2028, marking a major leap in space self-reliance

Read more at: thehindubusinessline.com

India unveils a bold space vision focused on power, purpose, and global progress.

Read more at: tripurastarnews.com

Bharat set to launch earth-imaging satellite to boost defense and surveillance amid growing tensions with Pakistan

Read more at: thehindu.com

10 Indian is satellites playing a crucial role in ensuring the safety and security of Indian citizens

Read more at: indianexpress.com

Karnataka is set to become India's next hub for space technology with the launch of a Space Tech Manufacturing Park and Centre of Excellence.

Read more at: indiatimes.com

Satellites are now being trained for potential space combat scenarios, highlighting a growing focus on orbital defense.

Read more at: india.com

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

India Space Congress 2025

25- 27 June 2025
Le Méridien, New Delhi
isc2025

UK Space Conference

16 - 17 July 2025
London, UK
uksc2025

Small Satellite Conference

10 - 13 Aug 2025
Utah, USA
smallsat2025

Upcoming...

Launches

Rocket Lab | Electron/Curie | The Sea God Sees

17 May 2025 13:45 IST
Rocket Lab LC-1A, Māhia Peninsula, New Zealand

ISRO | PSLV-XL | EOS-09

18 May 2025 05:30 IST
First Launch Pad, Satish Dhawan Space Centre, India

SpaceX | Falcon 9 Block 5 | Axiom Mission 4 (Ax-4)

08 June 2025 18:30 IST
LC-39A, Kennedy Space Center, Florida, USA

SPACE BEACON
cosmic cadences on our radar

Compiled by

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