



LUCE: a small spacecraft for near lunar environment exploration

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SOLVE (Small spacecraft fOr near Lunar enViroment Exploration) is a novel mission proposal to employ a 12U CubeSat which will be deployed by a Lunar Orbiter providing transportation and data relay services. SOLVE will characterize the Lunar environment by studying the complex set of interactions between radiation, illumination, plasma, magnetic field and dust, progressively approaching the surface of the Moon. It will decrease its orbit gradually from 500 km altitude in a controlled way until it finally reaches the surface with an attempt to land softly. Besides the above-mentioned geophysical variables, the radiation environment relevant to humans will be measured along the trajectory by detecting highly penetrating ionizing particles (GCRs and SEPs). The spacecraft and instruments are partly based on ESA's SIMBA and PICASSO CubeSats and on the Asteroid Geophysical Explorer (AGEX), which was part of ESA's CubeSat Opportunity Payload Intersatellite Network Sensors (COPINS). SOLVE will provide a unique opportunity for demonstration of new and innovative technologies. It will have propulsion systems enabling high Delta-V maneuvers and state-of-art attitude determination and Control System (ADCS) of relevance to future CubeSat missions. Demonstration of small landers for the Moon would open new science opportunities and exploration possibilities that may lead to future geophysical network stations on the Moon as well as other solar system bodies.