BKG/DGFI Combination Center Annual Report 2011

Sabine Bachmann, Michael Lösler, Robert Heinkelmann, Michael Gerstl

Abstract

This report summarizes the activities of the BKG/DGFI Combination Center in 2011 and outlines the planned activities for the year 2012. The main focus was to stabilize outlier detection and to update the Web presentation of the combined products.

1. General Information

The BKG/DGFI Combination Center was established in October 2008 as a joint effort of the Federal Agency for Cartography and Geodesy (Bundesamt für Kartographie und Geodäsie, BKG) and the German Geodetic Research Institute (Deutsches Geodätisches Forschungsinstitut, DGFI). The participating institutions, as well as the tasks and the structure of the IVS Combination Center, have been described in [5]. The tasks comprise quality control and a timely combination of the session-based intermediate results of the IVS Analysis Centers into a final combination product (e.g., Earth Orientation Parameters (EOP)). In coordination with the IVS Analysis Coordinator, the combination results will be released as official IVS products. The Combination Center is also expected to contribute to the generation of the official IVS input to any ITRF activities. These tasks are performed on an operational basis.

2. Component Description

The BKG/DGFI Combination Center performs a combination of session-based results of the IVS Analysis Centers on an operational basis. The strategy for the combination has been adopted from the combination process developed and performed by the IVS Analysis Coordinator (cf. [3], [4]).

At BKG Combination Center (BKG CC) the following tasks are performed:

- Ensuring quality control of the Analysis Center results: checking the format of the results and their suitability for combination, performing identification and reduction of outliers, comparing the Analysis Centers' results with each other, and comparing the results w.r.t. external time series, e.g. from IERS or IGS.

- Providing feedback to the Analysis Centers: quality control results will be available at the BKG IVS Combination Center Web page [8].

- Creating high quality combination products and performing timely archiving and distribution: combination products will be created using the DGFI DOGS software package [7].

- Submitting official IVS combination products to the IERS: the produced official IVS combination products will be submitted to the responsible IERS components as requested by the IERS. This will be supported by the staff of the IERS Central Bureau at BKG.

- Placing final results in IVS Data Centers: final results will be placed in the BKG Data Center. This will be assisted by the staff of the BKG Data Center in Leipzig.

- Generating official IVS input to the ITRF: official IVS input to the ITRF will be created as combined quarterly solutions in SINEX format.

DGFI is in charge of the following Combination Center functions:

- Developing state-of-the-art combination procedures: state-of-the-art combination procedures will be developed mainly at DGFI. This work, as well as the following item, is also related to DGFI's efforts within the IERS WG on the Combination on Observation Level (COL).

- Performing software development and documentation: at DGFI the DOGS software package will be continuously updated by implementing the developed state-of-the-art combination procedures.

- Adhering to IERS Conventions: the DGFI DOGS software package is continuously updated to be in accordance with the IERS Conventions.

3. Staff

In the beginning of 2011 Michael Lösler replaced Alexander Lothhammer for the hardware maintenance and for the maintenance of the IVS combination Web pages at BKG. The list of the staff members of the BKG/DGFI Combination Center in 2011 is given in Table 1.

Table 1. Staff members of the BKG/DGFI Combination Center.

Name	Affiliation	Function	E-Mail
Michael Gerstl	DGFI	Software maintenance	gerstl@dgfi.badw.de
Robert Heinkelmann	DGFI	Combination strategies	heinkelmann@dgfi.badw.de
Sabine Bachmann	BKG	Combination	sabine.bachmann@bkg.bund.de
Michael Lösler	BKG	Hardware/Web site maintenance	michael.loesler@bkg.bund.de

4. Current Status and Activities

The combination of the IVS Rapid EOP series (R1 and R4 sessions), which started in 2009 at BKG, has been continued routinely in 2011. In 2011, six IVS Analysis Centers (BKG, DGFI, GSFC, IAA, OPA, and USNO) contributed to the IVS combined product (see [4]). Potential new ACs are AUS, CGS, NMA, and TUW. The rapid solutions contain only R1 and R4 sessions, and new data points are added twice a week as soon as the SINEX files of at least four IVS Analysis Centers are available. The results of the combination process are placed in the BKG Data Center in Leipzig. The combined rapid EOP series, as well as the results of the quality control of the Analysis Center results, are also available directly at the BKG/DGFI Combination Center Web page [8] or via the IVS Analysis Coordinator Web site [6]. The inclusion of new Analysis Centers has continued, and new Web-based analysis possibilities of combined products have been made available.

5. Plans for 2012

In 2012 the work of the BKG/DGFI Combination Center will focus on the following:

- Including three new Analysis Center solutions: one based on the GEOSAT software and provided by Halfdan Pascal Kierulf from the Geodetic Institute, Norwegian Mapping Authority (NMA), Hønefoss, Norway; another one based on the OCCAM software and provided by Oleg Titov from Geoscience Australia (AUS), Canberra, Australia; and a third one based on VieVS (Vienna VLBI Software) provided by the Vienna VLBI Group from the Technical University of Vienna, Austria.

- Inclusion of source coordinates in the routine combination process as soon as enough Analysis Centers provide source parameters in their SINEX files.

- Extending the Web-based data analysis feature on the IVS Combination Center Web pages ([8]).

- Providing more products and information resulting from the combination process.

References

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[2] Kutterer, H., Krügel M., Tesmer V., Towards an improved assessment of the quality of terrestrial reference frames, in: Drewes H. (ed.) *Geodetic Reference Frames*, IAG Symposia 143, doi: 10.1007/978-3-642-00860-3_10, Springer-Verlag Berlin Heidelberg, 2009.

[3] Nothnagel, A., Böckmann, S., Artz, T., Analysis Coordinator Report, in: International VLBI Service for Geodesy and Astrometry 2007 Annual Report, NASA/TP-2008-214162, D. Behrend and K. D. Baver (eds.), 16–17, 2008.

[4] Nothnagel, A., Böckmann, S., Artz, T., Analysis Coordinator Report, in: International VLBI Service for Geodesy and Astrometry Annual Report 2009, NASA/TP-2010-215860, D. Behrend and K. D. Baver (eds.), 45–47, 2010.

[5] Schwegmann, W., Gerstl, M., Heinkelmann, R., BKG/DGFI Combination Center Annual Report 2008, in: International VLBI Service for Geodesy and Astrometry Annual Report 2008, NASA/TP-2009-214183, D. Behrend and K. D. Baver (eds.), 250–252, 2009.

[6] http://vlbi.geod.uni-bonn.de/IVS-AC/index.html
BKG/DGFI Combination Center results at Analysis Coordinator's Web page.

[7] http://ilrs.dgfi.badw.de/fileadmin/dogs/cs_manual.ps
DOGS_CS software manual (German version only).

[8] http://ida.bkg.bund.de/IVS/
BKG Combination Center Web page.