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The European Student Moon Orbiter

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The European Student Moon Orbiter (ESMO) project is the third mission in the Student Space Exploration and Technology Initiative (SSETI) programme. The primary objectives of the ESMO mission are (1) to launch the first lunar spacecraft to be designed, built and operated by students across ESA Member States for valuable hands-on education experience; (2) transfer the spacecraft to the Moon; (3) achieve a lunar orbit; (4) take pictures of the lunar surface for education outreach purposes. A secondary mission objective to perform niche lunar science, preferably relevant to future lunar exploration is also being considered.

ESMO was approved in 2006 by the ESA Education Department for a Phase A Feasibility Study. If approved for implementation in 2007, ESMO would be launched in 2011 as an auxiliary payload into a highly elliptical, low inclination Geostationary Transfer Orbit (GTO) on a new Arianespace Support for Auxiliary Payloads (ASAP) by either Ariane 5 or Soyuz from Kourou. From GTO, the small spacecraft would use its on-board propulsion system for lunar transfer, lunar orbit insertion and orbit transfer to its final polar orbit around the Moon. The Phase A study aims to define and trade-off full system design solutions for two different options: a chemical propulsion-based spacecraft and a solar electric propulsion-based spacecraft.

A miniaturised payload would perform measurements during the lunar transfer and lunar orbit phases over a period of a few months. The core payload is a Narrow Angle Camera for optical imaging of the lunar surface, principally for education outreach purposes. An optional scientific payload being considered is a nanosat subsatellite for precision global gravity field mapping via accurate ranging of the subsatellite from the main spacecraft. Such a nanosat, called Lunette, would need to be deployed in a low altitude near-circular polar orbit at 200 km or below. The Phase A will study the impact of this science requirement on the system design and cost. The paper will

present the present status of the ESMO project, and the preliminary results of the Phase A feasibility study for the system design and payload options described.