

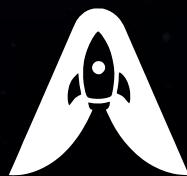
APOGEE PRESENTS

BRAHMAND

WITH SPACE TECHNOLOGY INCUBATION CENTRE (S-TIC)

Release
January 2025

Issue 01 : Birth of Indian
Space Expedition



Meet the Team



Standing from left : Parvash Kamboj (CE'27), Samridhi Saini (ECE'27),
Sonali Jaiswal (ICE'27), Janvi Khurana (BT'27),
Chahat Kesharwani (ICE'27)

Sitting from left : Vatsal Khanna (ECE'27), Bhavya Goyal (ECE'27)



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ISSUE 01



Birth of Indian Space Expedition

From the Editor

The excitement we feel looking at the star-studded sky in the pitch of Dark is something that connects each one of us. An Innate curiosity embellished with overwhelming passion towards the unknown, unconquered and hidden elements of existence drives us towards ever-increasing flow of Knowledge. It is moment of immense joy and great pride to present "Bramhand", One of its kind space magazine by APOGEE space club ,NITJ. It is an initiative to cater to ardent desire to keep learning about the universe from different spheres. This inaugural Edition of our magazine is dedicated to the "Birth of Indian Space Expedition". It is much more than just a story of rockets or satellites – but a testament of time and dreams that dare to defy gravity with countless years of relentless work and a belief that India could touch the stars.

The first Edition is especially significant as it marks the beginning of a journey that we believe would inspire and ignite the curiosity of readers for years to come. We pour our passion and immense love for space into every page, celebrating the vision, courage, and sheer determination that brought India to the forefront of space exploration. Our magazine is a tribute to those who have reached for the impossible and shown that dreams can indeed become reality and to the young minds who continue to push boundaries, fueled by an unquenchable thirst for discovery and an immense love for space. India's space exploration story is one of collective pride—a reminder that when a nation dares to dream together, even the sky is not the limit.

We hope that as you read, your heart swells with pride and your mind fills with wonder. Let these stories remind us all that space is more than a place—it is a symbol of humanity's boundless potential, an eternal call to explore, to dream, and to persevere.

Keep shining!
Samridhi Saini
(Editor)



Faculty Insights

A Message from Dr. Harleen Dahiya

Faculty Coordinator, APOGEE

Welcome to the Space Club!

As the faculty coordinator, I'm thrilled to invite you on a journey of exploration and discovery. Our Space Club is a vibrant platform where curious minds and aspiring astronomers can delve into the mysteries of the cosmos, learning not only the essentials of astronomy, astrophysics, and space technology but also the innovative tools that drive these advancements.

In a world advancing swiftly in science and technology, understanding space is more crucial than ever. Through club activities, you'll cultivate a spirit of inquiry and critical thinking, tackle challenging projects, and push beyond conventional boundaries to find creative solutions.

Joining APOGEE also means connecting with like-minded peers, fostering a sense of community, and forming lasting friendships. This journey will enrich your academic experience and equip you with skills to contribute meaningfully to humanity's future. Together, let's reach for the stars and beyond!

Sincerely,
Harleen Dahiya
Faculty Coordinator, APOGEE



Faculty Insights

A Message from Dr. Sateesh Kumar Awasthi

Faculty Coordinator, APOGEE

APOGEE is a fantastic initiative by the students of NIT Jalandhar. I extend my heartfelt wishes to all stakeholders of this club on the release of the first edition of its magazine. Since its inception, the club has been actively engaging in space-related activities at the Institute, including organizing competitions for National Space Day and conducting workshops on ISRO-assigned projects through the Space Technology Incubation Center (STIC) at NIT Jalandhar.

I am confident that the students of NIT Jalandhar will benefit greatly from the upcoming activities of APOGEE. The club offers a space for curious young minds to come together and exchange ideas in space-related research. This initiative will inspire students to develop indigenous technologies, reducing dependence on external sources. In ancient times, we held rich knowledge of space and nakshatras, as recorded in various scriptures. I am sure the club will also organize activities to explore our Indian Knowledge System on space science, complementing it with contemporary insights.

Last but not least, I once again congratulate all the members of APOGEE for this wonderful initiative and hope they will keep its spirit alive in the future.

Sincerely,
Sateesh Kumar Awasthi
Faculty Coordinator, APOGEE





“ Sometimes, I wonder what lies beyond the horizon. APOGEE gives me the chance to chase that wonder, to capture the universe's magic through my lens, and to make the infinite, infinitesimally mine.

~Parvansh Kamboj
(CE'27)

“ Gazing up at the stars fills me with a sense of wonder at how we are all made of stardust. APOGEE is my medium for expressing my love for the cosmos and helping others experience it too :)

~Janvi Khurana
(BT'27)

“ Honored to be the Gaganyaan Generation & on a road to bring Space down to earth for everyday people of NIT Jalandhar and beyond!

~Bhavya Goyal
(ECE'27)

“ I love designing, and APOGEE gives me the perfect space to explore my creativity, express ideas, and connect them with the wonders of space.

~Chahat Kesharwani
(ICE'27)

TEAM APOGEE

“ The only way to imagine infinity is to gaze at the stars and reflect on our past and future. At APOGEE, we reach for the stars, bridging our history and limitless dreams.

~Samridhi Saini
(ECE'27)

“ Apogee is growing at a speed that it doesn't seem that it was formed just 8 months back. It's all the result of extraordinary support of our Faculty Coordinators, STIC Coordinators and all the members in the Apogee family, and most importantly, the kind blessings of the God.

~Vatsal Khanna
(ECE'27)

“ APOGEE gave me a way to express my creativity and build teamwork skills proving to be a significant part of my college experience.

~Sonali Jaiswal
(ICE'27)



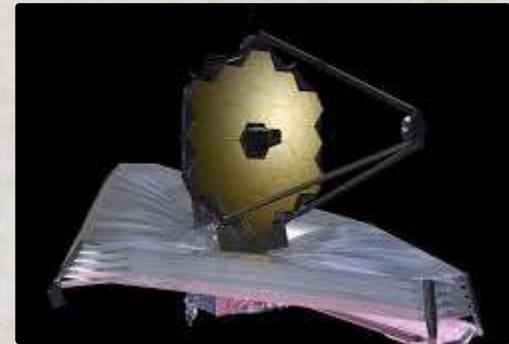
SPACE NEWS

A Year in Space-2024 edition

JANUARY

JWST DETECTS WATER ON A DISTANT EXOPLANET

The James Webb Space Telescope identified water vapor in the atmosphere of a distant exoplanet. This marks a milestone in the search for potentially habitable worlds. The findings open doors to understanding exoplanetary climates.



FEBRUARY

ISRO TESTS REUSABLE LAUNCH VEHICLE

India's ISRO conducted a critical test of its Reusable Launch Vehicle (RLV). This project aims to reduce costs for satellite deployment significantly. The successful test underscores India's innovation in space technology.

MARCH

NASA PREPARES FOR MARS SAMPLE RETURN

NASA and ESA announced the next steps in the Mars Sample Return mission, including finalizing designs for retrieval systems. The mission is expected to launch in the late 2020s.

APRIL

CHINA TESTS LUNAR MINING TECHNOLOGY

China conducted tests for extracting resources like helium-3 and rare Earth elements from the Moon. This is part of their roadmap for establishing a sustainable lunar base by 2035.

MAY

SPACEX ACHIEVES RECORD-BREAKING 100TH FALCON 9 LAUNCH

SpaceX celebrated its 100th successful Falcon 9 rocket launch, emphasizing its role in making space access more reliable and cost-effective.

JUNE

INDIA'S GAGANYAAN SPACECRAFT TEST SCHEDULED

ISRO announced unmanned tests for its Gaganyaan spacecraft, aiming to prepare for India's first human spaceflight by 2025.

AUGUST

ADITYA-L1 COMPLETES FIRST YEAR OF SOLAR RESEARCH

India's Aditya-L1 celebrated a year of studying the Sun, delivering valuable data on solar winds and their effects on Earth's magnetosphere.



SEPTEMBER

FRANK RUBIO SETS LONGEST SPACE MISSION RECORD

NASA astronaut Frank Rubio returned to Earth after spending 371 days aboard the ISS, setting a record for the longest U.S. spaceflight



NOVEMBER

ASTEROID MINING TECHNOLOGY TESTED SUCCESSFULLY

A private company tested robotic systems to mine asteroids for rare metals in low-Earth orbit, showing promising results for resource extraction in space.

JULY

HUBBLE SPACE TELESCOPE BREAKS NEW RECORD

The Hubble Space Telescope identified the most distant galaxy cluster to date, further refining our understanding of the universe's expansion.

OCTOBER

BREAKTHROUGH IN SPACE PROPULSION TECHNOLOGY

A U.S. research team has successfully tested an advanced ion propulsion system that promises to significantly speed up interplanetary travel while minimizing fuel usage. This breakthrough could revolutionize space missions by enabling more efficient and cost-effective exploration of distant planets.

DECEMBER

PARKER SOLAR PROBE SETS NEW RECORDS NEAR THE SUN

On December 24, Parker Solar Probe set records by reaching 3.8 million miles from the Sun at 430,000 mph. This milestone advances our understanding of solar phenomena impacting Earth and space exploration.

| Our Visionaries



The People's Scientist

**Dr. APJ Abdul
Kalam**

“

We are all born with a divine fire in us. Our efforts should be to give wings to this fire and fill the world with the glow of its goodness.

”

— Dr. A.P.J. Abdul Kalam

Dr. A.P.J. Abdul Kalam - the **Missile Man** of India was a beacon of hope and inspiration. His life, and belief in the power of dreams and determination, ignited millions minds with his relentless passion for science and profound love for his country, leaving an indelible mark on the soul of India.



I K Gujral congratulating former President Dr. APJ Abdul Kalam after he was conferred with the Bharat Ratna at Rashtrapati Bhawan in New Delhi. (Source: Express photo by Virendra Singh)



One of the little known facts about former President A P J Abdul Kalam is that he has a medical invention to his name — a coronary stent built with missile composites that dramatically brought down the cost of heart stents from Rs 55,000 to Rs 10,000 in the mid-1990s. Former president Dr APJ Kalam deliver lecture on Homi Bhabha Birth Centenary Commemoration TIFR Foundation Day at Colaba. (Source: Express Photo by Ganesh Shirsekar)

A Legacy of Innovation and Vision

Dr. A.P.J. Abdul Kalam, a luminary in India's space and defense sectors, played a pivotal role in the development of the nation's indigenous hovercraft, Nandi, symbolizing strength and innovation.

As the Project Director of ISRO, he spearheaded the development of the Satellite Launch Vehicle (SLV III), successfully launching the Rohini satellite in 1980.

the Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV).

Under his leadership, the Integrated Guided Missile Development Program significantly advanced India's missile technology, earning him the title of 'Missile Man of India'. His Ideas continue to act as torch bearer for India as we strive to establish ourselves in collaboration with space science



Dr. Abdul Kalam, who received several prestigious awards including Bharat Ratna, played a crucial role when India tested its nuclear weapons at Pokhran in 1998 when the Vajpayee government was in power. Former prime minister Atal Bihari Vajpayee, George Fernandes, Pramod Mahajan, Bhairon Singh Shekhawat and other senior scientist and army officials at the site of 1998 Pokhran nuclear missile launch. (Source: Express photo by Ravi Batra)

He was also part of the INCOSPAR committee, which established the Thumba Equatorial Rocket Launching Station (TERLS) for space research. Leading the DRDO, Dr. Kalam developed indigenous guided missiles such as Agni and Prithvi, based on the SLV program. As the Chief Scientific Advisor and DRDO Secretary, he coordinated the Pokhran II nuclear tests and promoted the advancement of satellite launch vehicles, including

Providing us a direction reminding us all that with passion and perseverance, even the sky is not the limit.



Dr. APJ Abdul Kalam in Sukhoi-30 MKI. (Source: Express photo by Ravindra Joshi)

| Our Visionaries

Dr. Vikram Sarabhai

The Father of Indian Space Program



“

If we are to play a meaningful role nationally, and in the community of nations, we must be second to none in the application of advanced technologies to the real problems of man and society.

”

— Dr. Vikram Sarabhai

These inspiring words by Dr. Vikram Sarabhai encapsulate his visionary spirit. He had an unwavering belief in the transformative power of space science to address India's challenges and contribute to the global community.



Dr. Vikram Sarabhai, ISRO Chairman, and Dr. Thomas O. Paine, NASA Administrator, sign an agreement to use a satellite for broadcasting instructional TV programs to 5,000 Indian villages.

Founding of Physical Research Lab (PRL)

At the young age of 28, Dr. Sarabhai took his first step in institution-building by founding the Physical Research Laboratory (PRL) in Ahmedabad in 1947. This marked the beginning of his remarkable journey and laid the foundation for India's space research efforts.

The Birth of ISRO

Dr. Sarabhai's greatest legacy is undoubtedly the creation of the Indian Space Research Organisation (ISRO). With a firm belief in the potential of space technology for national development, he spearheaded several groundbreaking initiatives. One of his most notable projects was the establishment of the Thumba Equatorial Rocket Launching Station (TERLS) in Kerala.

The Launch of Aryabhata: A Milestone in Indian Space History

Though Dr. Sarabhai did not live to witness it, his visionary work laid the groundwork for the launch of India's first satellite, Aryabhata, in 1975. This monumental achievement set the stage for India's future successes in space exploration.

A Legacy That Lives On

Dr. Sarabhai's vision and tireless dedication continue to guide India's space endeavors. Every milestone ISRO achieves is a testament to his belief that advanced technology can solve real-world problems and uplift society. His legacy reminds us of the power of vision, determination, and innovation in shaping a nation's future.



ISRO's Remarkable Journey



Milestones of Innovation
and Exploration

Founding ISRO: The Beginning of a New Era

Dr. Vikram Sarabhai: Pioneer of India's Space Program

In the early 1960s, as India aspired to make strides in scientific and technological advancement, Dr. Vikram Sarabhai emerged as a pivotal leader, often referred to as the father of the Indian space program. His belief in the potential of space technology as a catalyst for national development was visionary, seeing its application in critical areas like communication, weather forecasting, and resource management.

Establishment of INCOSPAR: The Beginning of India's Space Program

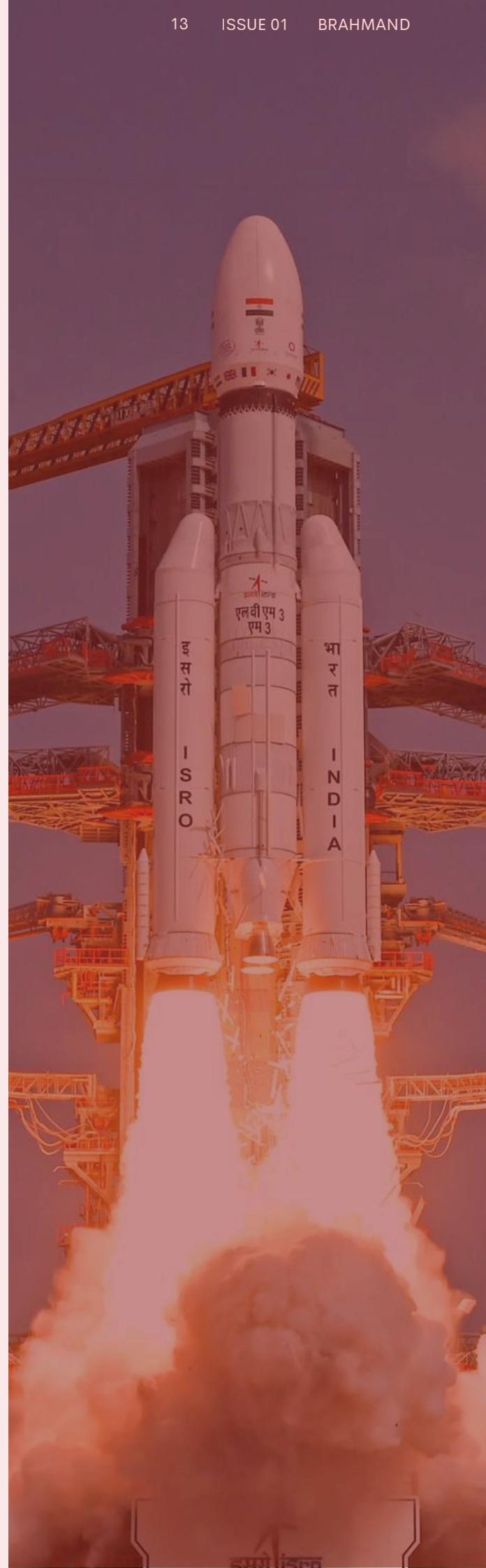
In 1962, Dr. Sarabhai founded the Indian National Committee for Space Research (INCOSPAR), working under the Department of Atomic Energy (DAE). This organization became the initial platform for assembling a dedicated team of scientists. Among them was the ambitious young physicist, Dr. A.P.J. Abdul Kalam, who would later play a key role in India's space and defense initiatives.

Evolution of ISRO and India's Path to Self-Reliance

By 1969, INCOSPAR evolved into the Indian Space Research Organisation (ISRO), placed under the Department of Space and directly overseen by the Prime Minister's Office. Dr. Sarabhai's focus was on self-reliance and developing India's indigenous satellite launch capabilities, a vision that set the stage for ISRO's remarkable achievements in space exploration and technology.

A Legacy of Dedication and Purpose

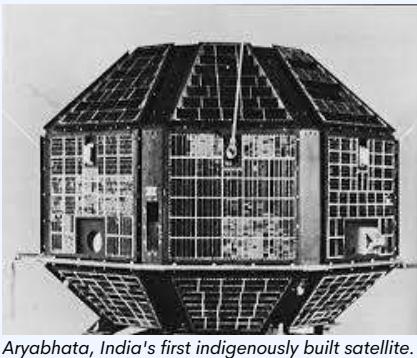
Dr. Sarabhai's efforts serve as an inspiring reminder that dreams pursued with dedication and purpose can elevate a nation. His foundational work transformed India's aspirations in space technology into a reality that continues to shape India's progress and innovation on the global stage.



ARYABHATA

India's First Satellite Mission





Aryabhata, India's first indigenously built satellite.



Launch and Initial Parameters

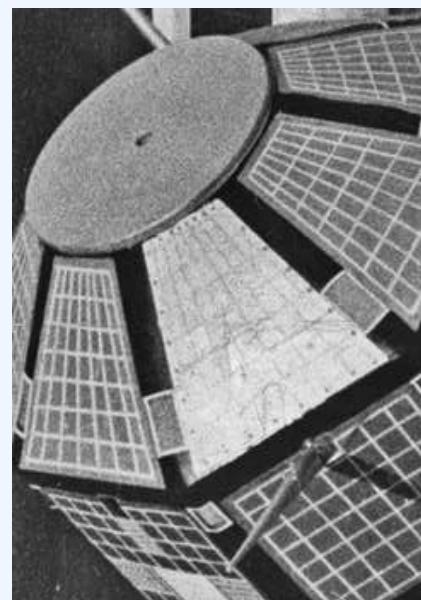
On 19 April 1975, at 1300 IST, Aryabhata was successfully launched into a near-earth orbit. The satellite's initial orbital parameters included an **apogee height of 620 km**, a **perigee height of 562 km**, and an inclination of **50.7 degrees**. Beyond being just a satellite, Aryabhata marked a monumental achievement for a young nation, carrying advanced payloads for **X-ray astronomy, aeronomy, and solar neutron and gamma-ray studies**.

Project Visionary: Dr. U.R. Rao

Dr. Udupi Ramachandra Rao, Aryabhata's project director and a globally recognized space scientist, led this groundbreaking mission under the guidance of Dr. Vikram Sarabhai. He later stated that Aryabhata's success became a source of national pride, inspiring confidence in India's ability to build advanced satellites for communication, remote sensing, and meteorology.

From Design to Launch - The International Collab

Initially, Aryabhata was intended to be launched by the **American Scout launch vehicle**. However, in 1971, an unexpected opportunity arose: the **Soviet Academy of Sciences** offered to support India's launch at no cost. Following discussions among twenty Soviet scientists and four ISRO scientists, the launch was finalized. This support accelerated India's entry into space research and ensured Aryabhata's successful launch.



Aryabhata, India's first indigenously built satellite.

Key Objectives of the Aryabhata mission

The Aryabhata mission set ambitious goals:

- Designing & fabricating a space-ready system.
- Evaluating orbital performance and developing intricate satellite operations.
- Establishing ground-based tracking systems and necessary testing infrastructure.

Mission Execution and Challenges

During the satellite's initial phase, control was managed by the Bears Lake ground station in the USSR, then transferred to SHAR during the normal operational phase. While Aryabhata faced early issues with tumbling and power inconsistencies in the aeronomy experiment, most subsystems functioned well, monitored through 91 health parameters. After 45 orbits, scientific operations were ceased, and the satellite was spin-stabilized at 50 revolutions per minute.

Legacy and Impact

Aryabhata remained in orbit for nearly seventeen years, marking a new era for India's space program. The mission provided invaluable experience, laying the groundwork for future operational satellites and establishing India as a rising player in global space technology.

”

TIMELINE OF **ISRO's** **Achievements**

Here's a timeline of some key achievements by the Indian Space Research Organisation (ISRO)



1969**Formation of ISRO**

Indian Space Research Organisation (ISRO) was formed on August 15, 1969, under the leadership of Dr. Vikram Sarabhai.

Aryabhata

India's first satellite, Aryabhata was launched on April 19, 1975, from the Soviet Union.

1975**Rohini Satellite**

Rohini-1, the first satellite to be placed in orbit by an Indian-made launch vehicle (SLV-3), was launched on July 18, 1980.

1980**INSAT-1B**

Launched on August 30, 1983 INSAT-1B was part of the Indian National Satellite System, enhancing telecommunications and meteorology services.

1983**1992****PSLV**

The Polar Satellite Launch Vehicle (PSLV) successfully launched its first mission on October 15, 1994, marking a milestone for ISRO.

1994

2001**GSLV**

The first successful flight of the Geosynchronous Satellite Launch Vehicle (GSLV) was conducted on April 18, 2001.

Chandrayaan-1

India's first lunar mission, Chandrayaan-1, was launched on October 22, 2008. The mission made a significant discovery of water molecules on the moon.

2008**2013****Mangalyaan (Mars Orbiter Mission)**

Launched on November 5, 2013, Mangalyaan successfully entered Mars' orbit on September 24, 2014, making India the first country to achieve this feat on its first attempt.

PSLV-C37

ISRO set a world record by launching 104 satellites in a single mission on February 15, 2017, using the PSLV-C37.

2017**2019****Chandrayaan-2**

Launched on July 22, 2019, Chandrayaan-2 aimed to explore the lunar south pole. While the lander Vikram did not succeed in its soft landing, the orbiter continues to study the moon from orbit.

GSAT-30

Launched on January 17, 2020 GSAT-30 is a communication satellite that replaced the INSAT-4A.

2020

2023**Aditya-L1**

India's first mission to study the Sun, Aditya-L1, was launched to study the solar atmosphere.

Chandrayaan-3

Successfully launched on July 14, 2023, with the goal of achieving a soft landing on the moon.

2023

This timeline highlights ISRO's significant milestones, showcasing India's growing capabilities and achievements in space exploration and technology.



Breaking Barriers in Space Exploration

- Ritu Karidhal



For those who dare to dream, there are no limits to what can be achieved.

— Kalpana Chawla

Ritu Karidhal: Breaking Stereotypes in Space Science

Known as India's "Rocket Woman," Ritu Karidhal has carved an extraordinary path in space science, defying stereotypes and inspiring a new generation. Born in Lucknow, Uttar Pradesh, she nurtured a passion for space from a young age, spending nights gazing at the stars and dreaming of one day working among them.



Ritu Karidhal Srivastava in an interview.

Pushing Through Barriers and Pursuing Dreams

Despite all societal expectations and traditional gender roles, Ritu pursued her dreams with unwavering commitment. She earned a **Master's degree in Aerospace Engineering** from the Indian Institute of Science (IISc), Bangalore, and joined **ISRO** in 1997.

Key Roles in Mars and Lunar Missions

Ritu played a pivotal role as the **Deputy Operations Director** for India's historic **Mars Orbiter Mission (Mangalyaan)** in 2013. Her leadership contributed significantly to India becoming the first country to reach Mars on its maiden attempt. In 2019, she further showcased her expertise as the **Mission Director for Chandrayaan-2**, leading advancements in India's lunar exploration goals.

An Inspiration for Future Generations

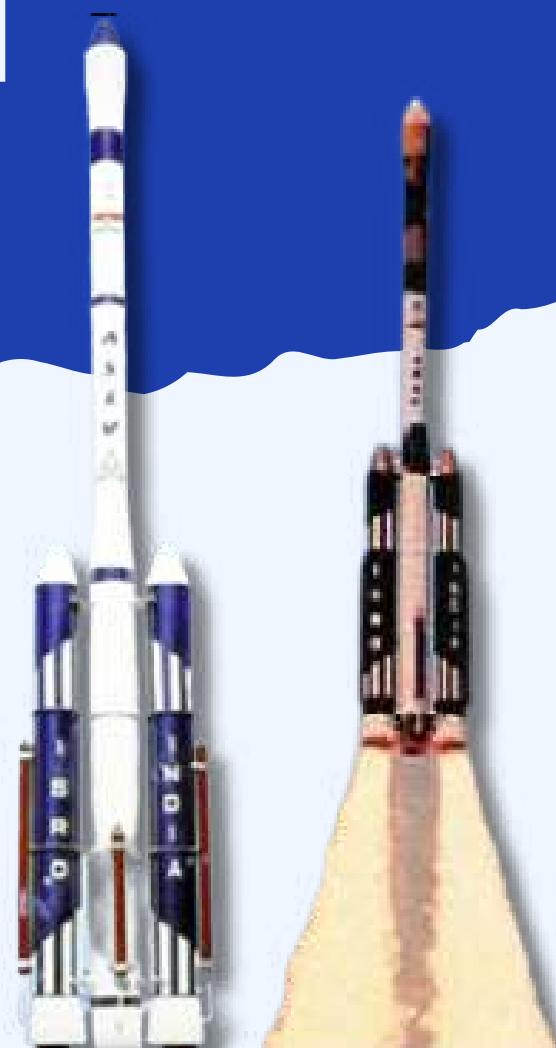
Ritu Karidhal's journey is a powerful narrative of breaking barriers and a beacon of inspiration for countless young girls. She has proven that with passion and perseverance, anyone can reach for the stars. Her story is a reminder that women, too, can excel in fields traditionally dominated by men, inspiring future generations to challenge and redefine stereotypes.



Chandrayaan-3 mission is being led by Ritu Karidhal Srivastava, India's very own 'rocket woman'.

The Rise of the Powerhouse of Indian Space Missions

The Story behind ASLV and PSLV



“ —————
Space exploration is a force of nature unto itself that no other force in society can rival.
————— **”**

— Neil deGrasse Tyson

The Ambitious Leap of ASLV :

The journey of the Indian **Space Research Organisation (ISRO)** is a remarkable testament to innovation and resilience. Among its most defining achievements are the Augmented Satellite Launch Vehicle (ASLV) and the Polar Satellite Launch Vehicle (PSLV), two pioneering programs that have catapulted India into the ranks of global space powers. The ASLV marked ISRO's bold leap forward from its initial successes. Launched in the late 1980s, the ASLV was designed to improve payload capacities and enhance launch reliability, symbolizing India's ambition to scale up its space capabilities. The first ASLV flight lifted off on March 24, 1987, with a payload capacity goal of 150 kg to low Earth orbit (LEO). Although the journey faced setbacks—with only two successful launches out of five—the ASLV program was a vital learning experience for ISRO. Through early challenges, the ASLV introduced critical innovations such as strap-on boosters and advanced guidance systems, which laid the groundwork for ISRO's future advancements.

The Game Changer : PSLV's Rise to Reliability

In 1994, ISRO introduced the **PSLV**, which would go on to transform its launch capabilities and establish it as a reliable and versatile space organization. The PSLV's first successful launch on October 15, 1994, was a milestone, enhancing payload capacity to 1,750 kg to **Sun-synchronous** orbit (SSO). The PSLV's modular design allowed for customization, and its ability to launch multiple satellites in a single mission underscored its flexibility and efficiency. This launch vehicle became essential to India's landmark missions, including **Chandrayaan-1** and the Mars Orbiter Mission (Mangalyaan), showcasing India's growing expertise on the world stage. With over **50 successful launches**, the PSLV has earned a reputation as ISRO's workhorse, celebrated for its consistency and adaptability.



PSLV-C35 on the SDSC FLP

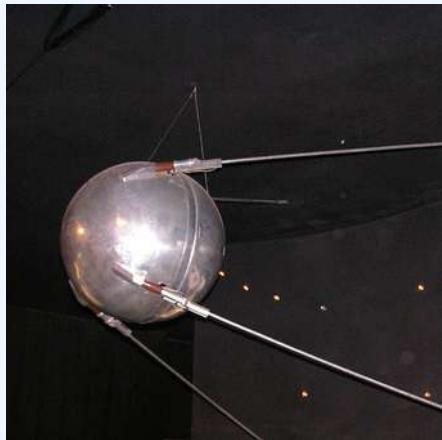
Looking Ahead: From PSLV to Gaganyaan

The combined contributions of the ASLV and PSLV have significantly strengthened India's space capabilities, enabling a wide array of satellite services in communication, navigation, and Earth observation. These programs have positioned ISRO as a prominent player in the global space industry and set the foundation for future missions, such as the Geosynchronous Satellite Launch Vehicle (GSLV) and the ambitious Gaganyaan manned mission.

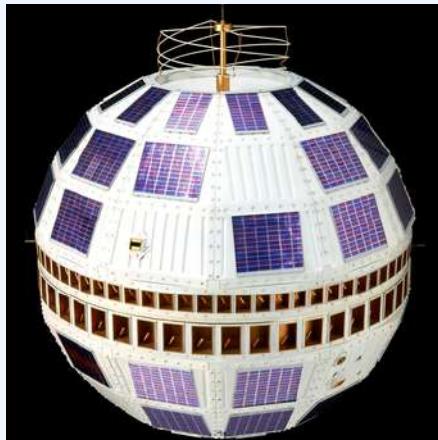
Beyond the Sky: ISRO's Vision for the Future

From the ASLV's pioneering steps to the PSLV's ongoing achievements, ISRO's journey is a testament to determination, adaptability, and excellence. These launch vehicles not only boosted India's capacity to reach new heights in satellite deployment but also inspired a new generation of space enthusiasts and engineers. As we continue to explore the cosmos, the legacy of the ASLV and PSLV serves as a powerful reminder: with persistence and innovation, the sky is not the limit—it's merely the beginning.

”



Sputnik 1



Telstar 1



Intelsat 1



INSAT - 4B



INSAT - 3DR



INSAT - 3E

The First Signal to Smile

The Story Behind Satellite Communication

Introduction: A Global Communication Revolution

Satellite communication has fundamentally transformed global connectivity, reshaping how we communicate, share information, and experience the world. From the first artificial satellite to today's advanced systems, the journey has been filled with groundbreaking innovations and scientific advancements.



Source : wikipedia

Sputnik 1: The Dawn of the Space Age

The story begins with Sputnik 1, launched by the Soviet Union on October 4, 1957. This small, beeping satellite sent back signals from space, symbolizing the dawn of the space age and igniting worldwide interest in the potential of satellite technology.

Telstar 1: A Leap Toward Practical Applications

A major leap came with the launch of Telstar 1 on July 10, 1962. Developed by AT&T, Telstar 1 became the first active communication satellite, capable of relaying telephone and television signals across the Atlantic Ocean. This achievement showcased the practical applications of satellite communication, demonstrating that global connectivity was possible.

Rise of Commercial Satellite Communication: Intelsat I

The success of these early missions paved the way for more advanced systems. The launch of *Intelsat I* in 1965 marked the beginning of commercial satellite communication, establishing a network for global broadcasting.

India's Commitment to Satellite Communication: The INSAT System

India's commitment to satellite technology was exemplified in 1983 with the launch of the Indian National Satellite System (INSAT), which provided essential services in telecommunications, broadcasting, and meteorology. This marked India's serious entry into the realm of satellite communication.



Source : wikipedia

The Impact of Satellite Communication on Modern Life

Satellite communication has since enabled near-instantaneous global communication, revolutionizing television broadcasting and bringing crucial services to remote areas. It supports data transmission, facilitates global internet access, and powers technologies like the Global Positioning System (GPS), which we rely on daily.

Conclusion: The Journey from Sputnik to Today's Connected World

From Sputnik's first signal to today's sophisticated communication satellites, the journey of satellite communication has been one of relentless innovation. This technology continues to shape how we live, work, and connect in a globalized world, reminding us that the first signal to smile was just the start of a revolution in human connectivity.

”



India's First Friendship in Space

The Story of USSR- India Space Ties and the Launch of Rakesh Sharma

Introduction: A Historic Partnership in Space

India's journey into space exploration is marked by several important milestones, but few are as inspiring as its early partnership with the Soviet Union. This collaboration not only advanced India's capabilities in space technology but also paved the way for India's first manned mission, symbolizing a profound friendship that transcended borders.

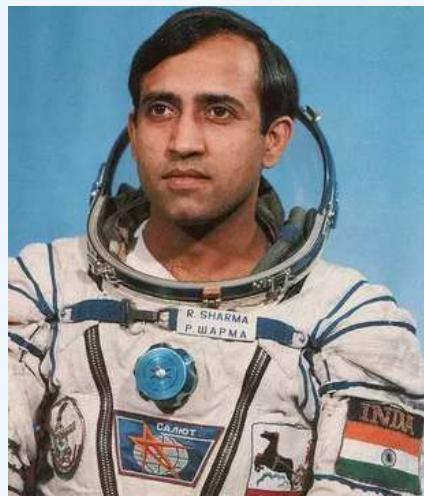
The Beginnings of Indo-Soviet Space Collaboration

In the 1970s, the Indo-Soviet space collaboration began to take shape, building the foundation of a strong partnership. This era saw the launch of Aryabhata, India's first satellite, which was sent into space aboard a Soviet rocket in 1975. The success of this mission was more than just a technical achievement—it marked the start of a long-lasting and fruitful relationship that would shape India's space program for years to come.



India's First Astronaut: Rakesh Sharma's Historic Mission

On April 2, 1984, Rakesh Sharma made history as the first Indian to travel to space. Through the Soviet Union's Intercosmos program, he was launched aboard Soyuz T-11 to the Salyut 7 space station. This historic journey elevated India to the rank of the 14th nation to send a human to space. His iconic response to Prime Minister Indira Gandhi, "Saare Jahan Se Achha," when asked how India looked from space, resonated with the pride and aspirations of millions.



Impact of the Mission: Inspiring a Nation

Sharma's mission had a deep and lasting impact on India. His journey symbolized not only national pride but also inspired countless young Indians to pursue careers in science, technology, and space exploration. This historic moment demonstrated the strength of Indo-Soviet collaboration, showcasing the potential for international partnerships in advancing scientific knowledge and human achievement.

A Legacy of Friendship and the Future Collaborations

The Indo-Soviet space collaboration set a powerful precedent for future international partnerships. It laid the groundwork for ISRO's current collaborations with space agencies around the world. Today, ISRO continues to build on this foundation, working with various countries to further space exploration, research, and technology.

Conclusion: The First Friendship, A Lasting Legacy

The story of Rakesh Sharma and the Indo-Soviet space partnership is a reminder of the power of friendship and cooperation in achieving extraordinary goals. This milestone in India's space history continues to inspire future generations, reminding us that our first friendship in space was only the beginning. As we look to the stars, we honor this legacy and carry forward the spirit of exploration that unites nations and inspires dreams.

”

STAR OF THE YEAR



Name	:	HD 140283
Constellation	:	Libra
Apparent Magnitude	:	7.223, making it visible with binoculars or a small telescope.
Distance	:	Approximately 190 light-years from Earth.

We are thrilled to present **HD 140283**, commonly known as the **Methuselah Star**, as our Star of the Quarter. This remarkable celestial object stands as a testament to the incredible age and history of our universe, offering a unique glimpse into the early epochs of star formation and cosmic evolution.

Here are some key points about the Methuselah Star:

Estimated Age:

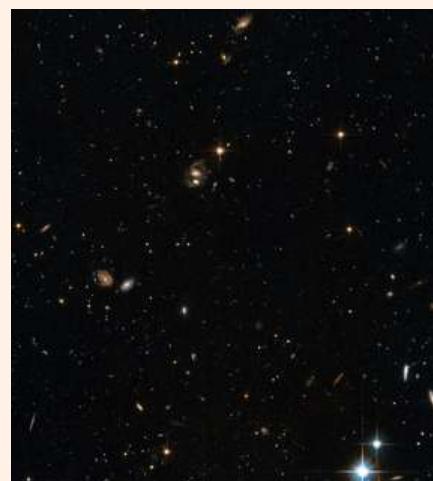
Around 14.27 billion years (± 0.8 billion years), almost as old as the universe itself (13.8 billion years).

Age Paradox:

Initially seemed older than the universe, but the margin of error reconciles this discrepancy.

Population II Star:

A metal-poor star, formed early in the history of the universe with low levels of elements heavier than hydrogen and helium.



NASA, ESA and T.M. Brown (STScI)

High Proper Motion:

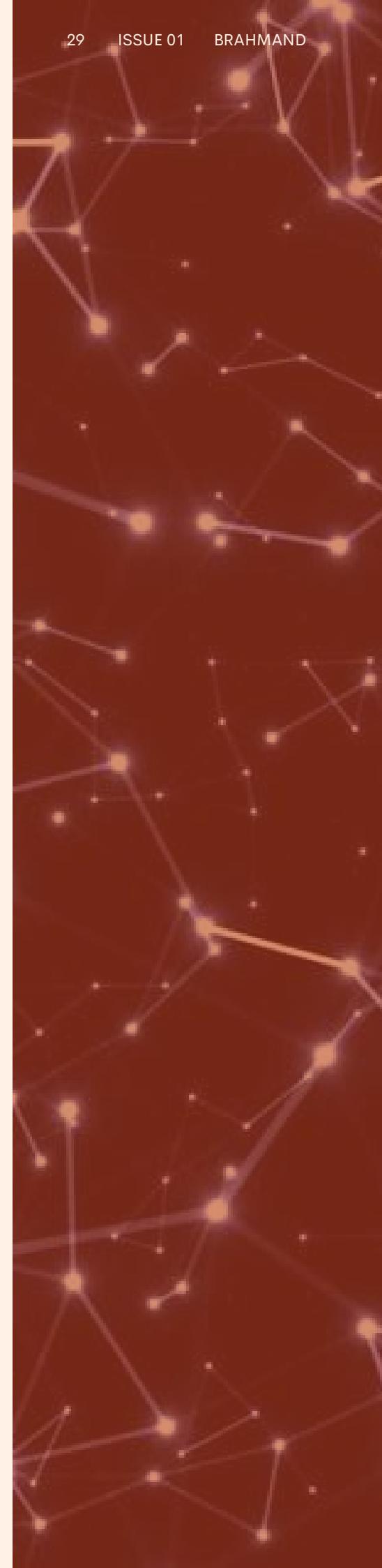
A fast-moving halo star, orbiting the Milky Way far above and below the galactic plane.

Scientific Importance:

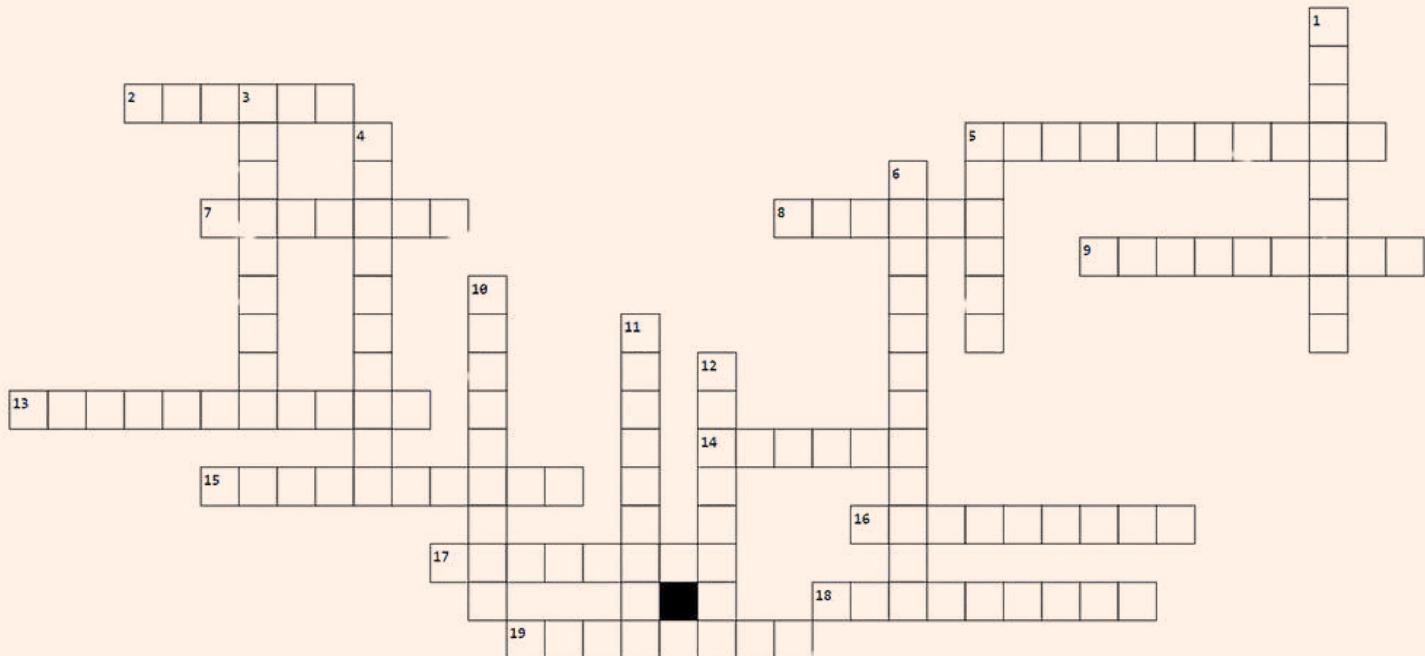
Provides insights into the early universe, star formation, and galaxy evolution.

Gaze up at the night sky, let the light of ancient stars guide you, and remember that our journey into the cosmos is just beginning. Keep exploring, keep questioning, and keep looking up. The universe awaits!

”



Space Trivia



Across

2. Luminous galactic nucleus
5. Sun's visible surface
7. Dense star remnant
8. Rotating neutron star
9. Gravity well
13. Infinite spacetime curvature point
14. Star system
15. Extremely large star
16. Distance light travels in a year
17. Light wavelength increase
18. Study of the universe's origin
19. Space rock

Down

1. Study of celestial objects
3. Exploding star
4. Invisible universe mass
5. Astronomical distance unit
6. Study of stars' physics
10. Planet orbiting another star
11. Four-dimensional continuum
12. Neutron star with a strong magnetic field
16. Redshift
17. Black Hole
18. Cosmology
19. Asteroid

1. Astronomy, 2. Quasar, 3. Supernova, 4. Dark Matter, 5. Photosphere, 6. Astrophysics,
7. Neutron, 8. Pulsar, 9. Black Hole, 10. Exoplanet, 11. Space-Time, 12. Magnetar,
13. Singularity, 14. Galaxy, 15. Hypergiant, 16. Lightyear, 17. Redshift, 18. Cosmology,
19. Asteroid

Answers



1. The moon is slowly moving away from Earth.

The Moon is indeed moving away from Earth at an average rate of about 3.8 centimeters per year due to tidal interactions.



2. There are more stars in the observable universe than grains of sand on all the Earth's beaches.

Estimates suggest there are around 10^{22} to 10^{24} stars in the observable universe, which is vastly more than the number of grains of sand on all the Earth's beaches.



3. You would be instantly crushed if you fell into a black hole.

If you fell into a black hole, you would experience "spaghettification" due to intense tidal forces stretching you out, rather than being instantly crushed.



5. The planet Jupiter has the shortest day of all the planets in the Solar System.

Jupiter has the shortest day of all the planets, rotating once approximately every 10 hours.



5. The sun will become a black hole at the end of its life.

The Sun is not massive enough to become a black hole. Instead, it will eventually shed its outer layers and become a white dwarf surrounded by a planetary nebula.



ASTRO PHOTOGRAPHY



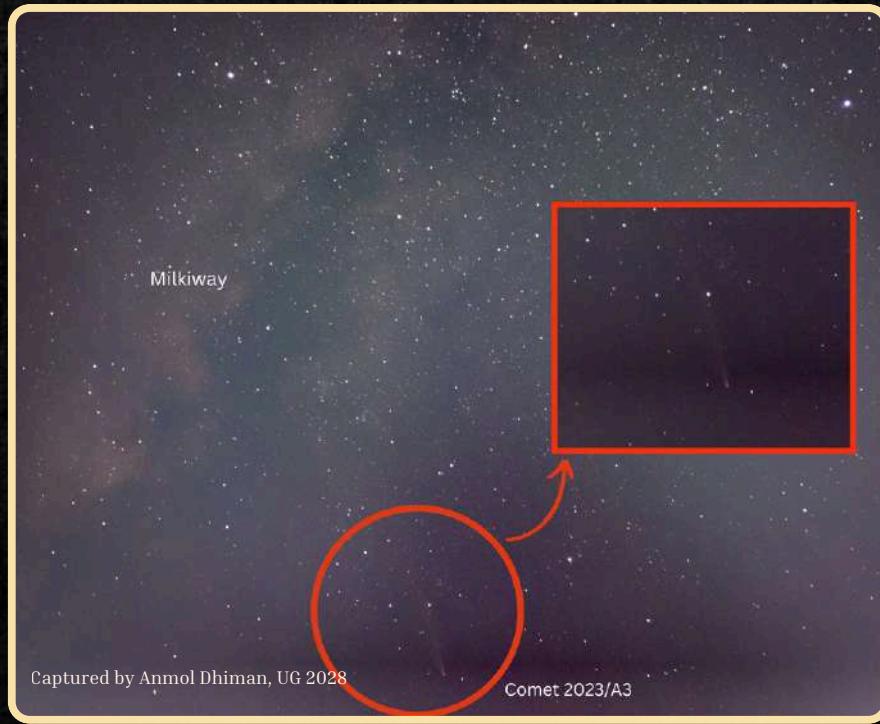
Captured by Harshveer Mangla, UG 2027

A hybrid solar eclipse was visible from Punjab, India, on the evening of Apr 20, 2023



Captured by Parvansh Kamboj, UG 2027

Venus



Captured by Anmol Dhiman, UG 2028

Comet 2023/A3

Captured by Vidur Dua, UG 2027

“Astrophotography: where patience meets the infinite, and a moment captures the cosmos.

Comet C/2023 A3, a cosmic traveler that won't pass by again for another 80,000 years! 🚀🌟



Captured by Ekansh Sharma, UG 2027



Captured by Bhavya Goyal, UG 2027



Captured by Anmol Dhiman, UG 2028



Captured by Anmol Dhiman, UG 2028

An Event by APOGEE

COSMIC CLICKS

Category : Mobile Clicks



Captured by Anmol Dhiman (ICE'28)

Our Milky Way Galaxy is a barred spiral galaxy that contains over 100 billion stars, including our Sun.



Captured by Ritik (BT'25)



Captured by Mayank (VLSI'28)



Captured by Sandeep (CE'28)



Captured by Anmol Dhiman (ICE'28)



Captured by Ekansh Sharma (CSE'27)



Captured by Ekansh Sharma (CSE'27)



Captured by Diya (BT'25)



Captured by Diya (BT'25)



Captured by Siya (BT'25)



Captured by Siya (BT'25)

Category : Using Telescope

Image Source : Stellar Shot (Astro Photography)

About APOGEE

APOGEE is a rapidly evolving and growing initiative of space science and technology enthusiasts in the prestigious Dr. B.R. Ambedkar National Institute of Technology, Jalandhar. It was formed in May, 2024 under the kind guidance of Dr. Harleen Dahiya and Dr. Sateesh Kumar Awasthi. APOGEE has proven to be more than just a club, rather its a community, Community of learners, explorers and enthusiasts in the field of Astronomy, Space Technology, Cosmology and Astrophotography. The club since its inception has been successful in establishing its astounding presence in the institute, receiving applauses from the worthy Director, ISRO-Space Technology Incubation Centre and honored scientists from ISRO itself. The club continues to grow due it's amazing and enthusiastic members, supportive faculty, worthy faculty and blessings of the God. For going forward with different agendas, the common aim of all APOGEE members remains the same : Explore the universe far and wide, for even the Sky is not the limit.

BRAHMAND