ISSUE 21 I 27 NOVEMBER 2024

SPACE BEACON

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Stellar Odyssey: Humanity's Journey to the Stars

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

Firefly Aims for the Moon: January Launch Date Set


nasa.gov

Firefly Aerospace is gearing up for a historic moment in its journey to the Moon. The company has announced a January 2025 launch date for its Blue Ghost 1 lunar lander mission.

This ambitious mission aims to land on the Moon's surface near Mons Latreille, carrying a payload of 10 NASA instruments.

If successful, this mission will mark a significant achievement for Firefly Aerospace and the United States' lunar exploration program. The Blue Ghost 1 lander is designed to collect valuable scientific data and pave the way for future lunar missions.

Volcanic Caves: Martian Haven for Ancient Life?


cdn.net

Scientists at the University of South Florida are studying Earth's volcanic caves, formed by ancient lava flows, to uncover clues about Mars' potential for past life. These caves, known for preserving minerals and organic compounds shielded from harsh surface conditions, offer a glimpse into similar environments that might exist on the Red Planet.

Researchers believe Martian lava tubes could have served as refuges for microbial life, making them key targets for future exploration. By examining the geology and microbiology of Earth's volcanic caves, scientists can better understand the types of environments that might have supported life on Mars. This research not only sheds light on Mars' history but also informs upcoming missions, which could focus on exploring these promising subsurface habitats for signs of extraterrestrial life.

Nearby Supernova Could Unlock Dark Matter Secrets


futurecdn.net

A nearby supernova could offer a rare opportunity to study axions, hypothetical particles thought to be a key component of dark matter. Axions are notoriously difficult to detect due to their weak interaction with ordinary matter, but the extreme conditions of a supernova might enable their production.

By analyzing gamma-ray emissions from such an event, scientists hope to identify the unique signature of axions, shedding light on their mass and properties. Detecting axions would be a groundbreaking discovery, confirming the existence of dark matter and deepening our understanding of the universe’s fundamental makeup. Although the likelihood of a nearby supernova is low, the potential scientific payoff from such an observation could be transformative.

Lunar Outpost Partners with SpaceX for Moon Rover Delivery


futurecdn.net

Lunar Outpost, a leading company in lunar mobility and space resource development, has chosen SpaceX's Starship as the launch vehicle for its Lunar Terrain Vehicle (LTV).

This strategic partnership will enable Lunar Outpost to deliver the LTV to the Moon's surface, marking a significant step forward in lunar exploration.

The LTV, designed to support future Artemis missions, will play a crucial role in exploring the Moon's surface and establishing a sustainable lunar presence.

By utilizing SpaceX's powerful Starship, Lunar Outpost aims to accelerate its mission and contribute to the ongoing efforts to unlock the Moon's resources and pave the way for human settlement.

Unveiling the Sun's Secrets: New Hydrogen Emissions Discovered



spxdaily.com

Scientists at the National Solar Observatory (NSO) have identified new hydrogen emission lines in the Sun's lower atmosphere, offering fresh insights into the Sun's dynamic processes.

These emissions provide a clearer view of how magnetic fields drive solar flares and other explosive events, deepening our understanding of the mechanisms behind solar activity.

This discovery is a major breakthrough in solar physics, with implications for predicting space weather events that can disrupt Earth's communication systems and power grids.

As researchers explore these findings further, they open new pathways for understanding the fundamental forces shaping our solar system.

A Baby Planet Challenges Our Understanding of Planetary Formation



Astronomers have discovered a young, transiting planet that is defying traditional theories of planetary formation. This newfound celestial body is challenging our understanding of how planets come into existence, particularly those orbiting close to their host stars. The newly discovered planet, known as HD 110067 b, is a hot Jupiter that orbits its star at an incredibly close distance.

Its existence raises questions about the mechanisms that allow such massive planets to form so close to their parent stars. By studying this young planet, scientists hope to gain valuable insights into the early stages of planetary formation and the conditions that can lead to the birth of hot Jupiters. This discovery could have profound implications for our understanding of the diversity of planetary systems in the universe.

Genspace

Cover broader space news not fitting into other categories

Blue Origin's New Shepard Soars Again



Blue Origin's New Shepard suborbital vehicle successfully launched its ninth crewed mission. The capsule, carrying six astronauts, reached an altitude of 107 kilometers before safely returning to Earth.
This successful mission marks another milestone for Blue Origin's space tourism endeavors.

This recent launch highlights the increasing accessibility of space travel. As private companies like Blue Origin continue to push the boundaries of space exploration, more and more people are getting the opportunity to experience the thrill of spaceflight firsthand. This democratization of space travel promises to open up new horizons for scientific research, commercial applications, and space tourism.

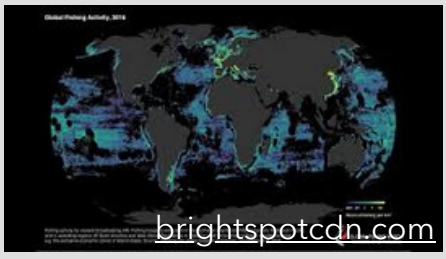
China Pioneering Inflatable Space Technology



China has silently made strides in space technology by successfully testing its first inflatable space module. This innovative technology involves launching a compact, foldable module that expands into a functional space once in orbit.
This breakthrough offers several advantages, including reduced launch costs and increased payload capacity.

Inflatable modules could be used to expand existing space stations or create new habitats for future missions to the Moon or Mars. China's achievement in this area showcases its growing prowess in space exploration and its commitment to pushing the boundaries of space technology.

NASA's Artemis II Mission: A Giant Leap for Lunar Exploration



NASA's Artemis II mission is set to make history as the first crewed lunar mission in over 50 years. This ambitious endeavor will mark a significant step towards establishing a sustainable human presence on the Moon. The Artemis II mission will send astronauts on a lunar flyby, testing the Orion spacecraft's systems and capabilities for future lunar landings.

This mission will pave the way for the Artemis III mission, which aims to land astronauts on the Moon's south pole. By returning to the Moon, NASA aims to gain valuable scientific knowledge, test new technologies, and prepare for future missions to Mars. This renewed focus on lunar exploration is part of a broader effort to establish a long-term presence in space and leverage the Moon as a stepping stone for deeper space missions.

Sierra Space Advances Space Habitat Technology



Sierra Space, a leading aerospace company, is making significant strides in the development of its LIFE 10 space habitat technology. This innovative technology aims to provide safe and comfortable living quarters for astronauts on long-duration missions in low Earth orbit and on the Moon.

The LIFE 10 module prioritizes safety and sustainability, featuring advanced life support systems and radiation shielding. By focusing on these key areas, Sierra Space aims to ensure the well-being of astronauts during extended stays in space. The company is actively working towards certifying the LIFE 10 technology for spaceflight. This certification process involves rigorous testing and evaluation to ensure the module meets stringent safety and performance standards. As the demand for space exploration and utilization grows, Sierra Space's LIFE 10 technology offers a promising solution for providing sustainable and habitable environments for astronauts.

Orion Space Solutions Paves the Way for On-Orbit Refueling



Orion Space Solutions is set to revolutionize satellite refueling with its Tetra-6 mission. This ambitious project aims to demonstrate a novel approach to on-orbit refueling, offering a more sustainable and cost-effective way to extend the lifespan of satellites.

The Tetra-6 spacecraft will showcase a distinct refueling technique compared to its predecessor, Tetra-5.

By successfully refueling in geosynchronous orbit (GEO), Orion Space Solutions will pave the way for a new era of satellite servicing and maintenance. This technological advancement has the potential to significantly reduce the cost of space operations. By refueling satellites in orbit, operators can extend their missions and avoid costly replacement launches. This could lead to more sustainable and efficient use of space resources.

Space Station Dodges Debris: A Close Call in Orbit



The International Space Station (ISS) recently executed a precautionary maneuver to avoid a potential collision with a piece of space debris. This near-miss highlights the increasing risk of orbital debris, a growing concern for space operations. Space debris, consisting of discarded satellites, rocket stages, and other man-made objects, orbits the Earth at high speeds.

Collisions with even small pieces of debris can have catastrophic consequences for spacecraft. To mitigate this risk, space agencies and satellite operators regularly monitor the orbital environment and take evasive action when necessary. The ISS maneuver underscores the importance of responsible space activities and the need for international cooperation to address the growing problem of space debris. By taking proactive measures to reduce the amount of debris in orbit and implementing debris mitigation strategies, we can ensure the long-term sustainability of space exploration.

Satellogy

Focus on recent and upcoming satellites and launches

The return-to-fligh Vega-C Launch Delayed

The highly anticipated return-to-flight mission for the Vega-C rocket has faced a setback. Due to a technical issue identified during pre-launch checks, the launch has been postponed by a day. This delay comes as a disappointment as the mission is crucial for the European Space Agency's (ESA) Earth observation program.



The Vega-C rocket is set to carry the Sentinel-1C satellite into orbit. This satellite will replace the Sentinel-1B, which malfunctioned in 2022. Sentinel-1C is a vital component of the Copernicus program, providing radar imagery for monitoring Earth's surface and tracking changes in land use, sea ice, and other environmental factors. Despite the delay, ESA remains optimistic about the upcoming launch. The technical issue is being addressed, and the rescheduled launch is expected to take place on December 3, 2024. The successful deployment of Sentinel-1C will ensure the continuity of critical Earth observation services and contribute to a better understanding of our planet.

New Satellite Bus: A Versatile Platform for Space Missions

Lockheed Martin is poised to revolutionize the space industry with its new LM 400 mid-sized satellite bus. Designed to be a flexible and adaptable platform, the LM 400 can be customized to support a wide range of missions, from Earth observation to communication and national security. This advanced satellite bus is set to become a cornerstone of Lockheed Martin's future space endeavors.



By leveraging cutting-edge technology and proven engineering practices, the LM 400 offers superior performance and reliability. As the demand for satellite services continues to grow, the LM 400 provides a cost-effective and efficient solution for launching and operating satellites. With its modular design and scalable capabilities, the LM 400 is well-positioned to meet the evolving needs of the space industry.

Space Force Seeks Alternatives to GPS

The Space Force is enhancing its Positioning, Navigation, and Timing (PNT) capabilities to reduce reliance on the traditional GPS system, addressing vulnerabilities associated with depending on a single source. Efforts include developing jam-resistant encrypted M-code signals for military operations and integrating PNT signals into data transport satellites through the Space Development Agency, bolstering redundancy and resilience.



In parallel, the Air Force Research Laboratory is testing new PNT technologies, exploring innovative solutions to ensure reliable and secure navigation. By diversifying PNT sources and advancing alternative technologies, the Space Force is taking a proactive approach to safeguard critical military operations against potential disruptions or attacks on GPS signals.

Exolaunch's Universal Adapter: A New Era of Satellite Deployment


spacenews.com

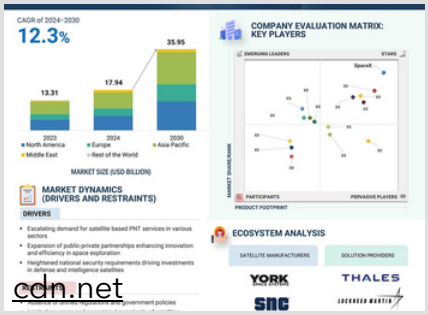
Exolaunch is set to revolutionize satellite deployment with its new universal adapter.

This innovative technology will enable the launch of a wider range of satellites on various launch vehicles, making space access more efficient and cost-effective.

The universal adapter is designed to be compatible with both small and large launch vehicles, providing flexibility for satellite operators. By eliminating the need for custom adapters, this solution streamlines the launch process and reduces launch costs. With this new technology, Exolaunch aims to expand its capabilities and offer even more comprehensive launch services to its customers.

This will help to accelerate the development of satellite constellations and enable the deployment of smaller, more affordable satellites.

Satellite Industry Soaring: A $35.95 Billion Opportunity



cdn.net

The global satellite industry is projected to reach $35.95 billion by 2030, driven by rising demand for real-time data, communication services, and expanding satellite constellations. Small satellites are at the forefront of this growth due to their affordability, low operational costs, and versatility, with applications in Earth observation, communication, and scientific research.

The Asia-Pacific region is expected to lead the market, propelled by increasing investments in space exploration and technological advancements, while Europe focuses on telecommunications and defense.

Innovations such as AI, machine learning, 3D printing, and reusable rocket technologies are enhancing satellite capabilities and reducing costs, further fueling the industry's rapid expansion.

Solar Lasers Could Power Future Space Missions


photonics.com

An international team is developing technology to convert sunlight into laser beams for power transmission across vast distances, inspired by photosynthesis. The APACE project, involving researchers from multiple countries, aims to create efficient light-harvesting systems based on bacteria to amplify sunlight and power lasers for use in space.

Unlike traditional solar panels, this bio-inspired system directly transmits power via infrared lasers, offering a sustainable, replicable solution for space missions.

The technology could enable power generation on space stations and transmission to satellites or Earth, with a prototype expected in three years.

CubeTech

Showcase innovative CubeSat missions and unique payloads

Pulsar Helium Partners with SMSTS to Empower STEM Students


akamaized.net

Pulsar Helium has partnered with Send My Stuff To Space (SMSTS) to offer exciting opportunities for STEM students. Through the Pulsar Scholars program, students will receive quarterly grants of $2,500 to fund their scientific projects and test CubeSats and experiments in a Mars-like environment using SMSTS's suborbital flights.

SMSTS, known for deploying biodegradable balloons to high altitudes, provides a unique platform for scientific research.

This collaboration combines Pulsar's financial support with SMSTS's technical expertise, empowering students to advance space technology and contribute to the future of scientific exploration.

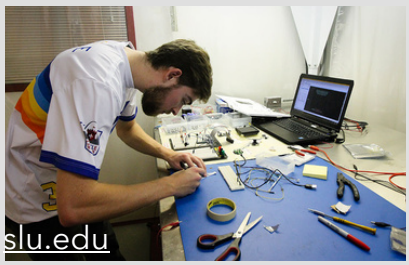
How Satellite Connectivity Empowers Schools, Communities and Small Businesses


viewasia.com

This article explores the positive impact of satellite connectivity on schools, communities, and small businesses. It highlights how satellite connectivity can bridge the digital divide, which is the gap between those who have access to the internet and those who don't. The article argues that satellite connectivity can improve education by providing schools in remote areas with access to educational resources and opportunities.

It can also boost economic development by enabling small businesses to connect with customers and markets around the world. Additionally, satellite connectivity can help to connect people in remote areas to the rest of the world, promoting social inclusion and improving overall quality of life.

SLU Students Launch Their Satellite Dreams


slu.edu

Saint Louis University (SLU) students are launching the DARLA CubeSat in 2025, marking a significant step in student-led space exploration. The project provides hands-on experience in satellite design, construction, and operation, helping students develop skills in engineering, computer science, and project management.

DARLA's launch will contribute to scientific research and inspire future generations of space enthusiasts, encouraging more young people to pursue careers in STEM fields by showcasing the potential of student-driven projects.

Space-Based Solar Power: A Laser-Focused Approach



A revolutionary concept is emerging in the realm of space technology: harnessing the Sun's energy and beaming it back to Earth via laser. A proposed satellite design envisions using sunlight to generate laser energy, which can then be transmitted over vast distances with minimal energy loss. Inspired by photosynthesis, this technology seeks to capture and concentrate sunlight using advanced mirrors and lenses.

The collected solar energy is then converted into laser beams, which can be precisely directed towards Earth. This could potentially provide a sustainable and abundant source of energy for our planet. While still in the early stages of development, this ambitious project holds the potential to revolutionize how we harness and utilize solar energy. If successful, it could significantly reduce our reliance on fossil fuels and pave the way for a more sustainable future.

Western Australia Celebrates First Space Week



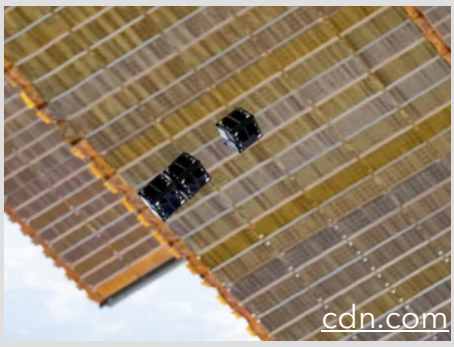
Western Australia is launching its first-ever Space Week, coinciding with a $3.5 million investment by the Cook Government to develop the state's commercial satellite building capabilities.

The funding will support WA Earth Observation company LatConnect 60 in constructing the region's first satellite assembly facility.

This project aims to create jobs, stimulate the local economy, and position Western Australia as a leader in the Australian space industry.

The new facility will enhance satellite development, promote innovation, and elevate the state's role in both national and international space efforts, driving future space exploration and technological advancements.

Solar Storms Shorten CubeSat Lifespan



A recent study conducted by Curtin University has revealed the detrimental impact of increased solar activity on satellites, particularly CubeSats. Three Australian CubeSats launched in 2021 experienced a shorter lifespan due to the intense solar storms that occurred during that period. Solar storms, characterized by powerful eruptions of charged particles from the Sun, can disrupt satellite operations and even cause them to malfunction or fail.

As the Sun's activity increases and decreases in an 11-year cycle, satellites orbiting Earth are exposed to varying levels of radiation and charged particles. This research highlights the importance of understanding and mitigating the effects of space weather on satellites. By studying the impact of solar storms on CubeSats, scientists can develop strategies to protect future space missions and ensure the longevity of critical satellite infrastructure.

The 75SSM

SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

Vibration Sensor (SW-200D)

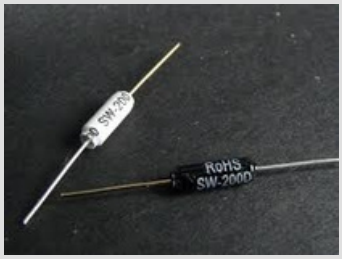
The SW-200D sensor is an electromechanical device designed for tilt and vibration detection.

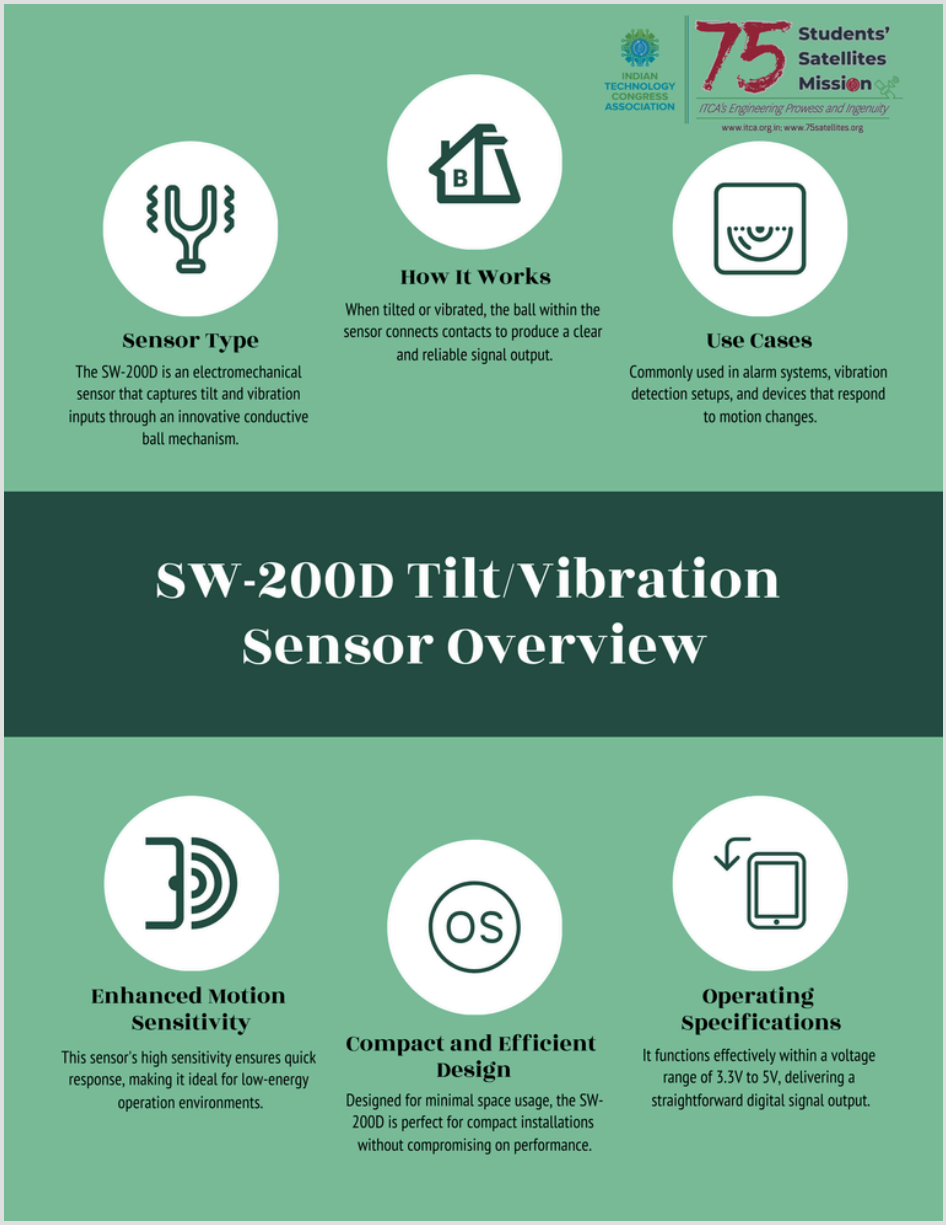
It operates by using a conductive ball inside, which bridges internal contacts when tilted or vibrated, producing a digital signal.

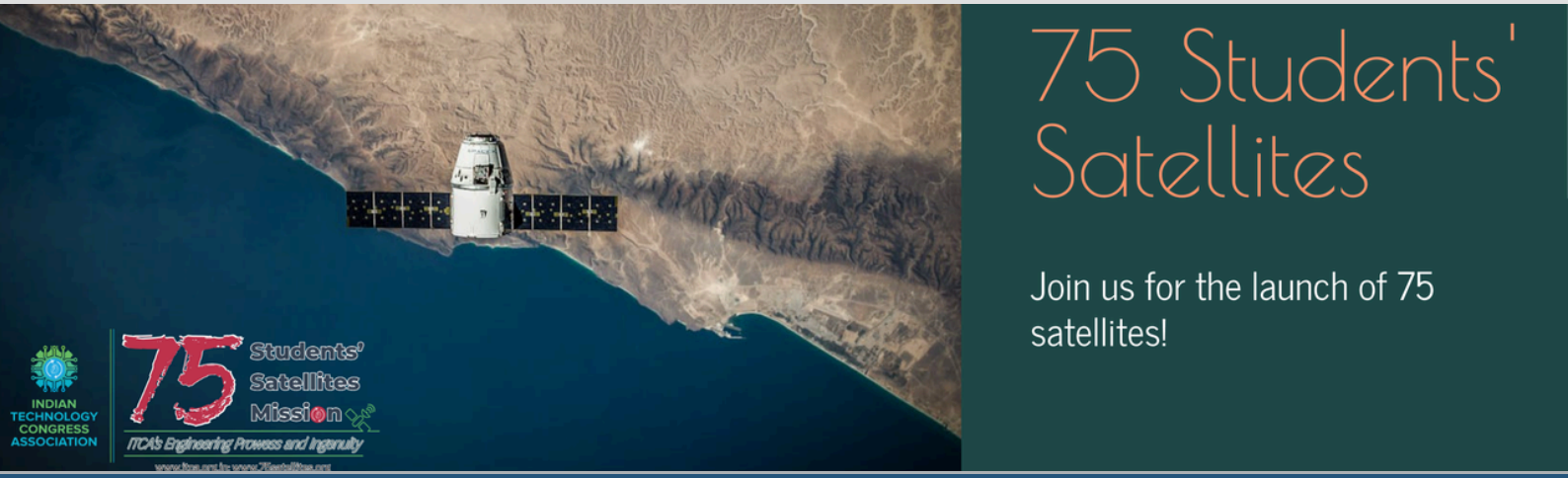
Compact and sensitive, the SW-200D is commonly used in alarms, motion-triggered devices, and anti-theft systems.

It functions within a voltage range of 3.3V to 5V, making it suitable for low-power applications.

Its reliable design and versatility make it a popular choice for detecting motion and orientation changes.







Space@India

Glimpses into India's space chronicle, every week



'A 4-day drive from Delhi to Mars': Why this cold desert in India is becoming a training ground for Martian experiments

Read more at: **https://www.msn.com/en-in/news**

ISRO signs Implementation Agreement with Australian Space Agency for Gaganyaan mission

Read more at:
https://www.thehindu.com/sci-tech





Geo-satellite data 'sub-optimal' to track stubble fires in Punjab, Haryana: Isro

Read more at:
https://economictimes.indiatimes.com

ISRO and SpaceX: India Needs to Realise There's No Such Thing as a Free Launch

Read more at:
https://m.thewire.in/article/space/isro-and-spacex-india





India's First Reusable Hybrid Rocket RHUMI 1 Launched by a Start-Up

Read more at:
https://marksmendaily.com/technology/indias-first-reusable-hybrid-rocket-rhumi-1-launched/

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.....

IAP - Free Space Optical Communication 2025

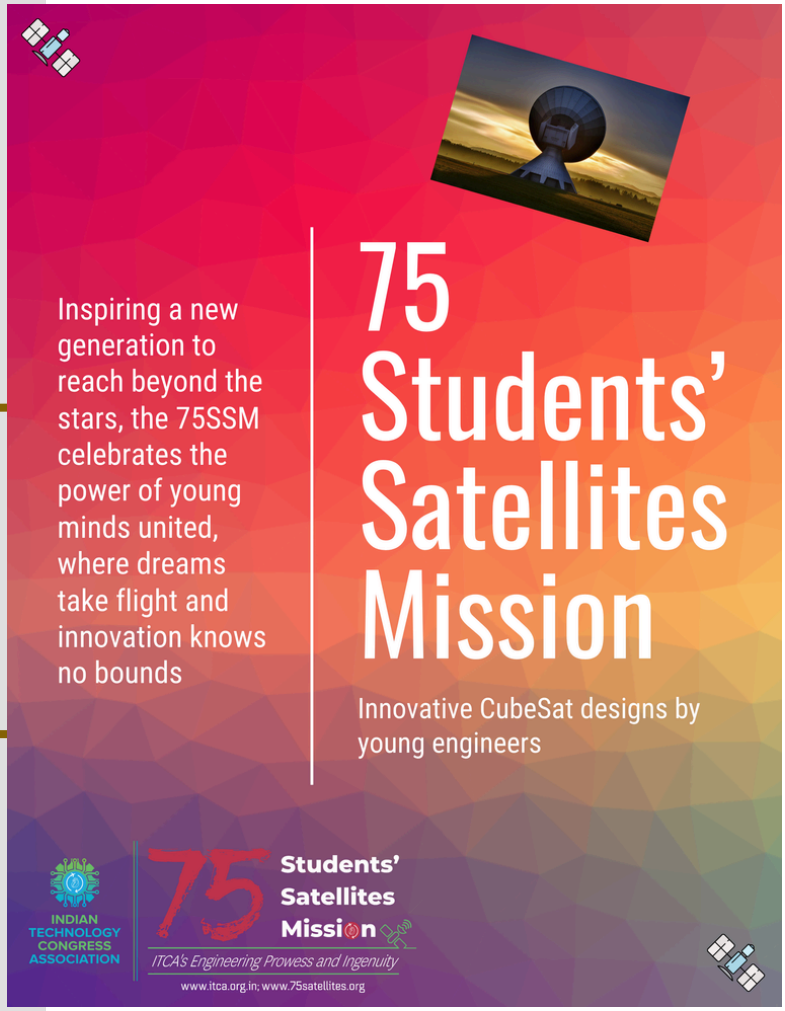
06 January 2025
MIT Beaver Works - 300 technology square suite 2
https://calendar.mit.edu/event/copy-of-iap-free-space-optical-communication-2025

SmallSat Symposium 2025

4 – 6 February 2025
at the Computer History Museum in Mountain View, California
https://smallsatshow.com/

CubeSat Developers Workshop 2025

16 - 18 December 2024
Fiera di Roma - Italy
https://www.nseexpoforum.com/



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