



Electrical Imaging of Planetary Subsurface Materials by means of Mutual Impedance Probes on Underground Tools

R. Trautner (1), F. Simoes (2), R. Grard (1)

(1) Research and Scientific Support Department (RSSD), ESA/ESTEC, Post Bus 299, L-2000 AG, Noordwijk, The Netherlands, (2) Centre d'étude des Environnements Terrestre et Planétaires (CETP), CNRS, 4 Avenue de Neptune, F-94107 Saint Maur Cedex, France. Email: Roland.Trautner@esa.int, Fax: +31 71 565 4697

Mutual Impedance Probes can accurately measure the electrical properties of gaseous, solid and liquid materials. Flight instruments have been developed for atmospheric investigations (Huygens, [1]) and for stationary surface measurements (Rosetta lander, [2]). A laboratory prototype of a subsurface MI probe for applications on drills and moles has been developed and tested in a laboratory environment. The hardware architecture is introduced. The experimental setup for the laboratory tests is shown, and the results of the first subsurface measurements are presented. Areas that require further improvements are pointed out, and possible future applications on planetary missions such as detection of water and identification of stratigraphic structures are discussed.

[1] M. Fulchignoni et al., The Characterization of Titan's atmospheric physical properties by the Huygens Atmospheric Structure Instrument (HASI), *Space Science Reviews* 104: 395-431, 2002.

[2] Seidensticker et al., The Rosetta Lander Experiment SESAME and the new Target Comet 67P/Churyumov-Gerasimenko, *Astrophysics and Space Science Library (ASSL)*, eds.: Luigi Colangeli et al., 2004