Chandrayaan-2 Mission

The Chandrayaan-2 mission was successfully launched on 22nd July 2019 at 14:43 hrs by GSLV MkIII-M1 from Satish Dhawan Space Centre (SDSC), Sriharikota. After a series of Earth bound manoeuvres, the spacecraft entered into Lunar Transfer Trajectory (LTT) on August 14th. Lunar Orbit Insertion (LOI) manoeuvre was performed on August 20th, thereby Chandrayaan-2 was successfully inserted into the elliptical orbit around the Moon. This was followed by a series of Lunar bound orbit maneuvers for reducing the orbit to circular polar orbit around the Moon.

On September 2nd, Vikram lander separated from the Orbiter and de-orbiting maneuver was performed to reduce the orbit to 35 km x 101 km. Vikram landing was attempted on 7th September and it followed the planned descent trajectory from its orbit of 35 km to around 2 km above the surface. Communication with lander and ground station was lost. All the systems and sensors of the Lander functioned excellently until this point and proved many new technologies such as variable thrust propulsion technology used in the Lander. However, the Orbiter is healthy and all the payloads are operational.

Chandrayaan-2 Orbiter is currently in a 100 km x 100 km orbit around the Moon, carries 8 experiments for studies ranging from surface geology and composition to exospheric measurements that would continue to build upon the understanding from previous lunar missions.

Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS), an X-ray fluorescence spectrometer is also a continuation of C1XS (on Chandrayaan-1) with a larger collection area aiming to map elemental abundances at 12 km spatial resolution at its best.

A **Solar X-ray Monitor (XSM),** companion payload to CLASS measures the simultaneous solar spectrum required for inversion of XRF line flux to elemental abundances.

The **Imaging Infra-red Spectrometer (IIRS)** measures the surface reflectance in the 0.8-5 micron band uniquely designed to sample in 256 bands at 20 m spatial resolution. This would unambiguously provide clear signatures of water molecule

and their temporal and spatial variations. In addition, IIRS will also complete global mapping of lunar surface mineralogy in continuation to M3 on Chandrayaan-1.

The **dual frequency SAR (DFSAR)** in L and S band has both circular polarization mode and full linear polarization mode and can image at 2-75 m spatial resolution. This would again add upon previous SAR instruments in lunar orbit and in addition has the potential for new science given the L band capability for deeper subsurface imaging and full polarimetric modes of operation.

CHandra's Atmospheric Composition Explorer-2 (CHACE-2) is a mass spectrometer which will measure neutral species in the tenuous exosphere of the Moon.

An **Orbiter high resolution camera (OHRC)** with a 25 cm spatial resolution from 100km orbit and a swath of 3k, can provide sharpest images ever from the lunar orbiter platform and generate DEMs of specific target sites of interest. The **Terrain Mapping Camera-2 (TMC-2)** is a continuation to the TMC on Chandrayaan-1 to generate DEMs for the entire Moon.

The initial science results have provided confidence to pursue lunar science research in detail using orbiter payloads. The results are released in ISRO website, https://www.isro.gov.in/chandrayaan2-latest-updates

Chandrayaan-2 payloads' data will definitely improve our knowledge about the Moon and attempts are underway to bring in more scientists and researchers from national institutions, academia, universities and colleges in the country for data analysis and interpretation.