



European Space Agency

ESA Science & Technology

08-Jun-2005 18:18:54

No. 37 - Start of Moon Eclipse Season

12 Apr 2005

Overall Status

The issue reported in the previous status report (No. 36) concerning EDAC has been ongoing with another error occurring on 4 April 2005. Following discussions between ground control and industry a new procedure was developed, tested and executed on 7 April 2005. As a result a decision was made to only upload Flight Dynamic profiles and no Payload commands until a memory verification could be carried out. Consequently no payload activities were possible during the second half of the reporting period, running from 28 March to 10 April.

Otherwise the spacecraft status is good with all functions working nominally.

Future activities

- Resume instrument commissioning and start Science
- Fine tune procedures and tools to optimise Lunar phase

Spacecraft Status

AOCS

The Moon eclipse season started on 7 April 2005 and will last until 20 June 2005. The eclipses are currently occurring shortly after the perilune passage and lasting up to a maximum of 20 minutes.

Star Trackers

The star tracker temperatures continue to vary depending on the operational conditions of the spacecraft. During routine science operations the temperatures of both star trackers are below the desired 19 °C. During two Medium Gain Antenna (MGA) Earth pointings, lasting up to 10 hours each, the temperature in ST#1 reached a peak of 24 °C. The cause of this rise in temperature is not yet clear, but one theory being considered is the effect of Lunar infrared radiation.

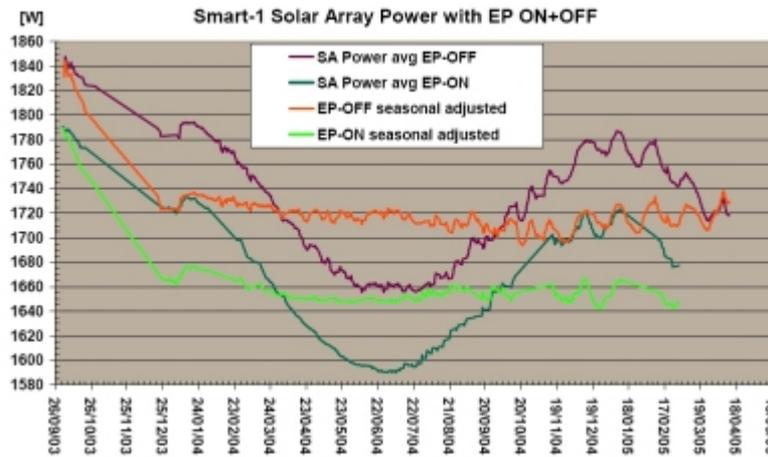
During MGA pointings the main thermal inputs are:

1. Direct solar illumination causing a general heating in platform temperatures
2. Slight illumination of the inner baffle of ST#2 causing a small temperature

In this case, however, ST#1 showed not only the highest temperatures, but there were high temperature variations even though the solar illumination changes gradually. In future, analysis could be undertaken to confirm that these variations are caused by Lunar infrared radiation.

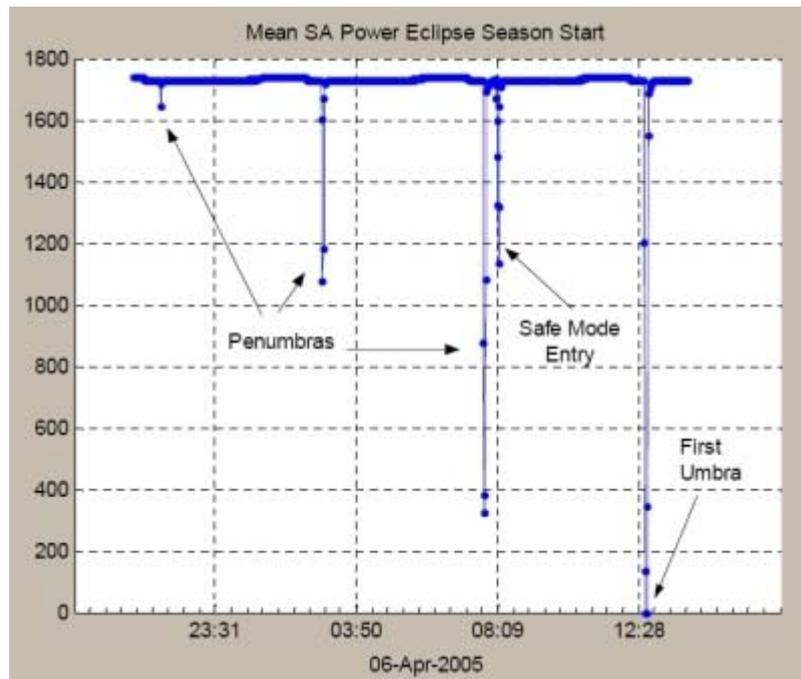
Power

The plot below shows analysis of the Solar Array (SA) power throughout the mission. The plots also show the seasonally adjusted (Earth orbital effect only) trend, with the oscillations at the end due to uncorrected lunar orbital effects.



SA power through the mission (courtesy of P. Rumler - ESA/ESTEC)

As mentioned elsewhere the spacecraft has now entered a period of eclipses. The diagram below shows how the SA power output falls steadily as the penumbral phase increases and finally reaches an umbral phase.



SA power through the first eclipses

Orbital Information

SMART-1 OD301 - Close to Apolune 401
Epoch (UTC) 2005/04/04 02:31:05.2

Elements WRT Moon and its equator of date

Pericentre Distance (km)	2271.862078
Apocentre Distance (km)	4535.563122
Semi Major Axis (km)	3403.712600
Eccentricity	0.332534
Inclination (°)	89.710424
Ascending Node (°)	236.666779

Argument of Pericentre (°)	276.712045
True Anomaly (°)	180.017573
Osculating Orbital Period (h)	4.949765

The changes since apolune 369 are as follows:

- Semi-major axis: +0.2 km
- Perilune height: +14.5 km
- Apolune height: -14.1 km
- Orbital period: +0.0 min

For further information please contact: SciTech.editorial@esa.int
