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# SMART-1 SIR: review of results and legacy after 10 years

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With SMART-1, launched on 27 September 2003, ESA opened with the Small Missions for Advanced Research and Technology program, the possibility for European space-based lunar science to take off. Primarily built to demonstrate the capability of the Solar Electric Primary Propulsion (SEP) System for future ESA cornerstone missions, the satellite carried instruments and experiments to test new technologies for future missions. Among those experiments, the SIR experiment, a grating, near-infrared point-spectrometer was built as a compact low mass (2 kg) instrument, designed to measure reflectance spectra of the lunar surface on the SMART-1 spacecraft in the wavelength range between 900 and 2400 nm, with the goal to investigate the Moon's mineralogical composition. SIR's great advantages compared to ground-based instrumentation was its high spatial resolution, its ability of observe the lunar far side and the fact that space- based observations would generate reflectance spectra that would not be affected by atmospheric absorptions and emission lines. Compared with the Clementine multi-color-data, SIR could measure complete spectra with a much higher spectral resolution, thus allowing for an accurate determination of the positions of the mineral absorption bands. SIR collected data until the end of the mission on 3 September 2006. We will review some of the results which originated from the 28 million spectra taken during the SIR-1 mission, report on insights gained with the SIR experiment on SMART-1, explain what role it played for the developments of the SIR-2 experiment flown on Chandrayaan-1, and show what progress NIR lunar spectroscopy has made in those 10 years.