

The lunar gravity mission MAGIA: preliminary design and performances

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Abstract The importance of an accurate model of the Moon gravity field has been assessed for future navigation missions orbiting and/or landing on the Moon, in order to use our natural satellite as an intermediate base for next solar system observations and exploration as well as for lunar resources mapping and exploitation. One of the main scientific goals of MAGIA mission, whose Phase A study has been recently funded by the Italian Space Agency (ASI), is the mapping of lunar gravitational anomalies, and in particular those on the hidden side of the Moon, with an accuracy of 1 mGal RMS at lunar surface in the global solution of the gravitational field up to degree and order 80. MAGIA gravimetric experiment is performed into two phases: the first one, along which the main satellite shall perform remote sensing of the Moon surface, foresees the use of Precise Orbit Determination (POD) data available from ground tracking of the main satellite for the determination of the long wavelength components of gravitational field. Improvement in the accuracy of POD results are expected by the use of ISA, the Italian accelerometer on board the main satellite. Additional gravitational data from recent missions, like Kaguya/Selene, could be used in order to enhance the accuracy of such results. In the second phase the medium/short wavelength components of

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