

3.7.2 Working Group on Combination at the Observation Level

The IERS Working Group “Combination at the Observation Level” (COL) was created in the course of 2009. Its charter is available at <http://www.iers.org/WGCOL>. A major task of the WG COL is to study methods and advantages of combining space geodetic techniques (DORIS, GNSS, SLR, VLBI), searching for an optimal strategy to solve for geodetic parameters and to intercompare the solutions obtained by the software packages of the different institutes involved in the Working Group.

Its main objective is to bring together groups able to perform combinations of space geodetic techniques at the observation level, this in order to improve the accuracy, the time resolution and the overall consistency of the geodetic products derived, i.e. Earth Orientation Parameters, terrestrial and celestial reference frames. The road map is summarized as follows:

- 1) review the approach of the various groups and their capability to process two or more space geodetic techniques,*
- 2) elaborating benchmarks to intercompare results between groups from the same data set,*
- 3) insuring SINEX compatibility between techniques, the international technique centers and IERS,*
- 4) establishing common processing standards for all techniques in order to guarantee homogeneity and consistency,*
- 5) optimizing and unifying parameterization.*

Meetings Two meetings were organized in 2010. The first one was held in May 2010 during the EGU meeting. Its main objective was to organize a benchmark campaign over a dedicated interval for inter-comparison. Several analyses centres took part: AIUB from Bern, DGFI from Munich, ESOC from Darmstadt, GFZ from Potsdam, GRGS from Toulouse, GSFC from Greenbelt, and JPL from Pasadena. A period of test of benchmarking was adopted corresponding to the VLBI CONT08 campaign extending from 10th to 30th August 2008.

Over this period, each analysis centre had to deliver weekly normal equations derived from the processing of the different geodetic techniques. Parameters to be estimated include daily EOP, weekly station coordinates, weekly quasar coordinates for VLBI and in addition hourly troposphere delays. The format for all normal equations spanning the three weeks is the normalised SINEX format. This format was upgraded to take into account additional types of formats of normal equations. This had to be validated at the following step.

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The IERS WG COL organized another meeting at the Bavarian Academy of Sciences of Munich on 9 and 10 December 2010. New Analysis Centres joined the Working Group: TU Vienna and ASI/e-GEOS of Matera and MAO Kiev Observatory. An important part of the meeting concerned the activity reports of the various analyses centres: SLR and GNSS processed using Bernese software by AIUB, SLR processed with DOGS software and VLBI using OCCAM software by DGFI, combined SLR GNSS and SLR DORIS with NAPEOS software by ESOC. The combination centres DGFI and GRGS reported about their analyses concerning the station coordinates and EOP solutions obtained by combination of the results derived by the different analysis centres. A discussion on the models used by each analyses centre was summarized and a consensus was adopted concerning the following models: gravity field, the ocean tides FES2004 and atmospheric loading. The terrestrial reference frame chosen as the a priori is ITRF2008 and for EOP is EOPC04_08 consistent with ITRF2008. Additional parameters such as troposphere delays in collocated stations and radio-sources coordinates relative to the ICRF2 reference frame are also considered in the process of multi-technique combinations. The next step consisted in computing normal equations delivered using homogenized standards and parameters over the three week period and new set of data by LEO satellites such as Jason-2 with multi-technique (SLR, DORIS, GPS) or GRACE-A/B (SLR, GPS).

Schedule deadlines

- At the end of January 2011 the a priori models and information were put on the COL forum <<http://grgs.obspm.fr/forum/>>.
- SINEX files had to be delivered through the ftp server <<ftp://hpiers.obspm.fr/iers/eop/grgs/>>.

Contributors for 2010

The following people contributed to the work of the WG COL in the year 2010:

Daniel Gambis, Jean-Yves Richard, Christian Bizouard, Observatoire de Paris/GRGS

Richard Biancale, Jean-Michel Lemoine, CNES/GRGS

Manuela Seitz, Robert Heinkelmann, Michael Gerstl, Horst Müller, Mathis Blossfeld, DGFI

Ralf Schmid, TUM

Sylvain Loyer, Laurent Soudarin, CLS

Daniella Thaller, AIUB

Maria Mareyen, Sabine Bachmann, BKG

Rolf König, Daniel König, GFZ

Tim Springer, Drazen Svehla, ESA/ESOC

Hana Krasna, Kamil Teke, TUW

Sciarretta Cecilia, ASI/e-GEOS
Maria Kudryashova, ORB
Florent Deleflie, IMCCE

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Daniel Gambis