

**Time & location:**

Tuesday, October 13, 2015: 08:30 – 18:00 (full day)

University of Bern, Main Building, room 501 “Kuppelsaal”, Hochschulstrasse 4, CH-3012 Bern

**AGENDA**

*Last update: October 09, 2015*

1. Opening (Kenyeres)
2. Approval of minutes of 68<sup>th</sup> TWG meeting in Leipzig (all)
3. Review of Action Items from previous TWG meetings (all)
4. EUREF
  - a. Terms of Reference (Ihde)
  - b. List of liaison persons – update (Söhne)
5. Campaigns
  - a. The 2015 CEGRN campaign and processing (Caporali)
6. Height & Gravity
  - a. Vertical Datum Transformation – ESRI letter (Bruyninx, Ihde)
7. EUREF 2016 symposium (Zurutuza)
8. EPN
  - a. New EPN stations (Bruyninx)
  - b. Update of the EPN stations guidelines (Bruyninx)
  - c. Real-Time Project Report (Söhne)
  - d. Reference Frame Coordinator Report (Kenyeres)
9. Working Groups
  - a. WG on EPN Densification (Kenyeres)
  - b. WG on Deformation Models (Lidberg)
  - c. Multi-GNSS WG
    - i. Multi-GNSS Activities swisstopo / EPN (Brockmann)
    - ii. Update on time scales biases and compatibility between SP3 and broadcast ephemeris (Caporali)
    - iii. RINEX v3 long file names in EPN RDCs (Stangl)
  - d. Reprocessing WG (Voelksen)
    - i. Analysis Centre Coordinator Report (Szafranek)
    - ii. Repro2 EPN troposphere combination (Pacione)
10. EPOS – EUREF relation (Bruyninx, Fernandes, Kenyeres, Dousa)
11. Status of ITRF2014 (Altamimi)
12. Short Notes
  - a. Update on UN-GGIM WG on the GGRF (Altamimi)
  - b. UN GGIM: Europe (Poutanen, Ihde)

## c. EUPOS status (Kenyeres)

## 13. Action Items (all)

## 14. AOB

## a. Next TWG meeting (all)

**PARTICIPANTS****TWG members:**

Z. Altamimi (ZA)  
 E. Brockmann (EB)  
 C. Bruyninx (CB)  
 A. Caporali (AC)  
 R. Dach (RD)  
 J. Dousa (JD)  
 R. Fernandes (RF)       excused  
 H. Habrich (HH)       excused  
 J. Ihde (JI)  
 A. Kenyeres (AK)  
 M. Lidberg (ML)  
 R. Pacione (RP)  
 M. Poutanen (MP)  
 W. Söhne (WS)  
 G. Stangl (GS)  
 K. Szafranek (KS)  
 J. Torres (JT)       excused

**Guests:**

A. Araszkievicz (AA)  
 C. Voelksen (CV)  
 J. Zurutuza (JZ)

## 1. Opening

On behalf of the local organizers, RD welcomes the TWG members. The chairman of the TWG, AK, also welcomes the members and expresses the collective thank to CB, who chaired at least 24 consecutive meetings. AK also informs the group that CB is the new chair of IAG sub-commission 1.3 on "Regional References Frames" for the period 2015 to 2019.

2. Approval of minutes of 68<sup>th</sup> TWG meeting in Leipzig

The minutes are approved.

## 3. Review of Action Items from previous TWG meetings

WS reviews the four Action Items of the last meeting. No comments.

## 4. EUREF

## a. Terms of Reference

A draft was sent out in September to the sub-group formed last TWG meeting and to all TWG members shortly before this meeting. AK proposes more influence of the plenary on the resolutions. CB proposes one vote per attending country. AK couldn't remember any biased decision in the past. Concern is formulated, that countries with many people attending the symposium could move the voting in one direction but most members do not see this problem. JI proposes small group especially to discuss about voting. ML and MP mention the poor

role of height and gravity in the reference frame. GS raises the question about the members at large; the TWG proposes to keep such position.

b. List of liaison persons

WS sent out the list of EUREF representatives from October 2013 prior to the meeting. MP proposed to update the list at least once a year. Some updates are already made.

5. Campaigns

a. The 2015 CEGRN campaign and processing

JZ gives the presentation. Latest campaign in June 2015 with about 180 stations. Two analysis centres, UPA and MAO, with 120 and 130 stations processed. Meanwhile 12 campaigns between 1996 and 2015. AK asks about the necessity of a (renewed) approval of the 2015 campaign. AC replies that this is not planned. He formulates the hope that EPN could get some data from the eastern countries on a more regular basis. Presentation at the TWG just in context of the existing MoU. AK is waiting for the results from CEGRN2015 for the EPN densification action.

6. Height & Gravity

a. Vertical Datum Transformation – letter from Esri

A letter was sent by the company to various people in charge with different positions, amongst them CB as (former) TWG chair, content was a request for height transformation parameters. List of recipients looks quite inhomogeneous. Discussion about what they really want to get. Offsets and slopes? Grids? Could it come from existing publicly available pages? JI mentions that much work has to be done with this request (who can do it?). Could BKG provide the data for all European countries? EB mentions that Esri could probably ask for more products in the future, e.g. European geoid.

7. EUREF 2016 symposium

JZ presents the status of the local organisation. Web page is already prepared, will be [http://euref2016.geolabpasaia.org/index\\_en.php](http://euref2016.geolabpasaia.org/index_en.php). Some text has to be reformulated (was just copied from other pages). If a tutorial is taking place, it will be at the university. Specific login section foreseen for each registered participant.

JI raises the question of the general representation of promotion and outreach of EUREF.

8. EPN

a. New EPN stations

CB presents the status of new EPN stations. Since June this year, 11 new proposed stations but most of the stations are much longer existing, e.g. from 2012. Again discussion about antenna calibration for one of the stations – NYA2, i.e. IGS uses type mean, EPN individual calibration. CB explains the examples COMO and POTS who had delay in delivering individual calibrations and were processed with the type mean. EB proposes to not immediately include any (new) IGS station into the EPN. No agreement on this. Agreement on waiting for the next ANTEX file (which should come soon as reported by ZA) before including individual calibration of NYA2 in EPN.

ITRF2014 release includes several non-EPN stations in Europe, e.g. three in the Netherlands, approx. 10 in Great Britain, few in other countries like Iceland. CB has started contacting the station managers. Detailed discussion about proposed EPN stations PASA and PLAN. PASA has obstruction problem due to mountains. Because of well performing position time series, TWG accepts to add PASA to EPN. KS is raising the problem of finding enough ACs to process new stations. Catalan stations from ICGC: PLAN with some issues due to data quality, but situation improved. AVAL and

CASE are currently removed from list of proposed stations due to density of network in Spain. Agreed proposal: possible inclusion in the EPN needs confirmation by at least three ACs in advance. Finally, the list of potential new stations for the EPN consists of about 23 stations at the moment.

- b. Update of the EPN stations guidelines  
CB presents the update of the EPN station guidelines distributed in advance amongst the members. Proposal to remove, for the time being, the section about RINEX3 station naming convention in the preamble part because it is confusing the reader and it is not yet used as is within the IGS nor EPN.  
Discussion about sections 2.4.1 and 2.4.2 which need some reformulation.
  - c. Real-Time Project Report  
Three different tools are available for monitoring the content and consistency of three EPN broadcasters. CB announced a new tool which deals with antenna height, names etc.
  - d. Reference Frame Coordinator Report  
AK reports on the EPN cumulative solution and the ETRS89 maintenance. He plans to loosen the current scheme of differentiation between Class A and Class B stations keeping stations with high, but long-term stable seasonal signal in class A. Criteria allow the exclusion of temporal bad signals. RD mentions specific stations, e.g. in Russia with (well-known) high seasonal signals which fall under the old criterion. Communication (explanation) to the station providers concerning (temporal) degradation to Class B is needed. CB asks that the relevant web page at the EPNCB contains the reasons for separation in sections with Class A and Class B, according to the new scheme.
9. Working Groups
- a. WG on EPN Densification

There are new contributions from Greece and Ukraine (MAO, as already mentioned in Agenda Item 5a). The densification action is still waiting (and hoping) for contribution from the Nordic countries. Planned tasks of the WG comprise metadata collection, reprocessing, reference frame definition w.r.t. ITRF2014, publication on web as well as via paper, cooperation with, e.g. EUPOS and EPOS. CB reports that as of today there are 414 log sheets already available from the densification stations (from approx. 2000 stations).

- b. WG on Deformation Models  
ML reports on the WG progress. He raises the question on terminology – static - dynamic - kinematic - semi-kinematic – for reference system and reference frame. Alternative terminologies are discussed. Parametric model may have advantage for, e.g. Japan, semi-dynamic for, e.g. New Zealand. Reference frames are identified as kinematic rather than as dynamic.
- c. Multi-GNSS WG
  - i. Multi-GNSS Activities swisstopo / EPN  
EB reports about progress in multi-GNSS activities at swisstopo and w.r.t. the EPN. Full RINEX3 chain established in parallel to RINEX2. Examples for some stations (DAVO, DLF1) providing RINEX3 data from the receiver showing probably firmware or software (teqc) bugs. He explains the example that, if different satellites record different observation types in RINEX3, a conversion program like BNC might return only half the observations when transforming in RINEX2. He also reports that using different observation types in the processing this results in different coordinates.
  - ii. Update on time scales biases and compatibility between SP3 and broadcast ephemeris

AC gives an update of his investigations concerning time scales of different GNSS constellations. Calibration constants are computed for each receiver and GNSS with GPS and the (arbitrarily chosen) Septentrio receiver as reference. The GLONASS to GPS, Galileo to GPS and BeiDou to GPS Time Offsets are found generally repeatable for receivers of the same brand, with exceptions which are listed in a first calibration table.

iii. RINEX v3 long file names in EPN RDCs

GS reports about the long file names for RINEX3 files. Only few DCs on the global scale are able to accept, check and store files with long filenames. Both EPN RDCs made good progress. Discussion about the IERS DOMES numbers are identified as still necessary. Most recent update of GFZ transformation software should be able to rename short to long filenames without changing file content. Discussion about usefulness having or introducing separate directories for RINEX3 files. Starting upload of RINEX3 files (short and long filenames) to OLG (in addition to BKG) identified as first action.

d. Reprocessing WG

CV briefly gives an overview about the status of the second EPN reprocessing.

i. Analysis Centre Coordinator Report

KS reports on the EPN ACC activities, especially for the repro2. Discrepancies between ADDNEQ and CATREF as reported last TWG meeting almost disappeared (was a weighting problem). Some stations show sections where a jump appears, mutually different antenna calibrations used. Proposal to remove those section from, e.g. cumulative solution.

ii. Repro2 EPN troposphere combination

RP reports about the troposphere combination. Eight individual solutions from five ACs are available. Standard deviation of ASI routine combination higher than for BKG, mutually due to handling the complete time series as delivered by the ACs and with weighting scheme. Discussion about which solution (of those ACs, which have more than one) should be finally used. Probably the same set as for the coordinate combination.

10. EUREF – EPOS relation

CB gives the report on behalf of RF. In CW41 was the kickoff meeting of the next phase (EPOS IP) in Rome. EUREF members presented to the GNSS representatives in WG10 a proposal for a new functioning scheme of TCS GNSS. EPOS high level supports the visibility of EUREF within EPOS GNSS WP. A MoU between EPOS and EUREF seems the best way to prepare cooperation.

11. Status of ITRF2014

ZA explains the published preliminary solution, especially the post seismic deformation (psd). Only six stations in Europe (five EPN) are affected: ANKR, BUCU, ISTA, PETP/PETS, REYK/REYZ, TUBI. Introduction of ITRF2014 (or IGS14 if available) into the EPN processing should be decided at the next TWG meeting, might help solving some interpretation problems.

12. Short Notes

a. Update on UN-GGIM WG on the GGRF

ZA reports about his participation at the meeting in New York in August (ggim.un.org), especially about a side event where a roadmap was discussed. Five paragraphs within the WG on GGRF with five topics each (which are the same for all). Discussion about what the WG might expect from EUREF, e.g. some advice on the roadmap. Draft roadmap should be ready by end of this year and final roadmap should be presented next August at the UN.

b. UN GGIM: Europe

There are five regional groups beyond UN GGIM level established. Two of them have already a regional GRF working group. A third WG C should be established within UN GGIM: Europe. MP could be a potential chair. ZA recommends that contributions by – also European – countries should contribute to the GGRF and the roadmap first. Not exactly clear at this early stage what such a European WG could do.

### 13. Action Items

**AI1\_TWIG69\_on\_AI4a to ZA, JI, AK, MP, WS:** form a sub-group working on the ToR, especially on membership, on plenary constitution and on voting procedure.

**AI2\_TWIG69\_on\_AI4a to all:** send questions concerning the ToR to WS and JI, until end of November.

**AI3\_TWIG69\_on\_AI4b to WS:** circulate again the list of representatives and ask members to update and correct, until end of November.

**AI4\_TWIG69\_on\_AI6 to JI:** write a short letter to Esri as the coordinated EUREF answer (asap).

**AI5\_TWIG69\_on\_AI7 to ZA:** setting up a draft program for a tutorial about ETRS89 for the 2016 symposium (with help by other TWG members he may contact).

**AI6\_TWIG69\_on\_AI7 to JI:** make a

proposal for continuation of the promotion and outreach topic within EUREF.

**AI7\_TWIG69\_on\_AI8a to WS:** contact Wettzell station manager about a second station to be probably announced for the EPN and inform CB about the result.

**AI8\_TWIG69\_AI8b to CB, AK, ML, and GS:** reformulate the sections 2.4.1 and 2.4.2 of the EPN station guidelines.

**AI9\_TWIG69\_AI8d for AK:** check HERS/HERT velocities in EPN cumulative solution C1845.

**AI10\_TWIG69\_AI9c to CB and GS:** send out mail to station providers to encourage them to upload RINEX3 files with short or, if possible, long filenames also to OLG RDC.

**AI11\_TWIG69\_AI9c to WS:** inform the TWG about if or when BKG will start renaming of RINEX3 files (asap).

**AI12\_TWIG69\_AI10 to CB, AC, AK, MP, and WS:** work on a MoU between EUREF and EPOS in preparation of the negotiations with EPOS.

### 14. AOB

a. Next TWG meeting  
Not yet decided.

b. EUREF symposium 2018  
MP received a proposal / invitation for the 2018 EUREF symposium from the Netherlands (Amsterdam). He will positively answer to them.