

Minutes of the 3rd COL Working Group Meeting *21-22 November 2011 – Observatoire de Paris*

Agenda, 21 November (9:30-18:00)

13:00 welcome

13:30 introduction and reminder of actions decided at the last meeting, R. Biancale

13:45 Status on software and activities in the COL Analysis Centres (15 mn each)

1. *AIUB / BKG, D. Thaller*
2. *DGFI, M. Seitz*
3. *(ESOC, T. Springer)*
4. *GFZ, R. Koenig*
5. *GRGS, R. Biancale*
6. *(ASI, C. Sciaretta)*
7. *GSFC, F. Lemoine*
8. *TUW, H. Spicakowa*
9. *other*

15:30 *pause*

16:00 continuation AC

16:30 activities in the COL Combination Centres (15 mn each)

1. *DGFI, M: Seitz*
2. *GRGS, D. Gambis, J.-Y. Richard*

17:00 discussion on

1. *test period and data*
2. *a priori models and parameters*
3. *SINEX files compatibility*
4. *comparison strategy and results*

17:30 *adjourn*

Agenda, 22 November (9:00-12:30)

09:00 discussion on roadmap (tasks and sequence)

09:30 proposal on test reiteration:

1. *standards*
2. *data sets*
3. *parameter sets*
4. *SINEX evolutions*

10:30 discussion on combination

1. *strategy and methods*
2. *objectives to be reached*
3. *planning of work*

11:30 activity report
12:00 summarizing next actions and schedule
12:30 *end of meeting*

Chair

Richard Biancale

List of participants

Manuela Seitz, Dietlef Angermann (DGFI); Sylvain Loyer (CLS); Daniela Thaller (AIUB); Hana Spicakova (TUW), Frank Lemoine (GSFC), Rolf Koenig (GFZ), Nicole Capitaine, Christian Bizouard, Daniel Gambis, Jean-Yves Richard (Obs Paris/GRGS); Arnaud Pollet, David Coulot, Zuheir Altamimi (IGN/GRGS), Sylvain Loyer (CLS), Jean-Michel Lemoine, Richard Biancale (CNES/GRGS).

Minutes

1) Introduction and reminder of actions decided at the last meeting (R. Biancale)

As defined in the COL-charter, the COL-WG major tasks are studying methods and advantages of combining techniques at the observation level, searching for an optimal strategy to solve for geodetic parameters.

Demonstration is presently based on weekly combined modified SINEX files (actually containing unconstrained normal equations of station coordinates, Earth rotation parameters, nutation parameters and quasar coordinates) from all space geodetic techniques together (SLR/LLR, GNSS, VLBI, DORIS) over 3 weeks including the CONT08 period (10-30 August 2008). This approach is valid considering that combination at the observation level is equivalent to the normal equation level under the condition that all common parameters must be combined together (like tropospheric parameters).

A priori standards (in terms of model and parameterization) were defined at the previous meeting and are available in the COL-forum (<http://grgs.obspm.fr/forum/>).

One particular interest in the end will be to process homogeneously multi-technique satellites for the COL objectives.

2) Status on software and activities in the COL Analysis Centres

- ✓ AIUB (D. Thaller)
Report on GPS-Glonass-SLR processing with Bernese
- ✓ DGFI (M. Seitz)
Report on SLR-VLBI processing with homogenized DOGS/OCCAM software packages
- ✓ GFZ (R. König)
Report on GPS (constellation/CHAMP/GRACE) processing with EPOS-OC
- ✓ GRGS (R. Biancale)
Report on SLR-VLBI-DORIS-GPS processing with GINS

✓ GFSC (F. Lemoine)
General report on SLR-DORIS-GPS processing with GEODYN

✓ TUW (H. Spicakova)
Report on VLBI processing with VieVS

3) activities at the COL Combination Centres

✓ DGFI (M. Seitz)
Various technique combinations have been first achieved: SLR from AIUB+DGFI+GRGS, VLBI from DGFI+OPA+TUW, GNSS from AIUB+GRGS. DORIS is at present only provided by GRGS. Some inhomogeneities were detected. Multi-technique combination results were compared to DTRF2008 and EOP 08 C04.

✓ GRGS (J.-Y. Richard)
OP maintains the forum for data archiving and exchange, information display, discussion between ACs or CCs... Experience in combination is gathered through various treatments with AIUB, DGFI and GRGS data, including some comparisons of tropospheric delays from GRGS solutions.

4) discussion

✓ test period
The COL-WG decided to extend the tests to the CONT11 period as well. Hence next tests will be performed over both 3-week periods: 10-30 August 2008 and 11 September-1 October 2011.

✓ data set
Rather than providing the exact same data set per technique to all groups (what does happen to be difficult, mainly for GNSS), it is recommended that groups use the same station set per technique. These lists of stations provided by the ACs will be made available through the COL-forum.

✓ a priori models
Jean-Michel Lemoine will provide an updated gravity field model to be used for the CONT11 campaign period.

As for the model delivered for the CONT08 period, it will include some averaged departures from atmospheric gravitational effect (from ECMWF) as well as from oceanic circulation effect (from MOG2D) over the 3 weeks of the campaign.

The Ray-Ponte atmospheric tide model should be used. It will be compared to the Bode-Biancale model used by GRGS and GFZ.

Rolf Koenig will provide the ocean tide loading model (from Scherneck)

David Coulot will implement the ITRF08 for the 2011 period.

The GPT/GMF tropospheric delay models should be used for the electromagnetic techniques and the Mendes-Pavlis model for light.

All these models will be made available through the COL-forum.

✓ parameterization

Daily EOP and nutation parameters can be either piece-wise linear (at 0hr) or offset + drift (at 12hr). The NRO nutation corrections in X and Y should be implemented and used in all software packages.

A priori values for wet tropospheric zenithal delays should be present every 2-hours and northward/eastward gradients per day, at least for a few co-located stations whose list is put on the forum (Hartebeesthoek, Concepcion, Greenbelt, Mount Stromlo, Tahiti, Kokee Park, NyAlesund...)

Antenna phase centres for DORIS and GPS should be present as well.

✓ SINEX file compatibility

Most of discrepancies are now solved. However it can still be improved by satellite names, processing description (e.g. models)...

✓ Interpolation

As proposed in 2010 meeting the Gerstl's paper on interpolation methods will be provided by DGFI and put on the forum.

✓ Weighting

OP will provide variance factors obtained by the Helmert's variance component estimation method for all normal equations.

✓ Comparison strategy

It is proposed that ACs will check the SINEX files per technique from now on. Hana Spikacova will do it for VLBI, Manuela Seitz for SLR, Frank Lemoine for DORIS, Daniela Thaller for GNSS.

CCs will then focus on inter-technique combinations.

Moreover Christian Bizouard will provide Earth's rotation excitation time series for the time of the CONT08 campaign (1 value/day) for validation purposes.

5) Time schedule

December: finalizing models to be used and upgrading software packages in AC

31 March: delivery of normals format)

31 May: results of combinations

6) Miscellaneous

The discussion of the COL participation to the next ITRF2013 proposal is delayed. In the actual state each group is free to submit a combined product.

7) Next meeting

Close to IDS Spring meeting, probably end of May in Prague (or Munich). Frank will provide the date soon and Hana Spikacova will see about logistic (for Prague).