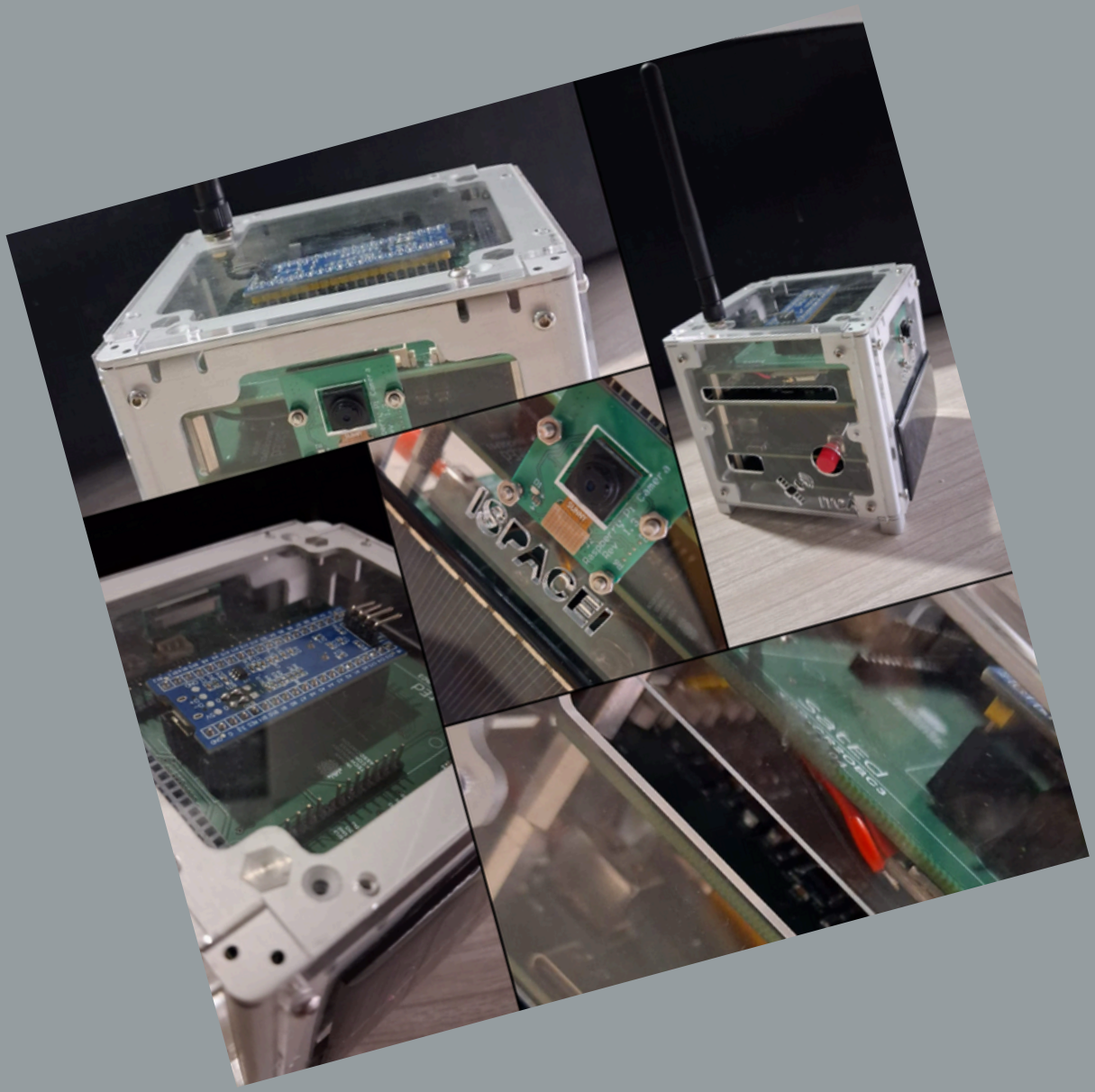
ISSUE 24 I 18 DECEMBER 2024

Space Beacon

Stay up-to-date with the latest in spacetech



A Voyage Through the Universe

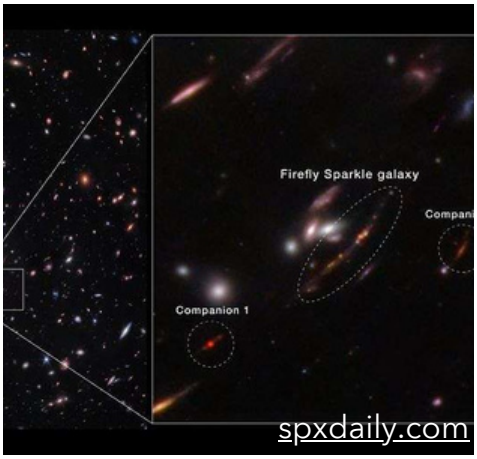
INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

A new galaxy, much like our own

Stunning images from NASA's James Webb Space Telescope reveal "Firefly Sparkle," a galaxy forming 600 million years after the Big Bang, resembling a young Milky Way. With 10 star clusters and a mass similar to our galaxy's early stages, it offers a rare glimpse into early galactic evolution. Surrounded by gravitationally lensed arcs of background galaxies, Firefly Sparkle features pink, purple, and blue clusters connected by faint lines. This discovery provides valuable insights into how galaxies like the Milky Way took shape.



NASA targets Lunar dust woes!

NASA is tackling lunar dust challenges, a major obstacle for Moon missions, by testing mitigation technologies aboard a Blue Origin rocket. Lunar dust is jagged, electrostatic, and ferromagnetic, damaging equipment and impairing vision. Tests include ClothBot for spacesuit dust transport, Electrostatic Dust Lofting to study UV-triggered behavior, and Hermes Lunar-G for regolith mechanics. These experiments will refine models for future missions, ensuring systems like power, mobility, and resource utilization operate effectively on the Moon.



Mars' sunny days come with a warning

Mars dust storms, while natural wonders, pose significant hazards, often triggered by high solar heating in 78% of cases. Though the thin atmosphere limits wind damage, storms can blanket the planet, obscure surface features, and deposit dust on solar panels, as seen with NASA's Opportunity rover, which lost power during a global storm. These storms challenge current rovers and landers and raise concerns for future crewed missions, as the fine, sticky dust affects everything it touches, according to Heshani Pieris of the University of Colorado, Boulder.

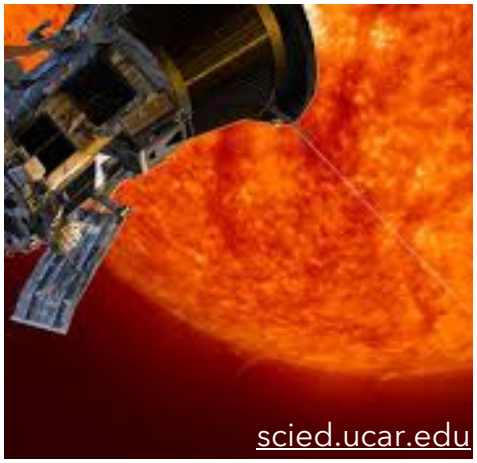




Hubble Reveals Decade of Changes on Outer Planets

NASA's Hubble Space Telescope, through the OPAL program, has tracked atmospheric changes on Jupiter, Saturn, Uranus, and Neptune over the past decade. It observed Jupiter's Great Red Spot shrinking with minimal seasonal changes, Saturn's dramatic seasonal shifts, and dark ring spokes. Uranus showed a brightening polar cap as it nears its 2028 summer solstice.

On Neptune, Hubble tracked dark storms linked to the solar cycle, enhancing our understanding of the outer planets' atmospheres.



How satellites are helping scientists study the sun

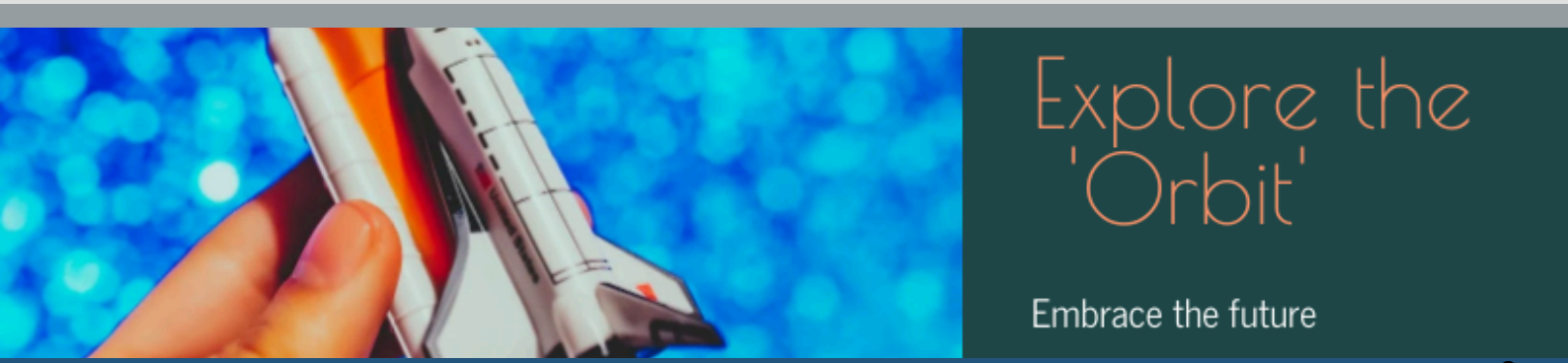
The European Space Agency's Proba-3 mission aims to create solar eclipses lasting hours instead of minutes to study the sun's corona. Using two satellites, the Occulter blocks the sun's light, and the Coronagraph observes the eclipse from 500 feet. This alignment will occur in orbit at 40,000 miles above Earth, maintaining eclipse conditions for up to six hours every 20-hour orbit. The goal is to study the corona, crucial for understanding solar wind and space weather. The first eclipse observation is expected in March after commissioning.



Could this be our future home on the Moon or Mars?

Hab-1, India's first "analog mission" by ISRO, was tested for three weeks in Ladakh's high mountains to simulate space conditions for astronauts. Designed by space architect Aastha Kacha-Jhala, it includes space-grade Teflon insulation, a bed, pull-out workstation, storage, kitchenette, and a dry toilet to conserve water.

The facility aims to address challenges astronauts might face on missions to the Moon or Mars, ensuring efficient waste disposal and odor control in limited space.



Genspace

Cover broader space news not fitting into other categories

Apollo-Era Antenna Still Communicates with Voyager 2

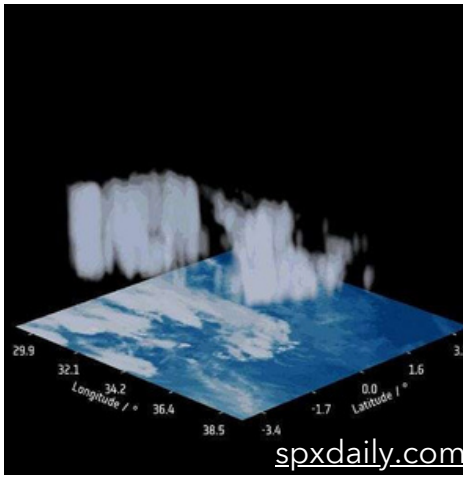
Deep Space Station 43 (DSS-43) in Australia has been a crucial link for NASA's deep-space missions for over 50 years, supporting spacecraft like Voyager 2 and Mars Curiosity. The 64-meter antenna played a key role in Apollo 17 and continues to communicate with spacecraft exploring the outer solar system. After major upgrades in 2020, including a new X-band cone and recertified pointing accuracy, DSS-43 remains vital for future missions, including those to the Moon and Mars, ensuring reliable communication across vast distances.



AI-Powered 3D Cloud Mapping Using Satellite Data

ESA's EarthCARE satellite, launched in May 2024, is nearing the end of commissioning, with its first data on clouds and aerosols expected early next year. Scientists have used AI to merge CloudSat vertical profiles and MSG imagery into 3D cloud maps, bridging gaps between infrequent and 2D data.

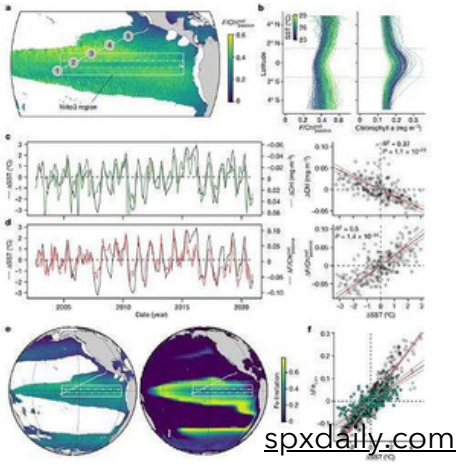
This breakthrough, presented at a global conference, highlights AI's potential to enhance EarthCARE's role in climate modeling and understanding cloud dynamics.



AI Transforms Ocean Monitoring with Satellite Fusion

The Cross-Satellite Atmospheric Correction (CSAC) system standardizes ocean color data from multiple satellites, creating reliable, long-term global records of upper ocean bio-optical properties. Using MODIS-Aqua's high-quality data as a benchmark, this AI-driven system harmonizes data from sensors like SeaWiFS and MERIS, reducing inconsistencies by up to 50%.

CSAC enables precise monitoring of marine ecosystems, climate trends, and the ocean's role in the carbon cycle.




nasa.gov

NASA TechLeap Prize

The Space Technology Payload Challenge seeks submissions to address NASA's technology shortfalls, advancing innovations for future exploration and science needs. Technologies will be tested through suborbital or orbital demonstrations on platforms like landers, balloons, or parabolic flight aircraft.

The challenge targets shortfalls from the Space Technology Mission Directorate (STMD) and NASA's Biological and Physical Sciences (BPS) Division under the CERISS program.



asysto.pl

UN/WHO Conference on Space Tech for Global Health

The United Nations/WHO Regional Conference on Space Technology for Advancing Global Health, held in Vienna from 23-25 October 2024, focused on space technologies' role in global health, covering satellite data for disease management, disaster response, and public health.

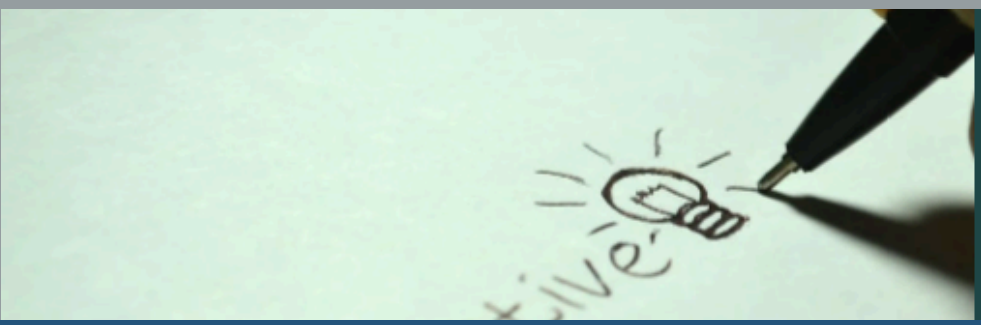
Key recommendations included creating a virtual observatory, integrating space and health into national plans, and enhancing education and training, with a focus on Latin America and the Caribbean.


esa.int

Submarines for space exploration

Submarines are being used to study human adaptation to extreme environments, simulating conditions for space missions. The SubSea project, a collaboration between ESA, the Portuguese Space Agency, and the Portuguese Navy, involved a 60-day underwater expedition with 25 volunteers to analyze psychological and physiological effects of isolation.

The findings will help prepare for long-term space missions, such as those to the Moon and Mars, and position Portugal as a hub for space mission research.



Satellogy

Focus on recent and upcoming satellites and launches

100 LEO Satellites for OneWeb Replenishment

Eutelsat has ordered 100 broadband satellites from Airbus Defence and Space to replenish its OneWeb low Earth orbit (LEO) constellation, with the first batch expected to be completed by 2026. These satellites will include key technology upgrades, particularly for 5G integration, and will be compatible with IRIS2, Europe's $11.1 billion multi-orbit broadband project. The new satellites aim to ensure continuity of service as OneWeb's current generation of satellites nears the end of its operational life around 2027-2028. Eutelsat also signed a contract to be the main architect and operator of IRIS2's LEO segment.



Space Force to Test Modular Satellite Tech

The U.S. Space Force will test the "plug and play" Handle interface by The Aerospace Corporation in its upcoming TacRS mission to accelerate payload integration for rapid launches.

The system supports various payloads without customization and will be used in the 2026 Victus Salo mission to enhance space domain awareness. Impulse Space was awarded a $34.5 million contract for launch services and orbital maneuver vehicles for Victus Salo and Victus Surgo.



World's First Ruggedized Satellite Withstands 10,000Gs

The world's first ruggedized satellite has been designed to withstand extreme conditions, enduring up to 10,000Gs of force.

This robust satellite aims to operate in harsh environments that typical satellites cannot handle, making it suitable for both military and commercial uses.

It is built to endure the intense forces encountered during launch and survive in space, expanding the possibilities for satellite applications in demanding conditions.





SpaceX Launches U.S. Space Force GPS Mission

On Dec. 16, SpaceX launched the GPS III SV-07 satellite for the U.S. Space Force's Rapid Response Trailblazer-1 (RRT-1) mission from Cape Canaveral.

Originally set for a 2025 launch aboard a ULA Vulcan rocket, the satellite was reassigned to SpaceX to demonstrate the ability to shorten mission planning cycles from two years to under six months, highlighting the military's push for rapid deployment and flexibility in national security space operations.



Seaspan Signs Deal with KVH for OneWeb LEO Solution

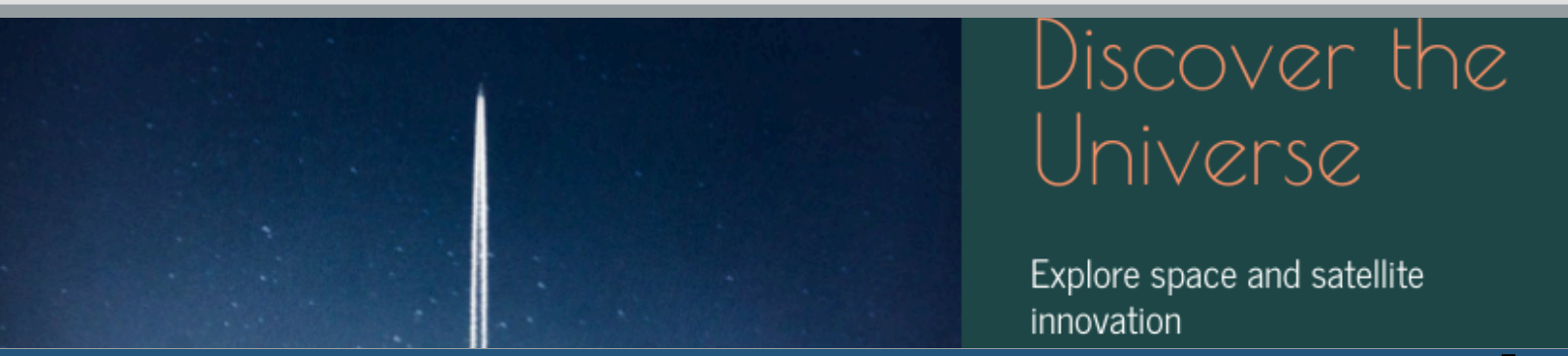
Seaspan Corporation has partnered with KVH Industries to equip its fleet with OneWeb's low-earth orbit (LEO) satellite technology, enhancing maritime connectivity. This makes Seaspan the first major containership operator to adopt the solution, improving access to high-bandwidth applications and cloud services.

The partnership aims to provide shore-like connectivity, boost efficiency, and improve seafarer welfare, setting a new standard for maritime communications with better bandwidth, low latency, and greater reliability.

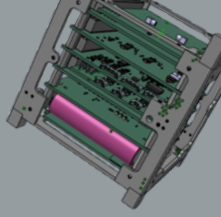


Airbus Delivers Thuraya 4 Satellite for Launch

Space42's Thuraya 4 telecommunications satellite, built by Airbus, has arrived at Kennedy Space Center for its launch aboard a SpaceX Falcon 9 rocket. The satellite will enhance connectivity across Europe, Africa, Central Asia, and the Middle East, providing over 15 new products once operational. Based on Airbus' Eurostar Neo platform, it features advanced all-electric capabilities, a 12-meter L-Band antenna, and enhanced on-board processing, marking a milestone in the partnership between Airbus and Yahsat, part of Space42.



CubeTech



Showcase innovative CubeSat missions and unique payloads

LEO Satellite Market Driving Connectivity and Data

The LEO Satellite market report on the industry provides a thorough analysis of the different methods and materials employed in the manufacturing of LEO Satellite market goods.. Key regions that are speeding up marketization are used to segment the market study. The scope of various market segments and applications that may have future market influence is also provided in this section. The comprehensive data is predicated on historical turning points and contemporary trends. The report offers details on the LEO Satellite Market's evolving investment structure, growth drivers, technologies, and market trends and development.

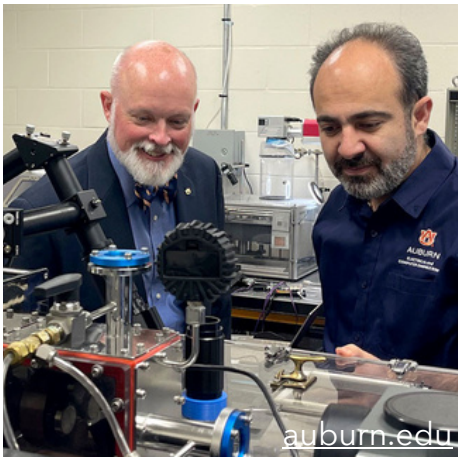


Nasa Partners with Auburn for Space Machines

NASA has partnered with Auburn University to develop machines for space exploration. This collaboration focuses on creating advanced technologies to support missions beyond Earth's orbit.

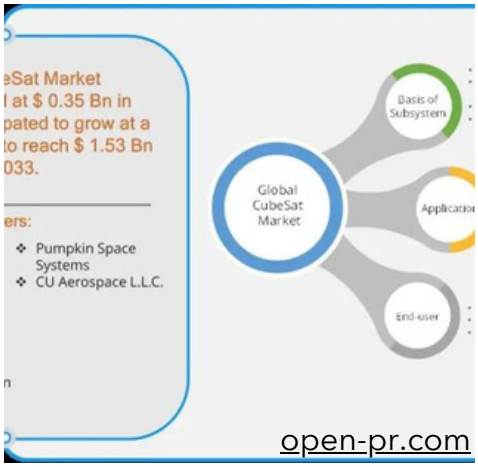
The goal is to build innovative systems that can operate effectively in the harsh conditions of space.

The machines will be integral in enhancing NASA's capabilities, especially for future lunar and deep space missions.



CubeSat Market Analysis and Forecast to 2033

The CubeSat market, valued at $0.35 billion in 2023, is expected to grow at a CAGR of 16.82% through 2033. This growth is driven by advances in satellite technology, making CubeSats more accessible and cost-effective for applications in communication, Earth observation, and scientific research. However, challenges like high launch costs and space debris concerns remain. Key players like Planet Labs, GomSpace, and AAC Clyde Space are leading the charge with innovative CubeSat solutions across various industries.





CUAVA-2 is back on mission

CUAVA-2, a CubeSat developed by the University of Sydney and other academic teams, launched in August on SpaceX's Transporter 11 mission. The satellite carries payloads like a GPS Reflectometry Receiver, HyperSpectral Imager, Charge Exchange Thruster, and more. Despite a failed SD card, CUAVA-2's backup system is operational, and its payloads are being prepared for use. The mission contributes to Australia's growing space capabilities and includes technical demonstrations targeting various international space sector niches.



New Small Satellite Propulsion Tech Set for Flight Demo

Seaspan Corporation has partnered with KVH Industries to equip its fleet with OneWeb's low-earth orbit (LEO) satellite technology, enhancing maritime connectivity. This makes Seaspan the first major containership operator to adopt the solution, improving access to high-bandwidth applications and cloud services.

The partnership aims to provide shore-like connectivity, boost efficiency, and improve seafarer welfare, setting a new standard for maritime communications with better bandwidth, low latency, and greater reliability.



First Wooden Satellite, LignoSat, Launched

The world's first wooden satellite, LignoSat, was launched on November 5, 2024, aboard a SpaceX Falcon 9 rocket from NASA's Kennedy Space Center. Developed by Kyoto University with Sumitomo Forestry, this 10 cm cube satellite is made from honoki wood. It will be deployed into Earth's orbit from the ISS to assess the durability of wooden materials in space, marking a significant step toward sustainable space exploration by exploring the use of renewable materials in spacecraft design.

CubeTech Innovation

CubeSat Tech Growth



Air Quality Sensor
(ZMOD4410AI)

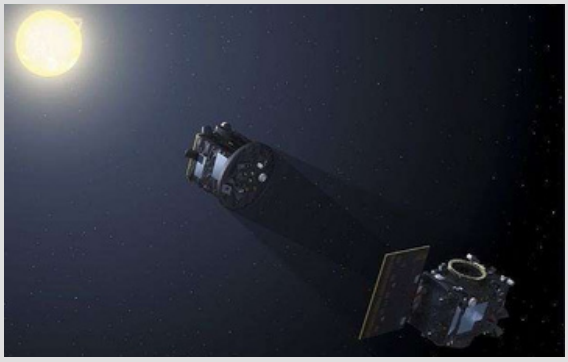
The ZMOD4410 is a digital air quality sensor module designed to measure indoor air quality (IAQ). It features a compact design and low power consumption, making it suitable for portable and battery-powered devices. The sensor uses metal oxide technology to detect volatile organic compounds (VOCs) and provides data for estimating IAQ indices. Applications include HVAC systems, air purifiers, and smart home devices. The ZMOD4410 integrates a sensing element with a microcontroller for processing and communication, simplifying its use in IoT applications.





Space@India

Glimpses into India's space chronicle, every week

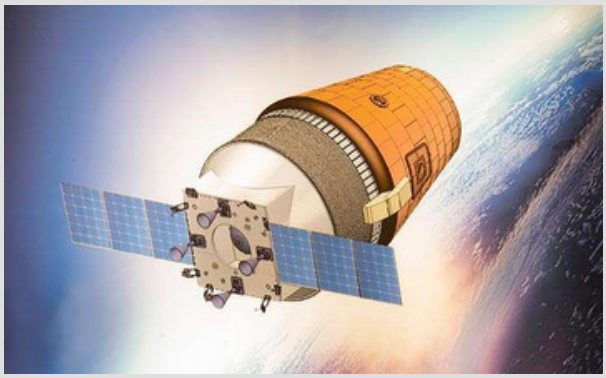


Growing a business from mobile apps to space software with Proba-3

Read more at:
https://www.spacedaily.com/

Indian Navy and ISRO conduct astronaut well deck recovery trials for Gaganyaan Mission

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Manastu Space delivers green propulsion system for satellites to DRDO

Read more at:
https://www.indiatoday.in/science

India practices pulling its Gaganyaan astronaut capsule out of the sea

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https://news.satnews.com/2024/12/08/thaicoms-ipstar-to-provide-satellite-services-in-india/



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New Delhi, India
https://www.iafastro.org/

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EXPO: 28-30 JANUARY 2025
ORLANDO, FL
https://www.spacecomexpo.com/

Committee on the Peaceful Uses of Outer Space

25 June - 4 July 2025
https://www.unoosa.org/



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