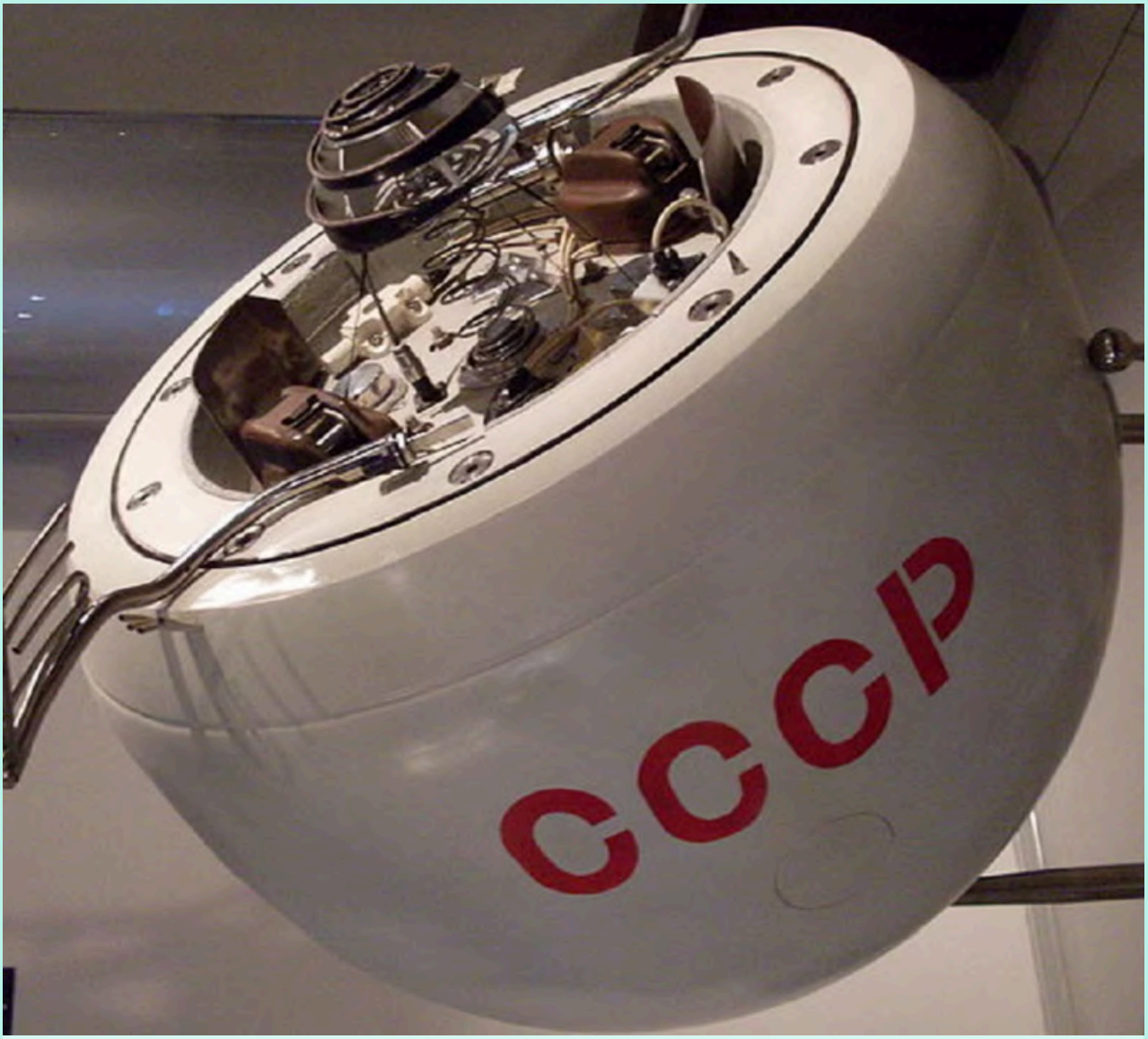
ISSUE 46 | 21 MAY 2025

# Space Beacon




**Venus Vagrant: After 53 years in orbit, Soviet spacecraft Kosmos-482 — built for Venus in 1972 — has returned to Earth. Designed to survive Venus's harsh atmosphere, its lander may have endured re-entry. Splashing down in the Indian Ocean, it stands as a relic of the Cold War space race.**

*Stay up-to-date with the latest in spacetech*

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

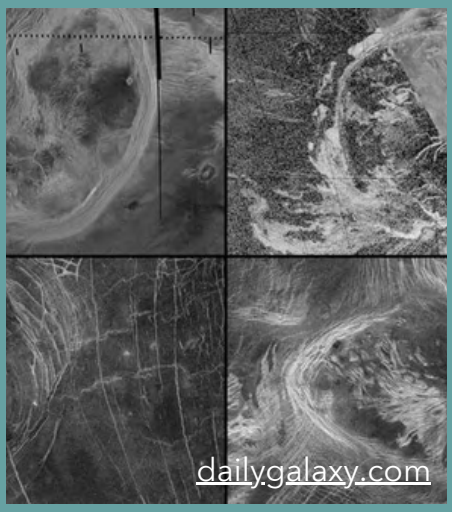
# Orbital

*Lead with the most significant celestial events and discoveries*

*Did you Know*
**Saturn's moon Titan has rivers and lakes, these aren't made of water but liquid methane and ethane, due to Titan's frigid temperatures**

## Ancient life signs discovered beneath venus' surface

They uncovered intriguing signs that Venus, often deemed Earth's "evil twin," may have once hosted conditions suitable for life. Using data from past missions and computer simulations, scientists identified mysterious surface formations known as "tesserae," which could be remnants of ancient tectonic and possibly habitable environments. These structures suggest Venus might have once had Earth-like plate tectonics and water. The revelation fuels hopes of unlocking secrets about early planetary evolution—and possibly life beyond Earth.




## Life-hunting Europa clipper tech tested on mars

The Europa Clipper, set to explore Jupiter's moon Europa, recently tested its life-detection tech on Mars. The SUDA (Surface Dust Analyzer) instrument simulated collecting and analyzing Martian dust. Results showed the system successfully detected organic molecules—building blocks of life—validating its design for Europa's icy surface. Scientists believe this strengthens the case for searching life in extreme environments. With Europa's subsurface ocean a key interest, this test enhances confidence in Clipper's mission.

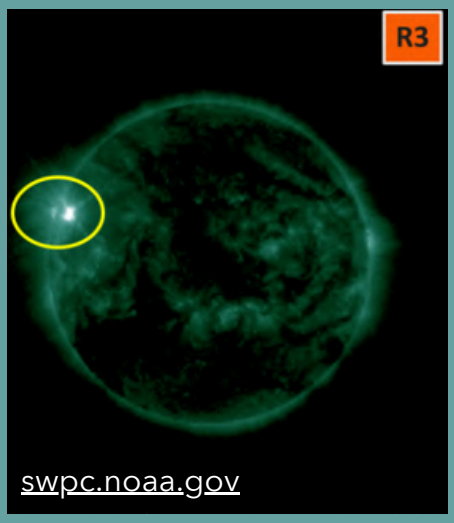

## Webb telescope spots bizarre lights on jupiter

James Webb Space Telescope has detected a mysterious infrared glow around Jupiter's poles that has scientists stumped. Unlike auroras caused by solar winds, this unusual lightshow doesn't align with known patterns or expected solar activity. The discovery has sparked questions about Jupiter's upper atmosphere and the complex forces at play in the planet's magnetic field. The infrared emissions appear to pulse and shift in unexpected ways, suggesting unknown energy sources or interactions.

space.com

## Universe's end may come sooner than expected

Astrophysicists have delivered a cosmic jolt—our universe might end much sooner than previously thought. A new study suggests the universe could begin collapsing in as little as 100 million years. This theory hinges on a mysterious force known as "dark energy," which currently drives the universe's expansion. However, if dark energy weakens or reverses, the cosmos could stop expanding and begin to shrink, leading to a "big crunch." Though far off by human standards, in cosmic time, it's shockingly soon.




swpc.noaa.gov

## Major solar flare from Region 3685 sparks alert

A strong R3 (Strong) radio blackout occurred on 14 May due to a major X2.9-class solar flare from active Region 3685, formerly known as 4087. This intense burst of solar energy affected high-frequency radio communication across the sunlit side of Earth, particularly over the Americas. The NOAA Space Weather Prediction Center is monitoring the region closely, as it remains a significant source of solar activity. More flares are likely in the coming days, with ongoing updates expected. Space weather can affect navigation, communication, and satellites.

spacedaily.com

## Lunar law gap, who owns the moon's landmarks?

Space law is failing to keep pace with lunar ambitions. As countries and companies eye the Moon for mining and bases, there are no binding protections for historic sites like Apollo 11's landing zone. The Outer Space Treaty bans national claims, but doesn't address commercial activity or the preservation of extraterrestrial heritage. Without clear international rules, disputes over lunar resources and legacy sites could arise. As Moon missions surge, experts urge global cooperation to establish legal frameworks that safeguard both science and history.

**Venus's veiled mysteries, probed by new atmospheric data**

# Genspace

*Cover broader space news not fitting into other categories*

*Did you Know*
**Galaxies Beyond Counting, there are an estimated two trillion galaxies in the universe, each containing billions of stars**

## New sat tech boosts military communication power

A breakthrough in satellite orchestration technology is set to transform military communications. The upcoming demonstration will highlight how advanced orchestration can seamlessly manage multiple satellite networks, delivering secure and uninterrupted connectivity for defense missions. This tech ensures real-time optimization and coordination, even in contested or complex environments. It promises to enhance flexibility, responsiveness, and resilience—key for mission success in today's dynamic defense landscape.


spacenews.com

## World's first reusable debris collector takes off

The move for space sustainability, a world-first reusable space debris collector is being developed to clean up Earth's orbit. Spearheaded by Australian company Neumann Space, the mission aims to tackle the growing threat of space junk using a magnetic harpoon system and electric propulsion. Unlike previous one-time-use solutions, this collector can retrieve and deorbit multiple debris pieces, reducing risk and cost. With space traffic increasing, such innovations are vital for the future of satellite safety and orbital operations.


newswise.com

## Saving space heritage with archaeology's new frontier

In orbit and on alien worlds, humanity's space history risks being lost forever. Enter space archaeologists – a new wave of researchers aiming to preserve our cosmic legacy. From Apollo landing sites to decaying satellites, these experts are documenting the artifacts of our space age before they vanish. By treating space as a cultural landscape, they're reframing space junk as invaluable evidence of our extraterrestrial evolution. Their mission isn't just scientific– it's a vital preservation of human history in space.


bbc.com


opentools.ai

## Building a booming lunar economy, dream or reality?

Can humanity truly establish a thriving economy on and around the Moon? From mining rare resources to supporting space tourism and scientific research, experts believe lunar infrastructure could unlock multi-billion-dollar industries. But major hurdles remain—like the lack of a legal framework, extreme lunar conditions, and the enormous cost of transporting materials. Private space companies and national agencies are laying the groundwork, but success hinges on global cooperation and long-term investment.


adsadvance.co.uk

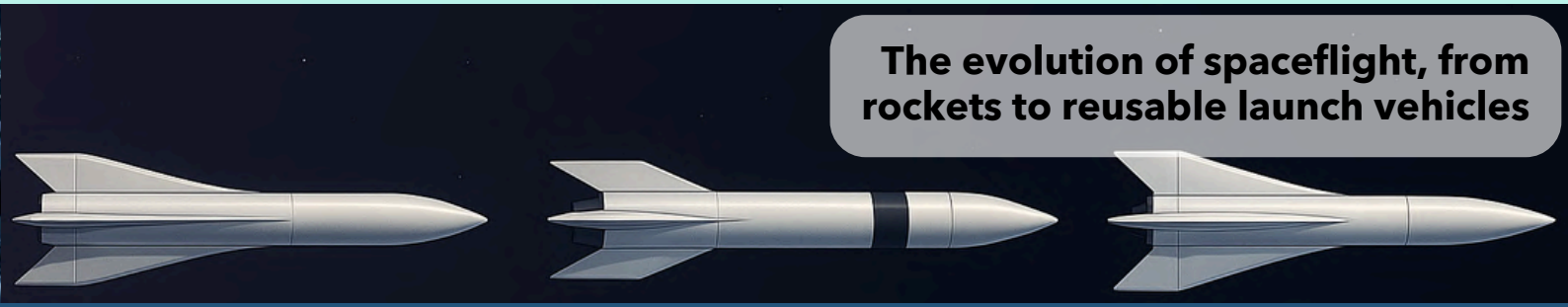
## Glasgow lab helps satellites dodge deadly debris

A pioneering lab at the University of Glasgow is helping the space industry prepare for the growing threat of orbital debris. The Space Technology Centre's state-of-the-art facilities simulate high-speed impacts between spacecraft and space junk, offering crucial data for designing stronger, more resilient satellite components. As the number of satellites in orbit increases, so does the risk of catastrophic collisions. This Glasgow-based research could be the key to futureproofing spacecraft and protecting multibillion-dollar assets in low Earth orbit.


eu-startups.com

## Wildfire digital twin tech secures €37M funding boost

Munich-based space startup OroraTech has raised €37 million to develop a digital twin of Earth focused on wildfire detection and response. Leveraging satellite-based thermal data and AI-powered analytics, the company aims to provide real-time global wildfire monitoring. This next-generation platform will help governments, insurers, and environmental agencies take proactive steps against the rising threat of wildfires. With growing climate challenges, OroraTech's innovation could transform disaster prevention and ecological protection worldwide.



# Satellogy

*Focus on recent and upcoming satellites and launches*

*Did you Know*
**Intelsat I (Early Bird, 1965 - USA), the first commercial communication satellite, facilitating international telephone and television connections**

## 12 AI satellites launched to outpace supercomputers

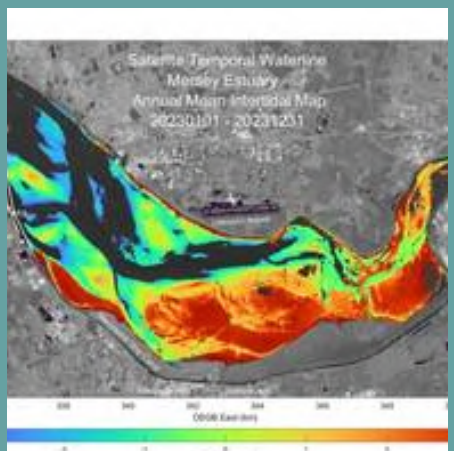
China has recently launched 12 advanced AI satellites designed to rival global data centers. This ambitious space mission aims to boost computing power by leveraging satellite-based AI processing, potentially surpassing Earth's top supercomputers. By shifting data processing to space, China hopes to enhance speed, reduce latency, and strengthen its position in the global tech race. These satellites will enable real-time AI applications, transforming industries from defense to big data analytics.


## SWOT satellite transforms ocean monitoring

NASA and France have launched the SWOT satellite to deliver high-resolution maps of the world's oceans. This mission tracks small ocean features such as eddies and currents that play a key role in climate and marine ecosystems. By precisely measuring sea surface height over vast areas, SWOT improves understanding of sea-level rise and ocean circulation patterns. Using cutting-edge radar technology, it captures both large-scale and fine ocean details, enabling better climate predictions and environmental insights.


## Earth's first dedicated space weather station planned

SpaceX has announced plans to develop the world's first dedicated space weather station to monitor solar storms and space weather events. This groundbreaking project aims to improve forecasting of solar flares and other space weather phenomena that can impact satellites, power grids, and communication systems on Earth. By deploying this station in orbit, SpaceX hopes to provide early warnings and protect critical infrastructure from potential disruptions. This initiative marks a significant step forward in space weather research and planetary defense.




liverpoolchamber.org.uk

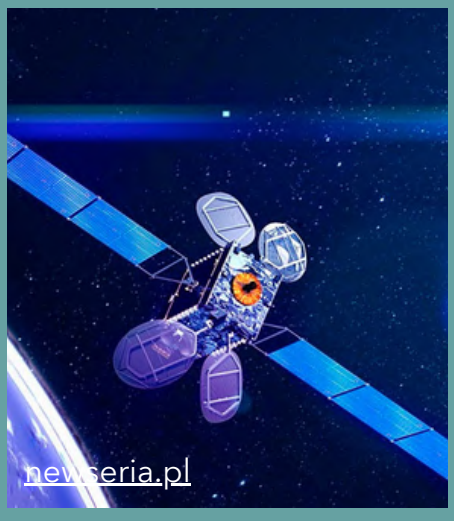
## Satellites boost navigation safety with tidal mapping

Cutting-edge tidal mapping technology, powered by satellites, is enhancing navigation safety on the River Mersey. This innovative system provides precise tidal data, improving the accuracy of water level predictions crucial for maritime operations. By integrating satellite data, local authorities can better manage shipping routes, reduce risks of accidents, and support efficient port operations. The project exemplifies how space technology directly benefits coastal safety and commercial navigation, fostering safer waterways and boosting economic activity.

idstch.com

## Optimizing TCP/IP for faster sat network performance

Satellite networks face unique hurdles in ensuring reliable communication—high latency, variable delays, and limited bandwidth can cripple TCP/IP performance. This article dives into how TCP/IP protocols are being optimized specifically for space applications, including the use of Performance Enhancing Proxies (PEPs), link-layer retransmissions, and delay-tolerant networking. These innovations are critical for improving throughput and reducing transmission delays across geostationary and low Earth orbit satellites.



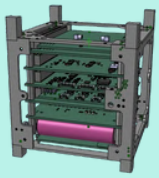
newseria.pl

## Sat imaging to reshape global agriculture and security

The global satellite-based Earth observation market is expected to surpass $15 billion by 2031, growing at a CAGR of over 10%. This growth is driven by increasing demand in agriculture, environmental monitoring, disaster management, and defense applications. High-resolution imagery is helping farmers optimize yields, while real-time data supports emergency response and urban planning. Technological advancements and AI integration are also improving image analysis, expanding use cases worldwide.

**Exploring the universe, satellites expanding our understanding of the cosmos**

# CubeTech

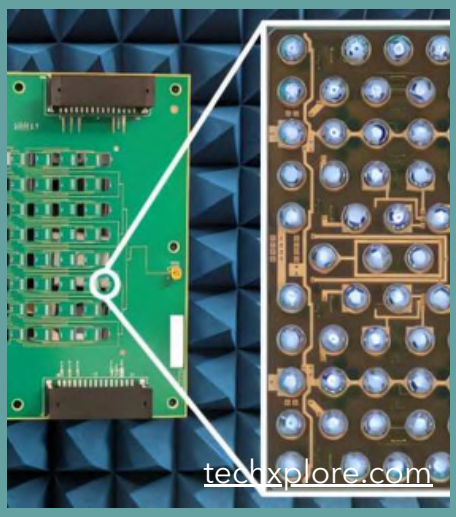


*Showcase innovative CubeSat missions and unique payloads*

*Did you Know*
**Hurricane Monitoring, NASA's CYGNSS mission uses a constellation of CubeSats to study hurricanes and improve weather prediction models**

## Dual-polarization chip revolutionizes Sat communication

Researchers at the Tokyo Institute of Technology have developed a groundbreaking Ka-band wireless chip that enables small satellites to independently control both left-hand and right-hand circularly polarized (LHCP and RHCP) communication beams. This innovation addresses a significant limitation in small satellite communication systems, which traditionally could handle only single polarization beams. A CMOS chip with a switch-type hybrid enables dual-polarization reception, doubling small satellite communication capacity.

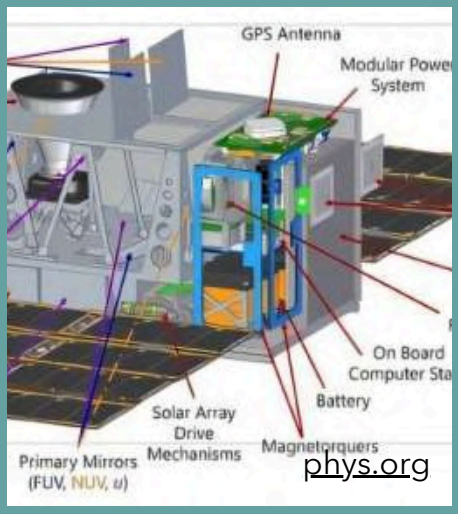


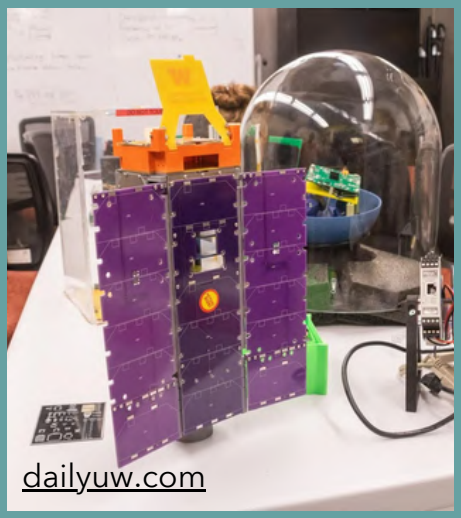

## Saudi Arabia CubeSat to fly moonward with Artemis

The space collaboration between NASA will carry Saudi Arabia's CubeSat to the Moon as part of the Artemis program. The announcement followed a meeting between former U.S. President Donald Trump and Saudi Crown Prince Mohammed bin Salman. The mission highlights Saudi Arabia's growing investment in space tech and deepening ties with U.S. space efforts. This CubeSat will join NASA's broader lunar ambitions, marking a milestone for the kingdom's space agency.


## CubeSat captures ultraviolet view of stellar explosion

For the first time, a CubeSat has captured the ultraviolet (UV) spectrum of a supernova, marking a milestone in small satellite astronomy. The burst, named SN 2023ixf, was observed by NASA's CUTE (Colorado Ultraviolet Transit Experiment), originally designed for exoplanet studies. The data offers crucial insights into how massive stars explode and evolve, particularly in the UV range, which is difficult to observe from Earth. This success demonstrates small satellites can deliver big science in astrophysics transforming.

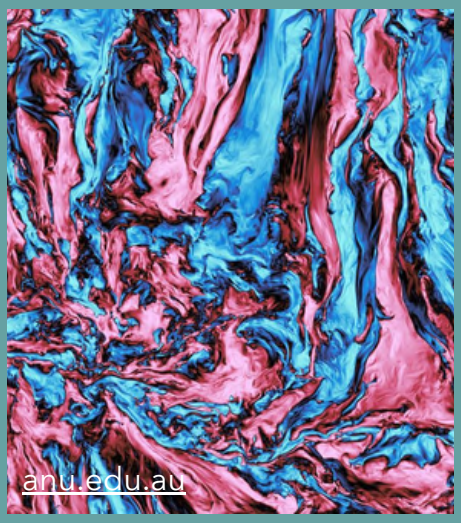




dailyuw.com

## Husky satellite lab aims for orbital milestone

The Husky Satellite Lab at the University of Washington is launching its latest space project: a student-designed capsule set to orbit Earth. The mission—dubbed "HuskySat-2"—will carry a time capsule filled with digital data, symbolizing student contributions to space science. Launching aboard a SpaceX Falcon 9 in mid 2025, the project reflects years of student effort, engineering, and collaboration. With this mission, the Lab continues its legacy of hands-on aerospace education, offering students real-world experience in satellite design, testing, and operation.



anu.edu.au

## Scientists unveil space turbulence in stunning detail

For the first time, scientists at the Australian National University have simulated space turbulence in extraordinary detail, offering unprecedented insight into one of the universe's most chaotic phenomena. Their breakthrough helps explain how turbulent magnetic fields behave in space—critical for understanding solar flares, cosmic rays, and star formation. Using powerful supercomputers, the team replicated conditions similar to those in space plasma, capturing turbulent dynamics that were once invisible.


wlv.ac.uk

## Satellite solution to tackle UK's water crisis

Researchers at the University of Wolverhampton have secured major funding to develop a groundbreaking micro satellite system aimed at addressing water quality issues across the UK. The satellite will monitor key indicators of pollution in real-time, offering a scalable, cost-effective solution to environmental challenges. Designed with cutting-edge CubeSat technology, the mission will support regulatory bodies and policymakers in managing and protecting freshwater resources more efficiently.

**Connecting remote communities CubeSats providing vital communication services**

# The 75SSM

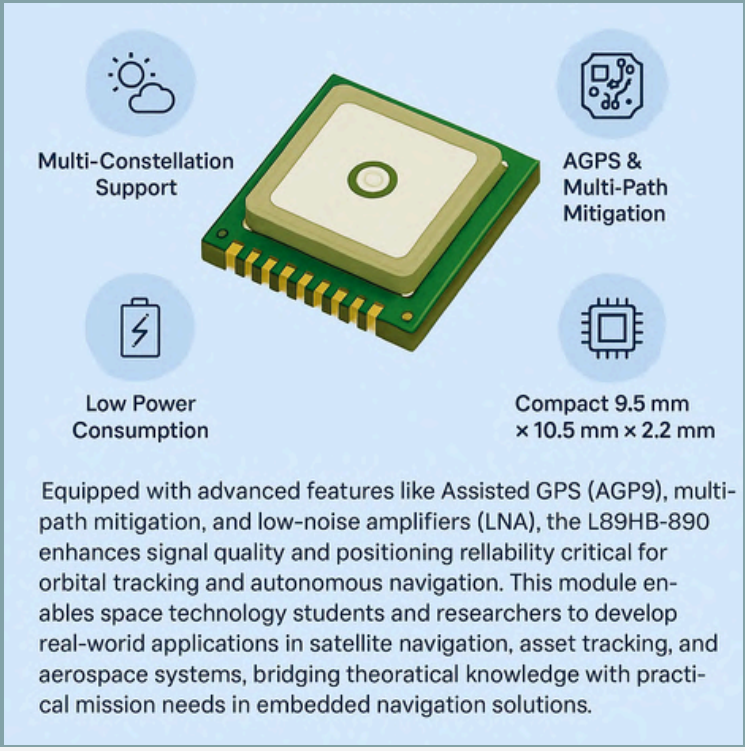
**SSM: Students' Satellites Mission**

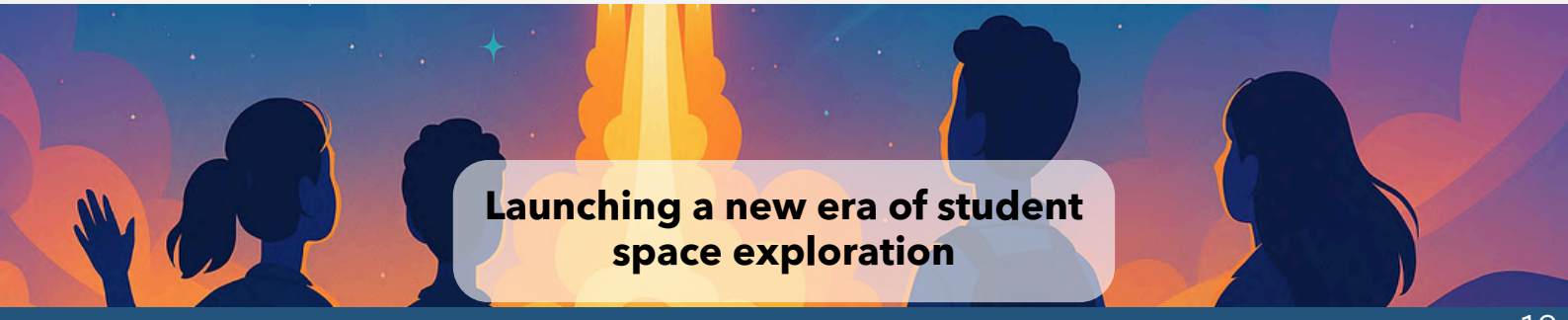
*Update on our ITCA internal space-based innovations*

*Did you Know*
**The 75 Students Satellites Mission is launching a new era of student-led space exploration, empowering future innovators to build and launch their own satellites into orbit!**

## GNSS L89HB-S90 Module: Precise Navigation

CRSat gives students hands-on experience with satellite tech, mirroring CubeSats. It integrates solar power, sensors, and real-time data collection, bridging theory and practice to build skills in power management, data analysis, and communication for real-world space challenges. It is a compact, high-performance multi-constellation positioning module designed for space and aerospace missions requiring precise navigation. Supporting IRNSS, GPS, GLONASS, Galileo, BDS, and QZSS, it delivers fast time-to-first-fix (TTFF) and reliable accuracy even in challenging conditions such as urban canyons or dense foliage. Its low power consumption and easy UART interface make it ideal for integration in CubeSats, drones, robotics, and IoT devices used in satellite projects like CRSat. Equipped with advanced features like Assisted GPS (AGPS), multi-path mitigation, and low-noise amplifiers (LNA), the L89HB-S90 enhances signal quality and positioning reliability critical for orbital tracking and autonomous navigation. This module enables space technology students and researchers to develop real-world applications in satellite navigation, asset tracking, and aerospace systems, bridging theoretical knowledge with practical mission needs in embedded navigation solutions.



# Space@India

*Glimpses into India's space chronicle, every week*

*Did you Know*
**RISAT Series, India's radar imaging satellites like RISAT provide vital data for agricultural monitoring, disaster management, and national security**

India's Chandrayaan-5 mission takes shape as ISRO and JAXA deepen collaboration to finalize spacecraft design and boost lunar exploration success

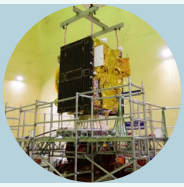
Read more at: indiatoday.com

ISRO chairman explains how India's space missions are carefully designed to ensure national safety and security

Read more at: deccanherald.com

Despite a rare PSLV mission failure, ISRO's legacy of resilience and innovation promises a strong comeback.

Read more at: indiatimes.com



How India's NavIC satellite system is transforming navigation from space to smartphones

Read more at: etvbharat.com

India has achieved 7 out of 30 planned space launches for FY 2024–25, signaling steady progress in its space agenda.

Read more at: wionews.com

All satellites operated smoothly and played a vital role in the success of Operation Sindoor, showcasing India's advanced space capabilities

Read more at: uniindia.com

Amazon is planning to enter India's rapidly growing satellite internet market with Project Kuiper, following Starlink success

Read more at: timesofindia.com

Bharat space agency is actively developing innovative vertical landing technology for rockets to enhance future space missions

Read more at: wionews.com

75 Students' Satellites Mission

ITCA's Engineering Prowess and Ingenuity

## ITCA: Pioneering India's Tech Future

Innovating India's tech for 22 years, we pioneered the '75 Students' Satellites Mission' and made a global impact in space tech, precision agriculture, and Industry 4.0.

## Events

**SpaceOps 2025**

26- 30 May 2025
Quebec, Canada
spaceops 2025

**Space Tech Expo USA**

02 - 04 June 2025
California, USA
ste2025.com

**India Space Congress**

25- 27 June 2025
New Delhi, India
isc2025.com

## Upcoming...

### Launches

**VKS RF | Soyuz 2.1a/ Fregat-M | Cosmos**

23 May 2025 12:30 IST
Plesetsk Cosmodrome, Russia

**SpaceX | Falcon 9 Block 5 | Starlink Group 12-22**

24 May 2025 22:49 IST
SLC-40, Cape Canaveral SFS, Florida, USA

**CASC | Long March 3B/E | Tianwen 2**

28 May 2025
LC-2, Xichang Satellite Launch Center, China


SPACE BEACON
cosmic cadences on our radar

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