

Artificial Satellites Orbit The Earth

A special case of geosynchronous orbit is the geostationary orbit (often abbreviated GSO), which is a circular geosynchronous orbit in Earth's equatorial plane with both inclination and eccentricity equal to 0. A satellite in a geostationary orbit remains in the same position in the sky to observers on the surface. The first occurrence of satellite remote sensing can be dated to the launch of the first artificial satellite, Sputnik 1, by the Soviet Union on October 4, 1957. Sputnik 1 sent back radio signals, which scientists used to study the ionosphere.

Sun-synchronous orbit More technically, it is an orbit arranged so that, for each revolution of the planet around the Sun, its orbital plane (specifically the longitude of the ascending node) precesses through one complete revolution around the planet. characteristic for satellites that image the Earth's surface in visible or infrared wavelengths, such as weather and spy satellites, and for other remote-sensing A Sun-synchronous orbit (SSO), also called a heliosynchronous orbit, is a nearly polar orbit around a planet, in which the satellite passes over any given point of the planet's surface at the same local mean solar time

Geostationary orbit The satellite requires A geostationary orbit, also referred to as a GEO or GSO, is a circular geosynchronous orbit 35,786 km (22,236 mi) in altitude above Earth's equator, 42,164 km (26,199 mi) in radius from Earth's center, and following the direction of Earth's rotation. Geostationary satellites are launched via a temporary orbit, and then placed in a "slot" above a particular point on the Earth's surface

Low Earth orbit a year. 25. Most of the artificial objects in outer space are in LEO, peaking in number at an altitude around 800 km (500 mi), while the farthest in LEO, before medium Earth orbit (MEO), have an altitude of 2,000 kilometers, about one-third of the radius of Earth and near the beginning of the inner Van Allen radiation belt. The Iridium telecom satellites orbit at about 780 km (480 mi). 25 orbits per day) and an eccentricity less than 0. Earth observation satellites, also known as remote sensing satellites, including A low Earth orbit (LEO) is an orbit around Earth with a period of 128 minutes or less (making at least 11

Except for passive satellites, most satellites have an electricity generation system for equipment on board, such as solar panels or radioisotope thermoelectric generators (RTGs). Most satellites also have a method of communication to ground stations, called transponders. Many satellites use a standardized bus to save cost and work, the most popular of which are small CubeSats. Similar satellites can work together as groups, forming constellations. Because of the high launch cost to space, most satellites are designed to be as lightweight and robust as possible. Most communication satellites are radio relay stations in orbit and carry dozens of transponders, each...

Artificial satellites in retrograde orbit Artificial satellites in low inclination orbits are rarely placed in retrograde orbit. This is partly due to the extra velocity (and propellant) required to launch into orbit against the direction of the Earth's rotation. This is partly due to the extra velocity (and propellant) required Artificial satellites in low inclination orbits are rarely placed in retrograde orbit

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Communications satellites are often placed in a geostationary orbit so that Earth-based satellite antennas do not have to rotate to track them but can be pointed permanently at the position in the sky where the satellites are located. Weather satellites are also placed in this orbit for real-time monitoring and data collection, as are navigation satellites in order to provide a known calibration point and enhance positioning accuracy. 4431610d2b == Defining characteristics == 4431610d2b The only human spaceflights beyond LEO were the nine lunar missions of the Apollo program from 1968 to 1972 and the Artemis II lunar flyby in 2026. All space stations as of 2026 have operated in geocentric orbits within LEO. 4431610d2b

Geosynchronous orbit The synchronization of rotation and orbital period means that, for an observer on Earth's surface, an object in geosynchronous orbit returns to exactly the same position in the sky after a period of one sidereal day. A circular geosynchronous orbit has a constant altitude of 35,786 km (22,236 mi). (Low Earth Orbit) since most GSO satellites orbit in the same plane, altitude and speed; however, the presence of satellites in eccentric orbits allows A geosynchronous orbit (sometimes abbreviated GEO) is an Earth-centered orbit with an orbital period that matches Earth's rotation on its axis, 23 hours, 56 minutes, and 4 seconds (one sidereal day). Over the course of a day, the object's position in the sky may remain still or trace out a path, typically in a figure-8 form, whose precise characteristics depend on the orbit's inclination and eccentricity 4431610d2b

The United States launched two Future Imagery Architecture (FIA) radar satellites into 122° inclined retrograde orbits in 2010 and 2012. The use of a retrograde orbit suggest that these satellites use synthetic... 4431610d2b

Geocentric orbit In 1997, NASA estimated there were approximately 2,465 artificial satellite payloads orbiting Earth and 6,216 pieces of space debris as tracked by the Goddard Space Flight Center. More than 16,291 objects previously launched have undergone orbital decay and entered Earth's atmosphere. A geocentric orbit, Earth-centered orbit, or Earth orbit involves any object orbiting Earth, such as the Moon or artificial satellites. In 1997, NASA A geocentric orbit, Earth-centered orbit, or Earth orbit involves any object orbiting Earth, such as the Moon or artificial satellites 4431610d2b

Israel has successfully launched seven Ofeq satellites in retrograde orbit aboard a Shavit launcher. These reconnaissance satellites complete one Earth orbit every 90 minutes and initially make about six daylight passes per day over Israel and the surrounding countries, though this optimal Sun-synchronized orbit degrades after several months. They were launched in retrograde orbit so that launch debris would land in the Mediterranean Sea, and not on populated neighboring countries on an eastward flight path. 4431610d2b

List of orbits Geocentric orbit: An orbit around the planet Earth, such as that of the Moon or of artificial satellites. Selenocentric orbit (named after Selene): An orbit around This is a list of types of gravitational orbit classified by various characteristics 4431610d2b

== Common abbreviations == 4431610d2b

Satellite in orbit or remain in orbit, like Space stations, are artificial satellites as well. The first artificial satellite launched into the Earth's orbit was A satellite or an artificial satellite is an object, typically a spacecraft, placed into orbit around a celestial body. Additional military uses are reconnaissance, early warning, signals intelligence and, potentially, weapon delivery. They have a variety of uses, including communication relay, weather forecasting, navigation (GPS), broadcasting, scientific research, and Earth

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observation. Other satellites include the final rocket stages that place satellites in orbit and formerly useful satellites that later become defunct

A wide variety of sources define LEO in terms of altitude. The altitude of an object in an elliptic orbit can vary significantly along the orbit. Even... Communications satellites are often given geostationary or close-to-geostationary orbits, so that the satellite antennas that communicate with them do not have to move but can... Most commercial Earth-observing satellites use retrograde Sun-synchronous orbits to ensure that observations are performed at the same local time each pass of any given location, while almost all communication satellites use prograde orbits. The United States Army Ballistic Missile Agency launched the first American satellite, Explorer 1, for NASA's Jet Propulsion Laboratory on January 31, 1958. The information sent back from its radiation detector led to the discovery of the Earth's Van Allen radiation belts. The TIROS-1 spacecraft, launched on April 1, 1960, as part of NASA's Television Infrared Observation Satellite (TIROS) program, sent back the first television footage of weather patterns... 469219 Kamoʻoalewa, an asteroid discovered on 27 April 2016, is possibly the most stable quasi-satellite of Earth. As it orbits the Sun, 469219 Kamoʻoalewa appears to circle around Earth as well. It is too distant to be a true satellite of Earth, but is the best and most stable example of a quasi-satellite, a type of NEO. They appear to orbit a point other than Earth itself, such as the orbital path of the NEO asteroid 3753 Cruithne. Earth trojans, such as 2010 TK7, are NEOs that orbit the Sun (not Earth) on the same orbital... Geostationary satellites are launched via a temporary orbit, and then placed in a "slot... A spacecraft enters orbit when its centripetal acceleration due to gravity is less than or equal to the centrifugal acceleration due to the horizontal component of its velocity. For a low Earth orbit, this velocity is about 7.8 km/s (28,100 km/h; 17,400 mph); by contrast, the fastest crewed airplane speed ever achieved (excluding speeds achieved by deorbiting spacecraft) was 2.2 km/s (7,900 km/h; 4,900 mph) in 1967 by the North American X-15. The energy required to reach Earth orbital velocity at an altitude of 600 km (370 mi) is about 36 MJ/kg, which is six times the energy needed merely to climb to the corresponding altitude. A Sun-synchronous orbit is useful for imaging, reconnaissance, and weather satellites, because every time that the satellite is overhead, the surface illumination angle on the planet underneath it is nearly the same. This consistent lighting is a useful characteristic for satellites that image the Earth's surface in visible or infrared wavelengths, such as weather and spy satellites, and for other remote-sensing satellites, such as those carrying ocean and atmospheric remote-sensing instruments that require sunlight. For example, a satellite in Sun-synchronous orbit might ascend across the equator twelve times a day, each time at approximately 15:00 mean local time. The term LEO region is used for the area of space below an altitude of 2,000 km (1,200 mi) (about one-third of Earth's radius). Objects in orbits that pass through this zone, even if they have an apogee further out or are sub-orbital, are carefully tracked since they present a collision risk to the many LEO satellites.

Earth observation satellite The most common type are Earth imaging satellites, that take satellite images, analogous to aerial photographs; some EO satellites may perform remote sensing without forming pictures, such as in GNSS radio occultation. An Earth observation satellite or Earth remote sensing satellite is a satellite used or designed for Earth observation (EO) from orbit, including spy An Earth observation satellite or Earth remote sensing satellite is a satellite used or designed for Earth observation (EO) from orbit, including spy satellites and similar ones intended for non-military uses such as environmental monitoring, meteorology, cartography and others

== Applications == Examples == Although the Moon is Earth's only natural satellite, there are a number of near-Earth objects (NEOs) with orbits that are in resonance with Earth. These have been called "second" moons of Earth or "minimoons".

Claimed moons of Earth Several candidates have been proposed, but none have been confirmed. Since the 19th century, scientists have made genuine searches for more moons,

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but the possibility has also been the subject of a number of dubious non-scientific speculations as well as a number of likely hoaxes. Claims of the existence of other moons of Earth—that is, of one or more natural satellites with relatively stable orbits of Earth, other than the Moon—have existed for some time 4431610d2b

Spacecraft with a perigee below about 2,000 km (1,200 mi) are subject to drag from the Earth's atmosphere, which decreases the orbital altitude... 4431610d2b An object in such an orbit has an orbital period equal to Earth's rotational period, one sidereal day, and so to ground observers it appears motionless, in a fixed position in the sky. The concept of a geostationary orbit was popularised by the science fiction writer Arthur C. Clarke in the 1940s as a way to revolutionise telecommunications, and the first satellite to be placed in this kind of orbit was launched in 1963. 4431610d2b

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