Solar Outages

Around the spring and autumn (fall) equinoxes, when the day and night are about the same length, the sun crosses the equator and traces an arc that is directly behind the geo-arc of satellites. This momentarily disrupts satellite reception and causes a phenomenon known as a **solar or sun outage** . The exact date, time and duration of such events depends on the receive site location, the satellite in question, the earth station antenna beamwidth or focal resolution, the station keeping accuracy of the satellite and of course the accuracy of antenna pointing.

The sun is a powerful broadband microwave transmitter and has a noise temperature well in excess of 25000K. As the sun passes directly behind the satellite, when viewed from earth, reception may be degraded or sometimes even swamped by the overwhelming noise from the sun. The observable result ranges from impulse noise (sparklies) on an FM system to total loss of signal. Digital systems appear to be more resilient but communication may still be lost suddenly.

The outage may last several minutes either side of the peak each day during the season and will last longer the smaller the antenna. Similarly the event will occur for several days both before and after the peak day, thus outages will occur at roughly the same time each day and may repeat on a daily basis for a week or more.

Damage to receiving equipment is also possible due to the intense heat from the sun being focussed onto the head unit. Rare stories of protective caps melting and dramatic LNB explosions due to ingressed water vaporization have been reported so if you have expensive equipment, and a solid white painted antenna, it may be a good idea to shield the head end during these events.

A precise knowledge of when these events occur is also useful for other reasons. If you booked transponder time to relay, say, a news feed and it happened just to coincide with a solar outage on the downlink you might be a little cross. You could use the advance information to book a transponder at an alternative time or on an another satellite.

A highly accurate algorithm is used to calculate annual solar outage events associated with a particular location and satellite combination. Events are listed in date order and grouped into early and late seasons.

IMPORTANT: If elderly satellites have lapsed into severe inclined orbits, results may not be accurate. This module assumes reasonable station keeping accuracy of around 0.1 degrees. Always check the satellite's inclination before releasing any predictions!