Geophysical Research Abstracts
Vol. 16, EGU2014-6592, 2014
EGU General Assembly 2014

Rosetta CONSERT operations and data analysis preparation: simulation software tools.

Yves Rogez, Alain Hérique, Maël Cardiet, Sonia Zine, Mathieu Westphal, Mickael Micallef, Yann Berquin, and Wlodek Kofman

IPAG CNRS/UJF, Grenoble, France (yves.rogez@obs.ujf-grenoble.fr)

The CONSERT experiment onboard Rosetta and Philae will perform the tomography of the 67P/CG comet nucleus by measuring radio waves transmission from the Rosetta S/C to the Philae Lander. The accurate analysis of travel time measurements will deliver unique knowledge of the nucleus interior dielectric properties.

The challenging complexity of CONSERT operations requirements, combining both Rosetta and Philae, allows only a few set of opportunities to acquire data. Thus, we need a fine analysis of the impact of Rosetta trajectory, Philae position and comet shape on CONSERT measurements, in order to take optimal decisions in a short time. The integration of simulation results and mission parameters provides synthetic information to evaluate performances and risks for each opportunity.
The preparation of CONSERT measurements before space operations is a key to achieve the best science return of the experiment. In addition, during Rosetta space operations, these software tools will allow a “real-time” first analysis of the latest measurements to improve the next acquisition sequences.

The software tools themselves are built around a 3D electromagnetic radio wave simulation, taking into account the signal polarization. It is based on ray-tracing algorithms specifically designed for quick orbit analysis and radar signal generation. This allows computation on big domains relatively to the wavelength. The extensive use of 3D visualization tools provides comprehensive and synthetic views of the results. The software suite is designed to be extended, after Rosetta operations, to the full 3D measurement data analysis using inversion methods.