



European Space Agency

ESA Science &amp; Technology

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## No. 54 - Successful Perilune Raising Manoeuvres

24 Jul 2006

### Report for Period 19 June to 16 July 2006

**The main activity during the reporting period has been the perilune raising manoeuvres using the attitude thrusters. The manoeuvres started as planned on 19 June. Due to the spacecraft's good performance, the necessary delta-V to boost SMART-1's orbit was achieved earlier than planned, and the period during which the manoeuvres were carried out ended on 2 July as opposed to the expected end date of 7 July.**

In total, the perilune raising manoeuvres required 2404 attitude segments in two weeks (this number usually lies between 180 and 240 per week) and 520 reaction wheel off-loadings were commanded in 65 orbits.

The next step will be the trim manoeuvres lasting about two days in late July to fine tune the impact time between 5:30 and 06:30 UTC on 3 September 2006, allowing optimal observations from ESO, US Kitt-peak and Hawaii.

A Spacecraft Safe Mode occurred on 15 July 2006 at 04:17:04 because the startracker stopped providing valid attitude data for more than 5000 seconds. The spacecraft was fully recovered and payload activities were restarted on the 18 July 2006. The cause of the problem is still under investigation.

The payload activities will continue during the last weeks of the mission with short interruptions for the trim manoeuvres at the end of July and just prior to the impact. After the tracking campaign with the Chinese CLTC in June, another one is being planned with ISRO in preparation for their lunar mission. This will take place during the third week of July.

The operations with the SMART-1 Ground Operations Automation System (GOAS) are proceeding as planned with some delays due to problems with the interface of the mission control system. A real time demonstration of GOAS is planned during the second half of July before the end of the mission.

### Future Activities

The future activities are focused on:

- Carry out the trim manoeuvres and continue science afterwards
- Preparation of papers for IAA in Valencia
- Preparation of mission termination and closure

### Spacecraft Status

The spacecraft status is good with all functions working nominally.

### AOCS

The performance of the AOCS subsystem has been nominal during most of the time in this reporting period. There were two anomalies with the startracker:

- Not possible to request startracker image. Problem was solved on 14 July
- Safe Mode because the startracker stopped providing valid attitude data for more than 5000 seconds. Spacecraft fully recovered again on 18 July

**Electric Propulsion, Power, Thermal**

During the reporting period, the electric propulsion system was off. The performance of the power and thermal subsystems was very good.

**Orbital Information**

SMART-1 OD453 Close to Apolune 2631  
Epoch (UTC) 2006/07/10 07:21:36.0

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

Pericentre Distance (km)	1984.625277
Apocentre Distance (km)	4939.507385
Semi Major Axis (km)	3462.066331
Eccentricity	0.426751
Inclination (°)	90.946022
Ascending Node (°)	239.683817
Argument of Pericentre (°)	223.535143
True Anomaly (°)	180.000003
Osculating Orbital Period (h)	5.077598

The changes in four parameters since apolune 2598 are:

- semi-major axis -0.1 km
- perilune height -50.1 km
- apolune height +49.8 km
- orbital period -0.0 minutes

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