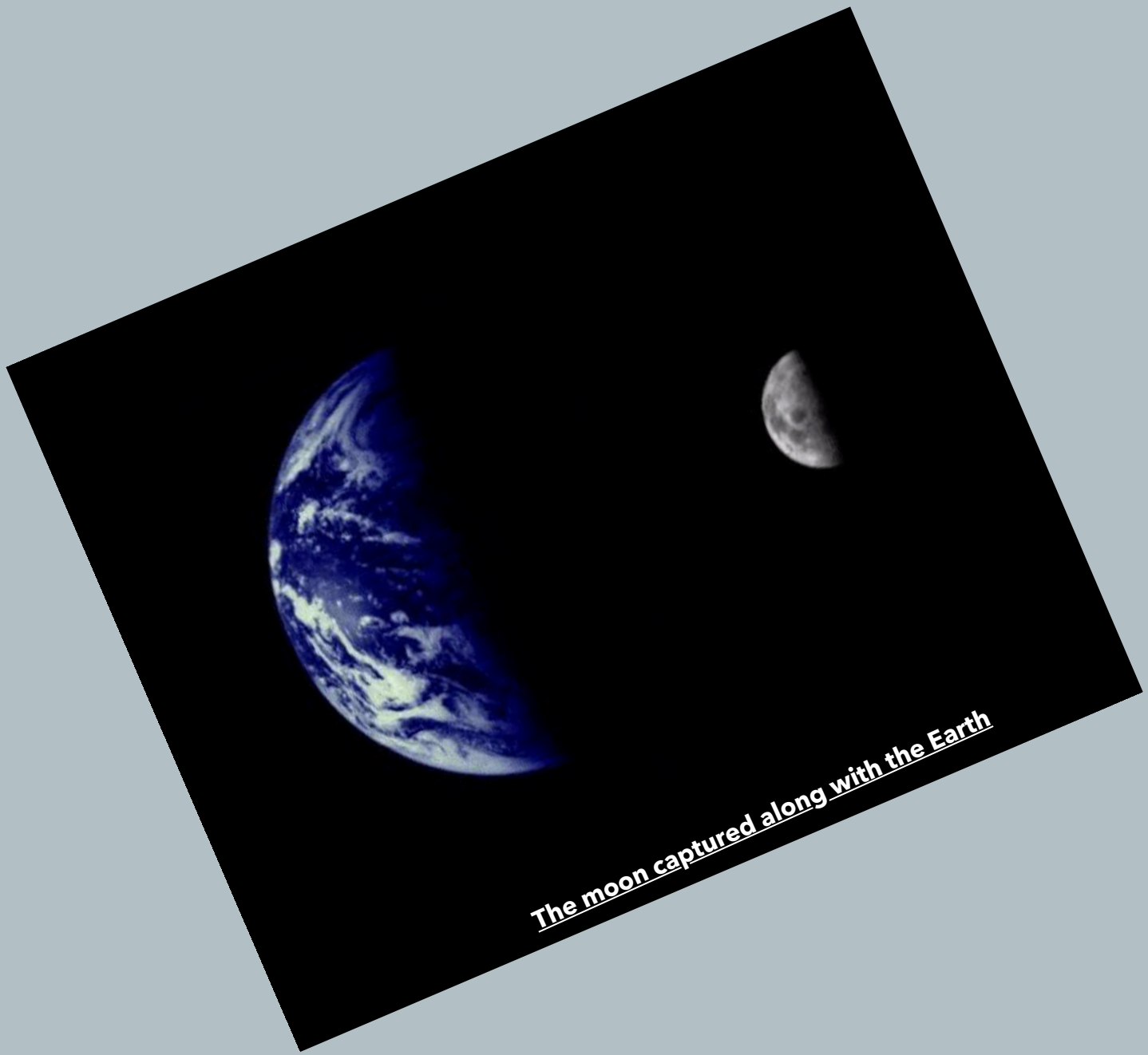
ISSUE 18 I 6 NOVEMBER 2024

SPACE BEACON

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The moon captured along with the Earth

Charting New Realms: Emerging Technologies in the Space Industry

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

Orbital

Lead with the most significant celestial events and discoveries

Moon Rover 'VIPER' Futures

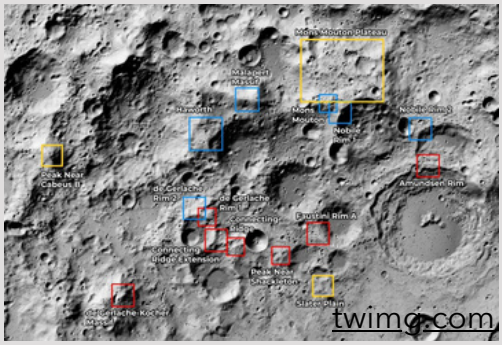


NASA has paused the VIPER mission, originally set for a 2023 landing near the Moon's South Pole, to better align it with its broader lunar exploration goals.

VIPER's mission to search for water ice in shadowed lunar craters remains essential, providing crucial data for future human presence on the Moon.

This delay allows NASA to refine VIPER's capabilities and explore potential integration with other missions. By leveraging recent lunar data and advancements, NASA aims to ensure VIPER plays a key role in unlocking the Moon's resources and paving the way for a future lunar base.

NASA Refines Landing Sites for Artemis 3



The Artemis 3 mission has narrowed its list of potential landing sites near the Moon's south pole from 13 to nine, emphasizing safety, accessibility, and compatibility with SpaceX's Starship. These sites, located in shadowed craters likely containing water ice, hold valuable scientific and resource potential, crucial for future lunar exploration and possible human habitats.

The final landing site will be chosen closer to launch, based on timing and surface conditions. This flexibility ensures a safe and scientifically rich landing, advancing the mission's goal of establishing a sustainable human presence on the Moon and paving the way for new exploration milestones.

A Hidden Ocean on Uranus' Moon 'Miranda'?



Miranda, one of Uranus' icy moons, might hold a hidden ocean beneath its chaotic surface, new research suggests. Its jumbled terrain has long puzzled scientists, but a subsurface ocean could explain these oddities, with potential churning beneath the icy crust.

This idea comes from analyzing gravity and shape data from NASA's Voyager 2 flyby in 1986. Just as bumps on an orange might hint at hidden pockets, Miranda's irregularities may signal an internal ocean.

If confirmed, this would make Miranda another intriguing world with liquid water, opening possibilities for future missions to explore potential extraterrestrial environments suitable for life.

DTU Discovers Record-Breaking Neutron Star in Milky Way



Researchers from DTU Space have identified the fastest-spinning neutron star ever detected in our Milky Way galaxy, completing a full rotation in just 1.4 seconds.

Using an X-ray telescope on the International Space Station, the team captured this incredible speed, likely caused by the powerful forces from the supernova that created it.

This discovery is essential for advancing our understanding of stellar evolution and extreme matter physics. The neutron star's exotic properties provide a unique opportunity to study the behavior of matter under intense pressure, adding to the rich tapestry of cosmic phenomena within our galaxy.

Each finding like this brings us closer to grasping the vast and dynamic nature of the universe.

Chandrayaan-4 Aims for Lunar Reaches in 2028



India's ambitious Chandrayaan-4 mission, set for launch in 2028, aims to collect lunar samples from the Moon's south pole, an area believed to contain water ice.

The mission targets permanently shadowed craters, which could hold valuable resources for future lunar settlements.

The goal is to gather around 6.6 pounds (3 kilograms) of lunar material, which will be carefully analyzed upon return to Earth, offering key insights into the Moon's geological history and potential resources. Chandrayaan-4 marks a significant milestone for India's space program, reinforcing its role in lunar exploration. By retrieving lunar samples, the mission could contribute to advancing space science globally and pave the way for sustainable human presence on the Moon, making 2028 a pivotal year for lunar exploration.

Hubble and Webb Team Up to Unravel Disk Mystery



The Hubble and James Webb space telescopes have teamed up to investigate the mysterious smooth disk surrounding the star Vega. Unlike the clumpy disks around young stars where planets form, Vega's disk is surprisingly featureless, raising questions about the formation of planetary systems.

Hubble has already provided valuable data on Vega's disk, and now Webb's infrared capabilities are being used to analyze its composition and structure in greater detail. This collaboration between the two telescopes aims to uncover whether the smooth disk is a remnant of a past collision or a clue to a unique planetary formation process. By combining their strengths, scientists hope to gain new insights into how planetary systems form, highlighting the power of teamwork in space exploration to unlock the mysteries of the universe.

Genspace

Cover broader space news not fitting into other categories

SpaceX Delivers Cargo to the ISS



SpaceX's Falcon 9 successfully launched a mission to the International Space Station (ISS), carrying the Cargo Dragon capsule with lots of supplies and scientific experiments. This marks the second launch of the year, continuing the vital NASA-SpaceX collaboration to sustain the ISS with equipment and research materials for the crew.

The mission includes experiments on plant growth in space and the effects of microgravity on human health, contributing to advancements in space agriculture and medicine. Falcon9's reliability and the Cargo Dragon's journey highlight ongoing progress in space exploration and international cooperation.

Space Age Alloys: New 3D-Printed Metal Strengthens Deep Space Dreams



Researchers have developed a 3D-printed metal alloy with exceptional durability, perfect for spacecraft and deep space missions.

This alloy offers a strong yet lightweight solution, overcoming the limitations of traditional manufacturing and improving fuel efficiency for space travel.

The alloy's 3D-printing capabilities allow for customized, intricate parts that can withstand the harsh conditions of space. This breakthrough could revolutionize spacecraft design, enabling missions to explore farther and push the boundaries of human exploration.

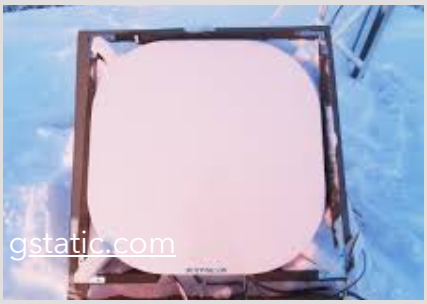
Apple Injects $1.5 Billion Boost in Globalstar



Apple has made a major $1.5 billion investment in Globalstar to upgrade its satellite constellation, enhancing both companies' capabilities. This partnership allows Apple to tap into Globalstar's low-Earth orbit satellites, potentially improving features like emergency messaging and satellite-based internet for future iPhones, while providing Globalstar with the funds needed to modernize its infrastructure.

The investment is set to expand Globalstar's network coverage, enabling broader services beyond Apple products. This upgrade underscores the growing significance of low-Earth orbit satellite constellations, which offer global reach and lower latency, helping bridge connectivity gaps in remote areas.

Kymeta Debuts Goshawk u8 Antenna for Seamless Multi-Orbit Communication



Kymeta's new Goshawk u8 antenna is revolutionizing mobile satellite communication by providing seamless multi-orbit connectivity. This compact, lightweight antenna can switch between satellite constellations in different orbits, ensuring reliable communication across land, sea, and air, making it ideal for mobile applications like vehicles, airplanes, and ground personnel.

The Goshawk u8 offers significant advantages, particularly in remote areas or during disruptions caused by weather or terrain.

Its versatility makes it a valuable tool for industries like emergency response and businesses operating in hard-to-reach locations, offering a future-proof solution for staying connected in an increasingly mobile world.

Record-Breaking Receiver Boosts Deep Space Communication



Researchers at Chalmers University of Technology in Sweden have developed a breakthrough communication system featuring a highly sensitive receiver and silent amplifier, enabling clearer, faster data transmission across vast distances.
This innovation overcomes the limitations of current light signal systems, providing high-quality images, videos, and scientific data from deep space.

The technology promises to revolutionize deep space communication, offering clearer connections with spacecraft and potentially facilitating future human missions.

This could pave the way for more reliable communication with distant probes, enhancing scientific discovery and exploration.

Space-Based Solar Power Poised to Light Up the Future



Space-Based Solar Power (SBSP) is an emerging technology that could revolutionize how we generate and distribute energy. Unlike traditional solar panels, SBSP systems would be placed in geostationary orbit, continuously receiving sunlight and converting it into electricity. This energy would then be transmitted wirelessly to Earth using microwave beams, providing a consistent, weather-independent energy source.

While challenges such as building and maintaining space infrastructure and safely transmitting microwave beams remain, the potential benefits of SBSP are vast.

It could provide clean, renewable energy for remote areas and power grids, paving the way for a greener future. Countries like the US, Japan, and China are already researching this promising technology, bringing us closer to a sustainable energy revolution.

Satellogy

Focus on recent and upcoming satellites and launches

Japan Launches Kirameki-3 Satellite Through H3 Rocket



Japan's space program achieved a significant milestone with the successful launch of the H3 rocket, which carried the classified Kirameki-3 satellite into orbit.

While details about the satellite are unclear, its name and number suggest it may be part of a constellation for military communication, reflecting Japan's focus on enhancing its space-based defense infrastructure.

The H3 rocket's successful flight marks a key step in replacing the older H-2A series, offering greater payload capacity and reliability.

This launch not only underscores Japan's growing presence in space but also sets the stage for future missions, showcasing the nation's technological capabilities and strategic goals in space exploration.

New Satellite Tool Tracks Plastic Pollution on Beaches



Scientists have developed a groundbreaking satellite tool to track plastic debris on beaches worldwide, offering a revolutionary solution to ocean plastic pollution. Unlike traditional methods, which are time-consuming and geographically limited, this tool uses high-resolution satellite imagery to automatically identify and map plastic waste along coastlines, providing a comprehensive and efficient way to monitor pollution.

The tool enables targeted cleanup efforts by pinpointing areas with high plastic concentrations, and can also help identify pollution sources to prevent further contamination. This innovation marks a major leap forward in the fight against plastic pollution, with the potential to significantly improve beach cleanup efforts and protect our oceans for future generations.

Student Experiments Blast Off on SpaceX Mission



On November 3rd, budding scientists from across North America had their experiments launched aboard a SpaceX resupply mission to the International Space Station (ISS), marking an exciting milestone in scientific exploration. These student-led experiments reflect months of planning and curiosity, with projects that could investigate topics like microgravity's effects on plant growth, material behavior, or cosmic radiation.

This collaboration between students, educators, and SpaceX is fostering a new generation of space enthusiasts. By providing opportunities to conduct experiments in space, it sparks passion for scientific discovery and inspires the next wave of innovators to push the boundaries of human knowledge.

Russia Launches Slew of Satellites



spxdaily.com

Russia set a new record by launching 55 satellites into orbit in a single mission aboard a Soyuz rocket, a significant achievement for its space program.

Among the payloads were two satellites built by Iran, signaling growing space collaboration between the two nations. The satellites serve various purposes, including Earth observation, communication, and scientific research.

This launch underscores Russia's ongoing commitment to space exploration and its ability to efficiently deploy multiple payloads.

It also highlights the increasing trend of international cooperation in space, as countries like Russia and Iran work together on joint ventures and technological advancements, pushing the boundaries of space exploration.

Next-Gen GPS Satellites



satnews.com

Astranis has secured an $8 million contract with the U.S. Space Force (USSF) Space Systems Command (SSC) to develop design concepts for the next generation of Resilient GPS (R-GPS) satellites. These advanced satellites will feature the latest GPS signals, including the secure M-Code, ensuring reliable navigation in contested environments.

Astranis' expertise in building cost-effective, high-orbit satellites makes them an ideal partner for the project, which aims to enhance U.S. national security and maintain GPS dominance. The USSF is pushing for a fast turnaround, with the first eight R-GPS design concepts due by 2028. This rapid development underscores the critical importance of the program, as these satellites will provide secure, dependable navigation for both military and civilian use. With Astranis' involvement, the R-GPS program is set to deliver cutting-edge technology while staying within budget, securing America's future in GPS capabilities.

Zimbabwe's second Satellite Launch Marks Major Milestone


gstatic.com

Zimbabwe launched its second satellite, ZIMSAT-2, on November 5th, 2024, joining ZIMSAT-1 in orbit.

The satellites will provide critical data on agriculture, water, and the environment, helping the country make informed decisions on resource management.

This launch strengthens Zimbabwe's position in the African space industry, with several nations pursuing space programs.

Upgrades to the Mazowe Ground Station will ensure efficient communication and data processing for ZIMSAT-2, highlighting Zimbabwe's growing role in global space exploration.

CubeTech

Showcase innovative CubeSat missions and unique payloads

Lockheed Martin Acquires Terran Orbital


spacenews.com

Lockheed Martin has acquired Terran Orbital, a leading small satellite manufacturer, strengthening its position in the growing smallsat market.

Finalized in October 2024, the deal combines Lockheed Martin's aerospace expertise with Terran Orbital's specialized knowledge in small satellites, which offer cost-effective solutions for applications like Earth observation and communications. Despite the acquisition, Terran Orbital will retain its identity as a subsidiary, maintaining competition and fostering innovation in the smallsat sector.

This strategic move highlights the increasing importance of small satellites, with the partnership set to drive advancements in technology and shape the future of space exploration and commercial applications.

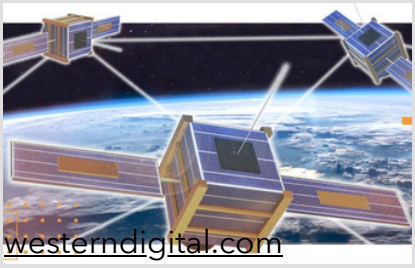
Japan Tests World's First Wooden Satellite


spaceanddefense.io

Japan is set to launch its first wooden satellite, WoodenSat, aiming to test the viability of sustainable materials in space exploration. Constructed primarily from laminated wood, this innovative satellite has been specially treated to withstand the harsh conditions of space, including extreme temperatures and radiation.

The mission will gather valuable data on wood's performance in orbit, exploring its potential for future spacecraft components. WoodenSat represents a significant step towards eco-friendly space exploration, as wood is a renewable resource that could help reduce the environmental impact of space missions. If successful, this experiment could pave the way for larger spacecraft components made from sustainable materials, marking a greener future for space exploration.

Small Sats: Big Growth on the Horizon

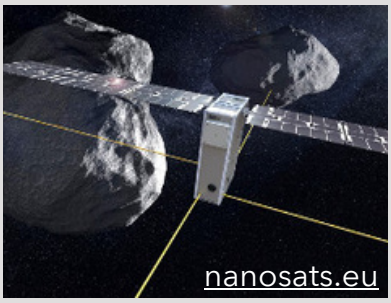

westerndigital.com

The smallsat revolution is making space more accessible with affordable, smaller satellites that can be quickly built and launched.

These satellites, often under 1,000 pounds, enable applications like real-time Earth imaging and global internet connectivity.

To survive harsh space conditions, engineers are increasingly using commercial components with software-based resilience instead of costly radiation-hardened hardware. This approach is driving rapid growth in low Earth orbit, creating new opportunities to leverage space data.

Additional Funding for Juventas Mission



The Juventas mission, aiming to explore the asteroid Psyche, has received additional funding to expand its original agreement. This mission, focused on studying Psyche's metallic composition to understand the early formation of our solar system, involves advanced spacecraft designed by GomSpace. The funding boost is crucial for enhancing the spacecraft's key components, ensuring their successful development.

GomSpace's role in the Juventas mission highlights their expertise in building cutting-edge space technology. This funding reflects the growing complexity of the mission and reinforces GomSpace's commitment to contributing to the collaborative effort of exploring Psyche, a journey that could unveil groundbreaking insights about the solar system's origins.

Hera Mission's CubeSats Send First Signal Back to Earth



The European Space Agency's Hera mission has received its first signal from its CubeSats, Juventas and Milani, marking a key milestone in ESA's deep-space exploration.

Launched in October with a SpaceX Falcon 9, the CubeSats will fly closer to Dimorphos, the asteroid targeted by NASA's DART mission, to gather detailed data that the larger Hera spacecraft cannot safely collect.

These CubeSats are crucial to studying the effects of the DART impact on Dimorphos, helping to analyze its composition and structure.

With successful communication now established, the Hera mission is progressing toward unlocking valuable insights from the Didymos system.

MUREP Space Tech



NASA's MUREP Space Technology Artemis Research (M-STAR) program is empowering university students, especially those from minority populations, to innovate in small satellite development, also known as CubeSats or nanosatellites. Through this initiative, students gain hands-on experience in designing, building, and analyzing spacecraft, tackling real-world challenges such as space environment testing or Earth observation.

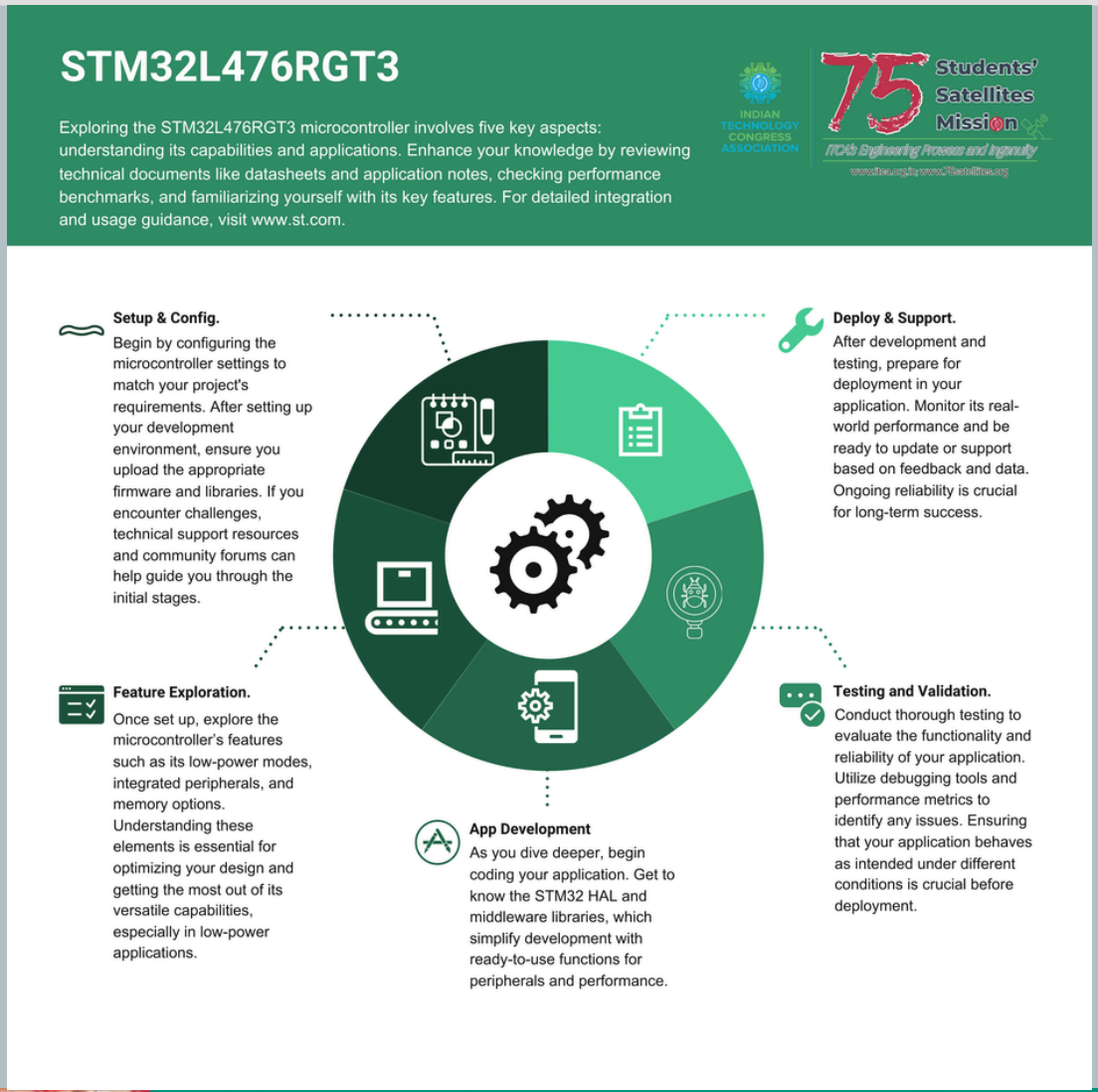
By supporting small satellite projects, NASA is nurturing the next generation of space pioneers. CubeSats provide a cost-effective platform for scientific exploration, making space research more accessible and opening new possibilities for students and researchers to contribute to our understanding of the universe.

STMiroelectronics series

The STM32L476RGT3 microcontroller by STMicroelectronics is a low-power, high-performance microcontroller from the STM32L4 series. It features an ARM Cortex-M4 core operating up to 80 MHz and provides 1 MB of flash memory with 128 KB of SRAM, ideal for embedded applications that need efficient power management.

This microcontroller supports various peripherals, including a 12-bit ADC, DACs, and multiple communication interfaces (I2C, SPI, UART, USB OTG, and CAN), making it suitable for a wide range of IoT, industrial, and wearable applications.

With advanced low-power modes and an operating temperature range of -40°C to 125°C, the STM32L476RGT3 offers robust performance for power-sensitive designs.





Space@India

Glimpses into India's space chronicle, every week

ISRO Launches India's First Analog Space Mission for Lunar Habitat Research

ISRO has launched India's first analog space mission in Ladakh, where it will simulate life in an interplanetary habitat. Chosen for its Martian-like terrain, Ladakh's high-altitude, dry, cold climate provides an ideal setting for testing spaceflight systems in extreme conditions. The mission, aimed at supporting India's lunar habitat plans, features an inflatable habitat called Hab-1, equipped with essentials like hydroponics, a kitchen, and sanitation facilities.



The month-long mission, a collaboration between ISRO, AAKA Space Studio, the University of Ladakh, IIT Bombay, and the Ladakh Hill Development Council, will generate valuable data for future long-duration space missions. Ladakh's low-pressure, low-oxygen environment at over 3,000 meters elevation allows researchers to test life support systems under conditions similar to Mars.

India's own E-Satellite to be launched in December



India is set to launch its first electric propulsion satellite, or E-Satellite, this December, marking a major advancement in its space capabilities. Unlike traditional satellites that require substantial amounts of chemical fuel (usually about 2,500 kg for a 4,000 kg satellite), this satellite will use ionized argon, which, when charged by solar energy, generates thrust to propel the satellite forward.

This breakthrough will reduce fuel weight to around 200 kg, freeing up more space for instruments, increasing operational lifespan, and ultimately cutting production costs. While chemical fuels can propel a satellite to a high orbit (36,000 km) within a week, electric propulsion systems require up to three months.

The extended time is a trade-off for greater fuel efficiency, as electric propulsion systems provide lower thrust compared to chemical fuels. Previously, India used Russian-provided electric propulsion technology in GSAT-9 (launched in 2017), but with this mission, India will fully utilize its own technology, joining global leaders like SpaceX, OneWeb, and China in the transition to electric propulsion.

ITCA: Pioneering India's Tech Future

Driving India's tech innovation for over 21 years, we've built strong academia-industry partnerships. Pioneer of the '75 Students' Satellites Mission,' we've made a global impact in space tech, precision agriculture, and Industry 4.0. We are shaping the future of India's technology landscape.

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5 - 7 November 2024
Chatrium Grand
Bangkok -Thailand
https://apsccsat.com/

Newspace Europe

3 December 2024
European Convention
Centre Luxembourg
https://space-agency

IPSPACE Symposium

18-20 February 2025
Málaga. Spain
https://sssif.com/



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cosmic cadences on our radar

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