

# CHANDRAYAAN- 3

Bhavya Jaiswal

ISRO is crossing new frontiers by launching its 3rd Lunar Exploration Mission, CHANDRAYAAN-3, on July 14, 2023. It will conduct detailed research on the Moon's surface, including its composition, mineralogy, and the presence of water ice. Chandrayaan-3 will take off in the 43.5 m tall rocket launcher LVM3. This will be the fourth operational mission of the launcher.

With Chandrayaan 3, ISRO aims to land a rover on the South Pole highlands of the Moon. The mission will use the same lander and rover (but no orbiter this time) as Chandrayaan 2, but with some changes to ensure a successful landing this time. The total weight of Chandrayaan is around 3900kg, with a mission life of 1 lunar day, equivalent to 14 Earth days. The budget is just under Rs 615 crore. The primary mission of Chandrayaan-3 is to have a soft landing on the Moon's surface, demonstrate the loitering capabilities of the rover, and make scientific observations about the soil and composition of the Moon.

The three main components of Chandrayaan 3 are:

**1) Propulsion module:** The propulsion module behaves like that of any ordinary satellite. It will carry the lander and rover to a 100km lunar orbit. It carries a payload called Spectro-polarimetry of Habitable Planet Earth (SHAPE) to study Earth's spectral and polarimetric measurements in the near-infrared wavelength range from the lunar orbit.

**2) Lander:** It is responsible for the soft landing on the Moon. It will carry the rover and other scientific instruments to perform in-situ experiments. The lander has a Laser Doppler Velocimeter(LDV), which uses Doppler shift in a laser beam to measure the velocity in transparent fluid flows or in linear or vibratory motion of opaque, reflecting surfaces. It also has Rambha-LP (Langmuir probe) to measure the near-surface plasma density and its time dependence, Chandra's Surface Thermophysical Experiment (ChaSTE) to carry out the measurements of thermal properties of the lunar polar region, and also ILSA (Instrument for Lunar Seismic Activity) to measure seismicity around the landing site.

**3) Rover:** It is a moving laboratory that will travel on the surface, collect soil samples and analyze the composition of the Natural Satellite. It has the Alpha Particle X-Ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscope (LIBS) for deriving the elemental composition near landing site. The rover will have a lifespan of 14 days and will carry out experiments to study the Moon's surface.

According to scientists, the rocket will put the Chandrayaan at an altitude of about 179km above the Earth's surface after 16mins of the launch, after which the spacecraft will move around the Earth 6-7 times in elliptical orbits, with a maximum distance of 36,500km before entering the lunar orbit. The propulsion module will then journey to the Moon until it reaches 100km above the lunar surface. The lander is expected to make a soft landing on the Moon on August 23 or 24.

The Chandrayaan 3 mission is a significant step forward for India's space program. It marks a renewed effort to explore and study the Moon, which remains a critical destination for future space exploration. In conclusion, Chandrayaan 3 is an exciting mission with great promise for India's space program.