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Surface roughness mapping from multi-resolution DTMs for landing site selection

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An unique digital terrain model (DTM) creation method described in [1] allows the production of co-registered multi-resolution DTMs (from 1 – 100 m) from NASA HiRISE stereo images, and images from the ESA HRSC instrument. These DTMs have been used to extract surface roughness estimates from an interpretation of MOLA beam broadening effects [2] for an area in Athabasca Vallis.

Since 2009, the UK NASA Regional Planetary Image Facility (RPIF) based in the Centre for Planetary Sciences at UCL/Birkbeck has hosted a 3D extraction and visualisation suite, known as RPIF-3D. This includes a Dell PC running the commercial SOCET® system employed by the USGS Flagstaff to generate CTX and HiRISE stereo DTMs based on pre-processing using the ISIS suite [3] and a 3D visualisation suite employing the Fledermaus and ENVI/IDL image processing and visualisation tools based on a dual-screen Mac desktop. RPIF-3D is available both to members of the UCL-CPS and external collaborators from the UK and the European mainland. RPIF-3D and a parallel system at MSSL have been used to generate 1 m HiRISE DTMs of the Mars Pathfinder landing site.

Preliminary results will be shown of surface roughness estimation at different scales from HiRISE to HRSC DTMs and corresponding MOLA beam broadening results. The implications of these results with respect to the future selection of the ExoMars 2018 landing site will be described.

References cited

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