

3.6.2.5 Institute of Geodesy and Geoinformation of the University of Bonn (IGGB)

The IGGB has been operating an IERS Combination Research Center (CRC) since 2001 in cooperation with the Deutsches Geodätisches Forschungsinstitut (DGFI) in Munich. The CRC and its efforts are closely linked to the tasks of the Analysis Coordinator of the International VLBI Service for Geodesy and Astrometry (IVS) hosted by IGGB.

In 2006, most of the investigations concentrated on the preparations for a rigorous combination of VLBI solutions on the basis of pre-reduced (de-composed) normal equations in SINEX format. Prior to the combination which mainly consists of stacking of the normal equation matrices, all elements of time dependent parameters have to be transformed to identical epochs. The requirement for identity also applies to all a priori values of the parameters to be estimated at the end. In order to account for the different qualities of the individual contributions, i.e. individual normal equations, to the IVS normal equation combination, weighting factors were determined and tested for their suitability. One way of determining weighting factors is to use variance component estimation. Its basic idea is to compute individual variance factors for each group of observations instead of one common a posteriori variance factor. Here, a group of observations consists of the estimated parameters of one contribution. The estimated variance factors can then be used for re-weighting each contribution. It is planned to generate the official combined EOP series of the IVS exclusively on the basis of combinations of datum-free normal equations in SINEX format from January 1, 2007 onwards. The DOGS-CS software of DGFI will be used for the routine combinations.

In parallel to this, investigations have been started in cooperation with DGFI to generate consistent VLBI solutions from two different software packages. The resulting normal equations are meant for subsequent combinations not only within the VLBI technique but also with other space-geodetic techniques like GPS and SLR. Geophysical models as well as the parameter space is being made consistent in order to eliminate any known sources of systematic deviations. In this project, also software is being developed for the extraction of the full normal equation matrix from the Calc/Solve software and subsequent pre-reduction of VLBI specific elements of the normal equations, e.g. the clock parameters.

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