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The final days of SMART-1's spectacularly successful mission have seen intense activity including a successful recovery from safe mode as mission controllers manoeuvre the craft into a planned lunar impact at 05:42 UT 3 September 2006.

Spacecraft Status

At 13:09 UT on 1 September 2006, and with the planned manoeuvre activity pending, SMART-1 unexpectedly placed itself into safe mode, a standard recovery and diagnostic status in which most spacecraft functions and payload operations are suspended.

Safe mode is usually caused by a key parameter running out of expected range, or by a memory or CPU problem in an on board computer, and it allows controllers to investigate the problem, upload corrective commands and restart normal operations.

The switch to safe mode occurred just after the star trackers had recorded and stored routine images and after a download of other stored data.

At 18:15 UT, 1 September 2006, Science operation mode was restored with no reported loss of spacecraft data. This enabled the planned trajectory correction manoeuvre to take place as scheduled.

Science

Star Trackers

An impressive sequence of Moon images in earthshine was acquired by one of SMART-1's star trackers from 12:15 to 13:06 UT on 1 September, during a slew manoeuvre aimed at starting the next imaging session with the AMIE camera on board the spacecraft.

Orbit

Earlier this week, and based on estimates including local area topography, impact was due to occur in a region located at mid-southern latitudes on the lunar near-side.

Of the possible impact times and locations, this target was chosen to favour the ground observation campaign and optimise potential science returns.

However, updated estimates of the elevation of the surrounding Moon terrain indicated that, in the absence of any further manoeuvres, impact would very likely occur one orbit earlier, at 00:38 UT during orbit 2889, with SMART-1 possibly clipping the rim of a medium-sized crater, Clausius, with a high spot 1600 metres above the local surface and located at 43.5° West and 36.5° South.

As a result, during the night of 1-2 September, mission controllers conducted manoeuvres using the spacecraft's thrusters aiming to boost the height of perilune of the penultimate orbit, while maintaining the intended (nominal) impact time and location.

The manoeuvres successfully achieved this aim, boosting perilune by 592 metres, with the result that the new impact time is now predicted to occur at 05:42 UT at 46.2° West and 34.2° South.

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