

3.6.2.2 Deutsches Geodätisches Forschungsinstitut (DGFI)

The DGFI activities as IERS Combination Research Centre during the year 2004 can be divided into four major topics:

- Refinements of the SLR intra-technique combination
- Steps towards a rigorous combination of VLBI, GPS and SLR data using CONT02 data
- Simultaneous estimation of a TRF, the EOPs and a CRF
- DGFI contributions to the IERS Combination Pilot Project

SLR intra-technique combination

During the ILRS AWG meeting in San Fernando, Spain on June 5, 2004, DGFI was nominated as official ILRS Backup Combination Centre, ASI was nominated as official ILRS Primary Combination Centre. Both centres are obliged to weekly compute a combined SLR solution as official product (SINEX files with station positions and Earth Orientation Parameters) for the ILRS. The input data are SINEX files with loosely constrained solutions provided by official ILRS analysis centres (in 2004: ASI, DGFI, GFZ, JCET, NSGF). To guarantee the operational combination of the individual SLR solutions on a weekly basis, DGFI has refined the intra-technique combination methodology and software for an automated processing.

CONT02 combination

The VLBI campaign CONT02, initiated by the IVS, provides 15 days of continuous VLBI measurements of eight participating telescopes. This data set was used in a joint research project of DGFI and the FESG for detailed combination studies (Krügel et al., 2004; Thaller et al., 2004). For this purpose, free daily normal equations were generated for GPS (at FESG with Bernese GPS Software) and VLBI (at DGFI with OCCAM software) using identical models and the same parameterization to avoid any inconsistencies. This provides the opportunity to study all common parameters (not only station coordinates and EOPs, but also tropospheric zenith delays and gradients) within this rigorous combination. The results demonstrate the potential of such a rigorous combination, though some details need to be further investigated.

TRF, CRF, and EOPs

In cooperation with the Technical University of Vienna and Geoscience Australia, DGFI is intensively involved in the development and enhancement of the VLBI software OCCAM (Titov et al., 2004). 2600 VLBI sessions from 1984–2004 were re-processed and station positions, station velocities, quasar coordinates and Earth Orientation Parameters (EOP) were estimated in a common adjustment (Tesmer et al., 2004). In these first investigations, systematic effects w.r.t. such simultaneously estimated TRF and CRF were found in the TRF estimates if CRF was fixed to ICRF-Ext1, as well as in the CRF estimates if ITRF2000 was fixed. This will be studied in more detail.

IERS Combination Pilot Project

The IERS Combination Pilot Project was initiated by the IERS Analysis Coordinator and the IERS Working Group on Combination in the beginning of 2004 as a follow-on project of the IERS SINEX Combination Campaign (Angermann et al., 2003). It aims towards more consistent, routinely generated IERS products. „Weekly“ SINEX solutions, made available by the various Technique Centres, containing site coordinates, EOPs, and, possibly, Quasar coordinates, shall be rigorously and routinely combined into consistent weekly IERS products (SINEX files). Within this project, DGFI provides individual SLR and VLBI solutions and combined SLR solutions for the intra-technique combination. Furthermore DGFI has been accepted by the IERS as an Combination Centre for the inter-technique combination. The presently available SINEX files were analysed concerning various issues, such as format and suitability for a rigorous combination. A suitable strategy for the weekly inter-technique combination, including input data check and validation of results is under development.

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