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The SMART-1 AMIE, SIR, and D-CIXS data sets in ESA's Planetary Science Archive

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In August 2010, the European Space Agency (ESA) has published the complete data acquired by the lunar mission SMART-1 during its 14 month cruise and 22 month in lunar orbit. The data are available on ESA's Planetary Science Archive (PSA) in Planetary Data Format (PDF). There are data sets from five instruments: the Advanced Moon MicroImaging Experiment (AMIE), the Demonstration of a Compact Imaging Spectrometer (D-CIXS), the SMART-1 Infrared Spectrometer (SIR), the Spacecraft Potential, Electron and Dust Experiment (SPEDE), and the X-ray Solar Monitor (XSM).

We discuss the data from the remote sensing instruments AMIE, SIR, and D-CIXS and show the coverage and resolution on the lunar surface. For these instruments, geometry tables are provided to facilitate searching. We describe the formats of the geometry tables and demonstrate how searches for certain locations and for certain observation types can be performed. We describe the formats of the actual data products and show how the data can be accessed using either PDS, FITS, or homegrown tools. For AMIE, we also briefly discuss the data calibration.

The calibrated AMIE data sets comprise a total binary data volume (without metadata overhead) of 130 GB. This can of course not be loaded completely into the RAM of a (contemporary) computer system. If we want to visually browse the complete AMIE data (or other large planetary data sets), we need a system employing advanced visualization technologies. An example of such a system is GeoVisionary, the result of a collaboration between the Virtalis company and the British Geological Survey. GeoVisionary combines a powerful data engine with a virtual geological toolkit. We demonstrate some possibilities of its application to the AMIE data.