**Satellite design and construction**

- the elements that need to be considered for satellite design and construction, and satellite systems design and other factors relating to the design of a satellite.  
Satellite design and construction is a particularly specialised business. The requirements for satellites are very stringent and satellites must be capable of operating in extreme conditions whilst still maintaining the highest standards of reliability because they cannot be retrieved for maintenance or repair. Apart from the general factors relating to satellite design, the circuitry required for their operation such as the transmitters and receivers, satellites also contain a number of systems used for what is called station keeping. All of these functions, whether for performing the primary role of the satellite, or for ensuring that it reliably maintains its position and function are all important and must be included in the design of the satellite.

**Satellite position maintenance**

Satellites need to be kept in the correct position. Although they may be placed in exactly the correct orbit after they are launched, the variations in the Earth's gravitational field and other factors may cause them to drift out of their correct position. As a result it is necessary to reposition them periodically.  
Small thrusters are used to perform this operation. Often they consist of canisters of a gas which when released with a catalyst gives a form of rocket propulsion to move the satellite back on station. Often the service life of a satellite is determined by the amount of fuel for repositioning the satellite rather than the reliability of the electronics.  
The other problem with a satellite is that its attitude will change. This is of great importance because directive antennas or cameras are often used, and the satellite needs to be orientated in the correct direction for them. The basic method of gaining the correct orientation is to use the thrusters. However the attitude will change comparatively quickly. The most common method to overcome this is to use the gyroscopic effect. Sometimes a large flywheel may be made to spin inside the satellite. This can be inefficient in its use of the weight of the satellite. To overcome this other cylindrical satellites actually rotate a portion of the body, often an inner cylindrical section so that the antennas mounted on the outer section do not revolve.