SPACE™
EMPOWERING LIFE

OCTOBER 2026
Volume 5 | Issue X

Galactica

Astronomy and Space Science Magazine



What's Inside?

SPACE Insights
Highlights From September 2026
Moon Phases And Planet Visibility
What's Awaiting in October 2026
Space Paradoxes
Setbacks That Built Space Success
Stories of India's Greatest Minds
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Student's Corner
Astronomy & Space Term
October Born Legends
Mission: Do It Yourself
Train Your Brain

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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

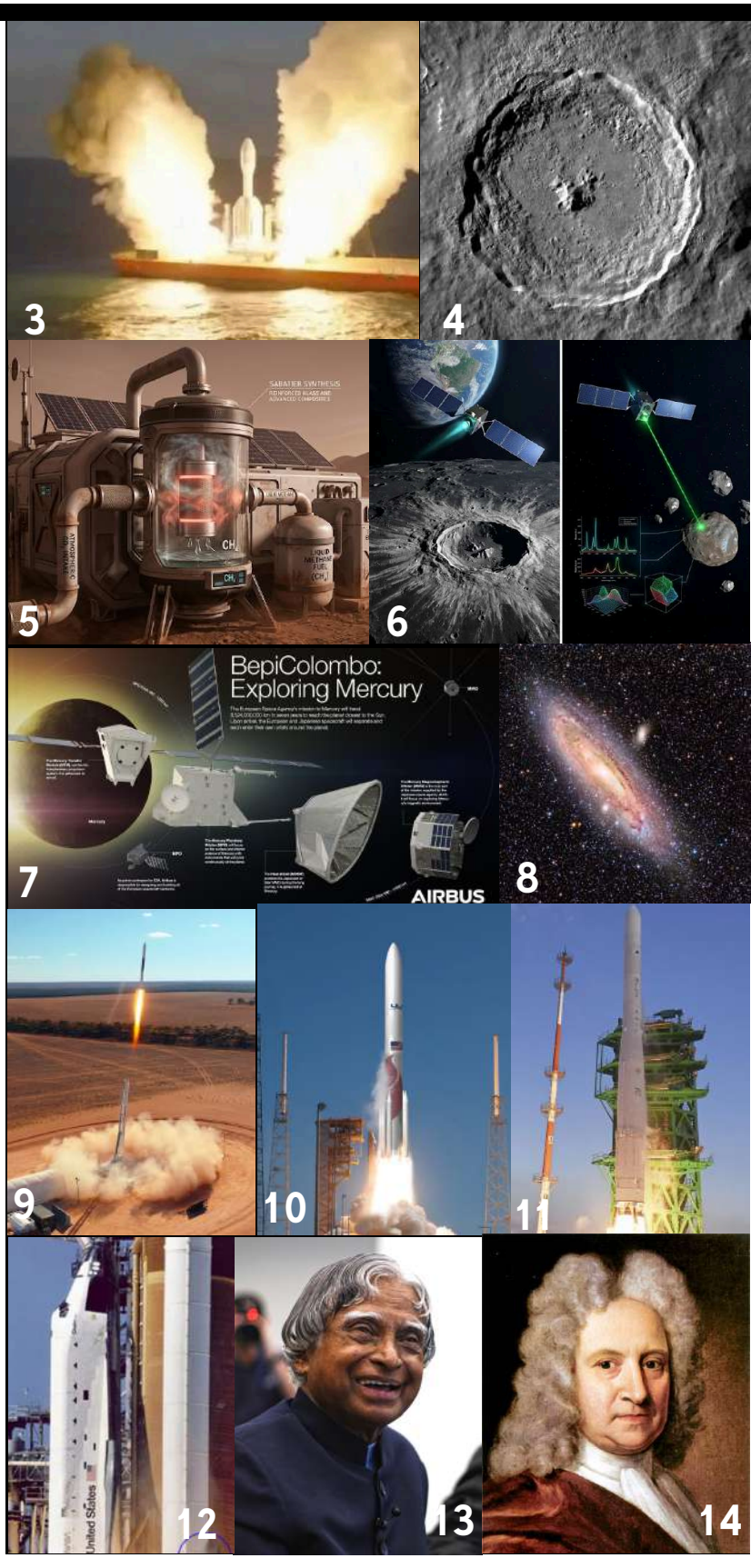


Ms. Shalini Bahmba, Co-founder, SPACE

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.

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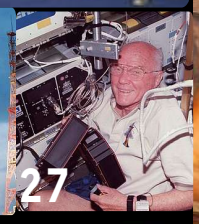


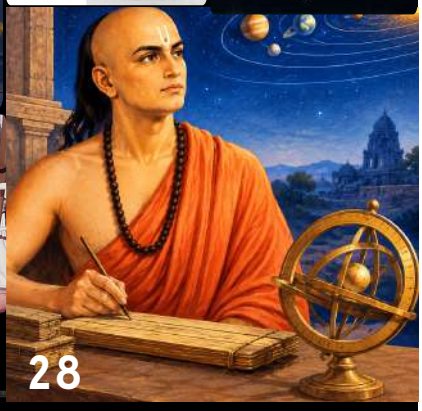




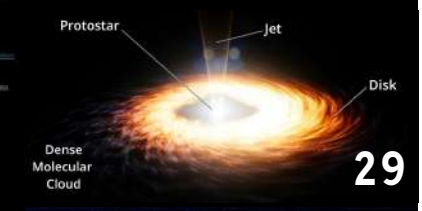














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World Space Week OCTOBER 4-10

Rocket Revolution

From **4-10 October 2026,** the world comes together to celebrate **World Space Week**, highlighting the incredible role of space science and technology in shaping our future. This year, SPACE India brings the celebration to classrooms and communities under the theme "**Rocket Revolution**."

Led by **Dr. Sachin Bahmba, National Coordinator – World Space Week India 2026 and Founder & CMD, SPACE Group of Companies,** the initiative aims to inspire young minds to explore space through creativity, observation, experimentation and innovation.

Students across different age groups can participate in a range of national-level competitions and programmes. Young astronomy enthusiasts can capture the connection between rockets, satellites and the night sky through The Flame & The Stars – National Astrophotography Competition. Students from Classes I–VIII can bring their imagination to life through the National Astro Toon Competition, while Classes IX–XII can transform space concepts into engaging visuals through the Space Infographics Competition.

For budding engineers, the Water Rocketry Competition & Training Programme offers an opportunity to design, build and launch their own rockets. Meanwhile, students from Classes VI–VIII can sharpen their communication and critical thinking skills through the Kalam Debate Competition.

Through these diverse opportunities, World Space Week India 2026 encourages students to move beyond textbooks—to observe, create, question, design, experiment and discover the future of space exploration.

Competition	Eligible Participants	Mode	What Students Will Do	Registration Link
The Flame & The Stars – National Astrophotography Competition	Students / Youth & Astronomy Enthusiasts*	Online	Capture original photographs connecting rockets, satellites, or human-made space technology with the sky.	Register Here
National Astro Toon Competition 2026	Classes I–VIII	Online	Create original cartoons or comic stories interpreting the theme **"Rocket Revolution."**	Register Here
Space Infographics Competition	Classes IX–XII*	Online	Transform concepts related to rockets and space innovation into engaging visual infographics.	Register Here
Water Rocketry Competition & Training Programme	Classes VI–IX	Physical	Learn the science of rocketry and design, build, and launch a water rocket.	Register Here
Kalam Debate Competition 2026	Classes VI–VIII	Physical	Prepare both **FOR** and **AGAINST** a space-related motion; the final side will be revealed at the venue.	Register Here

For any queries or concerns, please feel free to reach out to us at outreach.delhi@space-india.com or 95997 47721.

EXPLORING THE COSMOS: SPACE ARCADE'S MONTHLY TELESCOPIC OBSERVATION

Space Arcade successfully conducted its Monthly Telescopic Observation Session in Chennai, bringing together curious participants eager to explore the night sky . Unfortunately, the parallel session scheduled in Delhi had to be cancelled due to unfavorable weather conditions.

Despite the smaller group, the evening proved to be an enriching experience. Attendees had the opportunity to observe both the Moon and Saturn, with clear skies allowing for a detailed view of lunar features and a brief but captivating glimpse of the Ringed Planet. The session featured a range of telescopes, including: Space Voyage 130 EQ Reflector Telescope, 8" SCT Computerized GoTo Telescope, Space Launcher 76mm Reflector Telescope, Space Launcher 60mm Refractor Telescope.

Participants were guided by the SPACE ARCADE team in operating the instruments and learning about their distinct capabilities and optical systems. The hands-on approach enabled participants to gain a deeper appreciation of astronomical observation and telescope functionality.







Follow us on Instagram to stay updated on future events: @SpaceArcadeInd

HIGHLIGHTS OF SEPTEMBER 2026

Orbital Marathon: China Fired Four Different Rockets in 45 Hours



China recently demonstrated its growing spacefaring agility by launching four distinct rocket models from three separate sites in just 45 hours, placing 30 satellites into orbit. The marathon highlighted a seamless orchestration between state-backed aerospace giants and agile private pioneers.
Launch Sequence Breakdown

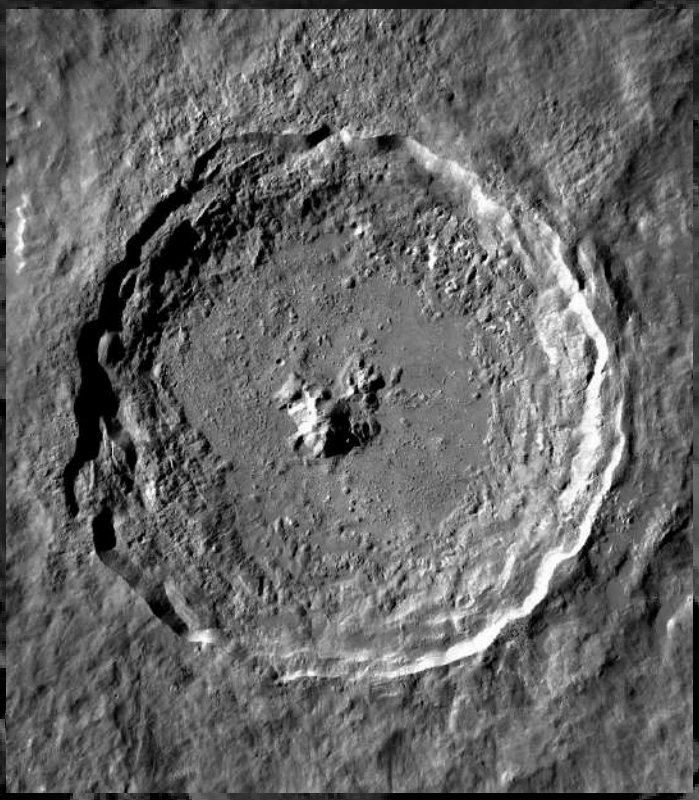
The action began at the Jiuquan Satellite Launch Center with LandSpace's methane-fueled Zhuque-2E delivering 10 Qianfan broadband satellites. Hours later, commercial rival Orienspace launched its solid-fueled Gravity-1 from a sea barge off Shanghai, adding nine more Qianfan payloads.

The state sector quickly maintained the tempo. A Long March 12 rocket lifted off from tropical Wenchang with nine satellites for the national SatNet network, before a Kuaizhou-11 solid-fuel rocket capped the surge back at Jiuquan with two Earth-observation satellites.

Coordinating four unique vehicle architectures across desert, island, and sea sites demonstrates immense logistical mastery. As global constellations expand, this blitz signals China's transition toward rapid, on-demand orbital deployment.

Moon’s Fresh Scar: NASA Orbiter Spots the Largest New Lunar Crater in a Century

An asteroid the size of a six-story building slammed into the Moon's eastern edge, carving out a fresh scar larger than Rome’s Colosseum.



Officially named McGetchin, the giant impact crater measures roughly 728 feet (222 meters) wide and 141 feet (43 meters) deep—deep enough to stack three school buses vertically. Discovered by scientists analyzing high-resolution images from NASA’s Lunar Reconnaissance Orbiter (LRO), it is the single largest newly formed impact crater identified in the Solar System.

The collision occurred between April and May 2024, releasing tremendous kinetic energy. Because the Moon lacks an atmosphere to burn up incoming space rocks, the impactor struck at full speed. The resulting blast did far more than hollow out a massive pit.it fundamentally altered the surrounding terrain:

- Massive Blast Radius: Debris and displaced lunar soil (regolith) were violently hurled over 100 kilometers across the surface.
- Thermal Shockwave: Thermal sensors revealed a 4-mile-wide "cold spot" around the crater. The impact fluffed and loosened the topsoil, rendering it far less dense and reducing its capacity to retain heat overnight.

Statistically, an impact of this magnitude happens only about once every century. Beyond giving geologists a front-row seat to active lunar processes, this fresh scar provides critical safety data. As space agencies prepare long-term habitats for future astronauts, understanding how far high-speed debris flies during rare, violent strikes is vital for protecting lunar bases.

Mining the Sky: Now Engineers Will Make Rocket Fuel Out of Martian Air



Hauling enough fuel from Earth to launch a rocket back home from Mars is an engineer's nightmare. The weight of that extra propellant makes the initial voyage nearly impossible. The solution? Don't bring the fuel—make it on Mars out of thin air.

This process relies on a strategy called In-Situ Resource Utilization (ISRU). Despite its extreme thinness—less than 1% of Earth's surface pressure—the Martian atmosphere is roughly 95% carbon dioxide (CO_2). That CO_2 holds the key to generating both the fuel and the oxidizer required to power a return launch vehicle.

The process begins by harvesting the surrounding air:

- Oxygen Extraction: Using Solid Oxide Electrolysis (demonstrated on Mars by NASA's MOXIE experiment aboard the Perseverance rover), heavy-duty compressors pull in CO_2 and heat it to around 800°C. Electricity splits the molecules into carbon monoxide and oxygen (O_2). Liquefied oxygen accounts for up to 78% of a rocket's total propellant mass, making on-site production a game-changer.

- Methane Fuel Synthesis: Combining atmospheric carbon dioxide with hydrogen—either transported from Earth or extracted from local sub-surface ice—triggers the Sabatier reaction. At elevated temperatures, CO_2 and hydrogen (H_2) react to produce methane (CH_4) and water (H_2O). The water is then electrolyzed into hydrogen (recycled back into the system) and additional oxygen.

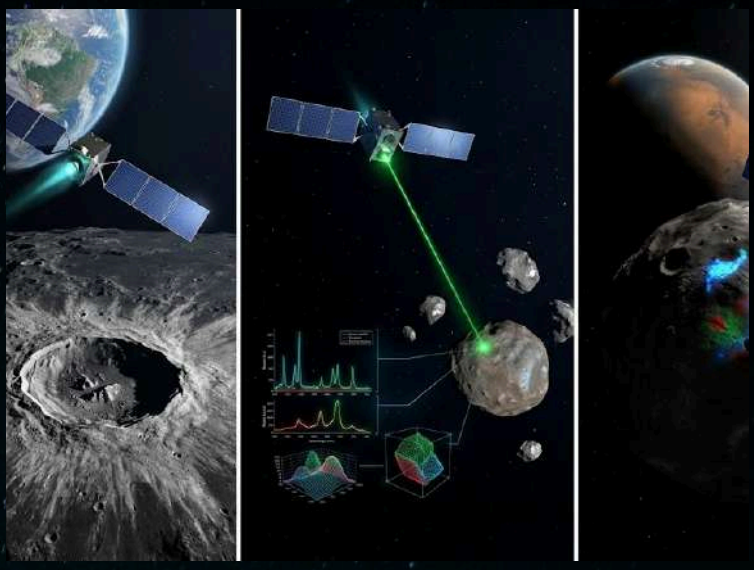
By pairing liquid methane with liquid oxygen, engineers create the exact cryogenic propellant mixture used by modern interplanetary ships. Transforming Mars' toxic, thin air into a high-powered launchpad moves human deep-space exploration from science fiction into a practical reality.

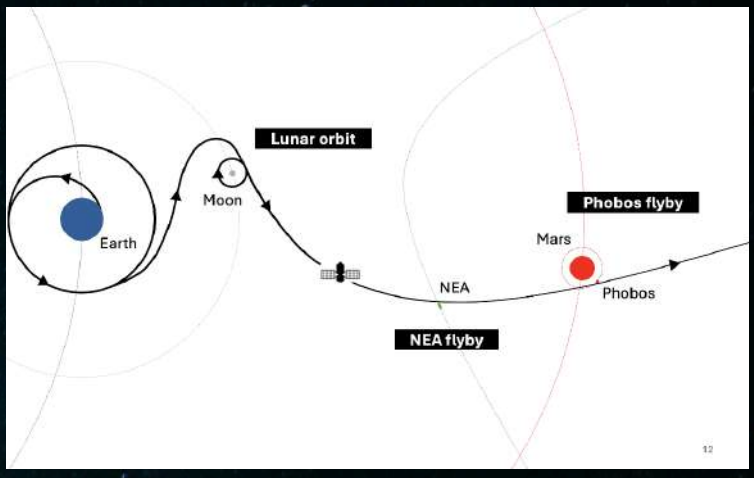
Interworld Slingshot: NASA's Futuristic Concept for Mapping Deep-Space Resources

Before humanity sets up permanent bases on the Moon or harvests valuable metals from asteroids, space agencies face a multi-billion-dollar dilemma: how do we know where to dig? Landing on a resource-poor crater could derail an entire exploration program. To solve this, NASA's Innovative Advanced Concepts (NIAC) program has funded an ambitious new study known as Interworld Slingshot Resource Surveys.

Led by Dr. Pablo Sobron of the SETI Institute, the project aims to build a 300-kilogram, refrigerator-sized probe designed to scout multiple celestial bodies in a single trip. Powered by solar-electric propulsion and using gravitational "slingshots," the spacecraft would embark on a grand tour—analyzing water ice and ilmenite on the Moon, probing metals on a near-Earth asteroid, and mapping volatile compounds on the Martian moon Phobos.

The real technological leap lies in its primary scientific instrument. The spacecraft aims to bring "Landsat-style" orbital mineral mapping to deep space using Raman spectroscopy.





While NASA's Perseverance rover on Mars already uses Raman instruments to identify rock compositions up close, "Slingshot" would perform this analysis from 30 to 50 kilometers (19 to 31 miles) above a planet's surface.

By firing a laser and capturing faint, scattered light signatures that reveal molecular structure, the probe could map essential minerals without ever landing. Detecting these faint photon shifts across vast distances presents a massive engineering challenge—only about one photon in 10 trillion undergoes Raman scattering.

If the Phase 1 study proves successful, this reconnaissance technique could transform deep-space logistics. Providing accurate, remote mineral intelligence before astronauts ever touch down ensures future missions land exactly where the most valuable cosmic resources await.

Escaping the Sun: BepiColombo Begins Its Awaited Mercury Orbital Capture

Nearly eight years after blasting off from French Guiana in October 2018, the joint European Space Agency (ESA) and Japan Aerospace Exploration Agency (JAXA) BepiColombo mission has officially entered its grand finale. Ground control teams have kicked off the complex sequence that will place two distinct scientific probes into orbit around Mercury, the Solar System's innermost, most enigmatic world.

Reaching Mercury is a masterclass in gravitational gymnastics. Because falling inward toward the Sun causes a spacecraft to pick up immense speed, BepiColombo had to repeatedly slam on the cosmic brakes. Over its multi-billion-mile journey, the spacecraft executed nine planetary flybys—one of Earth, two of Venus, and six of Mercury itself—shading off kinetic energy until the planet's faint gravitational grip could take over.

The transition to the arrival phase began as the Mercury Transfer Module—the ion-propelled workhorse that ferried the mission across the void—prepared to release its twin payloads. "It will basically be a new mission starting today," declared ESA operations leadership as telemetry confirmed the milestone, opening a six-month stretch of precise orbital burns and staging maneuvers.

The upcoming science payoff is unprecedented. ESA's Mercury Planetary Orbiter will map the planet's scorched surface and oversized iron core, while JAXA's Mio orbiter will study its unique magnetosphere.

Working in tandem from dual polar orbits, BepiColombo will soon unlock the mysteries of volatile water ice hidden inside dark polar craters and reveal how the tiny planet survives under the Sun's unrelenting furnace.



WHAT'S UP IN THE SKY - OCTOBER 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
Not easily visible because it stays close to the Sun and is best observed shortly after sunset.

Venus
Not visible for most of Oct. Inferior conjunction on 24 Oct. Rises 46 minutes before sunrise on 31 Oct.

Mars
Morning planet, rising before midnight. Close to Moon on 5 Oct.

Jupiter
Morning planet in Leo. Midway between Mars and Regulus at month end

Saturn
Opposition on 4 Oct. Mag. +0.1 in Cetus. 94%-lit waxing gibbous Moon near 24 Oct.

Uranus
Reaches peak altitude in darkness all month. Mag. +5.6 in Taurus.

Neptune
Shines at mag. +7.8 in Pisces near the Circlet asterism.

BRIGHT DEEP SKY OBJECTS



Messier 25 (M25) is a bright, prominent open cluster located in Sagittarius constellation. The cluster lies at a distance of 2,000 light years from Earth and has an apparent magnitude of 4.6. Its designation in the Index Catalogue is IC 4725. It lies 6.5 degrees north and a little east of Lambda Sagittarii, the star that marks the top of the Teapot asterism in Sagittarius.



Lagoon Nebula (M8) was discovered in 1654 by the Italian astronomer Giovanni, sought to catalog nebulous objects in the night sky so they would not be mistaken for comets. This star-forming cloud of interstellar gas is located in the constellation Sagittarius and its apparent magnitude of 6 makes it faintly visible to the naked eye in dark skies.



This Hubble image of M92's core is a composite made using observations at visible and infrared wavelengths. Located 27,000 light-years from Earth in the constellation Hercules, this globular cluster - a ball of stars that orbits our galaxy's core like a satellite – was first discovered by the German astronomer Johann Elert Bode in 1777.



The Andromeda Galaxy is a barred spiral galaxy and is the nearest major galaxy to the Milky Way. It was originally named the Andromeda Nebula and is cataloged as Messier 31, M31, and NGC 224. Andromeda has a diameter of about 152,000 light-years and is approximately 2.5 million light-years from Earth.

ROCKET LAUNCHES IN OCTOBER 2026

SR75 FLIGHT 2: GERMANY'S NEXT STEP TOWARDS HYBRID ROCKET INNOVATION

SR75 Flight 2 is the second flight of the SR75 suborbital sounding rocket, developed by German aerospace company HyImpulse Technologies. The mission is currently targeted for 5 October 2026, from SaxaVord Spaceport in the Shetland Islands, Scotland. It is planned as a suborbital test flight to further demonstrate the rocket's performance and capabilities.


SR75 Flight 2
(Credit: hyimpulse)

The SR75 is a single-stage rocket measuring about 12–13 metres in length and powered by the HyPLOX-75 hybrid engine. It uses paraffin fuel and liquid oxygen (LOX) to produce approximately 75 kN of thrust. The vehicle is designed to carry scientific and technology payloads to altitudes of around 200–250 km and provide valuable microgravity conditions.

The main objective of Flight 2 is to validate the SR75's hybrid propulsion, flight performance and recovery systems. The mission will also provide important experience for HyImpulse's future SL1 orbital launcher, helping advance Germany's capabilities in small-satellite launch and commercial suborbital research.

AMAZON LEO (LE-04): EXPANDING GLOBAL CONNECTIVITY FROM ORBIT


Ariane 64 Block 2
(Credit: spacenexus)

Amazon Leo (LE-04) is the fourth European launch dedicated to deploying satellites for Amazon's Leo broadband constellation, formerly known as Project Kuiper. The mission is planned to launch in October 7th, 2026 from the Guiana Space Centre in French Guiana, South America. The satellites will be placed into Low Earth Orbit (LEO) to expand Amazon Leo's global internet network.

The mission will use Ariane 64 Block 2, the four-booster configuration of Europe's Ariane 6 launch vehicle, operated by Arianespace. The Ariane 64 is designed for high-capacity missions and uses four solid-propellant boosters to provide additional thrust during liftoff. The upgraded Block 2 configuration is intended to improve the launcher's performance for demanding commercial missions.

The primary purpose of LE-04 is to deploy additional Amazon Leo satellites that will form part of a large LEO constellation designed to provide fast and reliable broadband connectivity to users, including communities with limited access to traditional internet infrastructure.

DRAGON CRS-2 SPX-35: RESUPPLYING THE INTERNATIONAL SPACE STATION



Falcon 9 Block 5
(Credit: Nextspaceflight)

Dragon CRS-2 SpX-35 is SpaceX's 35th Commercial Resupply Services mission for NASA, designed to deliver scientific experiments, supplies and essential equipment to the International Space Station (ISS). The mission is currently planned for October 2026 from Space Launch Complex 40 at Cape Canaveral Space Force Station, Florida, USA. NASA currently lists the launch as no earlier than fall 2026, so a final launch date has not yet been confirmed.

The mission will use SpaceX's Falcon 9 Block 5, a two-stage, partially reusable orbital launch vehicle. Its Cargo Dragon 2 spacecraft will transport payloads to the ISS in Low Earth Orbit (LEO). The Falcon 9's first stage is planned to return for a landing at Landing Zone 40, demonstrating the reusable technology that is central to SpaceX's launch operations.

The primary purpose of CRS-35 is to support continuous research and operations aboard the ISS. Among its planned cargo are the final sets of ISS Roll-Out Solar Arrays (IROSA) and experiments in areas including biotechnology, materials science and space-based research.

AMAZON LEO (LV-01): BUILDING THE FUTURE OF GLOBAL SATELLITE INTERNET

Amazon Leo (LV-01) is the first planned launch of Amazon's next-generation Leo broadband satellite constellation, formerly known as Project Kuiper. The mission is scheduled for October 2026 from Space Launch Complex 41 (SLC-41), Cape Canaveral Space Force Station, Florida, USA. The satellites will be deployed into Low Earth Orbit (LEO) to expand Amazon's global satellite-internet network and provide high-speed connectivity to users around the world.

The mission will use United Launch Alliance's Vulcan VC6L, a two-stage heavy-lift rocket equipped with six solid rocket boosters. The vehicle stands approximately 63.3 metres tall and is designed to carry up to 27,200 kg to LEO. This mission will also mark the first flight of the LEO-optimized Centaur V upper stage and serve as a certification flight for the new configuration.

The primary purpose of LV-01 is to deploy Amazon Leo satellites that will form part of a planned constellation of thousands of spacecraft. Operating in LEO, the network is intended to deliver fast, low-latency broadband internet, particularly to regions where traditional internet infrastructure is limited.



Vulcan VC6Lr
(Credit: nextspaceflight)

NEONSAT-2 TO 6: SOUTH KOREA'S NEXT GENERATION OF EARTH OBSERVATION

NeonSat-2 to 6 is a mission carrying five satellites developed by the Korea Aerospace Research Institute (KARI) as part of South Korea's growing Earth-observation capabilities. The mission is scheduled for 7 October 2026, with the launch window beginning at 8:53 AM IST, from Launch Complex 2 at Naro Space Center, South Korea. The satellites are designed to provide frequent observations of Earth and support national monitoring requirements.

The mission will be launched aboard Nuri (KSLV-II), South Korea's domestically developed three-stage orbital launch vehicle. Powered by liquid-propellant engines using liquid oxygen and kerosene, Nuri is designed to place satellites into Low Earth Orbit (LEO). Deploying five satellites together will demonstrate the launcher's ability to support multi-payload missions.

The primary objective of NeonSat-2 to 6 is to enhance Earth observation, environmental monitoring and rapid data collection. Operating as a coordinated group, the satellites can increase observation frequency and provide valuable information for applications such as disaster management, land monitoring and national security.



Nuri
(Credit: Nextspaceflight)

MARTIAN MOONS EXPLORATION (MMX): JAPAN'S MISSION TO THE SECRETS OF PHOBOS



H3-24L
(Credit:Nextspaceflight)

Martian Moon eXplorer (MMX) is a Japanese-led planetary exploration mission developed by JAXA, with international contributions from France and Germany. The spacecraft is scheduled to launch on 20 October 2026 at 4:41 AM JST (1:11 AM IST) from Launch Complex LP-2 at Tanegashima Space Center, Japan. The mission will travel for about a year before reaching the Martian system and beginning detailed exploration of Phobos, one of Mars' two moons.

MMX will be launched aboard the H3-24L, a heavy-lift configuration of Japan's H3 launch vehicle operated by Mitsubishi Heavy Industries. The approximately 4,200 kg spacecraft consists of propulsion, exploration and sample-return modules. It will study Phobos and Deimos using advanced instruments and deploy the IDEFIX rover, developed through cooperation between CNES and DLR.

The mission's primary goal is to collect samples from Phobos and return them to Earth, helping scientists investigate the origin and evolution of Mars and its moons. MMX will also study water, organic matter and surface materials, providing important clues about the early Solar System and potentially supporting future human exploration of Mars.

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

SETBACKS THAT BUILT SPACE SUCCESS

CHALLENGER: WHEN 73 SECONDS CHANGED SPACEFLIGHT

What can go wrong in just 73 seconds?

On 28 January 1986, millions watched as Space Shuttle Challenger lifted off from Kennedy Space Center. Seven astronauts were on board, including Christa McAuliffe, a teacher selected to become the first teacher in space.

The launch appeared normal. But 73 seconds after liftoff, the shuttle broke apart, turning an exciting space mission into one of the most studied accidents in aerospace history.



Christa McAuliffe, pictured during T-38 flight training. (Credit: NASA).

It Started With a Small Seal:

The accident began with an O-ring, a rubber seal in a joint of the right Solid Rocket Booster. Its job was to prevent hot gases from escaping from the rocket motor.

The morning of the launch was unusually cold. Low temperatures affected the O-ring's ability to seal the joint properly.

At around 58 seconds after liftoff, hot gases began escaping through the joint.



Smoke from the right SRB joint after lift off. (Credit: NASA).

How One Failure Became a Chain Reaction:

The escaping hot gases created a flame that grew as the shuttle climbed. The flame then damaged the External Tank, which contained liquid hydrogen and liquid oxygen.

As the tank weakened, hydrogen began leaking. Around 72 seconds into the flight, the attachment between the booster and the External Tank failed. The booster rotated and struck the tank.

The tank ruptured, releasing its propellants, and the vehicle broke apart at about 73 seconds.

So the sequence was:

Cold conditions → O-ring fails to seal → hot gas escapes → External Tank is damaged → hydrogen leaks → booster attachment fails → booster strikes tank → vehicle breaks apart.

Beyond the Failure:

Challenger showed that engineering failures are not always about one broken component. Engineers had raised concerns about the O-rings and cold conditions, but those concerns were not acted upon. The disaster led to changes in shuttle design and safety practices, teaching an important lesson: good engineering means identifying risks, speaking up, examining evidence, and learning from failure.

Happy Birthday


October 5, 1958

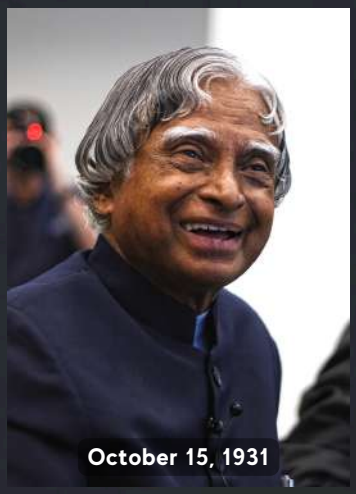
Neil degrasse Tyson

Neil deGrasse Tyson (born October 5, 1958) is a world-renowned astrophysicist, author, and science communicator. He has dedicated his life to making complex cosmic concepts accessible and engaging for the public. As the director of the Hayden Planetarium in New York, he has inspired millions through books, TV shows, and lectures. Tyson bridges science and culture, sparking curiosity about the universe and advocating for scientific literacy as essential for humanity's future and exploration of space. (Credits: Wikipedia)

Niels Bohr

Niels Bohr (7 October 1885 – 18 November 1962) a Danish physicist, transformed our understanding of atomic structure. He introduced the Bohr model, describing electrons in quantized orbits around the nucleus, which became a cornerstone of quantum mechanics. Awarded the 1922 Nobel Prize in Physics, he also contributed to nuclear research and the early development of atomic energy. He advocated international collaboration, inspiring generations of physicists and leaving an enduring legacy in both theoretical and applied science. (Credits: Wikimedia)

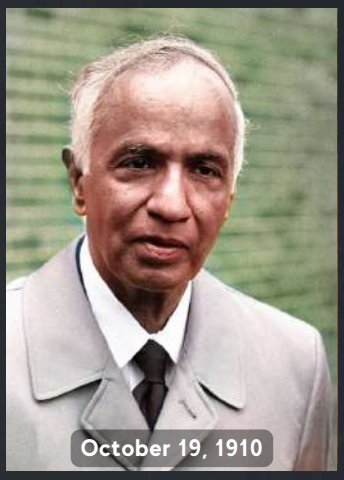

October 7, 1885


October 15, 1931

APJ Abdul Kalam

APJ Abdul Kalam (15 October 1931 – 27 July 2015), known as the "Missile Man of India", was a visionary scientist, aerospace engineer and the 11th President of India. He played a pivotal role in advancing the nation's defense and space capabilities. Beyond science, he inspired millions with his humility, dedication, and emphasis on education and youth empowerment. His vision for a developed India and his relentless pursuit of knowledge made him a beloved leader and a symbol of hope and innovation. (Credits: Wikimedia)

Happy Birthday



S. Chandrasekhar

Subrahmanyan Chandrasekhar (19 October 1910 – 21 August 1995) was an Indian-American astrophysicist renowned for his work on stellar evolution. He formulated the Chandrasekhar limit, determining the maximum mass of a stable white dwarf star, impacting our understanding of black holes and neutron stars. Awarded the 1983 Nobel Prize in Physics, his research and mentorship shaped modern astrophysics, leaving a lasting legacy in both theoretical science and the study of the life cycles of stars. (Credits: britannica.com)

Edmond Halley

Edmond Halley (29 October 1656 - 14 January 1741) was an English astronomer, mathematician, and geophysicist best known for calculating the orbit of the comet later named Halley's Comet. His work in celestial mechanics, including predicting cometary returns, advanced understanding of the solar system. Halley also contributed to the study of stars, Earth's magnetic field, and oceanography. A pioneer of observational astronomy, his research laid the groundwork for future generations of astronomers and earned him lasting recognition in science history. (Credits: Wikimedia)





Homi J. Bhabha

Homi Jehangir Bhabha (30 October 1909 – 24 January 1966) was an Indian nuclear physicist and visionary, known as the "Father of the Indian Nuclear Program." He played a key role in establishing India's nuclear research institutions, including the Tata Institute of Fundamental Research and the Bhabha Atomic Research Centre. Bhabha's work in cosmic rays and theoretical physics advanced global science, while his leadership and foresight laid the foundation for India's self-reliance in nuclear energy and research. (Credits: OdishaPlus)

SPACE PARADOXES: GLITCHES IN THE COSMOS

THE SUN'S UPSIDE-DOWN TEMPERATURE

A **Temperature Mystery:**

Imagine standing beside a bonfire. The farther away you move, the cooler it should feel. But the Sun breaks this rule. Its visible surface, the photosphere, is about 5,500°C, while its outer atmosphere, the corona, can reach millions of degrees. It is like finding a fire whose surrounding air is hotter than the flames themselves. This strange puzzle is called the coronal heating problem.

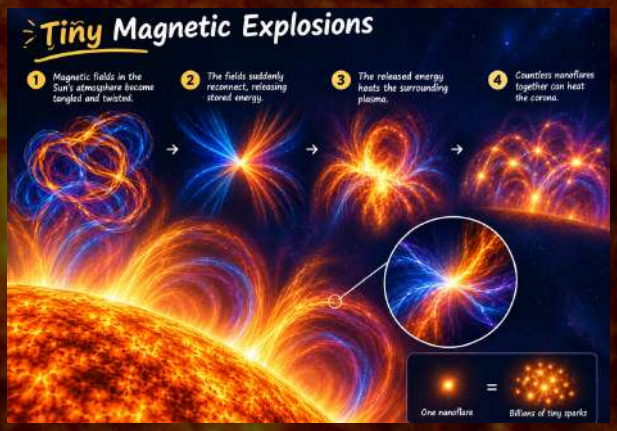
The Sun's Magnetic Engine

Where does the extra energy come from?

Think of the Sun as a boiling ocean of plasma. Its moving plasma twists and stretches magnetic fields, like ocean currents pulling invisible ropes.

These magnetic fields can store and transport enormous amounts of energy–like an invisible energy highway carrying energy from the Sun's surface into its atmosphere.





Waves Carry the Energy:

One possible explanation involves Alfvén waves. Imagine shaking one end of a rope and watching a wave travel along it. In the Sun, magnetic fields and plasma can carry waves upward. As these waves interact with charged particles, they can transfer energy and heat the corona, like a musician passing energy into a drum.

Tiny Magnetic Explosions:

Another possibility involves nanoflares. Like a stretched rubber band suddenly snapping, tangled magnetic fields can reconnect and release stored energy.

One nanoflare is tiny, but countless events could act like billions of sparks from a campfire, collectively heating the corona.

The Mystery Continues

So, is the puzzle solved? Not completely. Waves, magnetic reconnection and other processes may work together. NASA's Parker Solar Probe is helping scientists investigate by flying through the corona and measuring its magnetic fields and plasma. The Sun may look familiar, but its million-degree atmosphere remains a cosmic mystery still unfolding.

ASTRONOMICAL EVENTS

Draconid Meteor Shower: Shooting Stars from the Dragon

Every October, Earth passes through streams of dust left behind by Comet 21P/Giacobini-Zinner, creating the annual Draconid Meteor Shower. The shower is active from around October 6 to 10, with its peak usually occurring around October 7. The meteors appear to originate from the constellation Draco, giving the shower its name.



Position of the radiant in the constellation Draco.
Credit: starwalk.space

Unlike many major meteor showers, the Draconids are best observed during the early evening, soon after darkness falls, because their radiant is high in the sky during this time. Under normal conditions, only a few meteors may be visible per hour, but the Draconids are famous for occasionally producing spectacular meteor outbursts with hundreds or eventhousands of meteors per hour.

The meteors enter Earth's atmosphere at about 20 km/s, making them relatively slow and often producing bright, graceful streaks. For the best view, find a dark location away from city lights and watch a wide area of the sky.

Orionids: Meteors from Halley's Comet

One of the major meteor showers that occurs in October is the Orionid Meteor Shower, caused by dust and debris left behind by the famous comet 1P/Halley. In 2026, the shower will be active from October 2 to November 7, with peak activity expected around October 21–22. Under ideal dark-sky conditions, observers can see around 10–20 meteors per hour.


Position of radiant in constellation Orion.
Credit: starkwalk

Orionid meteors appear to radiate from the constellation Orion, giving the shower its name. However, the meteors are not actually coming from Orion; they are tiny particles left along Halley's orbit that encounter Earth's atmosphere. As they plunge into the atmosphere at about 66 km/s, they heat up and create bright, fast-moving streaks of light. Some may leave glowing trails that remain visible for several seconds.

The best time to watch is after midnight and before dawn, when Orion is higher in the sky. Find a dark location away from city lights, lie back comfortably, and watch a wide area of the sky. In 2026, moonlight may reduce the number of visible meteors, so the darker hours before dawn will be particularly useful.

Saturn at Opposition
A Prime Night for the Ringed World

Saturn reaches opposition when Earth passes directly between Saturn and the Sun. At this time, Saturn appears opposite the Sun in our sky, rising around sunset, reaching its highest point around midnight, and setting around sunrise. Opposition also brings Saturn relatively close to Earth, making it brighter and more prominent in the night sky.

In 2026, Saturn reaches opposition on October 4, making this an excellent time to observe the magnificent ringed planet. Around opposition, Saturn shines at approximately magnitude +0.3, making it easily visible to the naked eye as a steady, yellowish point of light. It can be found among the stars of Pisces, rising in the eastern sky during the evening.



The most exciting feature of Saturn is, of course, its spectacular ring system. Although the rings are far too distant to see clearly with the naked eye, even a small telescope can reveal Saturn's rings as a distinct structure surrounding the planet. With a larger telescope and good atmospheric conditions, observers may also spot the Cassini Division, a dark gap separating the major A and B rings.

Saturn's largest moon, Titan, is another rewarding target. Titan has a thick atmosphere rich in nitrogen and is the only moon in the Solar System known to have stable liquid lakes and seas on its surface, although these are made of methane and ethane rather than water. It can be spotted by using a telescope.

Opposition is also a good opportunity for astrophotographers. The planet's greater brightness and apparent size make it easier to capture details, especially when using high-frame-rate planetary cameras and stacking thousands of individual frames.

To observe Saturn around opposition, choose a location with an unobstructed view of the eastern sky. Allow your telescope to cool and observe when Saturn is highest above the horizon, when Earth's atmosphere is less likely to distort the view. October 2026 offers a particularly rewarding opportunity to see one of the Solar System's most recognizable worlds at its brightest and most accessible.



7.5-degree tilt of rings of Saturn during opposition.

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 Mercury and Venus

On October 5, Mercury and Venus will appear close together in the evening sky, with Venus shining brilliantly at about magnitude −4.3 and Mercury around magnitude 0.0. The pair will be visible low above the western horizon shortly after sunset, although the event is more favorable from the Southern Hemisphere. Look toward the western sky soon after sunset and choose a location with a clear horizon.



Place: Chennai / Date: 05th October / Time: 06:30 pm.

Conjunction of Moon and Jupiter

On October 6, the waning crescent Moon will appear very close to bright Jupiter in the pre-dawn sky, with Mars also visible nearby, creating a striking planetary lineup. Jupiter will shine at about magnitude −1.7, while Mars will be around magnitude +1.0. Look toward the eastern sky in the early morning hours before sunrise to see the Moon, Jupiter and Mars forming a graceful line across the sky.



Place: Chennai / Date: 06th October / Time: 03:30 a.m.

Conjunction of Moon and Saturn

On October 24, the nearly full Moon will appear close to Saturn in the evening sky. The Moon will be about 97% illuminated, while Saturn will shine at around magnitude +0.4. The pair will be visible from the evening through the night, with the Moon passing about 6°47′ north of Saturn. Look toward the eastern sky after sunset to spot this bright pairing.



Place: Chennai / Date: 24th October / Time: 07:30 p.m.

Conjunction of Mars and Jupiter

On October 31, Mars and Jupiter will be visible in the pre-dawn sky, appearing in the same region of the sky as they gradually approach their close conjunction in November. Jupiter will shine much brighter than Mars, making the pair easy to distinguish. Look toward the eastern sky in the early morning before sunrise for this planetary pairing.



Place: Chennai / Date: 31st October / Time: 04:00 a.m.

STUDENTS CORNER

A Day in the Life of a Photon Leaving the Sun

by Varsha S K

Have you ever felt sunlight on your face and thought, Where did this really come from? Not the Sun in the sky but the story before that moment. Because the light touching your skin right now didn't simply "leave" the Sun and arrive.

It lived an entire lifetime first. Deep inside the Sun's core, something extraordinary happens every second. Hydrogen atoms collide under crushing pressure and unimaginable heat. They fuse. In that tiny act, matter turns into energy. And from that energy, a photon is born a particle of light. This is where our photon's day begins. Or rather… where its very long wait begins. The moment it's created, the photon wants to escape. But the Sun is dense, crowded, and chaotic. So instead of flying straight out, the photon bounces. It crashes into atoms, gets absorbed, re-emitted, redirected again and again.

Forward. Sideways. Backward. It's a cosmic pinball. This slow, frustrating journey can take thousands to hundreds of thousands of years. Our photon spends ages trapped inside the Sun, changing energy, losing memory of its birth, just trying to find a way out.

Then, one day, it happens. Then one day it happens. The photon reaches the Sun's surface. Freedom. In an instant, everything changes. The struggle ends. Space opens up. And suddenly, the photon races outward at the fastest speed allowed in the universe the speed of light. Eight minutes later, it reaches Earth. No detours. No collisions.

Just a straight shot across 150 million kilometers of empty space. And then the end of its journey. The photon hits your skin. Or a leaf. Or the ocean. It warms, illuminates, fuels life.

After surviving the chaos of a star for thousands of years, its final act lasts less than a second. So the next time sunlight touches you, pause for a moment. That warmth is ancient. That light is patient. And every bright day is proof that even the smallest things in the universe can have the longest stories.

The Sun doesn't just shine. It sends out travelers.

Starry Facts

by Vetrivel. T

Introduction

Is the sun the most important star in the universe? How does it compare with other stars? Almost all the stars that you see in the dark shy are bigger and brighter than the Sun. A few of the faint ones are about the same size and brightness.

Sunshine

The star nearest to us is the Sun. The next closest star to the Earth is nearly 2,50,000 times farther away. For us on Earth and for the solar system, it is the most important object. The sun provides us with life – giving light, heat and energy.

How Big are Stars?

Although the Sun is impressive, compared to the billions of other stars in the universe, it is not as special. The largest of stars may be as much as 3,21,86,88,000 kilometers away. If such a huge star were in the center of our solar system, it would perhaps gobble up all the planets, including Earth! In comparison, the sun is about 13,92,000 kilometers in diameter. This makes the sun109 times wider than earth. Yet, it is an average sized star in the universe.

Far, Far and Away

How far are the sun and the other stars from Earth? They are very, very, very far away… much farther than you can ever imagine! The sun, which is the closest to us, is 150 million kilometers from Earth. All the other stars are much farther away.

Hottest Objects

Stars are amongst the hottest objects found in space. The hottest stars can be almost 55,538 C. This big number shows us that stars are much hotter than anything we will ever experience on Earth. The Sun is about 5,538 C. So, in comparison to the hottest stars, it is much cooler, nut still very, very hot.

Much hotter than the temperature in an oven! And these temperatures are only at the surface. The cores of stars are even hotter. The mindboggling large numbers above give you an idea of how extremely hot stars like the Sun can get. Cn you imagine what would happen if people get too close to the Sun?

The heat from a star also imparts the planets orbiting it. The closer the planets orbit near a star, the hotter they will be. In the case of our solar system, for example, Mercury and Venus are closer to the Sun than Earth, and are, therefore, much warmer than Earth. On the other hand, Earth is closer to the Sun than Mars and hence warmer than Mars. If a planet is too hot, all the water on it will evaporate.

Imagine if that were the case on Earth, how would we live without water? If the planet is too far, it would be too cold to sustain life. Are we not lucky to be living on a lovely planet which is at just the right distance from the Sun? It keeps us warm and yet not too hot!

Have We Already Heard From Aliens?

by Varsha S K

Have you ever looked up at the night sky and wondered, How would we know if someone was out there? We cannot travel to distant stars. We cannot see alien civilizations directly. So scientists have begun asking a different question: what traces would an intelligent civilization leave behind?

This is where the search for technosignatures begins.
For decades, the search for extraterrestrial life mainly focused on finding biological signs such as water, organic molecules, or environments where life might survive. But life does not necessarily have to be found directly. If a civilization becomes advanced enough to build technology, it may leave behind clues that can be detected across enormous distances. These clues are called technosignatures.

One of the best-known examples is the search for artificial radio signals. Since the 1960s, scientists have used radio telescopes to listen to the sky.
The idea is simple: natural sources can produce radio waves, but a signal with a very unusual structure could potentially reveal technology. In 1977, a radio telescope detected a signal that lasted for just over a minute. It appeared so unusual that the astronomer who found it wrote "Wow!" on the computer printout.

The event became known as the Wow! signal. It was never detected again, so scientists still do not know what caused it. The mystery remains. But technosignatures are not limited to radio waves. Astronomers can also study the light from distant planets. When a planet passes in front of its star, some of the star's light travels through the planet's atmosphere. By analyzing that light, scientists can identify certain gases. Some chemicals could be produced naturally.

Others might suggest industrial activity, although distinguishing technology from natural processes would be extremely difficult. Scientists have also considered the possibility of detecting large structures around stars. An advanced civilization might theoretically build enormous systems to collect energy from its star. Such structures could block or alter the star's light in unusual ways. This idea inspired the search for strange stars with irregular changes in brightness.

One famous example was Tabby's Star, which experienced unusual dips in brightness that briefly led some people to suggest an artificial structure. Later research found more natural explanations, including dust, but the discovery showed how unusual astronomical observations can raise extraordinary questions. The search is difficult because the universe is full of natural phenomena that can appear strange. Pulsars, exploding stars, magnetic fields, and clouds of dust can all create signals that initially seem mysterious.

That is why scientists do not immediately call every unusual signal evidence of aliens. They investigate. They test. They look for natural explanations. The goal is not simply to find something strange. It is to find something that cannot be easily explained by nature. And that may be the most fascinating part of the search. The first evidence of extraterrestrial intelligence may not be a photograph of an alien or a message written in words.

It could be a pattern in radio data, an unusual chemical signature, or a change in starlight that demands an explanation.
For now, no confirmed technosignature has been discovered. But every night, telescopes continue listening.
Because somewhere among the billions of stars, there may be a signal that has not yet reached us or perhaps one has already arrived, hidden in the cosmic noise. And we are still trying to understand what it means.

ASK THE UNIVERSE

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

Scientists cannot determine the exact number of black holes in the Universe. Astronomers estimate that there may be millions to billions of black holes in our galaxy alone, and many more across the observable Universe.

Black holes have been observed, but white holes are still hypothetical. No white hole has ever been confirmed by observation.

What is the first rover which landed on mars? (Question by Kavya Agarwal)

Sojourner was the first successful rover to operate on the surface of Mars.

It was part of NASA's Mars Pathfinder mission and landed on 4 July 1997 at Ares Vallis.The small, six-wheeled rover weighed about 11.5 kg and was designed to explore the Martian surface.It studied rocks and soil using instruments such as the Alpha Proton X-ray Spectrometer (APXS).Sojourner operated for about 83 Martian sols, far exceeding its planned 7-sol mission.Its success paved the way for later Mars rovers such as Spirit, Opportunity, Curiosity, and Perseverance.

How many rockets are launched in 2026? (Question by Samkit)

In 2026, more than 230 orbital and deep-space rocket launches have been attempted worldwide so far.The United States has conducted the highest number, with about 156 launches, followed by China with around 70.New Zealand has recorded about 24 launches, mainly through Rocket Lab missions.Russia has conducted around 14 launches, while Europe has recorded about 10.Japan has conducted around 5 launches, and Norway around 4.A few additional launches are classified under other or unknown categories.These numbers are as of 22 September 2026 and may vary slightly between launch databases depending on their counting methods.

Why is space dark? (Question by Vetrivel. T)

Space looks dark mainly because there is almost no atmosphere in space to scatter sunlight. On Earth, air molecules scatter sunlight in all directions, making the sky appear bright and blue. In space, light travels mostly in straight lines, so unless you are looking directly at a star, planet, or other illuminated object, your surroundings appear black.

Even though the Universe contains enormous numbers of stars and galaxies, the sky is still mostly dark because the Universe has a finite age and is expanding, so light from many distant objects has not reached us, and much of the light has been redshifted to wavelengths invisible to our eyes.

October

THIS MONTH IN HISTORY

NASA BEGINS OPERATIONS

01

OCT 1958

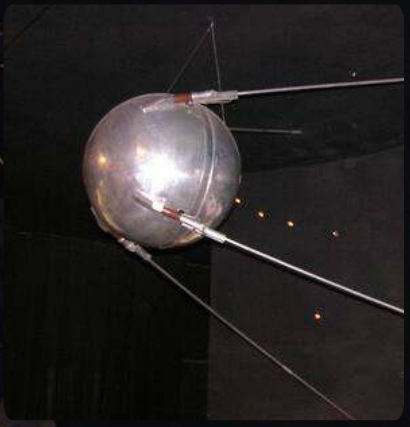
On 1 October 1958, NASA officially began operations as the United States' civilian space agency. It was created to lead the nation's activities in aeronautics and space exploration, taking over the facilities and programs of the earlier National Advisory Committee for Aeronautics (NACA). NASA soon began developing human and robotic spaceflight programs, including Project Mercury. Its establishment marked an important institutional milestone in the early Space Age and laid the foundation for decades of scientific research, planetary exploration, and human spaceflight. (image credit: www.nasa.gov)



SPUTNIK 1 LAUNCHED

04

OCT 1957



On 4 October 1957, the Soviet Union launched Sputnik 1, the world's first artificial satellite. The small spacecraft transmitted radio signals while orbiting Earth approximately every 96 minutes. Its successful launch demonstrated that humans could place an artificial object into orbit and marked the beginning of the Space Age. Sputnik 1 also triggered rapid developments in space science and technology around the world, eventually contributing to the establishment and expansion of national space programs, including NASA. (image credit: .nasa.gov)

PROJECT MERCURY

07

OCT 1958

On 7 October 1958, NASA formally organized its first human spaceflight program, initially called the man-in-space program and later named Project Mercury. Its primary objective was to place an American astronaut into orbit and safely return the spacecraft to Earth. Engineers developed the Mercury spacecraft, launch systems, tracking networks, and astronaut training programs. The experience gained through Mercury became essential for the later Gemini and Apollo programs, ultimately contributing to America's first crewed missions to the Moon.(image credit: nasa.gov)



October

THIS MONTH IN HISTORY

OUTER SPACE TREATY

10 OCT 1967

On 10 October 1967, the Outer Space Treaty entered into force, establishing fundamental principles for activities in outer space. The treaty states that outer space and celestial bodies cannot be claimed as national territory. It also establishes principles concerning peaceful exploration, international responsibility, and the prohibition of placing nuclear weapons or other weapons of mass destruction in orbit. The treaty remains a foundational framework for international space activities and is commemorated during World Space Week. (image credit: UN Photo)



PIONEER 1 LAUNCHED



11 OCT 1958

On 11 October 1958, NASA launched Pioneer 1, its first spacecraft launched under NASA management. The spacecraft was intended to travel toward the Moon and conduct scientific investigations, but a launch-vehicle problem prevented it from reaching its planned trajectory. Pioneer 1 nevertheless traveled more than 100,000 kilometers from Earth and returned valuable scientific measurements. Its observations helped scientists study Earth's radiation environment and demonstrated the scientific potential of robotic spacecraft beyond low Earth orbit. (image credit: NASA)

VOSKHOD 1 LAUNCHED

12 OCT 1964

On 12 October 1964, the Soviet Union launched Voskhod 1, carrying three cosmonauts: Vladimir Komarov, Konstantin Feoktistov, and Boris Yegorov. It became the first spacecraft to carry three people simultaneously. Because of the spacecraft's limited internal space, the crew flew without individual spacesuits. Voskhod 1 demonstrated the ability to operate a multi-person spacecraft and represented an important step in the development of increasingly complex human-spaceflight missions during the early Space Age. (image credits: space.com)



October

THIS MONTH IN HISTORY

FIRST SUPERSONIC FLIGHT

14 OCT 1947

On 14 October 1947, U.S. Air Force Captain Chuck Yeager became the first pilot to fly faster than the speed of sound in the Bell X-1. The rocket-powered aircraft reached approximately Mach 1.06 at an altitude of about 43,000 feet. The flight was an important milestone in high-speed aeronautical research. Knowledge gained from such research later contributed to aerospace engineering and the development of technologies used in aircraft, launch vehicles, and spacecraft.(image credits: NASA)



LAUNCH - CASSINI-HUYGENS

15 OCT 1997

On 15 October 1997, NASA launched the Cassini-Huygens spacecraft toward Saturn. The mission was a collaboration between NASA, the European Space Agency, and the Italian Space Agency. After a nearly seven-year journey, Cassini entered orbit around Saturn and studied its atmosphere, rings, and numerous moons. The Huygens probe later became the first spacecraft to land on Titan, Saturn's largest moon. Cassini-Huygens transformed our understanding of the Saturn system and its diverse worlds. (image credit: NASA/JPL)



GALILEO LAUNCHED

18 OCT 1989

On 18 October 1989, NASA launched the Galileo spacecraft aboard Space Shuttle Atlantis on mission STS-34. Galileo traveled to Jupiter using gravity assists from Venus and Earth before entering orbit around Jupiter in 1995. The spacecraft extensively studied Jupiter and its major moons. It found evidence supporting a subsurface ocean beneath Europa's icy surface and observed intense volcanic activity on Io. Galileo significantly expanded scientific knowledge of the Jupiter system and its moons.(image credits: en.wikipedia.org)



October

THIS MONTH IN HISTORY

CHANDRAYAAN-1 LAUNCHED

22 OCT 2008

On 22 October 2008, ISRO launched Chandrayaan-1, India's first lunar mission, aboard the PSLV-C11 from Sriharikota. The spacecraft carried 11 scientific instruments from India and international partners to study the Moon's surface, mineral composition, and geological history. Chandrayaan-1 produced important scientific observations, including evidence of water molecules associated with the lunar surface. The mission established India as an important participant in modern planetary exploration and provided valuable scientific data about Earth's natural satellite.(image credits: isro)





DEEP SPACE 1 LAUNCHED

24 OCT 1998

On 24 October 1998, NASA launched Deep Space 1, a technology-demonstration mission designed to test advanced spacecraft technologies. One of its most important experiments was an ion propulsion system, which could provide very efficient thrust over long periods. The spacecraft successfully demonstrated several new technologies and later encountered asteroid 9969 Braille and comet Borrelly. Deep Space 1 showed the potential of electric propulsion for deep-space missions and influenced the design of later spacecraft, including NASA's Dawn mission. (image credit: NASA/JPL)

STEREO LAUNCHED

25 OCT 2006

On 25 October 2006, NASA launched the twin STEREO (Solar Terrestrial Relations Observatory) spacecraft to study the Sun from different perspectives. The two spacecraft gradually moved into different positions relative to Earth, allowing scientists to obtain three-dimensional observations of solar activity. It provided valuable observations of CME, solar eruptions, and the solar wind. These observations improved scientists' understanding of space weather, which can affect satellites, communications, and technological infrastructure on Earth.(image credits: NASA)



October

THIS MONTH IN HISTORY

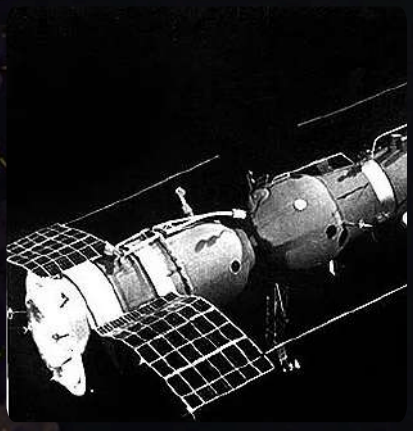
JOHN GLENN RETURNS

29 OCT 1998

On 29 October 1998, astronaut John Glenn returned to space aboard Space Shuttle Discovery on mission STS-95. Glenn had previously become the first American to orbit Earth in 1962 as part of Project Mercury. During STS-95, he participated in scientific research concerning aging and the effects of spaceflight on the human body. His mission created a remarkable link between America's early human-spaceflight era and the Space Shuttle era, separated by more than three decades. (image credits: NASA)



FIRST AUTOMATIC DOCKING



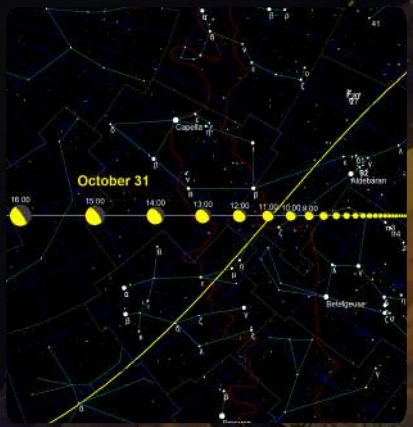
30 OCT 1967

On 30 October 1967, the Soviet Union achieved the first automatic docking two spacecraft in space when Kosmos 186 and Kosmos 188 successfully rendezvoused and docked in Earth orbit. The spacecraft were uncrewed versions of the Soyuz design. Automatic rendezvous and docking became a critical technology for future space stations, spacecraft servicing, and crew transportation. The achievement demonstrated that spacecraft could independently perform complex orbital maneuvers and connect with another spacecraft without direct manual control by astronauts. (image credit: nasa.gov)

2015 TB145 FLYBY

31 OCT 2015

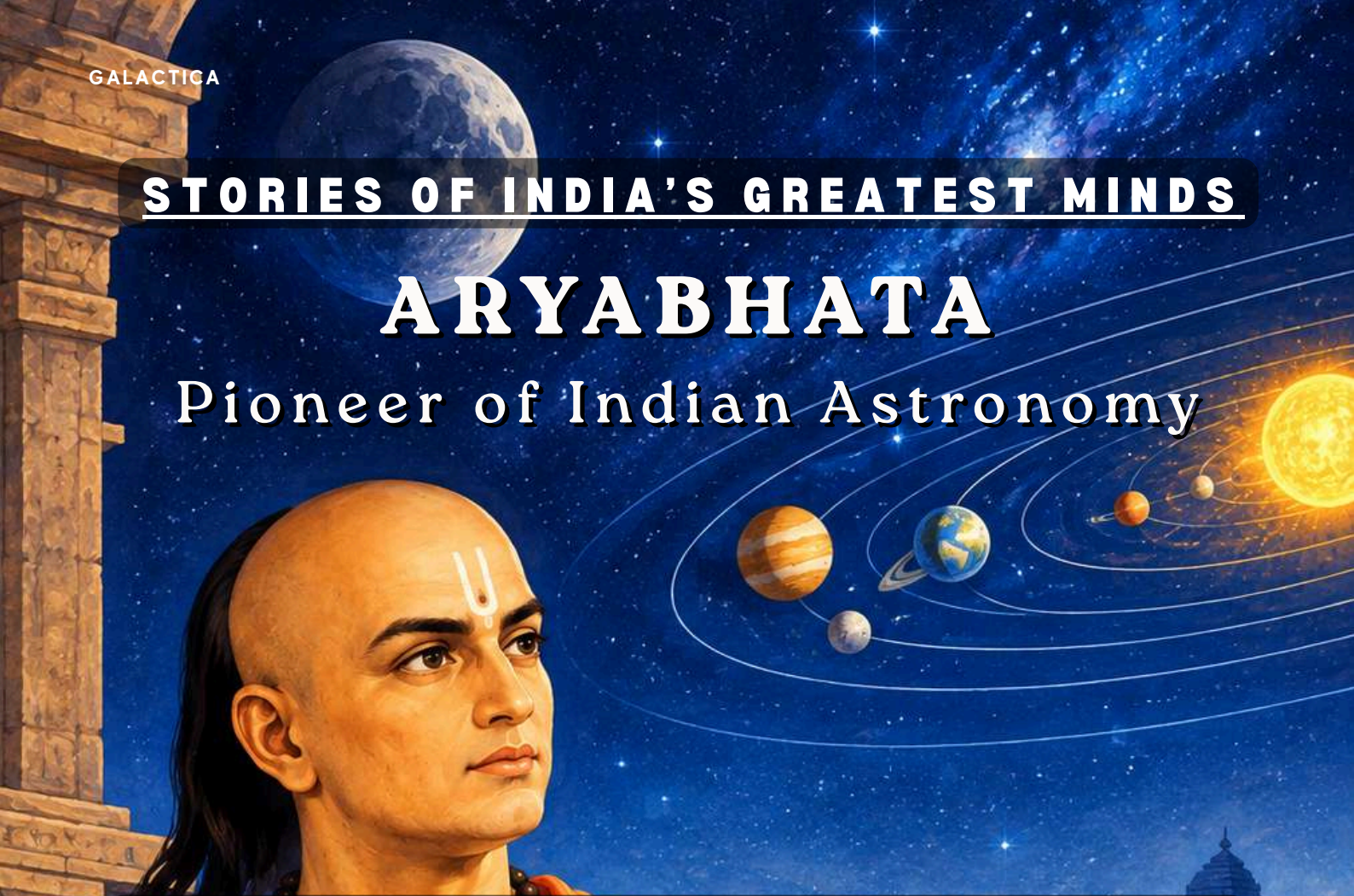
On 31 October 2015, the near-Earth asteroid 2015 TB145 made a close but completely safe flyby of Earth at a distance slightly greater than the Moon's average orbital distance. Estimated to be about 400 meters wide, the asteroid was nicknamed the "Halloween Asteroid" because its close approach occurred on Halloween. NASA and other observatories used radar and optical telescopes to study the object, producing detailed observations of its shape and rotation. The encounter provided scientists with a valuable opportunity to study a near-Earth asteroid. (image credits: skypath)



STORIES OF INDIA'S GREATEST MINDS

ARYABHATA

Pioneer of Indian Astronomy



In the 5th century CE, Aryabhata transformed the study of the heavens by treating astronomy as a problem that could be investigated through mathematical models, systematic calculation, and observation. Born in 476 CE, he presented his ideas in Aryabhatiya, a foundational work of classical Indian astronomy.

Aryabhata developed mathematical procedures for determining the positions of celestial bodies and incorporated trigonometric methods, including sine tables, into astronomical calculations. His approximation of π, approximately 3.1416, demonstrates the numerical precision achievable through his methods.

A particularly significant idea was his explanation of the apparent daily motion of the stars. Aryabhata proposed that this apparent movement could be understood through the rotation of Earth on its axis.

He also provided mathematical explanations for solar and lunar eclipses, describing them through the geometrical relationships and shadows involving the Sun, Earth, and Moon.

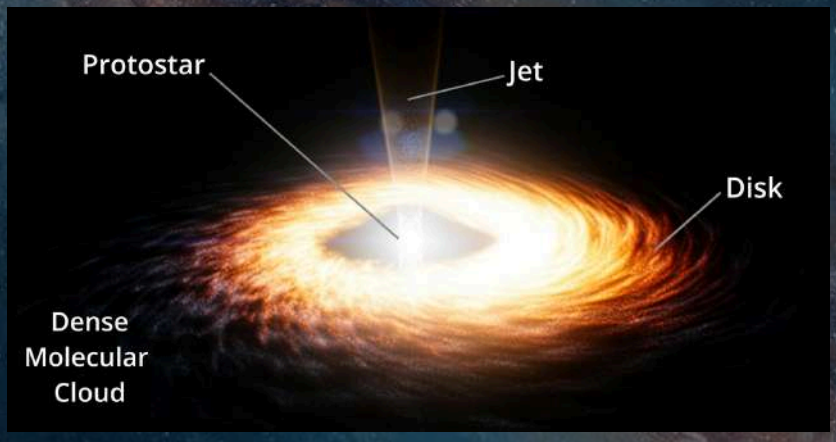
His astronomical work went beyond observation, combining geometry, arithmetic, and predictive calculations to model celestial phenomena. His methods provided later scholars with mathematical tools for refining planetary calculations and understanding astronomical cycles. This tradition helped establish a strong connection between mathematical reasoning and the systematic study of the universe.

His work influenced generations of Indian astronomers and established mathematics as a powerful tool for understanding celestial phenomena. In 1975, India honoured his legacy by naming its first satellite, Aryabhata, after him, linking an ancient scientific tradition with the beginning of India's space age.

ASTRONOMY & SPACE TERM

PROTOSTAR
A STAR IN THE MAKING

A protostar is a young object formed when a dense region of gas and dust within a molecular cloud collapses under its own gravity. As the material falls inward, it becomes increasingly compressed and heated, while more gas and dust continue to gather around it. A rotating accretion disk may form around the protostar, providing material that can eventually build planets. At this stage, the core is not yet hot enough to sustain hydrogen fusion, so it is not considered a true star.



As the protostar gains mass and its core temperature rises, it eventually reaches the conditions needed for nuclear fusion. Once stable hydrogen fusion begins, the protostar becomes a main-sequence star.

PLANETESIMALS
THE BUILDING BLOCKS OF PLANETS

Planetesimals are small, solid bodies that formed in the early Solar System from dust and rock within the swirling disk of material around the young Sun. Through collisions and the gradual sticking together of smaller particles, these objects grew from tiny grains into kilometre-sized bodies.

Gravity then allowed many planetesimals to collide and merge, eventually forming protoplanets and, later, the planets we see today. Some planetesimals that avoided being incorporated into planets remain in regions such as the asteroid belt and Kuiper Belt. Studying them helps scientists understand the earliest stages of planetary formation and the origins of our Solar System.



ASTROPHOTOGRAPHY BY SPACE TEAM

Lunar Occultation of Venus Captured by Mr. Ranjith Kumar E, Regional Product Manager, STEPL.



Jupiter Captured by Mr. Ranjith Kumar E, Regional Product Manager, STEPL.

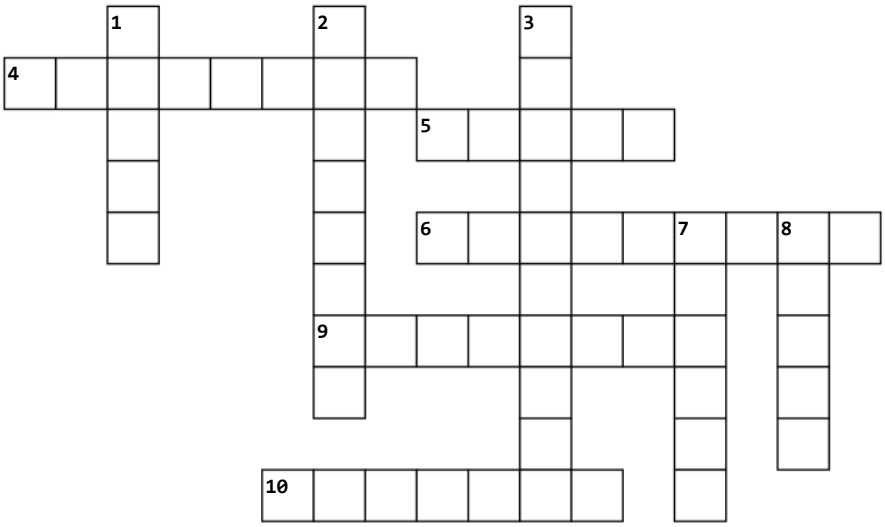


COSMIC JOURNEY- THE WINDY BLUE GIANT



TRAIN YOUR BRAIN

CROSSWORD



Across

4. From which space launch site was the Long March 7A launched?

5. Which country is developing the MMX spacecraft?

6. What field does Kanekar's research focus on?

9. Who developed the Special Theory of Relativity?

10. What type of fuel does the Prometheus engine use?

Down

1. Which satellite system was expanded under Dr. U. R. Rao's leadership?

2. Which type of light the Nancy Grace Roman Space Telescope observes?

3. What astronomical event occurs when Earth passes between the Sun and Neptune?

7. What type of spacecraft was Beagle 2?

8. What is the name of Rocket Lab's new portable launch system?

Astronomy Word Puzzle

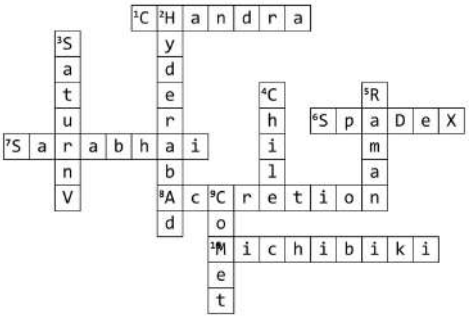
Moons of solar system

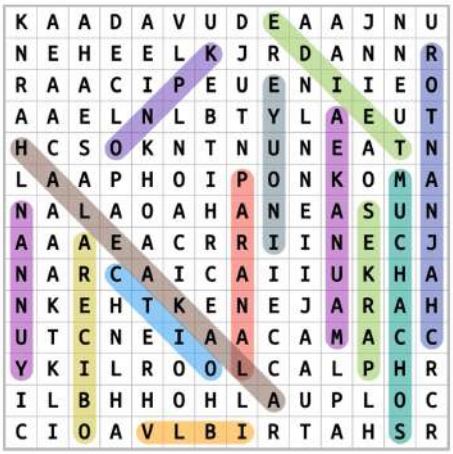
O	E	I	I	T	O	S	I	S	D	D	O	T	D
A	O	Y	U	M	E	U	R	O	P	A	E	E	S
E	E	O	E	I	I	D	E	S	J	Y	O	T	P
P	E	T	C	M	A	A	T	N	O	O	M	H	R
I	N	S	L	A	M	L	P	I	O	I	O	Y	O
M	O	I	E	S	U	E	H	E	T	A	E	S	M
E	I	L	I	M	S	C	U	T	T	A	T	O	E
T	D	L	R	J	A	N	U	S	S	U	N	I	T
H	S	A	A	D	D	E	N	O	S	U	S	A	H
E	Y	C	N	H	U	N	O	T	I	R	T	D	E
U	U	D	S	O	B	O	H	P	E	T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

TETHYS
PROMETHEUS
DEIMOS
EPIMETHEUS
GANYMADE
TRITON
MIMAS
ARIEL
ENCELADUS
TITAN
CALLISTO
MOON
DIONE
EUROPA
MIRANDA
PHOBOS
JANUS
IAPETUS

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

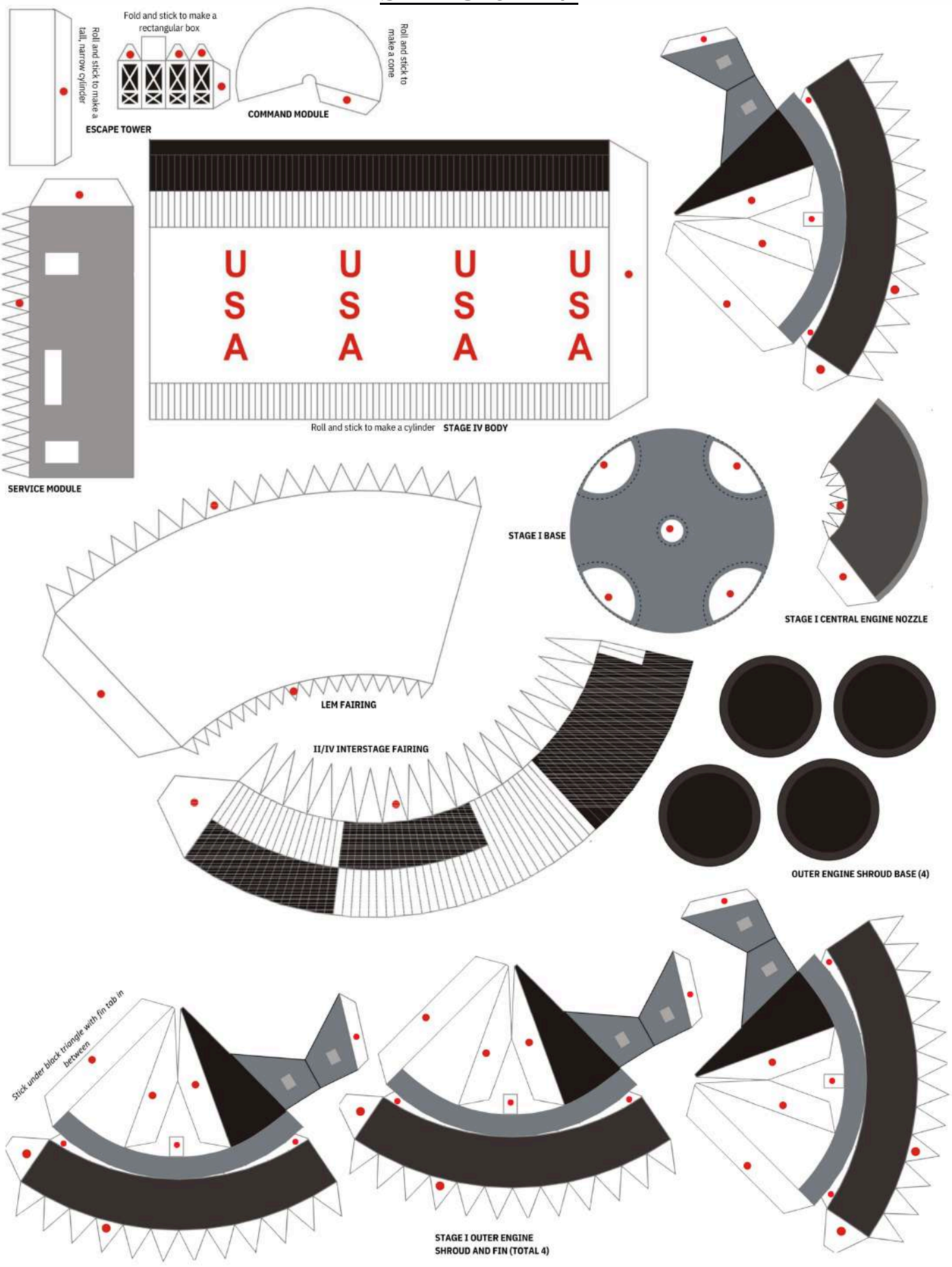
Answers for last month puzzles.





MISSION: DO IT YOURSELF

SATURN-V



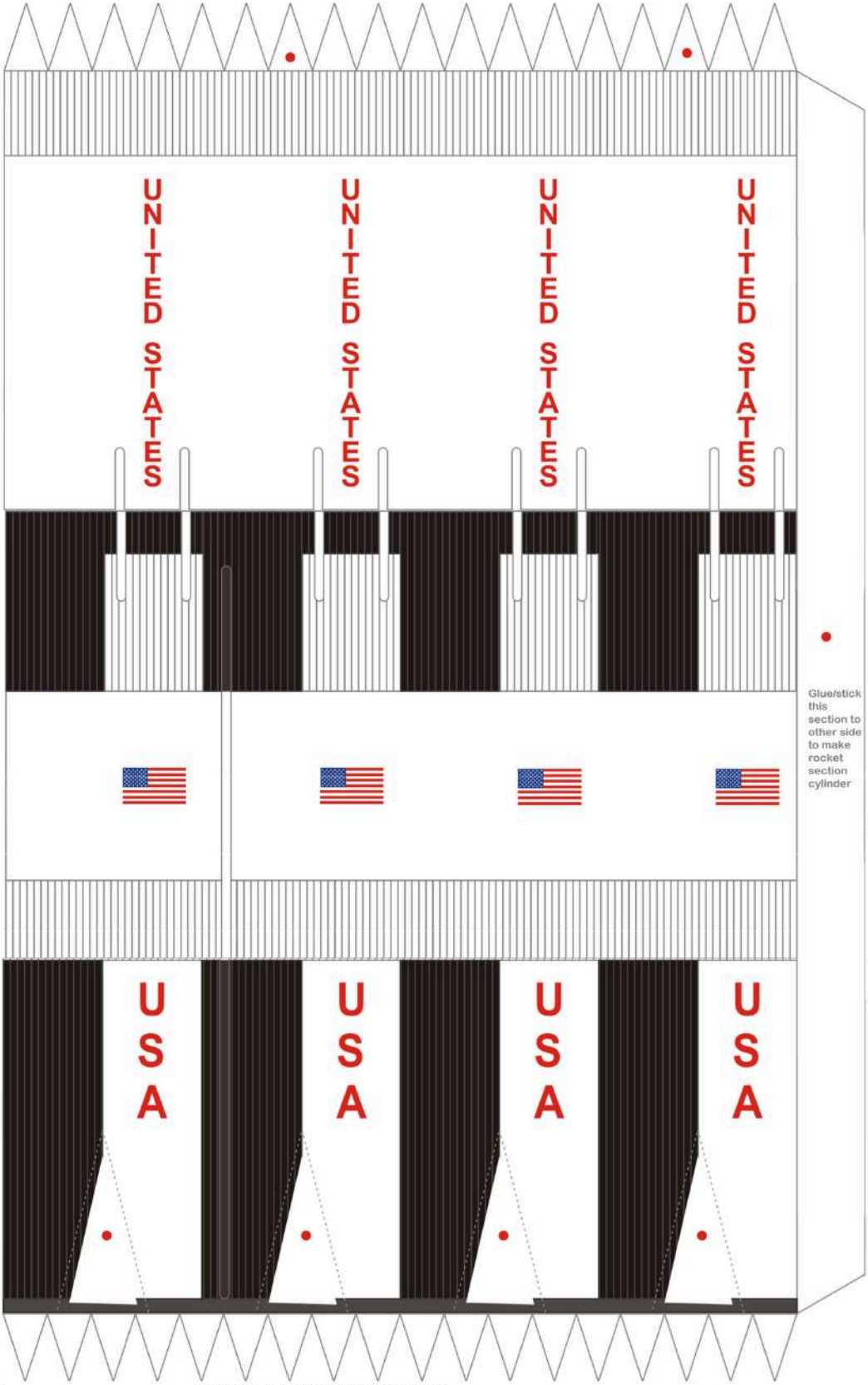
MISSION: DO IT YOURSELF

INSTRUCTIONS

- Cut out all the parts carefully.
- Roll the Stage I & II body into a cylinder.
- Roll the II/IV Interstage Fairing into a cone and attach it to the top of the Stage I & II body.
- Roll the Stage IV body into a cylinder and the LEM Fairing into a cone. Attach the LEM to the top of the Interstage Fairing.
- Roll the Service Module into a cylinder and attach it above the LEM Fairing.
- Roll the narrow piece into a cylinder and sharpen the tip. Fold the box-shaped part and attach it to the bottom of the tower.
- Roll the Command Module into a cone and attach it to the bottom of the Escape Tower. Then place the Command Module above the Service Module.
- Attach the Stage IV body to the main body.
- Attach the Stage I base to the bottom of the main body.
- Fold and glue the outer engine shrouds and fins to form half-cones with circular bases. Attach them to the four marked areas on the Stage I base.
- Attach each outer engine shroud to its engine nozzle, then attach the central engine nozzle to the center of the Stage I base.

Your Saturn V paper model is ready!





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OCTOBER 2026 | VOLUME 5 | ISSUE X

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