

Radioscience on terrestrial planet in order to measure tides and rotation

V. Dehant, T. Van Hoolst, S. Le Maistre, A. Trinh, P. Rosenblatt, S. Rosat
Royal Observatory of Belgium

A transponder is designed to obtain two-way Doppler measurements from the radio link between a lander or an orbiter and the Earth. If measurements are performed over a long time, period changes in the position of the lander/spacecraft will be observed. These Doppler measurements will be used to obtain orientation and rotation in space of the planet (precession, nutations, and length-of-day variations) as well as polar motion. It will be possible to obtain the tidal contributions as well. The ultimate objectives are to obtain information on interior and on the global atmosphere. The rotation variations will allow estimating the moment of inertia of the whole planet that includes the mantle and the core, the moment of inertia of the core, as well as the seasonal mass changes in the atmosphere if it exists. The use of additional altimetric measurements is complementing the radioscience measurements and may provide additional information on the rotation and orientation of the planet as well as on the tides.