

August Edition



COMBROSIA: THE COMMERCE SUBJECT SOCIETY
Motilal Nehru College, University of Delhi



चंद्रयान 3

India's remarkable journey into the cosmos.





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On 14th July 2023, the Indian Space Research Organisation (ISRO), made a triumphant comeback to the lunar frontier. This date marked the launch of Chandrayaan-3, the third spacecraft in ISRO's moon exploration project.

On 23rd August 2023, now known as the NATIONAL SPACE DAY, ISRO created a historic achievement for India, with the success of Chandrayaan-3 having a soft landing on the Moon's south pole.

CHANDRAYAAN-3

In a significant stride towards understanding the mysteries of the Moon, Chandrayaan-3, boosts a rover named Pragyan and a lander named Vikram. The mission features an indigenous propulsion module, designed to transport the lander and rover configuration from injection orbit to 62 miles lunar orbit.

OVERCOMING THE SETBACK

Following the unfortunate failure of Chandrayaan-2's landing attempt, ISRO was determined not to give up. Chandrayaan-3 thus emerged as a beacon of hope.

LAUNCH DAY

Chandrayaan-3 embarked on its journey on July 14th at 2:35 pm IST from the Satish Dhawan Space Centre, situated in Andhra Pradesh's Sriharikota.

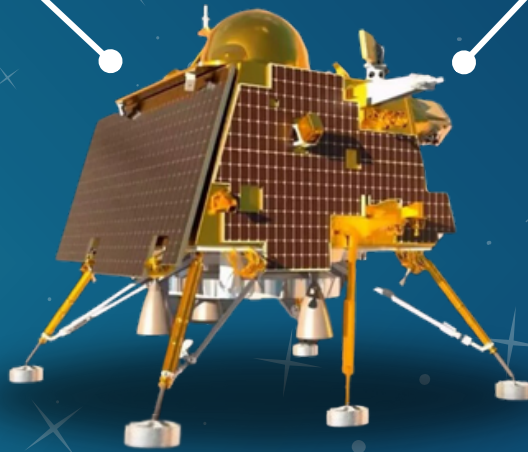
MISSION OBJECTIVES

The objectives of Chandrayaan-3 mission were as follows:

1. Successful demonstration of a safe and soft landing near the southern region of the moon, positioning India as a trailblazer by being the first country to land on the southern part of the moon.
2. Showcase the rover's loitering abilities on the southern part of the moon
3. Observing the moon's surface and carrying out 'in-situ' scientific experiments which involves real time investigations in the moon's natural environment.

1st

Country to land on the Moon's South Pole.



4th

Country to achieve a soft landing on the Moon.

FEATURES OF CHANDRAYAAN-3

1. Chandrayaan-3 retains certain components, such as the lander (Vikram) and rover payloads (Pragyaan), from its predecessor, Chandrayaan-2.
2. The lander's scientific instruments are designed to investigate lunar phenomena, including lunar quakes, thermal characteristics of the lunar surface, and precise Earth-Moon distance measurement.
3. The spacecraft's rover will interact with Earth through an orbiter. It will take pictures of the surface from 100km (about 62.14 mi) above the lunar orbit to analyze it.
4. Introducing a new experiment called SHAPE (Spectro-polarimetry of habitable planet Earth) as part of Chandrayaan-3, aimed at detecting smaller potentially habitable exoplanets.

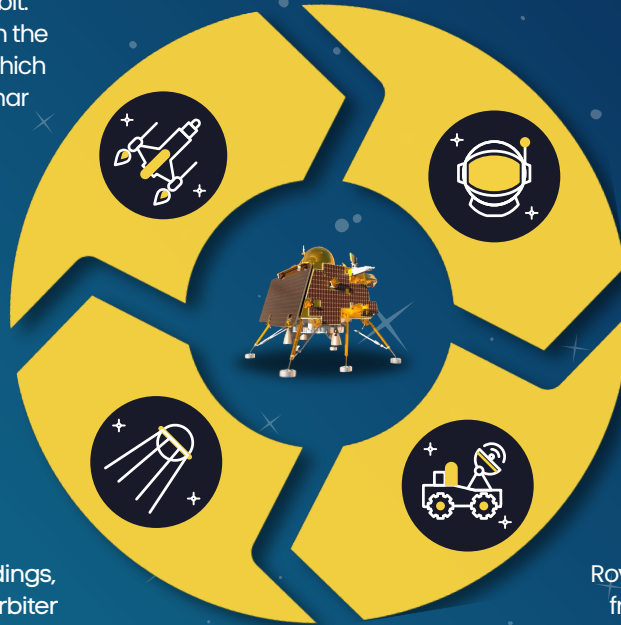
TYPES OF MOON MISSIONS

FLYBYS

Flyby missions involve spacecraft passing near the moon without entering its orbit. Examples include Pioneer 3 and 4 from the United States and the USSR's Luna 3, which provided us with groundbreaking lunar imagery.

HUMAN MISSIONS

Human missions involve the historic landing of astronauts on the moon. Between 1969 and 1972, NASA achieved this monumental feat. The upcoming Artemis III mission plans to return astronauts to the moon's surface by 2025.



LANDERS

Landers accomplish soft lunar landings, presenting more challenges than orbiter missions. In 1966, the USSR's Luna 9 pioneered this by sending the moon's first image.

ROVERS

Rovers are mobile explorers that detach from spacecraft to roam the moon's surface, gathering vital research data. Overcoming the limitations of lander missions, rovers like the famed lunar rovers have significantly expanded our lunar insights.

WHY SOUTH POLE ?

The reason is because scientists believe that we can find frozen water on the south side of the Moon which could be a huge source of oxygen, fuel and water which proves that there is a possibility to sustain human life.

However, landing on the Moon's South pole is challenging due to its rugged terrain, which has posed difficulties for previous missions from multiple countries, including India, Japan, UAE, Israel, and Russia. Despite these challenges, India's recent mission marks a significant accomplishment in lunar exploration.

LONGER ROUTE :

Was this the reason for Chandrayaan-3's success?

Chandrayaan-3 took more than 40 days to reach the lunar surface by looping through the widening orbits to use the earth's gravitational force as a slingshot. ISRO chose to take a longer route so that they can save more power, fuel and money.

THE BIG QUESTION :

What will happen on the fortnight?

The life of Chandrayaan-3 mission is for 14 days, which equals one lunar day. After the said period, it will be night on the moon and 'Vikram' lander and 'Pragyan' Rover which are powered by Solar energy will slow down. However, the moon craft will not return to earth.

CHANDRAYAAN-2 CHANDRAYAAN-3

Basis	Chandrayaan-2	Chandrayaan-3
Components	Orbiter, Lander, Rover	Propulsion module, Lander, Rover
Weight	Orbiter: 2379kg Lander: 1471kg Rover: 27kg Payload total: 3850kg	Propulsion Module: 2145kg Lander: 1749.86kg Rover: 26kg Payload total: 3900kg
Landing site	70.9-degree S, 22.7-degree E; high plain between two craters, manzinus C & Simpelius N	69.36-degree S, 32.34-degree E; slightly off the site for Chandrayaan 2
Days to Moon	48 days	40 days
Lander	Utilizing photographs obtained right away to evaluate the landing spot, five thrusters were to land in a 500m*500m space.	4 thrusters, stronger legs, and more panels designed with redundancies for more scenario using data previously produced by the C2 orbiter.
Budget	Rs. 978 crores	Rs. 615 crores

CHANDRAYAAN-3

Gamechanger for Indian Economy!

EMPLOYMENT OPPORTUNITIES

The Chandrayaan-3 missions have illustrated potential to form high-tech occupations ranging from investigating researchers and engineers to specialists and regulatory staff. This progress will help India to retain its skilled and talented workforce and shows the potential for substantial employment generation in the country.

COMMERCIAL OPPORTUNITIES

The share price of companies like Bharat Heavy Electricals, Paras Defense and space technology, TATA Steel, Hindustan aeronautics, MTAR Technologies etc. were increased by significant percentage. Chandrayaan-3's success will help people to invest more in such technology related and innovation stocks.

TECHNOLOGICAL ADVANCEMENTS

There are around 140 space startups in India that are registered and are working towards creating useful technology. Success of Chandrayaan-3 will help these startups to grow and help ISRO in space exploration.



EMERGENCE AS GLOBAL LEADER

Countries like China and Russia both provide affordable choices for space launches but with the success of Chandrayaan-3, India has emerged as a strong competitor.

ECONOMIC IMPLICATIONS

The successful landing of Chandrayaan-3 will really help India's space economy by creating more jobs, support investments from private companies, and promote the growth of the country's space technology.

INTERNATIONAL COLLABORATIONS

With successful landing India has become one of the top four advanced space nations making it easier for India to collaborate with other countries to bring in more money.

Sources:

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CYCLE SE CHAND TAK

A Success



Starting with a rocket on the cycle, ISRO successfully reached the Moon and created history on August 23, 2023 (National Space Day) at 6:04 p.m.

With the successful soft landing of Chandrayaan-3 on the moon's surface, now named the SHIVSHAKTI POINT, India became the 1st country to land on the southern part of the moon and the 4th nation to successfully land on the lunar surface.

After the disappointment of a Russian lander attempting to accomplish the same mission, the success of Chandrayaan-3 grabbed the attention of the whole world, making it the first to arrive on the lunar south pole, whose shadowed holes are thought to contain water ice that seems to bolster future moon settlement.

In conclusion, Chandrayaan-3's successful landing on the moon's surface represents a turning point in India's space exploration. This accomplishment shows the nation's scientific ability, the determination of ISRO, and its constant dedication to increasing human understanding. The mission's achievement not only opens a new chapter in India's space history, but it also provides the nation with new opportunities and technological developments in space.

The 'Make in India' programme and the space economy are poised to benefit from ISRO's success. Space start-ups and related industries are set for growth. Success of Chandrayaan-3 has created a feeling of confidence among the scientists, which will help them achieve success for the upcoming missions without fearing much about failure.

ISRO's FUTURE MISSIONS

- Investigation of the Sun's corona by the Aditya-L1 mission.
- The Gaganyaan Abort Mission Demonstration: Protecting the safety of the astronauts.
 - Mars and Venus exploration: investigation of additional planets.
 - The mission of Astrosat-2 is to improve space observation.
- Satellite technology advancements: space technology development.
- Joint space projects involving international collaborations.

CONTRIBUTORS

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