SPACE™
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Galactica

Astronomy and Space Science Magazine



What's Inside?

SPACE Insights
Highlights From July 2026
Moon Phases And Planet Visibility
What's Awaiting in August 2026
Space Paradoxes
Setbacks That Built Space Success
Stories of India's Greatest Minds
Historical Events Happened In August
Student's Corner
Astronomy & Space Term
August 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

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

LIST OF

Page no.	Topics
1	**SPACE INSIGHTS**
	Highlights of July 2026
6	Skyroot Aerospace Reaches Orbit with Vikram-1
7	Department of Space Tightens Exit Rules Amid Scientist Exodus
8	A Major Leap in the Search for a Second Earth
9	Printing the Future: Kidney and Liver Tissues Created in Space
10	Lightning Strikes Chinese Rocket During Liftoff in a Stunning Space Launch
11	Webb Uncovers a Possible Family Tree of Little Red Dots
12	**What's up in the sky - August 2026**
13	**Rocket Launches in August 2026**
16	**Setbacks That Built Space Success**
17	**August Born Legends**
19	**Space Paradoxes: Glitches in the Cosmos**
	Celestial Spectacles - August 2026
20	Perseids Meteor Shower: The Sky's Greatest Fireworks Display
20	A Celestial Gathering: Before the Sun Rises
21	Comet 10P/Tempel 2: A Frozen Wanderer at Its Closest to the Sun

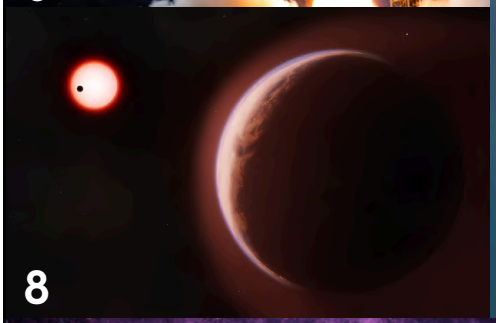


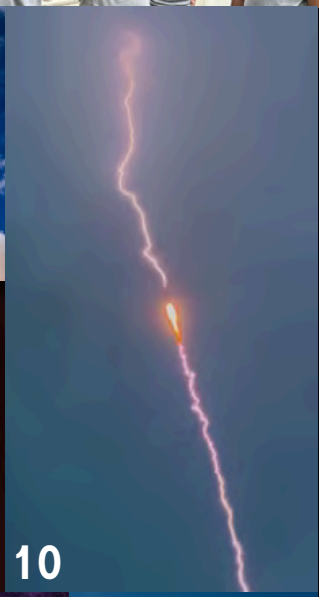




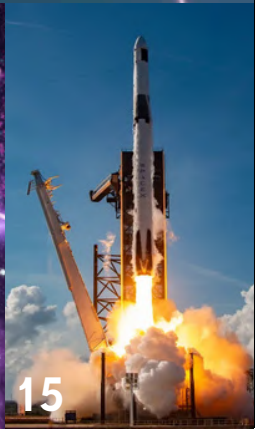












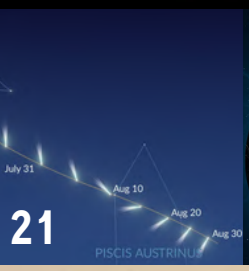
CONTENTS



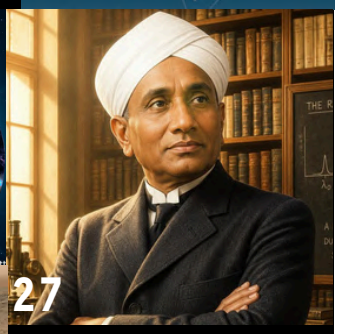




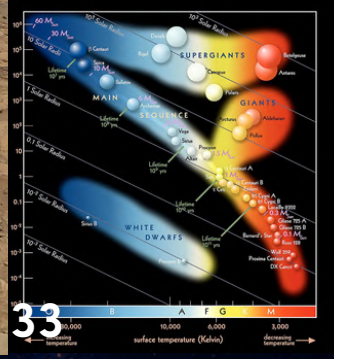














22 Greatest Elongations Of August: The Best Time To See The Inner Planets

23 Conjunctions for the month

24 Students Corner

25 Ask the Universe

27 Stories of India's Greatest Minds

28 Historical events of August

33 Astronomy & Space Term

34 Astrophotography by SPACE Team

35 Cosmic Journey- The Lord of Rings

36 Mission: Do It Yourself

38 Train Your Brain





SPACE INSIGHTS

The Nation Looks Up: A Celebration of Space, Science & Possibility

National Space Day celebrates India's remarkable achievements in space exploration and inspires young minds to dream, discover, and innovate. To mark this special occasion, SPACE India presents the National Space Day 2026 Celebration Series, offering exciting opportunities for students to explore astronomy, space science, innovation, and citizen science.

Virtual Panel Discussion – Open to All

Interact with scientists, educators, policymakers, and space industry experts.
Learn about India's space achievements, upcoming missions, and future technologies.
Last Date: 17 August 2026, Registration Link: https://forms.gle/8qz1RvGD3DzRLqQFA

Junior SPACE Tank

Design innovative solutions for real-world space challenges.
Explore entrepreneurship and the future space economy. Present ideas before experts.
Last Date: 23 August 2026, Registration Link: https://forms.gle/miTCAdK7inFGc71DA

Young Space Scholars Challenge

Research contemporary topics in space science.
Develop scientific writing and presentation skills.
Present findings before an expert panel.
Last Date: 20 August 2026, Registration Link: https://forms.gle/XYT2Ts74dM5wvgZL8

ISRO Gaganyaan Helmet Design Challenge

Design and build an astronaut helmet prototype.
Learn about India's Human Spaceflight Mission.
Combine creativity with engineering & sustainability.
Last Date: 22 August 2026, Registration Link: https://forms.gle/miTCAdK7inFGc71DA

Moon Mapping Challenge – From Apollo to Chandrayaan

Observe and map the lunar surface, Explore the history of lunar exploration, Participate in a citizen science initiative.
Last Date: 25 August 2026, Registration Link: https://forms.gle/Jvpt6XDtkfnVWHWu7

Ghar Se Gagan Tak

Observe the night sky from home. Identify celestial objects and document observations. Enjoy astronomy with family and friends.
Last Date: 25 August 2026, Registration Link: https://forms.gle/miTCAdK7inFGc71DA

Why Participate?

- Foster scientific curiosity and critical thinking.
- Develop research, innovation, and design skills.
- Experience hands-on STEM learning.
- Interact with experts from the space community.
- Explore careers in astronomy, aerospace, and space technology.
- Contribute to citizen science initiatives.

For Queries

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When the Night Gets Too Bright

Fireflies and the Hidden Cost of Light Pollution

An Article by SPACE Educator Sebin Sebastian

On a warm summer evening, a tiny light flickers above the grass. Another answer from nearby. Then another. To us, it appears magical, a silent dance of living stars among the trees. But for fireflies, these flashes are not a performance. They are a conversation. For millions of years, fireflies have relied on darkness to communicate. Their unique flash pattern allows males and females to identify one another and find mates in the night. Long before humans illuminated the landscape with electric lights, darkness was the canvas upon which these glowing messages were written. Today, that canvas is disappearing.

Research led by biologist Avalon C.S. Owens has revealed that artificial light at night is far more than a nuisance for fireflies. It interferes directly with their ability to communicate and reproduce. Fireflies evolved in an environment where darkness was predictable. Their flashes stood out clearly against the night sky. Modern lighting changes that environment entirely. In one study, Owens and colleagues exposed courting fireflies to different colours and intensities of artificial light. The results were striking. Under every lighting condition tested, courtship activity declined. Even amber lights, often promoted as wildlife-friendly alternatives, disrupted courtship behaviour. Owens describes artificial lighting as a new competitor in the nocturnal world. Unlike predators or habitat loss, this competitor did not evolve naturally.

It appeared suddenly in evolutionary terms, spreading across landscapes in little more than a decade. For astronomers and stargazers, this issue may sound familiar. The same light pollution that washes out the Milky Way also disrupts countless nocturnal organisms. Fireflies are only one voice in a much larger nocturnal orchestra. Moths, essential pollinators of many flowering plants, are drawn toward artificial lights and become easy prey. Migratory birds, which navigate using the Moon and stars, can become disoriented by brightly lit buildings and towers, often resulting in fatal collisions. Sea turtle hatchlings instinctively crawl toward the brightest horizon, which was once the moonlit ocean. Today, many instead move toward illuminated roads and hotels.

Scientists now recognise darkness as an ecological resource, just as important as clean air and water, because countless organisms depend on it to survive. Humans, too, are affected by the loss of natural darkness. Exposure to artificial light at night, especially blue-rich light from LEDs and electronic screens, can disrupt our circadian rhythm by suppressing melatonin production, leading to poor sleep and potential long-term health risks. It also robs us of one of humanity's oldest connections with nature: a clear, star-filled night sky. The encouraging news is that light pollution is one of the few environmental problems that can be reversed almost instantly.

A streetlight can be shielded. An unnecessary lamp can be switched off. Motion sensors and timers can reduce illumination during critical nighttime hours. When darkness returns, fireflies often respond quickly. The next time you see a firefly glowing in the darkness, remember you are witnessing a message that becomes harder to hear each year as our world grows brighter.



Credits: SRIRAM MURALI, Anamalai Tiger Reserve Forest Dept.



Credits: Sebin Sebastian SPACE Educator

From Classrooms to Cosmos

SPACE India Brings the Asteroid Hunt to Nagpur



The All India Asteroid Search Campaign (AIASC), one of India's leading citizen science initiatives, successfully conducted its Phase II workshops in Nagpur schools for the first time by SPACE India, marking an important milestone in expanding hands on astronomy education.

The campaign began with an online workshop attended by over 160 participants from schools across the region and individual registrations. Participants learned asteroid detection techniques, astronomical image analysis, and the scientific significance of asteroid discovery.

Hands-on offline workshops were conducted at St. Peter's School, Deolapar, Bishop Cotton School (State Board), Sadar, and Bishop Cotton School, Dharampeth, while online sessions were held for St. Ursula Girls' High School and Bishop Cotton School (CBSE), Sadar. Together, these workshops equipped students with the skills to analyse real astronomical datasets and contribute to authentic scientific research.

A major highlight of the campaign was the recognition of SPACE Squad, one of the participating teams, in the Faint Preliminary Discovery category for its asteroid detection efforts, showcasing the remarkable potential of young citizen scientists.

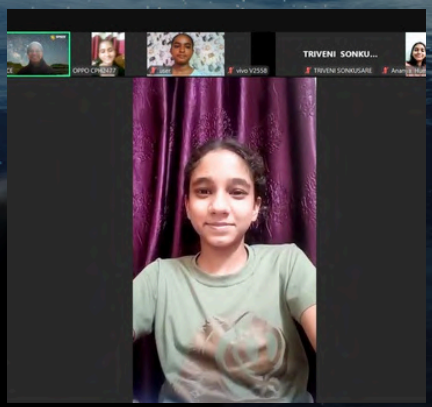
The successful completion of these workshops reflects SPACE India's continued commitment to promoting astronomy education, scientific research, and citizen science among learners across the country. By analyzing real astronomical data and searching for previously unidentified objects, participants gained firsthand experience of how professional astronomers conduct research. Such programs inspire young learners to become active contributors to the global scientific community.











From Mars Rovers to Lunar Settlements: Young Minds Explore the Cosmos

Two of our campuses were turned into launchpads for imagination this July, as students traded classrooms for control rooms and turned their curiosity about the cosmos into full blown exhibitions. At K. R. Mangalam World School, Vaishali's annual exhibition, Innovista, held on 18th July 2026, a school corridor was transformed into a dazzling space venue for students of Classes 2 to 8.

Younger students filled the corridor with shoebox dioramas and Moon phase banners, Class 3 unveiled a hanging solarsystem model complete with a glowing LED sun, Class 4 demonstrated a rotating Earth Moon model, and Class 5 stunned visitors with a stretched fabric "space time warp" and a finely detailed Mars rover. The undisputed showstopper was an in house Mars Landing Simulator, where parents and guests guided a rover onto a bed of red sand using nothing but four strings, alongside a Comet Kitchen and Virtual Reality station set up with support from SPACE India.









A week later, on 25th July 2026, Delhi Public School, Sector 81, Faridabad hosted TechSpark 2026, a spectacular fusion of STEM, space, and entrepreneurship. The exhibition welcomed distinguished guests Mr. Pankaj Dubey, Founder of DSPIN Consulting, and Mrs. Nivedita Dubey, Member (HR) on the Board of the Airports Authority of India. Its star attraction, the SPACE Lab, reimagined the exhibition as an immersive ISS Space Tour themed on Shubhanshu Shukla's historic journey, complete with a student portraying the astronaut himself. Visitors journeyed through a VR/AR space experience, explored life aboard the ISS, examined discoveries from the Hubble and James Webb telescopes, detected Martian surface samples, inspected a lunar rover model, traced the evolution of rockets, and marvelled at a futuristic Lunar Settlement Model before the day closed with an exhilarating Hydro Rocket Launch that sent the crowd into applause.

Together, these two exhibitions reflect a growing spirit of curiosity and innovation among young learners, proving that when students are given the tools to explore, imagination truly knows no bounds.

Sun, Moon & Chandrayaan: Three Stories, One Universe of Discovery

July brought the Sun, the Moon, and India's own Moon mission vividly to life across three engaging sessions, each turning familiar celestial neighbours into subjects of wonder and discovery. At MatriKiran High School, students explored the mysteries of our nearest star through Solarvaganza, an interactive session on solar science.

Discussions covered the Sun's layers, its powerful magnetic field, sunspots, and dramatic Coronal Mass Ejections, along with their potential to disrupt satellites, communication systems, and power grids and their beautiful counterpart, the aurora. The session's true highlight was the safe observation of the Sun itself, with students using a pinhole projector, solar viewing goggles, and a telescope fitted with a proper solar filter to witness our star up close.



At K. R. Mangalam World School, Vikaspuri, students of Classes IV and V marked International Moon Day on 20th July 2026 with an interactive celebration held with the support of Junior Coordinator Mrs. Ranjana. Using a simple thread-based model, students discovered that the Moon lies an astonishing 384,400 kilometres from Earth, dispelling the common misconception that the two are far closer.

A hands-on crater making activity, using marbles dropped onto a model lunar surface, brought the Moon's cratered landscape to life, while further discussion explored the Giant Impact Hypothesis, tidal locking, and the changing phases of the Moon.





Meanwhile, at K. R. Mangalam World School, Vaishali, six Grade VI students turned into space storytellers, carrying the story of Chandrayaan from classroom to classroom for their juniors in Grade V. Tracing India's lunar journey from Chandrayaan-1 in 2008 through Chandrayaan-2 in 2019 to the historic Chandrayaan-3 landing near the Moon's South Pole in 2023, the young presenters explained the roles of the Vikram lander and Pragyan rover, shared fascinating mission statistics, and looked ahead to Chandrayaan-4 and Gaganyaan leaving their Grade V audience buzzing with questions during the closing quiz.

Together, these sessions reflect a shared spirit of curiosity, transforming the Sun, the Moon, and India's space achievements into lessons that will stay with students long after the classroom lights go down.

HIGHLIGHTS OF JULY 2026

Mission Aagaman: Skyroot Opens a New Chapter in Indian Spaceflight



In a historic milestone for commercial space exploration, Hyderabad-based startup Skyroot Aerospace successfully launched Vikram-1, India's first privately developed orbital rocket, into Low Earth Orbit. Conducted from the Satish Dhawan Space Centre in Sriharikota under the inaugural mission Aagaman ("Arrival"), the flight made India only the third country in the world–after the United States and China to achieve private orbital launch capability.

Named in honor of Dr. Vikram Sarabhai, the father of the Indian space program, Vikram-1 is a 20-meter tall, four-stage small-lift launch vehicle engineered to carry payloads of up to 350 kg. The rocket utilizes lightweight carbon composite structures, 3D-printed liquid engines, and modular avionics. Its architecture pairs three solid-propellant booster stages with a liquid-propellant fourth stage designed for precise orbital positioning.

Founded by former ISRO engineers Pawan Kumar Chandana and Naga Bharath Daka, Skyroot aims to disrupt global space logistics by offering flexible, on demand launch services. The success of Mission Aagaman validates India's 2020 space sector reforms, which opened state infrastructure to private enterprises and fueled a rapid surge in domestic space tech innovation.

The debut of Vikram-1 marks a critical transition from suborbital technology demonstration to true orbital payload delivery. As Skyroot prepares to scale up manufacturing for routine commercial flights, Vikram-1 positions India as a major competitive player in the rapidly expanding global satellite launch market.

Department of Space Tightens Exit Rules Amid Scientist Exodus

In a decisive move to safeguard flagship national space missions, India's Department of Space (DoS) has tightened regulations governing the resignation and voluntary retirement of key scientists and engineers. The decision, issued via an internal memorandum, comes in response to an estimated 100 to 120 scientists—including high-profile project leaders—departing the Indian Space Research Organisation (ISRO) in recent months.

Stemming the Talent Drain: The wave of resignations hit key development hubs hard, with roughly 80 departures from the U R Rao Satellite Centre (URSC) and 20 from the Vikram Sarabhai Space Centre (VSSC). High-profile exits included project leads for critical endeavors like the LVM-3 rocket, the SpaDeX docking experiment, and key simulation managers from the Chandrayaan-3 team. This attrition has been largely accelerated by India's expanding private space industry, which offers attractive compensation packages and leadership opportunities.

Centralized Scrutiny and Stricter Approvals: Under the revised framework, DoS has rolled back a 2020 administrative order hat allowed ISRO centre directors to routinely process and approve exit requests up to the scientist/Engineer-SG rank.



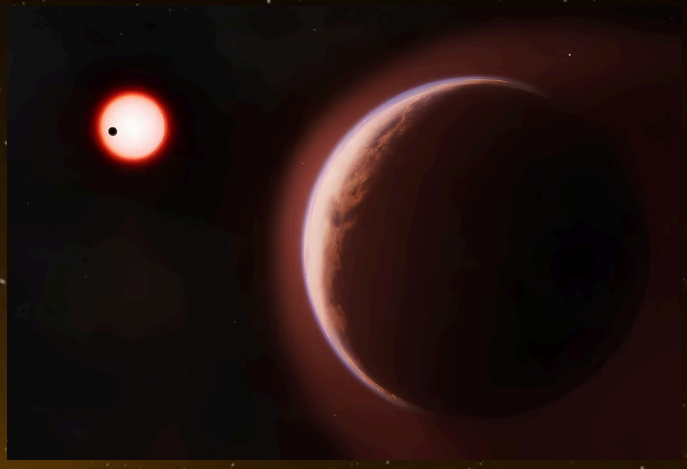
Department of Space tightens rules for exit from key ISRO centres

Centre heads are now instructed not to approve routine exits for Group 'A' scientific personnel involved in high-stakes projects like the human spaceflight program, Gaganyaan. All resignation and voluntary retirement applications must now be escalated directly to the DoS with centre-level recommendations for final determination.

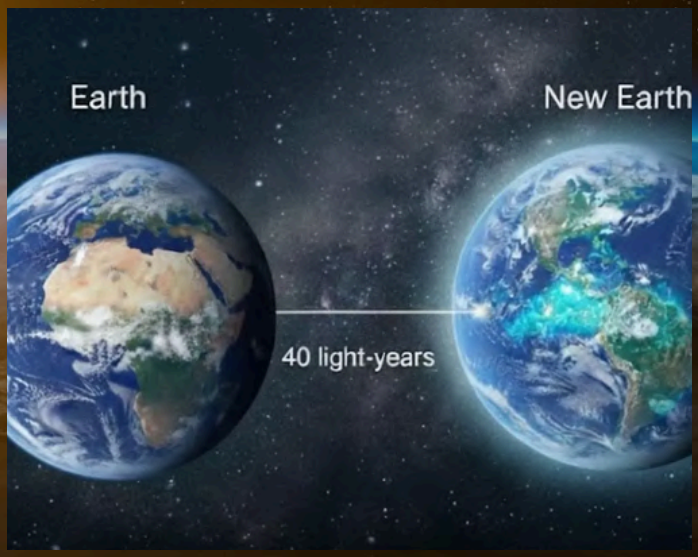
Protecting Mission Timelines: While ISRO leadership maintained that project continuity will be preserved through internal reassignments, the DoS emphasized that replacing specialized expertise mid-mission poses severe risks to timeline execution. By centralizing the exit review process, the government aims to protect strategically vital national initiatives while managing workforce stability.

Mylswamy Annadurai's journey from a small town in Tamil Nadu to becoming one of India's most respected space scientists is a testament to the power of education, perseverance, and curiosity. Today, his continued contribution to school education ensures that countless students are inspired to explore the universe and shape a brighter future through science.

A Rocky World, an Atmosphere and a Question: Could Life Exist Beyond Earth?



Artist's concept : The exoplanet LHS 1140 b



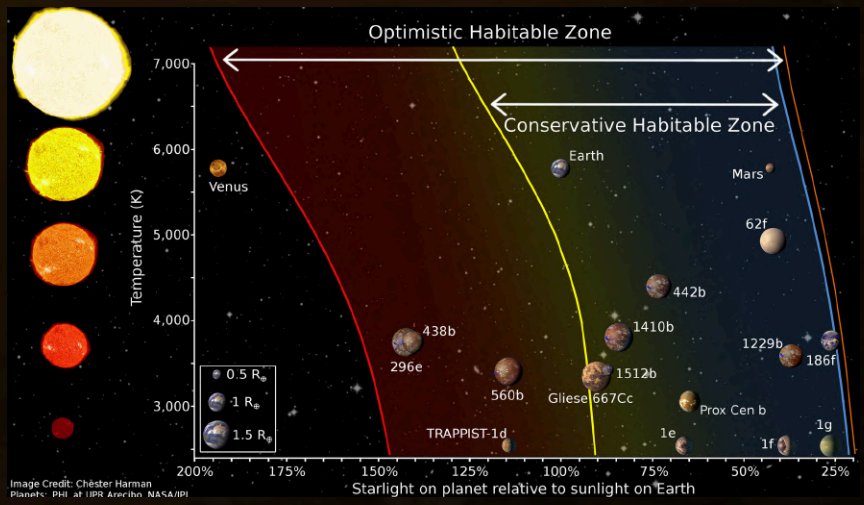
Astronomers have achieved a major breakthrough in the search for life beyond our Solar System by detecting an atmosphere around LHS 1140 b, a rocky exoplanet located about 48 light-years from Earth. The discovery is especially significant because the planet lies within the habitable zone of its star–the region where conditions may allow liquid water to exist.

LHS 1140 b is a super-Earth, with a mass about 5.6 times that of our planet. It orbits a cool red dwarf star and was first discovered in 2017. Using observations from the WINERED spectrograph in Chile, researchers detected evidence of helium escaping from the planet's upper atmosphere. This finding suggests that LHS 1140 b has managed to retain an atmosphere for billions of years, despite the intense radiation typically associated with red dwarf stars.

The presence of an atmosphere is an important factor in determining whether a planet could potentially support life.However, scientists emphasize that this discovery does not prove that life exists on LHS 1140 b.

More observations are needed to determine the atmosphere's full composition and whether the planet has water or other conditions suitable for life.

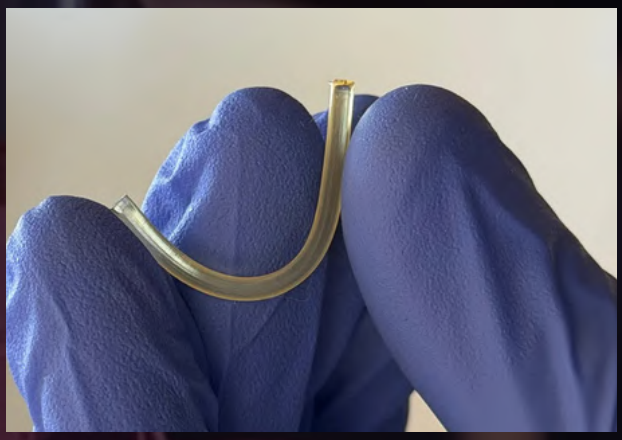
This discovery marks an exciting milestone in exoplanet research. It demonstrates that rocky worlds in habitable zones can retain atmospheres and gives astronomers a promising new target in humanity's continuing quest to discover whether we are alone in the universe.

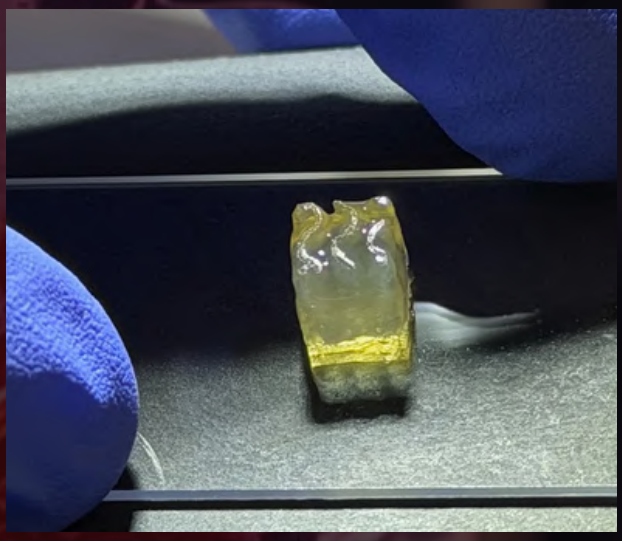


A habitable zone is defined by the propensity of an Earth-sized planet with an Earth-like atmosphere at that particular distance from its parent star to have the capacity for liquid water, without a cover of ice, on its surface.

Printing the Future: Kidney and Liver Tissues Created in Space

In a groundbreaking achievement for space medicine and biotechnology, scientists have successfully bioprinted kidney and liver tissues aboard the International Space Station (ISS) the first time these tissue types have been manufactured in orbit. The experiment, carried out by California-based Auxilium Biotechnologies, demonstrates how the unique environment of microgravity could transform the future of regenerative medicine.





International Space Station astronauts used Auxilium's orbital biomanufacturing technology to bioprint the first liver (Image-1)and kidney (Image-2) tissue in space.

The tissues were produced using the company's AMP-1 orbital bioprinter, with cell and tissue models developed by researchers at the Wake Forest Institute for Regenerative Medicine. Unlike Earth, where gravity can cause cells and particles to settle unevenly, microgravity allows scientists to achieve a more uniform distribution of cells. This could help researchers create complex biological structures that are difficult to manufacture on Earth.

The mission also produced cartilage tissues and nerve-repair implants. The bioprinted materials were later returned to Earth for detailed analysis. Scientists are now studying their structure and properties to understand how effectively space-based biomanufacturing can support medical research.

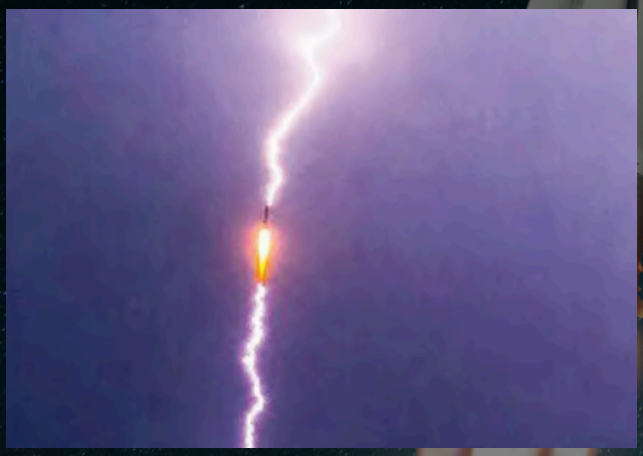
However, this breakthrough does not mean that complete human organs can be printed and transplanted immediately. Researchers believe the nearer-term goal is to develop tissue patches that could help repair damaged organs and improve drug testing. Full-scale transplantable organs remain a long-term possibility.

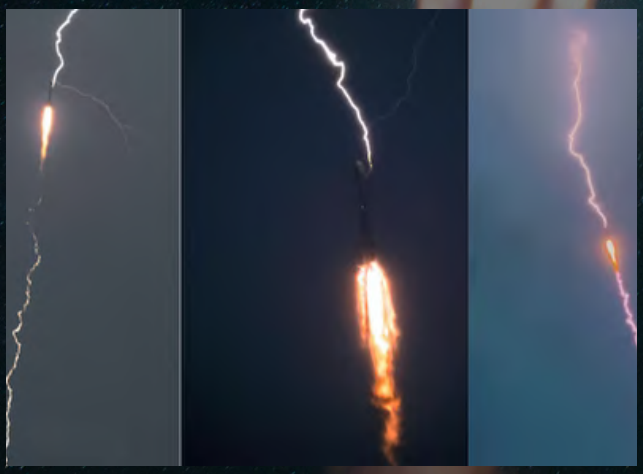
This milestone opens an exciting new chapter in space-based manufacturing, where future orbital laboratories could potentially produce advanced medical tissues and devices, bringing together space exploration and healthcare innovation.

Lightning Strikes Chinese Rocket During Liftoff in a Stunning Space Launch



A Long March-3B carrier rocket carrying the Tianlian II-06 satellite blasts off from the Xichang Satellite Launch Center athon





A Chinese Long March 3B rocket was struck by lightning moments after lifting off

A spectacular and unexpected event unfolded during a recent Chinese rocket launch when lightning struck a rocket shortly after it lifted off creating a dramatic scene captured in photographs and videos.

On July 23, 2026, a Long March-3B rocket launched from China's Xichang Satellite Launch Center, carrying the Tianlian II-06 communications relay satellite. Around 30 seconds after liftoff, lightning struck the ascending rocket, startling spectators who had gathered to watch the launch. Despite the dramatic strike, the mission continued successfully, and the rocket delivered its satellite payload into the planned geostationary orbit. The satellite is expected to support communications with China's Tiangong Space Station and other crewed space missions.

Although such an event may seem extraordinary, rockets have encountered lightning before. During NASA's Apollo 12 mission, the Saturn V rocket was struck twice by lightning shortly after launch. Some non-essential instruments were affected, but the mission continued successfully, eventually sending astronauts to the Moon. A Russian Soyuz rocket also survived a lightning strike in 2019 and successfully reached orbit.

However, lightning can pose serious risks to space missions. In 1987, a lightning strike contributed to the failure of an Atlas/Centaur rocket. The incident led NASA to establish strict Lightning Launch Commit Criteria, which help determine when weather conditions are safe enough for rocket launches.

The remarkable image of the Long March-3B surrounded by lightning serves as a powerful reminder of the unpredictable forces of nature and the remarkable resilience of modern space technology.

The Saguaro Galaxy: Webb Finds a Missing Link to the Little Red Dots

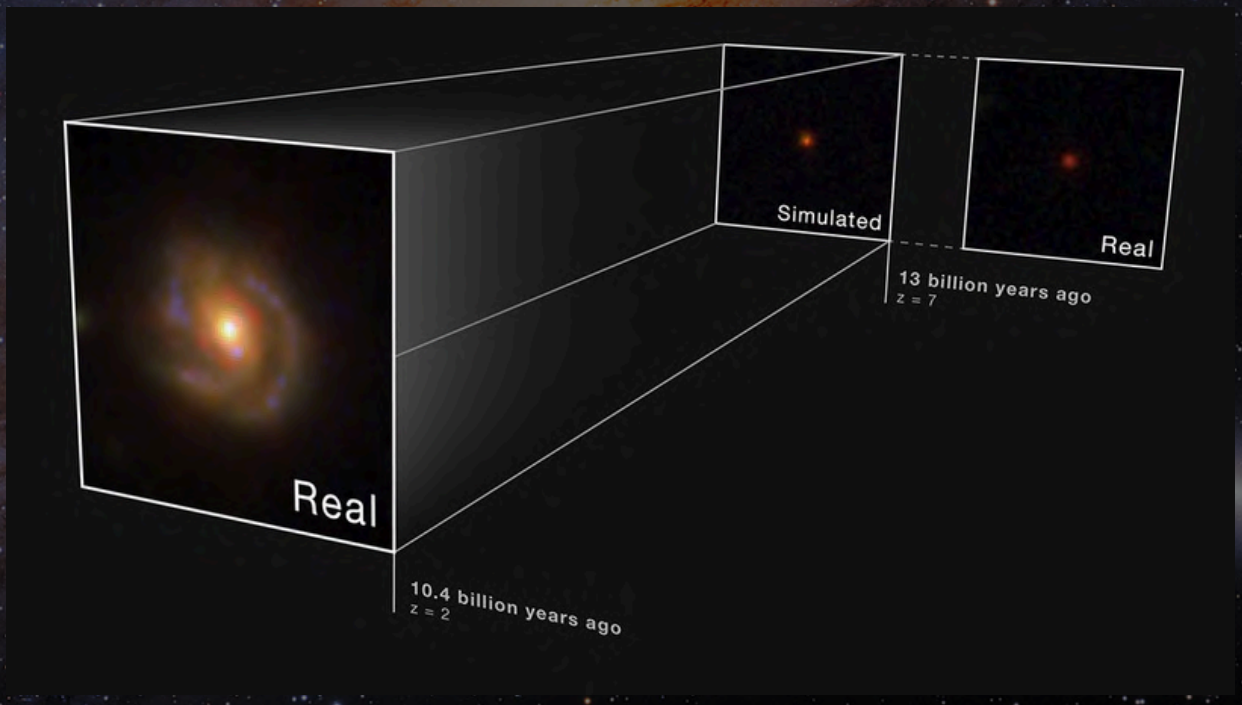
NASA's James Webb Space Telescope (JWST) is helping astronomers solve the mystery of the enigmatic "little red dots" (LRDs), compact, extremely distant objects discovered in the early universe. One leading idea is that LRDs are active galactic nuclei (AGN) powered by rapidly feeding supermassive black holes. However, their numbers decline sharply at lower redshifts, raising an important question: What do these mysterious objects become as the universe evolves?

A team led by Pierluigi Rinaldi studied a lower redshift spiral galaxy called WISEA J123635.56+621424.2, nicknamed the "Saguaro." Located at redshift 2, its light comes from a time when the universe was about 3.3 billion years old. At its centre lies a compact red nucleus with properties remarkably similar to distant LRDs.

Using observations from Webb, Hubble, and NASA's Chandra X-ray Observatory, researchers found evidence that the Saguaro hosts a highly obscured, X-ray-weak active galactic nucleus. When the galaxy was digitally shifted to a much higher redshift, its surrounding structure became too faint to detect, leaving only its red central source visible, just like an LRD.

These findings suggest that LRDs may represent a temporary phase in the growth of supermassive black holes, rather than a distinct type of galaxy. Further observations of similar galaxies could reveal the cosmic "family tree" of these fascinating objects.

Ultimately, the Saguaro offers an important clue to the evolution of little red dots and the supermassive black holes at their centers. By studying similar galaxies across different stages of cosmic history, astronomers may be able to trace how these compact, mysterious objects transform over time.



Webb's simulation shows how the Saguaro galaxy could appear as a little red dot in the early universe.

WHAT'S UP IN THE SKY - AUGUST 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
Best visible at the beginning of the month, reaching greatest western elongation on 2 August.



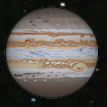
Venus
Reaches greatest eastern elongation on 15 Aug. Best seen after sunset on 15 Aug.



Mars
Visible in the morning sky. Close to the Moon on 9 Aug.



Jupiter
Visible in the morning sky, with a close approach to Mercury on 15 August..



Saturn
Improving morning planet, Attain a peak altitude in darkness from 20 August.



Uranus
Visible in the pre-dawn sky. Rises around 3:00 a.m. at the start of the month.



Neptune
Morning planet. Visibility improves throughout the month.



BRIGHT DEEP SKY OBJECTS

Great Sagittarius Cluster also known as M22 is located in Sagittarius constellation with an apparent magnitude of 4.9. 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.





Andromeda galaxy also known as NGC 224 or M31 is located in Andromeda constellation with apparent magnitude of 3.4 and is best observed from Northern Hemisphere. To the naked eye, M24 will only appear as a faint patch of light.

NGC 6611 or Eagle Nebula is located in Serpens constellation and is best observed from Northern Hemisphere. It has an apparent magnitude of 5.9. It is 5700 light years away and it resembles an eagle with spread wings.





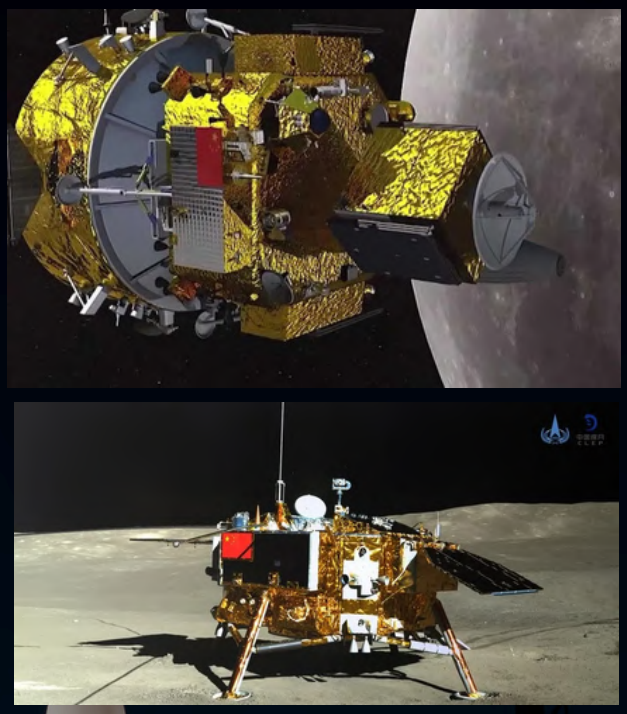
NGC 6205 also known as Hercules Globular Cluster is best observed from Northern hemisphere. It has an apparent magnitude of 5.8. The object is easily distinguishable with binoculars. It is located 23,000 light years away from Earth. We can use a small telescope for detailed view.

ROCKET LAUNCHES IN AUGUST 2026

CHANG'E-7 – CHINA'S LUNAR SOUTH POLE EXPLORATION MISSION

Chang'e-7 is one of China's most ambitious lunar exploration missions, designed to investigate the largely unexplored south polar region of the Moon. The mission is scheduled for launch in 2026 from the Wenchang Spacecraft Launch Site in Hainan, China, aboard a Long March-5 rocket. It will consist of an orbiter, relay satellite, lander, rover, and a unique flying or hopping exploration vehicle, allowing scientists to study the Moon from orbit and explore its challenging surface terrain.

The primary objective of Chang'e-7 is to study the Moon's south pole, particularly the permanently shadowed craters where sunlight may not have reached the surface for billions of years. Scientists believe these extremely cold regions may contain water ice and other volatile materials preserved in the lunar soil. The mission will investigate the region's surface composition, terrain, thermal environment, magnetic field, internal structure, and the distribution of water and other resources.



Chang'e-7 (Credit: Planetary.org)



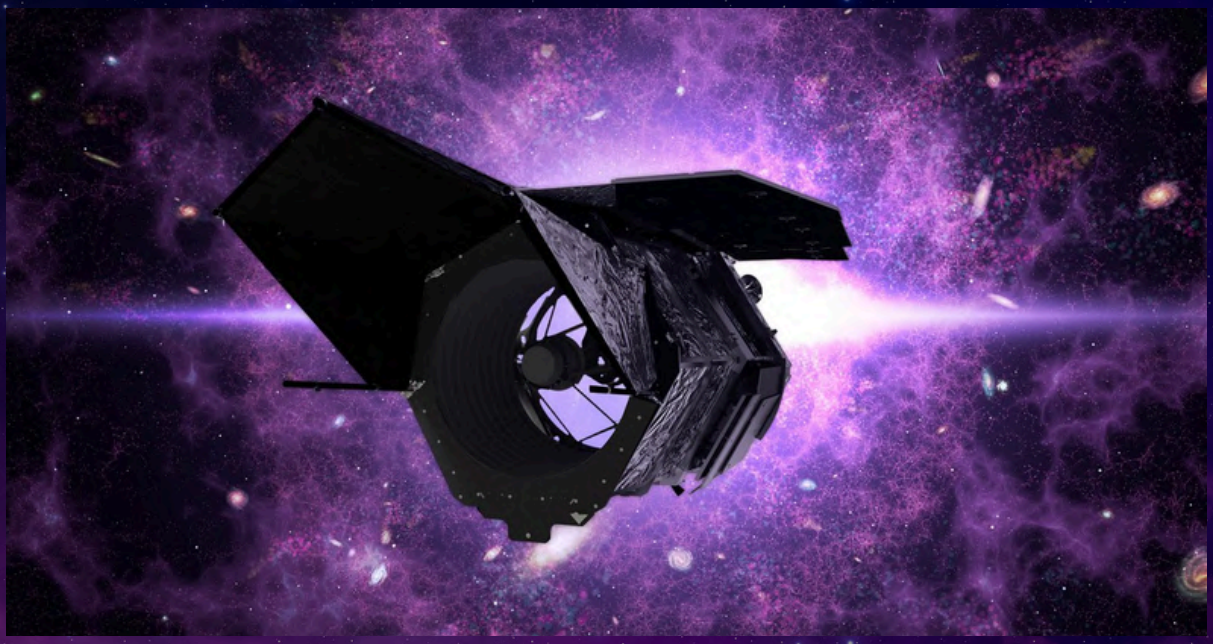
Long March 5 (CZ-5) (Credit: supercluster)

One of the most exciting features of Chang'e-7 is its combination of different exploration methods. The orbiter will observe the Moon from above, while the lander and rover will conduct scientific investigations on the surface. A special hopping exploration vehicle is also planned to reach difficult locations, including areas near or inside permanently shadowed craters. This combination of orbiting, landing, roving, and hopping will allow the mission to explore a much wider range of the lunar south pole.

The mission also includes international scientific cooperation, with instruments from several countries contributing to studies of the lunar surface, space environment, radiation, space weather, and astronomy. The search for lunar water ice is especially important because water could potentially be used by future explorers for drinking, producing oxygen, and generating rocket fuel. These resources could make the Moon a valuable base for future human missions and deeper journeys into space.

Chang'e-7 is therefore more than a mission to explore a remote region of the Moon–it is an important step toward the future of lunar exploration. The knowledge gained from the mission could support future robotic and crewed missions, the development of lunar resources, and plans for long-term scientific facilities on the Moon. By exploring one of the most mysterious and scientifically valuable regions of our nearest celestial neighbour, Chang'e-7 could help reveal the secrets of the lunar south pole and prepare humanity for a new era of exploration beyond Earth.

NANCY GRACE ROMAN SPACE TELESCOPE NASA'S WIDE-EYED OBSERVATORY



NASA's Wide Field Infrared Survey Telescope (WFIRST) is now named the Nancy Grace Roman Space Telescope, after NASA's first Chief of Astronomy. Credits: NASA

The Nancy Grace Roman Space Telescope is NASA's next-generation space observatory, designed to investigate some of the biggest mysteries in the universe, including dark energy, dark matter, the evolution of galaxies, and the formation of planetary systems. Named after Nancy Grace Roman, NASA's first chief astronomer and a key figure in the development of the Hubble Space Telescope, Roman is scheduled to launch on 30 August 2026 aboard a SpaceX Falcon Heavy rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida. After launch, the telescope will travel to the Sun-Earth L2 point, approximately 1.5 million kilometres from Earth, where it will conduct its scientific observations.

Roman's greatest strength is its enormous field of view. Its Wide Field Instrument will capture huge sections of the sky in near-infrared light, allowing astronomers to survey the universe far more rapidly than previous space telescopes. With a field of view at least 100 times larger than Hubble's, Roman will be able to study billions of galaxies and create detailed maps of the universe. These observations will help scientists understand how the universe has expanded over time and investigate the mysterious dark energy believed to be driving its accelerating expansion.

The telescope will also be a powerful tool for discovering planets beyond our Solar System. By using a technique called gravitational microlensing, Roman will search for distant exoplanets, including planets that are difficult to detect using other methods. Its Coronagraph Instrument, a technology demonstration, will also test advanced techniques for blocking the glare of stars so that astronomers can directly study some of the planets and planet-forming disks surrounding them.

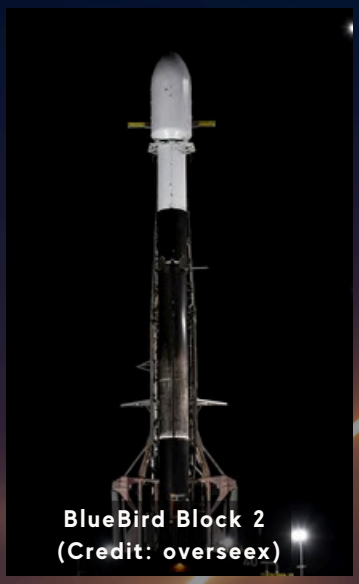
The Nancy Grace Roman Space Telescope is expected to transform astronomy by combining a wide view of the cosmos with powerful infrared observations. It will study dark energy and dark matter, trace the growth of galaxies, discover new worlds, and observe changing cosmic events across vast regions of space. By surveying the universe on an enormous scale, Roman will complement observatories such as Hubble and the James Webb Space Telescope while helping scientists answer some of the most fundamental questions about how the universe began, evolved, and continues to change.

MICHIBIKI 7 (QZS-7)

Michibiki 7 (QZS-7) is the seventh satellite in Japan's Quasi-Zenith Satellite System (QZSS), also known as Michibiki. It is scheduled to launch on 7 August 2026 from the Tanegashima Space Center aboard the H3-22S (H3 F9) launch vehicle. The H3-22S configuration features two LE-9 liquid-fuel engines, two SRB-3 solid rocket boosters, and a short payload fairing, making it suitable for carrying the navigation satellite into orbit. QZS-7 is designed to strengthen Japan's satellite navigation infrastructure by improving the accuracy, reliability, and availability of positioning, navigation, and timing (PNT) services. The enhanced capabilities will benefit a wide range of sectors, including transportation, disaster management, surveying, precision agriculture, autonomous systems, and emergency response. The satellite will work alongside other QZSS satellites to provide better regional coverage, particularly over Japan and nearby areas.



H3-24
(Credit: nextspaceflight)


BlueBird Block 2
(Credit: overseex)

BLUEBIRD BLOCK 2

BlueBird Block 2 (Satellites 6-8) is a satellite deployment mission for AST SpaceMobile's next-generation BlueBird satellite constellation, designed to provide space-based cellular broadband connectivity directly to standard mobile phones.

The mission is scheduled to launch on 17 June 2026 from Space Launch Complex 40 at Cape Canaveral Space Force Station, Florida, aboard a SpaceX Falcon 9 rocket.

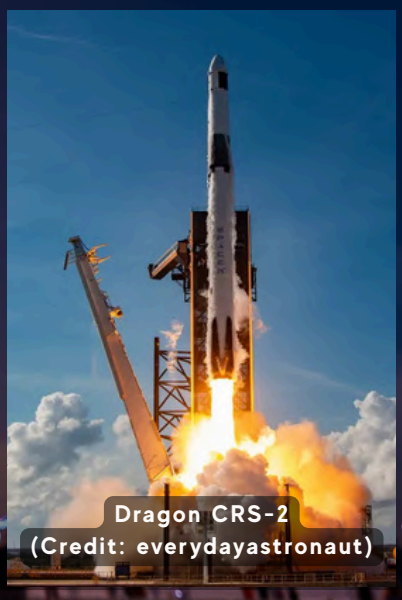
The primary purpose of these satellites is to expand AST SpaceMobile's space-based cellular broadband network, providing voice, messaging, and broadband data services directly to ordinary smartphones, especially in remote and underserved areas where traditional cellular infrastructure is limited or unavailable.

DRAGON CRS-2

Dragon CRS-2 (SpX-2) was a commercial resupply mission that delivered cargo and scientific supplies to the International Space Station (ISS). The mission launched on 1 March 2013 from Space Launch Complex 40 at Cape Canaveral Air Force Station, Florida, aboard a Falcon 9 v1.0 rocket.

The primary purpose of Dragon CRS-2 was to support NASA's Commercial Resupply Services program by transporting essential cargo and scientific experiments to the ISS.

The mission also demonstrated SpaceX's ability to deliver supplies to the station and safely return the Dragon spacecraft and cargo back to Earth.


Dragon CRS-2
(Credit: everydayastronaut)

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

SETBACKS THAT BUILT SPACE SUCCESS

THE MISSION THAT CHANGED HOW WE LAND ON MARS



Mars Polar Lander Under Final Preparation. (Credit: NASA)

A Bold Journey to the Red Planet:
On 3 January 1999, NASA launched the Mars Polar Lander on an ambitious mission to explore the icy south pole of Mars. Scientists hoped the spacecraft would become the first to study this unexplored region, dig beneath the dusty surface, and search for frozen water that could reveal clues about the planet's ancient climate.

Imagine sending a robot to explore Antarctica—but instead of crossing snow on Earth, it had to travel more than 700 million kilometres through space. After an 11-month journey, the lander finally reached Mars. On 3 December 1999, it began the most dangerous part of its mission: landing safely on the Red Planet.

Seven Minutes That Changed Everything:
Landing on Mars is one of the toughest challenges in space exploration. Imagine throwing a paper airplane from one city and expecting it to land perfectly on a tiny target in another, without being able to guide it.

That's because radio signals from Mars take several minutes to reach Earth, so the spacecraft must make every decision on its own.
As Mars Polar Lander entered the atmosphere, it had to survive intense heat, deploy a parachute, fire its rocket engines, and slow down for a gentle landing. Then, just moments before touchdown, communication suddenly stopped.

A Small Mistake, A Big Lesson:
Engineers later concluded that when the lander's legs unfolded, they created a small vibration. The onboard computer mistakenly thought the spacecraft had already landed and switched off its engines while it was still about 40 metres above the surface.

It was like stepping off a ladder because you thought your feet had reached the ground—only to discover there were still several steps left. Although NASA never heard from the lander again, scientists continued searching for it using orbiting spacecraft, hoping to solve the mystery.

A Legacy That Lives On:
The Mars Polar Lander's journey changed Mars exploration forever. Along with the lessons from the Mars Climate Orbiter, it inspired better software testing, stronger safety checks, and smarter landing systems.

These improvements helped later missions like Phoenix, Curiosity, and Perseverance land successfully and unlock new secrets about Mars. Every space mission teaches something valuable. Just like every practice run makes an athlete stronger, every mission helps scientists build safer spacecraft and take the next giant leap toward exploring the Solar System.

Happy Birthday


August 1, 1818

Maria Mitchell

Maria Mitchell (August 1, 1818 – June 28, 1889) was America's first professional female astronomer and a pioneering figure in science. In 1847, she discovered a comet through a telescope, which became known as "Miss Mitchell's Comet," earning her international acclaim. Her remarkable achievement led to her becoming the first female member of the American Academy of Arts and Sciences. Her legacy lives on as a symbol of curiosity, perseverance, and the importance of women in astronomy. (Credit: Maria Mitchell Association)

Neil Armstrong

Neil Alden Armstrong (August 5, 1930 – August 25, 2012) was an American astronaut, aeronautical engineer, and the first human to walk on the Moon. On July 20, 1969, during NASA's Apollo 11 mission, he stepped onto the lunar surface and declared, "That's one small step for man, one giant leap for mankind." A former Navy pilot and test pilot, he flew over 200 types of aircraft. His legacy continues to symbolize bravery, excellence, and humanity's enduring quest to explore the vast frontiers of space. (Credit: Wikipedia)


August 5, 1930


August 10, 1927

Vainu Bappu

Manali Kallat Vainu Bappu (10 August 1927 – 19 August 1982), known as the "Father of Modern Indian Astronomy," made significant contributions to Indian science. He co-discovered a comet and formulated the Bappu-Bok relation, which helps determine the brightness of stars. A visionary leader, he helped establish major observatories, including the Vainu Bappu Observatory in Tamil Nadu. His dedication and vision inspired generations of students to explore the universe and contributed greatly to India's position in global astronomy. (Credits: Duraspace)

Happy Birthday

Vikram Sarabhai


August 12, 1919

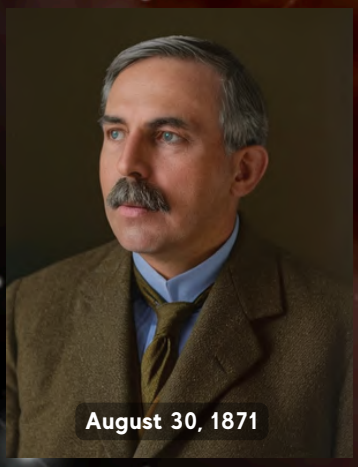
Vikram Ambalal Sarabhai (12 August 1919 – 30 December 1971), hailed as "Father of the Indian Space Program". He believed that space technology could help solve real-life problems in India like communication, education and weather forecast. He founded ISRO and guided the launch of India's first satellite, Aryabhata. He also helped set up top research institutions like IIM Ahmedabad and the Physical Research Laboratory. His work laid the foundation for India's space success, including missions like Chandrayaan and Mangalyaan. (Credit: Wikipedia)

John Flamsteed

John Flamsteed (19 August 1646 – 31 December 1719) was an English astronomer and created one of the most accurate star catalogs of his time, listing over 3,000 stars. He also made the first recorded observations of Uranus, though he mistook it for a star. He laid the foundation stone for the Royal Greenwich Observatory, which later became the center for timekeeping and astronomical research. His dedication and precision laid the groundwork for many discoveries in modern astronomy and inspired generations of stargazers. (Credit: Wikipedia)


August 19, 1646

Ernest Rutherford


August 30, 1871

Ernest Rutherford (30 August 1871 – 19 October 1937) was a physicist known as the "Father of Nuclear Physics". He was the first to show that atoms have a tiny, dense center called the nucleus. His famous gold foil experiment led to the discovery that most of an atom is empty space. Rutherford also discovered the concept of radioactive half-life and named the alpha, beta, and gamma rays and received the Nobel Prize in Chemistry in 1908. His groundbreaking research changed the understanding of the atom, nuclear science and energy. (Credit: Wikipedia)

SPACE PARADOXES: GLITCHES IN THE COSMOS

Can the Universe Lose Its Memory?

For decades, black holes were thought to be the universe's ultimate shredders. Anything that crossed the event horizon; stars, planets, even light, seemed destined to vanish forever. Then Stephen Hawking discovered that black holes slowly evaporate by emitting Hawking radiation. This raised a startling question: If the black hole disappears, what happens to everything that fell into it?
That puzzle became known as the Black Hole Information Paradox.

The Library That Burned Without Leaving Ash:
Imagine burning an entire library. The books are gone, but in principle, every word still exists within the smoke, heat, and scattered ash. The information hasn't vanished, it has become unimaginably scrambled.

Hawking's calculations suggested black holes were different. Their radiation appeared perfectly random, carrying no trace of the stars, planets, or people that had fallen in. If the black hole eventually evaporated, the universe would lose information forever, a direct violation of quantum mechanics, which insists that information can never truly be destroyed.



A New Chapter in the Story:
For years, physicists proposed solutions ranging from "soft hair" on the event horizon to hidden quantum correlations. But the biggest breakthrough came in 2019 with the discovery of entanglement islandss and replica wormholes.

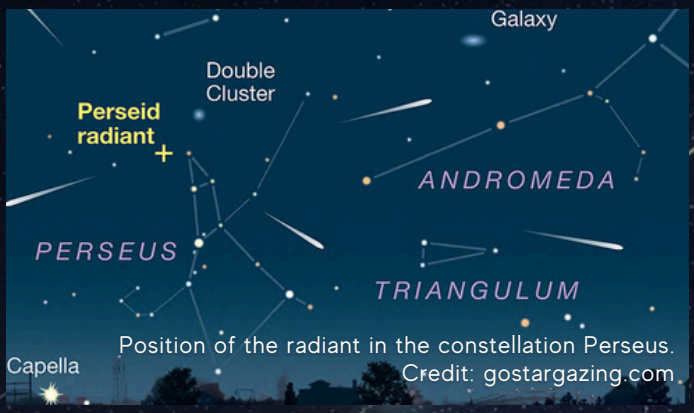
These ideas revealed that Hawking's original calculation had overlooked subtle quantum-gravity effects. Once included, the radiation is no longer perfectly random. Instead, it behaves like the pieces of a thousand-piece jigsaw puzzle: each fragment appears meaningless on its own, but together they reconstruct the complete picture.

The Universe Never Forgets:
Imagine a document shredded into thousands of tiny pieces. The message seems lost, but every fragment still holds part of the story.
Physicists now believe Hawking radiation works the same way. Information isn't destroyed, it is scattered into tiny quantum patterns that are almost impossible to decode. The mystery is no longer if black holes preserve information, but how they do it.

ASTRONOMICAL EVENTS

Perseids Meteor Shower: The Sky's Greatest Fireworks Display

The Perseid Meteor Shower is one of the brightest and most reliable meteor showers of the year. Active from July 17 to August 24, it reaches its peak on the night of August 12–13, when Earth passes through the dust trail left behind by Comet 109P/Swift-Tuttle.



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

Under ideal dark skies, observers can expect a Zenithal Hourly Rate (ZHR) of about 100 meteors per hour. These meteors streak across the sky at nearly 59 km/s, often leaving long, glowing trails and occasionally producing brilliant fireballs. In 2026, a new Moon provides excellent observing conditions with minimal moonlight interference.

Although the meteors appear to radiate from the constellation Perseus in the northeastern sky, you don't need to look directly at the radiant. The best viewing time is after midnight until dawn, when Perseus climbs higher in the sky. Simply lie back and observe as much of the sky as possible from a dark, unobstructed location.

A Celestial Gathering: Before the Sun Rises

On August 12, an impressive pre-dawn planetary alignment brings Mercury, Jupiter, Mars, Uranus, Saturn, and Neptune into the morning sky. While the planets are not physically close, they appear aligned along the ecliptic, creating a beautiful celestial display.

Begin observing before sunrise, around 4:15 AM to 5:30 AM looking toward the eastern and southeastern horizon. Mercury, Jupiter, Mars, and Saturn are visible to the naked eye, while Uranus (magnitude +5.7) and Neptune (magnitude +7.8) require binoculars or a small telescope under dark skies.



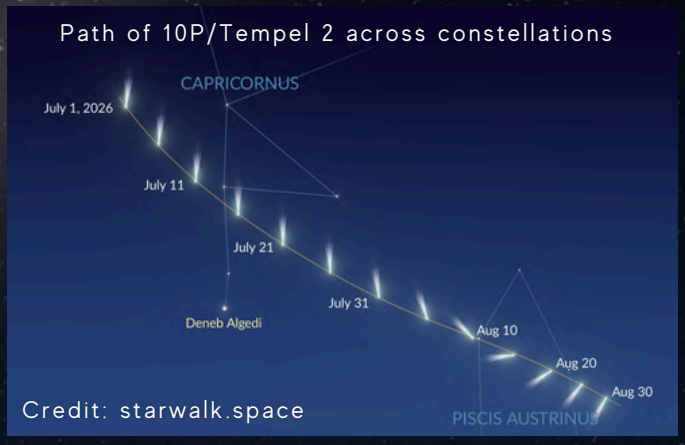
With a clear, unobstructed horizon, this rare gathering offers a wonderful opportunity to observe six planets in a single morning. Jupiter shines as the brightest member of the lineup, Mars appears distinctly reddish, and Saturn's steady golden glow completes this spectacular pre-dawn planetary parade. Although planetary alignments are not uncommon, seeing six planets visible during the same observing session is always a memorable experience for skywatchers.

Comet 10P/Tempel 2: A Frozen Wanderer at Its Closest to the Sun

Imagine witnessing an object that has been travelling through the Solar System for billions of years. On August 2, 2026, Comet 10P/Tempel 2 reaches perihelion its closest point to the Sun–offering astronomers and skywatchers a chance to observe one of the Solar System's oldest visitors.

Discovered in 1873 by German astronomer Wilhelm Tempel, this Jupiter family comet completes one orbit around the Sun every 5.4 years. Its icy nucleus, about 10 kilometres across, is a frozen time capsule preserving material from the birth of the Solar System nearly 4.6 billion years ago.

As the comet approaches the Sun, solar heat causes its frozen surface to sublimate, releasing streams of gas and dust into space. This forms the comet's glowing coma and delicate tail, creating the spectacular appearance that has captivated skywatchers for centuries. Each return allows astronomers to study how comets evolve and uncover clues about the Solar System's earliest history.



Near perihelion, Comet 10P/Tempel 2 is expected to brighten to around magnitude +7, making it an excellent target for binoculars or small telescopes under dark skies. During early August, the comet will be located in the constellation Capricornus. Observers in the Southern Hemisphere will enjoy the best views, with the comet appearing high in the sky. In the Northern Hemisphere, the comet remains visible but stays low above the southern horizon, making a clear, unobstructed view essential. The best time to observe is during the late evening and early morning hours.



10P/Tempel 2 photographed on June 22, 2026, by Pepe Chambó. Credit: cloudynights.com

Unlike planets that follow predictable paths or stars that appear fixed in the sky, a comet is a true celestial wanderer. Watching 10P/Tempel 2 drift slowly against the background stars is like witnessing a messenger from the dawn of the Solar System. Every glimpse of this ancient visitor is a reminder that the building blocks of our planetary system are still travelling through space, waiting to share their story with those who look up.

GREATEST ELONGATIONS OF INNER PLANETS

Mercury and Venus are known as the inner planets because they orbit the Sun closer than Earth. Unlike Mars, Jupiter, or Saturn, they never appear high in the midnight sky. Instead, they are always found close to the Sun, either in the western sky after sunset or in the eastern sky before sunrise. This is a result of the unique geometry of the Solar System. Since these planets orbit inside Earth's path, our line of sight never allows them to stray far from the Sun in the sky.

As Mercury and Venus orbit the Sun, the angle between the Sun, Earth, and the planet constantly changes. When this angle reaches its maximum, the planet is said to be at greatest elongation, its greatest apparent distance from the Sun in our sky. This is the best time to observe the planet, as it remains visible longer after sunset or before sunrise. Greatest eastern elongation places the planet in the evening sky, while greatest western elongation makes it visible before sunrise.

Because Mercury orbits the Sun in just 88 days, it reaches a greatest elongation approximately every 3 to 4 months, alternating between eastern and western elongations. Venus, with its slower 225-day orbit, reaches greatest elongation only about once every 9½ months, making each event a much more anticipated spectacle. These predictable celestial alignments not only provide excellent viewing opportunities but also beautifully demonstrate the orbital dance of the planets around the Sun.

MERCURY AT GREATEST WESTERN ELONGATION



Place: New Delhi / Date: 02nd August / Time: 05:50 a.m.

On August 2, Mercury will reach its maximum angular separation from the Sun (19°28'), making this the best time to observe the planet. Look low in the eastern sky about 30–45 minutes before sunrise, where the tiny planet will shine at around magnitude 0.3 and be positioned in the constellation Gemini. You can see it with the naked eye in the morning sky.

VENUS AT GREATEST EASTERN ELONGATION



Place: New Delhi / Date: 15th August / Time: 07:45 p.m.

On August 15, Venus will reach its maximum angular separation from the Sun (45°53'). It will shine brilliantly at a magnitude of -4.3 and will be positioned in the constellation Virgo. You can easily see it with the naked eye in the evening sky. A telescope reveals Venus as a striking half-illuminated (48%) disk. Venus is much brighter than Mercury and remains above the horizon much longer.

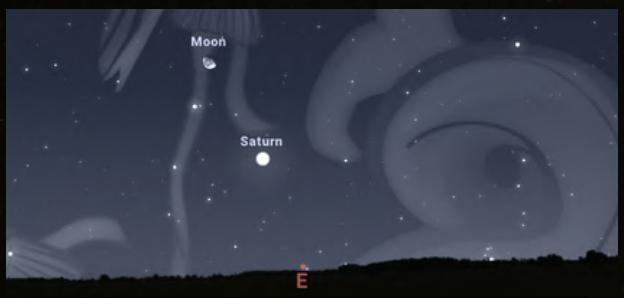
CONJUNCTIONS FOR THE MONTH

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 Saturn

On August 4, the 74% illuminated Moon appears close to Saturn in the early morning sky. Saturn shines steadily at magnitude +0.6, making it easy to spot near the bright waxing gibbous Moon. Look high in the southwestern sky before sunrise to observe this attractive conjunction. The event is visible to the naked eye, while binoculars or a small telescope can provide a more detailed view.



Place: New Delhi / Date: 03th August / Time: 11:00 pm.

Conjunction of Moon and Pleiades

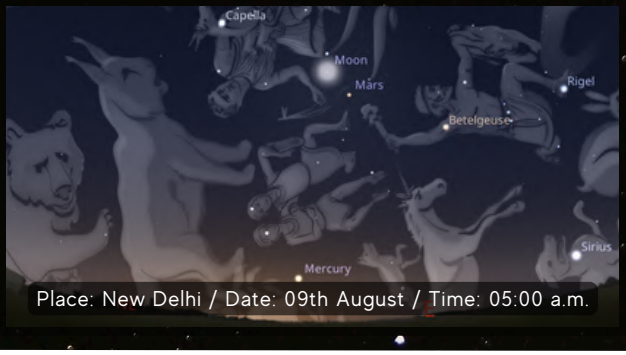
On August 7, the 40% illuminated Moon appears close to the Pleiades (M45) in the pre-dawn sky. The beautiful open star cluster will be visible just beside the crescent Moon, creating an attractive pairing for early morning skywatchers. Look toward the eastern horizon before sunrise for the best view. The conjunction is easily visible to the naked eye, while binoculars will reveal the blue stars of the Pleiades in greater detail.



Place: New Delhi / Date: 07th August / Time: 05:30 a.m.

Conjunction of Moon and Mars

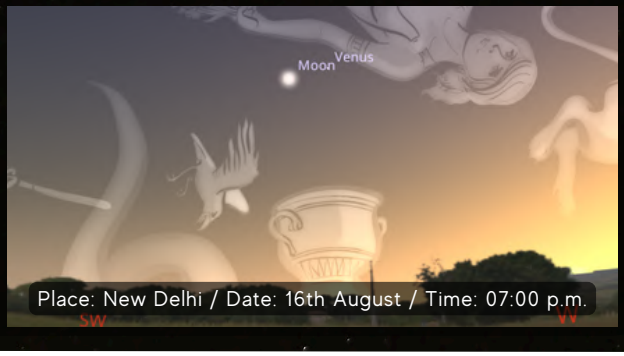
On August 9, the 18% illuminated Moon appears close to Mars in the pre-dawn sky. Mars shines with its distinctive reddish-orange glow at around magnitude +1.3, making it easy to identify near the slender waning crescent Moon. Look toward the eastern horizon before sunrise to enjoy this attractive conjunction. The event is easily visible to the naked eye, while binoculars provide a detailed view.



Place: New Delhi / Date: 09th August / Time: 05:00 a.m.

Conjunction of Moon and Venus

On August 16, the 17% illuminated Moon appears close to Venus in the western sky after sunset. Venus shines brilliantly at magnitude −4.2, making it the brightest object in the evening sky after the Moon. Look toward the western horizon during twilight to observe this striking conjunction. The event is easily visible to the naked eye, while binoculars offer a beautiful view of the slender crescent Moon alongside dazzling Venus.



Place: New Delhi / Date: 16th August / Time: 07:00 p.m.

STUDENTS CORNER

DARK MATTER

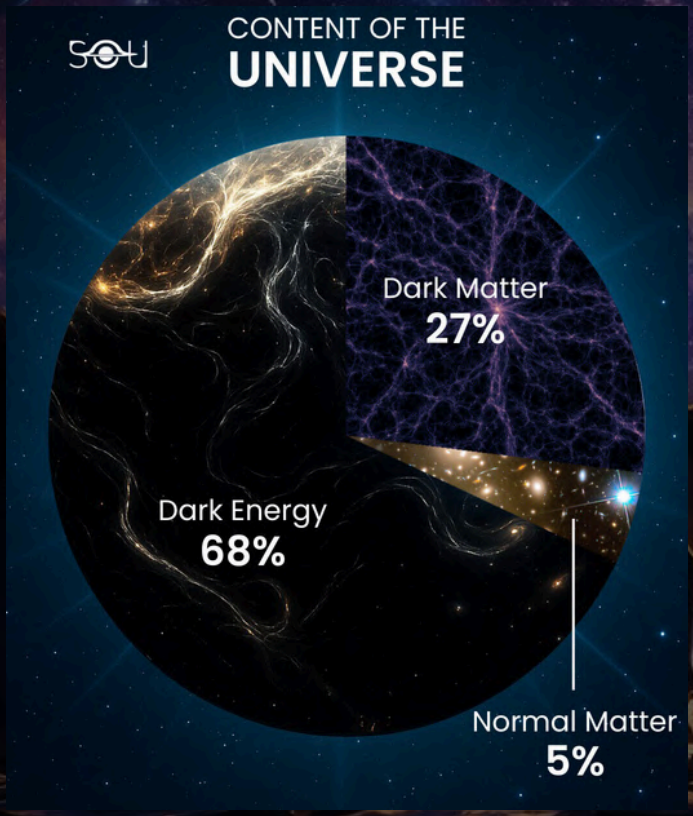
ADVIKA PANDEY

The more you read about space, the more you learn about the depths of the mysteries in our ever expanding universe that still remain unsolved.

The first time I heard the name of dark matter I imagined a black cloud somewhere in outer space, but turns out it isn't what I imagined at all. It doesn't emit, absorb, or reflect light, and its presence is only known through its gravitational pull on visible objects.

Then why do scientists think it exists? In the 1970s, astronomers like Vera Rubin took note that stars at the outer edges of galaxies were moving much faster than predicted by Newtonian physics and there wasn't enough visible mass in the galaxies to generate the gravitational force needed to keep these stars from flying out into deep space.

This as of our understanding meant a large amount of unseen mass. A famous pieces of evidence comes from observing the Bullet Cluster, after the collision of two galaxy clusters, it was observed that ordinary matter slowed down during collison while the dark matter passed right through, seperating itself from normal matter.



Researchers are continuously trying to detect the particles in dark matter using underground detectors, or indirectly by observing cosmic rays and gamma rays using massive telescopes but we still barely understand it.

Ironically the name itself suggests how mysterious dark matter is. We know it isn't magic but we haven't found an actual answer either. It's just our best bet.

Many more mysteries as such remain unsolved and perhaps that's what makes space all the more intriguing.

ASK THE UNIVERSE

In the very beginning of universe, when it was creating, there was nothing and if there was nothing there was not darkness, then what was there , how was the universe formed , who created the very first material of universe..???? (Question by Agampreet kaur)

According to the Big Bang Theory, the universe began about 13.8 billion years ago from an extremely hot and dense state. Before this event, our current understanding of physics cannot explain what existed, or even whether concepts like space, time, light, or darkness had any meaning. Darkness requires space without light, but if space itself did not yet exist, darkness as we know it did not exist either. As the universe expanded and cooled, the first particles, atoms, stars, and galaxies gradually formed. Scientists are still investigating what, if anything, existed before the Big Bang, and who or what initiated it remains an open question.

What is the difference between meteor , meteoroids and meteorite? (Question by Bhavya Shukla)

A meteoroid is a small rocky or metallic object traveling through space, usually much smaller than an asteroid.

A meteor is the bright streak of light produced when a meteoroid enters Earth's atmosphere and burns up due to friction with the air. It is commonly called a "shooting star."

A meteorite is the part of a meteoroid that survives its journey through the atmosphere and lands on Earth's surface.

And when many meteors appear to originate from the same region of the sky, we call it a meteor shower.

If time moves differently near massive objects, could astronauts on a very long mission technically "travel into the future" compared to people on Earth? (Question by Advika Pandey)

Yes! According to Einstein's Theory of Relativity, astronauts on a very long mission could technically travel into the future compared to people on Earth. This happens because time passes more slowly for objects moving at very high speeds or near extremely massive objects, such as black holes. This effect is called time dilation. When the astronauts return, they may have aged less than the people who stayed on Earth. Although the difference is tiny for today's space missions, it has been measured using precise atomic clocks and GPS satellites. So, in a scientific sense, astronauts can indeed travel slightly into Earth's future.

ASK THE UNIVERSE

What actually happens to information and matter when it falls into a black hole? (Questions By ANURABH SHRIVASTAVA)

When matter falls into a black hole, it is pulled inward by the black hole's immense gravity. As it approaches the event horizon the point beyond which nothing can escape it appears to slow down and fade from the view of a distant observer due to the effects of gravity. Once it crosses the event horizon, it is trapped forever and continues toward the singularity, a region where gravity becomes so intense that our current understanding of physics no longer works.

The fate of the information carried by that matter is still an unsolved scientific mystery. According to quantum physics, information should never be destroyed, but classical black hole theory suggests it could be lost. This conflict is known as the Black Hole Information Paradox. One possible explanation is that the information is somehow encoded on the event horizon or slowly released through Hawking radiation, but scientists have not yet confirmed the exact answer.

What existed before the Big Bang theory? (Question by Aarav Kumar Poddar)

The honest scientific answer is that we do not know what existed before the Big Bang. According to the Big Bang Theory, the universe began about 13.8 billion years ago, and with it, space and time as we know them also came into existence. If time itself began with the Big Bang, then asking "what happened before it?" may not have a meaningful answer in the usual sense.

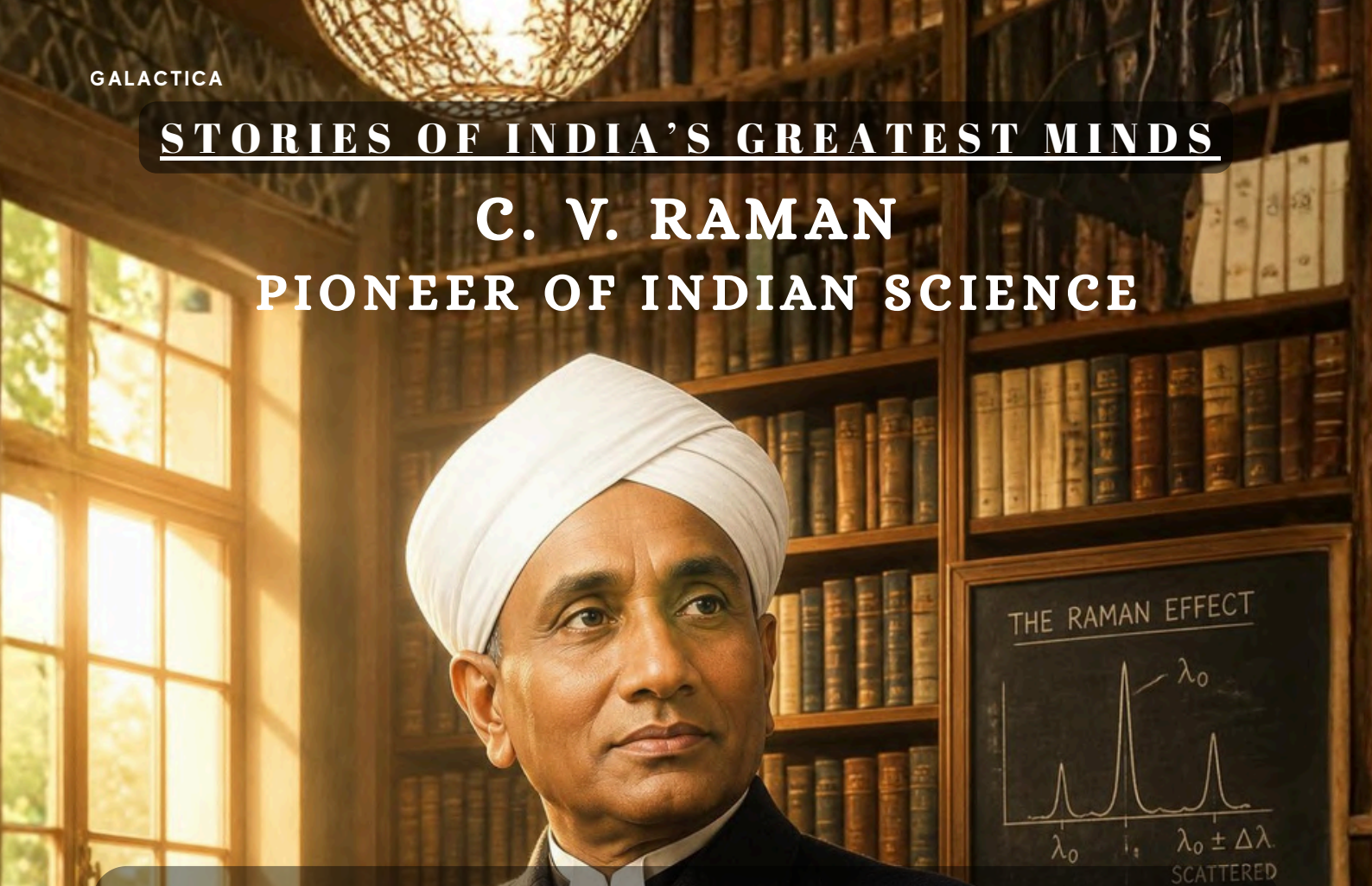
Scientists have proposed several ideas, such as a previous universe that collapsed and rebounded (the Big Bounce), a universe born from quantum fluctuations, or the existence of a multiverse. However, none of these hypotheses has been confirmed by evidence. Therefore, the scientifically accurate answer is that what existed before the Big Bang remains one of the greatest unsolved mysteries in cosmology.

How did the universe begin, and what mysteries about its origin are scientists still trying to solve? (Question by Divyansh)

The Big Bang Theory states that the universe began about 13.8 billion years ago from an extremely hot and dense state, then expanded and cooled to form stars, galaxies, and planets. While this theory explains how the universe evolved, scientists are still trying to answer important questions: What caused the Big Bang? What happened in the first fraction of a second? What are dark matter and dark energy? These remain some of the greatest mysteries in modern astronomy.

STORIES OF INDIA'S GREATEST MINDS

C. V. RAMAN
PIONEER OF INDIAN SCIENCE



Sir Chandrasekhara Venkata Raman (1888–1970) was one of India's greatest scientists and the first Indian to receive the Nobel Prize in Science. His groundbreaking discovery, known as the Raman Effect, transformed the field of physics and laid the foundation for modern spectroscopy. He was awarded the Nobel Prize in Physics in 1930, becoming the first Asian scientist to receive a Nobel Prize in the sciences.

On 28 February 1928, Raman discovered that when light passes through a transparent material, a small portion of the scattered light changes its wavelength. This phenomenon, later named the Raman Effect, revealed that light interacts with molecules in unique ways. His discovery enabled scientists to identify the chemical composition and molecular structure of substances without destroying them. Today, this principle is widely used in medicine, chemistry, environmental science, forensic investigations, and materials research.

The Raman Effect also plays a significant role in space science. Raman spectroscopy is used to analyze the composition of rocks, minerals, ice, and atmospheric gases on planets and moons. Space missions use instruments based on Raman's discovery to search for water, study planetary geology, and even investigate signs of past or present life beyond Earth. His work has therefore become an essential tool in planetary exploration and modern space optics.

Beyond his scientific achievements, C. V. Raman was a passionate teacher and mentor who believed that curiosity and experimentation were the keys to discovery. He inspired generations of Indian students and researchers to pursue careers in science and helped establish India as a nation capable of world class scientific research. His contributions continue to influence scientific advancements across the globe.

To honour his historic discovery, 28 February is celebrated every year as National Science Day in India. Sir C. V. Raman's legacy reminds us that a single observation, driven by curiosity and determination, can change the course of science and deepen humanity's understanding of the universe.

August

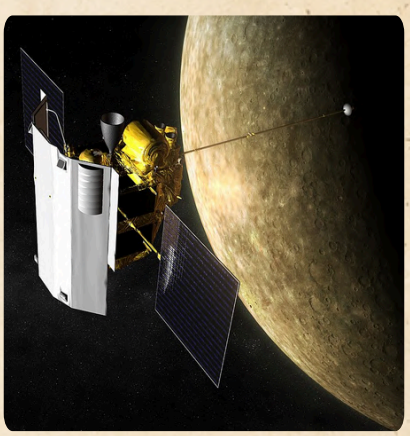
THIS MONTH IN HISTORY

LAUNCHING OF MESSENGER

03

AUG 2004

NASA launched the MESSENGER (MErcury Surface, Space ENvironment, GEochemistry, and Ranging) spacecraft on its journey to Mercury. It became the first mission to orbit the innermost planet after completing multiple flybys of Earth, Venus, and Mercury. During its four-year orbital mission, MESSENGER mapped nearly the entire surface, studied Mercury's magnetic field, analyzed its chemical composition, and confirmed the presence of water ice. (image credit: NASA / JHU/APL)



CURIOSITY ROVER ON MARS



06

AUG 2012

NASA's Curiosity Rover successfully landed inside Gale Crater on Mars using the revolutionary Sky Crane landing system. The mission was designed to investigate whether ancient Mars ever had conditions suitable for microbial life. Curiosity has since discovered evidence of ancient rivers, lakes, and organic molecules while continuously studying the Martian atmosphere and geology. It remains one of the most successful planetary exploration missions ever undertaken and continues to provide valuable scientific discoveries. (image credit: en.wikipedia.org)

EXPLORER 6 LAUNCHED

07

AUG 1959

The United States launched Explorer 6, an experimental satellite that became famous for transmitting the first image of Earth from orbit. Although the image was low in resolution, it marked the beginning of satellite Earth imaging, which later revolutionized weather forecasting, environmental monitoring, and Earth science. Explorer 6 also studied cosmic rays, radiation, and the Earth's magnetic environment, making it an important milestone in the early Space Age. (image credit: mix.msfc.nasa.gov)



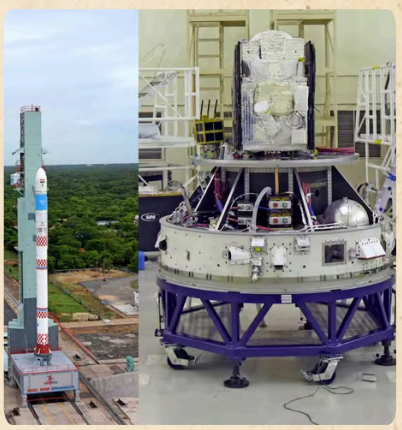
August

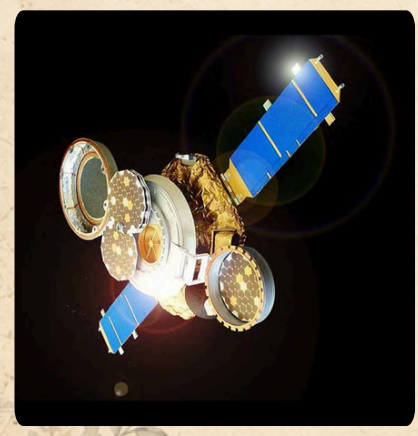
THIS MONTH IN HISTORY

SSLV-D1 MAIDEN FLIGHT

07 AUG 2022

ISRO conducted the first developmental flight of the Small Satellite Launch Vehicle (SSLV-D1) from the Satish Dhawan Space Centre. Although the mission encountered an issue that prevented the satellites from reaching their intended orbit, it successfully validated most of the rocket's systems. The lessons learned from SSLV-D1 helped ISRO improve the vehicle, leading to later successful missions. SSLV is designed to provide a cost-effective and quick-launch option for placing small satellites into orbit. (Image Credit: ISRO)





GENESIS SPACECRAFT

08 AUG 2001

NASA launched the Genesis spacecraft, a mission designed to collect particles from the solar wind and return them to Earth for laboratory analysis. Scientists hoped these samples would reveal the original composition of the Sun and provide clues about the formation of the Solar System. Although the sample capsule crash-landed due to a parachute failure, researchers successfully recovered many samples, leading to important discoveries about the Sun's elemental composition. (Image Credit: science.nasa.gov)

THE GREAT DAYLIGHT

10 AUG 1972

A spectacular meteoroid known as the Great Daylight Fireball entered Earth's atmosphere over North America. Instead of crashing into Earth, it skimmed through the upper atmosphere at high speed before escaping back into space. Thousands of people witnessed the brilliant daylight fireball, making it one of the rarest astronomical events ever recorded. The event helped scientists better understand how near-Earth objects interact with our atmosphere. (Image Credit: apod.nasa.gov)



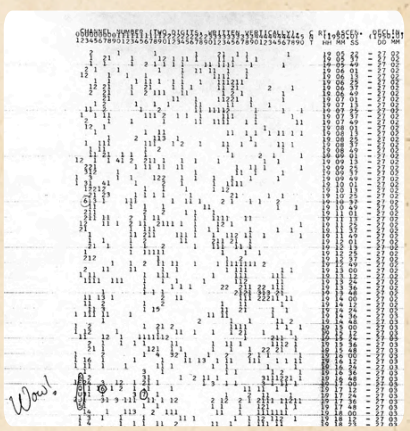
August

THIS MONTH IN HISTORY

THE "WOW!" SIGNAL

15 AUG 1977

Astronomers at Ohio State University's Big Ear Radio Observatory detected a strong, narrowband radio signal lasting 72 seconds. Researcher Jerry Ehman famously circled the printout and wrote "Wow!", giving the signal its famous name. Despite decades of investigation, the source of the signal has never been conclusively identified. It remains one of the most intriguing events in the history of the Search for Extraterrestrial Intelligence (SETI).(Image Credit: Big Ear Radio Observatory)



DISCOVERY OF HELIUM



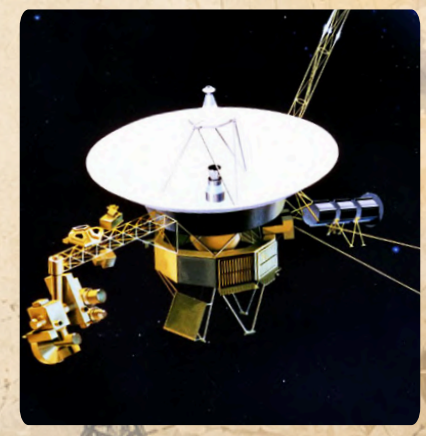
18 AUG 1868

During a total solar eclipse observed in India, French astronomer Pierre Janssen detected a previously unknown yellow spectral line in the Sun's atmosphere. English astronomer Norman Lockyer later concluded that the line belonged to a new element, which he named helium, after the Greek word Helios meaning Sun. Helium became the first element discovered in space before it was identified on Earth, marking a major milestone in spectroscopy and astronomy.. (Image Creadit:www.smithsonianmag.com)

VOYAGER 2 LAUNCHED

20 AUG 1977

NASA launched Voyager 2, one of the most successful spacecraft ever built. It became the only spacecraft to visit Jupiter, Saturn, Uranus, and Neptune, making groundbreaking discoveries about their atmospheres, rings, and moons. Voyager 2 continues its journey through interstellar space, carrying the famous Golden Record, a message from humanity intended for any intelligent civilizations that might encounter it in the distant future. (Image Credit: NASA)



August

THIS MONTH IN HISTORY

CHANDRAYAAN-3 LANDING

23 AUG 2023

ISRO's Chandrayaan-3 mission successfully achieved a soft landing near the Moon's south polar region. With this achievement, India became the fourth country to soft-land on the Moon and the first nation to land near the lunar south pole, an area believed to contain water ice. The mission demonstrated India's growing technological capabilities in planetary exploration, and 23 August is now celebrated annually as India's National Space Day. (Image Credit: isro.gov.in)





PLUTO RECLASSIFIED

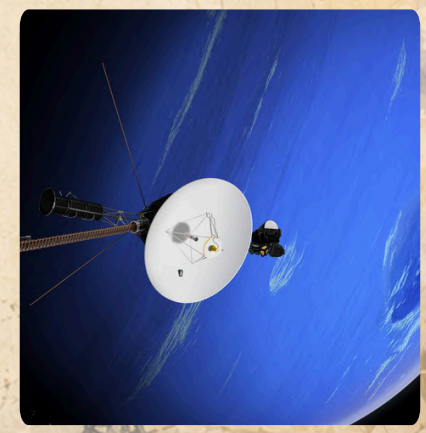
24 AUG 2006

The International Astronomical Union (IAU) adopted a formal definition of a planet during its General Assembly in Prague. Under the new criteria, Pluto no longer qualified as a planet because it had not cleared its orbital neighborhood. It was reclassified as a dwarf planet, sparking worldwide debate among scientists, educators, and the public. The decision reshaped our understanding of the Solar System and planetary classification.(Image Credit: NASA)

VOYAGER 2 FLYBY OF NEPTUNE

25 AUG 1989

Voyager 2 became the first and only spacecraft to fly past Neptune, providing humanity's first close-up observations of the distant ice giant. It discovered the Great Dark Spot, studied Neptune's powerful winds, examined its faint ring system, and discovered new moons. The encounter completed Voyager 2's historic Grand Tour of the outer planets and remains our only direct exploration of Neptune.(Image Credit: www.deviantart.com)



August

THIS DAY IN HISTORY

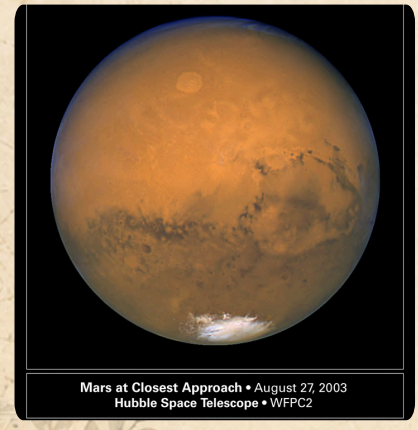
MARINER 2 LAUNCHED

27

AUG 1962

NASA launched Mariner 2, the first successful spacecraft sent to another planet. After a journey of nearly four months, it flew past Venus, measuring its extremely hot surface environment and studying the solar wind. The mission proved that interplanetary exploration was possible and laid the foundation for future missions to planets throughout the Solar System.(Image Credit:starchild.gsfc.nasa.gov)





Mars at Closest Approach • August 27, 2003
Hubble Space Telescope • WFPC2

MARS' CLOSEST APPROACH

27

AUG 2003

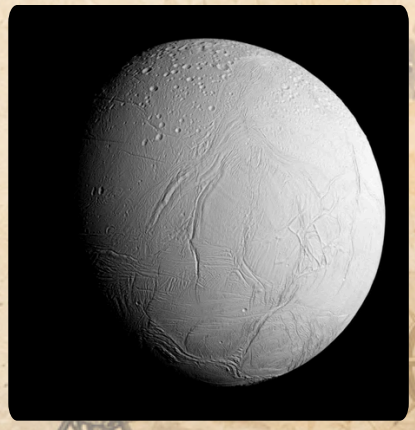
Mars made its closest approach to Earth in nearly 60,000 years, coming within about 55.76 million kilometers. The event attracted astronomers and skywatchers worldwide, as the Red Planet appeared brighter and larger than usual in the night sky. Although Mars still appeared as a bright reddish point without a telescope, the close approach provided excellent opportunities for scientific observations and public outreach. (Image Credit: science.nasa.gov)

DISCOVERY OF ENCELADUS

28

AUG 1789

British astronomer William Herschel discovered Enceladus, one of Saturn's moons, using his newly built telescope. More than two centuries later, NASA's Cassini mission revealed that Enceladus has active geysers ejecting water vapor and ice from a global subsurface ocean beneath its icy crust. These discoveries have made Enceladus one of the most promising places in the Solar System in the search for possible extraterrestrial life.(Image Credit: NASA/JPL)

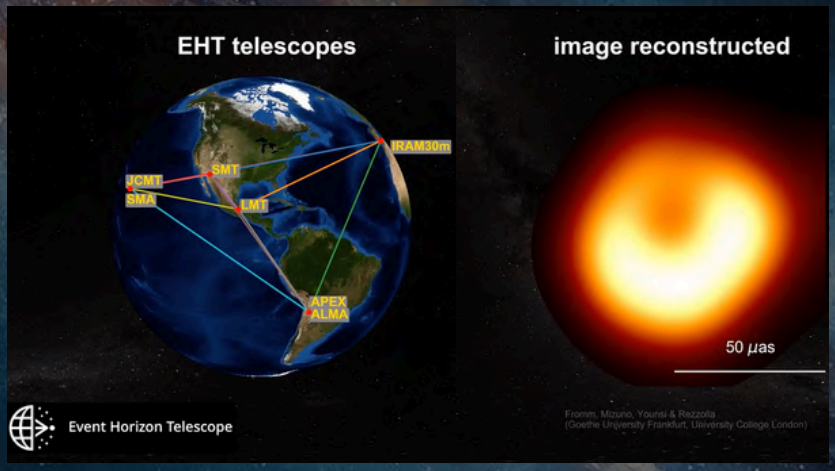


ASTRONOMY & SPACE TERM

INTERFEROMETRY

COMBINING TELESCOPES, EXPANDING VISION

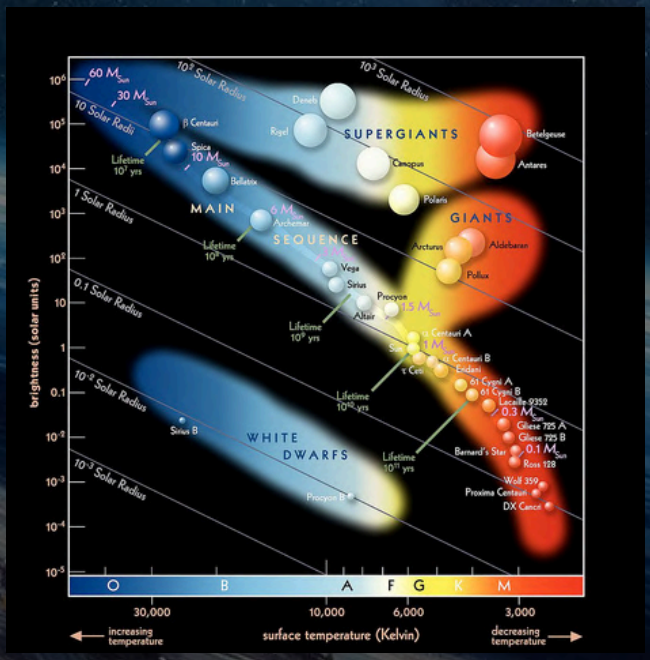
Interferometry is a technique in astronomy that combines light or radio waves collected by two or more telescopes to create a much sharper image than a single telescope can produce. By working together, these telescopes act like one giant telescope with a much larger diameter, allowing astronomers to observe distant stars, galaxies, and even the surroundings of black holes in remarkable detail. Interferometry has played a key role in major discoveries, including capturing the first-ever image of a black hole.



H-R DIAGRAM

A MAP OF STELLAR EVOLUTION

The Hertzsprung-Russell (H-R) Diagram is one of the most important tools in astronomy. It is a graph that compares a star's luminosity (brightness) with its surface temperature or spectral type. By plotting stars on this diagram, astronomers can classify them into groups such as main-sequence stars, giants, supergiants, and white dwarfs. The H-R Diagram also reveals how stars evolve over their lifetimes –from their birth to their final stages. It has played a crucial role in helping scientists understand the life cycles, sizes, and temperatures of stars throughout the universe.

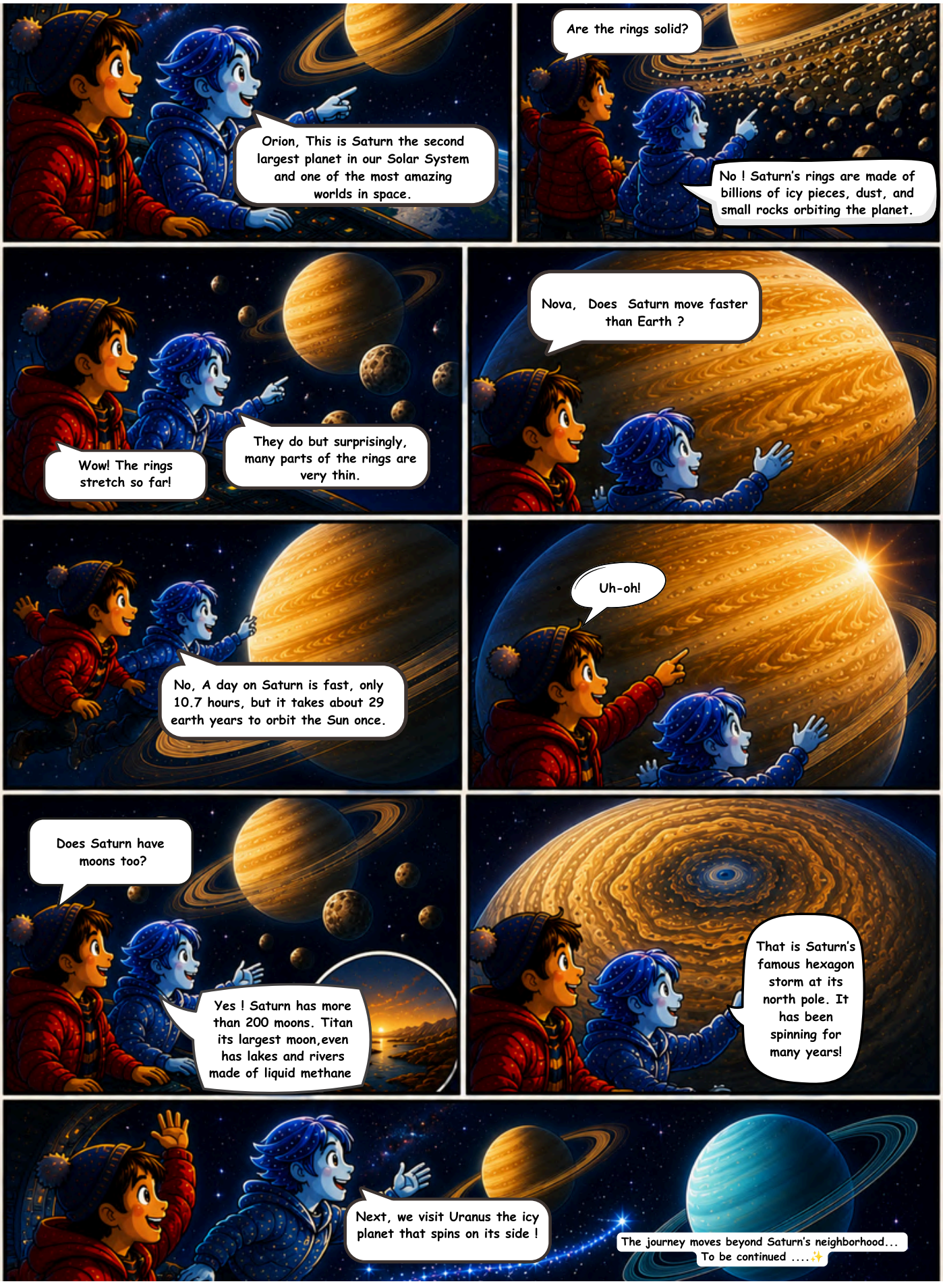


ASTROPHOTOGRAPHY BY SPACE TEAM



Centaurus and Crux constellations were captured and marked by
Mr. Sebin Sebastian, Educator, STEPL.

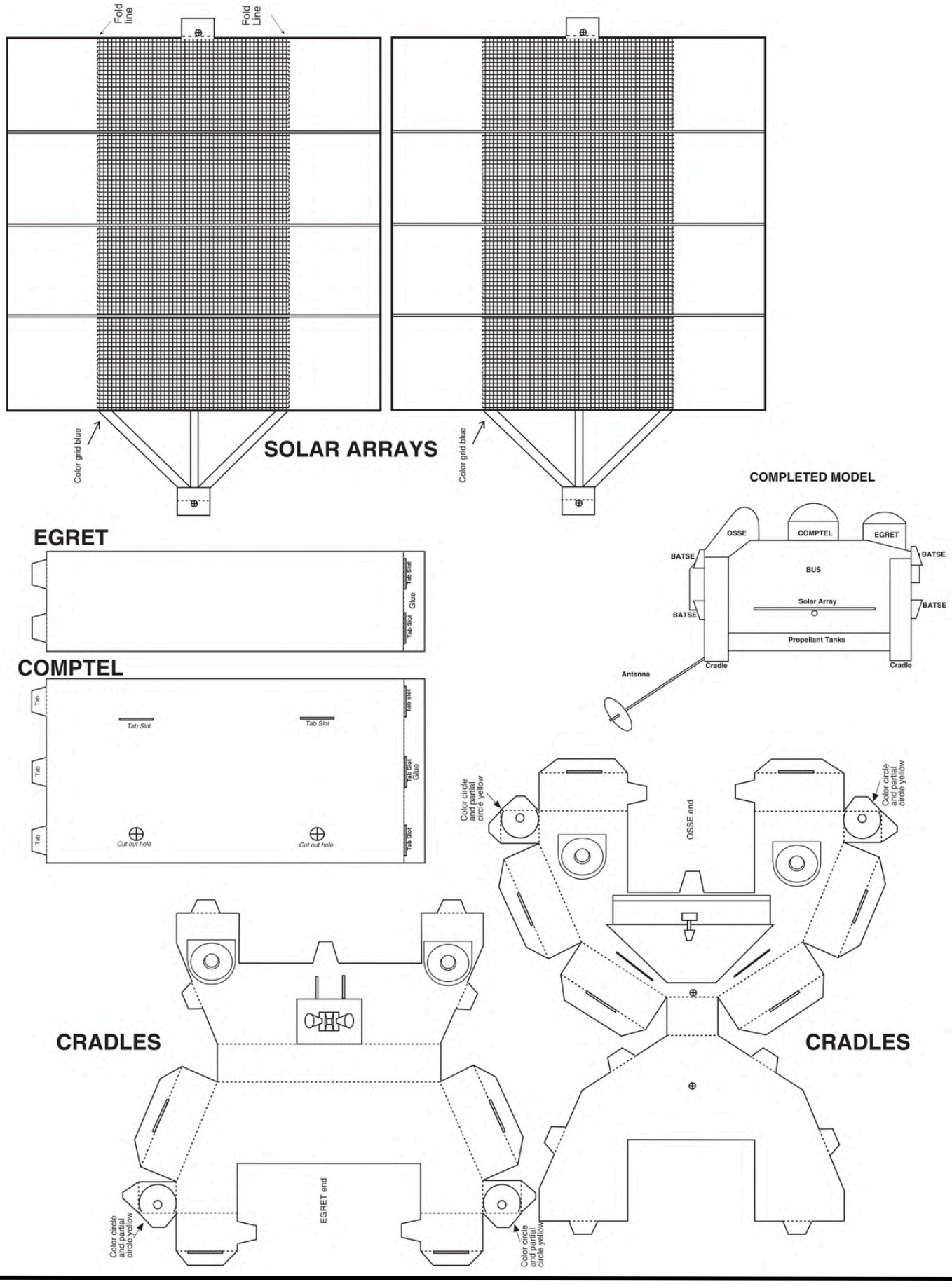
COSMIC JOURNEY- THE LORD OF RINGS



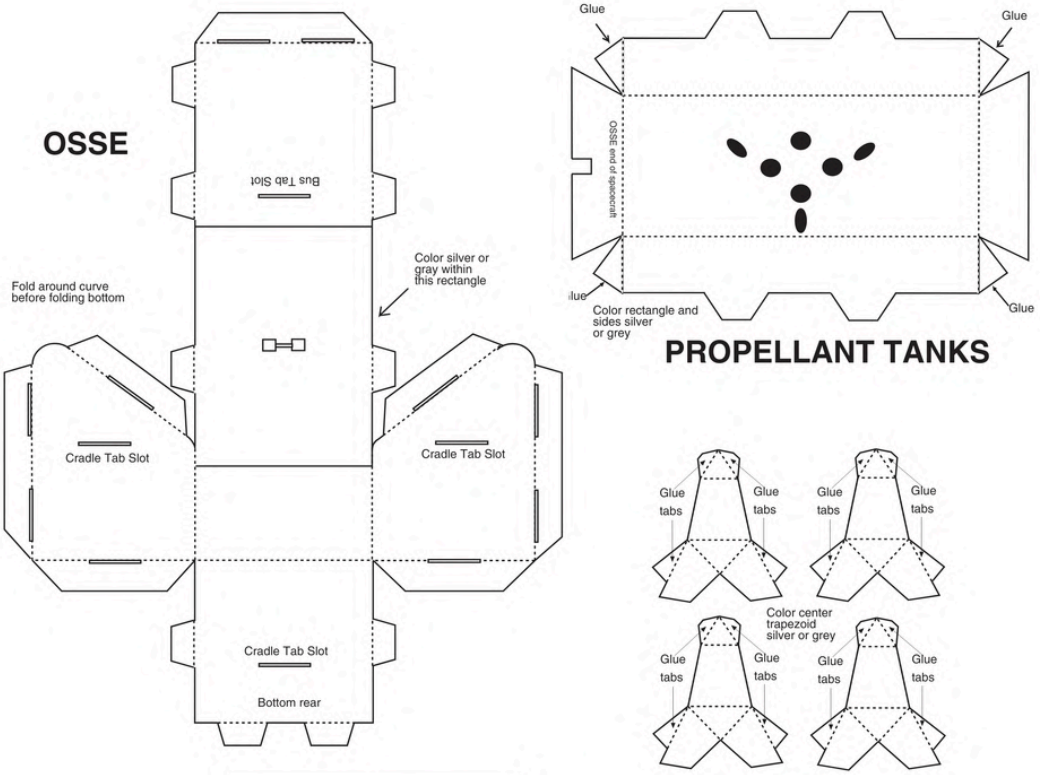
www.space-global.com

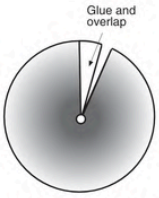
MISSION: DO IT YOURSELF

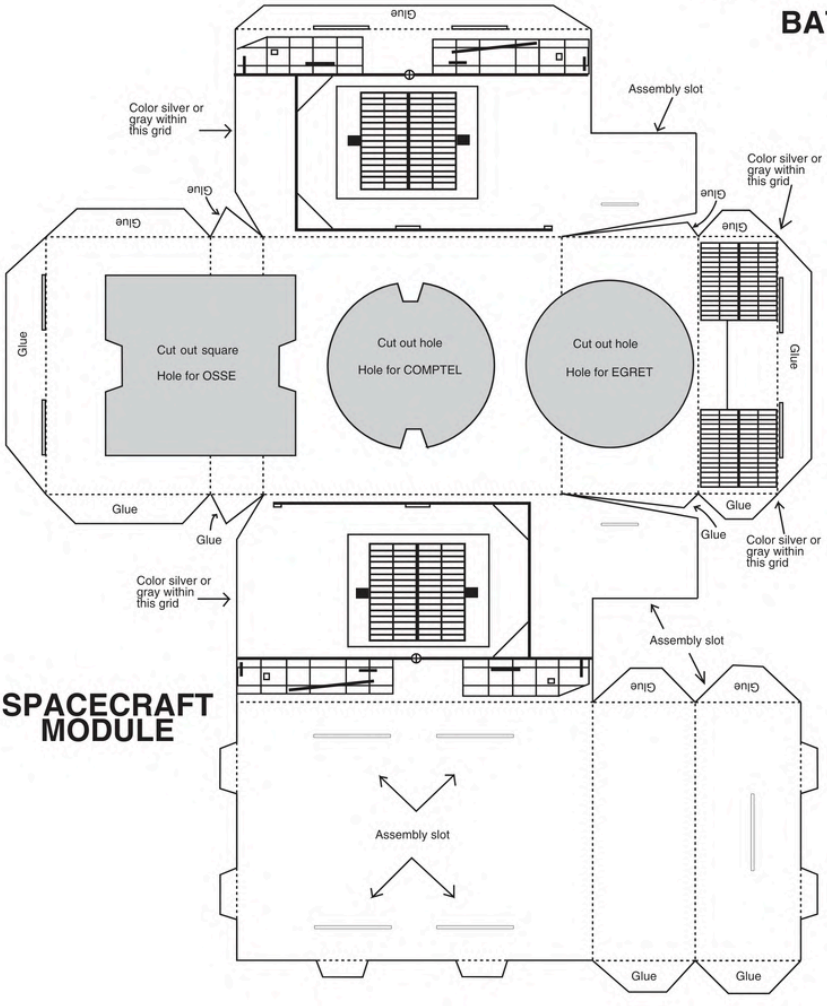
CROMPTON GAMMA RAY OBSERVATORY



MISSION: DO IT YOURSELF





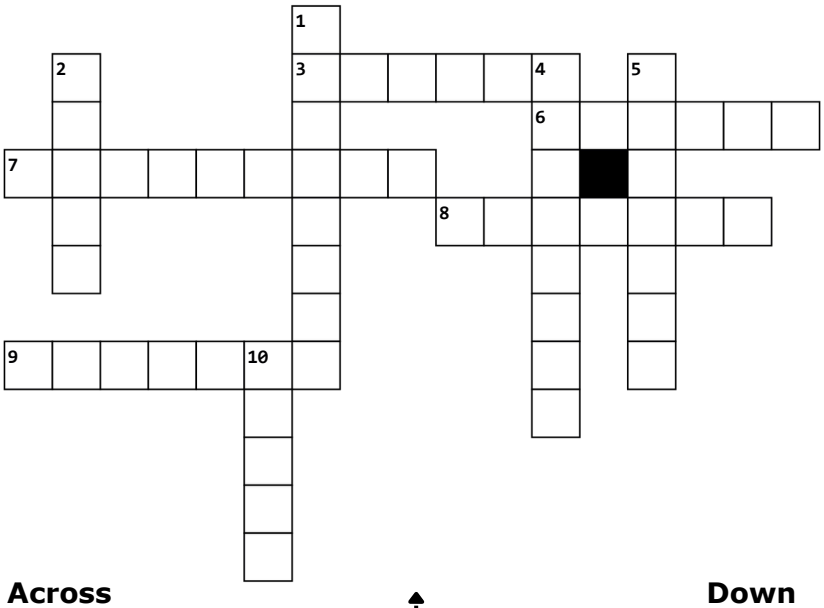


INSTRUCTIONS

- Cut out all parts, open the marked slots, score the fold lines, and assemble them.
- Cut the holes for OSSE, COMPTEL, and EGRET, then assemble the Spacecraft Module.
- Attach the propellant tank under the Spacecraft Module.
- Assemble and attach OSSE to the spacecraft.
- Assemble the two cradles, make the antenna hole in the OSSE-side cradle, and attach both cradles as marked.
- Roll COMPTEL and EGRET into cylinders and insert them into the marked holes. Add tissue paper inside to form the dome.
- Assemble and attach BATSE to both cradles.
- Apply glue wherever needed to secure the parts.
- Finally, attach the antenna and solar panels using a paper dowel rod.

TRAIN YOUR BRAIN

CROSSWORD



Across

3. Which company is developing the Project Kuiper satellite constellation?

6. What is the name of NASA's planned Mars orbiter scheduled for launch in 2028?

7. Which ancient civilization associated Sirius with the flooding of the Nile River?

8. What type of celestial object was first discovered by Jocelyn Bell Burnell?

9. Which NASA space observatory captured the most detailed X-ray images of the jet from M87*?

Down

1. Which Japanese mission may investigate the suspected remains of Phobos 1 in 2031?

2. Which lunar module landed in the Sea of Tranquility during Apollo 11?

4. Which Indian scientist founded the Inter- University Centre for Astronomy and Astrophysics (IUCAA)?

5. Which star is currently known as the North Star?

10. Which astronomer provided strong evidence for the existence of dark matter?

Astronomy Word Puzzle

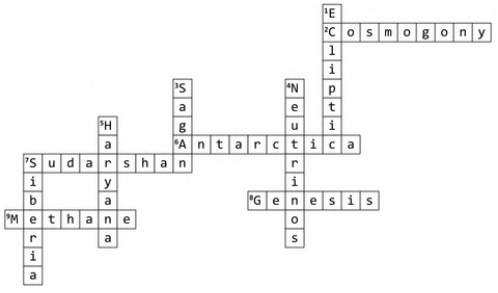
Periodic Comets

K	O	P	F	F	L	S	H	O	L	M	E	S	O
E	E	P	L	L	R	S	E	L	M	F	A	C	L
A	N	N	O	E	C	C	L	G	A	L	L	I	U
A	R	R	B	E	R	H	R	Y	N	O	W	H	U
A	F	L	T	N	O	A	E	B	E	W	E	T	P
T	O	T	E	C	M	U	F	R	S	T	S	U	A
L	L	E	M	K	M	M	I	O	R	U	T	M	L
F	L	M	E	E	E	A	N	O	O	T	P	N	E
N	L	P	L	O	L	S	L	K	R	T	H	I	I
L	M	E	A	R	I	S	A	S	B	L	A	E	B
Y	U	L	G	L	N	E	Y	S	S	E	L	R	L
O	R	N	A	H	S	N	I	H	C	U	S	T	L
H	A	L	L	E	Y	O	P	S	A	E	N	H	E
S	Y	I	B	O	R	R	E	L	L	Y	U	B	N

BROOKS
BORRELLY
WOLF
OLBERS
GALE
WESTPHAL
BRORSEN
TUTTLE
CROMMELIN
KOPFF
HOLMES
FAYE
REINMUTH
TSUCHINSHAN
BIELA
HALLEY
SCHAUMASSE
TEMPEL
FINLAY
ENCKE

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

Answers for last month puzzles.



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



GALACTICA MAGAZINE

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