



## **SMART-1 Mission at the Moon: Status and First Results**

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SMART-1 is the first of Small Missions for Advanced Research and Technology as part of ESA science programme “Cosmic Vision”. Its objective is to demonstrate Solar Electric Primary Propulsion (SEP) for future Cornerstones (such as Bepi-Colombo) and to test new technologies for spacecraft and instruments. The spacecraft has been launched on 27 Sept. 2003, as Ariane-5 auxiliary passenger. SMART-1 has left the inner radiation belt, and spiraled out towards lunar capture on 15 November 2004. It then spiraled down towards lunar science orbit (300-3000 km) until February 2005. The status of SMART-1 will be given. After a 15-month cruise with primary SEP, the SMART-1 mission has started to orbit the Moon for a nominal period of six months, with expected 1 year extension. The spacecraft carries out a complete program of technology and science measurements during the cruise and in lunar orbit.

We shall present the first results from SMART-1's science and technology payload, featuring many innovative instruments and advanced technologies with a total mass of some 19 kg. The payload includes a miniaturized high-resolution camera (AMIE) for lunar surface imaging, a near-infrared point-spectrometer (SIR) for lunar mineralogy investigation, and a very compact X-ray spectrometer (D-CIXS) with a new type of detector and micro-collimator which will provide fluorescence spectroscopy and imagery of the Moon's surface elemental composition. There is also an experiment (KaTE) aimed at demonstrating deep-space telemetry and telecommand communications in the X and Ka-bands, a radio-science experiment (RSIS), a deep space optical link (Laser-Link Experiment), using the ESA Optical Ground station in Tenerife, and the validation of a system of autonomous navigation (OBAN) based on image pro-

cessing.

SMART-1 lunar science investigations include studies of the chemical composition of the Moon, of geophysical processes (volcanism, tectonics, cratering, erosion, deposition of ices and volatiles) for comparative planetology, and high resolution studies in preparation for future steps of lunar exploration. The mission addresses several topics such as the accretional processes that led to the formation of rocky planets, and the origin and evolution of the Earth-Moon system.