Return to the Moon (02)
Scientific Highlights and Lessons from Recent Lunar Missions (1)

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SMARTIC – EXPLORING SMART-1 IMAGES

Abstract

SMART-1 was the first of a series of Small Missions for Advanced Research in Technology (SMART) created by the European Space Agency (ESA). This first satellite was designed to improve the knowledge about the Moon pursuing several scientific goals: search for signs of water-ice in craters near the Moon's poles, contribute to clarify the origin of the Moon and reconstruct the evolution of the Moon by mapping its surface distribution of minerals, key chemical elements and topography. Launched on 27th September 2003 from the Guiana Space Centre in Kourou, French Guiana, onboard of Ariane 5 rocket, it started on the 15th March 2005 a lunar orbit 400-3000Km that culminated with a planned impact on 3rd September 2006. During the operation period the Advanced Moon micro-Imager Experiment (AMIE) acquired about 32000 images of 1024x1014 pixel divided on seven sub-images using different color filters at 750, 915 and 960 nm. The 5.3°x5.3° field of view of the camera allowed different resolution images from the highest 27m/pixel at 27Km altitude at the perilune to the lowest definition of 300m/pixel at the apolune altitude of 3000Km. The data gathered by SMART-1 can be of great importance not only to European scientist but to the worldwide scientific community. Information about the existence of water, oxygen or minerals can be of great value specially when the time comes to consider a long-lasting human presence on the Moon. Despite the potential scientific value of the images acquired during this mission, up to now not much has been done with it. In this work, we present SMARTIC, a project dedicated to the exploration of this valuable data. We begin with the presentation of the indexing architecture we created in order to organize and facilitate image search. Taking advantage of this data structure, a complete lunar coverage study on the different image definitions was performed and is presented on this paper. Finally, a first study about the relative precision and stability of the pointing device used on the lunar orbiter is done using the stitching factors of overlapping images taken by the SMART-1.