

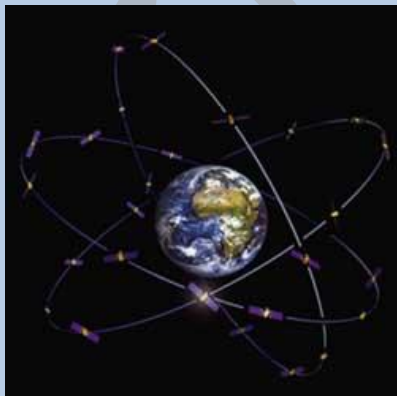
## Satellites Factsheet

### What are satellites?

The largest satellite of the Earth is actually the Moon. The satellites that we send in to space are called artificial satellites. There are thousands of satellites orbiting the Earth, doing a variety of jobs. Most are telecommunications satellites, used for television and mobile communications. Other uses include satellites for the military, weather, Earth observation and global positioning systems.

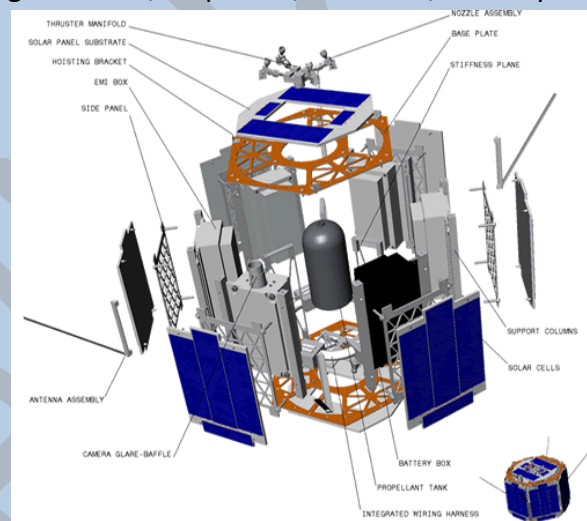
### Where are the satellites?

Most satellites are about 35,000 km away from the surface of the Earth, in geo-stationary orbit. Geo-stationary orbit is special because the satellites keep the same position over the same region of the Earth all the time, so they have an orbital period of 24 hours just like the Earth. Geo-stationary orbits are very useful for telecoms. Many of the satellites that gather science data are in Low-Earth-Orbit, about 1000 km above the Earth, and these satellites are also able to gather data over the poles. The GPS satellites are in Mid-Earth-Orbit; there are 24 of them in a constellation to enable full Earth coverage, all of the time.



### Inside a satellite

The two main parts to a satellite are called the spacecraft and the payload. The spacecraft is the main structure of the satellite and contains the power systems and avionics (flight systems). The payload contains the hardware needed to do the job that the satellite was built for, e.g. signal generators, amplifiers, antennas, telescopes.



### ACTIVITY

When building a satellite, a strong but lightweight structure is essential. It must withstand the huge g-forces and vibrations at launch and have a low mass to minimise the fuel needed for launch. Your task is to build a spacecraft that can hold a raw egg as a payload and undergo a shock test by dropping the spacecraft 1 metre from the ground. Your egg must not be taped to the structure and must be removed after the test. If your egg survives unbroken then you have passed the test.

You have the following available to you:

| Equipment                 | Number |
|---------------------------|--------|
| Plastic straws            | 10     |
| Sheets of A4 paper        | 10     |
| Small roll of sticky tape | 1      |
| Raw egg (unbroken)        | 1      |
| Pair of scissors          | 1      |