




Chandrayaan-2 mission

- India's Mission to Moon

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UNCOPUOS Meeting

Vienna, June 2019



Chandrayaan-2: Objectives

Orbiter, Lander (Vikram) and Rover (Pragyan) to study the Moon

- ❑ To pursue lunar science studies
 - water identification / mapping
 - mapping of surface composition
 - explore in-situ lunar regolith properties at Southern latitudes

- ❑ To develop and demonstrate key technologies for end-to-end lunar mission capability, including soft-landing and roving on the lunar surface.





Chandrayaan-2 Mission Strategy



Orbiter

Orbiter at 100 km orbit
1 year mission life



Lander

Lander (Vikram) at 70 deg S
unique and unexplored
1 lunar day : ~14 Earth days

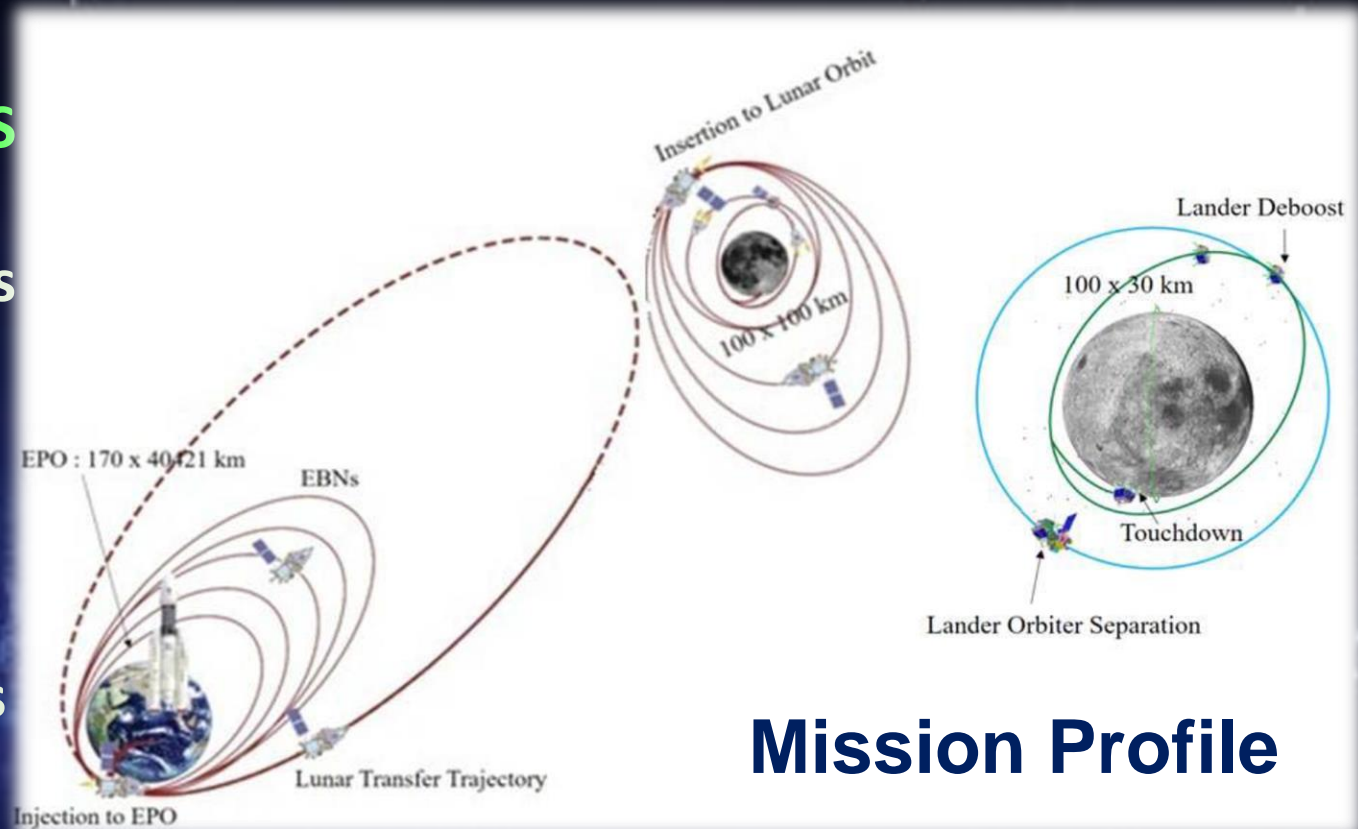


Rover

Rover (Pragyan)
At vicinity of landing site
1 lunar day : ~14 Earth days

Challenges

- Lunar capture
- Lander separation from Orbiter in lunar orbit
- Soft Landing on the Moon
- Rover operations



Mission Profile



Chandrayaan-2: science payloads

Large variations in **lunar surface composition (elements as well as mineral distribution)** needs extensive mapping – essential to trace back the origin and evolution of the Moon.

Elemental mapping

Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS) & Solar X-Ray Monitor (XSM)	Identification of elements and mapping its distribution on the lunar surface from 100 km orbit.
Alpha Particle X-ray Spectrometer (APXS)	In-situ mapping around the landing site from Rover
Laser Induced Breakdown Spectroscope (LIBS)	In-situ mapping around the landing site from Rover

Surface mapping

Terrain Mapping Camera (TMC-2)	Topographic maps and DEMs.
Orbiter High Resolution Camera (OHRC)	High-resolution topographic maps and DEMs for landing.
Dual Frequency Synthetic Aperture Radar (DFSAR)	Surface roughness

Mineralogy mapping

Imaging IR Spectrometer (IIRS)	Confirm hydroxyl, water and water-ice signatures along with Mineralogy mapping.
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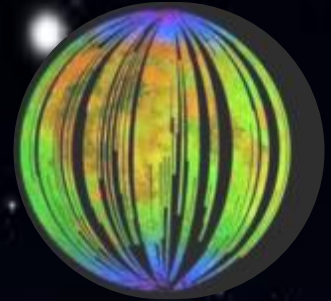
Lunar exosphere studies

Chandra's Atmos. Composition Explorer-2 (CHACE-2)	Composition and distribution
Dual Frequency Radio Science (DFRS)	Variations in lunar ionosphere



Chandrayaan-2: science payloads

Evidence for water discovered by Chandrayaan-1, demands more focused studies on the **extent of water** on the surface, below the surface and in the tenuous lunar exosphere to address the Origin of water on Moon.



DISCOVERY OF WATER

Lunar water

Imaging Infrared Spectrometer (IIRS)	Surface of Moon (top few microns of the lunar surface) – water on surface
Dual Frequency Synthetic Aperture Radar (DFSAR)	Below the lunar surface (few metres deep) – search for buried water
Chandra's Atmospheric Composition Explorer-2 (CHACE-2)	Exosphere (100 km altitude) – detects sparse water molecules above the surface



Chandrayaan-2: Landing site science

Landing site properties and **landing site** characterization

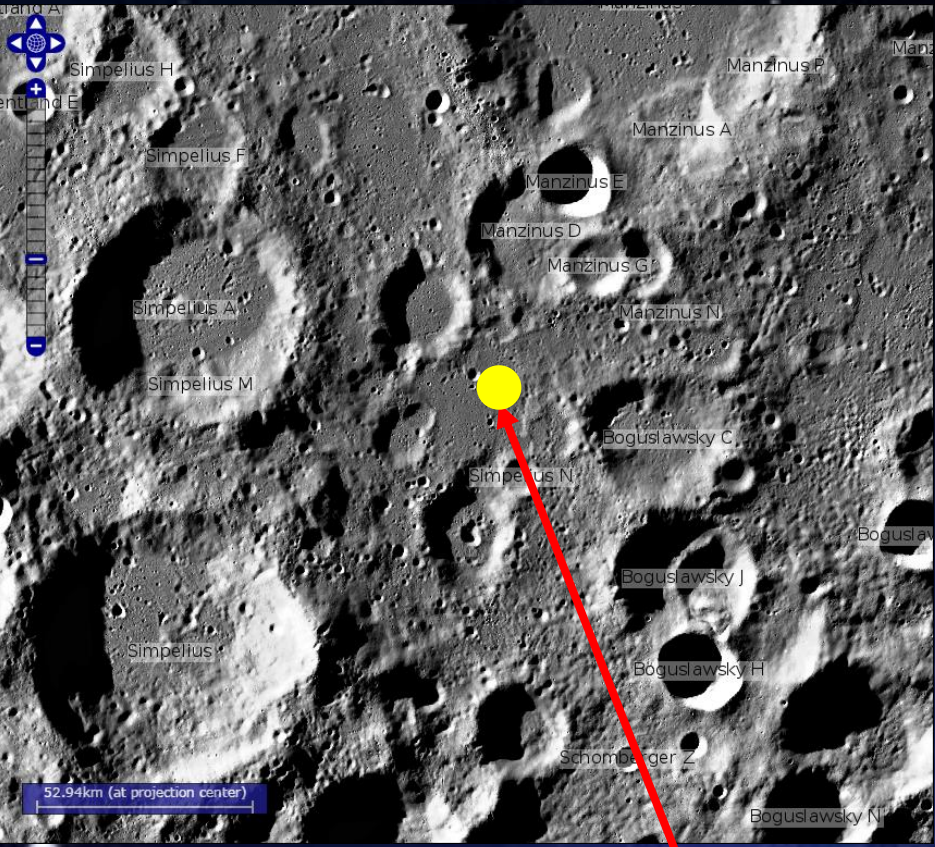


Radar image of the south pole region of the moon
Courtesy Source: Internet

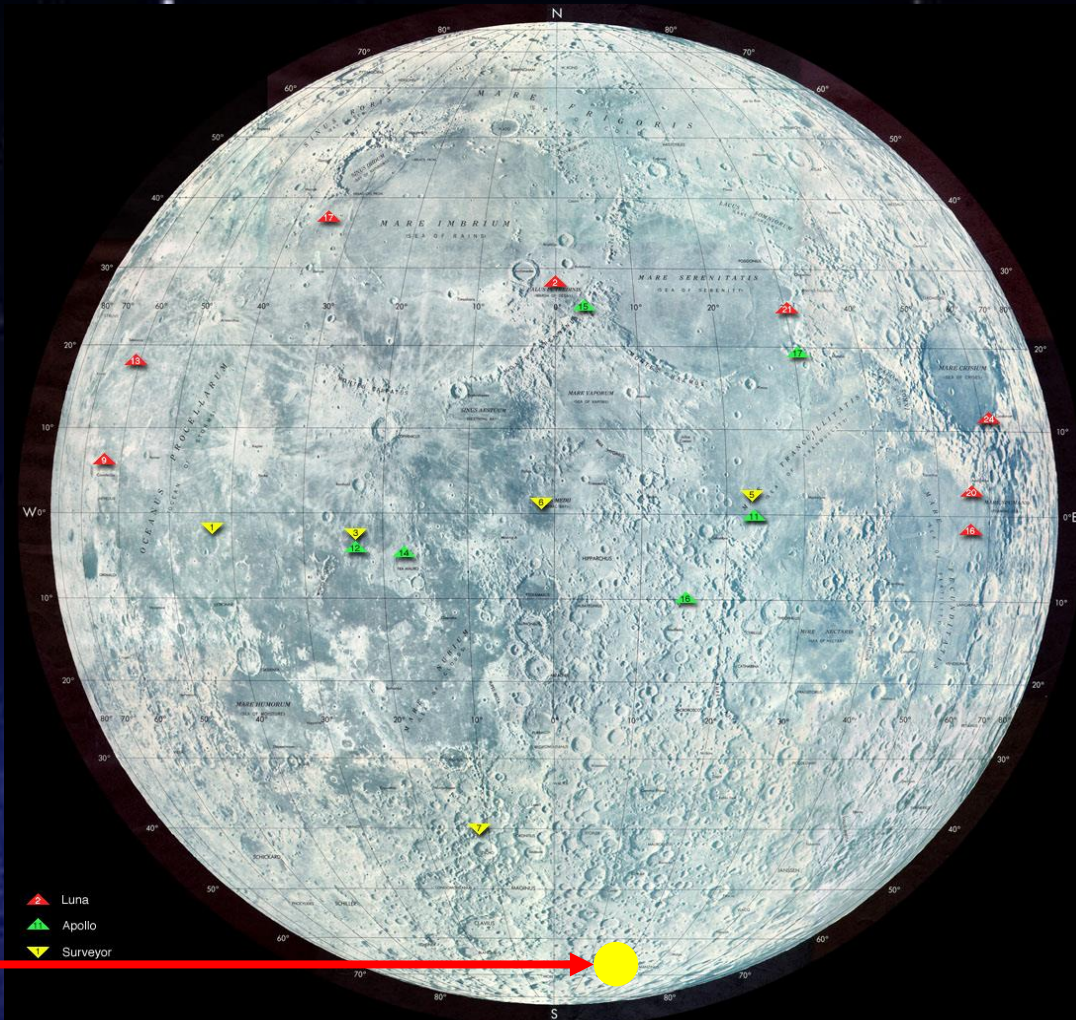
Landing site	
TMC-2 and OHRC	Landing site mapping
Lander and Rover Imagers	Imaging the site locally
APXS and LIBS	Elemental composition
Langmuir Probe (LP)	Plasma density and variations
Chandra's Surface Thermo-physical Experiment (ChaSTE)	Thermal conductivity and temperature
Instrument for Lunar Seismic Activity (ILSA)	Seismicity



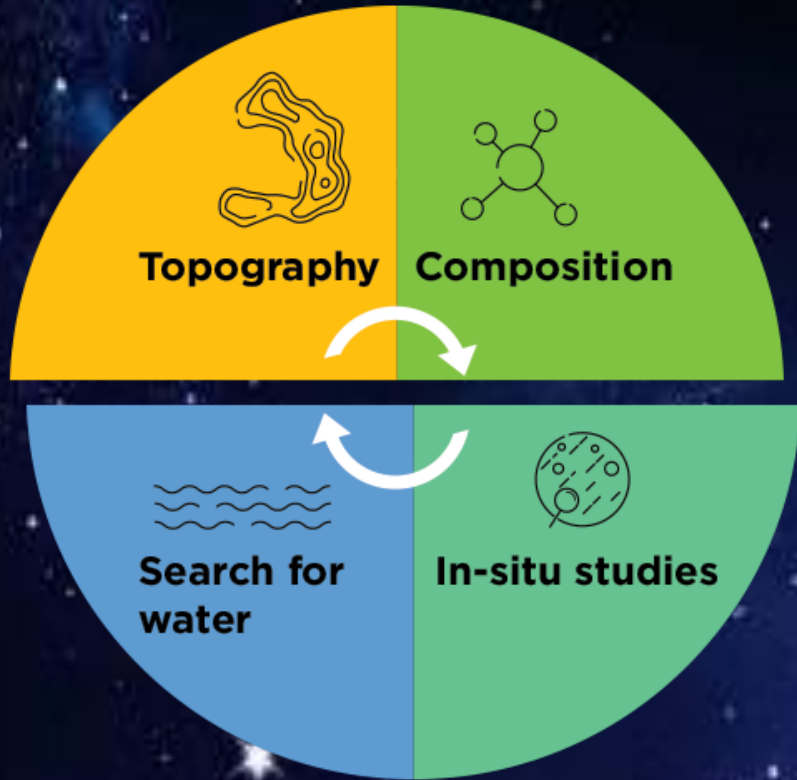
CHANDRAYAAN-2: LANDING SITE



Long; 22.78
Lat -70.90



Chandrayaan-2 Orbiter ... ready to go



Chandrayaan-2 ... getting ready to go

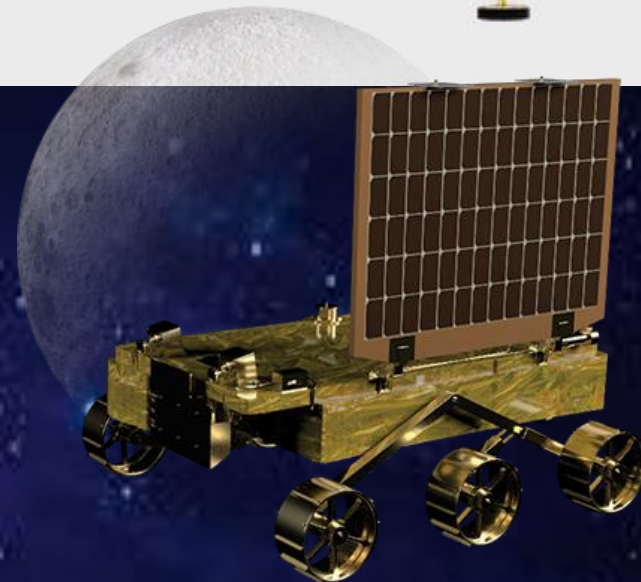
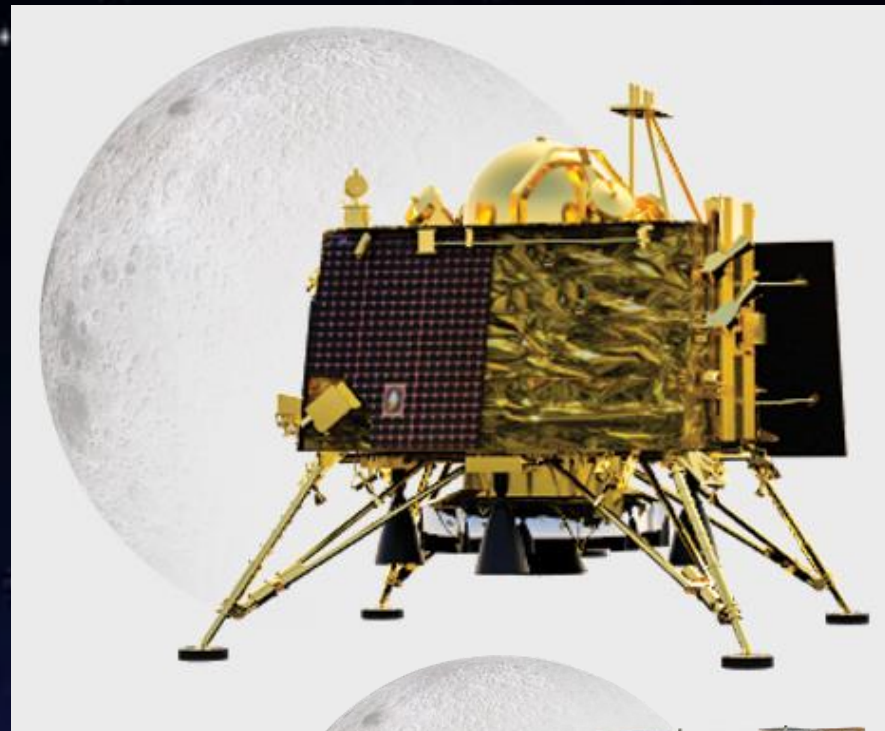
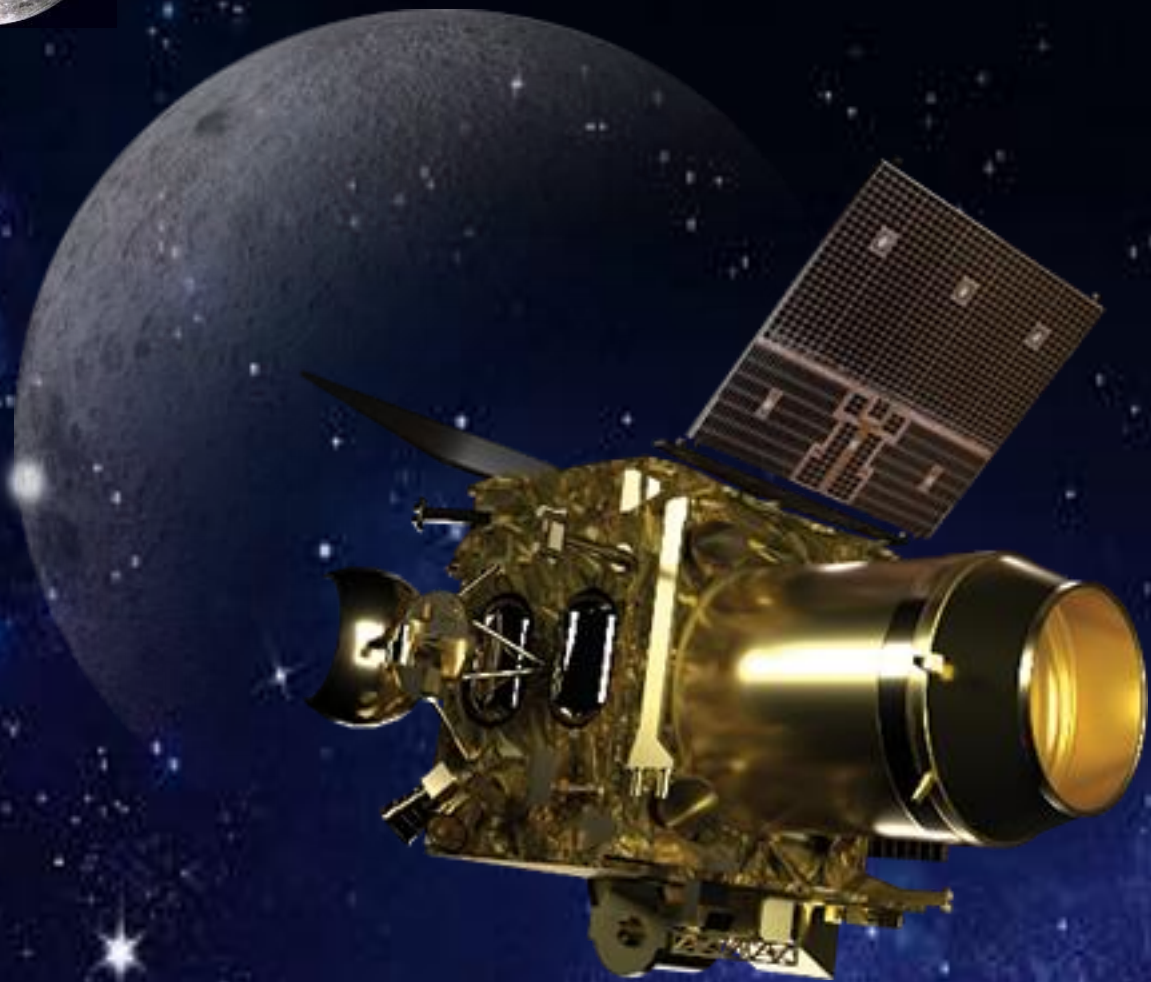


Chandrayaan-2 Lander ... getting ready





All modules are ready for July 15th launch by GSLV Mk III from SDSC



Thankyou for your attention...