



European Space Agency

ESA Science &amp; Technology

08-Jun-2005 18:17:55

## No. 36 - Ongoing Lunar Commissioning

29 Mar 2005

### Overall Status

The spacecraft is in good health with all functions working nominally. The only noticeable event was an anomaly with the mass memory caused by a double EDAC (Error Detection and Correction). The spacecraft software responded accordingly and invalidated those errors in memory. Ground operations are investigating the cause of the problem and will seek to recover the data at a later point.

### Future activities

- Instrument commissioning and start of science phase
- Fine tune procedures and tools to optimise Lunar phase

### Spacecraft Status

#### AOCS

The AOCS subsystem has been nominal during the period 14 to 27 March 2005. The spacecraft has been following a Moon nadir-pointing attitude during the entire orbit and period except for short periods of Earth pointing where the MGA antenna was pointed to the Earth in order to download data.

#### Electric Propulsion

The EP has been off during the entire period and will remain so for the next few months. The table below shows a summary of EP performance to date.

Total number of pulses	526
DOY of last pulse	71
Date of last pulse	12 March 2005
Acumulated Cathode A time (h)	3511.59
Accumulated Cathode B time (h)	1115.86
EP Hours firing (h)	4627.456
Xenon mass left (kg)	9.933
Xenon mass used (kg)	72.567

#### Star Trackers

Both star trackers have been working within operational temperatures (below 19 °C) during the period 14 to 26 March. On 27 March, however, the star tracker #2 temperature reached 19.66 °C. Throughout the period the average temperature of ST#1 was 6.19 °C as opposed to 17.10 °C for ST#2. This was solely due to the attitude of the spacecraft and ST#2 undergoing greater exposure to solar radiation.

#### Power

Since the EP system is inactive there is plenty of power available for Lunar science activities. The main factor in determining the power output from the solar arrays over the coming months is the spacecraft-Sun distance.

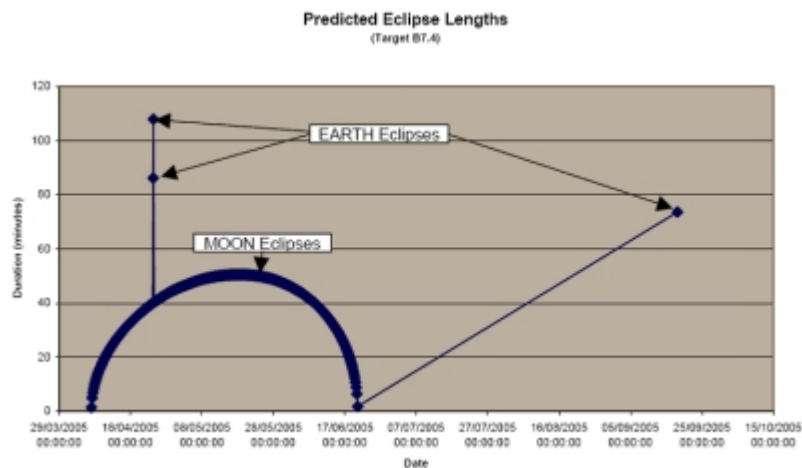
### Instrument Status

Commissioning activities have been ongoing with no reported problems.

**Orbital Information**

**Eclipses**

A new season of eclipses is due to begin on 6 April with a penumbral eclipse and a full umbral eclipse on 7 April. The duration of eclipses will increase to a peak of around 50 minutes toward the end of May. The plot below shows the distribution of eclipse durations in the coming months.



Duration (min) of eclipses for the period 29 March to 15 October 2005

On 24 April four eclipses, two Earth and two lunar, will occur:

Start Time (UTC)	End Time (UTC)	Duration (min)	Type
05:27:21	06:07:19	39.96	Lunar
08:03:08	09:29:19	86.16	Earth
10:25:35	12:13:31	107.94	Earth
15:23:48	16:04:10	40.38	Lunar

**Orbital parameters**

SMART-1 OD229 - Close to Apolune 369  
 Epoch (UTC) 2005/03/28 12:06:43.4

**Elements WRT Moon and its equator of date**

Pericentre Distance (km)	2257.315951
Apocentre Distance (km)	4549.680236
Semi Major Axis (km)	3403.498093
Eccentricity	0.336766
Inclination (°)	90.087897
Ascending Node (°)	236.687631
Argument of Pericentre (°)	278.617404
True Anomaly (°)	180.008804
Osculating Orbital Period (h)	4.94297

The changes since apolune 334 are as follows:

- Semi-major axis: - 0.4 km
- Perilune height: + 2.7 km
- Apolune height: - 3.5 km
- Orbital period: - 0.0 min

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