

**ESA SMART-1 MISSION TO THE MOON**

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SMART-1 is the first in the programme of ESA's Small Missions for Advanced Research and Technology. 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 is to be launched in early October 2003, as an Ariane-5 auxiliary passenger. After a cruise with primary SEP, the SMART-1 mission is to orbit the Moon for a nominal period of six months, with possible extension. The spacecraft will carry out a complete programme of scientific observations during the cruise and in lunar orbit.

SMART-1's science payload, with a total mass of some 19 kg, features many innovative instruments and advanced technologies. A miniaturised 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 sur-

face elemental composition. The payload also includes 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 processing.

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 could address 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.