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Space Beacon

ISRO's 100th Mission: The GSLV-F15/NVS-02 Launch Success

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Orbital

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Bright Comet ATLAS Dazzles in Spacecraft Images

Comet C/2024 G3 (ATLAS) surged through spacecraft images from 11-15 January 2025, as it passed just 8 million miles from the sun. Captured by SOHO's LASCO instrument, the comet's bright tail became so intense that it caused sensor artifacts. These images allow scientists to study the comet's interaction with the solar wind. While briefly visible in the Northern Hemisphere, ATLAS is now receding and may have broken apart, causing it to fade rapidly. The comet is now best observed in the Southern Hemisphere.

Ingenuity Measures Martian Winds in Historic First

Ingenuity, NASA's Mars helicopter, has made history by measuring wind speeds on Mars for the first time using its flight data. By analyzing the helicopter's orientation during flights, scientists were able to reconstruct wind speeds ranging from 9 to 54 mph. This groundbreaking research, led by Brian Jackson at Boise State University, helps understand Martian weather and surface processes. The data also supports future planning for safe missions, including entry, descent, and landing on Mars, and could aid in exploring other planetary environments.

Mars Mounds Support Theory of Ancient Ocean

Researchers have discovered thousands of mounds on Mars containing layers of clay minerals, suggesting that liquid water once flowed on the planet's surface. These mounds, located in Mars' northern region, provide evidence of a wetter, warmer past nearly four billion years ago. The findings strengthen the theory that an ancient ocean once existed on Mars. This research, led by Joe McNeil, also points to Oxia Planum as a key site for future exploration by ESA's Rosalind Franklin rover in search of past life on Mars.

Scientists Detect Unexpected Cosmic Chirps from Space

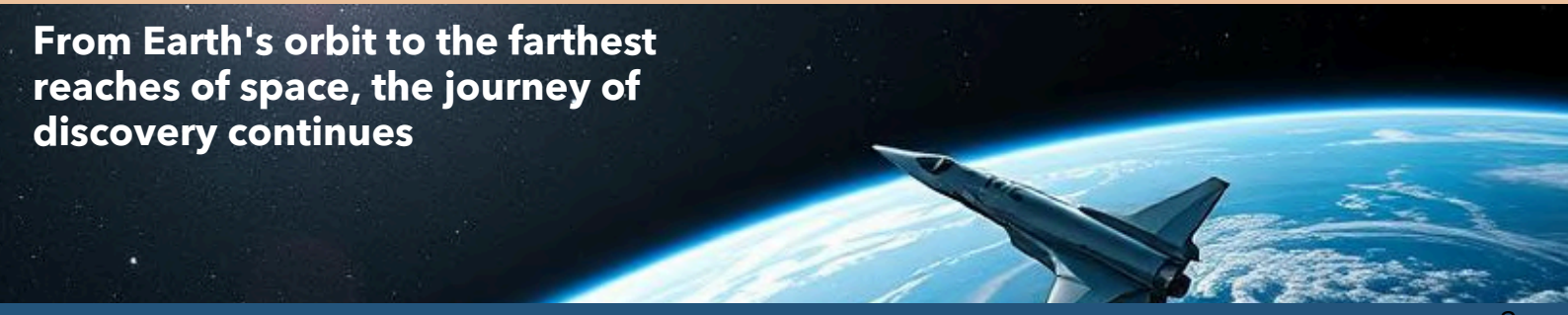
Scientists have detected chirp-like electromagnetic waves, known as chorus waves, from a surprising 62,000 miles away from Earth. Previously, these waves were only detected closer to Earth. The waves originate from the terrestrial mid-tail neutral sheet, an area with distorted magnetic fields. This discovery challenges previous knowledge and could change our understanding of space weather. Despite the chaotic region, chorus waves interact with electrons similarly to those found nearer Earth. These waves play a key role in Earth's protective magnetic field against solar storms.

ESA Plans Advanced Mars Lander for 2035 Mission

The European Space Agency (ESA) is working toward an advanced Mars lander by the mid-2030s, following its 2028 Rosalind Franklin rover mission. ESA recently called for proposals to develop key technologies for high-precision entry, descent, and landing capabilities. The goal is to ensure readiness before the next key ministerial meeting in November 2025. The 2035 launch window is particularly favorable for Mars missions, and ESA's broader "Explore 2040" campaign includes plans for a LightShip tug for Mars exploration and communication.

Tech to Extract Oxygen from Moon's Regolith Tested

Sierra Space engineers have developed a system to extract oxygen from lunar regolith, simulating conditions at NASA's Johnson Space Center. By heating the regolith and using a carbothermal process, oxygen is released for potential use by astronauts on a lunar base. Challenges like lunar gravity remain, but further tests will be conducted on the moon. This technology could also support rocket fuel production and resource extraction, reducing reliance on Earth-based resupplies and enabling sustained lunar exploration and future Mars missions.



Genspace

Cover broader space news not fitting into other categories

Space Research Could Transform Heart Repair

A study led by Emory University's Chunhui Xu found that heart muscle cells thrive in space's microgravity environment, offering hope for heart repair on Earth. Heart cell therapy faces challenges with cell survival after transplantation, but space research showed increased protein production and cell resilience in space-exposed cells. By understanding these molecular changes, scientists aim to enhance heart cell survival on Earth, potentially leading to more effective therapies for heart conditions and paving the way for advancements in regenerative medicine.

Singapore Joins Global Effort to Detect Dark Matter

Singapore has joined GNOME, an international collaboration aiming to detect dark matter. Hosted by A*STAR, the Singapore node will use quantum sensors, machine learning, and cloud computing to enhance detection accuracy. Its equator location boosts global coverage, improving signal filtering. This partnership promises advancements in understanding the universe and innovations in fields like biomedical imaging and navigation. The first data from Singapore's GNOME station is expected in 2025.

NASA Tests Cost-Effective 3D-Printed Antenna for Space

NASA tested a 3D-printed antenna for transmitting data to Earth, showcasing the potential of additive manufacturing in space exploration. Made with ceramic-filled polymer and precision 3D printing, the antenna performed well in tests at NASA's Goddard Space Flight Center and during a weather balloon flight. The successful demonstration highlights the ability to create mission-specific antennas cost-effectively, supporting NASA's Near Space Network. This breakthrough could lead to more adaptable and affordable communication systems for future space missions.

Astronauts Search for Microbes on ISS Exterior

Astronauts will collect microbiological samples from the ISS exterior during a spacewalk. This research, part of the ISS External Microorganisms experiment, explores how microbes survive in space's harsh conditions. The findings could support the Panspermia hypothesis, suggesting life may have originated elsewhere in the galaxy. The study also helps understand potential contamination of space environments, especially for future missions to the Moon or Mars. Insights into microbial resilience could reveal how life might exist beyond Earth.

Aerospace Corp. and Google Partner on Space Weather

Aerospace Corp. and Google Public Sector have partnered to improve space weather forecasting using AI and high-performance computing. Their goal is to enhance solar-activity predictions, such as geomagnetic storms, with better accuracy. Leveraging data from NASA and other agencies, the collaboration aims to address the complexities of solar flares and coronal mass ejections. Google's Vertex AI platform will play a key role in processing data to transform space weather forecasting and protect critical infrastructure.

Malargüe Station Upgraded with Cryogenic Technology

Researchers are using supercomputers to study electron behavior in ion engine exhaust. This helps reduce damage to spacecraft components like solar arrays and antennas. Understanding how electrons move allows for better electric propulsion designs, improving mission efficiency and enabling longer, farther journeys with less fuel. These advancements will pave the way for more cost-effective and sustainable space exploration missions. As electric propulsion advances, it could revolutionize deep-space exploration, allowing humanity to reach distant planets.

Satellogy

Focus on recent and upcoming satellites and launches

Swarm Satellites Uncover Magnetic Signals in Oceans

ESA's Swarm mission has identified faint magnetic signals from ocean tides, aiding studies on magma distribution, ocean dynamics, and volcanic activity. Swarm's advanced sensors help analyze ocean temperature, salinity, and seismic behavior. The mission's extended operation, enhanced by solar minimum conditions, provides crucial data for climate science and early volcanic eruption warnings, making it an essential tool for Earth research. This unexpected longevity also opens new avenues for future exploration and scientific discoveries.

AI Tool Generates Satellite Images of Future Flooding

MIT scientists have developed an AI tool that generates realistic satellite images of future flooding caused by hurricanes. Combining generative AI with a physics-based flood model, the tool creates accurate, birds-eye-view images of potential flooding impacts on regions like Houston. This method was tested using Hurricane Harvey data, showing improved accuracy compared to AI-only methods. The tool can help residents prepare and make evacuation decisions, offering a more tangible visualization than traditional flood maps.

PUNCH Spacecraft Make Final Stop Before Launch

Southwest Research Institute's (SwRI) PUNCH mission, consisting of four small spacecraft, has arrived at Vandenberg Space Force Base before its planned launch in February 2025. The mission aims to better understand the Sun's corona and solar wind. Three spacecraft will feature heliospheric imagers, and one will carry a coronagraph to study the Sun's outer atmosphere. The satellites will work as a "virtual instrument," capturing images to map solar features and measure coronal mass ejections' motion in three dimensions.


asdnews.com

ESA and Hisdesat Launch New Secure Satellite

Hisdesat's SpainSat NG I, launched on 29 January 2025, enhances secure communications across Europe, the Americas, and beyond. Developed with ESA's Pacis 3 partnership, it features advanced antennas for faster, secure data transmission and adaptable coverage. Weighing 6.1 tonnes, the satellite will support government and military communications and undergo in-orbit testing before becoming operational. The satellite's flexibility ensures reliable service, enhancing Europe's secure communication for government and defense.


scitechdaily.com

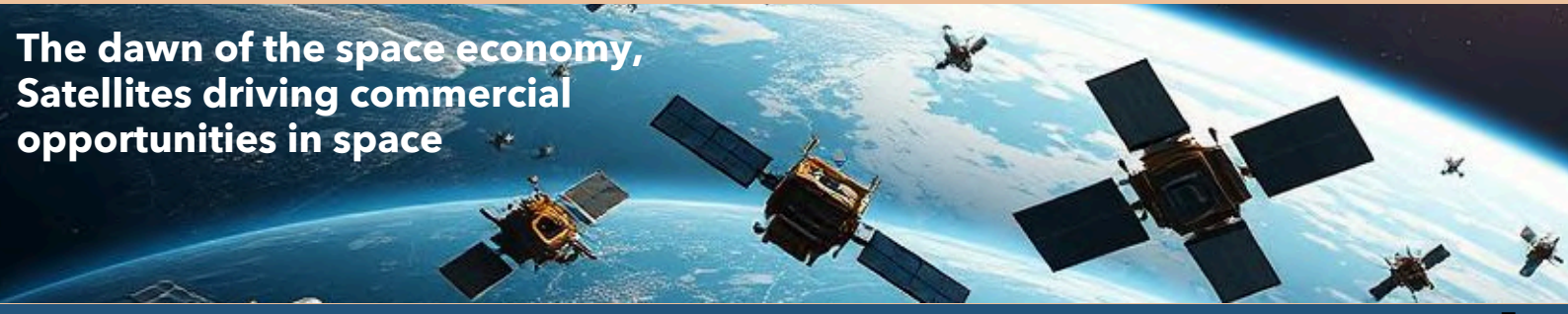
Solar Exploration Mission Gears Up for Launch

The upcoming solar exploration mission is set for launch with four small satellites designed to study the Sun's outer atmosphere. Launching alongside the SPHEREx space telescope on a SpaceX Falcon 9 rocket, these satellites will observe how the Sun's corona transitions into solar wind, deepening our understanding of space weather. Led by Southwest Research Institute, the mission is currently undergoing final preparations at Vandenberg Space Force Base, with a planned launch in late February 2025.

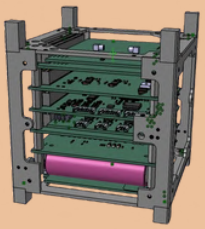

spacedaily.com

Thales Alenia Space Leads Key Earth Mission

The Italian Space Agency (ASI) has selected Thales Alenia Space to integrate the SBG-TIR satellite using its PRIMA-S platform. The mission will monitor ecosystems, climate, and geological changes with advanced thermal infrared instruments. Thales will adapt the platform for high-resolution Earth observation, contributing to global challenges like climate change. The collaboration enhances Italy's capabilities in Earth observation, improving environmental resource management and understanding of global phenomena.



CubeTech



Showcase innovative CubeSat missions and unique payloads

GITAI Expands Into Satellites with Successful Launch

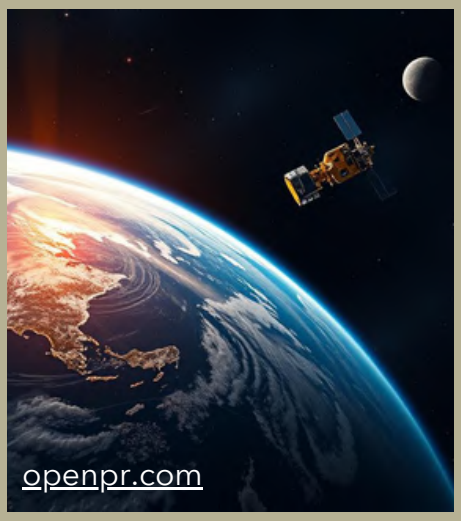
Japanese robotics startup GITAI has ventured into the satellite industry, launching its first 16U cubesat, SC1, on SpaceX's Bandwagon rideshare mission in December. Developed in-house, SC1 successfully established communications, validated sensors, and transmitted data back to Earth. Initially focused on robotic arms for on-orbit services, GITAI will now offer satellite bus components for Low-Earth Orbit constellations. The company plans a 2026 in-orbit demo showcasing satellite docking and life extension, with funding and a SpaceX contract secured.

Rocket Lab Launches Satellites for Wildfire Monitoring

Rocket Lab will launch eight satellites for OroraTech on a dedicated Electron mission. The satellites, equipped with thermal infrared cameras, will enhance global wildfire detection and response. The mission will help expand OroraTech's constellation, providing 24/7 wildfire monitoring to assist first responders and governments. The rapid four-month turnaround showcases Rocket Lab's responsive launch capabilities. OroraTech aims to grow its constellation to 100 satellites by 2028, aiding in better wildfire management worldwide.

AscendArc Targets Small GEO Satellite Market

Portland-based AscendArc, founded by a former SpaceX engineer, emerged from stealth on 29 January after securing $4 million in funding. The startup aims to provide cost-effective, scalable solutions for small geostationary (GEO) satellites, addressing the U.S. military's demand for advanced satellite systems. AscendArc also received a $1.8 million AFWERX Phase II contract to enhance high-bandwidth satellite communications. With its first launch planned for 2027, AscendArc is joining companies like Astranis and Swissto12 in the growing small GEO market.



openpr.com

Nanosatellite and Microsatellite Market Growth Outlook

The nanosatellite and microsatellite market is expected to grow from $2.96 billion in 2024 to $6.72 billion by 2029. This growth is driven by space exploration, government support, and advancements in satellite technology. Key trends include the rise of small satellite constellations and miniaturization. Leading companies include Spire Global, Lockheed Martin, and Planet Labs. North America leads the market, with increasing satellite launches supporting growth in Earth observation, communication, and reconnaissance applications.

fox40.com

NPS CubeSat Launch Boosts Global Space Partnerships

The Naval Postgraduate School (NPS) successfully launched its second CubeSat, Otter, on 14 January 2025, aboard a SpaceX Falcon 9 rocket. In partnership with the National Reconnaissance Office (NRO) and New Zealand's Defence Science & Technology unit, Otter aims to explore new space technologies. The mission supports applied research in spacecraft integration, testing, and operations, providing valuable hands-on experience for NPS students. Otter continues NPS' tradition of advancing space research and fostering international defense collaborations.

aviationweek.com

Space Robotics Startup Demos CubeSat for LEO

A space robotics startup has successfully demonstrated its CubeSat, marking progress in developing small satellites for low-Earth orbit (LEO) missions. The company plans to expand its satellite offerings, including 50-kg and 200-kg spacecraft. The demonstration confirmed reliable communications, sensor functionality, and image transmission. This success positions the startup to secure contracts, including potential U.S. government opportunities, and to support future LEO constellation applications.

Testing new technologies in space, CubeSats as a platform for innovation

The 75SSM

SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

CRSat's Smart Brain: The Powerhouse of On-Board Computing

CRSat's On-Board Computer (OBC) system features four processors for different tasks: Arduino Uno for telemetry, STM32 for sensor fusion and control, and Raspberry Pi for image processing. With redundancy mechanisms for reliability, it ensures continuous operation. The satellite includes ESD protection, antenna safety, and emergency systems for power cutoff and alarms. Its communication system uses LoRa for long-range, energy-efficient transmission with error correction. Key sensors collect data, processed through multi-stage systems, while performance is monitored for optimization and troubleshooting.

Space@India

Glimpses into India's space chronicle, every week

ISRO Marks Milestone with 100th Rocket Launch from Sriharikota; GSLV-F15 Successfully Places Navigation Satellite NVS-02 in Orbit

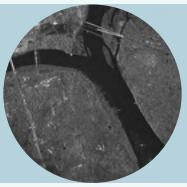
Read more at: cnbc.com

INSPACe Chief Pawan Goenka Honored with Padma Shri; Union Minister and IIT Praise His Achievements

Read more at: theprint.com

Satellite Images Unveiled Showing the Vast Tent City and Sacred Sangam Area During the Maha Kumbh Mela

Read more at: businessstandard.com



Three Private Firms Shortlisted for Developing Surveillance Satellites to Address Strategic Needs

Read more at: communicationtoday.com

52 Eyes in the Sky: A Deep Dive into India's Ambitious Spy Satellite Program and Its Strategic Impact

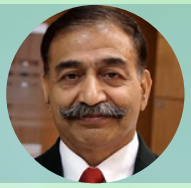
Read more at: mathrubhumi.com

India's Space Agency Successfully Completes First Gaganyaan Astronaut Crew Capsule

Read more at: spacetech.org

NVS-02 Satellite to Boost Indigenous Navigation Capabilities with the NavIC System

Read more at: indianewsnetwork.com



"India's Emphasis on Small Satellites Could Boost Global Market Share to 10%, Says Lt Gen AK Bhatt of Indian Space Association"

Read more at: outlookbusiness.org

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.

Events

Paris Space week

04 - 05 February, 2025
Espace Champerret, Paris
paris-space-week.com

Farnborough International Space Show

19 - 20 February, 2025
Farnborough, UK
farnboroughspaceshow.com

IAC 2025

29 Septemper-03 October 2025
ICC, Sydney
iac2025.org

Upcoming.....

Launches

CASC | Long March 8A | Demo Flight

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

Arianespace | Ariane 62 | CSO-3

26 Feb, 2025 21:54 IST
ELA-4, Guiana Space Centre, French Guiana, France

SpaceX | Falcon 9 Block 5 | PRIME-1 (IM-2)

27 Feb, 2025 05:32 IST
LC-39A, Kennedy Space Center, Florida, USA

SPACE BEACON
cosmic cadences on our radar

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