Chandrayaan 3: A New Chapter in India's Space Odyssey

On 14 July 2023, the Indian space exploration desires embarked on a new adventure as the nation witnessed the launch of the LVM–3 rocket from Satish Dhawan Space Centre in Sriharikota, piercing the barriers of the atmosphere with full afterburner.The Chandrayaan–3 is another attempt by India to conduct a successful soft landing on the surface of the moon. Till now only nations like US, Russia and China are able to conduct such kind of missions successfully. The Chandrayaan–3 consists of a lander and rover, which is similar to those used in Chandrayaan–2 but with some modifications. The lander and rover of the Chandrayaan–3 would be communicating back to Earth through the lunar orbiter delivered into the moon's orbit by the Chandrayan–2 mission.

What distinguishes India's lunar missions from the same type of missions by other nations so far is the fact that ISRO is always more interested in exploring the South Pole region of the moon. It is because this region has never been in direct contact with sunlight, due to which it still preserves a lot of essential minerals like ammonia, sodium, mercury and silver. The craters at the south pole of the moon are also expected to have nearly 100 million tonnes of water. By exploring this region of the moon, scientists can learn a lot about the origin of Earth and the universe.

The Chandrayaan–3 is also going to be the fastest mission to the lunar surface by ISRO as compared to the Chandrayaan–1 and Chandrayaan–2, taking almost 40 days to reach the moon. The increase in speed of the mission is only possible due to Launch Vehicle Mark–3 (LVM–3) which is a three–stage medium lift launch vehicle with better payload capacity than the previous GSLV family.

The Pragyan rover of Chandrayaan–3 is equipped with modern instruments like Alpha Particle X–ray Spectrometer and Laser Induced Breakdown Spectrometer which would help the rover to conduct chemical and mineralogical study of lunar surface. The rover weighs about 26 kg and has a range of 500 meters with an expected lifespan of 14 Earth days.

Apart from this, some major structural changes have been done to the lander of Chandryaan–3. The lander responsible for soft landing on the lunar surface will now have four throttle engines with stronger legs in case of harsher impact. The lander is packed with various kinds of equipment like altimeters, velocimeters, navigation guidance and control and two hazard detection and avoidance cameras instead of one.

It further has some mission oriented payloads like Radio Anatomy of Moon bound hypersensitive ionosphere and atmosphere (RAMBHA) and Langmuir probe to study near–surface plasma density, Chandra's Surface Thermophysical Experiment (ChaSTE) to study about thermal properties of the lunar surface and Instrument for Lunar Seismic Activity (ILSA) to study about the lunar crust and mantle.

The propulsion module attached to the lander will have a Spectro–polarimetry of Habitable Planet Earth (SHAPE) payload which could be used for search for habitable exoplanets outside our solar system. The propulsion module will also behave like a communication relay satellite.