Geophysical Research Abstracts
Vol. 16, EGU2014-15175, 2014
EGU General Assembly 2014

ESA SMART-1 mission: review of results and legacy 10 years after launch

Bernard Foing and the SMART-1** Project, Operations and Science Technology Working Team
ESA ESTEC/SRE-S, Noordwijk, Netherlands (bernard.foing@esa.int, +31 71 565 4697)

We review ESA's SMART-1 highlights and legacy 10 years after launch. The SMART-1 mission to the Moon achieved record firsts such as:
1) first Small Mission for Advanced Research and Technology; with spacecraft built and integrated in 2.5 years and launched 3.5 years after mission approval;
2) first mission leaving the Earth orbit using solar power alone with demonstration for future deep space missions such as BepiColombo;
3) most fuel effective mission (60 litres of Xenon) and longest travel (13 month) to the Moon!;
4) first ESA mission reaching the Moon and first European views of lunar poles;
5) first European demonstration of a wide range of new technologies: Li-Ion modular battery, deep-space communications in X- and Ka-bands, and autonomous positioning for navigation;
6) first lunar demonstration of an infrared spectrometer and of a Swept Charge Detector Lunar X-ray fluorescence spectrometer ;
7) first ESA mission with opportunity for lunar science, elemental geochemistry, surface mineralogy mapping, surface geology and precursor studies for exploration;
8) first controlled impact landing on the Moon with real time observations campaign;
9) first mission supporting goals of the ILEWG/COSPAR International Lunar Exploration Working Group in technical and scientific exchange, international collaboration, public and youth engagement;
10) first mission preparing the ground for ESA collaboration in Chandrayaan-1, Chang'E1-2-3 and near-future landers, sample return and human lunar missions.

The SMART-1 technology legacy is applicable to geostationary satellites and deep space missions using solar electric propulsion. The SMART-1 archive observations have been used to support scientific research and prepare subsequent lunar missions and exploration. Most recent SMART-1 results are relevant to topics on: 1) the study of properties of the lunar dust, 2) impact craters and ejecta, 3) the study of illumination, 4) observations and science from the Moon, 5) support to future missions, 6) identifying and characterising sites for exploration and exploitation. This legacy is relevant to the preparation for future orbiters, landers, sample return, a global robotic village, human missions and international lunar bases (consistent with ILEWG, COSPAR and Global Space Exploration roadmaps).

Link: http://sci.esa.int/smart-1/
References and citations: http://scholar.google.nl/scholar?&q=smart-1+moon
**We acknowledge ESA, member states, industry and institutes for their contribution, and the members of SMART-1 Teams: G.Racca and SMART-1 Project Team, O. Camino and SMART-1 Operations Team, D. Frew and SMART-1 STOC, B.H. Foing and STWT, B. Grieger, D. Koschny, J.-L. Josset, S. Beauvivre, M. Ellouzi, S. Peters, A. Borst, E. Martellato, M. Almeida, J.Volp, D. Heather, M. Grande, J. Huovelin, H.U. Keller, U. Mall, A. Nathues, A. Malkki, W. Schmidt, G. Noci, Z. Sodnik, B. Kellett, P. Pinet, S. Chevrel, P. Cerroni, M.C. de Sanctis, M.A. Barucci, S. Erard, D. Despan, K. Muinonen, V. Shevchenko, Y. Shkuratov, P. McMannamon, P. Ehrenfreund, C. Veillet, M. Burchell, other Co-Investigators, associated scientists, collaborators, students and colleagues.