European Space Agency

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# No. 50 - Preparing for Second Push-Broom Operations Phase

20 Apr 2006

**Report for period 20 March to 16 April 2006**

**SMART-1 operations have been nominal during this period. The only noticeable event was another double EDAC error on 3 April 2006. The error occurred in page 0 causing the invalidation of the Timetag Queue. Fortunately the FD vector had a validity of about 3 hours at the time of occurrence and it happened during visibility, so it could be recovered without operational impact.**

Payload operations have run as planned and all preparations are being made to start the second pushbroom operations phase by mid April.

Moon impact preparation:

- Flight Dynamics strategy is completed
- The Swedish Space Corporation Analysis is completed
- The Thermal analysis and simulations are currently under work
- The new procedures development has been started. They will be tested in the simulator during May
- The SMART-1 Principal Investigator, Bernard Foing continues coordinating the Moon smart impact and observation campaign

The SMART-1 Ground Operations Automation delta Review (GOAR) was completed on 31 March 2006. The Board authorised the use of the system subject to the resolution of two actions and the completion of the validation tests. SMART-1 is planning to start using the system operationally in May 2006.

## Future Activities

The future activities are focused on the following:

- Finalise the end of mission impact on the moon analysis
- Tone ranging test on SMART-1 with Chinese CLTC Kashi station and with ISRO
- Start using the SMART-1 Ground Operations Automation System (S1 GOAS)
- Preparation of papers for Spaceops and IAA in Valencia

Note: The second ranging test with the Chinese station Kashi has been postponed to mid May due to a launch campaign at CLTC.

## Spacecraft Status

The spacecraft status is good with all functions working nominally.

**AOCS**
The AOC subsystem has done well in the period covered by this report. Most noticeable during this period were four double blindings on 20 March, 1 April (two blinding) and 2 April respectively that caused rate integration to be activated for a period longer than usual but they did not cause any problem in the spacecraft.

**TT&C**
The performance of the TTC subsystem has been nominal during this period. Telemetry reception was affected by a Sun conjunction on day 88.

## Electric Propulsion, Power and Thermal

The performance of the Power and Thermal Subsystems during the reporting period was very good.

**Power**
During the reporting period there was an Earth eclipse causing a temporary drop in the solar array output power. During the time that SMART-1 was in the Earth's penumbra, the solar array output power was still high enough to support the loads, so that the batteries did not start discharging. The Moon eclipse season is scheduled to start on 20 April at 00:26:52, with an eclipse of duration 5 minutes and 49 seconds.

**Electric Propulsion**
The Electric Propulsion has been off during the reporting period. An EP CRP characterization test is planned for this Moon eclipse season, scheduled to start on 20 April.

**Thermal**
The Thermal Subsystem has performed very well during the reporting period.

## Orbital Information

SMART-1 OD421 Close to Apolune 2194
Epoch (UTC) 2006/04/10 07:45:21.7

| **Elements WRT Moon and its equator of date** | |
|---|---|
| Pericentre Distance (km) | 2253.170397 |
| Apocentre Distance (km) | 4584.861907 |
| Semi Major Axis (km) | 3419.016152 |
| Eccentricity | 0.340989 |
| Inclination (°) | 90.350181 |
| Ascending Node (°) | 238.983153 |
| Argument of Pericentre (°) | 239.756300 |
| True Anomaly (°) | 180.000004 |
| Osculating Orbital Period (h) | 4.983185 |

The changes since apolune 2161 are as follows:

- semi-major axis +0.2 km
- perilune height -7.3 km
- apolune height +7.7 km
- orbital period +0.0 min

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