SPACE™
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Galactica

Astronomy and Space Science Magazine



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Galactica is a monthly magazine about astronomy & space science published by SPACE India targeting amateur astronomers. Each monthly issue includes astronomy news, space launches, what's up in the sky every month, events and announcements done by the space team, Astrophotographs and articles on astronomy & astrophysics submitted by the readers for the general audience, and the article about historical missions & events of astronomy and more. All of this comes in an easy-to-understand user-friendly style that's perfect for astronomers at any level.

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ABOUT SPACE

Legacy of 24 years | Pioneer Organization | 10000+ Activities Developed | 1000+ Schools Associated | 1.5M+ Students Engaged | 10K+ Outreach Events | 10+ Cities Presence

SPACE is the pioneer organization working towards the development of science and astronomy in India. It aims to create a scientifically aware society and contribute to the technological and social development of the country, SPACE organization belongs to an astronomical league. diligently working towards development in astronomy and space science through astronomical tutorials, modules, and curriculum for education requirements of schools & students in India. We constantly engage in offering introductory astronomy, science about space, astrophysics, telescopes, and internet astronomy to the masses.

Vision: To popularize hands-on space science & STEM Education through various fun-filled pioneering concepts, services, and programs.

Mission: To develop and popularize space science & STEM Education In India and establish a global association with national & international space science agencies, societies, amateur, and professional organizations, government agencies, and space observatories.

CMD's Message



Dr. Sachin Bahmba, CMD, SPACE

Space and Astronomy are the future for the young generation of our country. This is a great means to inculcate scientific temperament among the masses. Such astronomy sessions will provide a hands-on learning platform for students wherein they explore the real world of science, I wish for young students to let their ambitions soar and think big as they are the future of our country.

Co-founder's Message

Astronomy education is important as it builds curiosity, critical thinking, and problem-solving skills, helping young minds prepare for the future. It encourages innovation, exploration, and a scientific mindset. Young learners build creativity and confidence through hands-on, experiential learning, preparing them for careers in space science and technology. We aim to cultivate future innovators who will lead progress, discovery, and global advancement.



Ms. Shalini Bahmba, Co-founder, SPACE

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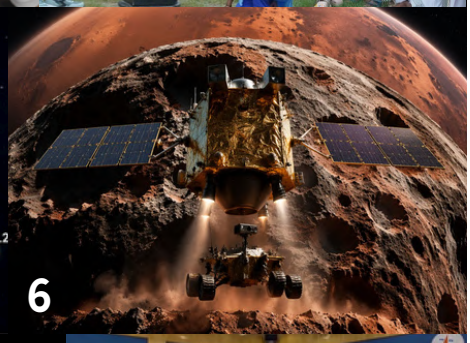

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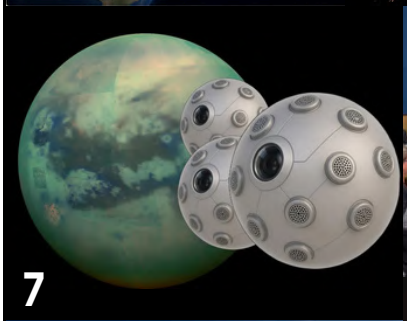

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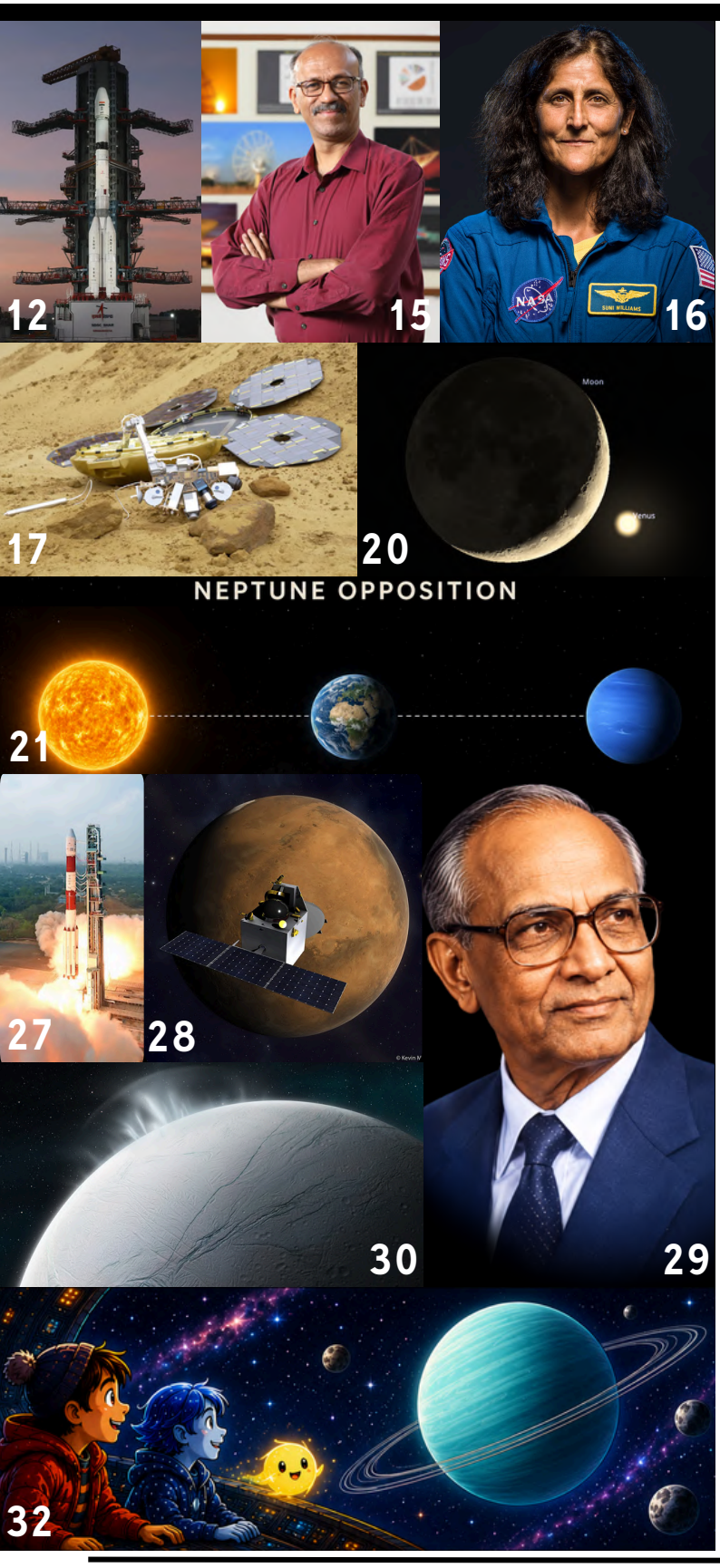

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ANVESH 2026: Exploring Space Through Science, Innovation and Discovery

ANVESH 2026 was organised on 25 August 2026 at Delhi Public School, Sec. 81, Greater Faridabad, as part of the National Space Day celebrations, with Chandrayaan-3 as its central theme. The event offered students an engaging experience through hands-on activities in space science, robotics, and rocketry. Grade 6 students explored space technologies and robotics applications, while students and parents collaborated in a rocket-building and launching activity. Students of Grades 8 and 9 also participated in a creative Light Painting activity using mobile phones. Supported by 40 enthusiastic student volunteers, ANVESH 2026 encouraged curiosity, teamwork, creativity, experimentation, and scientific thinking beyond the classroom.





A Night Under the Stars: National Space Day Observation at Beach

The spirit of National Space Day came alive at Thiruvanmiyur Beach, Chennai, as the SPACE Chennai Team conducted a public Night Sky Observation on 23 August 2026. Organised with the cooperation of local police authorities, the event aimed to promote awareness of astronomy, space science, and India's achievements in space exploration. The telescope attracted curious visitors of all age groups, creating an engaging opportunity for interaction and learning. Although initial cloud cover delayed observations, the skies eventually cleared, allowing around 100 people to observe the Moon and Venus through the telescope. The programme successfully inspired curiosity, scientific thinking, and appreciation for the night sky.





Celebrating National Space Day 2026 at Raman Science Centre

Space-India, in collaboration with Raman Science Centre, Nagpur, a unit National Council of Science Museums (NCSM), celebrated National Space Day 2026 from 23-08-26 to 25-08-26. The three-day event commemorated India's historic soft-landing of the Chandrayaan-3 mission near the Moon's south pole in 2023. The event ignited curiosity among young students through hands-on workshops, demonstrations, competitions and an inspiring lecture.

The celebration commenced with the Hydro-Rocketry workshop, where students not only learned the principles of rocket propulsion but also built and launched their own water-powered model rockets. Students explored how science, creativity and engineering come together to make things fly.

The event continues as students from various schools learned the mechanics of telescopes. How the lenses and mirrors reveal the mysteries of the night sky. On the second day, students explored the universe in an engaging Stellarium workshop. They learned to navigate the digital night sky, identify constellations and planets, and explore Zodiac signs using Stellarium software.

Later on that day, young artists put their creativity and imagination on display during a poster-making competition on 'India in Space'. They showcased India's inspiring journey in space exploration and envisioned the possibilities that lie ahead.





Young minds penned imaginative thoughts on '**India's first city on Mars - A letter from 2050**' during an exciting science fiction writing competition. Participants imagined a futuristic city on Mars and explored how science, creativity, and storytelling can come together to create fascinating science fiction narratives.

The final day featured an inspiring Popular Science lecture by eminent scientist Dr. Sreenivasan G, Scientist-G and General Manager at ISRO-National Remote Sensing Centre, Nagpur. He highlighted ISRO's remarkable achievements from its early missions to upcoming missions like the Gaganyaan mission. He also noted the societal benefits of the Indian space programme. His words painted a road map of India's future in space science.

The three-day program at Raman Science Centre was more than a celebration – it was a launchpad for imagination. By blending hands-on science, cultural creativity, and visionary lectures, the event nurtured the next generation of explorers who will carry India's cosmic journey forward.

National Space Day 2026 – Celebrating the Spirit of Exploration

SPACE India celebrated National Space Day 2026 across its partner schools and centres, commemorating the third anniversary of Chandrayaan-3's historic landing. Through interactive activities, hands-on experiments, student-led demonstrations and immersive learning experiences, the celebrations brought India's remarkable journey in space exploration closer to young minds.

At **DPS Sector 19, Faridabad,** students from Grades 4–8 participated in Cosmic Quest – Discover, Dream, Explore. Student volunteers led engaging exhibitions and demonstrations on telescopes, Moon phases, crater making, astrophotography, spectroscopy and the Jantar Mantar model. Grade 7 students further participated in experiential sessions and creative space challenges.

At **K R Mangalam World School, Vaishali,** students of Classes 3–5 and their parents participated in Mission Space Family, guided by enthusiastic Class 8 student volunteers. Families explored spectroscopy, telescope pointing, megastructures and Mars rover challenges, along with parent-child stomp rocket designing and launching.

At **Bal Bharati Public School, Pitampura,** senior students from Classes VI–VIII took the lead as volunteers, conducting astronomy activities for students of Classes III–V. The programme featured stomp rocketry, Moon phases, crater creation, astronomy games and safe solar observation.

At **St. Martin's Diocesan School,** Grade 9 students participated in a peer-led session on India's Chandrayaan missions and the Vikram Lander and Pragyan Rover, including a hands-on 3D rover model.

The National Space Day celebrations across schools associated with Space India in the Universe in the School (UITS) programme engaged students and parents through an immersive Chandrayaan-3 journey featuring detailed models, paper rocket making and hydro rocket launches. These experiences transformed space science into an exciting, meaningful and memorable learning journey, inspiring students to explore, question and dream beyond the skies.











When Science Stepped Out of the Classroom: National Space Day in Mahoba

A rocket built by a student does not need to travel very far to change the way science is understood.

On National Space Day 2026, that idea came alive in Mahoba, where more than 400 students spent the day not simply listening to science, but experimenting with it. Organised by the District Administration, Mahoba, in collaboration with SPACE India, the initiative placed experience at the centre of learning.

The transformation was visible in the simplest moments. A lesson on pressure became a water rocket rising into the air. Ideas of force, motion and trajectory became questions students could test for themselves. Astronomy moved beyond diagrams as students engaged with the Solar System, celestial objects and the tools that help us explore the universe.



When District Magistrate Smt. Gazal Bharadwaj, IAS, joined students for a water-rocket launch, it became more than a ceremonial moment. It reflected the larger purpose of the initiative to create a culture where curiosity is encouraged and scientific learning is something students actively participate in.



That journey was already visible among Mahoba's students. Young participants who successfully completed NASA's All India Asteroid Search Campaign (AIASC) were recognised during the programme.

Having worked with astronomical data as part of the campaign, their achievement represented an important shift: from being introduced to space science to contributing to a real scientific search.

Students from schools across the district participated alongside children from Pratibha Khand Anathalaya, extending the opportunity to experience science to learners from different backgrounds.

For Mahoba, National Space Day was therefore about more than celebrating India's achievements in space. It was about asking what those achievements can inspire next. Because the distance between a classroom and the cosmos may be vast—but sometimes, all it takes to begin that journey is the chance to experiment.

HIGHLIGHTS OF AUGUST 2026

Roman Space Telescope Takes Flight to Uncover the Universe's Mysteries



The observatory successfully launched on August 30, 2026



Roman is now travelling from Earth toward the Sun-Earth Lagrange Point 2



Roadmap Of Roman Space Telescope's Journey in Space

NASA's Nancy Grace Roman Space Telescope has officially begun its journey into space, marking an important milestone for the future of astronomy. The observatory successfully launched on 30 August 2026, at 7:26 a.m. EDT aboard a SpaceX Falcon Heavy rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida. Following launch, Roman successfully separated from the rocket's second stage and began its journey into deep space.

The successful launch came after weeks of extensive preparations. Engineers completed spacecraft integration, launch rehearsals, encapsulation inside the Falcon Heavy payload fairing, and final readiness reviews before NASA and SpaceX officially declared the mission "go" for launch. Remarkably, Roman launched about nine months ahead of its original development schedule, highlighting the progress achieved by the mission team.

Roman is now travelling roughly one million miles from Earth toward the Sun-Earth Lagrange Point 2 (L2). The journey and initial commissioning process are expected to take approximately three months before the observatory begins preparing for its scientific programme.

Equipped with powerful infrared instruments and an exceptionally wide field of view, Roman will survey enormous regions of the universe. Scientists hope its observations will help investigate dark energy and dark matter, map billions of galaxies, study black holes, and discover planets beyond our solar system. NASA estimates that Roman's surveys could reveal around 100,000 new exoplanets.

India–US Space Partnership Takes a Giant Leap Toward the Moon





Besides the Moon Base project, India and the US also agreed to advance discussions on cooperation in open scientific data sharing under the accords.

India and the United States are strengthening their cooperation in space exploration, with NASA reportedly inviting the Indian Space Research Organisation (ISRO) to participate in future lunar initiatives linked to sustained human presence on the Moon.

The development reflects the growing strategic partnership between the two countries in science, technology and space exploration. India has already demonstrated strong lunar capabilities through the Chandrayaan missions, particularly Chandrayaan-3, which achieved a historic soft landing near the Moon's south polar region in August 2023. The success significantly raised India's profile as a major spacefaring nation.

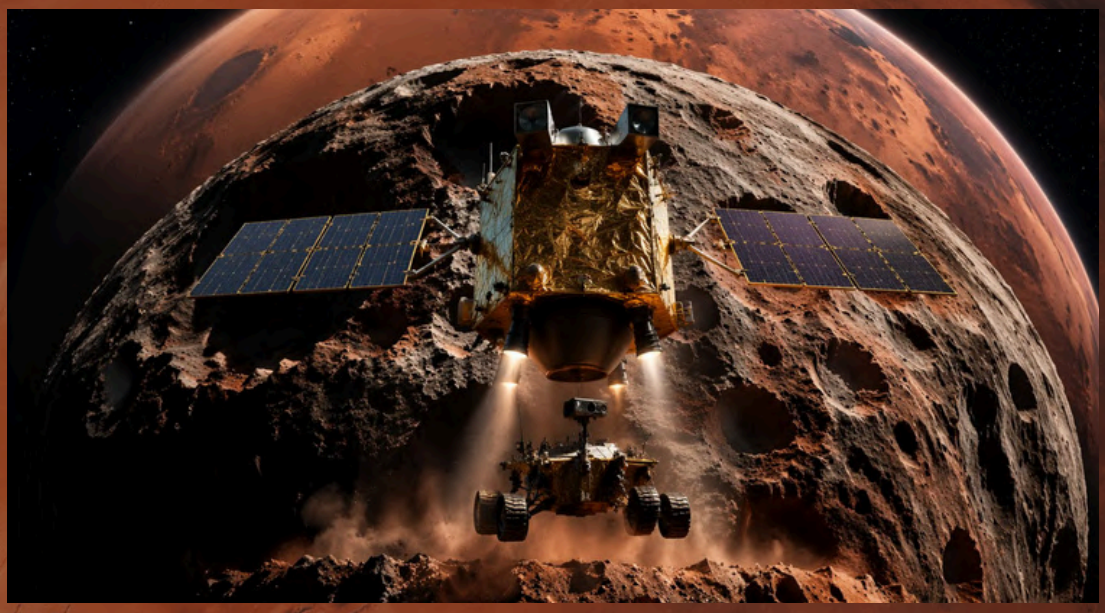
NASA's long-term lunar exploration plans are centred on the Artemis programme, which aims to return astronauts to the Moon and establish the infrastructure needed for extended scientific missions. Cooperation with ISRO could potentially involve lunar science, navigation, communications, robotic exploration, technology development and other supporting activities.

India and the US have already expanded their space partnership through projects such as the NASA-ISRO Synthetic Aperture Radar (NISAR) Earth-observation satellite and increasing collaboration in human spaceflight. India also became a signatory to the Artemis Accords in 2023, establishing a broader framework for peaceful and responsible space exploration.

Closer participation in lunar programmes could provide ISRO with valuable experience in advanced technologies required for future crewed and deep-space missions. For NASA, India offers proven engineering capabilities and a rapidly expanding space ecosystem.

The growing partnership signals a shift from individual national missions toward international collaboration, potentially making India an important contributor to humanity's long-term exploration and scientific study of the Moon.

Japan Prepares Historic Sample Return Mission to Phobos



Japan Aerospace Exploration Agency (JAXA), MMX is scheduled for launch in October 2026 aboard Japan's H3 rocket from the Tanegashima Space Center.

Japan has unveiled its ambitious Martian Moons eXploration (MMX) spacecraft, designed to travel to Mars, study its mysterious moons and bring samples from Phobos back to Earth. Developed by the Japan Aerospace Exploration Agency (JAXA), MMX is scheduled for launch in October 2026 aboard Japan's H3 rocket from the Tanegashima Space Center.

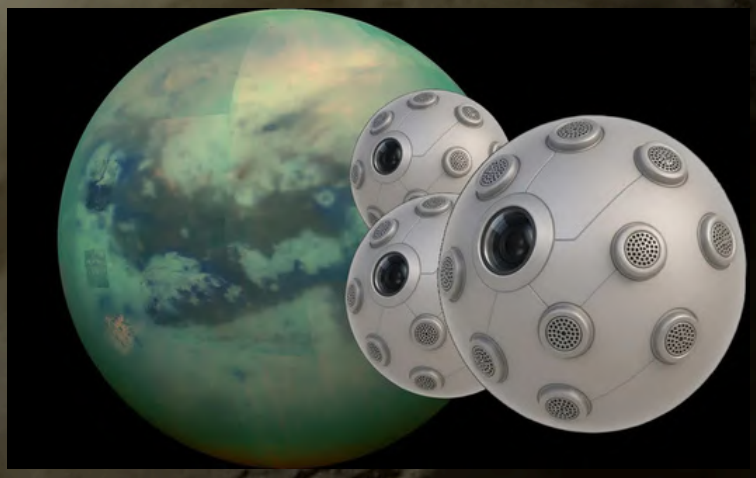
The mission will investigate Mars' two small moons, Phobos and Deimos, which have puzzled scientists for decades. Researchers are still uncertain whether these moons are captured asteroids or fragments created after a massive collision involving ancient Mars. By examining their surfaces and composition, MMX could provide important clues about the formation and evolution of the Martian system.

After reaching Mars roughly a year after launch, MMX will enter a specialised orbit around Phobos and conduct detailed scientific observations. The spacecraft will then descend to the moon's surface and collect more than 10 grams of rock and soil, which will eventually be transported back to Earth. If successful, MMX will become the world's first mission to return samples from the Mars region.

The mission also includes international contributions from agencies including NASA, ESA, France's CNES and Germany's DLR. Scientists hope the returned samples will reveal how water and organic materials travelled through the early Solar System. Expected to return to Earth around 2031, MMX could significantly deepen our understanding of Mars, its moons and the conditions that helped create habitable worlds.

NASA funds spherical 'Aerobots' that could explore the caves of Saturn's moon Titan

NASA is supporting an innovative concept that could one day send small spherical flying robots deep into the caves of Titan, Saturn's largest moon. The project, called SPARK – Solid-state Propulsion for Autonomous Reconnaissance of Karst, has received Phase I funding through NASA's Innovative Advanced Concepts (NIAC) program.





Saturn's moon Titan from NASA's Cassini spacecraft; renderings of several "SPARK" Aerobots.

Led by Daniel Drew of the University of Hawai'i at Mānoa, SPARK proposes lightweight, balloon-like "aerobots" capable of navigating underground caverns and sinkholes that conventional rovers may find impossible to reach. Titan is especially intriguing because its surface contains rivers, lakes and seas of liquid methane and ethane, along with possible cave systems that could preserve valuable clues about the moon's chemistry and geological history.

Unlike ordinary drones, SPARK aerobots would not rely on spinning propellers. Instead, they would use electrohydrodynamic propulsion, sometimes called atmospheric ion propulsion. Electric fields accelerate charged particles in Titan's thick atmosphere to generate thrust. The system has no major moving mechanical parts, produces very little disturbance and could operate effectively in Titan's extremely cold environment. NASA researchers estimate that Titan's atmospheric conditions could make this technology far more power-efficient than it would be on Earth. The aerobots could eventually be deployed from a larger spacecraft and work together to investigate underground environments autonomously.

Although SPARK is still an early-stage concept and is unlikely to join NASA's upcoming Dragonfly mission, its development could shape future Titan exploration. By reaching places no traditional rover can access, these tiny flying explorers may reveal an entirely new side of one of the solar system's most fascinating worlds.

Rocket Lab Unveils GHOST: A Portable Spaceport for Rapid Global Launches

Rocket Lab has unveiled GHOST (Global Hypersonic & Orbital Spaceport Technology), a new portable launch system designed to make rocket launches faster, more flexible and globally deployable. Announced on August 10, 2026, GHOST aims to provide what Rocket Lab describes as a capability for "launching anywhere, anytime and without compromise."

Unlike traditional spaceports that require permanent and extensive infrastructure, GHOST packages essential launch equipment into standard shipping containers. These containers can transport rockets, ground-support equipment, launch infrastructure and range-control systems to different locations. Once deployed, the system can support both orbital and suborbital missions using Rocket Lab's Electron and HASTE rockets.

Electron is primarily used for launching small satellites into orbit, while HASTE is designed for suborbital missions, including hypersonic technology testing. Because both rockets can use common ground infrastructure, GHOST could enable rapid mission preparation and back-to-back launches from temporary or newly established locations.

The system's first deployment will be at the Pacific Spaceport Complex in Kodiak, Alaska, where Rocket Lab plans to establish two launch pads known collectively as Launch Complex 4. GHOST is expected to conduct its first operational suborbital launch from Alaska in 2027.
Rocket Lab CEO Peter Beck says the system is particularly suited to missile-defense testing, national-security missions and sovereign launch requirements for allied countries.



Rocket Lab's GHOST containerized launch system for Electron and HASTE rockets

By making launch infrastructure transportable, GHOST represents an important step toward a future in which access to space can be more responsive, distributed and adaptable to changing mission requirements.

China's Long March 7A Rocket Fails Shortly After Lift-Off

China's space programme faced a rare setback on August 10, 2026, when a Long March 7A rocket failed shortly after launching from the Wenchang Space Launch Site in Hainan province. The rocket lifted off at approximately 8:02 p.m. Beijing time, but about 85 seconds into its flight, it suffered a major anomaly and exploded during the first-stage ascent.

The rocket was carrying ChinaSat-4B (Zhongxing-4B), a communications satellite intended for deployment into a high-altitude orbit. The failure resulted in the loss of both the launch vehicle and its satellite payload. Videos recorded near the launch site showed the rocket breaking apart and producing a bright fireball less than 90 seconds after liftoff.

The Long March 7A is designed primarily to launch satellites into geostationary transfer orbit and can carry approximately seven tonnes to such trajectories. The August accident marked only the second failure of the Long March 7A, following its unsuccessful maiden mission in March 2020.

Chinese authorities confirmed that an anomaly occurred during flight and launched an investigation to determine the cause. The findings will be important for ensuring the reliability of future Long March 7A missions and maintaining the momentum of China's rapidly expanding space programme.



China's Long March 7A rocket explodes shortly after liftoff, ending its ChinaSat-4B satellite mission.

WHAT'S UP IN THE SKY - SEPTEMBER 2026

LUNAR CALENDAR

IMPORTANCE OF MOON PHASES FOR STARGAZERS

One might wonder why it is important to refer to moon phases for star gazing. The reason is that the phases of the Moon reflect a great deal of illumination, and because the Moon is so close to us, it overrides the brightness of other celestial objects.

So, What Moon phase is best for stargazing? "The New Moon and the days immediately before and after the new moon (Crescent phases)" are among the best times for stargazing. Whereas the Remaining phases like Full Moon, waxing or waning gibbous, the first or third quarter Moon offers a time to zoom in and witness the features of the Moon.



PLANETS VISIBILITY

Mercury
Unlikely to be visible in Sept because it stays very close to the Sun in the sky, making it difficult to observe.

Venus
Unlikely to be visible in Sept because it remains too close to the Sun's glare, especially during the relevant observing period

Mars
Rises around midnight in early Sept. The Moon is near it on Sept 6 and 7

Jupiter
Visible in the morning sky in Cancer, with the waning crescent Moon nearby on Sept 8 and 9.

Saturn
Visible in the morning sky in Pisces, moving into Cetus on Sept 6.

Uranus
Visible under dark skies, reaching its highest altitude of 58° from Sept 25.

Neptune
Visible all night around because of its opposition on September 26.

BRIGHT DEEP SKY OBJECTS

Great Sagittarius Cluster also known as M22 is located in Sagittarius constellation with an apparent magnitude of 5.1. It is visible to naked eye under dark sky and is excellent binocular target. It is around located 10,600 light years away from Earth.





M28 is a globular cluster in the constellation Sagittarius, it is about 18,000 light-years from Earth. With a magnitude of 6.8, it is a faint object best viewed through binoculars or a telescope. It contains hundreds of thousands of old stars packed closely together.

NGC 6341 (M92) is a bright globular cluster located in the constellation Hercules. It contains hundreds of thousands of old stars packed closely together and is about 26,000 light-years away. With a magnitude of around 6.4. It is best visible through Binocular.





NGC 6205 also known as Hercules Globular Cluster is best observed from Northern hemisphere. It has an apparent magnitude of 5.8. The object is easily distinguishable with binoculars. It is located 23,000 light years away from Earth. We can use a small telescope for detailed view.

ROCKET LAUNCHES IN SEPTEMBER 2026

GISAT-1A (EOS-05) MISSION - INDIA'S NEW SENTINEL FROM GEOSTATIONARY ORBIT

GISAT-1A (EOS-05) is an upcoming Indian Earth-observation mission developed by the Indian Space Research Organisation (ISRO). The satellite is designed as a geostationary imaging satellite, intended to provide rapid and continuous imaging of the Indian region. Its observations are expected to support applications such as disaster monitoring, weather-related observations, agriculture, environmental monitoring and other Earth-observation requirements.


GSLV Mk II
(Credit: Nextspaceflight)

The mission is currently expected to launch in September 2026 from the Second Launch Pad at Satish Dhawan Space Centre, Sriharikota. The spacecraft will be carried by GSLV-F17, using the GSLV Mk II launch vehicle. The GSLV Mk II is a three-stage rocket with four liquid strap-on boosters, a solid-fuel first stage, a liquid-fuel second stage and an indigenous cryogenic upper stage.

GISAT-1A will be placed into a Geosynchronous Transfer Orbit (GTO) before reaching its operational geostationary orbit. The mission represents ISRO's continued development of high-resolution, near-real-time Earth-imaging capabilities for national applications.

IRNSS-1L (NVS-03): STRENGTHENING INDIA'S NAVIC FOR THE FUTURE


GSLV Mk II
(Credit: Nextspaceflight)

IRNSS-1L (NVS-03) is the third satellite in ISRO's second-generation NavIC (Navigation with Indian Constellation) series. It is being prepared for launch in September 2026 from the Second Launch Pad at Satish Dhawan Space Centre, Sriharikota. The satellite is designed to strengthen and augment India's regional navigation system, which provides positioning, navigation and timing services across India and the surrounding region.

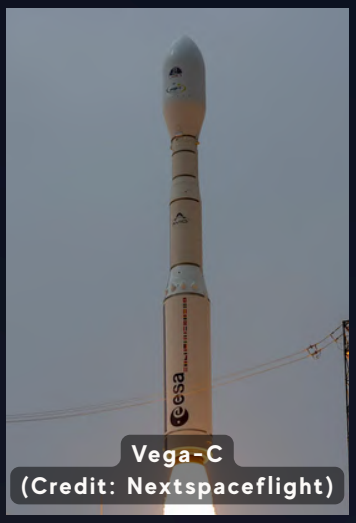
The satellite will be launched aboard the GSLV Mk II, with the mission designated GSLV-F18/NVS-03 in ISRO's current mission plan. This three-stage launch vehicle uses four liquid strap-on boosters, a solid-fuel first stage, a liquid-fuel second stage and an indigenous cryogenic upper stage. The mission is intended to place NVS-03 into a Geosynchronous Transfer Orbit (GTO), from where it will be manoeuvred into its operational orbit.

NVS-03 will help improve the availability and continuity of NavIC services, supporting applications such as transportation, surveying, timing, emergency services and strategic operations. Its launch is particularly important for restoring and strengthening the constellation, as ISRO has identified NVS-03 as ready for launch along with NVS-04 and NVS-05, which are also being developed to reinforce NavIC.

EUROPE'S NEXT EYES IN ORBIT

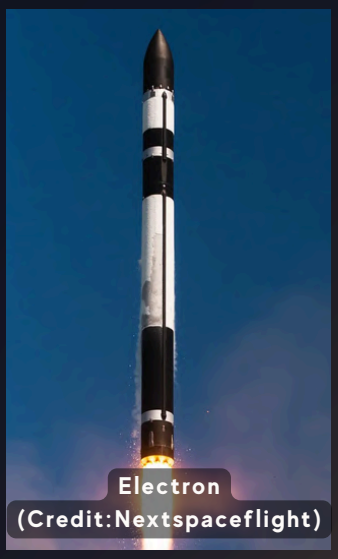
Sentinel-3C and FLEX are two advanced European Earth-observation satellites scheduled to launch together on 15 September 2026 from Europe's Spaceport in French Guiana. The mission will use the Vega-C rocket (VV30), carrying both satellites into orbit.

Sentinel-3C, the third satellite in the Copernicus Sentinel-3 series, will monitor oceans, land, ice and the atmosphere, supporting weather forecasting and environmental monitoring. FLEX (Fluorescence Explorer) will study plant health by detecting the faint fluorescence emitted during photosynthesis.Together, the satellites will provide valuable information about Earth's changing environment, vegetation health, climate and water systems. FLEX will operate alongside Sentinel-3C, combining their observations to improve our understanding of how plants interact with the atmosphere and how Earth's ecosystems respond to environmental changes.



Vega-C
(Credit: Nextspaceflight)

A NEW EYE ON EARTH TAKES FLIGHT


Electron
(Credit:Nextspaceflight)

BlackSky Gen-3 6 is a next-generation Earth-imaging satellite scheduled for launch in September 2026 from Rocket Lab Launch Complex 1, Mahia Peninsula, New Zealand. The mission is designed to expand BlackSky's high-resolution satellite constellation and provide rapid, detailed imagery of locations around the world.

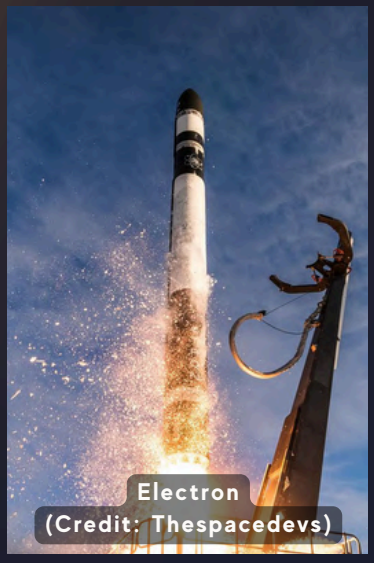
The satellite will be launched aboard Rocket Lab's Electron, a two-stage orbital launch vehicle designed for small satellite missions. It will be deployed into Low Earth Orbit (LEO), adding further imaging capacity to BlackSky's growing constellation.

Gen-3 satellites provide 35-centimetre-class imagery, enabling detailed monitoring of infrastructure, vehicles, vessels and environmental changes. Combined with BlackSky's AI-powered analytics, the satellite will support rapid observation and timely decision-making for commercial, environmental, defence and intelligence applications.

SIX SATELLITES - A WORLD OF SIGNALS.

The 6x HawkEye 360 mission is planned for launch in September 2026, carrying six HawkEye 360 satellites designed to expand the company's space-based radio-frequency (RF) sensing constellation. The satellites will detect, identify and locate RF signals from sources on Earth, providing valuable data for monitoring activities across land, sea and air.

The mission is expected to use Rocket Lab's Electron, a small-lift, two-stage orbital launch vehicle, from Launch Complex 1 in Mahia, New Zealand. The satellites will operate in Low Earth Orbit (LEO), contributing to HawkEye 360's growing network of RF-sensing spacecraft.The mission will strengthen maritime awareness, emergency response, security and intelligence applications by providing timely information about radio-frequency activity worldwide. HawkEye 360's constellation uses satellite-based collection, signal processing and analytics to transform RF signals into actionable information.


Electron
(Credit: Thespacedevs)

AMAZON LEO LV-01: A NEW ERA OF CONNECTIVITY FROM SPACE



Vulcan VC6L
(Credit: Nextspaceflight)

Amazon Leo (LV-01) is the first planned Vulcan mission dedicated to Amazon's Leo broadband satellite constellation, formerly known as Project Kuiper. It is scheduled for September 2026 from Space Launch Complex 41 (SLC-41), Cape Canaveral, Florida, with the exact launch time yet to be confirmed. The mission will deploy satellites into Low Earth Orbit (LEO) to expand Amazon's global satellite-internet network.

The mission will use United Launch Alliance's Vulcan VC6L, a two-stage heavy-lift configuration equipped with six solid rocket boosters. The vehicle is approximately 63.3 metres tall and is designed to carry large payloads to LEO. This mission will also be an important flight for the LEO-optimised Centaur V upper stage configuration.

Amazon Leo aims to provide high-speed, low-latency broadband connectivity from space, particularly benefiting areas where conventional internet infrastructure is limited. The constellation is planned to consist of thousands of satellites operating in LEO, creating a network capable of delivering internet services across a wide geographic region.

THEMIS T1H-1: PIONEERING EUROPE'S REUSABLE ROCKET FUTURE

Themis T1H-1 is the first flight test of the European Space Agency's (ESA) Themis reusable rocket demonstrator, developed with ArianeGroup. The mission is planned for September 2026 from Launch Complex 3B at Esrange Space Center in northern Sweden. It will be a short suborbital hop test, targeting an altitude of approximately 100 metres.



Themis Demonstrator
(Credit: Thespacedevs)

The vehicle, known as T1H (Themis-1 engine-Hop), is powered by the Prometheus, a reusable methane-fuelled engine. During the test, the engine will operate continuously at different throttle levels, demonstrating controlled ascent and descent. The rocket is designed to perform a vertical landing back at its launch site, an important capability for future reusable launch systems.

The main objective of T1H-1 is to test reusability, propulsion control and precision vertical landing technologies. Data from this demonstration will help ESA and European industry develop future low-cost, partially reusable launch vehicles capable of launching, landing and flying again.

****Note: Launch dates of the missions are scheduled to be launched in SEPTEMBER 2026 but may subject to change.**

Happy Birthday



Dirk Brouwer

Dirk Brouwer (1902–1966) was a Dutch-American astronomer and expert in celestial mechanics. He earned his Ph.D. from the University of Leiden in 1927. Even as a student, he made an important discovery by calculating the mass of Titan, Saturn's largest moon, using its gravitational effect on Saturn's other moons. Brouwer later became a leading scientist in orbital calculations and satellite motion, making significant contributions to astronomy and space science through his research and mathematical methods.

James Edward Keeler

James Edward Keeler (1857–1900) was an American astronomer who made important contributions to the study of Saturn's rings. In 1888, while working at Lick Observatory, he observed a narrow gap in Saturn's A Ring, later known as the Encke Gap. His observations helped scientists understand the structure and motion of Saturn's rings. In his honor, another major gap in the A Ring, discovered by the Voyager spacecraft, was named the Keeler Gap.





Nissim Kanekar

Nissim Kanekar (born 11 September 1973, Mumbai) is an Indian astrophysicist and cosmologist and a professor at the National Centre for Radio Astrophysics (NCRA-TIFR). His research focuses on the evolution of the electron-proton mass ratio and its implications for fundamental physics and cosmology. He has made significant contributions to radio astronomy and our understanding of the universe. In recognition of his outstanding scientific contributions to the physical sciences, he received the prestigious Shanti Swarup Bhatnagar Prize in 2017.

Jean-Sylvain Bailly

Jean-Sylvain Bailly (1736–1793) was a French astronomer renowned for his work on Halley's Comet and the four known moons of Jupiter. He calculated the comet's orbit and established an observatory to make detailed observations of Jupiter's satellites. His research helped improve the understanding of planetary and satellite motion. Bailly was elected to the prestigious Académie des Sciences in 1763 and authored important scientific works on Jupiter's moons, contributing significantly to 18th-century astronomy.



Happy Birthday



September 17, 1857

Konstantin Tsiolkovsky

Konstantin Tsiolkovsky (1857–1935) was a Russian scientist and a pioneer of aeronautics and astronautics. He conducted groundbreaking research on rockets, space travel, and aerodynamics, including the development and use of wind tunnels for scientific studies. Tsiolkovsky was among the first scientists to develop the theoretical foundations of rocket travel in space. His pioneering ideas about space exploration, rocket propulsion, and human spaceflight greatly influenced the development of modern astronautics and inspired future generations of space scientists.

Sunita Williams

Sunita Lyn Williams (born September 19, 1965) is a retired U.S. Navy captain and NASA astronaut known for her remarkable achievements in space exploration. She served aboard the International Space Station (ISS) as a flight engineer and commander during several expeditions. In 2024, she became the first woman to fly on a flight test of an orbital spacecraft during the Boeing Crew Flight Test. She is also an experienced spacewalker, completing nine spacewalks totaling over 62 hours.



September 19, 1965



September 30, 1951

Simon White

Simon David Manton White (born September 30, 1951) is a British-German astrophysicist known for his pioneering research into galaxy formation and dark matter. He served as a director at the Max Planck Institute for Astrophysics until retiring in 2019. During the 1980s, White collaborated with Marc Davis, George Efstathiou, and Carlos Frenk to develop the cold dark matter theory. Their computer simulations helped explain how galaxies and large-scale structures formed and evolved throughout the universe.

Philip Cary Plait

Philip Cary Plait (born September 30, 1964), popularly known as "The Bad Astronomer," is an American astronomer, science writer, and science communicator. He worked with the Hubble Space Telescope team and has dedicated his career to promoting astronomy and science education. Plait has authored popular books, including Bad Astronomy and Death from the Skies. He also hosted Crash Course Astronomy and has appeared in several science documentaries, making complex astronomical ideas engaging and accessible to the public.



September 30, 1964

SETBACKS THAT BUILT SPACE SUCCESS

BEAGLE 2: LOST AND FOUND

A Mission to Mars:
In 2003, Europe sent a small but ambitious spacecraft to Mars. Named Beagle 2, the lander was part of the European Space Agency's Mars Express mission and was designed to study the Martian surface and search for clues about whether Mars had ever provided conditions suitable for life. Beagle 2 separated from Mars Express on 19 December 2003 and was expected to land on Mars on Christmas Day.



The Beagle-2 lander on Mars Express equipped with a suite of instruments. (Credit: ESA/Medialab)

Then, Silence:
Beagle 2 was expected to begin communicating with Earth soon after landing. But no signal ever arrived. Scientists searched for the spacecraft using Mars Express and NASA's Mars Odyssey, but their attempts were unsuccessful. For more than a decade, Beagle 2 remained one of the great mysteries of Mars exploration. Had it crashed? Had it missed its landing site? Or was it still somewhere on the Red Planet?



Beagle 2 Found on Mars. (Credit: NASA)

A Discovery Eleven Years Later:
The mystery was finally solved in 2015. Scientists examining extremely detailed photographs taken by NASA's Mars Reconnaissance Orbiter spotted an object in the expected landing area. It was Beagle 2. The images showed that the lander had actually survived its descent and successfully reached the Martian surface on Dec 2003.

What Went Wrong?
The images revealed that Beagle 2 had only partially deployed its solar panels. Since the communication antenna was underneath the panels, the incomplete deployment prevented the lander from sending signals back to Earth. It had reached Mars, but could not tell anyone.

A Failure That Inspired Science:
Beagle 2 never returned scientific data, but its story became an important lesson in space exploration. Its discovery showed the value of persistence, careful analysis and new technology. Sometimes, a mission does not succeed exactly as planned, yet it still teaches scientists something valuable.

SPACE PARADOXES: GLITCHES IN THE COSMOS

THE TWIN PARADOX: CAN SPACE TRAVEL MAKE YOU YOUNGER?

A Journey Into Space:

Imagine two 20-year-old twins, Aarav and Arjun. They have grown up together, shared the same birthdays and experienced time in exactly the same way. But on their 20th birthday, their lives take different paths.

Arjun boards a spacecraft and begins a journey through space at a speed very close to the speed of light. Aarav stays on Earth.

For Arjun, the journey lasts only 5 years. When he returns, he is just 25 years old. But something extraordinary has happened on Earth. For Aarav, 75 years have passed. He is now 95 years old! The twins who left Earth at the same age have returned with a remarkable 70-year difference in age. How can two people who started together experience such different amounts of time?

When Time Slows Down:

The answer is time dilation, one of the most fascinating ideas in Albert Einstein's Special Theory of Relativity. We often think of time as a universal clock one that ticks at the same speed for everyone, everywhere. Einstein showed that this is not true. When something travels at an extremely high speed, especially close to the speed of light, time passes more slowly for the traveller compared with someone who remains behind. For Arjun, however, nothing feels strange. His watch ticks normally. His heart beats normally. Five years simply feel like five years. He does not feel that his time has slowed down. The difference becomes clear only when he returns to Earth and compares his age with Aarav's.

Why Is It a Paradox?

This is where things become puzzling.

Arjun is moving very fast compared with Aarav. But from Arjun's point of view, he could also say that Aarav and Earth are moving relative to him. If motion is relative, why should Arjun be the younger twin? The answer is that their journeys are not exactly the same. Aarav stays on Earth, while Arjun travels into space, turns around, and comes back. Arjun changes his motion during the journey, making his path through spacetime different from Aarav's.

When they meet again, both agree that Arjun has experienced less time.

A Real Effect:

The Twin Paradox is not just science fiction. Time dilation has been experimentally measured using highly accurate clocks and fast-moving particles. It teaches us a remarkable lesson: time is not as simple as it seems. In our universe, how fast you travel can change how much time you experience.

ASTRONOMICAL EVENTS

September Epsilon Perseids: A Hidden Meteor Shower in the September Sky

The September Epsilon Perseids are a minor annual meteor shower active from September 5–21, 2026, peaking around September 9–10. The shower has a Zenithal Hourly Rate (ZHR) of about 8 meteors per hour under ideal dark sky conditions, with meteors traveling at approximately 64 km/s.

The shower's radiant lies in the constellation Perseus, near the star Epsilon Persei, giving the shower its name. The meteors can streak across different parts of the sky, even though they appear to originate from the radiant.

The best time to observe the September Epsilon Perseids is during the pre-dawn hours, when Perseus is higher in the northeastern sky. Find a dark location away from city lights, allow your eyes 20–30 minutes to adjust, and watch a wide area of the sky with your unaided eyes. No telescope or binoculars are needed.



Position of the radiant in the constellation Perseus.
Credit: .universeguide.com

With patience and dark skies, you may catch these fleeting streaks lighting up the September night. It is a simple but rewarding way to experience the dynamic sky without any special equipment

Equinox: A Balance of Light and Dark

The word equinox comes from Latin and means "equal night." However, day and night are not exactly 12 hours long at most locations because of atmospheric refraction and the Sun's apparent disk size.

The Autumn Equinox marks the beginning of astronomical autumn in the Northern Hemisphere and occurs when the Sun crosses the celestial equator, moving from north to south. In 2026, the Autumn Equinox occurs on September 23 at approximately 00:05 UTC (5:35 a.m. IST). Around this time, the Sun rises close to due east and sets close to due west, resulting in nearly equal amounts of daylight and darkness.

For observers in the Northern Hemisphere, the equinox marks the transition from summer toward winter, while in the Southern Hemisphere, it marks the beginning of spring. After the September equinox, days gradually become shorter in the Northern Hemisphere and longer in the Southern Hemisphere.

The equinox is also a useful time to observe how the Sun's position changes along the horizon throughout the year. It provides a natural reference point for understanding Earth's changing seasons. The event also highlights how Earth's axial tilt shapes the pattern of sunlight received across the planet.

A Cosmic Disappearing Act
Moon Occults Venus

A lunar occultation occurs when the Moon passes directly in front of a distant celestial object, temporarily hiding it from our view. On September 14, 2026, the Moon will pass in front of brilliant Venus, creating a rare and fascinating celestial event. During the occultation, Venus will gradually approach the Moon's edge, disappear behind it, and later emerge from the opposite side. The event will be visible from parts of India, Asia, Africa, Europe and western Russia.



What Will Happen?

The young crescent Moon will appear very close to Venus before gradually moving across it. For observers within the occultation path, Venus will disappear behind the Moon and later reappear from the opposite side. Venus will be extremely bright at about magnitude −4.5, making the event particularly interesting to observe.

When Can India Observe It?

From India, the occultation is expected to occur approximately between 5:00 p.m. and 7:10 p.m. IST on September 14, based on the country's visibility window of 11:30–13:40 UTC. The exact disappearance and reappearance times vary depending on your location.

Where and How to Watch?

Look toward the western sky, where the Moon and Venus will be relatively low as the event progresses. Because the event occurs around sunset, visibility will depend strongly on your location, horizon, and sky brightness. Binoculars or a small telescope can help reveal Venus near the Moon, but extreme caution is essential while the Sun is above the horizon. Never point binoculars or a telescope toward the Sun without a proper solar filter.

This event offers a remarkable opportunity to watch the Moon's motion in real time as it briefly hides one of the brightest objects in our planetary neighborhood.

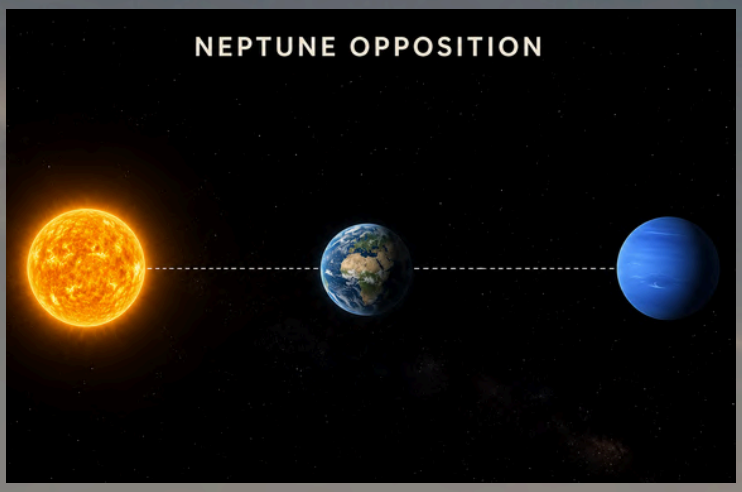
Neptune at Opposition: The Distant Blue World at Its Best

Neptune reaches opposition on September 26, 2026, offering one of the best opportunities of the year to observe the Solar System's most distant major planet. Opposition occurs when Earth passes between the Sun and Neptune, placing Neptune opposite the Sun in our sky.

At this time, Neptune is closest to Earth for the year and appears at its brightest and largest from our perspective. The opposition occurs at approximately 7:07 a.m. IST on September 26.

Opposition provides the best observing opportunity of the year because Neptune is closest to Earth and receives favorable viewing conditions. Although it will remain a challenging target, successfully locating this distant blue world can be a rewarding experience for amateur astronomers.

It is a reminder that even a tiny point of light in a telescope can be an entire planet billions of kilometers away. For observers in India, Neptune will be well placed throughout the night around September 26.



It will rise in the eastern sky around sunset, gradually climb higher, and reach its highest position around midnight before setting toward the west near sunrise.

The best observing period is therefore from late evening through the early morning hours, when the planet is higher above the horizon.

Where Will Neptune Be?

Neptune will appear in the constellation Pisces, in a relatively sparse region of the sky. At opposition, it will shine at approximately magnitude +7.8, making it far too faint to see with the unaided eye. It will be about 28.9 astronomical units (AU) from Earth roughly 4.3 billion kilometers away. Through a telescope, Neptune appears as a tiny blue gray disk only about 2.4 arcseconds across.

How to Find Neptune?

Neptune cannot be identified easily by simply looking at the sky. Good binoculars or, preferably, a telescope are required, along with a detailed star chart or astronomy app to locate its position among the stars. Under dark skies, binoculars may help you identify Neptune as a faint point of light, while a telescope with sufficient magnification can reveal its tiny blue disk. Around 200× magnification and steady atmospheric conditions can make its planetary disk easier to distinguish.

CONJUNCTIONS FOR THE MONTH

A phenomenon grabs the imagination of scientists and stargazers alike in the vast panorama of the night sky, where stars shine as distant diamonds and planets roam over the cosmic canvas. Conjunctions, those ethereal moments in the heavens when heavenly bodies appear to collide, provide a mesmerising sight that connects us to the beauty of the cosmos. The word "Conjunction" comes from Latin, meaning to join together.

From Earth's perspective, a conjunction occurs when two planets or a planet and the Moon or Sun align. Solar conjunctions are invisible to us. Moon planet conjunctions occur throughout the month, every month, as the Moon passes past each planet. The planets in The Great Conjunction and when multiple align are rare and captivating conjunctions. Technically speaking, objects are said to be in conjunction in that instant when they have the same right ascension on our sky's dome. Practically speaking, objects in conjunction will likely be visible near each other for some days.

Conjunction of Moon and Pleiades

On September 4, the waning Moon will appear close to the Pleiades (M45) in the eastern/northeastern pre-dawn sky. The Pleiades have an integrated magnitude of about +1.2, making them visible to the naked eye. Binoculars will provide a beautiful wide-field view and reveal more of the cluster's individual stars. Look for the pair before sunrise when the sky is still dark and choose a location with a clear eastern horizon.



Place: Chennai / Date: 04th September / Time: 05:30 am.

Conjunction of Moon and Mars

On September 7, the waning crescent Moon will appear near reddish Mars (about +1.25 magnitude) in the eastern sky before sunrise. The pairing will be visible to the naked eye, while binoculars will make Mars easier to identify and a small telescope may show its tiny disk. Mars will appear as a subtle reddish point of light beside the brighter Moon, creating an attractive morning sky scene.



Place: Chennai / Date: 07th September / Time: 04:00 a.m.

Conjunction of Moon and Jupiter

On September 9, a thin crescent Moon will pass close to brilliant Jupiter (-1.82 magnitude) in the eastern pre-dawn sky. Jupiter will be easily visible to the naked eye, while binoculars or a telescope can reveal its four bright Galilean moons. The large brightness difference between the delicate crescent Moon and Jupiter will make this an especially striking conjunction.



Place: Chennai / Date: 09th September / Time: 05:30 a.m.

Conjunction of Moon and Saturn

On September 27, the nearly full Moon will appear near Saturn (about +0.3 magnitude) in the eastern evening sky. Both will be visible to the naked eye, while binoculars will provide a clearer view and a telescope can reveal Saturn's distinctive rings. The bright Moon may make Saturn slightly harder to pick out, so observing from a darker location will improve the view.



Place: Chennai / Date: 27th September / Time: 07:00 p.m.

ASK THE UNIVERSE

Who made this universe and are we alone in this whole universe? (Question by Divyansh)

The universe began about 13.8 billion years ago with the Big Bang, but scientists are still studying what caused it. We do not yet know if someone or something "made" the universe. As for life beyond Earth, scientists are searching for signs of life on other planets and moons. The universe is incredibly vast, with billions of galaxies and countless stars and planets. So far, Earth is the only place where we have confirmed life. We may not be alone, but there is no confirmed evidence of extraterrestrial life yet. The search continues!

What is the difference between meteor , meteoroids and meteorite? (Question by Vihaan Verma)

We know the universe is expanding because distant galaxies are moving away from us, and their light is stretched toward red wavelengths (called redshift).

For very distant galaxies, space itself can expand so quickly that their distance from us increases faster than the speed of light. This does not break Einstein's rule because the galaxies are not moving through space faster than light space between us is expanding.

Is there any other element of life in our universe apart from us like aliens? (Question by Devansh Dua)

We don't know yet if aliens or other forms of life exist beyond Earth.
Scientists have found water, carbon, and organic molecules in many places in space ingredients that can support life. But no extraterrestrial life has been confirmed so far.

What is big bang? (Question by Samreen Khan)

The Big Bang is the scientific explanation for how our universe began about 13.8 billion years ago. The universe started in an extremely hot and dense state and then began expanding. As it expanded, it cooled and formed galaxies, stars, planets, and eventually life.

Is there a another planet like Earth. Why Earth alone has life and how, when and where does it started? (Question by Syed Zamin Hussain)

Scientists have found thousands of planets beyond our solar system, and some may have Earth like conditions. But Earth is the only planet where life is confirmed.
Life began on Earth over 3.5 billion years ago, possibly in the ancient oceans. Scientists are still studying how life first began and whether aliens exist elsewhere.

ASK THE UNIVERSE

How many black and white holes are there in the universe? (Question By Abhishri Singh)

Scientists think there may be millions or even billions of black holes in our galaxy alone, and many more across the universe. However, we cannot see black holes directly—we detect them by observing their effects on nearby matter and light.

White holes are still theoretical. No white hole has ever been observed, so scientists do not know if any exist or how many there could be.

How was the Universe born ? (Question By Anirudh Singh)

The universe began about 13.8 billion years ago with the Big Bang. It started in an extremely hot, dense state and began expanding rapidly. As the universe expanded, it cooled, allowing particles, atoms, stars, galaxies, and planets to form over billions of years.
Scientists study the cosmic microwave background, galaxy movement, and the abundance of light elements to understand this history.

What is the difference between quasars and black holes, and how and why do they form? (Question by Tejas Maurya)

A black hole is a region of space with extremely strong gravity that even light cannot escape. A quasar is a very bright object powered by a supermassive black hole, as hot gas and dust fall toward it. Black holes form through processes such as the collapse of massive stars, while supermassive black holes grow by gathering matter over time.

Do white holes exist? (Question by Tejas Maurya)

White holes are theoretical objects that would work opposite to black holes—they could let matter and energy out but nothing could enter. So far, no white holes have been observed, and scientists are still exploring whether they could exist.

How do Rockets launch the Satellite? (Question by Kritika Gupta)

A rocket carries a satellite into space using powerful engines. It first lifts off from Earth, passes through the atmosphere, and continues upward. The rocket then gives the satellite the right speed and direction to enter orbit. Finally, the satellite is released into space and uses its own systems to stay in orbit and perform its mission.

September

THIS MONTH IN HISTORY

ADITYA-L1 LAUNCHED

02
SEP 2023

On 2 September 2023, ISRO successfully launched Aditya-L1, India's first space-based mission dedicated to studying the Sun. The spacecraft was launched aboard the PSLV-C57 from the Satish Dhawan Space Centre in Sriharikota. Aditya-L1 carries seven scientific payloads designed to study the Sun's photosphere, chromosphere, and corona. It was placed into an Earth-bound elliptical orbit before beginning its journey toward the Sun-Earth Lagrange Point 1 (L1), about 1.5 million kilometers from Earth.(image credit: www.isro.gov.in)



VOYAGER 1 LAUNCHED



On 5 September 1977, NASA launched Voyager 1 aboard a Titan IIIE/Centaur rocket from Kennedy Space Center. The spacecraft was designed to explore the outer planets and made historic flybys of Jupiter and Saturn, revealing new details about their atmospheres, rings, and moons. Voyager 1 later became the first human-made object to enter interstellar space. It continues to communicate with Earth from the distant reaches of the Solar System, making it one of humanity's longest-running space missions.(image credit: nix.nasa.gov)

05
SEP 1977

SURVEYOR 5 LAUNCHED

08
SEP 1967

On 8 September 1967, NASA launched Surveyor 5, one of a series of robotic spacecraft designed to investigate the Moon before the Apollo missions. It successfully soft-landed in the Sea of Tranquility three days later and returned more than 19,000 photographs while also analyzing the chemical composition of the lunar surface. Its observations helped scientists understand lunar soil and terrain and provided valuable information for selecting safe landing locations for future human missions. (image credit: NASA)



September

THIS MONTH IN HISTORY

08
SEP
2016

OSIRIS-REX LAUNCHED

On 8 September 2016, NASA launched OSIRIS-REx, a pioneering mission to the near-Earth asteroid Bennu. The spacecraft was designed to study the asteroid and collect a sample from its surface for return to Earth. After reaching Bennu in 2018, OSIRIS-REx carefully mapped the asteroid and successfully collected material in 2020. Its sample returned to Earth in 2023, giving scientists pristine material from an ancient Solar System body.(image credit: United Launch Alliance)





PSLV-C21 LAUNCH

On 9 September 2012, ISRO successfully launched PSLV-C21, carrying the French satellite SPOT-6 along with India's PROITERES satellite. The mission demonstrated the versatility of the Polar Satellite Launch Vehicle (PSLV) for launching both Indian and international spacecraft. PSLV subsequently became one of the world's most reliable launch vehicles, supporting India's Earth-observation, navigation, planetary, and space-science missions while also carrying satellites for international customers.(image credit: isro.gov.in)

09
SEP
2012

12
SEP
1966

GEMINI 11 LAUNCHED

On 12 September 1966, NASA launched Gemini 11, carrying astronauts Charles Conrad Jr. and Richard Gordon. The mission successfully rendezvoused and docked with an Agena target vehicle and achieved an altitude of about 1,369 kilometers, then the highest altitude reached by humans at that time. The astronauts also conducted spacewalks and tested techniques for generating artificial gravity. Gemini 11 provided important experience for the upcoming Apollo missions to the Moon.(image credit: NASA/KSC)



September

THIS MONTH IN HISTORY

19 SEP 1982

ASTEROID 5841 DISCOVERED

On 19 September 1982, astronomer Eleanor F. Helin discovered an asteroid in the inner main asteroid belt at Palomar Observatory. The object was later named 5841 Stone in honor of physicist and planetary scientist Edward C. Stone, who played a major role in NASA's Voyager program. The naming connected asteroid astronomy with the history of planetary exploration and recognized Stone's enormous contribution to our understanding of the outer Solar System.(image credit: alchetron.com)





20 SEP 1993

FIRST PSLV FLIGHT

On 20 September 1993, ISRO conducted the maiden developmental flight of the Polar Satellite Launch Vehicle (PSLV) from Sriharikota. Although the mission did not successfully place its payload into orbit, it provided valuable engineering experience for improving the vehicle. PSLV later became one of India's most successful launch systems and earned the nickname "workhorse of ISRO." Its development was a crucial step toward India's independent capability to launch satellites into polar and other Earth orbits.(image credit: ISRO)

21 SEP 2003

GALILEO MISSION ENDED

On 21 September 2003, NASA's Galileo spacecraft ended its historic mission by entering Jupiter's atmosphere. Galileo had spent years studying Jupiter and its major moons, including Europa, Io, and Ganymede. Its observations provided strong evidence for a subsurface saltwater ocean beneath Europa's icy crust and revealed volcanic activity on Io. The spacecraft was intentionally destroyed to prevent it from accidentally contaminating Europa, which remains a major target in the search for habitable environments. (image credit: jpl.nasa.gov)



September

THIS MONTH IN HISTORY

23 SEP 2009

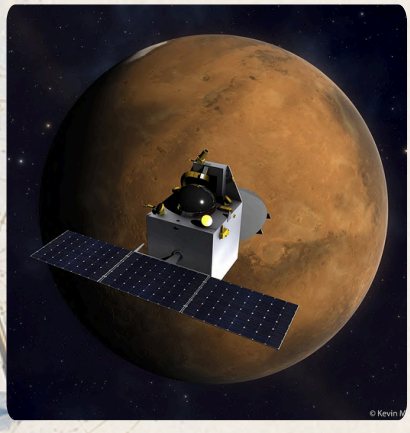
OCEANSAT-2 LAUNCHED

On 23 September 2009, ISRO successfully launched Oceansat-2 aboard PSLV-C14 from Sriharikota. The satellite was designed to study Earth's oceans and atmosphere, supporting applications such as ocean-color monitoring, marine resource assessment, and weather-related research. It also carried six international nanosatellites as secondary payloads. Oceansat-2 strengthened India's ability to use space-based observations for understanding and monitoring Earth's oceans and their interaction with the atmosphere.(image credit: www.isro.gov.in)



24 SEP 2014

MARS ORBITER ON MARS



On 24 September 2014, India's Mars Orbiter Mission (Mangalyaan) successfully entered orbit around Mars on its first attempt. India became the fourth space agency to successfully place a spacecraft in Martian orbit. The mission studied the Martian surface, atmosphere, and exosphere while demonstrating India's ability to conduct interplanetary missions. Designed for only six months, the spacecraft operated for years and became one of India's most celebrated achievements in planetary exploration.(image credit: en.wikipedia.org)

26 SEP 2018

DATA FROM ASTROSAT

On 26 September 2018, ISRO made the archival scientific data from AstroSat available to researchers around the world. AstroSat is India's first dedicated space astronomy observatory and observes celestial objects across ultraviolet, optical, and X-ray wavelengths. Making its data publicly accessible expanded opportunities for astronomers to study objects such as supernova remnants, active galactic nuclei, and galaxy clusters, India's contribution to international astronomical research.(image credit: ISRO)



STORIES OF INDIA'S GREATEST MINDS

DR. U. R. RAO

THE MAN WHO HELPED INDIA REACH FOR THE STARS



Dr. Udupi Ramachandra Rao (1932–2017) was a pioneering Indian space scientist and one of the key leaders who helped shape India's journey into space. Fondly known as U. R. Rao, he believed that space technology should not only explore the universe but also solve problems and improve life on Earth.

Dr. Rao began his remarkable career under the guidance of Dr. Vikram Sarabhai, the father of the Indian space programme. He played an important role in developing Aryabhata, India's first satellite, which was successfully launched in 1975. The mission demonstrated India's growing ability to design and build satellites and marked a major milestone in the nation's space journey.

In 1984, Dr. Rao became the Chairman of the Indian Space Research Organisation (ISRO). During his leadership, India made significant progress in satellite technology and launch systems. He guided the development and expansion of the INSAT satellite system, which transformed communication, television broadcasting, meteorological services and telecommunications across the country.

He also played a major role in strengthening the Indian Remote Sensing (IRS) satellite programme. These satellites provided valuable information for agriculture, water-resource management, forestry, land-use planning and disaster management.

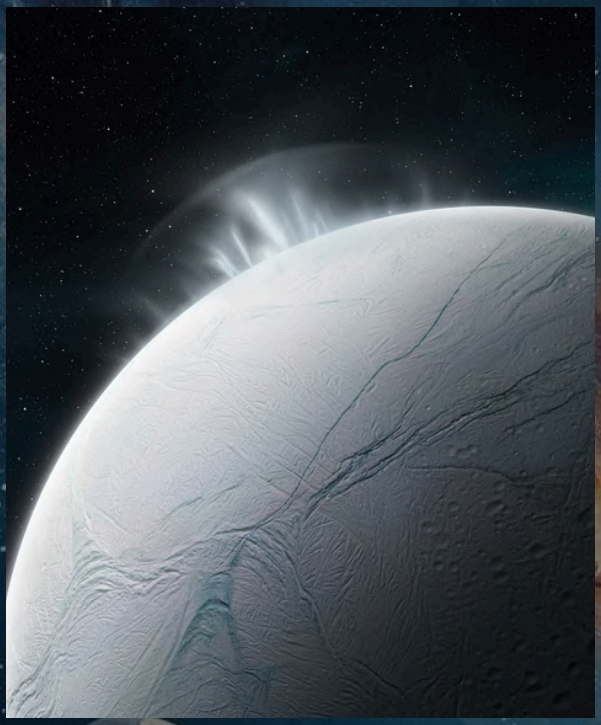
Dr. Rao's vision helped make India more self-reliant in space technology. His contributions extended beyond satellites, inspiring generations of scientists and strengthening India's position in the global space community.

For his outstanding contributions, he received several prestigious honours, including the Padma Bhushan and Padma Vibhushan. Dr. U. R. Rao's legacy continues to inspire young minds to dream, discover and reach for the stars.

ASTRONOMY & SPACE TERM

CRYOVOLCANISM

VOLCANOES OF ICE



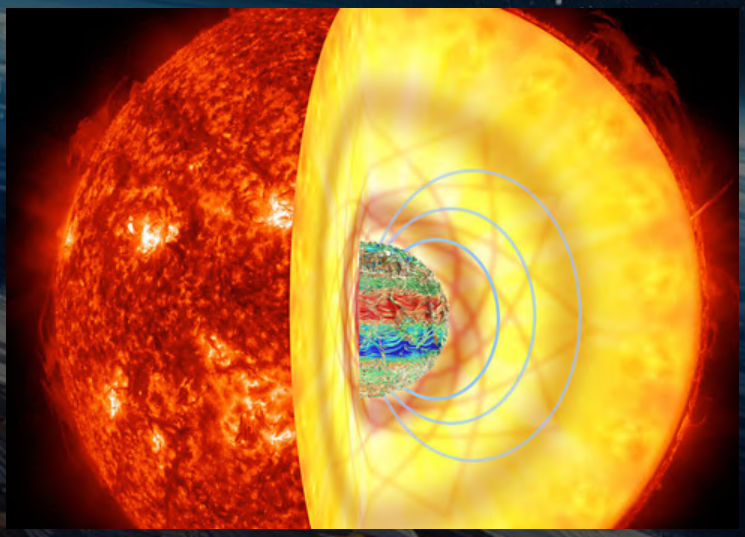
Cryovolcanism, often called ice volcanism, is a process in which icy worlds erupt substances such as water, ammonia, or methane instead of molten rock. It occurs on some moons and dwarf planets in the cold outer regions of the Solar System, including Enceladus, Europa, and Pluto. The material beneath the surface can be warmed by internal heat and pressure, eventually escaping through cracks or vents as icy plumes. Cryovolcanism provides scientists with valuable clues about the hidden interiors of these worlds and may even help us understand environments where the conditions necessary for life could exist.

ASTEROSEISMOLOGY

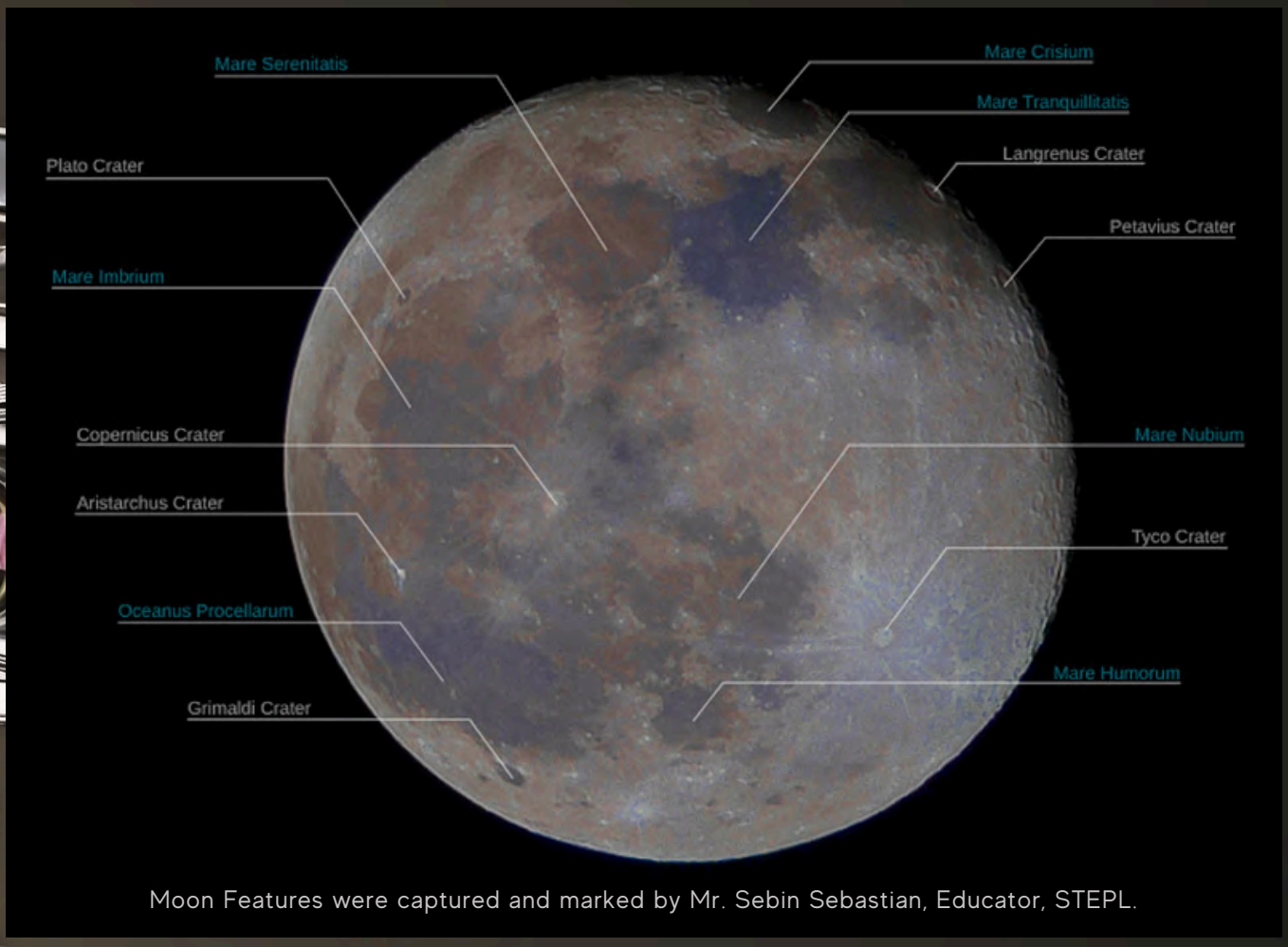
LISTENING TO THE MUSIC OF STARS

Asteroseismology is the study of vibrations and oscillations within stars. Just as earthquakes help scientists understand Earth's interior, tiny pulsations on a star's surface can reveal what is happening deep inside it.

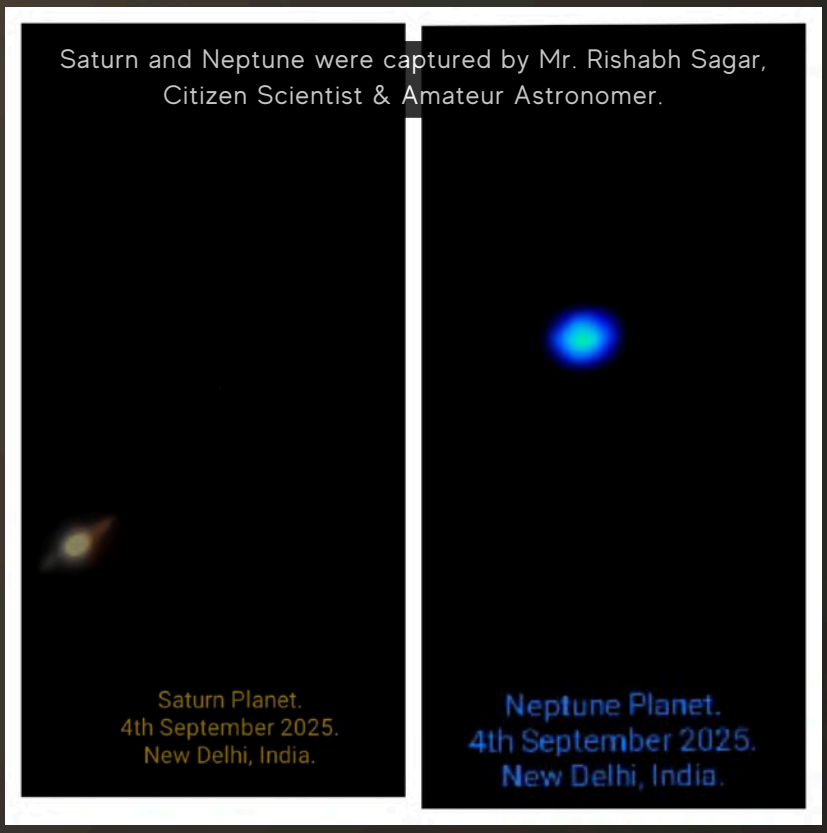
By studying these subtle changes in a star's brightness and movement, astronomers can determine its mass, size, age, and internal structure. This fascinating field allows scientists to effectively "listen" to the vibrations of stars, helping us better understand how they form, evolve, and eventually reach the end of their lives.



ASTROPHOTOGRAPHY BY SPACE TEAM

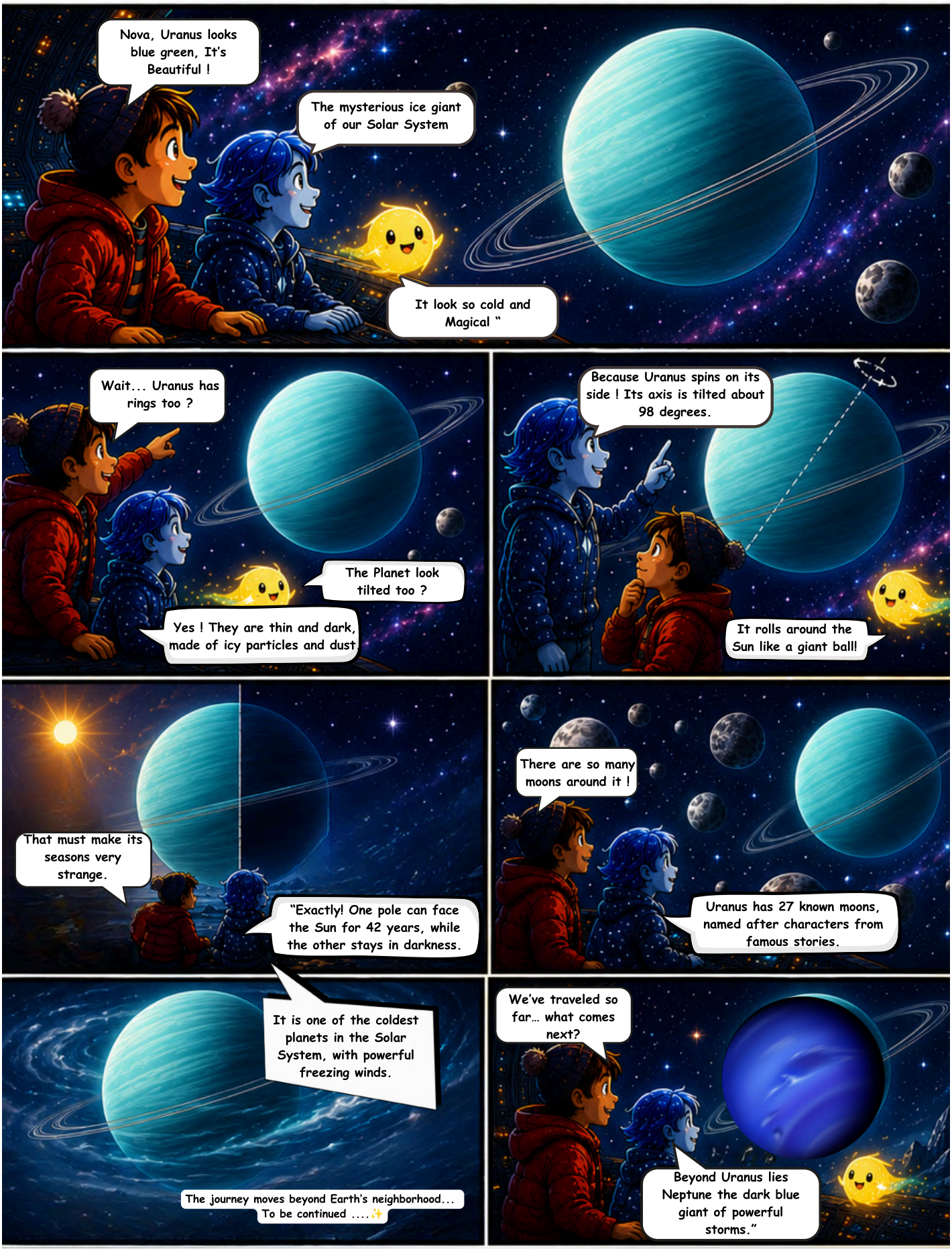


Moon Features were captured and marked by Mr. Sebin Sebastian, Educator, STEPL.



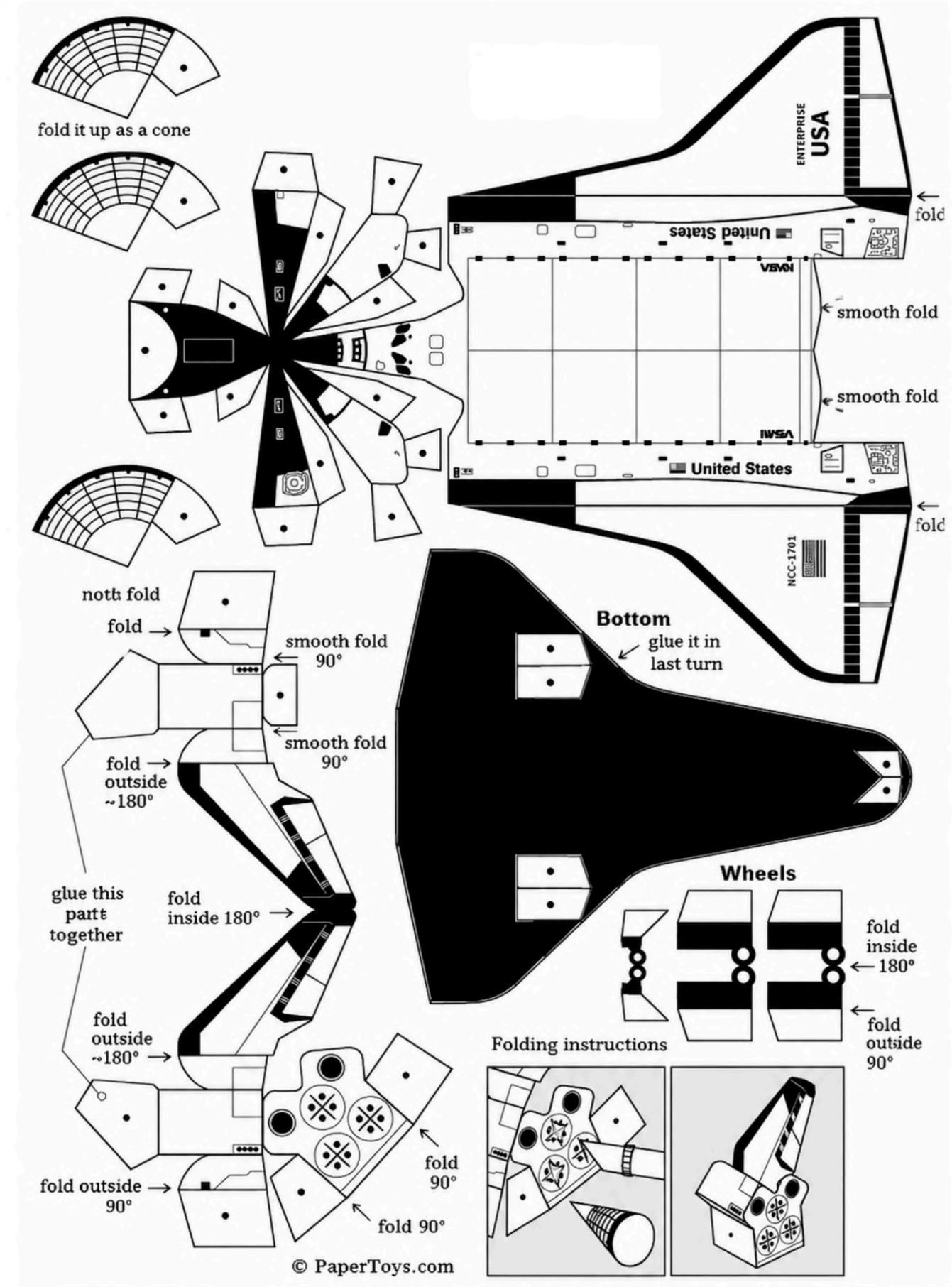
Saturn and Neptune were captured by Mr. Rishabh Sagar, Citizen Scientist & Amateur Astronomer.

COSMIC JOURNEY- A FROZEN FRONTIER



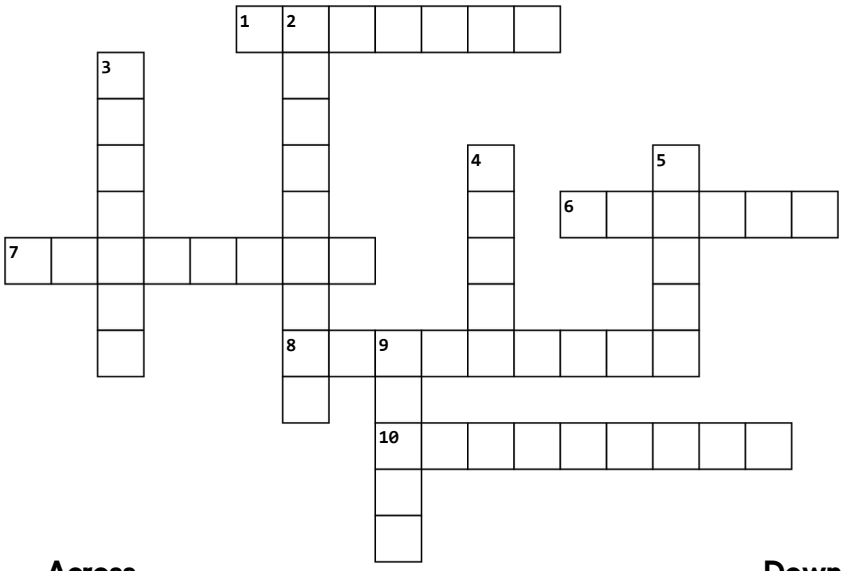
MISSION: DO IT YOURSELF

SPACE SHUTTLE



TRAIN YOUR BRAIN

CROSSWORD



Across

1. Which NASA telescope provided X-ray observations of the Saguaro?

6. Which Indian space docking experiment reportedly lost a project leader during the recent ISRO departures?

7. Who is known as the "Father of the Indian Space Program"?

8. What process occurs when a supermassive black hole rapidly gains material?

10. What is the other name given to Japan's Quasi-Zenith Satellite System?

Down

2. Which city is home to Skyroot Aerospace?

3. Which rocket was struck by lightning twice during Apollo 12?

4. In which country was the WINERED Spectrograph used to observe LHS 1140 b?

5. Who received the Nobel Prize in Physics in the year 1930?

9. What celestial object did Vainu Bappu co- discover?

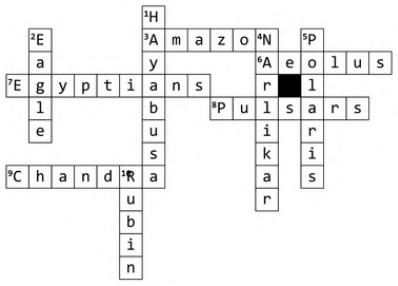
Astronomy Word Puzzle

Land-based Observatories

K	A	A	D	A	V	U	D	E	A	A	J	N	U
N	E	H	E	E	L	K	J	R	D	A	N	N	R
R	A	A	C	I	P	E	U	E	N	I	I	E	O
A	A	E	L	N	L	B	T	Y	L	A	E	U	T
H	C	S	O	K	N	T	N	U	N	E	A	T	N
L	A	A	P	H	O	I	P	O	N	K	O	M	A
N	A	L	A	O	A	H	A	N	E	A	S	U	N
A	A	A	E	A	C	R	R	I	I	N	E	C	J
N	A	R	C	A	I	C	A	I	I	U	K	H	A
N	K	E	H	T	K	E	N	E	J	A	R	A	H
U	T	C	N	E	I	A	A	C	A	M	A	C	C
Y	K	I	L	R	O	O	L	C	A	L	P	H	R
I	L	B	H	H	O	H	L	A	U	P	L	O	C
C	I	O	A	V	L	B	I	R	T	A	H	S	R

TEIDE
MAUNAKEA
PARANAL
KPNO
CTIO
CHAJNANTOR
MUCHACHOS
ARECIBO
VLBI
HALEAKALA
INOUYE
PARKES
YUNNAN

Answers for last month puzzles.





****Answers for this month puzzles will be shared in next magazine.**



GALACTICA MAGAZINE

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