

MORO: A EUROPEAN MOON ORBITING OBSERVATORY

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Background:

The Moon ORbiting Observatory (MORO) mission is being studied by the European Space Agency as a candidate mission for the next medium-size (M3) project of ESA, in the framework of the Agency's Horizon 2000 scientific program. The available budget for such a mission is about 350 M\$ including launch. In the planetary field, MORO is in competition with a network of surface stations on Mars and a Mercury orbiter until the final selection in 1996. MORO could be the first step of an ambitious long-term plan for lunar exploration and utilization in ESA (1).

Scientific Objectives:

The global characterization of the lunar surface, together with investigations of the interior and the environment of our natural satellite, represent the main scientific objectives of MORO. The following disciplines will be addressed by the core scientific payload: geology and morphology (imaging system); geochemistry and mineralogy (γ -ray spectrometer, Vis-IR spectrometer); topography and heat flow (altimeter with radiometer capability). In addition, a number of instruments are also being considered for gravimetry (sub-satellite tracking), magnetism (magnetometer) and solar wind and electric field (plasma package).

Mission Scenario:

The stringent budgetary limitations, within the ESA plans for this class of mission, have imposed a limited spacecraft design and mission scenario on the study team. An Ariane-5 launcher will be shared by the MORO spacecraft with other payloads. The mission scenario includes a launch into geo-transfer orbit with subsequent transfer into a proper autonomous lunar trajectory. The dry mass of the spacecraft will be limited to about 600 kg. Several trade-off studies are currently being performed to select the simplest spacecraft configuration which would satisfy the mission scientific objectives. A feasible mission concept, based on a 3-axis stabilized spacecraft in polar orbit, will be presented at the conference.

Reference:

(1) ESA's Lunar Study Steering Group, *Mission to the Moon: Europe's Priorities for the Scientific Exploration and Utilisation of the Moon*, European Space Agency, ESA SP-1150, 190 pp., 1992.