



Lunar altimetry, gravity and geodesy; status and future opportunities

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The present knowledge of the geodesy of the moon is largely based upon observations made most recently by the Clementine and the Lunar Prospector missions. Both these missions made significant improvements in our knowledge of the lunar gravity field and Clementine enabled the first global assessment of the shape of the moon with its laser altimeter. Hi-resolution imaging and surveying during the Apollo era provided detailed topography and mapping of local areas but global control was poor, particularly on the lunar far side, and coverage was largely limited to the lower latitudes. Starting with Smart 1, and continuing with the international missions, Chandrayaan, SELENE, Chang'e and LRO, all of which carry instrumentation suitable for high quality geodetic observations, there will be a major improvement in our knowledge of the locations of features on the lunar surface. This improvement, largely driven by the announced intention of several nations to launch robotic and human landers in the coming decades, will provide lunar geodetic control and positional knowledge that will enable them to conduct the missions safely and to return to Earth.