FFI Technology Development Center - Software Development

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Abstract

FFI's contribution to the IVS as a Technology Development Center focuses primarily on the development and validation of the GEOSAT software for a combined analysis at the observation level of data from VLBI, GPS, and SLR. This report shortly summarizes the latest improvements of the GEOSAT software. FFI is currently Analysis Center for IVS and ILRS, Technology Development Center for IVS, and Combination Research Center for IERS.

1. The GEOSAT Software

FFI's contribution to the IVS as a Technology Development Center focuses primarily on the development and validation of the GEOSAT software for a combined analysis at the observation level of data from VLBI, GPS, and SLR. The advantages of the combination of independent and complementary space geodetic data at the observation level are discussed in Andersen ([1]). After five years of development and extensive validation we are proud to announce that a major revision and extension of the GEOSAT software has been completed. The most important changes implemented have been described in recent IVS Annual Reports. Much more flexibility and automation have been added. Furthermore, the latest and "best" models (mostly following the IERS Standard) and "calibration tables" and "instrumental/geophysical events tables" have been included. Analysis of tracking data to S/C's in deep space has been added. The software automatically detects the central body if any (the Earth or a body in the solar system) and accordingly performs the analysis either in a local geocentric frame of reference (if the Earth is the central body) or in a solar system barycenter frame of reference. It is for example in principle possible to calculate the trajectory of the S/C and the orbit and gravity field of the central body. For any technique, the delay due to the troposphere is determined with 3D raytracing using the European Center for Medium-range Weather Forcast Numerical Weather Model. No mapping functions are used and the corrections are determined directly from interpolation in the raytracing files. The tropospheric correction for SLR is rescaled using actual surface met data. For microwave data (GNSS and VLBI) this is of no importance since empirical zenith delay parameters must be estimated.

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References

[1] Andersen, P. H. Multi-level arc combination with stochastic parameters. Journal of Geodesy (2000) 74: 531-551.