Aeolus Wind Satellite

Recently the European Space Agency's (ESA) launched its **Aeolus satellite** into the **polar orbit**.

- It is named after Aeolus, who in Greek mythology was appointed **'keeper of the winds'** by the Gods.
- This mission is the **fifth** in the family of ESA's Earth Explorers. It will also improve weather forecasting.
- Aeolus will use laser technology to measure winds around the globe and play a key role to better understand the workings of our atmosphere.
- Aeolus carries one of the most sophisticated instrument, named **Atmospheric Laser Doppler Instrument (Aladin)** which will blast the surface with a 10-megawatt ultraviolet laser 50 times per second, tracking the minute changes evident in the reflected beam caused by air molecules and other matter in the atmosphere – a completely new approach to measuring the wind from space.

Applications

- Although weather forecasts have advanced considerably in recent years, Aeolus will provide global wind profiles to **improve the accuracy** even further.
- The lack of direct global wind measurements was one of the major deficits in the Global Observing System. By filling this gap, Aeolus will give scientists the information they need to understand how **wind, pressure, temperature and humidity are interlinked.**
- In addition, its data will be used in **air-quality models** to improve **forecasts of dust** and other airborne particles that affect **public health.**

Types of Orbits

In general, there are two types of orbits:

- Polar Synchronous
- Geosynchronous

Polar Orbit

- A polar orbit travels **north-south over the poles** and takes approximately **90 minutes** for a full rotation.
- These orbits have an **inclination near 90 degrees**. This allows the satellite to see virtually every part of the Earth as the Earth rotates underneath it.
- These satellites have many uses such as **monitoring crops, global security, measuring ozone concentrations in the stratosphere or measuring temperatures in the atmosphere.**
- Almost all the satellites that are in a polar orbit are at **lower altitudes**.
- An orbit is called sun-synchronous when the **angle** between the **line joining the centre of the Earth** and the **satellite** and **the Sun** is **constant throughout the orbit.**
- These orbits are also referred to as **"Low Earth Orbit (LEO)"** which enables the on-board camera to take images of the earth under the **same sun-illumination conditions** during each of the repeated visits, thus making the satellite useful for **earth resources monitoring**.
- It passes over any given point on Earth's surface at the **same local solar time**.

Geosynchronous Orbit

- Geosynchronous satellites are launched into orbit in the same direction the Earth is spinning and can have any inclination.
- When the satellite is in orbit at a specific altitude (approximately **36,000km above** the Earth's surface), it will exactly match the rotation of the Earth.
- While, **Geostationary orbits** fall in the same category as geosynchronous orbits, but with that **one special quality of being parked over the equator.**
- In the case of geostationary satellites, the Earth's force of gravity is exactly enough to provide acceleration required for circular motion.