Geophysical Research Abstracts, Vol. 8, 04249, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04249

Rosetta Radio Science Investigations (RSI)

S.Tellmann (1), M. Pätzold (1), B. Häusler (2) and the RSI Team (1,2)

(1) Institut für Geophysik und Meteorologie, Universität zu Köln, Cologne, Germany (tellmann@geo.uni-koeln.de)

(2) Institut für Raumfahrttechnik, Universität der Bundeswehr München, Munich, Germany

In March 2004 the ROSETTA spacecraft started its journey to the comet P/Churyumov-Gerasimenko. The very ambitious mission will escort the comet for several months in 2015 as it heads towards he sun.

The ROSETTA Radio Science Experiment (RSI) uses the onboard radio subsystem that is responsible for the communication between spacecraft and Earth. The spacecraft is specially equipped with an Ultra-Stable Oscillator (USO) that stabilizes the radio links for a significant improvement of the sensitivity and accuracy of the measurement.

RSI is interested in dispersive frequency shifts due to the propagation of the radio signals through ionized media as well as non-dispersive frequency shifts caused by other pertubing forces acting on the spacecraft (gravity field, gas and dust mass flux from the comet).

These observations will allow the investigation of the comet's nucleus, its size and shape and the lower harmonics of its gravity field, and the dielectric properties of its surface. In addition the electron content of the cometary coma and the abundance of large dust grains can be determined.

During the flyby at asteroid Lutetia in 2010 the mass and bulk density of the asteroid will be determined.

First results from the comissioning phase and regularly performed measurements allow to assess the sensitivity of the experiment and the ageing of the USO quartz oscillator. These results are compared with the coherent twoway-measurements also recorded during commissioning.