

Context:

- The six-wheel, 26-kg rover, capable of slowly moving up to 500 metres, will begin its duty of lunar exploration after sliding down a ramp from the Chandrayaan-3 lander.
- The lander and rover landed at lunar dawn, and the six payloads on board will begin gathering data soon after to collect as much science as possible in the single lunar day or 14 Earth days that they will be operational.

IMPORTANT SCIENTIFIC EXPERIMENTS

ON MOON SURFACE



Mission Experiments

The lander
carries four
experiments



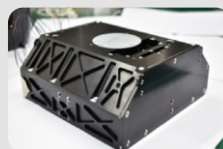
RAMBHA

RAMBHA (Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere) will investigate the electrons and ions near the moon's surface and how they change over time.



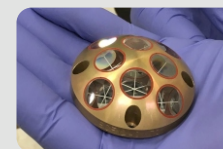
ChaSTE

The Chandra's Surface Thermo physical Experiment (ChaSTE) will study the thermal properties of the lunar surface near the polar region. Chandrayaan-3 has landed around 70 degree south latitude, the closest that any spacecraft has reached to the lunar south pole.



ILSA

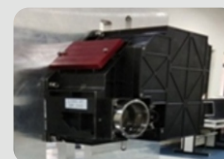
The Instrument for Lunar Seismic Activity (ILSA) will measure the lunar quakes near the landing site and study the composition of the Moon's crust and mantle.



LRA

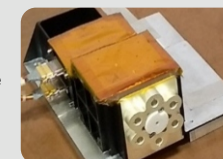
The LASER Retroreflector Array (LRA) is a NASA passive experiment that serves as a laser target for very exact measurements for future flights.

There are
two scientific
experiments on
the rover



LIBS

The LASER Induced Breakdown Spectroscope (LIBS) will determine the chemical and mineral composition of the lunar surface.



APXS

The Alpha Particle X-ray Spectrometer (APXS) will determine the composition of elements such as magnesium, aluminum, silicon, potassium, calcium, titanium, and iron in the lunar soil and rocks.

OTHER IMPORTANT FINDINGS

Discovery of Water

- The Moon Impact Probe (MIP) from India, a payload that was intentionally crashed on the lunar surface near the South Pole, assisted in studying the concentration of water and hydroxyl molecules in the lunar atmosphere.

Other Missions

- Another payload termed mini-SAR assisted in detecting underlying water-ice deposits in the permanently shadowed portions of the craters near the South Pole.
- A third NASA instrument, the Moon Mineralogy Mapper, or M3, also assisted in detecting these compounds on the Moon's surface.
- Chandrayaan-2, which was aimed to explore water on the Moon further, assisted in detecting water and hydroxyl molecules independently and mapping water features across the Moon for the first time.

Buried lava tubes

- The terrain mapping camera and hyperspectral imager on board Chandrayaan-1 detected an underground lava tube, which, scientists believe, can provide a safe environment for human habitation in the future. It can protect against hazardous radiation, small meteoric impacts, extreme temperatures, and dust storms on the surface of the Moon.

Thesis on the Magma Ocean

- The Moon is said to have formed after an early chunk of the Earth split apart owing to an impact. The energy released by the impact is thought to have caused the Moon's surface to melt. This is referred to as the magma ocean hypothesis.
- The M3 payload on board Chandrayaan-1 detected a specific form of lighter-density crystals on the Moon's surface, which could only be found there if the Moon was once liquid.

Solar flares

- The Solar X-Ray Monitor on the Chandrayaan-2 satellite was able to detect several solar microflares outside the active zone, as well as the elemental abundance in the less-than-bright solar corona.
- These findings, which had previously only been made for larger solar flares, may provide scientists with answers to the puzzle of coronal heating – why the Sun's atmosphere layer (corona) is a million degrees hot despite the surface temperature being just over 5,700 degrees Celsius.

Mapping of minerals

- For the first time, the CLASS X-ray Fluorescence experiment has mapped 95% of the lunar surface in X-rays. According to ISRO, X-ray spectrometers flown to the Moon during the last 50 years have covered less than 20% of the surface. Both Chandrayaan missions have delineated regions where sample return missions have not occurred.

