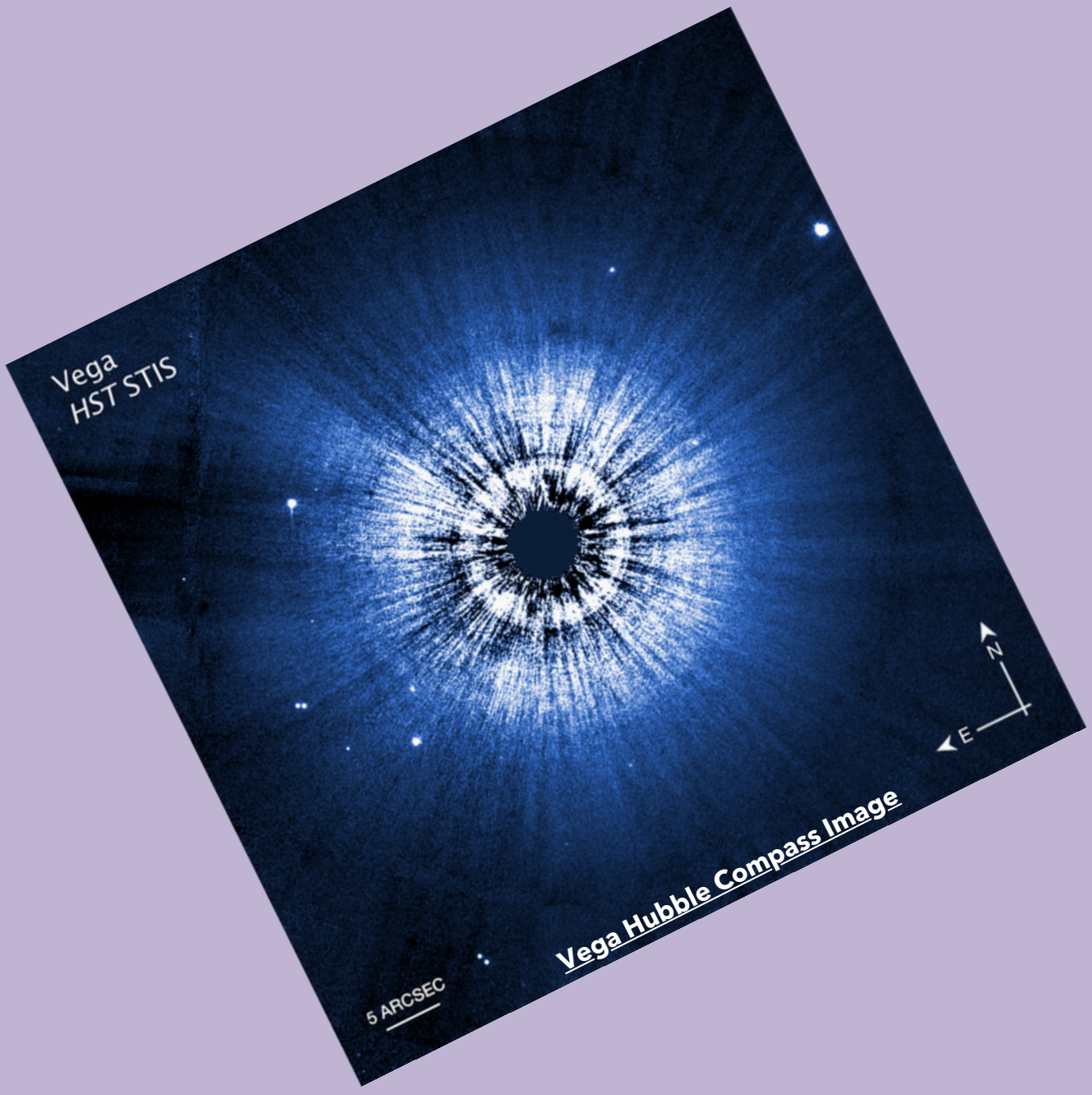
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SPACE BEACON

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The Space Tech Revolution: Forging a Path to the Stars

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

Study Hints at Mysterious Tunnel Near Earth



Scientists may have uncovered a "interstellar tunnel" within the Local Bubble, a vast region of hot, low-density gas surrounding our solar system. This mysterious structure, potentially free of the usual interstellar medium like dust and gas, could offer a pathway for easier travel between star systems. While the discovery relies on computer simulations, it presents exciting possibilities for future space exploration.

If confirmed, this finding could transform our understanding of interstellar space. Researchers suggest the tunnel might explain discrepancies in the distribution of hot gas within the Local Bubble. Further studies and observations are needed to validate its existence and assess its implications for space travel.

Moon Vaults: Sidus Space Wins Lunar Data Storage Contract



Sidus Space has secured a major lunar contract with Lonestar, a data storage provider, to design and build six custom spacecraft, dubbed LizzieSat™, for secure data storage in lunar orbit.

These spacecraft will provide redundant, mission-critical data storage solutions for Lonestar's clients, marking a significant advancement in off-planet data security.

Sidus Space will handle spacecraft production, payload integration, and on-orbit support, leveraging its expertise in satellite operations and AI capabilities.

This collaboration establishes Lonestar as a leader in deep-space data storage, advancing their vision for premium data storage and disaster recovery services from space.

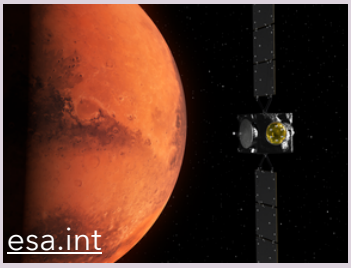
Voyager 2's Uranian Legacy: New Insights from Old Data



An analysis of Voyager 2's 1986 flyby data has revealed that a powerful space weather event compressed Uranus' magnetosphere just days before the encounter. This event depleted plasma and injected high-energy electrons, challenging previous assumptions about the planet's magnetic environment.

These findings suggest that Uranus' moons may be more active than previously thought, possibly harboring subsurface oceans. The study also sheds light on how magnetospheres respond to space weather, offering valuable insights for understanding the dynamic nature of outer solar system bodies.

Hera Blazes Trail to Didymos with Mars Flyby



The European Space Agency's (ESA) Hera mission is en route to the Didymos binary asteroid system and recently performed a deep-space maneuver, setting it up for a Mars flyby in March 2025. This flyby will leverage Mars' gravity for a fuel-efficient trajectory to Didymos while also allowing Hera's instruments to gather scientific data about Mars and its moon, Deimos.

Hera's mission is crucial for studying the aftermath of NASA's DART mission, which impacted Dimorphos, the smaller moon of Didymos, in 2022. By analyzing the impact's effects, scientists aim to develop strategies to deflect potentially hazardous asteroids. This Mars flyby showcases the mission's innovative design, contributing to asteroid defense research and our understanding of Mars, exemplifying the value of international collaboration in space exploration.

Proba-3 Mission to Continuously Monitor Solar Output



The European Space Agency's Proba-3 mission, set to launch in December 2024, aims to revolutionize solar observation by continuously monitoring the Sun's energy output. The mission involves two satellites working together: the Coronagraph, which acts as a cosmic shield to block the Sun's core light, and the Occulter, which houses the key instrument, the Davos Absolute Radiometer (DARA). This setup allows for unobstructed observation of the Sun's corona.

DARA is designed to measure the Sun's Total Solar Irradiance (TSI), a crucial factor in understanding Earth's climate. Unlike previous methods that relied on ground-based instruments and space radiometers with limitations, Proba-3 will provide continuous, precise data on TSI. This will enable scientists to track long-term solar energy trends and their potential impact on Earth's energy balance, marking a new era in solar observation.

Tidal Forces: A New Perspective on Planetary Interiors



NASA-funded research has challenged the traditional assumption that celestial bodies have perfectly spherical interiors, especially in the case of moons and planets with irregular shapes and eccentric orbits. The study focuses on the impact of tidal forces, the gravitational pull one celestial body exerts on another, and how these forces can cause significant deformations within planetary and lunar interiors.

One example is Jupiter's gravitational influence on its moon Europa, which generates tidal stresses that can heat the moon’s interior and potentially drive geological activity. This research provides crucial insights into the formation and evolution of celestial bodies and has broader implications for understanding planetary processes like volcanism, tectonics, and even the potential for habitability.

Genspace

Cover broader space news not fitting into other categories

Leaky ISS: US and Russia Disagree on Cause and Severity



A persistent air leak in the Russian segment of the ISS, traced to the Zvezda module, has sparked a disagreement between NASA and Roscosmos. While NASA expresses concern over a potential catastrophic failure of the PrK module, Roscosmos downplays the issue, attributing it to vibrations and "high cyclic fatigue."

To manage the leak, the hatch to the PrK module is kept sealed when not in use. Both agencies are collaborating to investigate and address the problem, highlighting the challenges of maintaining the aging ISS and the importance of international cooperation in space exploration.

Golden Orbit: OSCAR-7 Celebrates 50 Years in Space



The OSCAR-7 microsatellite, launched on November 15, 1974, has marked an incredible milestone, celebrating 50 years in orbit. As the longest-serving satellite dedicated to supporting amateur radio operators, it has played a key role in connecting ham radio enthusiasts across the globe, revolutionizing communication for the community.

Weighing just 15 pounds, OSCAR-7's impact has been far-reaching, paving the way for future amateur radio satellites. Its continued operation is a testament to the lasting influence of small spacecraft and the enduring spirit of amateur radio, inspiring innovation and global connection.

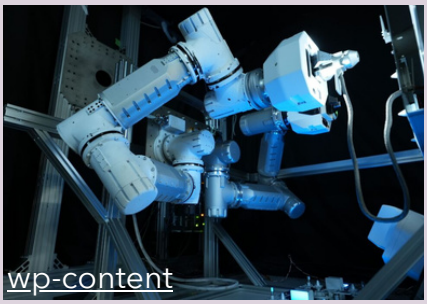
China Unlocks Real-Time Satellite Data to the Nation



In September 2024, China achieved a major milestone in satellite technology by establishing real-time data reception across its entire territory. This was made possible by a high-altitude ground station in Lijiang County, Yunnan Province, and a network of strategically positioned stations that enable instant access to satellite data, regardless of a satellite's location. This capability also extends to 70% of the Asian landmass.

The advancement offers numerous benefits, including improved environmental monitoring, resource exploration, urban development, and disaster management. Real-time access to satellite data allows for faster, more accurate assessments, enabling authorities to respond quickly to critical situations. This achievement solidifies China's position as a leader in satellite technology and data acquisition.

GITAI Space Robotic Servicing



Space robotics company GITAI has raised an additional $15.5 million in venture capital, bringing their total Series B Extension funding to $83 million.

This boost supports their goal of developing in-orbit robotic servicing capabilities, including maintaining and repairing satellites in space.

Known for its robots designed for lunar and space station construction, GITAI has secured contracts with NASA for lunar tower projects and is exploring the growing on-orbit servicing market. With upcoming test missions in December 2024 and October 2025, GITAI is set to revolutionize space operations, offering cost-saving solutions and extending the life of essential space infrastructure.

600th Rocket Launch Soars Over Swedish Lapland



On November 11, 2024, the 600th rocket launch beyond the Arctic Circle was successfully completed, with the German Aerospace Center (DLR) overseeing the mission.

The MAPHEUS 15 research rocket launched from Swedish Lapland, gathering valuable data during its flight, though the specifics of the research remain undisclosed.

This milestone highlights the increasing significance of the Arctic Circle as a launch site.

With advantages like minimal air traffic and clear skies, the region is becoming a prime location for scientific missions, paving the way for more launches as space exploration continues to advance.

Lightspeed Links in Space: Sony's Laser-Com Satellites



Sony, in partnership with California's Astro Digital, has ordered two small satellites to test high-speed laser communication technology. The satellites will feature Sony Space Communications Corporation's (SSCC) Lasercom optical terminals, enabling laser data transmission between the satellites, a ground station, and potentially a drone like the MQ-9 Reaper.

Building on previous successful tests, including data transmission from the International Space Station to a ground station in Japan, this mission could revolutionize space communication. If successful, Sony's laser system will offer faster, more efficient data transfer than traditional radio waves, supporting real-time data exchange for applications like robot control and live-streaming HD video. The satellites are set to launch in 2026, advancing the future of space communication.

Satellogy

Focus on recent and upcoming satellites and launches

Earth's Pulse: NISAR Satellite Ready to Monitor Surface Shifts



The NASA-ISRO SAR (Synthetic Aperture Radar) mission, or NISAR, is set to revolutionize Earth monitoring with its dual-frequency radar system, capable of observing land and ice masses with exceptional precision. This joint project between NASA and ISRO will enable scientists to track even the smallest surface movements, with data updates as frequent as four to six times a month, offering unparalleled insight into Earth's dynamic changes.

NISAR will support a range of applications, including monitoring ecosystem disturbances, ice sheet collapse, and natural hazards such as earthquakes, tsunamis, and landslides. It will also provide valuable data for monitoring groundwater levels, benefiting sectors reliant on this resource. As a critical tool for environmental monitoring, NISAR will empower authorities to assess and respond to potential threats, marking a major advancement in Earth observation technology.

SpaceX Sticks the Landing (and a Record) with Koreasat-6A Launch



On November 11th, 2024, SpaceX successfully launched the Koreasat-6A communications satellite on a Falcon 9 rocket, marking their 23rd mission with a single booster. The launch from NASA's Kennedy Space Center highlighted the continued success of SpaceX's reusable rocket technology, with the first stage landing back on Earth at Cape Canaveral Space Force Station.

The Koreasat-6A satellite, developed by Thales Alenia Space, is now on its way to geosynchronous orbit, where it will provide crucial communication services to South Korea, enhancing broadcast and navigation capabilities. This successful mission reinforces SpaceX's leadership in cost-effective space launches and its ongoing collaboration with commercial satellite operators to strengthen global communication infrastructure.

Innovation Aids in Ocean Wind Speed Measurements



NASA's new science antenna aboard MuSat-2, a satellite operated by Muon Space, enhances its ability to measure ocean wind speeds using GPS technology.

This antenna expands MuSat-2's coverage by collecting data from global navigation systems like Europe's Galileo, improving measurement accuracy.

Accurate wind speed data is vital for predicting storm intensity, aiding in better preparedness. This collaboration between NASA and Muon Space demonstrates the growing impact of space technology on improving weather forecasts and understanding Earth's climate systems.

Toxic Smog Grips India: Visible from Space Satellites



A toxic blanket of smog is choking large parts of India and Pakistan, with satellite images from NASA revealing the crisis's unprecedented severity. A combination of farm fires, vehicle emissions, and industrial pollution has driven air quality to hazardous levels, endangering millions.

Punjab alone has reported over 7,000 active farm fires, significantly intensifying the smog. Authorities have implemented emergency measures, such as school closures & vehicle restrictions, to protect public health.

This annual air pollution crisis underscores the urgent need for sustainable practices. Addressing farm fires, promoting cleaner transportation, and enforcing stricter industrial regulations are critical to mitigating the issue. Collaborative international efforts and innovative solutions are essential to tackling air pollution as a global challenge, ensuring a healthier and more sustainable future.

Spectral Fingerprints in Space: A New Tool for Security



University of Arizona researchers have created the first astronomical equivalent of a fingerprint database for satellites.

This "spectral atlas" includes 96 satellites in geostationary orbit (GEO), a crucial zone for communication and navigation.

This spectral data, unique to each satellite, allows for easier identification and tracking of objects in the increasingly crowded GEO belt. Previously, differentiating these satellites relied on limited information.

The atlas serves as a critical first step towards improved space security. By understanding the baseline data for these objects, authorities can better monitor changes, identify potential threats, and ensure the safe operation of vital space infrastructure.

Satellite Data Sheds Light on Environment's Impact on Brain



Researchers have used satellite data to uncover how environmental factors influence brain development, linking it to brain scans from over 11,800 children aged 9-10 across the US. This innovative study analyzed green space, air quality, and neighborhood layout, identifying correlations with brain structures tied to cognition and behavior.

These findings emphasize the critical role of environmental factors during a key window for brain development. The study underscores the importance of urban planning and policies that promote healthier environments for children. It also highlights the potential of satellite data for large-scale research on brain development and environmental health, paving the way for future studies to better understand and improve the connection between living spaces and human well-being.

CubeTech

Showcase innovative CubeSat missions and unique payloads

Solar Sizzle Scorches Tiny Spacecraft: Sun's Unexpected Activity Takes a Toll



The Sun's recent surge in solar activity is wreaking havoc on small satellites, particularly CubeSats, which typically have short lifespans of a few months.

Increased radiation and charged particles are causing these satellites to burn up in Earth's atmosphere sooner than expected. For instance, the Binar Space Program's three Australian satellites, designed for a three-month mission, were lost after just two months due to heightened solar activity.

This unexpected solar flare-up highlights the need for improved space weather forecasting to protect vulnerable satellites. While the Sun's activity is expected to settle by 2026, with a minimum forecast for 2030, this serves as a reminder of its powerful influence and the importance of accounting for solar activity in spacecraft design.

Small Satellite Market Poised to Reach $12.25 Billion



The small satellite market is experiencing remarkable growth, projected to reach USD 12.25 billion by 2030 with an estimated Compound Annual Growth Rate (CAGR) of 19.6%.

This surge is driven by growing demand for communication solutions, particularly faster internet and satellite-based connectivity.

Advancements in miniaturization and lightweight materials have also made it more cost-effective to develop and deploy small satellites. Additionally, lower launch costs, spurred by reusable rockets and dedicated small satellite launchers, are making space access more affordable. Coupled with rising investments and expanding applications like Earth observation, navigation, and scientific research, these trends are fueling a lucrative future for the small satellite industry.

Wallace State Students Launch Their Creations into Space



Students in Wallace State Community College's Machine Tool Technology program are making a significant impact in the space industry by fabricating critical hardware for NASA's CubeSat deployers.

These deployers will launch miniature satellites into orbit from the International Space Station.

Through NASA's HUNCH program, the students machined precision components like pusher plates, adhering to NASA's rigorous standards to ensure their performance in space. This collaboration provides students with invaluable hands-on experience, allowing them to contribute to real-world space missions.

USSF Space Systems Command's Tetra-1 Satellite Completes Successful Mission

The Juventas mission, aiming to explore the asteroid Psyche, has received additional funding to expand its original agreement. This mission, focused on studying Psyche's metallic composition to understand the early formation of our solar system, involves advanced spacecraft designed by GomSpace.



The funding boost is crucial for enhancing the spacecraft's key components, ensuring their successful development. GomSpace's role in the Juventas mission highlights their expertise in building cutting-edge space technology. This funding reflects the growing complexity of the mission and reinforces GomSpace's commitment to contributing to the collaborative effort of exploring Psyche, a journey that could unveil groundbreaking insights about the solar system's origins.

The Tenth UNISEC-Global Meeting

The **UNISEC** Program (University Space Engineering Consortium), supported by UNOOSA, empowers students globally to engage in satellite engineering and space exploration. As part of this initiative, India's **75 Students' Satellites Mission** celebrates 75 years of independence by involving students in satellite design.



Teams like those from Cambridge Institute of Technology and Government School, Malleswaram, will represent India at the Global Mission Idea Contest to the Moon in South Africa (Nov 27–30, 2024), showcasing India's innovation in space education. This initiative provides hands-on experience in satellite missions, aligning with UNISEC's goal of democratizing space education. It highlights India's commitment to STEM education while fostering international partnerships, inspiring students to address global challenges and excel in space science and technology.

Taiwan International Mission Idea Contest on CubeSat

The Taiwan International Mission Idea Contest on CubeSat (TIMICC 2024), organized by the Taiwan Space Agency (TASA) and Tamkang University, highlights CubeSat innovation. Held during TASTI 2024 (Nov 30–Dec 4, 2024) at Kaohsiung Exhibition Center, it invites global teams to present mission ideas.



Indian teams from the **75 Students' Satellites Mission**, like Kalvi Group of Schools and Jeppiaar Institute of Technology, will participate, reflecting India's growing role in international space collaborations.

The event showcases CubeSat technology's educational impact, enabling students to conceptualize and design innovative missions, reinforcing India's commitment to experiential learning and space technology leadership.

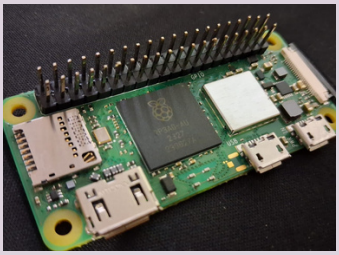
The 75SSM

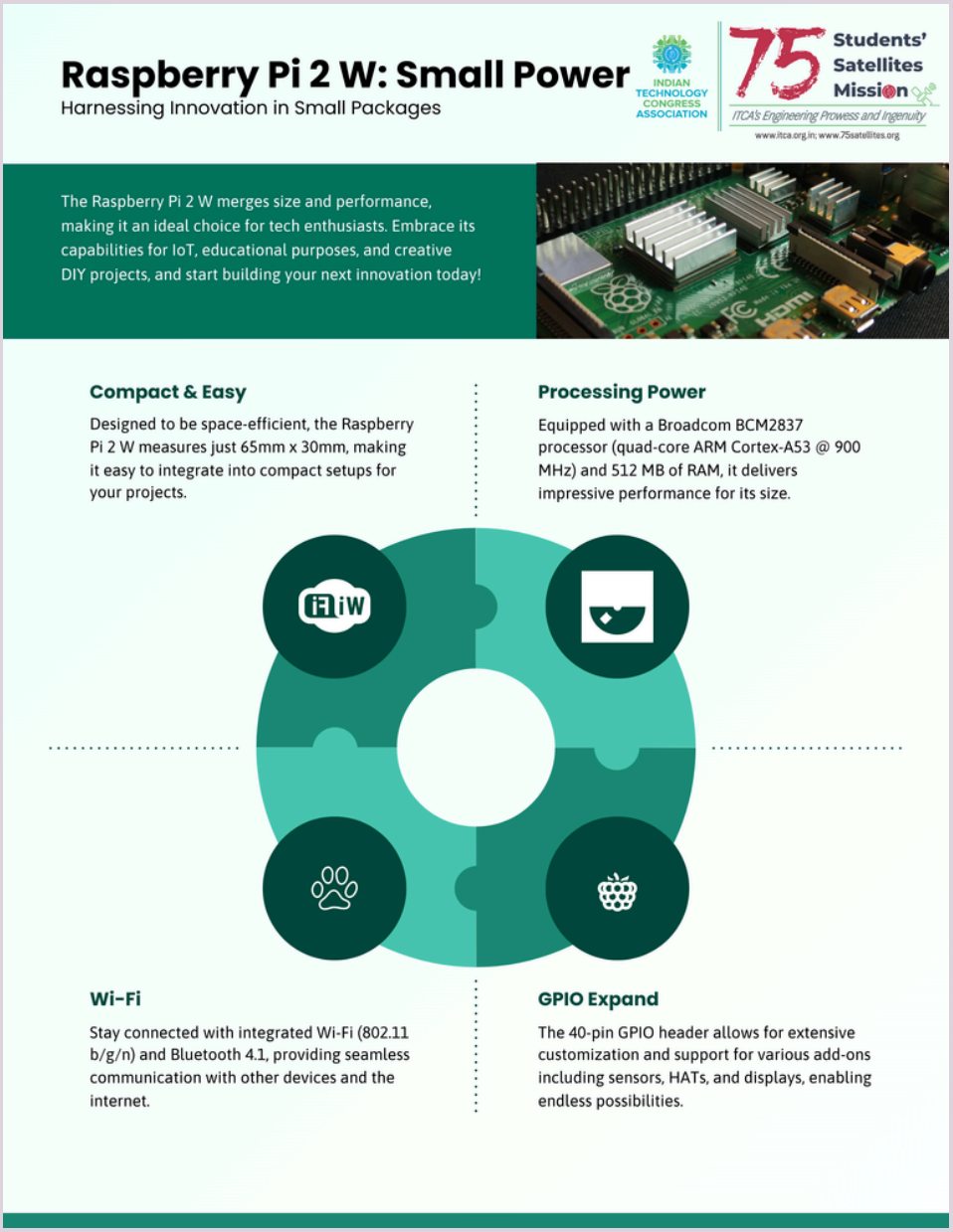
SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

Raspberry Pi 2 W : Compact Power for Endless Possibilities

The Raspberry Pi 2 W combines the portability of the Zero series with the processing power of the Raspberry Pi 2, featuring a Broadcom BCM2837 quad-core ARM Cortex-A53 processor, 512 MB RAM, and built-in Wi-Fi (802.11 b/g/n) and Bluetooth 4.1. Its 40-pin GPIO header supports various peripherals, while microSD compatibility ensures flexible storage. Ideal for IoT, robotics, education, media centers, and retro gaming, it's perfect for projects demanding performance in a small footprint. Affordable, energy-efficient, and backed by a vibrant community, the Raspberry Pi 2 W is your gateway to smarter DIY solutions.







Space@India

Glimpses into India's space chronicle, every week

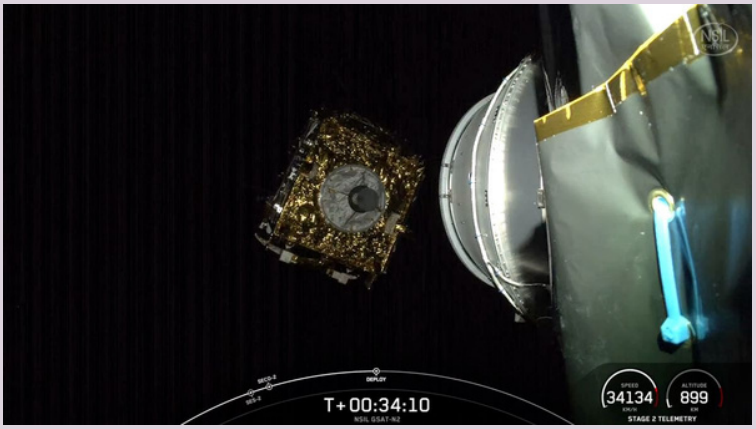
SpaceX is set to launche heavy satellite in 1st mission for India's space agency



SpaceX is set to launch the GSAT-20, a high-throughput communication satellite, on its Falcon 9 rocket. This mission marks the first collaboration between SpaceX and India's space agency through NewSpace India Limited (NSIL), the commercial arm of ISRO. The GSAT-20 satellite, weighing 4,700 kg, will surpass ISRO's current launch capacity, highlighting the importance of SpaceX's involvement.

GSAT-20 is a next-generation communication satellite designed to revolutionize broadband connectivity across India, particularly in remote and underserved regions. With a capacity of 48 gigabits per second (Gbps) using advanced Ka-band frequencies, it represents a significant leap in India's telecommunication capabilities. The satellite will support high-speed internet services, meeting the rising demand for reliable connectivity in rural and urban areas alike. Fully owned and operated by NewSpace India Limited (NSIL), GSAT-20 underscores India's commitment to leveraging space-based technologies for national development and digital inclusion.

This mission also reflects a strategic shift in India’s satellite launch approach. By utilizing SpaceX’s reusable Falcon 9 rocket, India reduces launch costs and demonstrates openness to collaborations with private global players. The Falcon 9, known for its reliability and cost efficiency, allows the deployment of heavier payloads into orbit, setting the stage for more such partnerships in the future. This approach not only aligns with India’s space privatization goals but also enhances its position in the global space economy. GSAT-20 is a key milestone in advancing India’s communication infrastructure and fostering international cooperation in space exploration.



75 Students' Satellites Mission

ITCA's Engineering Prowess and Ingenuity

ITCA: Pioneering India's Tech Future

Driving India's tech innovation for over 21 years, we've built strong academia-industry partnerships. Pioneer of the '75 Students' Satellites Mission,' we've made a global impact in space tech, precision agriculture, and Industry 4.0. We are shaping the future of India's technology landscape.

Upcoming.....

CyberSat 2024

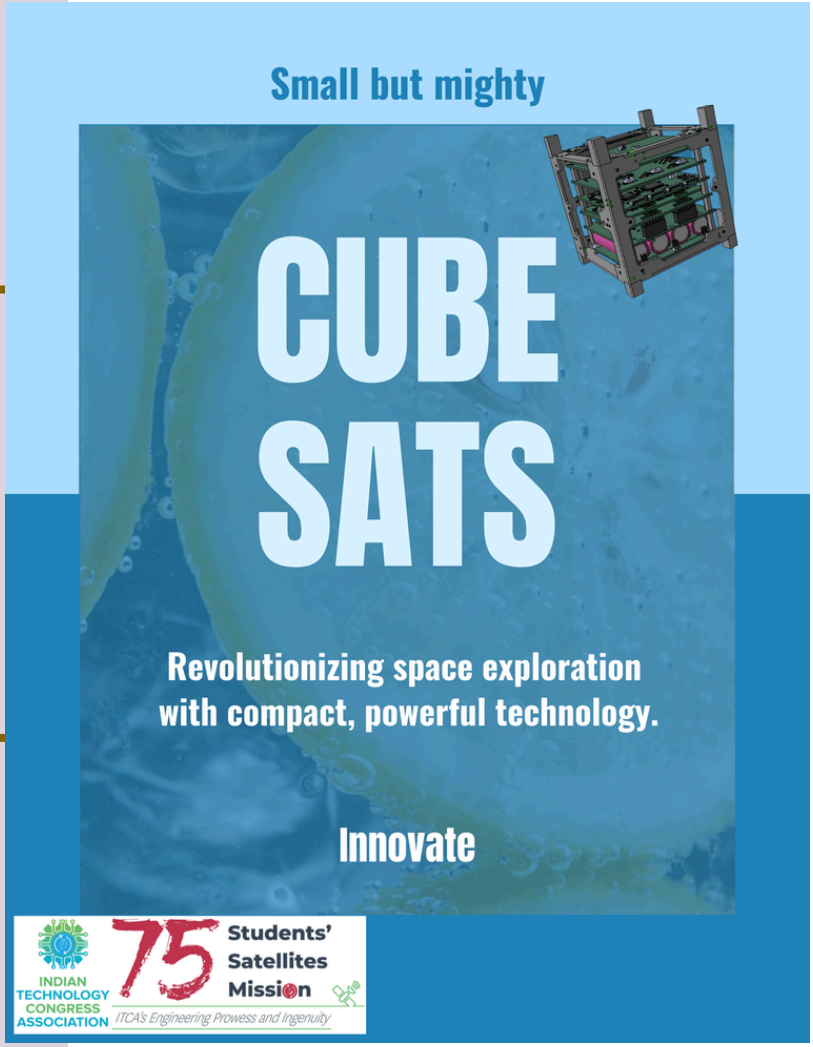
18-20 November, Reston, VA, USA - Where Cybersecurity Meets Satellite Innovation! https://apsccsat.com

Geosmart India

2-5 December 2024, Hyderabad International Convention Centre, India - Powering Digital Public Infrastructure through Geospatial Knowledge https://geosmartindia.net/2024/index.php

Annual Conference on Commercial Space Exploration

4-5 December 2024, Luxembourg https://commercialisation



SPACE BEACON
cosmic cadences on our radar

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