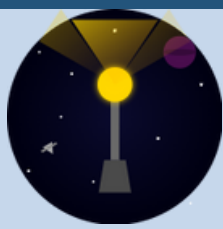
ISSUE 33 | 19 FEBRUARY 2025



Space Beacon

India's Star Rises at Aero India 2025: A New Era of Space Surveillance

Bangalore's Aero India 2025 soared to new heights, showcasing groundbreaking advancements in space and satellite technology. Headlining the show was the unveiling of India's ambitious space surveillance program. By 2027-28, 52 satellites will be deployed, strengthening national security and India's watch on the cosmos. In a landmark move, the private sector will be a key player, contributing 31 satellites via three companies, while ISRO delivers the remaining 21. International collaboration also took center stage, with ISRO partnering with France on some of the surveillance satellites.

Beyond surveillance, the event spotlighted cutting-edge satellite technologies poised to revolutionize communication, navigation, and earth observation. These innovations promise to transform sectors from agriculture and disaster management to urban planning. Aero India 2025 wasn't just about satellites; it also featured breathtaking aerial displays showcasing the latest in military and civilian aircraft, captivating audiences with aerobatic feats and technological prowess. The event underscored India's growing dominance in both space and aviation, forging global partnerships and illuminating the future of aerospace.

Orbital

Lead with the most significant celestial events and discoveries

Did you Know?
That tiny plasma jets, called picoflares, drive both fast and slow solar wind, challenging previous assumptions and potentially refining solar storm predictions

Tiny Plasma Jets Drive Solar Wind

New observations from the Solar Orbiter reveal that tiny plasma jets, known as picoflares, play a crucial role in driving both fast and slow solar wind. These jets, emerging from coronal holes on the Sun's surface, have been directly linked to the solar wind, challenging previous assumptions. The energy produced by a single picoflare jet is comparable to the annual power consumption of thousands of households. This discovery could refine predictions of solar storms and enhance our understanding of solar activity.

Titan's Orbit: Unraveling Cosmic Disturbance

Saturn's moon Titan has intrigued scientists with its thick atmosphere and methane lakes. Recent research by the Southwest Research Institute reveals that Titan's orbit has shifted significantly due to tidal dissipation, where energy is lost as Titan interacts with Saturn's gravity. This process offers insights into Titan's internal structure and its past. By analyzing Titan's spin axis rotation, researchers have inferred the moon's dissipation rate, uncovering a rapidly evolving orbit on a geologic timescale.

Detecting Dark Matter: Ambitious Space Plan

Scientists at the University of Southampton are developing a groundbreaking experiment to detect dark matter in space. The project involves levitating graphite sheets in microgravity to identify tiny anomalies that could reveal dark matter's nature. The experiment, set to launch aboard the Jovian-1 satellite in 2026, aims to measure the impact of dark matter on levitated particles. This innovative approach could provide the first direct detection of dark matter and significantly advance our understanding of the universe.

Magnetic Fields in Young Star Systems

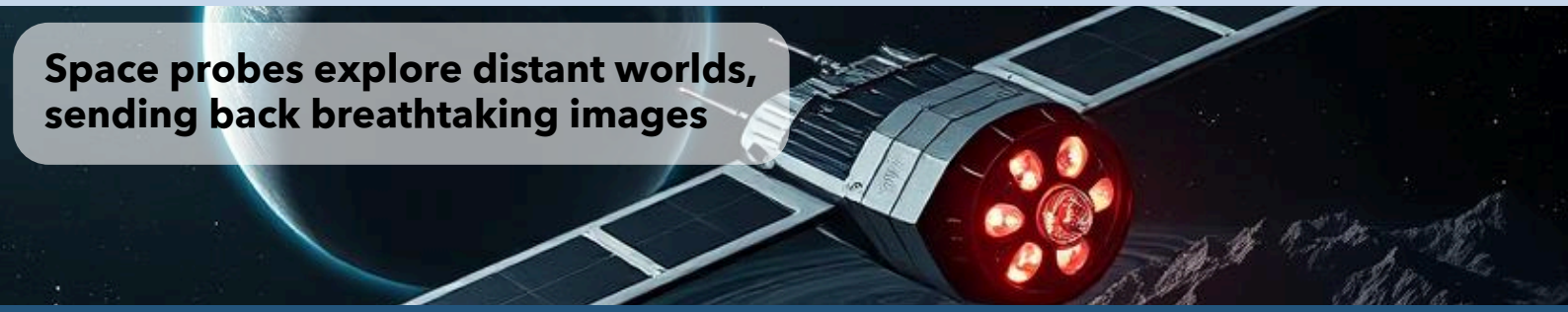
Astronomers have detected and analyzed the magnetic field around a young star, HD 142527, using the Atacama Large Millimeter/submillimeter Array (ALMA). By observing dust grains aligning with magnetic field lines, researchers mapped the three-dimensional structure of the magnetic field. This discovery sheds light on the role of magnetism in planetary formation within protoplanetary disks. The team plans to extend their research to other stars, aiming to understand the magnetic conditions where planets form.

FLIP Rover to Join Griffin-1 Mission

Astrolab's FLIP rover will be transported to the Moon aboard Astrobotic's Griffin-1 lander as part of Griffin Mission One. The mission, scheduled for late 2025, will deploy the rover in the Nobile Region near the lunar south pole. Originally designed for NASA's VIPER payload, Griffin-1 has been repurposed to demonstrate its capability as a large-scale lunar delivery system. This collaboration aims to advance lunar exploration and test critical technologies for future lunar logistics and exploration.

Dual-Mode Robot for Exploration

A research team from the Harbin Institute of Technology has developed a dual-mode robot prototype for planetary exploration. Weighing just 300 grams, the robot can roll on the ground and take off to overcome obstacles. Designed for extreme environments, it comes in multiple configurations, including dual-wheel and spherical designs. The robot conserves energy by rolling, extending its operational time. This innovative technology has potential applications beyond space, such as in coal mines and subway systems.



Genspace

Cover broader space news not fitting into other categories

Did you Know?
That China's new moon rover, "Tansuo," and its "Wangyu" spacesuits were named from over 9,000 public proposals, as part of its commitment to peaceful lunar exploration

China Unveils Moon Rover and Spacesuits

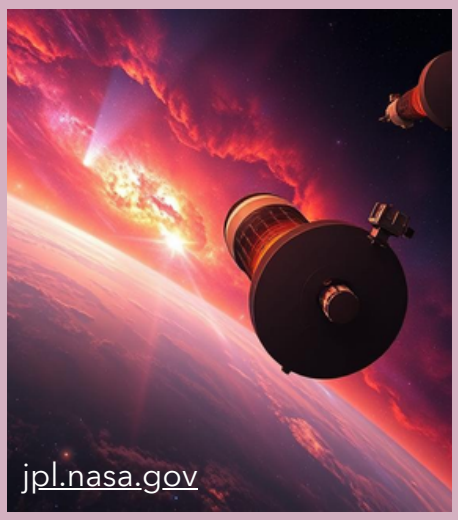
China has revealed the names of its new moon rover and spacesuits for future lunar missions. The rover, named "Tansuo" (Exploration), and the spacesuits, called "Wangyu" (Stargazing), symbolize China's commitment to peaceful space exploration. These names were selected from over 9,000 public proposals. The spacesuits and rover are currently in the prototype stage, with research progressing smoothly. China's first manned moon mission is planned for around 2030, aiming to advance lunar exploration and inspire public interest in space.

Comtech's MPR Platform Revolutionizes

Comtech's multipath radio (MPR) platform enhances over-the-horizon communications by mitigating signal disruption. Built on next-gen Troposcatter systems, it supports line-of-sight (LOS), obstructed-line-of-sight (OLOS), and beyond-line-of-sight (BLOS) scenarios. Its low Size, Weight, and Power (SWaP) configuration ensures rapid deployment and reliable communication in challenging environments. The MPR platform is a game-changer for military, first responders, and commercial operators.

NASA-SpaceX Capsule Swap Expedites Return

NASA has swapped the astronaut capsule for its upcoming Crew-10 mission to the International Space Station, advancing the launch to 12 March. This decision allows for the early return of astronauts Butch Wilmore and Suni Williams, who have been on the ISS longer than planned due to Boeing's faulty Starliner capsule. The mission will use a previously flown SpaceX Crew Dragon capsule, named Endeavor, instead of a new one delayed in production. This change impacts other planned SpaceX missions



SPHEREx Telescope to Seek Life's Ingredients

SPHEREx mission, launching on 27 February, will map the entire sky in infrared light to search for water, carbon dioxide, and other key ingredients for life. The telescope will focus on molecular clouds, where stars and planets form, to understand how these compounds develop on dust grains. By making over 9 million observations, SPHEREx aims to create the largest-ever survey of these materials, enhancing our knowledge of the origins of water and life's building blocks in the universe.

Integrating Satellites into Iron Dome System

The U.S. Space Development Agency (SDA) is seeking industry input on integrating its satellite network into the "Iron Dome for America" missile defense system. This initiative, directed by a presidential executive order, aims to create a comprehensive shield against advanced threats like hypersonic and ballistic missiles. The SDA plans to award contracts for 60-day studies focusing on digital simulation modeling and integrating the Missile Defense Agency's Hypersonic and Ballistic Tracking Space Sensor satellites into the Proliferated Warfighter Space Architecture (PWSA).

GNSS Interference: TU Graz's Risk Assessment Tool

The Graz University of Technology has developed a risk assessment tool to evaluate the dangers of GNSS interference signals. This tool helps detect, analyze, and plan preventive measures against falsified or disrupted signals from navigation satellites, which can impact critical infrastructure like online banking and telecommunications. The tool uses machine learning models trained with real and simulated data from various jamming and spoofing scenarios. This innovation is crucial for preparing companies and institutions for potential GNSS interference threats.

Satellogy

Focus on recent and upcoming satellites and launches

Did you Know?
That the Falcon 9 rocket set a new reuse record with its 26th flight, successfully launching 21 Starlink satellites and further proving the reliability of reusable space technology

Safran DSI Unveils US-Built LEO Antenna

Safran Defense & Space has introduced its first US-built 5.5-meter "VISION" LEO satellite tracking antenna, manufactured in Norcross, Georgia. This advanced antenna supports high-duty cycle operations for modern LEO missions and legacy space programs. It features tri-band frequency capability, enabling simultaneous operations in X, S, and Ka bands. The Norcross facility, AS9100-certified, ensures top-notch quality and reliability. Safran DSI plans to expand its US presence with a new factory in Colorado for small-satellite electric propulsion thrusters by 2026

NISAR Mission: Earth Observation Satellite Launch

ISRO and NASA's NISAR satellite is set to launch in March 2025. The satellite will first dock with the ISS for calibration before moving to its final orbit. NISAR will use dual-frequency radar to monitor Earth's surface changes, including earthquakes, deforestation, and glacier movements. This mission strengthens the US-India space partnership and aims to provide high-resolution, all-weather imaging of Earth's land and ice surfaces, enhancing our understanding of climate change and natural disasters.

Sentinel-1C Maps Land Deformation Precisely

Launched two months ago, the Copernicus Sentinel-1C satellite is already demonstrating its ability to map Earth's land surface with extreme precision. Using radar data and cross-satellite interferometry, Sentinel-1C can monitor subsidence, uplift, glacier flow, and natural disasters like landslides and earthquakes. These initial results, including an interferogram of the Atacama Desert plateau, highlight the satellite's capability to provide detailed insights into land deformation, supporting disaster response and environmental monitoring efforts.


businesswire.com

Eutelsat and ATSS Renew Partnership

Eutelsat and Saudi Arabia's Advanced Telecommunications Solutions and Services (ATSS) have renewed their satellite capacity agreement on the EUTELSAT 8 West B satellite. This partnership, announced at the LEAP event in Riyadh, aims to enhance premium broadcast services across the Middle East and North Africa. Leveraging the Ku-band coverage, the collaboration ensures the exclusive distribution of multiple television channels to millions of homes. This renewal strengthens Eutelsat's position as the leading video hotspot in the region.


businesstoday.in

Space Birdsong Detection Raises Safety Concerns

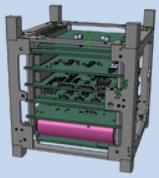
The Magnetospheric Multiscale (MMS) satellites have detected chorus waves, electromagnetic oscillations that sound like birdsong when converted to audio. These waves, found 100,000 km from Earth, accelerate "killer electrons" in Earth's radiation belts, posing threats to satellites and spacecraft. This discovery challenges previous knowledge and could revolutionize space weather predictions. The waves interact with Earth's magnetic field, influencing plasma dynamics and space weather patterns, and similar waves have been observed near Jupiter and Saturn.


space.com

Falcon 9 Sets New Reuse Record

The Falcon 9 rocket launched 21 Starlink satellites from Cape Canaveral on 15 February 2025, marking its 26th flight and setting a new reuse record. The rocket's first stage successfully landed on the "A Shortfall of Gravitas" droneship in the Atlantic Ocean. This mission included 13 satellites with direct-to-cell capability. The launch was the 20th Falcon 9 liftoff of the year, contributing to the nearly 7,000 operational Starlink satellites in orbit. This achievement underscores the rocket's reliability and reusability in space missions.

CubeTech



Showcase innovative CubeSat missions and unique payloads

Did you Know?
That Georgia Tech's STARI mission will use two CubeSats to bounce starlight back and forth, testing new technology to study exoplanets and their potential to support life?

CubeSats to Search for Life in Space

Georgia Tech engineers are developing propulsion systems for the STARI mission, a $10 million joint project with the University of Michigan. The mission will use two briefcase-sized CubeSats to bounce starlight back and forth, testing if this technology can study exoplanets. The CubeSats will fly a few hundred yards apart, maintaining precise positions to gather light into an optical fiber. This innovative approach aims to enhance our understanding of exoplanets and their potential to support life. The mission's success could enable future deep-space explorations using similar technology.

Onglaisat CubeSat Achieves Imaging Milestone

ArkEdge Space's Onglaisat CubeSat, developed with Taiwan's TASA, has achieved world-class ground resolution imaging. The 6U satellite, launched in December 2024, demonstrated high-precision attitude control and advanced optical systems, capturing images with resolutions between 2.5 to 3 meters. The mission validated the Time Delay Integration (TDI) imaging sensor technology and onboard image processing. This success advances small satellite optical systems, aiding future Earth observation and environmental monitoring.

In-Space Servicing Missions Methodology Developed

Researchers at the University of Illinois Urbana-Champaign have developed a methodology for using multiple CubeSats as servicing agents for in-space missions. This approach minimizes fuel consumption and ensures that servicing agents maintain a safe distance from each other. The method uses precomputed trajectories to optimize fuel efficiency and avoid collisions. This innovation could be applied to various space missions, including assembling or repairing space telescopes, and offers a more efficient and cost-effective solution for in-space servicing.

U-M Astronomy Leads First Satellite Mission

The University of Michigan's Astronomy Department will lead its first space mission, STARI, with a $10 million NASA grant. Scheduled for launch in 2029, STARI will use two CubeSats to demonstrate a new technique for studying exoplanets. This mission aims to prove the viability of interferometry, which involves multiple satellites working in precise coordination to bounce starlight between each other. The success of STARI could pave the way for future missions to search for signs of life on distant planets.

MIT Develops 3D-Printed Electrospray Engine

MIT engineers have created the first fully 3D-printed electrospray engine, ideal for propelling small satellites. This lightweight device can be produced on board a spacecraft, significantly reducing costs compared to traditional thrusters. The engine uses an electric field to generate a high-speed jet of tiny droplets, enabling precise in-orbit maneuvers. The 3D-printed thruster, comprising 32 electrospray emitters, demonstrated stable and uniform propellant flow, matching or exceeding the performance of existing engines.

Triple-Junction Solar Cells Tested in Space

German researchers from the University of Stuttgart and Azur Space Solar Power have developed a miniaturized solar cell experiment for nanosatellites. This experiment tested novel triple-junction metal wrap-through (MWT) solar cells in low Earth orbit. The team successfully sampled over 5,000 IV-curves, cell temperatures, sun error angles, and total ionizing dose measurements. The results validated the MWT technology for space applications, demonstrating its effectiveness for solar power generation in space and supporting future space missions.

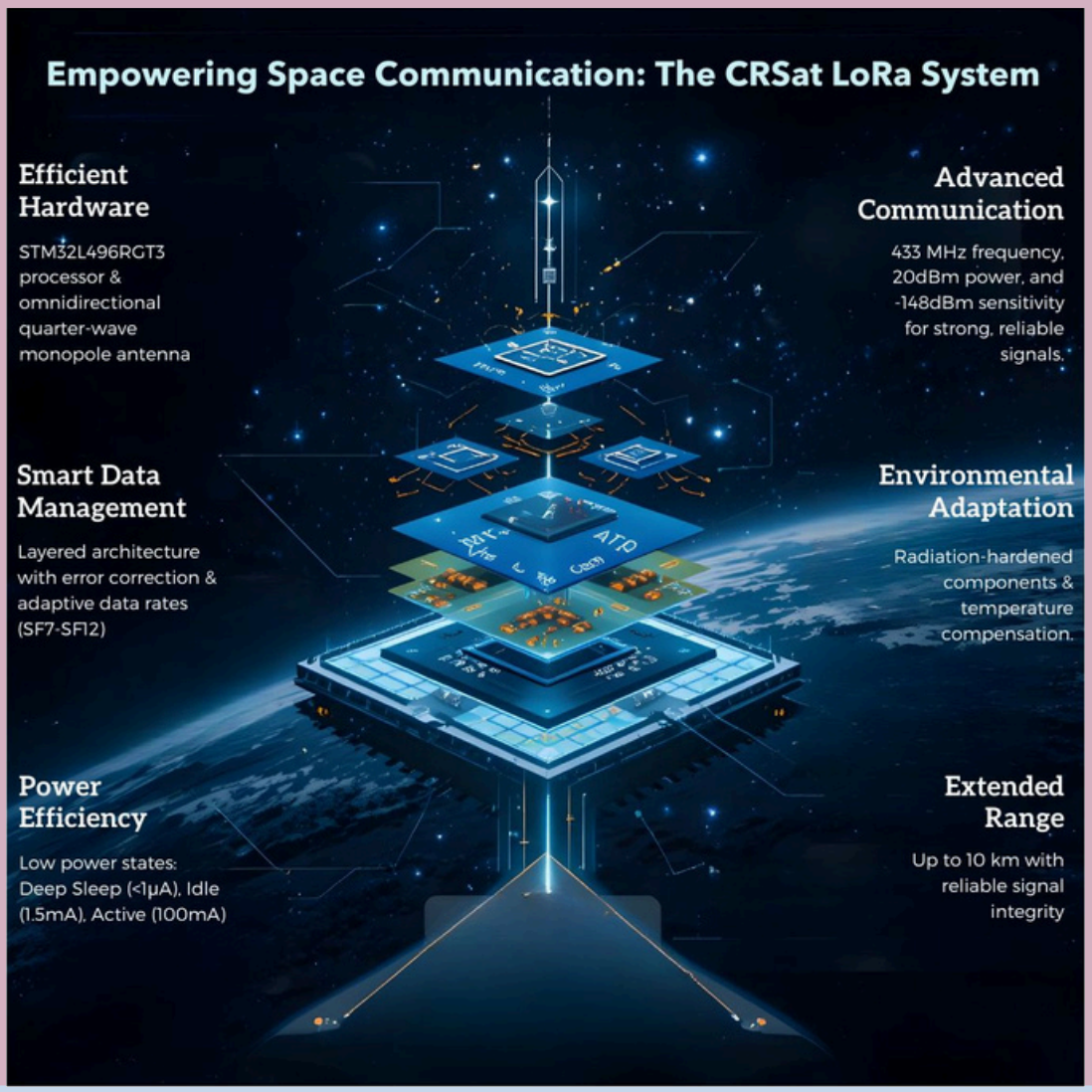
The 75SSM

SSM: Students' Satellites Mission

Update readers on our ITCA internal space-based innovations

Empowering Space Communication with CRSat LoRa System

The CRSat LoRa system uses the LoRa RA-02 module for long-range, low-power communication, operating at 433 MHz. It ensures reliable transmission with Chirp Spread Spectrum (CSS) modulation, robust error correction, and up to 10 km range. Optimized for CubeSats, it integrates an STM32L496RGT3 processor, efficient antenna design, and adaptive power management. With scalable, modular design, it's future-ready, supporting deep space missions with radiation-hardened components and temperature compensation. CRSat is redefining small satellite communication standards.



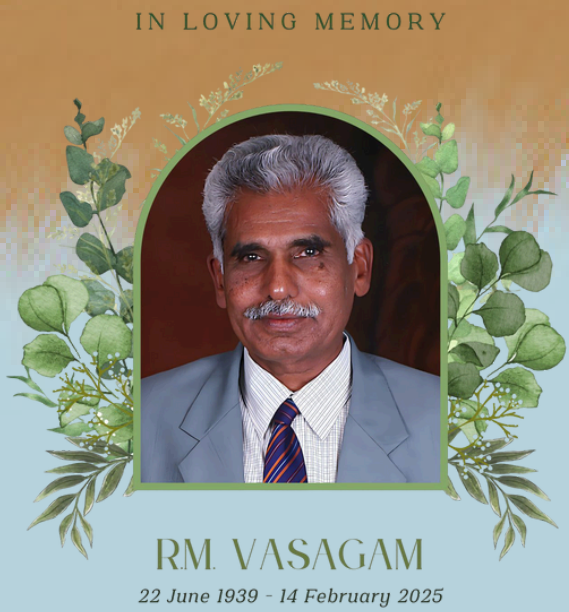
75 satellites, infinite possibilities

Space@India

Glimpses into India's space chronicle, every week

Visionary space scientist R M Vasagam's inspiring legacy

India's space program mourns the loss of Padma Shri R. Manicka Vasagam, a visionary scientist and former Anna University Vice Chancellor, at 86. Vasagam played a key role in developing APPLE, India's first experimental geostationary satellite, which paved the way for the INSAT series. His leadership at ISRO was vital in its global rise. Vasagam's legacy continues to inspire future generations in space exploration and technology.



Vasagam's expertise was key to the development of the powerful Vikas engine, which fuels the PSLV and GSLV rockets. He also pioneered India's first parallel computing flight simulation during the PSLV's early development at the Vikram Sarabhai Space Centre (VSSC). His work in aerospace electronics, system design, and simulations earned him widespread acclaim. His innovations advanced India's space capabilities.

Beyond his scientific achievements, Vasagam was a respected academic leader. He served as Vice Chancellor of Anna University and held leadership positions at other institutions. A founding fellow of the Indian Technology Congress Association, he championed collaboration between industry, academia, and research. His numerous accolades include the Padma Shri (1982). Colleagues remember him as a brilliant engineer, a vast repository of scientific knowledge, and a compassionate leader. R.M. Vasagam's legacy will continue to inspire generations of scientists and engineers.

India and US Enhance Space Collaboration: Launch New Innovation Bridge and Foster Deeper Partnerships

Read more at: economictimes.com

India Expands Ambitious Gaganyaan Program with Two Crewed Missions and New Bharatiya Antariksh Station

Read more at: indianexpress.com

India Raises Gaganyaan Mission Budget to $2.32 Billion, Expands Scope to Include National Space Station

Read more at: theprint.in

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

Business of Space Conference

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

Space-Comm Expo

11-12 February 2025
London Excel, London
spacecommexpo.com

Farnborough International Space Show

19-20 March 2025
FIECC, Farnborough, UK
farnboroughspaceshow.com

Upcoming.....

Launches

CASC | Long March 3B/E | Unknown Payload

22 Feb 2025 17:40 IST
LC-3, Xichang Satellite Launch Center, China

SpaceX | Falcon 9 Block 5 | Starlink Group 12-13

24 Feb, 2025 10:12 IST
SLC-40, Cape Canaveral SFS, Florida, USA

Arianespace | Ariane 62 | CSO-3

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

SPACE BEACON
cosmic cadences on our radar

Compiled by

Er. S. Shanmugam
Er. Sofia Vangeti
Er. Anvitha Lokepalli
Er. Moses Denny Veliath

#3, First Main, BDA Layout, HAL 2nd Stage, Bangalore 560008

www.itca.org.in; contact@itca.org.in

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