Paper ID: 12674
oral

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

Author: Prof. Bernard Foing
European Space Agency (ESA/ESTEC), The Netherlands

SMART-1 NEW RESULTS FROM ARCHIVE EXPLOITATION

Abstract

We present new SMART-1 results recently published obtained from archive exploitation that are relevant to the return to the Moon. SMART-1 demonstrated the use of Solar Electric Propulsion that will be useful for Bepi-Colombo and future deep-space missions, tested new technologies for spacecraft and instruments miniaturisation, and provided an opportunity for science [1-12]. The SMART-1 spacecraft operated on a science orbit for 18 months until impact on 3 September 2006. To date, 68 refereed papers and more than 300 conference or technical papers have been published based on SMART-1 (see ADS on SMART-1 scitech website). The SMART-1 data are accessible on the ESA Planetary Science Archive PSA [13]. Recent SMART-1 published results using these archives include: Multi-angular photometry of Mare and specific regions to diagnose the regolith roughness and to constrain models of light reflection and scattering [14] that can be extended to understand the surface of other moons and asteroids; the SMART-1 impact observed from Earth was modelled using laboratory experiments predicting the size of asymmetric crater and ejecta [15]; the lunar North and South polar illumination was mapped and monitored over the entire year, permitting to identify "SMART-1 peaks of quasi-eternal light" and to derive their topography [16, 17]; SMART-1 was also used for radio occultation experiments [18], and the X-Ray Solar Monitor data were used for activity and flare studies of the Sun as a star in conjunction with GOES AND RHESSI [19] or to design future coronal X-ray instruments [20]. The SMART-1 archive observations have been used to support Kaguya, Chandrayaan-1, Chang'E 1, the US Lunar Reconnaissance Orbiter, the LCROSS impact, and to characterise potential sites relevant for lunar science and future exploration.

Credits and References: we acknowledge members of SMART-1 Science and Technology Working Team and collaborators. SMART-1 Scitech or public websites: sci.esa.int/smart-1 or www.esa.int/smart-1

[1]Foing etal (2001) EMP85-523; [2]Racca et al (2002) EMP85-379; [3]Racca et al. (2002) PSS50-1323; [4]Grande et al. (2003) PSS51-427; [5]Dunkin et al. (2003) PSS51-435; [6]Huovelin et al. (2002) PSS50-1345; [7]Shkuratov et al (2003) JGRE108-E4-1; [8]Foing et al (2003) ASR31-2323;[9]Grande et al (2007) PSS55-494; [10]Pinet et al (2005) PSS53-1309; [11] Josset etal (2006) ASR37-14; [12] Foing et al (2006) ASR37-6; [13] http://www.rssd.esa.int/psa [14] Muinonen et al (2011) AA531-150; [15] Burchell et al (2010) Icarus207-28; 16] Grieger (2010) cosp38-417; [17]Bussey et al (2011) LPICO-1621-5; [18] Pluchino et al MSAItS 16-152; [19] Vaananen et al (2009) SolarPhys260-479; [20] Alha et al (2011)NIM