# GRAVITATION

## GEOSTATIONARY AND POLAR SATELLITES

### The definition of a satellite

A satellite is an object that orbits the sun, the earth, or any other massive body. When it comes to satellites, there are two basic categories of classification: natural and man-made. Planets, moons, and comets are examples of natural satellites. There are 67 natural satellites orbiting Jupiter. The moon, the earth's only permanent natural satellite, is responsible for the sea's tides. Other objects (such as asteroids) can occasionally reach the earth's orbit and serve as natural satellites for a period of time. Besides these, the planet has a slew of man-made satellites in orbit that are utilised for a variety of communications and data gathering purposes.

An artificial satellite, as the name implies, is one that is sent into space by humans and follows the orbit of natural satellites.

They can collect data faster than sensors that can be utilised at ground level since they have such a vast view field. Apart from that, clouds, dust, and other obscurities do not hinder their view into space beyond Earth, allowing satellites to view space much more efficiently than telescopes on Earth.

Currently, the earth is orbited by about 2,500 man-made satellites. The majority of these are Russian in origin. Given their size, you might wonder why none of these satellites collide with one another. It's entirely possible that this will happen. Although great care is taken to launch satellites in precise orbits to avoid collisions, these orbits can change. Many international organization's have been established to avert such catastrophes. A handful of Russian and American spacecraft did, however, collide for the first time in 2009!

The satellites are launched with a specific goal in mind for a variety of applications, including communications, scientific research, weather forecasting, and intelligence.

## Types of satellite

### Geostationary satellite

A geostationary satellite is an earth-orbiting satellite that rotates in the same direction as the earth. It is stationed at an altitude of approximately 35,800 kilometres (22,300 miles) directly over the equator (west to east).

Geostationary satellites appear to be fixed above the equator at one location.

On the ground, receiving and transmitting antennas do not need to track such a satellite. These antennas are substantially less expensive than tracking antennas and can be fixed in place. These satellites have revolutionised worldwide communications, television transmission, and weather forecasting, as well as serving a variety of essential defence and intelligence functions.

A single geostationary satellite has a direct line of sight with roughly 40% of the earth's surface. With the exception of small circular zones located at the north and south geographic poles, three such satellites separated by 120 degrees longitude can offer coverage of the whole planet. A directional antenna, generally a tiny dish, directed at the spot in the sky where the satellite appears to hover, can be used to access a geostationary satellite. The main benefit of this sort of satellite is that an earthbound directional antenna may be targeted and then left in place without needing to be adjusted again.

There are two primary drawbacks of geostationary satellites. For starters, because the orbital zone is a very narrow ring in the plane of the equator, the number of satellites that can be kept in geostationary orbits without colliding is limited. Second, an electromagnetic (EM) signal must travel a minimum of 71,600 kilometres (44,600 miles) to and from a geostationary satellite. When an EM signal travels at 300,000 kilometres per second (186,000 miles per second) from the surface to the satellite and back, a lag of at least 240 milliseconds is added.

## Polar Satellite

The Global Geospace Scientific (GGS) Polar Satellite is a NASA science spacecraft that was designed to examine the polar magnetosphere and aurora sensors. Technically, which gathered multi-wavelength aurora imagery and measured plasma entry into the polar magnetosphere and geomagnetic tail in order to analyse plasma flow to and from the ionosphere, as well as particle energy deposition in the ionosphere and upper atmosphere.

Forecasting, weather analysis, climate research and prediction, global sea surface temperature measurements, atmospheric soundings of temperature and humidity, ocean dynamics research, volcanic eruption monitoring, forest fire detection, global vegetation analysis, search and rescue, and a wide range of other applications rely on data from the Polar satellites.

Polar has several goals, one of which is to collect data that will aid scientists in protecting future satellites from radiation and other atmospheric threats. Because the satellite is travelling in the upper atmosphere, there is considerable risk that the sun's harmful radiation will influence or damage the satellite's equipment.

They orbit at low altitudes closer to Earth's surface, at a distance of 500-800 km, and complete one round around the planet in roughly 100 minutes. It crosses the same place on Earth numerous times a day due to its short period of revolution.

Satellites move in such a way that they scan the Earth's surface in a series of horizontal strips. Remote sensing, geology, and environmental research all benefit from the data collected by these satellites.

Polar satellites orbit the globe in a north-south orientation, as opposed to the east-west orbit of Geostationary satellites. They're particularly handy in situations where a single day's field vision of the entire globe is required.

They're employed in weather applications when it's possible to predict weather and climate-related disasters in a short amount of time. They serve as relay stations as well. In 1998, the International Space Station (ISS) was launched into space.

## Conclusion

Geostationary satellites orbit the earth at its equator. They have the same period of revolution as the earth, therefore to an observer on Earth, they appear to be stationary.

The name Polar satellites may imply that these satellites are permanently stationed at the poles. Satellites are never fixed in one orbital position. In order to stay in orbit, they must keep, They're employed in weather applications when it's possible to predict weather and climate-related disasters in a short amount of time. They serve as relay stations as well. In 1998, the International Space Station (ISS) was launched into space.