Low Earth Orbit (LEO)

- Any satellite in approximately circular orbit with semimajor axis less than, say, 1500 km is said to be in Low Earth Orbit. Sunsynchronous satellites are in low earth orbit, but many non-sunsynchronous satellites are also in orbit.
- Perhaps the most important aspect of non-synchronous LEOs is that they sample all local times, which can be important for climate and other applications.
- The altitude record for a human spaceflight in LEO was Gemini 11 with an apogee of 1,374.1 kilometers (853.8 mi).

Use of LEO

Although the Earth's pull due to gravity in LEO is not much less than on the surface of the Earth, people and objects in orbit experience weightlessness because they are in free fall.

A low Earth orbit is simplest and cheapest for satellite placement. It provides high bandwidth and low communication time lag (latency), but satellites in LEO will not be visible from any given point on the Earth at all times.

Examples

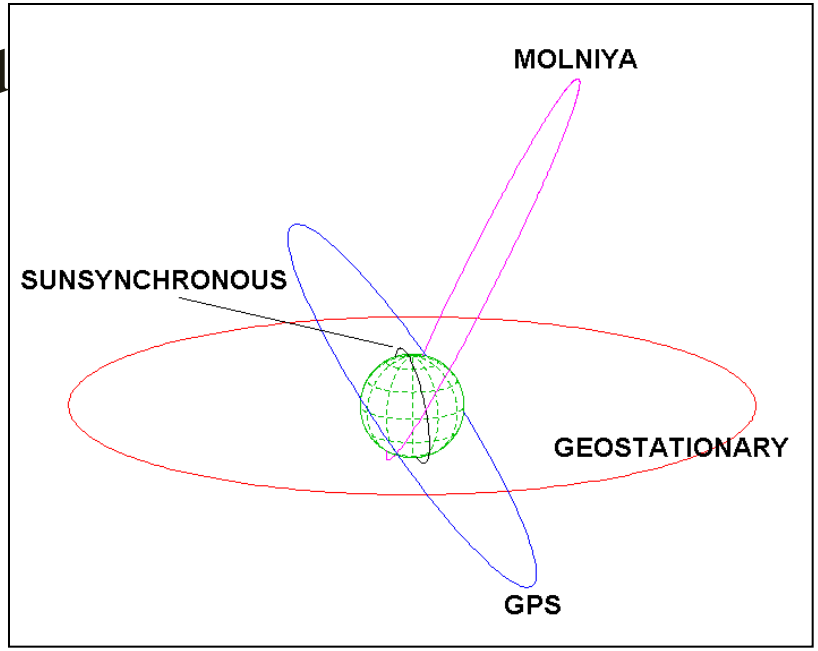
- Earth observation satellites and spy satellites use LEO as they are able to see the surface of the Earth more clearly as they are not so far away. They are also able to traverse the surface of the Earth. A majority of artificial satellites are placed in LEO, making one complete revolution around the Earth in about 90 minutes.
- The International Space Station is in a LEO about 400 km (250 mi) above the Earth's surface.
- Since it requires less energy to place a satellite into a LEO and the LEO satellite needs less powerful amplifiers for successful transmission, LEO is still used for many communication applications. Because these LEO orbits are not geostationary, a network (or "constellation") of satellites is required to provide continuous coverage. (Many communication satellites require geostationary orbits, and move at the same angular velocity as the Earth. Some communications satellites including the Iridium phone system use LEO.)

Examples

Lower orbits also aid remote sensing satellites because of the added detail that can be gained. Remote sensing satellites can also take advantage of sun-synchronous LEO orbits at an altitude of about 800 km (500 mi) and near polar inclination. Envisat is one example of an Earth observation satellite that makes use of this particular type of LEO

Mid-Earth Orbit (MEO)

1. Semimajor axis >LEO and <GEO
2. The Global Positioning System (GPS) is a good example



$a = 26559 \pm 5$ km
(4.2 earth radii)

$i = 55° \pm 1°$

e = 0