

EOS-03 satellite

August 7, 2021

In news- Geosynchronous Satellite Launch Vehicle-F10 (GSLV-F10) will launch earth observation satellite, EOS-03 on 12 August, 2021.

Key updates-

- EOS-03 is a state-of-the-art agile satellite that will be **placed in a Geosynchronous Transfer Orbit** by GSLV-F10.
- The satellite will **reach the final geostationary orbit** using its onboard propulsion system.
- It is capable of **imaging the whole country four-five times daily**.
- It would enable near **real-time monitoring of natural disasters** like floods and cyclones.
- It would also enable monitoring of water bodies, crops, vegetation conditions, and forest cover changes.
- A four metre diameter girth shaped payload fairing is being flown for the first time in this GSLV flight.
- This is the **fourteenth flight of GSLV**.

Types of orbit-

Geostationary orbit (GEO)-

- Satellites in GEO circle Earth above the equator from west to east following Earth's rotation – taking 23 hours 56 minutes and 4 seconds – by travelling at exactly the same rate as Earth.
- This makes satellites in GEO appear to be 'stationary' over a fixed position.
- GEO is used by satellites that need to stay constantly above one particular place over Earth, such as telecommunication satellites.
- It can also be used by weather monitoring satellites,

because they can continually observe specific areas to see how weather trends emerge there.

- Satellites in GEO cover a large range of Earth so as few as three equally-spaced satellites can provide near global coverage.

Low Earth orbit (LEO)-

- A low Earth orbit (LEO) is an orbit that is relatively close to Earth's surface.
- It is normally at an altitude of less than 1000 km but could be as low as 160 km above Earth.
- LEO satellites do not always have to follow a particular path around Earth in the same way – their plane can be tilted.
- This means there are more available routes for satellites in LEO, which is one of the reasons why LEO is a very commonly used orbit.
- It is the orbit most commonly used for satellite imaging, as being near the surface allows it to take images of higher resolution.
- It is also the **orbit used for the International Space Station (ISS)**, as it is easier for astronauts to travel to and from it at a shorter distance.
- A satellite takes approximately 90 minutes to circle Earth, meaning the ISS travels around Earth about 16 times a day.
- Individual LEO satellites are less useful for tasks such as telecommunication, because they move so fast across the sky and therefore require a lot of effort to track from ground stations.

Polar orbit and Sun-synchronous orbit (SSO)

- Polar orbits are a type of low Earth orbit, as they are at low altitudes between 200 to 1000 km.
- Satellites in polar orbits usually travel past Earth from north to south rather than from west to east,

passing roughly over Earth's poles.

- Sun-synchronous orbit (SSO) is a particular kind of polar orbit.
- Satellites in SSO, travelling over the polar regions, are synchronous with the Sun.
- This means they are synchronised to always be in the same 'fixed' position relative to the Sun.
- The satellite will always observe a point on the Earth as if constantly at the same time of the day.
- Such satellites are used to investigate how weather patterns emerge, when monitoring emergencies like forest fires or flooding or to accumulate data on long-term problems like deforestation or rising sea levels.

Transfer orbits and geostationary transfer orbit (GTO)-

- Transfer orbits are a special kind of orbit used to get from one orbit to another.
- Some satellites are not always placed directly on their final orbit and are instead placed on a transfer orbit, where, by using relatively little energy from built-in motors, the satellite or spacecraft can move from one orbit to another.
- This allows a satellite to reach, for example, a high-altitude orbit like GEO without actually needing the launch vehicle to go all the way to this altitude.