SPACE™
EMPOWERING LIFE

October 2025
Volume 4 | Issue X

Galactica

Astronomy and Space Science Magazine

What's Inside?

www.space-global.com

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.

Team

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.

Ms. Shalini Bahmba, Co-founder, SPACE

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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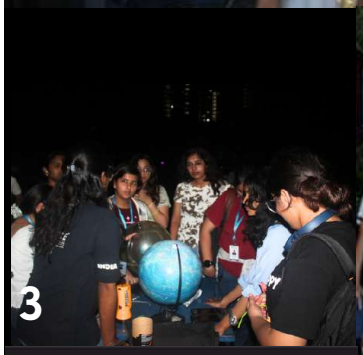

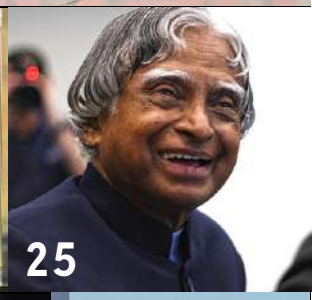

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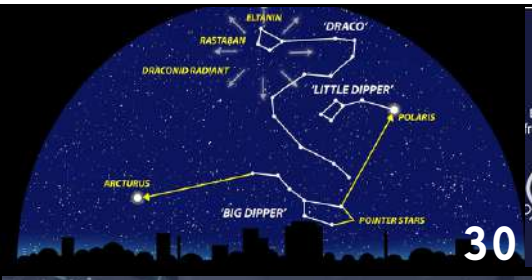
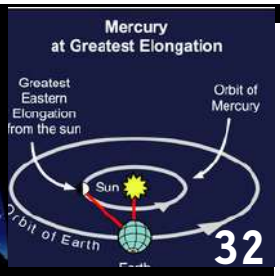
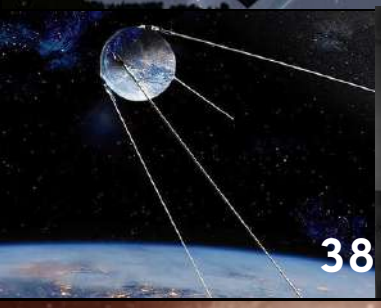
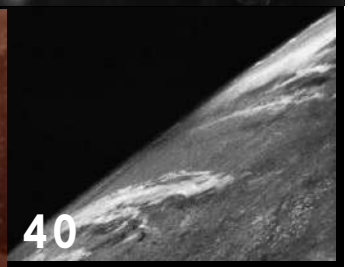
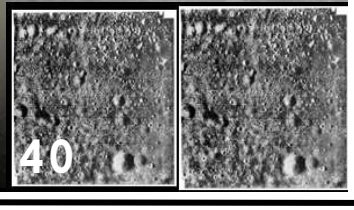










SPACE INSIGHTS

Inauguration of Khagolshala Space Lab at Victoria School CBSE, Thoothukudi

In collaboration with SPACE India, Victoria School CBSE, Thoothukudi, proudly inaugurated the Khagolshala Space Lab on its campus on 13th October 2025. This pioneering initiative marks the establishment of the first Khagolshala Space Lab in South India, opening new opportunities for students to engage in hands-on astronomy and space science learning.

The inaugural ceremony began at 11:00 a.m. with a soulful prayer song, followed by a warm welcome address by the Principal, Mr. D. Jagannathan. The event was graced by eminent dignitaries and scientists from the ISRO Propulsion Complex, Mahendragiri. The Chief Guests included Mrs. Deepa K. S., Group Head, Semi-Cryogenic Systems, and Mr. Velmurugan K., Scientist Engineer. The Correspondent, Mr. Einstein, along with special dignitaries, Rt. Rev. Dr. P. Issac Varaprasad, Moderator's Commissary-TND, and Mr. Joseph Reginald Issac, Financial Administrator-TND, added significance to the occasion with their presence and blessings.

In their keynote addresses, the Chief Guests reflected on India's glorious space journey, acknowledging both the past achievements and current milestones of ISRO, and urged students to nurture curiosity, discipline, and innovation. Their words of encouragement inspired the audience to dream big and contribute to India's future in space exploration.

The ceremony concluded with a heartfelt Vote of Thanks delivered by Vice Principal Ms. C. B. Adlin Sheni, followed by the National Anthem, which instilled pride and unity among all participants.

Adding vibrancy to the celebration, students of Victoria School showcased a series of live demonstrations and interactive activities inside the Khagolshala Space Lab. These included comet-making experiments, Eno and water rocket launches, DSLR light painting, Ring the Planets quiz, and hydro rockets powered by water and air pressure. Students also engaged in solar observation through a Dobsonian telescope, explored the science of light through reflection and refraction experiments, and practiced handling telescopes with a 50mm aperture. To inspire future explorers, they participated in a virtual reality experience of the International Space Station and activities under Astronomer Can Be One, which introduced astronaut-like routines and challenges.

With the inauguration of the Khagolshala Space Lab, Victoria School has taken a historic step in promoting STEM education in South India. The lab promises to ignite curiosity, inspire exploration, and nurture future scientists, innovators, and astronauts. This milestone stands as a testament to the school's vision of empowering students with hands-on space science learning, ensuring that the dream of reaching the stars begins right here on Earth.

graVITas CELESTIAL DIVE 4.0

In a continuing tradition of innovation and discovery, SPACE India in collaboration with VIT Vellore once again joined forces to host Celestial Dive 4.0 at the prestigious annual tech fest, graVITas 2025. Held from the night of September 26 through the early hours of September 27, the event brought together over 450 enthusiastic participants. Running from 09.30 P.M. until 4 A.M., the immersive program transformed the campus into a hub of astronomy, education and exploration.

Carrying forward the spirit of the graVITas theme, "Sustainable Tomorrow, Shaped Today," Celestial Dive 4.0 aimed to spark curiosity about the cosmos in a deeper way. Unlike the previous year, which primarily emphasized observation, this year, SPACE India equipped students with the knowledge and skills to navigate the night sky, bringing them closer to the world of amateur astronomy. Participants were divided into three groups of 150 each and guided through a structured blend of theory, hands-on practice and sky observation.

Learning the Sky: Orientation and Tools:

The event began with an orientation to the night sky, during which participants explored the science of dark adaptation, the importance of preserving dark skies, and how the human eye adjusts to low light. Using pointer constellations and celestial globes, they traced the Summer Triangle, located the Pole Star, and gained insights into the zodiac signs and the ecliptic line. A session on the local coordinate system (altitude and azimuth) taught participants how to communicate star positions and navigate the heavens with "handy measurements."

The Planisphere, a versatile tool:

Next, participants engaged with the planisphere, a versatile tool for star gazing and planning night sky observation. They learned how constellations shift with latitude and time, aligning the planisphere to the local date and time to map the sky above Vellore at midnight. Students explored how the night sky is divided into "houses," the concept of stellar magnitudes, and the classification of various objects, including open clusters, globular clusters, and galaxies. By the end of the session, students were equipped with the knowledge to independently plan skywatching sessions in the future.

Telescope Assembly and Observations:
The final and most anticipated activity was hands-on telescope training and observation. Participants assembled a 50mm refractor telescope, identified its components, including tripod, optical tube, diagonal eyepiece, and alt-azimuth knobs, and practiced pointing the instrument. They even experimented with afocal photography, capturing terrestrial targets to understand basic imaging techniques. Then came the larger instruments that SPACE India brought to the event. The night focused on hands-on observation and creative activities. SPACE India provided an impressive suite of instruments:
Four 8-inch Dobsonian telescopes
One 8-inch Schmidt-Cassegrain Telescope (SCT)
One 76mm reflector telescope
One 130mm equatorial mount reflector telescope
Despite a cloudy sky, some fortunate students glimpsed Saturn's majestic rings through the SCT, an unforgettable highlight. Others turned their telescopes to terrestrial objects and continued exploring the art of astrophotography.



Afocal Astrophotography:
One of the most engaging activities was afocal astrophotography, carried out primarily with the 8-inch Dobsonian telescopes. Students placed their smartphone cameras directly at the eyepiece, capturing images of terrestrial objects and experimenting with celestial photography whenever skies permitted. This hands-on technique gave them a first taste of astrophotography, showing how easily accessible stargazing can be with everyday devices combined with professional telescopes.

Light Painting Under the Stars:
The night also came alive with light painting sessions, where participants used long exposure techniques to create luminous trails. This activity merged science with creativity, allowing students to experience how smartphone photography can be used not just to record the cosmos, but also to artistically express their connection to it. The colorful patterns captured by participants on camera added an imaginative dimension to the event, making the night unforgettable for many.

A Night to Remember:
Celestial Dive 4.0 offered more than stargazing; it delivered a transformative experience. By the end of the night, students walked away not only with technical knowledge but also with stories of the Pole star, constellations, and the satisfaction of aligning a planisphere.
Once again, SPACE India and VIT Vellore turned a starlit night into a wonder, proving that even when the skies are cloudy, the universe still finds a way to inspire.



SPACE GROUP'S VISIONARY FOUNDER DR. SACHIN BAHMBA LIGHTS UP SHIVAJI COLLEGE WITH INDIA'S HUMAN SPACEFLIGHT DREAMS

On 22 September 2025, the Department of Physics, Shivaji College (University of Delhi) resonated with excitement as it welcomed Dr. Sachin Bahmba, the illustrious Founder and CMD of SPACE Group, for a special Alumni Talk titled "India's Human Space Mission: Past, Present and Vision 2047."

A distinguished alumnus and visionary science communicator, Dr. Bahmba captivated the audience with a masterful exploration of humankind's cosmic journey from the launch of Sputnik 1, which ignited the space race, to India's steady ascent toward the stars. His address intertwined history, technology, and human aspiration, revealing how every mission be it an orbiter, lander, rover, or crewed flight–represents an evolutionary step toward a shared destiny beyond Earth.

Drawing parallels between global milestones and India's remarkable progress under ISRO, Dr. Bahmba celebrated the nation's ingenuity and determination to achieve extraordinary feats with unmatched efficiency and vision. His narrative illuminated how India, once an emerging participant, now stands poised to shape the future of human space exploration.

In an electrifying series of live demonstrations, he transformed abstract concepts into tangible experiences – showcasing Maximum Absorbency Garments (Astronaut Diapers), simulating rocket fuel generation from lunar and Martian resources, and unveiling the thermal shield materials that safeguard spacecraft during fiery atmospheric re-entry. Each experiment invited awe and understanding in equal measure, embodying his passion for experiential learning.

A poignant moment arrived when Dr. Bahmba shared insights on the Shubhanshu Shukla Mission, underscoring the indispensable role of student-led innovation in advancing India's spacefront. He also introduced the audience to SERA's (Space exploration ad Research Agency) Global Astronaut selection Campaign – a truly once-in-a-lifetime opportunity for students to directly participate in a real astronaut selection process are extremely rare, and this initiative brings the experience to Indian classrooms for the first time. It allows students to engage with the exciting world of space exploration, pushing the boundaries of their knowledge, skills, and imagination.

The event commenced with a gracious welcome by Principal of Shivaji College, who lauded Dr. Bahmba's enduring commitment to his alma mater and his unwavering support through the institution's journey of growth and transformation.

Concluding with a forward-looking vision of India's Space Vision 2047, Dr. Bahmba inspired a hall full of young dreamers to see themselves not merely as observers of the cosmos, but as its future explorers. The session was more than a lecture – it was an awakening, igniting the spirit of scientific curiosity and national pride that will propel India's next leap into the stars.





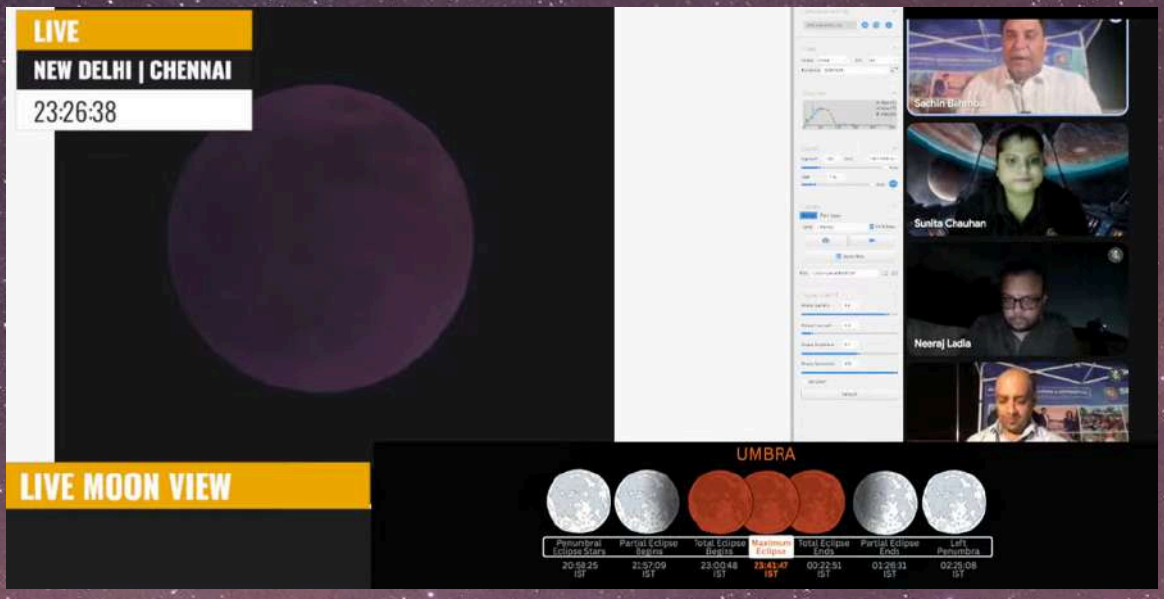
THE SCIENCE BEHIND SHADOWS: HOW INDIA MOVED BEYOND ECLIPSE SUPERSTITIONS

On September 7th, 2025, the night sky over India turned into a stage for one of nature's most captivating spectacles a Total Lunar Eclipse that unfolded over nearly five hours. From the first penumbral shading to the Moon's fiery red glow at totality, it became not just an astronomical event, but a nationwide science celebration.The **Space Education Foundation**, supported by **SPACE India** and **ARCADE**, organized a free national live educational webinar and observation, drawing a live audience alongside more than 11,000 online viewers.

The evening opened at 9:15 PM with a technical workshop led by Dr. Sachin Bahmba, Founder & CMD of SPACE Group, broke down the orbital mechanics of eclipses, the geometry of Earth's shadow, and the atmospheric science behind the Moon's crimson hue. He also emphasized the importance of myth-breaking conducting live activities with participants to bust superstitions traditionally associated with eclipses. Engaging with the audience, he demonstrated how science replaces fear with understanding, turning age-old myths into opportunities for awareness. His insights and interactive approach elevated the eclipse from a sky show into a real-time lesson in celestial physics.

Adding perspective, Mr. Vikrant Narang, CTO of SPACE Group, spoke about the broader context of eclipses their cultural significance and their role in nurturing a scientific outlook among students. His remarks connected scientific detail with the human curiosity that drives exploration.

At 9:58 PM, as Earth's shadow crept across the lunar surface, telescopic broadcasts delivered breathtaking views to households and classrooms nationwide. From the first shading to the dramatic red of totality, audiences stayed riveted for the entire duration students especially, whose enthusiasm never dimmed even after midnight. One of the evening's highlights was the student interaction. From questions on eclipse frequency to the physics of its colours, their curiosity sparked dialogue that was met with clear, logical explanations. This exchange transformed the event into a two-way classroom under the stars, blending observation with understanding.



By the time the eclipse ended, the night had left a lasting mark. The Total Lunar Eclipse of 2025 was more than a celestial spectacle; it was a milestone in science communication, uniting thousands across India in wonder, learning, and discovery. For five illuminating hours, India watched the sky not in fear, but in fascination.

UNDER THE CRIMSON MOON: A NIGHT OF CELESTIAL WONDER AT MIRANDA HOUSE

On the night of September 7, 2025, the skies over Delhi came alive with a spectacle that left over 500 participants spellbound. SPACE India, in collaboration with Miranda House, University of Delhi, hosted a Total Lunar Eclipse Observation, turning an ordinary evening into a journey across the cosmos. The evening began with a captivating presentation that explored the science and significance of eclipses. Participants learned how the Sun, Earth, and Moon align to create this extraordinary phenomenon, why the Moon transforms into a deep crimson Blood Moon, and how eclipses have inspired cultures and civilizations across centuries. The session also addressed myths and misconceptions, preparing everyone to experience the night with both wonder and understanding.

Following the presentation, a spectacular hydro-rocket launch set the tone for the night's celestial adventure. Students, teachers, and parents watched in awe as the rockets soared into the sky, igniting excitement and curiosity. This hands-on demonstration offered a playful yet scientific introduction to physics and aerodynamics, bridging the world of experimental learning with the cosmic experience that was about to unfold.
As darkness descended, the Moon gradually entered Earth's shadow, and telescopes and binoculars became windows to the heavens. Step by step, the Moon's familiar silver glow gave way to the enigmatic red of the Blood Moon, caused by sunlight refracted and scattered through Earth's atmosphere. Gasps of amazement echoed through the grounds as participants marvelled at the Moon's transformation, while engaging in discussions about orbital mechanics, atmospheric optics, and humanity's enduring fascination with the night sky.

The interactive nature of the evening made it truly unforgettable. Experts guided every stage of the eclipse, patiently answering questions and explaining the science. For many school children, it was their first experience of scientific skywatching, inspiring awe, curiosity, and a desire to explore further. Teachers and parents emphasized how initiatives like this foster critical thinking and a lifelong love for learning.

Beyond its visual splendour, the event highlighted the power of community learning. In an era when misinformation about celestial phenomena continues to circulate, structured engagement nurtures scientific awareness and shared discovery. By the time the Moon regained its luminous glow, participants carried home more than photographs–they left with firsthand experience of a cosmic alignment, a deeper appreciation of the universe, and the exhilaration of collective exploration. For Miranda House and SPACE India, the night was not just about observing an eclipse–it was a celebration of curiosity, wonder and humanity's endless quest to understand the cosmos.





UITS SCHOOLS ILLUMINATE THE TOTAL LUNAR ECLIPSE

The Total Lunar Eclipse (TLE) of September 7, 2025, was transformed from a solitary celestial event into a nationwide educational spectacle by five Universe in the School (UITS) institutions. Collaborating with SPACE India, these schools hosted community-wide observation programs, promoting scientific inquiry and fostering a rational perspective on the cosmos.

Decoding the Blood Moon:

A Total Lunar Eclipse (TLE) occurs when the Earth aligns perfectly between the Sun and the Moon, casting a complete shadow over the lunar surface. The Moon, enveloped in this shadow, does not vanish but takes on a striking reddish-orange hue, earning it the moniker “Blood Moon.” This phenomenon is caused by Earth's atmosphere filtering sunlight—it scatters the blue light away while bending the longer, red wavelengths onto the Moon. Unlike a solar eclipse, a TLE is completely safe to observe with the naked eye.

The events across all five schools included a special, unifying gesture: a heartfelt tribute to Fred Espenak, "Mr. Eclipse," the renowned astrophysicist who dedicated his life to documenting eclipses.

A Series of Scientific Celebrations-

1. **SD International School, Panipat (Chandrima Utsav):**

- Hosted a grand "Chandrima Utsav" featuring a Nukkad Natak (street play) and a Space Quiz.
- Students set up a Science Activity Area demonstrating concepts like the Danjon Scale (for measuring lunar brightness) and Rayleigh Scattering.
- The observation utilized a powerful 200 mm Dobsonian Telescope for detailed views.

Students explained the set up and use of a 50mm refractor telescope

Students presented about the science behind eclipses

2. **Matrikiran High School, Gurugram:**
   - The event featured a strong student-led focus, with students independently operating all telescopes (including an 8-inch Dobsonian).
   - Participants were engaged in a hands-on citizen scientist project and activities to understand the TLE's unique light pattern. Students observed the Rayleigh scattering during the event.

Students and Parents observed the Moon and identified its Danjon scale


Students observed the Rayleigh scattering during the total lunar eclipse

3. **K. R. Mangalam World School, Vaishali:**
   - Students paid tribute to Mr. Eclipse by lighting candles.
   - A Nukkad Natak was performed to bust superstitions, and participants deliberately ate snacks during the eclipse in a symbolic act to debunk the myth of not eating.
   - The community was introduced to the Pollution and Moon Redness Correlation Study as a key citizen science initiative.


Students performed Nukkad Natak to break myths


Participants had snacks to break the myth

4. **Delhi Public School, Greater Faridabad:**
   - The evening featured a detailed presentation, a skit, and a candle-lighting ceremony for Mr. Eclipse.
   - Over 100 participants witnessed the event, which centered on dispel-ling age-old myths to promote a rational outlook.
   - Students and parents broke the "no eating" superstition by enjoying refreshments together.

Candle-lighting ceremony was held to honor the late Fred Espenak (Mr. Eclipse)

The space educator engaged the public and shared insights about the eclipse

5. Victoria School CBSE, Thoothukudi:

The program was entirely student-driven, with pupils taking the lead in delivering presentations, running science activities, and operating the array of observation equipment.

Students explained the science, history, and myths of the TLE and introduced attendees to the ongoing citizen scientist project.

Participants observed the Eclipsed moon

Student explained the science behind Eclipse

This monumental joint effort by the five UITS schools–SD International School, Matrikiran High School, K. R. Mangalam World School, DPS Greater Faridabad and Victoria School–turned a spectacular astronomical event into a powerful lesson in scientific literacy. By integrating hands-on observation with dramatic myth-busting skits and dedicated citizen science projects, these institutions successfully moved beyond textbook learning. The collective decision to pay tribute to "Mr. Eclipse," Fred Espenak, underscored a commitment to honoring those who inspire a lifelong pursuit of the heavens. Ultimately, the night of the Blood Moon was more than just stargazing; it was a shining demonstration of how UITS schools are building a generation that approaches the world–and the cosmos–with curiosity, rationality, and a deep appreciation for the beauty of science.

World Space Week OCTOBER 4-10

Every year, the World Space Week Association (WSWA) announces a theme that unites space enthusiasts, scientists, educators, and students across the globe in a shared celebration of human progress in space exploration. Observed annually from October 4–10, World Space Week (WSW) is recognized as the largest international celebration of space science and technology, engaging participants from over 90 nations.

For World Space Week 2025, the theme "Living in Space" invites the world to envision a future where humanity not only explores space – but learns to live, build, and thrive beyond Earth. This theme sparks imagination around sustainable life on the Moon, Mars, and future space habitats, exploring the innovations, technologies, and human spirit that will make such endeavors possible.

In India, this global celebration is guided by Dr. Sachin Bahmba, Founder and CMD of SPACE Group, who also serves as the official National Coordinator for the World Space Week Association. Under his visionary leadership, India's participation in World Space Week has evolved into a nationwide movement that inspires scientific curiosity, innovation, and collaboration among students and educators alike.
As the National Coordinator, Dr. Bahmba has issued a National Call – inviting every school, university, research institute, planetarium, NGO, and science community across the country to come together in the spirit of discovery. This call emphasizes India's commitment to imagination, innovation, and global scientific leadership, showcasing our nation's expanding role in humanity's shared journey to the stars.

'NATIONAL FLAGSHIP CELEBRATIONS BY SPACE INDIA'

National Space Astro Creator Competition (Short Films)- ONLINE

- **Registration/Submission Link: https://forms.gle/rdNdNYqRyfH58Dg17**

National Astro Toon Competition- ONLINE

- **Registration/Submission Link: https://forms.gle/d3qZEdydeZecMDfX7**

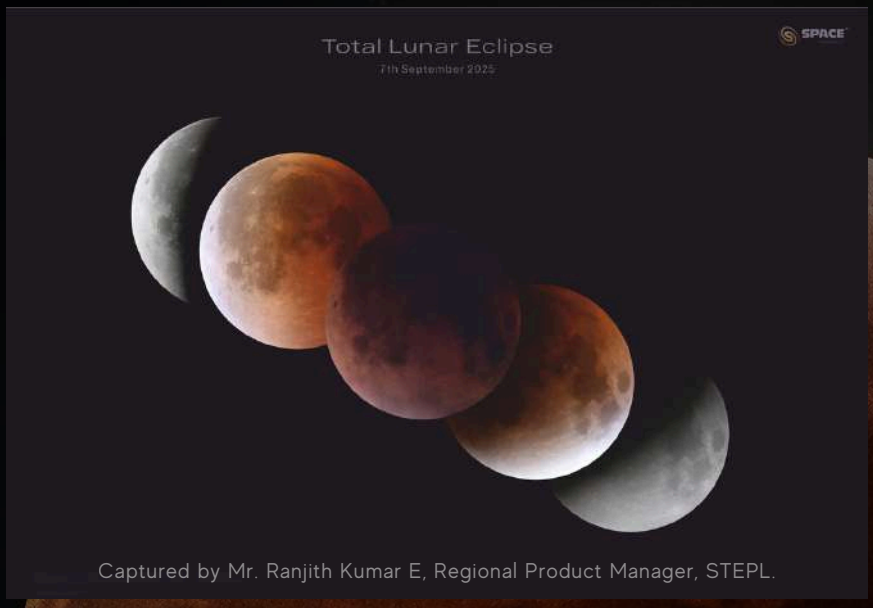
Stamp Making Competition – Delhi and NCR Edition-ONLINE

- **Registration/Submission Link: https://forms.gle/Dnkmzh8MV17T14NC9**

Through this year's celebrations, World Space Week 2025 aims to highlight the extraordinary possibilities of life beyond our planet – and remind us that the dream of "Living in Space" begins with the power of education, collaboration, and the boundless human will to explore.

HIGHLIGHTS OF SEPTEMBER 2025

TOTAL LUNAR ECLIPSE: NATURE'S NIGHTTIME LIGHT SHOW



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

On the night of September 7–8, sky watchers across Asia, Europe, Africa, and Australia witnessed a breathtaking total lunar eclipse, one of the more spectacular "Blood Moon" events in recent memory. The Moon glowed in deep shades of red and copper, casting a spellbinding sight in the night sky. For many, it was a rare celestial performance that will be remembered for years to come.

A lunar eclipse occurs when Earth slips between the Sun and the Moon, casting a shadow on the lunar surface. Depending on alignment, the eclipse can be penumbral, partial, or total and in this event, the Moon passed wholly into Earth's darkest umbra for a complete total eclipse. What made this occurrence truly special was that the Moon was near perigee, its closest approach to Earth. That proximity lent the Moon a slightly larger and more vibrant red hue during totality, intensifying the "super blood moon" effect.

Observers in India noted that the eclipse began around 8:58 PM IST, the totality phase lasting about 82 minutes, spanning roughly 11:00 PM to 12:22 AM IST for full immersion. Globally, the event unfolded over more than five hours, with timing shifted by geography. Clear skies in many regions made the spectacle widely visible and thoroughly enjoyed by enthusiasts and casual viewers alike.

This cosmic spectacle drew diverse audiences such as families, amateur astronomers, and professionals alike. Local observatories hosted watch parties; telescopes, binoculars, and cameras across the globe recorded the coppery lunar glow. In India especially, enthusiasts shared stunning sequences of reddened lunar disks over iconic cultural skylines, capturing unforgettable moments for social media and personal collections.

While the vivid red tones were perhaps the night's showpiece highlight, subtle gradations in color and shadow across the lunar surface, plus crisp views under clear skies, made this eclipse unforgettable. In its wake, astronomy clubs reported surges in public interest, many attendees, struck by the spectacle, signed up for stargazing workshops and future events. Indeed, the September 2025 eclipse will be remembered not just as a scientific milestone, but as a celestial bridge uniting observers and inspiring curiosity about the heavens for months to come.

NASA Welcomes 10 New Astronaut Candidates for the 2025 Class

On 22nd September 2025, NASA announced its 24th astronaut candidate class, selecting 10 new recruits (6 women and 4 men) from over 8,000 applicants nationwide. Acting NASA Administrator Sean Duffy welcomed the candidates at Johnson Space Center in Houston, praising their dedication and expertise.

"This class shows that in America, there is no limit to what a determined dreamer can achieve, even going to space," said Duffy.

The astronauts will undergo nearly two years of intensive training for missions to low Earth orbit, the Moon, and Mars. Their curriculum includes robotics, space medicine, geology, high-performance jet flight, survival training, foreign languages, and simulated spacewalks. After graduation, they will join NASA's active astronaut corps, supporting research aboard the International Space Station and preparing for future deep space missions.

Bringing expertise in aviation, engineering, and sciences, this class is essential to advancing NASA's exploration goals. "They represent America's best and brightest, inspiring the next generation of explorers," said Vanessa Wyche, director of Johnson Space Center.

The 10 candidates, pictured here at NASA's Johnson Space Center in Houston are: U.S. Army CW3 Ben Bailey, U.S. Air Force Maj. Cameron Jones, Katherine Spies, Anna Menon, U.S. Navy Lt. Cmdr. Erin Overcash, U.S. Air Force Maj. Adam Fuhrmann, Dr. Lauren Edgar, Yuri Kubo, Rebecca Lawler, and Dr. Imelda Muller. (Image Credit: NASA)

Perseverance's Sapphire Canyon Sample Stirs Excitement

NASA's Perseverance rover may have taken its most tantalizing step yet toward answering the age-old question: Are we alone?

A study published in Nature reveals that a rock core sample collected in July 2024 from Jezero Crater may contain a potential biosignature, a substance or pattern that could hint at past microbial life. The sample, nicknamed "Sapphire Canyon" and drilled from a rock called Cheyava Falls, comes from the Bright Angel formation, a once water-carved riverbed.

Perseverance's instruments detected a mix of organic carbon, sulfur, phosphorous, and oxidized iron, elements known to power microbial metabolisms on Earth. Even more intriguing were colorful mineral "leopard spots" carrying signatures of vivianite and greigite. On Earth, these minerals often form around decaying organic matter or with the help of microbes, though non-biological processes can also produce them.

"This finding is the closest we've come to discovering life on Mars," said acting NASA Administrator Sean Duffy. "It's a groundbreaking step forward."

The discovery challenges earlier assumptions that only older Martian rocks might preserve traces of life. Instead, these relatively young sedimentary rocks suggest Mars may have been habitable far longer than once thought.

Still, NASA scientists caution against jumping to conclusions. "Extraordinary claims require extraordinary evidence," noted Perseverance project scientist Katie Stack Morgan. Further analysis, including eventual return of samples to Earth, will be critical to confirm whether the biosignature is biological or abiotic.

For now, Perseverance continues its mission, building a library of Martian samples that may one day answer humanity's most profound question. Its ongoing exploration will map diverse rock formations and collect additional cores for detailed study. Each sample brings scientists closer to understanding Mars' past habitability and the potential for life beyond Earth.

The left image is a selfie of NASA's Perseverance rover, stitched from 62 photos, with the reddish rock nicknamed "Cheyava Falls" visible near the center-left, while the right image shows a close-up of the same rock, revealing its leopard-like spots in detail. (Image Credit: NASA/JPL-Caltech/MSSS)

A VISITOR FROM THE OUTER SOLAR SYSTEM: COMET C/2025 R2 (SWAN)

Comet R2 SWAN passes the bright star Spica on Sept. 15 as photographed by Gerald Rheemann and Michael Jäger. (Image Credit: Gerald Rhemann, Michael Jäger)

A newly discovered comet, C/2025 R2 (SWAN), has been capturing the attention of astronomers and skywatchers alike. Discovered on September 10 by Vladimir Bezugly of Ukraine using SOHO's SWAN camera, it is already being hailed as one of the brightest comets spotted on the instrument. The comet received its official IAU designation on September 15, and since then, observers in the Southern Hemisphere have been tracking its movement across the sky.

Comet SWAN passed perihelion, the closest approach to the Sun, on September 12, at a distance of 46.7 million miles, and is now moving toward Earth, reaching perigee on October 21, about 25.1 million miles away. Current estimates place its brightness between magnitude +6 and +7, putting it right on the edge of naked-eye visibility under dark skies, though binoculars or small telescopes will offer the best views.

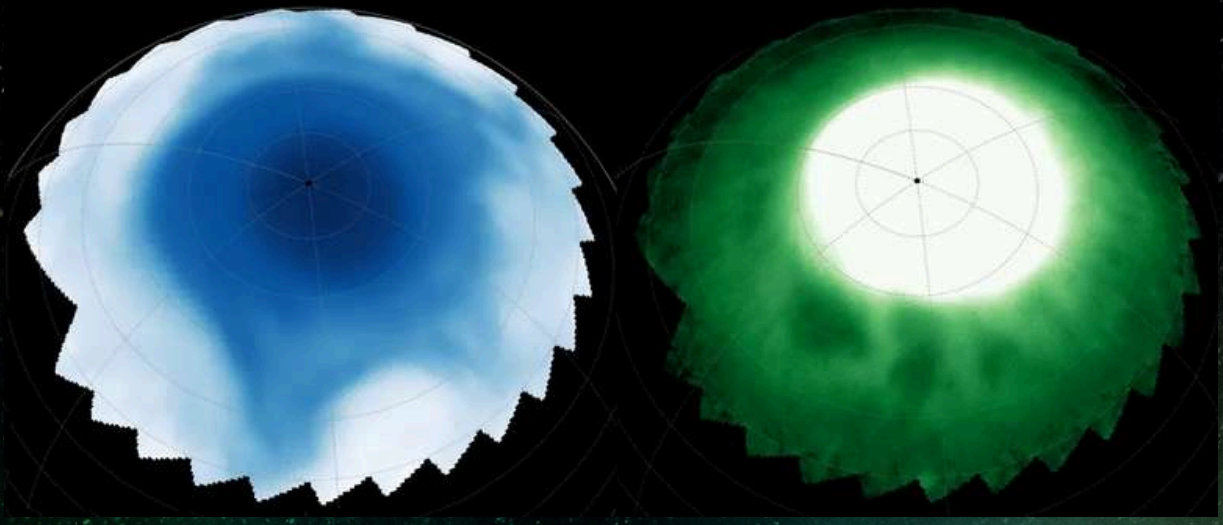
Throughout October, the comet will climb higher in the southwest evening sky for northern observers, traveling across constellations including Libra, Scorpius, Ophiuchus, and Sagittarius. It presents as a bluish-white, gas-rich comet with a condensed coma and a faint, narrow tail extending roughly 2 degrees.

The path of Comet C/2025 R2 SWAN through the constellations from its perihelion on September 12 until it disappears from view at the beginning of November. (Image Credit: Vito Technology, Inc.)

While social media speculation hinted at a possible meteor shower in early October, astronomers have confirmed that Earth will pass well ahead of the comet's orbit, making any meteor activity highly unlikely.

For amateur astronomers and enthusiasts, Comet SWAN offers a rare opportunity to witness a celestial visitor from the outer reaches of the solar system, perhaps for the first time with the unaided eye this October.

JWST REVEALS "DARK BEADS" AND WONKY STAR PATTERNS IN SATURN'S SKY



Montage of JWST images from Nov. 2024 showing Saturn's strange upper-atmosphere features: dark, bead-like patches embedded in auroral halos (right) and a lopsided star-shaped pattern extending from the pole (left). (Image credit: NASA/ESA/CSA/Stallard et al 2025)

Saturn, already renowned for its beauty and enigmas, has just become even more mysterious. Recent observations from the James Webb Space Telescope (JWST) have unveiled features in the planet's upper atmosphere that are completely unexpected and, for now, unexplained.

During a 10-hour continuous observation on November 29, 2024, an international team of 23 scientists tracked infrared light from hydrogen ions and methane, capturing the most detailed look yet at Saturn's atmosphere. About 680 miles above the clouds, they spotted a chain of dark, bead-like patches embedded in Saturn's auroras. These tiny "holes" in the glowing lights remained stable for hours, drifting only slightly, creating a strange, layered effect in the northern skies.

Some 310 miles lower, in the stratosphere, JWST revealed a sprawling star-shaped feature extending from the north pole toward the equator but with a twist. Unlike a perfect six-armed snowflake, only four arms reached outward, leaving the star lopsided. Intriguingly, the brightest arm aligned with the darkest bead above it, though whether the link is causal remains uncertain.

Scientists speculate that turbulent winds in the upper atmosphere, rather than icy particles from Saturn's E-ring, may produce the dark beads, while the star arms may relate to the planet's mysterious hexagonal north-pole cloud pattern first seen by Voyager in the 1980s.

Thanks to JWST's unprecedented sensitivity, astronomers can now study these faint atmospheric layers in detail, opening a new window into Saturn's secrets. With the planet near its rare equinox, researchers are eager to see how the beads and star arms evolve under shifting sunlight, keeping Saturn at the forefront of planetary mysteries.

Vikram 3201 - India's first fully indigenous 32-bit microprocessor

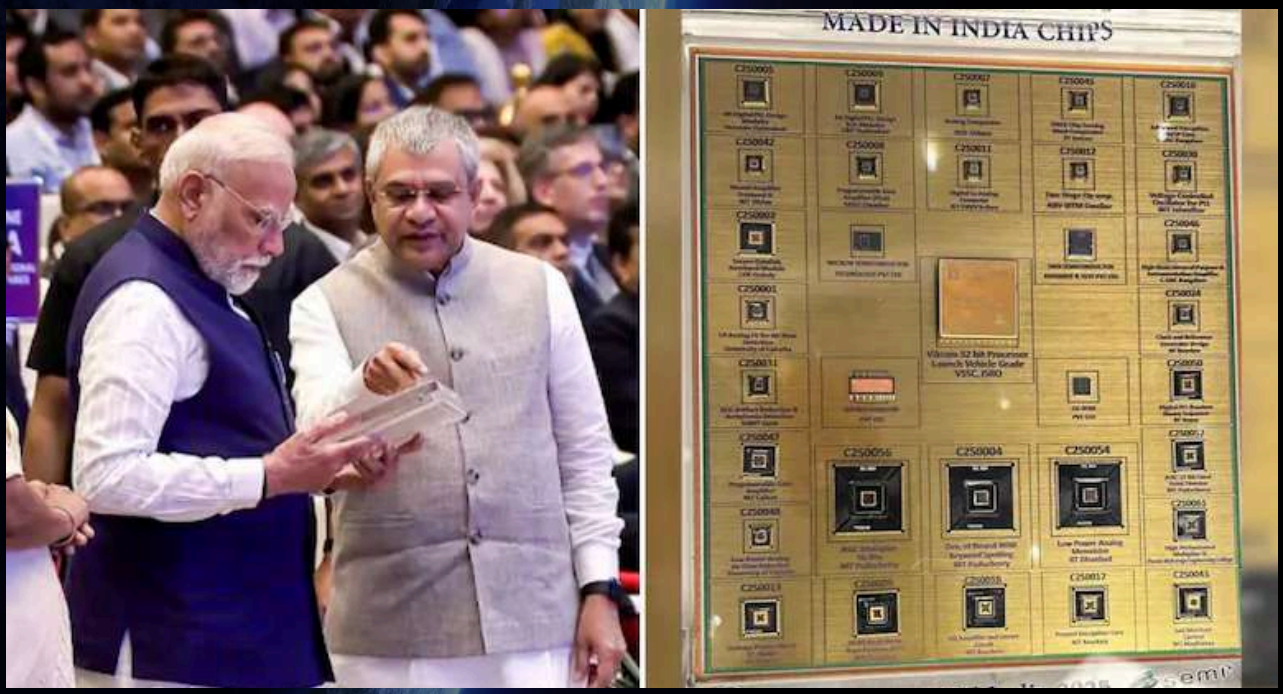
In September 2025, India marked a significant milestone in its semiconductor journey with the release of the Vikram 3201 microprocessor at Semicon India 2025. Electronics and IT Minister Ashwini Vaishnaw presented the nation's first indigenously developed 32-bit processor chip to Prime Minister Narendra Modi, symbolizing India's growing self-reliance in advanced chip technology.

The initial lot of Vikram 3201 devices was successfully validated in space during the PSLV-C60 mission. (Image Credit: ISRO)

Developed by ISRO's Semiconductor Laboratory (SCL), the Vikram-32 is designed to withstand the extreme conditions of spaceflight. The processor was successfully validated onboard the PSLV-C60 mission, demonstrating its reliability for future satellite and space vehicle launches. Fabricated and packaged at SCL's 180nm CMOS facility in Mohali, Punjab, Vikram 3201 showcases India's rapid transition from a major semiconductor consumer to a producer of high-performance, indigenous chips within just three and a half years.

The 32-bit processor can efficiently handle complex computations and substantial memory requirements, making it ideal not only for space applications but also for defense, aerospace, automotive, and energy sectors. Its versatility and robustness underscore India's strategic capabilities in critical technologies.

Speaking at the event, Minister Vaishnaw highlighted ongoing progress in India's semiconductor ecosystem, including the construction of five new fabrication units, approval of 10 major projects with over Rs 1.60 lakh crore investments, and support for 23 design startups under the Design Linked Incentive scheme.



PM Modi looking at the Vikram-32 chip presented to him at Semicon India. (Image Credit: X/@AshwiniVaishnaw)

WHAT'S UP IN THE SKY - OCTOBER 2025

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
Greatest eastern elongation on 29 October, but too low in the evening sky to be seen.

Venus
Morning planet, rising 2 hours and 15 minutes before sunrise on 1 October. Harder to see at the end of October.

Mars
Mars will be very low in the evening twilight in the southwest during October

Jupiter
Bright morning planet. Reaches 58° altitude under darkness at end of month.

Saturn
It is well-placed for viewing throughout October. It will rise in the east after sunset and remain visible for most of the night

Uranus
Well-placed morning planet south of the Pleiades, reaching 57° altitude

Neptune
Deteriorating evening planet, west of south as darkness falls at the start of the month.

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.

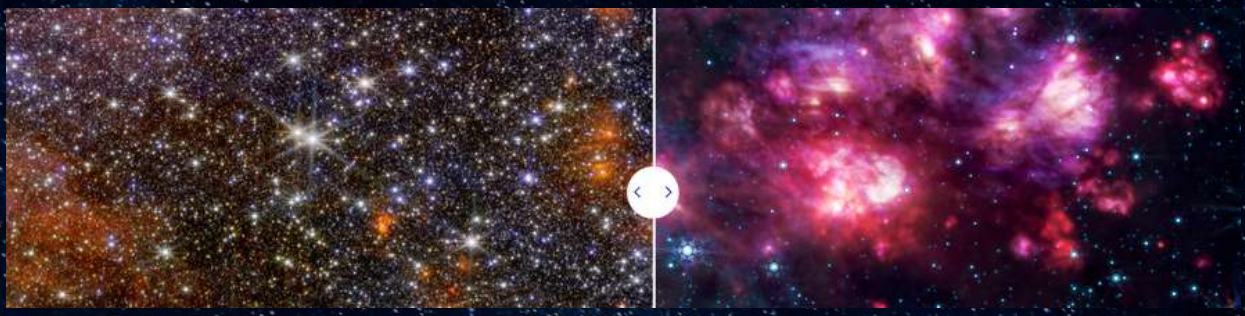
Lagoon Nebula (M8) was discovered in 1654 by the Italian astronomer Giovanni, sought to catalog nebulous objects in the night sky so they would not be mistaken for comets. This star-forming cloud of interstellar gas is located in the constellation Sagittarius and its apparent magnitude of 6 makes it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

EYES IN SPACE - SEPTEMBER 2025

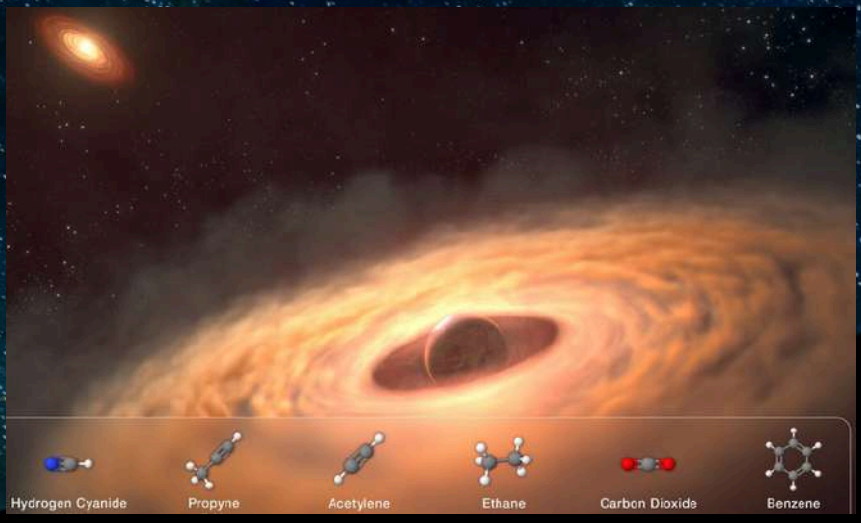
Webb Telescope Reveals Stellar Nursery in Sagittarius B2



Stars, gas and cosmic dust in the Sagittarius B2 molecular cloud glow in near-infrared light, captured by Webb's NIRCam instrument.

NASA's James Webb Space Telescope has unveiled a stunning view of Sagittarius B2, the Milky Way's most massive star-forming cloud. Using its powerful NIRCam and MIRI instruments, Webb captured intricate details of newborn stars, glowing dust, and dense regions too thick for even infrared light to penetrate. These dark areas are actually stellar nurseries, hiding stars still cocooned within gas and dust. Webb's mid-infrared data revealed Sagittarius B2 North as one of the richest molecular regions ever studied. Astronomers hope these findings will unravel why Sagittarius B2 is far more productive than the rest of the galactic center, deepening mysteries of star formation.

Webb studies moon-forming disc around massive planet

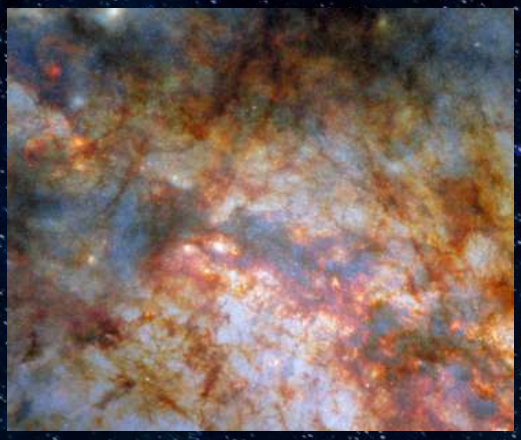


An artistic rendering of a dust and gas disk encircling the young exoplanet, CT Cha b, 625 light-years from Earth.

The star's frequent flares may strip away atmospheres, posing challenges for life. However, astronomers remain hopeful that the system's outer planets might retain atmospheres, offering crucial insights into which worlds could sustain water—and possibly life—around red dwarfs.

The exoplanet TRAPPIST-1 d, once considered a candidate for habitability due to its Earth-like size and position in the star's temperate zone, has been found to lack an Earth-like atmosphere,ccording to NASA's James Webb Space Telescope. Located 40 light-years away, the TRAPPIST-1 system hosts seven rocky planets orbiting a red dwarf star. Webb's NIRSpec instrument detected no signs of water, carbon dioxide, or methane on TRAPPIST-1 d, suggesting it may have only a thin Mars-like atmosphere, thick Venus-like clouds, or none at all.

Hubble Images Celestial Cigar's Smoldering Heart

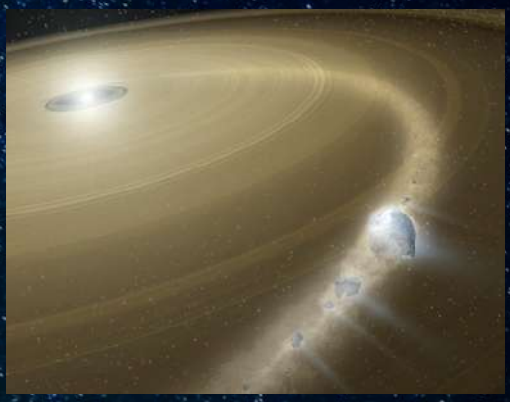


Messier 82 (M82), the Cigar Galaxy

This NASA/ESA Hubble Space Telescope image unveils stunning details of Messier 82 (M82), the Cigar Galaxy, located 12 million light-years away in Ursa Major. A starburst galaxy, M82 forms stars 10 times faster than the Milky Way, producing dazzling super star clusters, each holding hundreds of thousands of stars. Dusty clouds sculpt its luminous core, while data from Hubble, Chandra, Spitzer, and the James Webb Space Telescope provide complementary views across ultraviolet, infrared, and X-ray light. Together, these observations reveal the galaxy's complex star-forming processes. This new image includes data from Hubble's Advanced Camera for Surveys, offering unprecedented clarity.

Hubble sees white dwarf eating piece of Pluto-like object

In a nearby stellar neighborhood, astronomers using the NASA/ESA Hubble Space Telescope have discovered a white dwarf devouring a Pluto-like fragment from its own Kuiper Belt analogue. The dense stellar remnant, only Earth-sized but half the Sun's mass, tore apart the icy body with its immense gravity. Hubble's ultraviolet data revealed the fragments contained nearly two-thirds water ice, along with nitrogen, carbon, and sulphur–volatile elements rarely seen in such systems. The findings, published on 18 September 2025, suggest that even long after stars die, remnants of icy worlds survive, offering a glimpse into the distant future of our own Solar System.



This artist's concept shows a white dwarf surrounded by a large debris disk.

Hubble Surveys Cloudy Cluster

Nebula LMC N44C.

NASA and ESA released a stunning Hubble Space Telescope image showcasing a cloudy starscape within the Large Magellanic Cloud, a dwarf galaxy about 160,000 light-years away in Dorado and Mensa. We see part of N11, the galaxy's second-largest star-forming region, where gas clouds coalesce into new stars. Bright, young stars illuminate the clouds and shape dust with intense ultraviolet radiation. This image combines observations taken roughly 20 years apart, highlighting Hubble's longevity. The 2002-2003 data, captured with the Advanced Camera for Surveys, cataloged stars ranging from 0.1 to 100 solar masses.

Tour de Universe

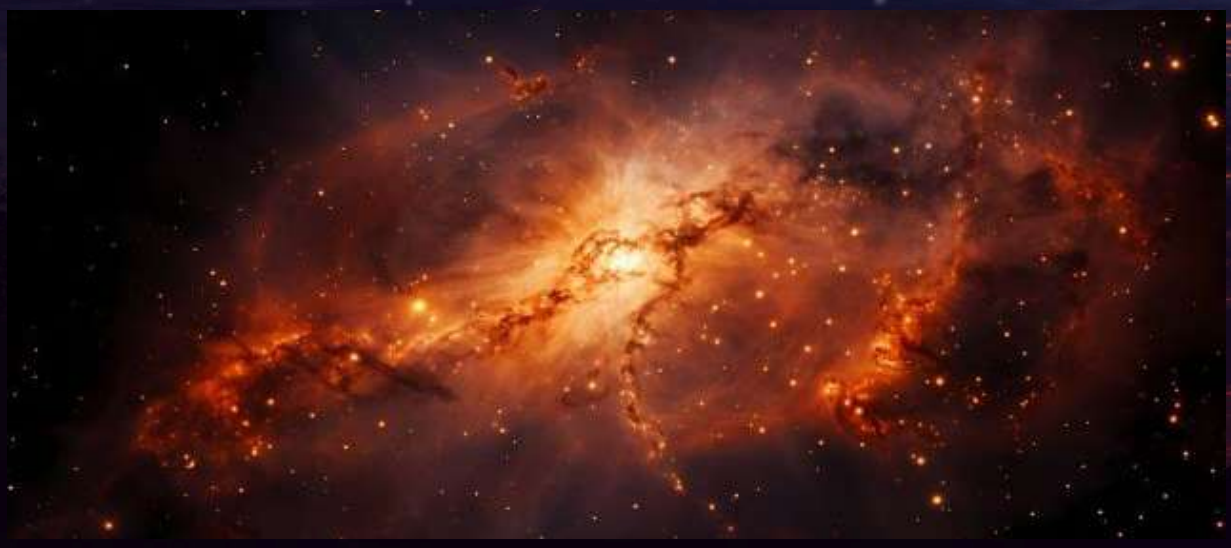
Corona Borealis: The Northern Crown

Corona Borealis, meaning "the northern crown" in Latin, is a small but distinctive constellation in the northern sky. Recognized since antiquity, it was first catalogued by the Greek astronomer Ptolemy in the 2nd century. Its graceful semicircle of stars has inspired myths across cultures, most famously linked to the crown of Ariadne in Greek mythology.

The constellation lies between Boötes and Hercules and covers an area of 179 square degrees, making it the 73rd largest constellation. It is visible from latitudes +90° to −50°, best seen in the evening sky of late spring and summer.

The brightest star, Alphecca (Gemma, Alpha Coronae Borealis), shines like a jewel at magnitude 2.2, while other notable stars include Nusakan (Beta CrB) and several intriguing variables. Among these are the Blaze Star (T CrB), a recurrent nova that occasionally flares dramatically, and the Fade-Out Star (R CrB), a prototype of a rare class of stars that dim unpredictably due to carbon dust clouds.

Corona Borealis also hosts the Abell 2065 Galaxy Cluster, containing hundreds of galaxies over a billion light years away, though none are visible without large telescopes.



Supernova explosion visible to naked eyes- Corona Borealis t Star

Mythological Significance of Corona Borealis

Greek Mythology:
In Greek mythology, Corona Borealis is most famously associated with Ariadne, the daughter of King Minos of Crete. Ariadne played a key role in the story of Theseus and the Minotaur. When Theseus entered the labyrinth to slay the Minotaur, Ariadne gave him a ball of thread (the clew) so he could retrace his steps and escape after killing the creature.
After the victory, Ariadne fled Crete with Theseus, but he later abandoned her on the island of Naxos. The god Dionysus (Bacchus to the Romans) found her, fell in love, and made her his wife. For their wedding, the god Hephaestus crafted a magnificent golden crown adorned with sparkling jewels. After the ceremony, Dionysus placed the crown into the heavens, where its jewels became the arc of stars known as Corona Borealis.

The brightest star, Gemma (Alphecca), literally means "jewel" in Latin, symbolizing Ariadne's crown itself.

Roman Adaptation:
The Romans adopted the same story but emphasized the divine transformation of mortal sorrow into eternal glory. For them, Ariadne's crown immortalized her as both the beloved of a god and as a celestial figure.

Celtic Mythology:
In Celtic tradition, Corona Borealis is linked to Caer Arianrhod, or the Castle of Arianrhod. Arianrhod was a powerful goddess of the moon, stars, and rebirth in Welsh mythology. Her starry "castle" in the sky was said to be her heavenly domain, reinforcing the constellation's link to divine femininity and celestial power.

Native American Mythology:
Among the Cheyenne people, Corona Borealis was known as the Camp Circle because its curved shape resembled the way their people arranged their lodges in a semicircle during gatherings. This gave the constellation deep cultural meaning as a reflection of unity, family, and community.

Australian Aboriginal Traditions:
In Aboriginal lore, Corona Borealis was called the Boomerang (Woomera), its curved shape resembling the iconic hunting tool. This highlights how cultures across the world projected their own environment and symbolism onto the same stars.

Rocket launches in OCTOBER 2025

VICTUS HAZE

Scheduled for launch in October 2025, Rocket Lab's Electron rocket will deploy the VICTUS HAZE mission for the U.S. Space Force from Virginia. This tactically responsive space operation aims to demonstrate rapid threat assessment and on orbit rendezvous capabilities in contested environments. The satellite carries advanced sensors to monitor and characterize potential adversarial objects, enhancing space domain awareness. As a key initiative under the Space Systems Command, VICTUS HAZE underscores the shift toward agile, responsive space operations to ensure space superiority and protect critical assets.

The mission will also test rapid launch readiness, adaptive mission planning, and autonomous spacecraft operations, showcasing the U.S. military's ability to respond swiftly to evolving threats. By combining cutting edge technology and operational flexibility, VICTUS HAZE represents a significant step toward a resilient, deterrence driven future in space defense.

Electron rocket (Credit: Loren Grush)

CMS-02 (GSAT-7R)

LVM-3 Rocket (Credit: ISRO)

Scheduled for October 2025, the Indian Space Research Organisation (ISRO) will launch the Communications Minisatellite-02 (CMS-02), also known as GSAT-7R, from the Satish Dhawan Space Centre, Sriharikota. This advanced military communications satellite will provide secure and reliable UHF, S-band, and Ku-band communication capabilities for the Indian Navy. Its encrypted, real-time data links will aid in maritime surveillance, network-centric operations, and strategic outreach across the Indian Ocean Region.

CMS-02 (GSAT-7R) exemplifies the critical role of indigenous space technology in enhancing national security and maritime domain awareness by providing robust and dedicated satellite communications to support naval operations.

ViaSat-3 F2 (ViaSat-3 EMEA)

Scheduled for launch in October 2025, United Launch Alliance's Atlas V rocket will undertake the ViaSat-3 F2 mission from Space Launch Complex-41, Cape Canaveral Space Force Station, Florida. This mission is designed to deliver the ViaSat-3 EMEA communications satellite to geostationary orbit, significantly enhancing broadband coverage and capacity across Europe, the Middle East, and Africa.

The flight will demonstrate the reliable performance of the Atlas V 551 configuration featuring five solid rocket boosters and a single engine Centaur upper stage while precisely deploying the high throughput payload. Success will reinforce ULA's position as a leading provider of heavy lift launch services for critical national security and commercial missions, offering assured access to space for the most demanding orbital destinations.

RFA's RFA One Rocket
(Credit: Spacewatch.global)

Starlink Group 11-25

Scheduled for October 2025, SpaceX's Falcon 9 will launch the Starlink Group 11-25 mission from Vandenberg Space Force Base, California. This batch of next generation microsatellites will expand the constellation's network capacity and coverage, particularly in the polar regions.

These advanced satellites will provide global high speed, low-latency broadband internet using sophisticated inter-satellite laser links. Their real time data routing will aid in connecting remote and underserved communities worldwide. Starlink Group 11-25 exemplifies the critical role of mega constellations in enhancing global connectivity efforts by providing cost effective, reliable internet access to support communication, education, and economic development strategies.

SpaceX's Falcon 9 Rocket
(Credit: SpaceX)

****Note: Launch dates of the missions are scheduled to be launched in October 2025 but may subject to change.**

Happy Birthday


October 5, 1958

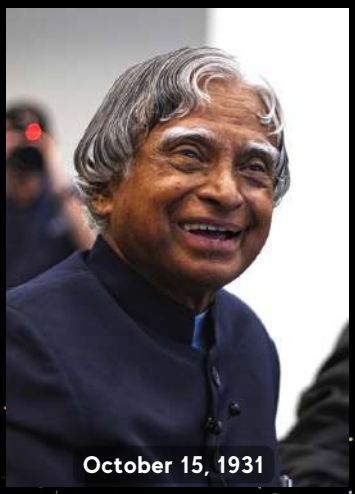
Neil degrasse Tyson

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


October 19, 1910

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)


October 29, 1656


October 30, 1909

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)

Astronomical Perception

THE NATURE OF LIGHT: A JOURNEY THROUGH TIME

It began with the simplest question what is light. For early humans, it was the fire that kept away the dark, the sunrise that brought life, and the stars that told time. But beyond its glow, light was always strange. How did it travel through space. Did it come from our eyes, or from the heavens themselves. For centuries, light was not just a mystery it was wonder.

Ancient Experiments and Ideas

The earliest explanations of light were woven with myths. Egyptians linked it to the sun god Ra, while Indian texts described tejas, the cosmic brilliance. But some thinkers began testing ideas with observation. In Greece, Euclid studied the geometry of light, showing that it reflected at equal angles. Ptolemy bent sticks in water to explore refraction, trying to understand why objects looked displaced. In China, Mozi built a dark room with a small hole and saw how light projected an inverted image a primitive version of the camera obscura.

The greatest leap came in the Islamic Golden Age. Around the 11th century, Ibn al Haytham shut himself in a darkened room and let sunlight stream through a small opening. He realized that light travels in straight lines, not as beams from our eyes but from luminous sources entering them. He experimented with mirrors, lenses, and water vessels, showing how images form and why rainbows arc across the sky. For the first time, light was not just a symbol it was a physical phenomenon that could be studied.

Dispersion of Light through a Prism and its beautiful Spectrum. (Credit: Kelvinsong)

Camera obscura the beginning of photography. (Credit: Photography school)

The Debate of Waves and Particles

In the 1600s, Isaac Newton passed sunlight through a prism and revealed a hidden rainbow and declared light id a stream of tiny particles. Yet Christiaan Huygens saw light as a wave rippling through space. The argument raged for a century until 1801, when Thomas Young let sunlight slip through two narrow slits. On the screen appeared not two bright spots but a striped pattern proof of interference, and proof that light was like a wave. Still, the question remained if light was a wave, what was waving in the emptiness of space.

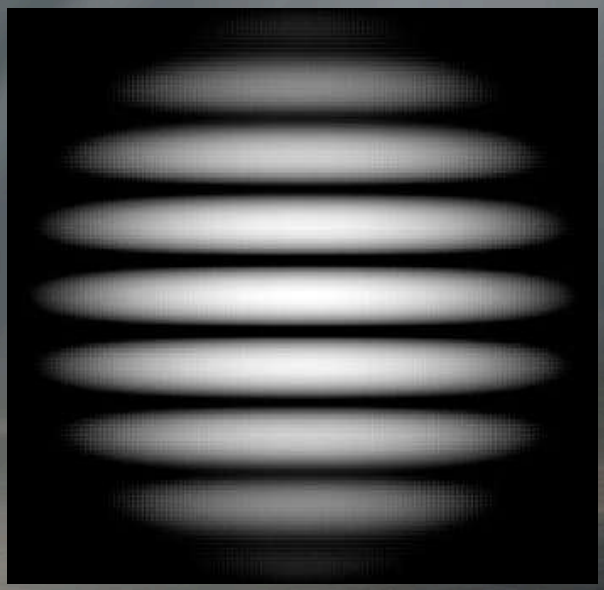
A Speed That Shattered Belief

Scientists imagined an invisible "ether" carrying light's waves, but in 1887 Michelson and Morley tested it with a delicate interferometer. To their astonishment, they found light's speed remained unchanged in every direction. The ether vanished, and the stage was set for Einstein.

In 1905, he explained the photoelectric effect by proposing that light came in tiny energy packets called photons. In the same year, relativity declared the speed of light a cosmic constant, weaving space and time together. Light was no longer just a wave or a particle, but both a duality at the very heart of physics.

Light in the Modern Age

With these mysteries unraveled, light became one of humanity's greatest tools. Telescopes caught its faintest whispers from distant galaxies, while lasers gave us beams sharp enough to guide surgery and strong enough to carry voices across oceans. Today, scientists use ultra fast flashes of light to freeze the motion of electrons, and cosmic observatories read ancient light to trace the history of the universe. From prisms to photons, light has led us from wonder to truth, yet it still dazzles us with mysteries we have only begun to explore.

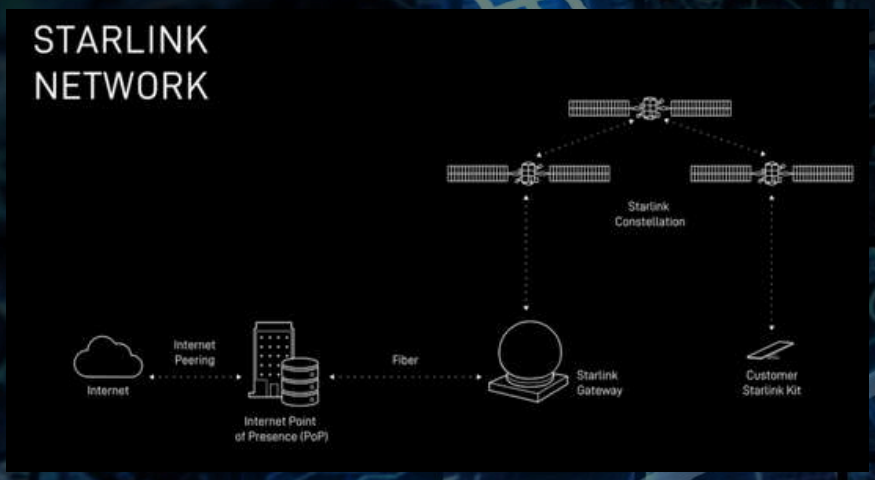


The diffraction pattern of light with many smaller interference fringes. (Credit: Jordgette)

A city illuminated by colorful artificial lighting at night. (Credit: Rhlius)

Role Of AI in Space

Smarter Skies: How AI Powers the Next Generation of Satellites



Starlink links satellites, gateways, and users for reliable internet. (Credits: Starlink.com)

Satellite communication is essential for global coverage, real time data transmission and remote monitoring. As the demand for high speed internet grows, especially in remote and underserved areas, Artificial Intelligence (AI) plays a pivotal role in ensuring reliable connectivity. By dynamically allocating bandwidth and predicting network usage, AI helps satellites deliver seamless communication across the globe.

Optimizing Satellite Operations

Satellites generate massive volumes of data every second. Traditional methods cannot handle this efficiently, but AI systems process and analyze the data in real time, enabling smarter operations. For example, OneWeb uses AI to autonomously manage its Low Earth Orbit (LEO) constellation. AI assists in orbital adjustments, collision avoidance and scheduling satellite handoffs, ensuring uninterrupted global coverage with minimal human intervention. Similarly, Starlink (SpaceX) leverages AI for real time network optimization, predicting congestion and dynamically routing signals to maintain low-latency internet services worldwide.

Enhancing Security and Reliability

With satellites supporting critical services, cybersecurity is increasingly important. AI strengthens these networks by continuously monitoring traffic, detecting unusual patterns and neutralizing potential threats. This proactive approach safeguards sensitive data and builds trust in satellite based communication and navigation systems. Predictive maintenance powered by AI also monitors satellite health, identifies anomalies and prevents failures, extending the operational lifespan of satellites.

Shaping the Future

Integrating AI into satellite communication and management is more than a technological upgrade, it is essential for the future of global connectivity. From optimizing operations and network performance to enhancing security and advancing space exploration, AI empowers satellites to operate smarter, safer and more efficiently. With Artificial Intelligence, the satellite industry is paving the way for a more connected, resilient and inclusive world.

With OneWeb-Eutelsat, even remote places can access internet (Credits: oneweb.net)

ASTRONOMICAL EVENTS - OCTOBER 2025

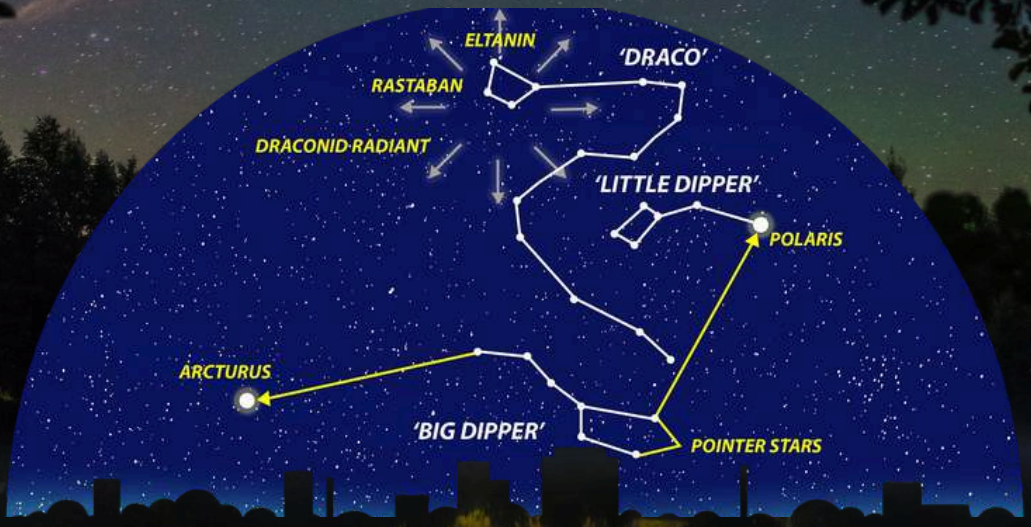
DRACONIDS METEOR SHOWER

Every October, the skies may host a quiet but captivating spectacle the Draconid meteor shower. Known as the Giacobinids, this shower is a rare celestial curiosity, with meteors radiating from the Dragon constellation as soon as night falls, offering skywatchers an evening treat unlike most other showers.

The Draconids are created when Earth passes through the dust left behind by Comet 21P/Giacobini-Zinner, a small periodic comet that orbits the Sun once every 6.6 years. This comet swings as close as Earth's orbit before venturing out past Jupiter, shedding icy dust and rocky debris along the way. Unlike most meteor showers, the debris is not evenly distributed; some clusters remain bunched near the comet. When Earth intersects one of these dense pockets, the Draconids can erupt into a spectacular meteor storm, producing hundreds or even thousands of meteors per hour. Historic storms occurred in 1933 and 1946, and notable outbursts were seen in 1985, 1998, 2011, and 2018. During the 2011 shower, observers in Europe reported over 600 meteors per hour, a truly unforgettable sight.

The last perihelion of 21P/Giacobini-Zinner was on March 29, 2025, which raises the tantalizing possibility of heightened activity this year. Could the Dragon awaken once more? Skywatchers will be keeping a close eye on the evening of October 8 into the early hours of October 9, with the predicted peak around 12:30 AM IST on October 9, 2025.

The Draconids are a modest shower in most years, producing only a handful of slow, languid meteors–around 10 per hour under ideal dark-sky conditions. But their unpredictability is what makes them special. Even with a bright waning gibbous moon on October 7, enthusiasts may still catch sight of these elusive streaks by blocking out the moonlight and finding a dark, unobstructed viewing spot.



The shower owes its name to the constellation Draco the Dragon, which winds across the northern sky. Watching meteors appear to fly from the Dragon's head is a rare thrill for both amateur and seasoned stargazers alike. Though typically subtle, the Draconids' history of sudden, dramatic storms keeps observers vigilant every October.

So, grab a chair, find a dark horizon, and step outside on the night of October 8–9. Most years, the Draconids offer a gentle celestial show, but there's always the chance that the Dragon might awaken, lighting the sky with its fiery, fleeting messengers once again.

ORIONIDS METEOR SHOWER

Every October, skywatchers are treated to one of the most breathtaking celestial displays of the year—the Orionid meteor shower. These brilliant streaks of light are tiny fragments of Comet 1P/Halley, blazing through Earth's atmosphere at an astonishing 148,000 mph (66 km/s). Their speed often leaves glowing trails that linger for several seconds, and occasionally, they erupt into dazzling fireballs, lighting up the night sky.

The Orionids are active from September 26 to November 22, but their peak performance comes on the nights of October 20–21, 2025, this year. The official peak is predicted around 5:30 AM IST on October 21, on the new moon, providing perfectly dark skies for observing. Under ideal conditions, viewers could see 10 to 20 meteors per hour, each streak a reminder of the comet that spawned them.

The shower's radiant—the point in the sky from which meteors appear to originate—lies in the constellation Orion the Hunter. Orion rises before midnight and reaches its highest point around 2 AM, but meteors can flash across any part of the sky, often leaving glowing trails that transform the night into a shimmering spectacle. With Orion's bright stars as a backdrop, the display is nothing short of magical.

Find a dark spot away from city lights, give your eyes a few minutes to adjust, get comfortable with a blanket or chair, and lie back to enjoy meteors streaking across the sky.

The Orionids are a legacy of Halley's Comet, humanity's most famous comet. First predicted by Edmond Halley in 1705, this comet completes a trip around the Sun every 76 years, shedding icy debris and dust along the way. These fragments intersect Earth's orbit, creating two annual meteor showers: the Orionids in October and the Eta Aquarids in May. Measuring roughly 8 × 15 kilometers, Halley loses just a few meters of material each pass, yet endures countless journeys through the solar system. With its unusual retrograde orbit—moving opposite to Earth—Halley spends most of its time far from our orbital plane. Currently, it is near the head of the constellation Hydra, invisible to the naked eye, and won't return until 2061.

Yet, Halley's presence is felt every year. Each Orionid meteor is a fiery messenger from this legendary comet, connecting us to a celestial wanderer that has fascinated humans for millennia.

On October 20–21, bundle up, step outside, and gaze skyward. Even though Halley is far away, its dazzling fragments remind us that the wonders of space are never out of reach—brief flashes of light that inspire awe and wonder in every observer lucky enough to catch them.

MERCURY AT GREATEST ELONGATION EAST

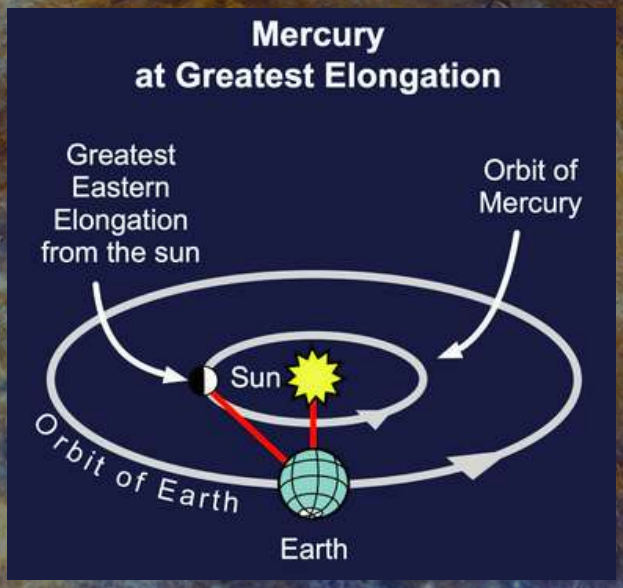
If you've ever tried to spot Mercury, you'll know it's a game of cosmic hide-and-seek. Tucked so close to the Sun, this tiny planet rarely strays far enough from the glare for us to catch a glimpse. Most of the time, it's lost in daylight. But a few times a year, Mercury steps into the spotlight—briefly—during what astronomers call greatest elongation.

These special moments happen every three to four months, alternating between morning and evening skies. When Mercury drifts to the east of the Sun, it glimmers in the fading light just after sunset. When it swings to the west, it sneaks up before sunrise, a fleeting companion to early risers.

But don't be fooled—seeing Mercury isn't easy. Its small size and proximity to the Sun make it one of the most challenging naked-eye planets. Your best bet is to catch it within a week of greatest elongation, when Mercury appears at its farthest distance from the Sun in our sky.

In between these apparitions, Mercury's swift orbit carries it out of sight—sometimes passing directly behind the Sun (superior conjunction), and other times slipping in front of it (inferior conjunction). Either way, it vanishes into the solar glare, waiting for its next chance to shine.

So, if you ever spot that tiny point of light hugging the horizon at dawn or dusk, take a moment to marvel. You've just caught the quickest planet in the solar system—Mercury—in one of its rare and dazzling appearances.



"BEST DAY TO OBSERVE MERCURY"

Mercury reaches its greatest elongation—its farthest separation from the Sun on 30 October 2025 at 3:30 AM IST, the highlight of its September–November evening apparition. Shining at magnitude −0.2, it will be visible to the naked eye under clear skies.

This apparition, however, isn't especially favorable for India. From New Delhi, Mercury will rise to just 12° above the horizon at sunset on 1 November, near the lower end of its usual 12°–23° range during evening apparitions. From Chennai, it will appear slightly better, peaking at 17° on 31 October, though still low and fleeting in the twilight.

At this elongation, Mercury sits against the backdrop of Scorpius the Scorpion. After sunset, look low in the western sky to spot it, with Mars nearby, glowing like a bright first-magnitude star.

Though Mercury shines brightly, spotting it this time will require a clear horizon, haze-free skies, and perhaps binoculars to cut through the twilight glow.

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 like distant diamonds and planets roam over the cosmic canvas. Conjunctions, those ethereal moments in the heavens when heavenly bodies appear to collide, provide a mesmerizing 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 October 5th, the ringed planet Saturn will meet the bright Moon in the South-eastern direction. Saturn is at a magnitude of 0.7 and the Moon has a magnitude of -12.74.

Place: New Delhi / Date: 05th October / Time: 09.40 p.m.

Conjunction of Pleiades and Moon

On October 10th, the Pleiades star cluster or seven sisters will meet the Moon in the Eastern sky. The Pleiades is at a magnitude of 1.59 and the Moon has a magnitude of -12.56.

Place: New Delhi / Date: 10th October / Time: 09.20 p.m.

Conjunction of Moon and Jupiter

On October 14th, the gaseous giant Jupiter will meet the Moon in the North-eastern direction. Jupiter is at a magnitude of -2.07 and the Moon has a magnitude of -11.91.

Place: New Delhi / Date: 14th October / Time: 12.30 a.m.

Conjunction of Mars and Mercury

On October 19th, the smallest and fastest planet Mercury will meet the red planet Mars in the South-western direction. Mercury will be at magnitude -0.11, and Mars at magnitude 1.51.

Place: New Delhi / Date: 19th October / Time: 06.30 p.m.

STUDENT'S CORNER

The Nebra Sky Disk: A Bronze Age Blueprint of the Cosmos

Varsha S K ,iAstronomer

Picture this: It's a moonlit night in ancient Europe, more than 3,600 years ago. A group of people gathers on a hillside, gazing at a shimmering bronze disk in their hands. Etched onto its surface are golden symbols: the Sun, the crescent Moon, and a cluster of stars. For them, it's not just art. It's a guide to the heavens—the Nebra Sky Disk.

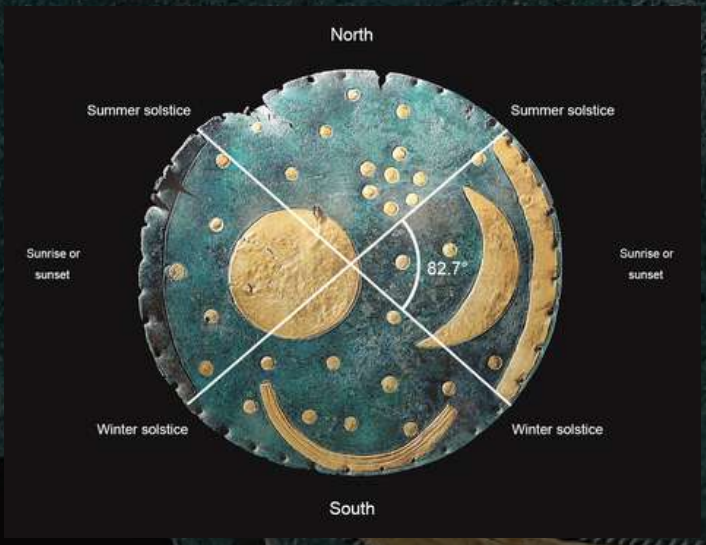
At first glance, it might look like a decorative shield or an ornament. But look closer, and you realize something astonishing: this is the oldest known map of the cosmos. Created around 1600 BCE and discovered in Nebra, Germany, the disk shows celestial objects with surprising accuracy. The cluster of seven dots, for instance, is almost certainly the Pleiades, a star group still used today to mark agricultural seasons.

Sounds unbelievable, doesn't it? Bronze Age people, without telescopes or computers, holding a portable star chart in their hands. Yet the Sky Disk is real, and it challenges our ideas of how advanced ancient civilizations were in observing the universe.

So, what exactly was it used for? Some researchers believe the disk helped synchronize lunar and solar calendars—a tool for farmers to know when to plant and harvest. Others suggest it had a ritual or symbolic role, connecting the earthly world to the cosmic order. And then there are those who wonder if it was both: a fusion of science and spirituality, practical and sacred at the same time.

Here's where things get even more intriguing: the Nebra Sky Disk wasn't static. Over centuries, it was modified, with golden arcs added to mark the horizon, and later a "solar boat" symbol possibly representing the Sun's journey across the sky. It's as if generations of stargazers updated their cosmic "software," making the disk an evolving manual of the heavens.

Now imagine this: what if the Sky Disk isn't just a relic of the past, but a reminder of how deeply humans have always craved to understand their place in the universe? Today, we use space telescopes and AI-driven star maps, but the impulse is the same—the desire to track, measure, and decode the patterns above us.



And here's the kicker: the disk lay buried for millennia, hidden until treasure hunters stumbled upon it in 1999. Had it remained undiscovered, we might never have known that Bronze Age Europe held such cosmic knowledge in its hands. So, what do you think? Was the Nebra Sky Disk simply a ceremonial object, or the world's first portable astronomy device? Either way, it invites us to imagine a night long ago, when our ancestors stood under the same stars we see today—guided by a gleaming bronze window into the cosmos.

A Celestial Visitor: Comet SWAN

"A wandering guest from the far edges of our Solar System"

Atharva Agarwal, Club Student

Discovery

This September, the night sky welcomes a rare traveler — Comet C/2025 R2 (SWAN). It was first spotted in early September by the SWAN camera aboard the SOHO spacecraft. Though not as bright as some famous comets, it has quickly caught the attention of astronomers worldwide.

Where to Look

For observers in India and across the Northern Hemisphere, Comet SWAN is visible in the early morning sky before dawn. It is passing close to Spica in the constellation Virgo. While it may be too faint for the naked eye, binoculars or a small telescope can reveal its soft glow and short tail.

Why It Matters

Comets are often described as "time capsules of the Solar System." Made of ancient ice, dust, and rock, they carry material left over from when the Sun and planets first formed. Each visit of a comet gives scientists a chance to study this ancient cosmic matter.

More Than Science

In history, comets were often seen as mysterious omens, nicknamed "hairy stars." Today, we understand them as natural wanderers of space, yet their sudden appearance still inspires awe. Watching a comet is a reminder of the vastness of the universe and our place in it.

How to Watch

To spot Comet SWAN, go to a dark location away from city lights. Look toward Virgo before sunrise, and let your eyes adjust. Even if it appears faint, remember — you are witnessing a visitor that has traveled millions of years to reach our skies.

Conclusion

This September, Comet SWAN reminds us that the universe is alive with surprises. Don't miss the chance to welcome this wandering guest from the far edges of our Solar System.

✨ "Every comet is a messenger from the dawn of the Solar System." ✨

ANCIENT MICROBIAL LIFE ON MARS

Sourajit Mandal, Astronomy Camp

We might have just found life beyond Earth. Yes, that is right. Perseverance rover might have just stumbled onto the strongest hint of alien life on Mars. This is not like the other times where we hype it more than we know. Though it is not definite proof for life- this time, it is actually very big.

In October 2025, NASA announced their rover- Perseverance drilled into a rock called "Cheyava Falls" and found a sample. This sample, now nicknamed had some peculiar observations on it. A few spots were seen on the rock, which are generally associate with biological activity on Earth. The larger spots, were named "Leopard spots", and the smaller spots were named "Poppy seeds". Organic compounds and weird mineral patterns were also seen on them. Scientists were baffled by the findings, and could not stop arguing. It looked suspiciously like something ancient microbes might have left behind.

Perseverance collected the core rock sample in July 2024. The rover, drilled into an ancient riverbed... a vein-filled mudstone in a river-valley system called "Neretva Vallis", on the edge of the "Jezero Crater" that once flowed into a Martian Lake. This means, the rock it sampled is fossilized mud with mineral veins running through it. This is the same kind of spot where, on Earth, microbes would have thrived.

The team nicknamed this core sample "Sapphire Canyon" and spent months running remote instrument checks, cross-checks, and careful research before going public. The official announcement and the paper were published in October 2025.

The spots on the rock, are not of simple colors. The poppy-seed nodules are small, dark, manganese or iron rich specks embedded in clay rich mudstone. The leopard spots are off-white spots rimmed by darker material. On Earth, similar textures and mineral associations are often produced where microbes mediate iron, phosphate, or sulfur in wet sedimentary settings. The Mars team also detected organic carbon and minerals such as Vivianite and Greigite in along with these spots. These minerals frequently show up where microbial life altered sediment chemistry, on Earth. This combination is the whole reason the why scientists across the world are so excited.

So... did we finally find aliens after thousands of years of human speculation and decades of research? And did we actually find it not on some random star in a faraway galaxy, but in our very own solar system?

Sadly, the truth, is almost always harder than that. The minerals and organic compounds could, in principle, be formed by nonbiological geochemical pathways. Science always has multiple ways to reach the same final conclusion.

This is the reason why the discovery is being described as the strongest hint so far rather than a confirmation. The only way to move from very strong hint to proof is to analyze the material in the kind of detail that can only be done in Earth laboratories... or to find patterns that are extremely unlikely to arise without life. Right now, the data push the confidence level higher, but the final answer requires more tests and, in an ideal case, the actual return of samples to Earth.

The Mars Sample Return plan that would bring these cores back for full lab work is estimated in 2030s or 2040s, unless and until political priorities change. This means, we do not have any immediate answer, and for the near future, scientists will use the instruments on Mars, along with remote sensing and laboratory analog experiments on Earth, to push this hypothesis further.

Proving that ancient life existed on Mars would rewrite biology, planetary science, and our place in the universe. But most of all, it would answer a millennium old question- Are we truly alone, in the universe?

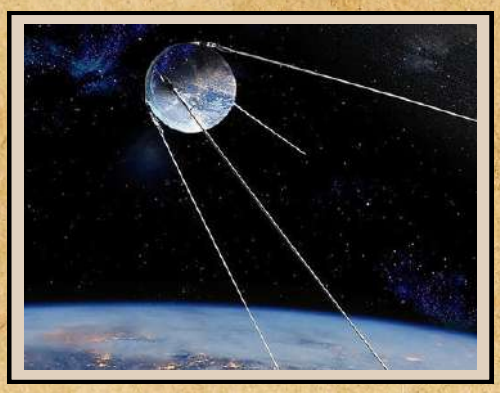
ASTROPHOTOGRAPHS FROM SPACE TEAM

Total Lunar Eclipse captured by STEPL Department Educators,Chennai.

Total Lunar Eclipse Captured by Mr. Ranjith Kumar E, Regional Product Manager, STEPL.

HISTORICAL EVENTS OF OCTOBER

Historical Timeline



Launch of Sputnik 1

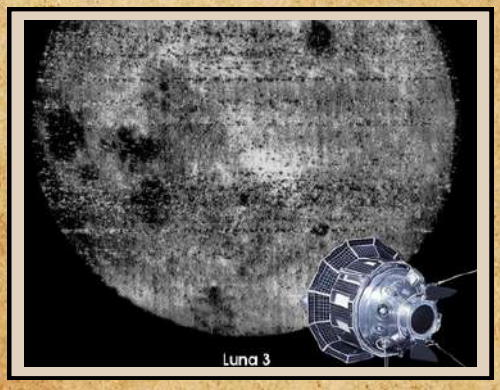
On October 4, 1957, the Soviet Union made history by launching Sputnik 1, the world's first artificial satellite. Carried into orbit by an R-7 rocket from the Baikonur Cosmodrome, Sputnik was a polished metal sphere just 58 cm in diameter with four long antennas. It weighed 83.6 kilograms and transmitted a simple "beep-beep" radio signal that could be picked up by amateur radio operators around the globe.
Orbiting Earth once every 96 minutes, Sputnik 1 marked the beginning of the Space Age and triggered the Space Race between the Soviet Union and the United States.

Edwin Hubble Identifies Cepheids in Andromeda

On October 5, 1923, Edwin Hubble, using the 100-inch Hooker Telescope at Mount Wilson Observatory, discovered Cepheid variable stars in the Andromeda Nebula. This proved Andromeda was not part of the Milky Way but a separate galaxy, expanding our view of the universe. By measuring the Cepheids' brightness, Hubble calculated distances and showed that galaxies exist far beyond our own. This discovery reshaped astronomy, leading to the idea of an expanding universe and laying the foundation for the Big Bang theory.

Asteroid 2008 TC_3 – First Predicted Impact

On October 6, 2008, astronomers detected asteroid 2008 TC_3 just 19 hours before it entered Earth's atmosphere—the first predicted asteroid impact. Only 4 meters wide, it disintegrated over the Nubian Desert in Sudan, creating a bright fireball. Scientists later recovered fragments, named Almahata Sitta, from a new class of asteroid. This event was a milestone in planetary defense, proving near-Earth objects can be tracked and studied before impact.



First Photographs of the Moon's Far Side Luna 3

On October 7, 1959, the Soviet spacecraft Luna 3 achieved a historic milestone by capturing the first photographs of the Moon's far side. Before this mission, only the near side of the Moon was known to humanity, as the far side is permanently hidden from Earth due to tidal locking. Luna 3's images, though blurry, revealed about 70% of the far side, uncovering previously unseen features such as the Mare Moscoviense and the Tsiolkovskiy Crater.

Discovery of Triton

On October 10, 1846, British astronomer William Lassell discovered Triton, Neptune's largest moon, just 17 days after Neptune itself was found. Triton orbits in a retrograde direction, suggesting it was once a captured Kuiper Belt object. About 2,700 km wide, it is the Solar System's seventh-largest moon and one of the coldest worlds, with nitrogen geysers and a thin atmosphere. Its orbit will eventually cause it to spiral into Neptune, possibly forming a ring system.

Outer Space Treaty Enters into Force

On October 10, 1967, the Outer Space Treaty came into force, becoming the foundation of international space law. Signed by the U.S., Soviet Union, and U.K., it declared that space should be used only for peaceful purposes, banned nuclear weapons in orbit, and prevented nations from claiming celestial bodies. The treaty emphasized cooperation and the benefit of all humankind. Today, with over 110 signatories, it remains the cornerstone of global space governance.

Shenzhou 5 – first Chinese human spaceflight

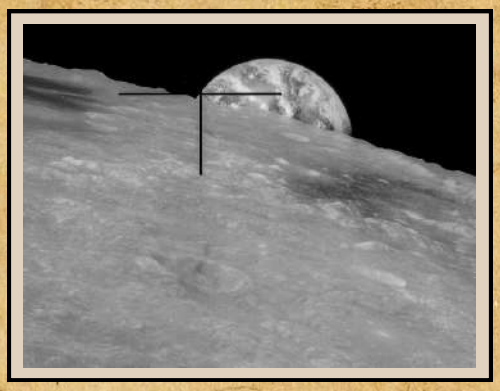
China launched astronaut Yang Liwei aboard Shenzhou 5,on 15 October 2003, making China the third country (after the USSR/Russia and the USA) to independently send a human into orbit. The spacecraft completed 14 Earth orbits during a 21-hour flight before safely landing in Inner Mongolia. This historic mission marked the beginning of China's human spaceflight program, paving the way for future missions like the Tiangong space station.

Launch of Galileo Spacecraft

On October 18, 1989, NASA launched the Galileo spacecraft aboard Space Shuttle Atlantis (STS-34), beginning a historic mission to Jupiter. After a six-year journey, Galileo entered orbit in 1995 and revealed groundbreaking discoveries: a subsurface ocean on Europa, volcanoes on Io, and a magnetic field on Ganymede. It also sent a probe into Jupiter's atmosphere, the first to directly measure its composition. Galileo transformed our understanding of gas giants and inspired future missions to icy moons.

Discovery of 'Oumuamua

On October 19, 2017, astronomers in Hawaii discovered 'Oumuamua, the first known interstellar object to enter our Solar System. Unlike comets or asteroids, it was elongated like a cigar, moved unusually, and lacked a visible tail. Its Hawaiian name means "scout" or "messenger." 'Oumuamua sparked global debate over its nature—natural or artificial—and opened a new field of interstellar object astronomy.

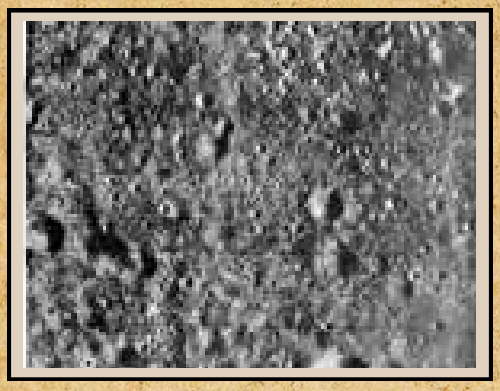


Launch of Zond 8 Towards the Moon

On October 20, 1970, the Soviet Union launched Zond 8, the last mission in its Zond program, aboard a Proton-K rocket from the Baikonur Cosmodrome. The spacecraft was sent on a circumlunar flight to test systems, study the Moon, and capture scientific data.
Zond 8 successfully traveled to the Moon, flying past its far side and transmitting detailed photographs of both the Moon and Earth. These images added to lunar cartography and provided useful insights into Earth's appearance from deep space.

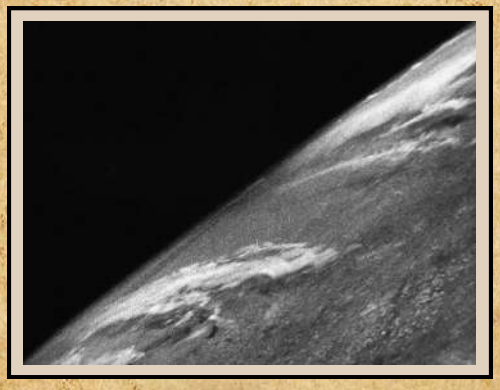
Earliest Recorded Solar Eclipse

On October 22, 2136 BCE, ancient Chinese astronomers recorded one of the earliest known solar eclipses. Court astronomers Hi and Ho failed to predict it, a serious offense since celestial events were linked to imperial power. This record is important both culturally and scientifically, showing how astronomy was tied to governance and religion. It also marks one of humanity's earliest steps in systematically studying the skies



Luna 12: High-Resolution Lunar Imaging

On October 22, 1966, the Soviet spacecraft Luna 12 transmitted the first high-resolution images of the Moon's surface. Equipped with an advanced imaging system, it captured detailed views of craters, rilles, and lava plains, aiding in the search for safe landing zones. The mission showcased improved Soviet orbital technology and provided scientists with vital data for lunar geology. Though overshadowed by Apollo, Luna 12 marked a key step in exploring worlds beyond Earth.



First Space Photograph of Earth

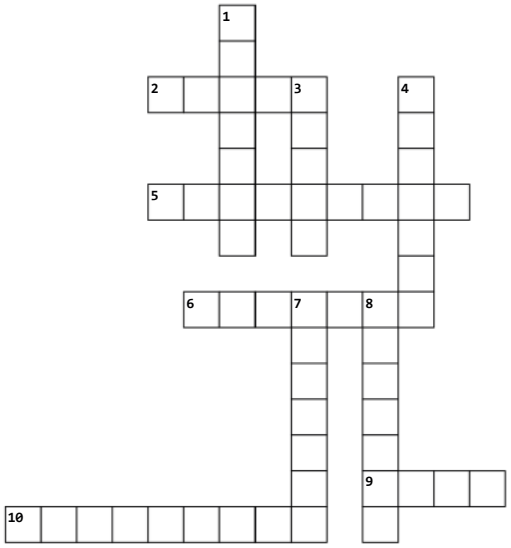
On October 24, 1946, a modified V-2 rocket launched from White Sands, New Mexico, carried a camera that took the first photos of Earth from space at 105 km altitude. The grainy images showed Earth's curvature and clouds, giving humanity a brand-new perspective. This event marked the beginning of space-based Earth observation, paving the way for weather satellites and remote sensing. It also showed how wartime rocket technology could be turned toward peaceful science.

Cassini Discovers Saturn's Moon Iapetus

On October 25, 1671, astronomer Giovanni Domenico Cassini discovered Iapetus, Saturn's third-largest moon. He noticed it looked much brighter on one side, later explained by its two-toned surface—one icy and reflective, the other dark with carbon-rich material. Iapetus' "yin-yang" appearance makes it unique in the Solar System. Cassini's discovery added to his legacy, which includes other Saturnian moons and the Cassini Division in Saturn's rings.

TRAIN YOUR BRAIN

CROSSWORD



Across

2. Which constellation is known as the Dragon of the Night Sky?

5. Which NASA rover discovered a coral-like rock in Gale Crater?

6. Who is the commander of the Artemis 2 mission?

9. Who discovered the first pulsar in 1967?

10. What is the name of India's human spaceflight program?

Down

1. Which space telescope observing X-rays from pulsars?

3. Which spacecraft is used for artemis mission?

4. Pulsars provide evidence for which type of star?

7. Which natural process exposed the branching mineral structures on Mars?

8. Which observatory in Puerto Rico that found many pulsars?

Astronomy Word Puzzle

Astronaut's Toolkit

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

SPACESUITS
CAMERA
JETPACK
PATCH
TETHER
HELMET
WRENCH
TABLET
TOOLKIT
RADIO
SENSOR
BOOTS
VISOR
OXYGEN
TIMER

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

Answers for last month puzzles.

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OCTOBER 2025 | VOLUME 4 | ISSUE X

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