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MoonLITE programmatic and technological update

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MOONLITE PROGRAMMATIC AND TECHNOLOGICAL UPDATE. A. Smith¹, I. A. Crawford², S. J. Barber³, P. Brown⁴, P. Church⁵, Y. Gao⁶, R. A. Gowen¹, A. Griffiths¹, A. Hagermann³, K. Joy², W. T. Pike⁴, A. Phipps⁷, W.G. Proud⁸, S. Sheridan³, M. R. Sims⁹, D. L. Talboys⁹, N. Wells¹⁰, ¹Mullard Space Science Laboratory, University College London, Holmbury St Mary, RH5 6NT, UK, E-mail: as@mssl.ucl.ac.uk, ²School of Earth Sciences, Birkbeck College, London, UK, ³Planetary and Space Sciences Research Institute, The Open University, Milton Keynes, UK, ⁴Department of Physics, Imperial College, London, UK, ⁵QinetiQ Ltd, Fort Halstead, UK, ⁶Surrey Space Centre, University of Surrey, Surrey, UK, ⁷Surrey Satellite Technologies Ltd, Surrey, UK, ⁸Cavendish Laboratory, University of Cambridge, Cambridge, UK, ⁹Department of Physics, University of Leicester, Leicester, UK, ¹⁰QinetiQ Ltd., Farnborough, UK.

sity, Surrey Satellite Technologies Ltd, University College London.

MoonLITE is envisaged as a 4-penetrator mission, embedding science payloads at widely separated lunar sites (including permanently shaded craters at the lunar poles) to undertake a range of scientific measurements including seismology, heat flow, geochemistry and a study of possible polar volatiles.

A UK(BNSC)-US(NASA) bi-lateral working group reported on opportunities for joint lunar exploration in late 2007. The MoonLITE project was identified as having excellent potential and a recommendation was made that a further study of the mission should be undertaken.

Impact velocities of order 300ms⁻¹ are foreseen for the MoonLITE penetrators and so comprehensive impact protection measures will be necessary. In May 2008 the first full-scale trials of penetrator impacts coordinated through the UK penetrator consortium, were performed in the UK (penetrator trials have been performed in US, Japan and Russia but have not yet led to a successful mission).

In July 2008 an international peer review was held of the MoonLITE mission, in particular, its scientific objectives. The results of this review were very supportive and gave useful pointers toward scientific priorities.

In December 2008 BNSC/STFC announced that it would undertake a phase A study of the MoonLITE Mission in collaboration with NASA.

A status report will be given which includes: a brief science overview including the outcome of the peer review panel; technological assessment (including results of the first impact trials) and identification of critical areas; organisation and plans for the phase A; longer term plans; potential role of international collaborations. MoonLITE represents a challenge in many respects, not just technology and finance. These challenges will first be identified and then their resolution discussed.

UK penetrator consortium organizations:
Astrium-UK, Birkbeck College London, Cambridge University, Imperial College London, Leicester University, Open University, QinetiQ Ltd., Surrey Univer-