

FFI Analysis Center

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Abstract

FFI's contribution to the IVS as an Analysis Center focuses primarily on a combined analysis at the observation level of data from VLBI, GPS (ground-based and LEO), SLR, altimetry and gradiometry using the GEOSAT software. This report briefly summarizes the current status of analyses performed with the GEOSAT software. FFI is currently an Analysis Center for IVS and ILRS and a Technology Development Center for IVS.

1. Introduction

A number of co-located stations with more than one observation technique have been established. In principle, all instruments at a given co-located station move with the same velocity, and it should be possible to determine one set of coordinates and velocities for each co-located site. In addition, a constant eccentricity vector from the reference point of the co-located station to each of the individual phase centers of the co-located antennas is estimated using constraints in accordance with a priori information given by ground surveys. One set of Earth orientation parameters (EOP) and geocenter coordinates can be estimated from all involved data types. The present dominating error source of VLBI is the water content of the atmosphere, which must be estimated. The introduction of GPS data with a common VLBI and GPS parameterization of the zenith wet delay and atmospheric gradients will strengthen the solution for the atmospheric parameters. The inclusion of SLR data, which is nearly independent of water vapor, gives new information which will help in the de-correlation of atmospheric and other solve-for parameters and lead to more accurate parameter estimates. These, and many more advantages with the combination of independent and complementary space geodetic data at the observation level, are fully provided by the GEOSAT software developed by FFI.

2. The GEOSAT Software and Analysis Activities in 2010

The analysis activities in 2010 have been concentrated on testing and validating the newly implemented modules for accelerometry and altimetry. The GEOSAT orbit model has been validated against external LEO orbit. The RMS difference between JPL GRACE orbits and internal GEOSAT orbits is typically 4 mm in each cartesian direction. The corresponding RMS difference between external GOCE orbits (ESA official, approximately 250 km altitude) and internal GEOSAT orbits is typically 11 mm.

The Norwegian Mapping Authority (NMA) and FFI have started a close cooperation in analysis of space geodetic data using the GEOSAT software. NMA has recently been given the status of an Associate Analysis Center of IVS. The GEOSAT software is to be used in the analysis of VLBI data. We are right now trying to get our GEOSAT-generated SINEX files accepted by the IVS combination software. There are options in GEOSAT so that the VLBI model is in compliance with the other analysis software packages.

3. Staff

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