Chandrayaan- 3

July 29, 2021

In news- India is likely to launch its third mission to the moon, Chandrayaan-3, in the third quarter of 2022.

Key updates-

- The Chandrayaan-3 mission has been planned as **only a lander-rover mission** to demonstrate India's capability of soft landing on a celestial body.
- It will communicate with Earth via the existing orbiter from Chandrayaan-2 whose lifespan has been estimated to be seven years.
- The mission was announced just a few months after the Vikram lander aboard Chandrayaan-2 mission crash-landed on the lunar surface just 2.1 km from its goal in September 2019.
- The realisation of Chandrayaan-3 involves various processes, including finalisation of configuration, subsystem realisation (manufacturing), integration, spacecraft-level detailed testing and a number of special tests to evaluate the systems performance on Earth.

Chandrayaan program-

- **Chandrayaan-1** was the first Indian lunar probe under the Chandrayaan program.
- It was launched by the Indian Space Research Organisation in October 2008, and operated until August 2009.
- The mission included a **lunar orbiter and an impactor.**
- India launched the spacecraft using a PSLV-XL rocket.
- India was the fourth country to place its flag insignia on the Moon.
- The **location of impact was named Jawahar Point.**

Goals:

- High-resolution mineralogical and chemical imaging of the permanently shadowed north- and south-polar regions
- Searching for surface or subsurface lunar water-ice, especially at the lunar poles
- Identification of chemicals in lunar highland rocks
- Chemical stratigraphy of the lunar crust by remote sensing of the central uplands of large lunar craters and of the South Pole Aitken Region (SPAR)

Due to technical issues **Chandrayaan-1 stopped communicating in August 2009 and ISRO officially declared that the mission was over.** Chandrayaan-1 operated for 312 days as opposed to the intended two years, but the mission achieved most of its scientific objectives.

Findings:

- The recent images sent by Chandrayaan-1 suggest that the moon may be rusting along the poles.
- Data sent indicates the presence of hematite at the lunar poles.
- Recently, NASA has found evidence of greater quantities of metals such as iron and titanium on the moon's subsurface.
- As per scientists at NASA, earth's oxygen could be driving the formation of hematite which is ferried by Earth's magnetosphere.
- Chandrayaan-1 data indicates that the moon's poles are home to water that scientists are trying to decipher.

Chandrayan-2:

- Chandrayaan-2 is **India's first lander mission.**
- It consists of an **Orbiter, Lander and Rover**, all equipped with scientific instruments to study the moon.
- **Orbiter** – The Orbiter is a 2379-kg spacecraft with **7 instruments on board.** It has instruments to study the

mineral composition on the moon and the lunar atmosphere, and to assess the abundance of water. The Orbiter will observe the lunar surface and relay communication between Earth and the Lander.

- **Lander** – ISRO has named the Lander module as **Vikram**. It carried three instruments that will mainly study the moon's atmosphere. One of the instruments will also look out for seismic activity on the lunar surface.
- **Rover** – The Rover is a **6-wheeled, Artificial Intelligence-powered and solar-powered vehicle named Pragyan, meaning wisdom**. Its primary objective is to study the composition of the moon's surface near the landing site and determine the abundance of different elements on the moon's surface.

- Chandrayaan-2 was planned to make a landing at a site where no earlier mission had gone, i.e near the **South pole of the moon.**

However, a **part of the mission failed as the Vikram lander crash-landed on the lunar surface.** A successful landing would have made India the fourth country in the world to do so after the US, the erstwhile USSR and China, and the first country to have landed so close to the lunar South Pole.