

## **5. Geotail**

**Prelims: Science & Technology- Space Technology**

**Mains: GS-III- Awareness in the Fields of space; Achievements of Indians in Science & Technology; Indigenization of Technology.**

### **Why in News?**

- ▶▶ Recently on board with Chandrayaan-2 mission, an instrument called CLASS, designed to detect signatures of elements in the Moon's soil, had detected charged particles during the mission. This happened in September, during the orbiter's passage through the "geotail".

### **Geotail:**

- ▶▶ The geotail is a region in space that allows the best observations.
- ▶▶ The region exists as a result of the interactions between the Sun and Earth.
- ▶▶ The Sun emits the solar wind, which is a continuous stream of charged particles. These particles are embedded in the extended magnetic field of the Sun.
- ▶▶ Since the Earth has a magnetic field, it obstructs the solar wind plasma.
- ▶▶ This interaction results in the formation of a magnetic envelope around Earth.
- ▶▶ On the Earth side facing the Sun, the envelope is compressed into a region that is approximately three to four times the Earth radius.
- ▶▶ On the opposite side, the envelope is stretched into a long tail, which extends beyond the orbit of the Moon. It is this tail that is called the geotail.

### **CLASS:**

- ▶▶ CLASS stands for Chandrayaan 2 Large Area Soft X-ray Spectrometer.
- ▶▶ For the CLASS instrument seeking to detect element signatures, the lunar soil can be best observed when a solar flare provides a rich source of X-rays to illuminate the surface.
- ▶▶ Secondary X-ray emission resulting from this can be detected by CLASS to directly detect the presence of key elements like Na, Ca, Al, Si, Ti and Fe.