

Satellites, Geo-stationary orbits and Solar Eclipses

Satellites in geo-stationary orbits close to the equinoxes experience an eclipse of the sun once every day.

Satellites and Geo-stationary Orbits

A satellite in geo-stationary (equatorial) orbit orbits the earth directly above the equator, at the same rate as the earth rotates. From the point of view of an observer on the earth's surface, geo-stationary satellites remain fixed in the sky. The majority of broadcasting satellites are in geostationary orbits so that the receivers don't have to track the transmitting satellite throughout the day. The receiver, for example a satellite dish on the roof of your house, can remain fixed once it is set-up pointing at the broadcast satellite. The great altitude of geo-stationary orbits, around 40000 km, means that a single satellite can transmit to a very large portion of the earth's surface.

Total Solar Eclipses for Geo-stationary Satellites

Between 28 February and 11 April, and between 2 September and 14 October, roughly 21 days either side equinoxes, satellites in geostationary orbits will pass through the shadow of the earth once every day. While in the earth's shadow the satellite gains no power from its all important solar cells. So, either a satellite is forced to shut down, or if 24-hour operation is necessary, to switch over to batteries. The time spent in the earth's shadow increases to a maximum of about 70 minutes right on the equinox. Batteries are one of the main limiting elements in the lifetime of a broadcast satellite.