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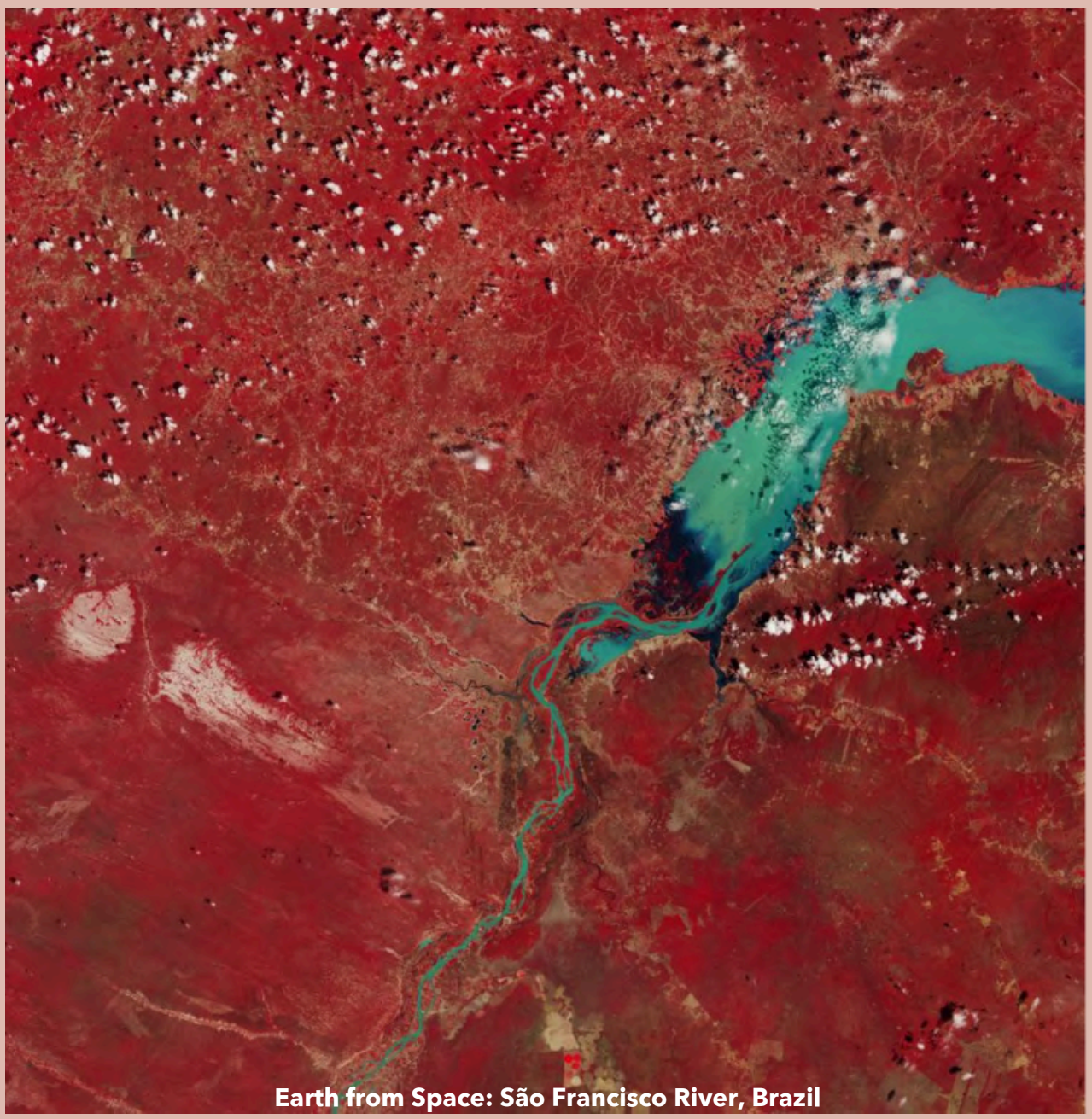
Space Beacon



Earth from Space: São Francisco River, Brazil

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 **ESA's Argonaut lunar lander, set to launch in the 2030s, will play a key role in supporting NASA's Artemis missions and Europe's contributions to lunar exploration**

First Lunar Lander to Support Exploration

The European Space Agency (ESA) has signed a $900 million contract with Thales Alenia Space to develop the Argonaut lunar lander. Set to launch in the 2030s, Argonaut will deliver cargo, scientific instruments, and essential resources to the Moon. It will endure extreme lunar conditions and operate for five years. The lander will integrate with ESA systems like Gateway and Moonlight, supporting international lunar programs, including NASA's Artemis missions. The first mission is planned for 2031, marking Europe's key contribution to lunar exploration.

Juno Detects Most Extreme Volcanic Activity on Io

Juno spacecraft recently spotted the most intense volcanic activity ever recorded on Jupiter's moon Io. During a December 2024 flyby, Juno discovered a massive volcanic hotspot in Io's southern hemisphere, emitting six times the energy of all Earth's power plants. This event suggests a vast subsurface magma system. The hotspot, spanning 40,000 square miles, likely left long-lasting surface changes. Juno will revisit the region in March 2025 to examine potential landscape shifts and deepen our understanding of volcanic activity on Io.

New Insights on Hydrogen in Mars' Atmosphere

Harvard researchers have proposed a new explanation for the presence of liquid water on ancient Mars. Their study reveals that episodic warm periods, lasting up to 100,000 years, were driven by hydrogen buildup in Mars' atmosphere. This hydrogen, combined with carbon dioxide, triggered greenhouse warming, supporting liquid water. The research also outlines how the Martian atmosphere's chemistry fluctuated between warm and cold phases. This modeling could offer new insights into prebiotic chemistry on Mars, contributing to understanding its potential for life.

ORBIMARS: Defining Mars' Orbital Space

ORBIMARS defines the orbital region within Mars' gravitational influence, about one million kilometers from the planet. This space allows for efficient spacecraft trajectories, stable orbits for satellites, and potential human transport routes. It accounts for Mars' unique gravitational dynamics, radiation, and atmospheric interactions, critical for future exploration, infrastructure, and scientific missions. ORBIMARS provides a framework for international collaboration and efficient planning in Mars exploration.

Scientists Monitor Asteroid That Could Hit Earth

The asteroid tracking of European Space Agency's (ESA) 2024 YR4, measuring 100m by 40m, with a one-in-83 chance of hitting Earth on December 22, 2032. Currently 27 million miles away, its path will cross Earth's orbit, potentially causing "severe damage" to a local region if it impacts. While the risk is low, ESA is closely monitoring its trajectory. Experts warn against overreacting, as early detection systems often overestimate impact likelihood. More data will be gathered as the asteroid moves closer.

Low-Mass Microquasars as Cosmic Ray Sources

Research reveals low-mass microquasars like GRS 1915+105 can accelerate particles, challenging previous views. Data from NASA's Fermi Telescope detected gamma rays, indicating proton acceleration. This suggests low-mass microquasars may contribute more to cosmic rays in the Milky Way than expected. Further studies are needed to understand the acceleration mechanisms. This discovery offers new insights into cosmic ray origins and their role in the universe's high-energy processes.

Genspace

Cover broader space news not fitting into other categories

Did you Know **The PLATO mission, launching in 2026, will use 26 cameras to search for Earth-like planets around 200,000 stars, advancing our understanding of exoplanets and their potential for life**

AI Enhances Space Missions with Autonomous Systems

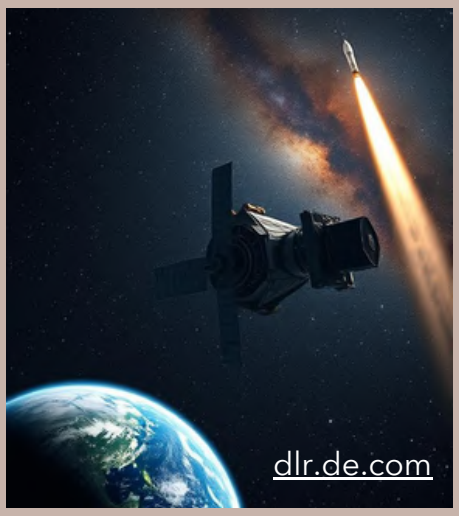
Airbus and ESA are advancing AI for autonomous space operations. The ORBIT-STAR AI system onboard the ISS's Columbus module detects faults and takes preventive actions independently, reducing the need for human oversight. This system enhances mission success and adapts over time. With future applications in deep space exploration and commercial space stations, AI is key to improving space autonomy. The Discovery programme supports further AI development, enhancing capabilities and reducing risks in space missions.

Astronauts Conduct Spacewalk for Key Tasks

Sunita Williams and Butch Wilmore are conducting a spacewalk outside the International Space Station. The six-and-a-half-hour spacewalk involves removing a radio antenna, collecting samples from the Destiny laboratory and Quest airlock to search for microorganisms, and preparing a spare elbow joint for the Canadarm2 robotic arm. Williams, with red stripes, is on her ninth spacewalk, while Wilmore, in an unmarked suit, is on his fifth. This marks the 274th spacewalk supporting ISS maintenance.

PLATO Mission to Launch in 2026 to Search for Planets

The PLATO mission, set to launch in late 2026 aboard Europe's Ariane 6 rocket, will use 26 cameras to search for Earth-like planets around 200,000 stars in the Milky Way. Led by DLR, PLATO will operate from Lagrange Point 2 (L2), 1.5 million km from Earth, to observe planets via the transit method. The mission aims to detect planets that may support life. PLATO's launch follows Ariane 6's first flight in 2024, enhancing Europe's space exploration capabilities. It will help advance our understanding of exoplanetary systems and their potential habitability.




spacenews.com

China's DeepSeek AI Boosts Space Autonomy

China's DeepSeek AI offers high performance with lower computational demands, crucial for space applications with limited resources. As an open-source platform, it could enhance real-time decision-making for autonomous satellites and deep-space missions. This innovation promises to drive space autonomy, with further breakthroughs expected in the near future. Experts predict these advancements will reduce reliance on ground control and improve orbit management efficiency.


morningstar.com

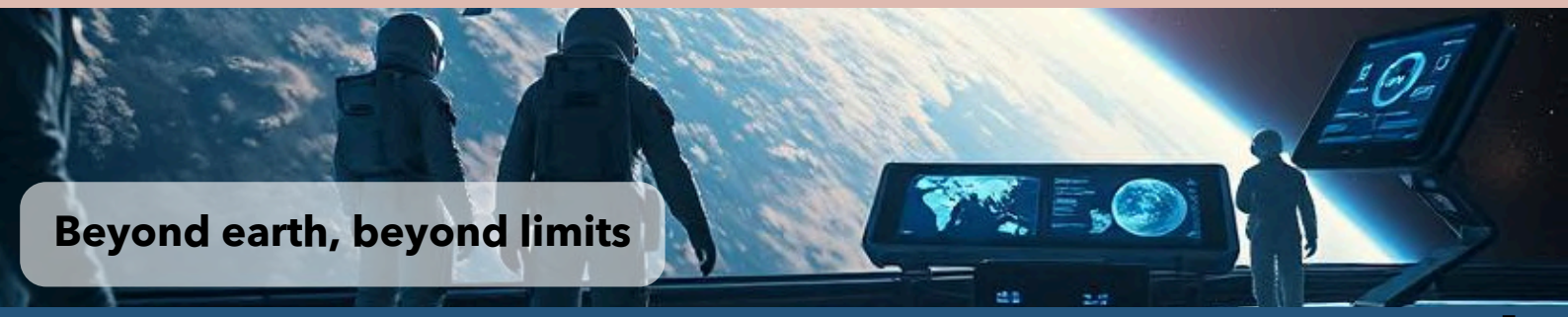
Virgin Galactic Partners with Redwire for Research

Virgin Galactic has partnered with Redwire to develop payload racks for suborbital research on its Delta-class spaceplane, launching in 2026. These racks, based on Redwire's ISS equipment, will support diverse experiments and allow for easier integration, including real-time data transmission. Designed for autonomous or human-tended studies, the lockers will simplify space access for scientists by reducing engineering complexities. The collaboration aims to enhance suborbital research and pave the way for broader space exploration and experimentation.


composite.com

Vast and SpaceX Seek Proposals for Space Research

Vast and SpaceX are calling for global research proposals to advance human space habitation. Selected projects will access Haven-1 Lab, Dragon spacecraft, and private ISS missions. Haven-1 will serve as a commercial space station for microgravity research. While no direct funding is offered, researchers will receive free support, including on-orbit crew time and flight assistance. This collaboration aims to drive space exploration and improve life on Earth. The initiative also helps develop vital experience for the future of space stations.



Satellogy

Focus on recent and upcoming satellites and launches

Did you Know **ESA's Satellites are revolutionizing disease monitoring by tracking waterborne, vector-borne, and non-communicable diseases, improving global health strategies and outbreak predictions**

SpainSat NG-I Satellite Successfully Launched by Airbus

Airbus' SpainSat NG-I satellite launched successfully aboard a Falcon 9 rocket from Cape Canaveral. Designed for the Spanish Armed Forces, it offers enhanced secure communications and will enter service in 2025. With a cutting-edge active antenna system, it provides 10x the capacity of previous satellites, enabling faster data transmission. SpainSat NG-II, the second satellite, is set for completion by late 2025. This advanced technology marks a significant step in strengthening Spain's communications and space capabilities.

European Satellites Detect Ocean Tidal Currents

Swarm satellites have detected electromagnetic signals from ocean tides, offering insights into Earth's liquid movements and potential volcanic activity. Using sensitive magnetometers, the satellites measure changes in Earth's magnetic field caused by tides. These signals could reveal ocean salinity, temperature, and more. The discovery, based on 2017 data during a solar minimum, allows continued research, as Swarm will operate until the next solar minimum in 2030.

H-3 Rocket Launches Michibiki No. 6 Satellite

JAXA successfully launched the fifth H-3 rocket carrying the Michibiki No. 6 satellite, enhancing Japan's GPS system. The launch, from Tanegashima Space Center, places the satellite into orbit for the Japanese positioning network. Michibiki satellites provide precise location data, with plans for seven satellites by 2025 and eleven in the future. Despite a launch failure in 2023, the H-3 series has since succeeded. JAXA aims to transfer the launch business to Mitsubishi Heavy in the future. This successful launch strengthens Japan's positioning capabilities and its role in global navigation.

conversation.com

Satellites: Key Tools for Monitoring Health and Nature

Satellite data is revolutionizing disease monitoring. Earth observation helps track waterborne, vector-borne, and non-communicable diseases by monitoring water quality, vector habitats, and heatwaves. This technology improves global health strategies, aids in predicting outbreaks, and supports timely interventions. As climate change and human activity impact disease patterns, satellites play a crucial role in enhancing public health decision-making. Satellite data will be key in combating emerging health threats, safeguarding human and environmental health.


viasatellite.com

Zaitra Boosts Czech Space Industry with AI Solutions

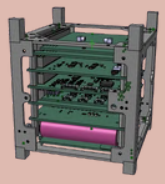
Czech AI startup Zaitra is enhancing satellite autonomy with AI-powered solutions. Backed by a €1.7M investment, the company focuses on reducing communication costs and preventing collisions. Zaitra's software, including real-time data filtering, is already used in commercial satellites. With in-orbit demos scheduled for 2025, the company is expanding globally and targeting new partnerships and investors. Zaitra aims to revolutionize space data processing, providing smarter sensors for increased mission efficiency and safety.

satnow.com

Exotrail Ally with CNES for In-Orbit Services

Exotrail is collaborating with CNES to advance its Spacevan platform, focusing on in-orbit services like Rendezvous and Proximity Operations (RPO) and Docking (RPO-D). A study is underway to prepare for a mission targeting satellite end-of-life management in LEO by 2027. Exotrail's first satellite, Spacevan-001, has demonstrated successful operations, including precise maneuvers in orbit. The company is now integrating key components to enhance its platform and foster a European ecosystem for advanced space logistics and mobility solutions.

CubeTech



Showcase innovative CubeSat missions and unique payloads

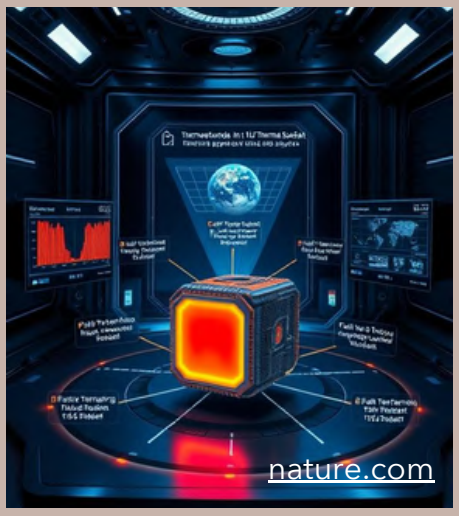
Did you Know **KAIST's AI technique can predict CubeSat engine performance with minimal error, significantly reducing design and testing time for satellite propulsion systems**

Array Labs Teams with Raytheon, Umbra on 3D Imaging

Array Labs has partnered with Raytheon and Umbra Space to develop advanced 3D Earth observation capabilities using synthetic aperture radar (SAR) from Low-Earth Orbit (LEO) satellites. The collaboration aims to provide high-resolution 3D models of Earth's surface for commercial, military, and intelligence uses. Their flagship product, Site3D, will enable precise mapping, change detection, and volumetric estimation. The first launch of their 3D cube satellites is expected early next year, marking a significant step in space-based Earth observation.

Design and Validation of CubeSat Thermal Subsystem

This work details the design and validation of a thermal subsystem for a 1U CubeSat. It includes passive temperature control using multilayer coatings and an electronic board measuring internal temperatures on all six faces. Validation occurs in a thermo vacuum chamber, simulating orbital conditions. Real-time data is transmitted wirelessly to an Earth station for processing, offering a graphical display. This setup assesses the efficiency of the passive thermal control system implemented in the CubeSat.



CubeSpace Expands Satellite Control with Investment

CubeSpace enhances small satellite control with modular ADCS solutions for spacecraft up to 1,000 kg. With over 350 systems in orbit, CS delivers faster, plug-and-play solutions, reducing design complexity. Recent investments boost production, offering high-performance components for Earth Observation. A cloud-based mission support ecosystem further strengthens CubeSpace's position as a key player in satellite development, supporting over 250 clients globally.

KAIST AI Predicts CubeSat Engine Performance

KAIST researchers developed an AI technique to predict Hall thruster performance for CubeSats. The AI model, trained on 18,000 data points, shows minimal error in predicting thrust, cutting down design and testing time. It applies to various Hall thrusters and ion beam sources used in industries like semiconductors. The model will be validated during the Nuri rocket's fourth launch in November. This breakthrough could significantly advance satellite propulsion and accelerate future space missions.

Innovative Thermal System Enhances CubeSat Missions

Researchers have developed a new thermal subsystem for 1U CubeSats, using passive control technologies like multilayer coatings to regulate temperature in space. Sensors monitor internal temperatures, transmitting data for analysis. Tested in simulated space conditions, the system ensures reliability and cost-effectiveness for CubeSat missions, improving satellite longevity and success rates for future scientific exploration. This breakthrough enables smaller, cost-effective satellites for space research.

SatRev's Raccoon Satellite Launch: A Polish Success

Polish company SatRev successfully launched its advanced Raccoon satellite platform into orbit, marking a significant achievement in space technology. The satellite's precise control, energy optimization, and modular design make it ideal for both commercial and scientific missions. The launch involved a two-phase deployment via SpaceX's Transporter-12 mission and the Impulse 2 Mira vehicle. SatRev's team continues to push boundaries, with plans to expand internationally and enhance space technologies, highlighting Poland's role in the global space industry.

CubeSats, redefining space exploration

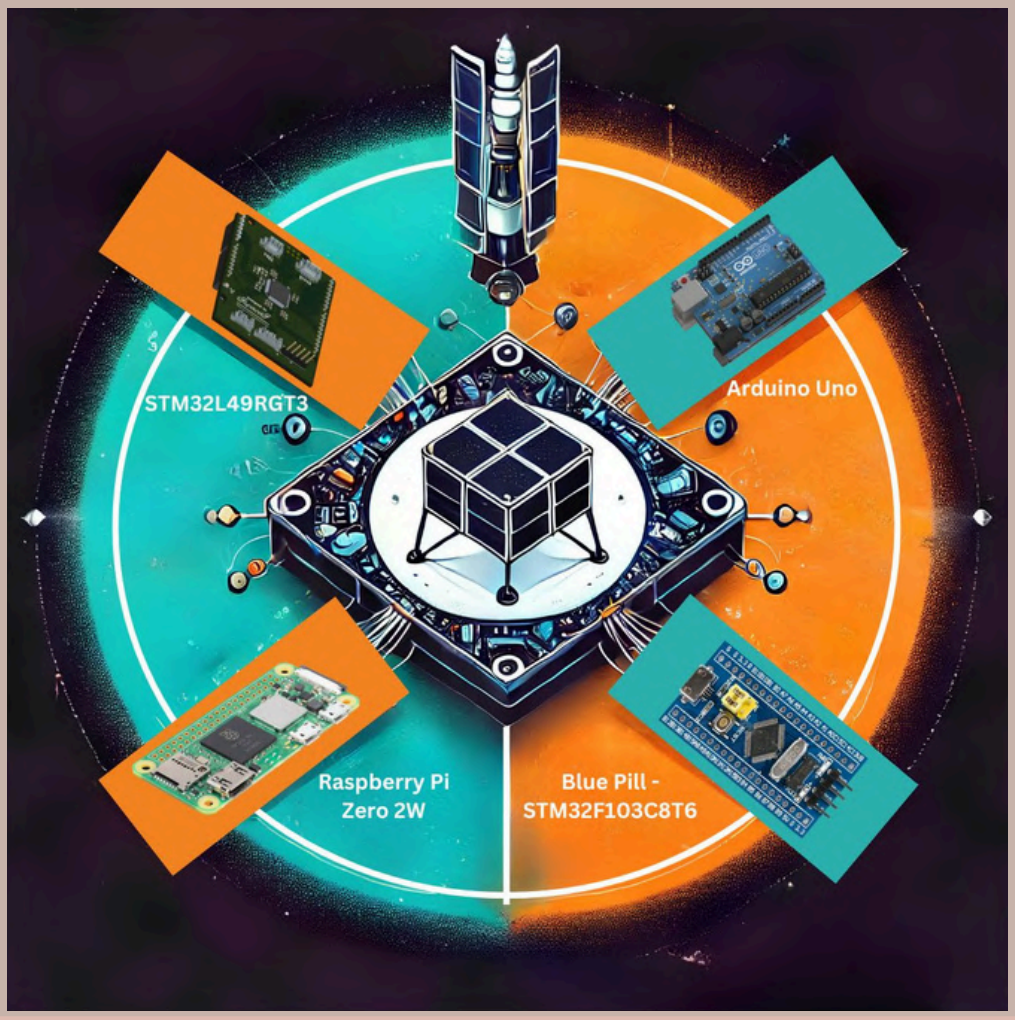
The 75SSM

SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

Quad-Processor Architecture: Enhancing Reliability and Efficiency in Satellite Systems

The CRSat system is designed for classroom demonstrations, featuring a quad-processor architecture where each microcontroller (Arduino Uno, STM32F103C8T6, STM32L496RGT3, and Raspberry Pi Zero W) can be used individually for various satellite tasks. Each microcontroller is capable of performing all necessary functions, from basic telemetry and sensor integration to advanced image processing and mission-critical operations. Students can explore how each processor handles satellite operations independently, offering a hands-on learning experience and flexibility in choosing the most suitable processor for different tasks in satellite demonstrations. This setup offers students a hands-on platform to compare microcontroller capabilities in satellite systems, enhancing practical knowledge for real-world space technology.



Space@India

Glimpses into India's space chronicle, every week

India's 2025 Budget Allocates Rs 13,416 Crore to Fuel Ambitious Space Exploration Goals

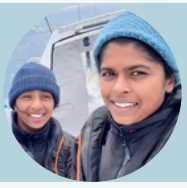
Read more at: dnaindia.com

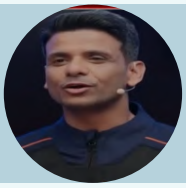
Economic Survey 2024-25: India's Space Growth Sparks Infrastructure, Urban Planning, and Judicial Reforms

Read more at: msn.com

INSV Tarini Achieves Historic Milestone by Passing Through Point Nemo, a Landmark Moment for India's Women Naval Officers

Read more at: republicworld.com





Indian Astronaut to Pilot Axiom-4 Spacecraft and Perform Yoga in Space, Pioneering New Milestone in Space Exploration

Read more at: ndtv.com

ISRO's NVS-02 Satellite Faces Minor Setback After Thrusters Fail to Fire, Team Actively Working on Recovery

Read more at: businesssstandard.com

India's SPADEx Mission: A Historic Leap in Space Docking Technology and Innovation

Read more at: oinegro.com

Space Industry Applauds Customs Duty Reduction on Satellite Launches and Vehicles

Read more at: moneycontrol.com

Space Industry Enthusiastically Welcomes FM's Strategic Plans to Boost Growth and Innovation

Read more at: rediff.com

75 Students' Satellites Mission

ITCA's Engineering Prowess and Ingenuity

ITCA: Pioneering India's Tech Future

Innovating India's tech for 21 years, we pioneered the '75 Students' Satellites Mission' and made a global impact in space tech, precision agriculture, and Industry 4.0.

Upcoming.....

Events

Spatial Perspectives

12 February 2025
Les Salons Hoche, Paris
perspectives-spatiales.com

Business of Space Conference

23-25 February 2025
UAH, Huntsville, Alabama
uah.edu

Space-Comm Expo

11-12 March 2025
London ExCeL, England
space-comm.co

Launches

SpaceX | Falcon 9 Block 5 | Starlink Group 12-9

8 Feb 2025 00:20 IST
SLC-40, Cape Canaveral SFS, Florida, USA

SpaceX | Falcon 9 Block 5 | Starlink Group 11-10

9 Feb 2025 05:55 IST
SLC-4E, Vandenberg SFB, California, USA

CASC | Long March 8A | Demo Flight

11 Feb, 2025 15:30 IST
LC-201, Wenchang Space Launch Site, China

SPACE BEACON
cosmic cadences on our radar

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