

# Prospects for a Gradiometry Mission for High-Resolution Mapping of the Martian Gravity Field

**R. Koop** (1), M. Smit (1), T. Zegers (1), J. Bouman (1), A. Selig (1), J. Flokstra (2), R. Cuperus (2), R. Wiegink (2), P. Visser (3), B. Vermeersen (3) and A. van den Berg (4)

(1) SRON Netherlands Institute For Space Research, Utrecht, The Netherlands, (2) Mesa+, Twente University, Enschede, The Netherlands, (3) DEOS, Delft University of Technology, Delft, The Netherlands, (4) Research Institute of Earth Sciences, Utrecht University, Utrecht, The Netherlands (R.Koop@SRON.nl / Fax: 00-31-30-2540860 / Phone: 00-31-30-2538578)

Nowadays knowledge of the Martian gravity field has been obtained from a combination of line-of-sight radio tracking of planetary orbiters and topography information from altimeters on board some of these orbiters. A promising technique to greatly improve the resolution and accuracy of gravity field models for Mars (and possibly other planets and moons) is planetary satellite gravity gradiometry. The first satellite gradiometer ever will fly on-board the Earth orbiting GOCE mission, to be launched in 2007. For a planetary mission to Mars, a GOCE-like gradiometer instrument is much too large and too heavy. Highly miniaturized instrumentation is a prerequisite in order to realize a planetary gradiometer mission. A novel technique for a so-called micro-gradiometer is currently being developed in the Netherlands. This micro-gradiometer is based on MEMS technology in combination with miniaturized and high-performance read-out and control electronics. This paper addresses these technological developments as well as the predicted improvements in gravity field models for Mars that are to be obtained with a micro-gradiometer mission. Such new models will greatly improve our understanding of the interior of Mars and of its evolution.