

3.6.2.5 Geodetic Institute of the University of Bonn (GIUB)

The Geodetic Institute of the University of Bonn (GIUB) and the Deutsches Geodätisches Forschungsinstitut (DGFI), both members of the German Forschungsgruppe Satellitengeodäsie (FGS), jointly form an IERS Combination Research Centre. The group at GIUB concentrates on VLBI related combination topics making use of its long-standing experience in VLBI network operation, correlation and data analysis. The work is funded by the German Bundesminister für Bildung und Forschung (BMBF) under the Geotechnologien Project "IERS - 03F0336B".

The research and development project at the Geodetic Institute of the University of Bonn related to combination aims at a rigorous combination of the three elements needed to describe the kinematics of System Earth: the celestial reference frame, Earth rotation, and the terrestrial reference frame. In order to achieve this goal a number of fields have been identified which have to be investigated individually before a complete combination can be tackled.

As all IVS Analysis Centers mostly define their celestial reference frame by using ICRF coordinates, a number of new sources have to be incorporated in a consistent way into a combined CRF catalogue. As a first step towards combined radio source positions, existing catalogues have been compared. It has become obvious that the use of atmospheric gradients in the VLBI refraction modelling plays an important role in these investigations.

The combination of Earth orientation parameters from VLBI analyses and the related research and development activities are being carried out in the framework of the responsibilities of the IVS Analysis Coordinator which is hosted by the GIUB. The official IVS Earth orientation parameter products are generated by a rigorous combination of input series produced by the IVS Analysis Centre. The results of the current combinations and more information are also available at the IVS home page <<http://ivscg.gsfc.nasa.gov>> with a link to the IVS Analysis Coordinator's page.

Realizations of terrestrial reference frames from VLBI analyses are being generated in two different ways: Either as simple ASCII files of coordinates and velocities with their standard deviations or as SINEX files containing the full variance-covariance matrix of the estimated coordinates and velocities. In order to combine individual solutions the input systems should ideally be datum-free and the datum should only be introduced after the combination process. In this context the validation of datum-free (singular) normal equations from VLBI analysis centres plays an important role.

Axel Nothnagel, Dorothee Fischer, Christoph Steinforth