Geophysical Research Abstracts
Vol. 20, EGU2018-12250, 2018
EGU General Assembly 2018

The Deimos and Phobos Interior Explorer "DEPHINE" – A Proposal to ESA's Cosmic Vision Program

Jürgen Oberst (1,2), Kai Wickhusen (1), and Konrad Willner (1)

(1) German Aerospace Center, Berlin, Germany (Juergen.Oberst@dlr.de), (2) Technical University Berlin, Institute of Geodesy and Geoinformation Sciences, Germany

DePhine – the Deimos and Phobos Interior Explorer – is proposed as an M-class mission in the context of ESA's Cosmic Vision program, expected for launch in 2030. The mission will explore the origin and the evolution of the Martian satellite system, by focusing on the interior structures and the diversities of the two moons. The spacecraft will be inserted into Mars transfer (the baseline mission assumes a launch on a Soyuz Fregat) and will initially enter a quasi-satellite orbit of Deimos to carry out a comprehensive global mapping with various remote-sensing instruments. As a highlight of the mission, close flybys will be performed, during which radio tracking, stereo imaging, radar sounding, observations of the magnetic field and recordings of the Gamma-Ray/Neutron flux will be carried out. A steerable antenna will allow simultaneous radio tracking and remote sensing observations. The close flybys at low velocities offer longer data integration times as well as higher signal strength and data resolution. 10 – 20 flyby sequences, including polar passes, will result in a dense global grid of observation tracks. The spacecraft will then transfer into a 2:1 Phobos resonance orbit to carry out multiple close flybys and to perform similar remote sensing experiments as those for Deimos for comparative studies. Additional instrumentation, e.g. a dust detector or a solar wind sensor, will study the space environment of the Martian satellites. If Ariane 6-2 with its significantly greater lift performance is available for launch, we expect to carry and deploy a small lander on Deimos. Launched approximately 6 years after MMX (Mars Moon Exploration), DePhine will address follow-on science issues that may not be resolved by this anticipated Phobos sample return mission (J. Oberst, K. Wickhusen, and K. Willner, for the DePhine Proposal Team).