Time & location:
November 4, 2014: 08:30 -18:00
Dipartimento di Geoscienze, Università di Padova, via Gradenigo 6, 35137 Padova, second floor meeting room

AGENDA
Last update: Oct.31, 2014

1. Opening (Bruyninx)
2. Approval of minutes of 65th TWG meeting in Vilnius (all)
3. Review of Action Items from previous TWG meetings (all)
4. EPN
   a) Network and Central Bureau (Bruyninx)
   b) EPN ACC news (Araszkiewicz)
   c) EUREF Troposphere (Pacione)
   d) Guidelines for EPN broadcasters (Söhne, Bruyninx)
   e) EPN Densification (Kenyeres, Bruyninx, Caporali)
   f) EPN Repro2 (Brockmann)
5. CEGRN Network Densification (Zurutuza, Caporali)
6. EUREF
   a) EUREF product catalogue (Söhne)
   b) EUREF ToR (Ihde, Torres)
   c) EUREF elections 2015 (Altamimi, Ihde)
   d) EUREF contribution(s) to IUGG 2015 (all)
7. Working Groups
   a) Multi-GNSS WG (Brockmann et al.)
8. Short Notes
   a) Status of EPOS (Fernandes et al.)
   b) WG on Deformation models (Lidberg et al.)
   c) EuroGeographics PosKEN (Ihde, Bruyninx)
   d) Towards the World Height System (Ihde)
   e) UN-GGIM GGRF (Altamimi)
   f) Status of ITRF2013 (Altamimi)
   g) EUREF contribution to ICG (Altamimi et al.)
   h) COST Action ES1206 (Pacione, Dousa)
   i) EUVN_DA (Kenyeres)
9. Next meetings
   a) Spring 2015 TWG meeting (all)
   b) EUREF 2015 symposium and tutorial (Ihde, Söhne)
10. Action Items (all)

Participants

TWG members:

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

Guests:

A. Araszkiewicz (AA)

J. Zurutuza (JZ)

Minutes of the Meeting

1. Opening (Bruyninx)

   In her property as chairwoman of the EUREF Technical Working Group (TWG), C. BRUYNINX opens the 66th meeting of the EUREF TWG, welcomes the participants and expresses her thanks to the Department of Geosciences of the University of Padova for the invitation and organization of this meeting. On behalf of the University, Prof. Cristina Stefani, Director of the Department of Geosciences, welcomes the TWG and submits her best wishes for a successful meeting. A draft of the agenda has been distributed among the TWG. The participants accept the agenda after some minor corrections.

2. Approval of minutes of 65th TWG meeting in Vilnius (all)

   The minutes are approved.

3. Review of Action Items from previous TWG meetings (all)

a. For previous meetings

AI1_62 on ML and JT: The Chairman of the Group should be invited similarly to what was done with Paul Dunkley for Eurocontrol. ML to invite the Chairman of the Baltic Mean Sea Level Commission to the EUREF Symposium in Vilnius. Done, Chairman will be invited; postponed to fall meeting

➔ postponed to EUREF symposium 2015 in Leipzig

AI1_63 on KS: keep in touch with the Polish NMA to finalize the Polish ETRF2000 Densification Campaign. In progress.

➔ Report by AA

AI4_63 on AK: is asked to prepare a document providing a proposal for description and status of the Densification Analysis Centers to be discussed at the next TWG.

➔ On agenda

AI8_63 on RP and JD: stimulate WG3 of COST Action to work on issue of SINEX_TRO format standardization.

➔ In progress + on agenda

AI13_63 on JI, JT and AC: better outline the role of the EUREF CB, and the duration of the terms (ToR). Postponed to fall meeting.

➔ On agenda

AI1_64 on GS: GS is asked to keep in contact with Michail Gianniou about the historical RINEX data for the EPN densification at Greece (Item AI4_63). In progress.

➔ Done

AI3_64 on AK: to make available, especially for scientific users, time series of the EPN coordinates outcome of his cumulative solution (Item 5).

➔ On agenda

AI12_64 on WS, RP, JD and CB: to set up guidelines for EPN broadcasters and revive the EUREF–IP mailing list (Item 12).

➔ On agenda

AI13_64 on CB and AK: update the EPN CB web site to give more visibility to EPN densification activities.

➔ In progress

AI14_64 on AK, ML, AC, ZA: to update the roadmap of the WG on Deformation modelling in time for the next TWG (Item 15).

➔ On agenda

b. For last meeting

AI1_65_Item5 on WS: ML, MP, Gunter Liebsch will help WS in setting up the program of the Tutorial

➔ On agenda

AI2_65_Item6 on JT: to report on this nominating Committee

➔ On agenda

AI3_65_Item7 on CB, AK and JD: to prepare sentences on how the contribution to EUREF can be a contribution to EPOS, and how can this be recognized. The document will have to be reviewed by WG4.

➔ Done

AI4_65_Item8 to ML: to set up a web site self managed on the WG activities, to be linked to the WG slot in the EUREF web site.

➔ On agenda

AI5_65_Item9 on AK: to check with providers of SINEX data that all the information on discontinuities, antenna changes etc. of the densification sites are available and included into the analysis.

➔ On agenda

AI6_65_Item10 on GS, AC: Distribute the relevant documentation and solicit M. Mulic to approve publication of the coordinates of Bosnian sites.

➔ Done

AI7_65_Item11 on JI and Artur Oruba: to identify common topics for a joint Symposium.

➔ On agenda

AI8_65_Item13 on KS: to contact ICGC for further discussion on their role as LAC.

➔ On agenda (AI moved to CB and AK)

AI9_65_Item14 on RP, WS: to figure out how to implement the inter-technique combined solution, including VLBI and radiosonde data.

➔ On agenda

AI10_65_Item15 on JD AC and ZA plus RD: to prepare contributions to the ICG meeting in Prague 10-14 November.

➔ On agenda

AI11_65_Item16 on WS: to prepare the Broadcaster Guidelines for the next TWG.

➔ On agenda

AI12_65_Item17 on Martina Sacher: check out the decision on the distribution of the results of EVRF2007 computation, and do what was decided.

➔ Postponed text TWG meeting

AI13_65_Item17 on AK: investigate the availability of EUVN DA data.

➔ Added to agenda

4. EPN

a) Network and Central Bureau (Bruyninx)

New sites in Sweden, Ireland and Ukraine. New EPN sites are all Glonass ready. All the Swedish sites have individually calibrated antennas. Several old stations have been updated from GPS to Glonass and also to Galileo. 79% of the EPN stations are now Glonass capable. One Swedish station SUN6 is still on the waiting list, because it has an individual calibration with duplicate antenna serial number (last five char) as the EPN station VALE, and this would cause a conflict in the .atx file. A change in the BSW has been preliminary made at ROB to cope

with this problem, which could become frequent. However, this software change has not yet officially adopted by the Bernese Group and therefore cannot be distributed yet to users. RD recommends an alternate procedure.

RP points out that a problem could exist with the PPP script, which does not support individual calibrations.

EUREF Strategic Plan: Associated EPN stations is a status granted to densification sites. These sites are committed to maintain a configuration status/logfile. Basically these are stations participating to the EPN Densification lead by AK. No LAC's anymore, but AC's involved in different activities (EPN maintenance, Densification, Troposphere, Real Time, Rapid, Ultra Rapid…). Main goal is to give visibility to all the contributing Analysis Centers and to the Densification Project. Metadata logsheets and DOMES numbers should be collected to convert the used sites to Associated EPN stations complying with all the specifications.

Within EPNCB some changes in the operational software is envisioned. Update of the Guidelines to reflect the new AC's is planned. Probably maintaining metadata will be the largest change. For the AC's the Rinex data of the densification sites should be available under a condition of traceability. A specific ftp address should be given in the site log, enabling the original Rinex data to be retrieved.

'Organization' part of the EPNCB web site is being reviewed by JD. A flow chart highlighting the connections between the CB, the TWG, the Coordinators, the Working Groups etc. has been extensively discussed within the TWG by email. The flow chart applies to EPN, not to the entire EUREF activities, which includes for example leveling, gravity, all outside the EPN. Hence JI recommends that, based on the ToR of EUREF, a more general flow chart is envisioned, applicable to the entire EUREF.

JI points out that contributors should be partners of EUREF. This applies in particular to EUPOS sites which are very hardly working. It is very important to motivate people to contribute. Visibility can be an important source of motivation.

The TWG agrees on the term 'EPN Densification Station' instead of 'Associated EPN station' and agrees that the EPN CB may conduct the necessary steps to introduce the densification stations and the generalized AC.

EPN CB activities wrt to Rinex3: EPN checks metadata Rinex3 vs. Rinex2, notifying Station Managers on discrepancies.

Trimble Dorne Margolin antennas: according to Unavco some have a degradation of L2 at low elevation, due to a poor performance of the Low Noise Amplifier. Trimble and the IGS WG on antennas are apparently not aware of the problem. Station managers will be contacted by CB.

b) EPN ACC news (Araszkiewicz)

SUT is still working with BSW50 and w/o Glonass. First results with Repro2 products are available. CANT, BELL and VILL are stations with inconsistent time series and therefore temporarily excluded from the combination.

One problem is that the LACs are computing various numbers of sites, and hence to ensure that each site is processed by a redundant number of LACs. A reorganization is proposed, involving DEO and grouping the LACs according to the software used (BSW, GIPSY, GAMIT). It must be considered that only BSW is GPS and Glonass capable; the

other two are only GPS capable. One proposal is that 14 LACs use BSW with each site processed by at least 2 LACs, MUT processes all the EPN with Gamit and DEO, ASI use Gipsy so that each site is processed by at least one AC.

c) EUREF Troposphere (Pacione)

Routine combination of the Tropo solutions is done for weeks 1800 to 1811. 10 mm is the threshold used to flag solutions and sites. Cross checks to the MUT coordinate combination is made to detect problematic sites. Problem site is BELL which shows a bias of opposite sign in the ASI and IGN solutions. BADH has also, but occasionally, different ZTD's according to different AC's; likewise for ENTZ, EGLT. Plots of ZTD are updated regularly on the EPN web site; likewise for radiosonde data. Rinex 3 Tropo file format is under discussion. There should be an indication in the filename of the AC-ID. RD reports that within IGS there is an ongoing discussion on the filenaming format, and no decision on a compromise is yet made.

d) Guidelines for EPN broadcasters (Söhne, Bruyninx)

Draft EPN Web page on monitoring Real Time streams is reviewed. Naming of mountpoints normally follow the convention of 4 char id plus a '0', but there are exceptions where the 0 is replaced by 1. CAS record structure is reviewed as broadcaster record. The NET record specifies the network. STR record is a stream specification record. It helps understanding if a stream is pulled by another caster or broadcast directly from the station. Guidelines to be updated: Guidelines for Data Centers and for EPN Stations and Operational Centers. For MGEX sites, broadcasting of raw data should be avoided. EUREF IP mailing list should be revitalized and checked. All the stream providers should be listed.

RD points out that when converting real-time streams to RINEX, BNC uses the metadata from the site log. If the station applies the PCV model to the data, then this information is lost and not available to the analysis. A procedure to inform analysts needs to be developed.

e) EPN Densification (Kenyeres, Bruyninx, Caporali)

Tests on agreement of the UPA and EPN solution are reviewed. AK reports on the data availability and examines the differences in the reference frames in time and for the various groups. Future steps involve i) filling white spots (Balkan, Fennoscandia); ii) EPN densification on a global scale. A Website is in preparation; a WG needs to be formed. First publication of the results by EGU2015: processing based on Repro2 products, EPOS Connection. All contributing Centers supply weekly Sinex files with the exception of LPT which provides a cumulative Sinex for the AGNES Swiss network.

AC reports on tests done on preliminary products generated by AK. Some inconsistencies in an early version (July 28, 2014) of the tested file have been reported and corrected in the Oct. 16, 2014 file (ITRF2008 frame instead of IGb08; incorrect reference epoch; C1778.SNX instead of C1778.SSC). The use of one frame in the SSC coordinate file header provided by AK is also somewhat misleading: the densification Sinex files used in the combination were computed in the IGb08 frame only after wk 1632, whereas earlier files were computed with several antenna models, orbits, frames, apriori constraints …, i.e. were not reprocessed according to the latest standards, but nevertheless included in the cumulative 'dense' solution. As a consequence, the coordinates

resulting from the multiyear stacking cannot be considered as defined in one frame IGb08 as the metadata would imply, but a mixture of several frames. The work done at UPA consisted in densifying the EPN_A_IGb08_1725.SSC cumulative solution with weekly Sinex files of a dense Italian network in the window 1632-1778, strictly following the published EPN guidelines. The resulting velocities and positions of densification sites in common with the 'dense' solution independently computed by AK have been compared. AC reports that the discrepancies for sites with > 2 yrs tracking data have zero mean and an rms of 0.53 and 0.95 mm/yr (hor/ver) for velocity and 4 and 8 mm (hor/ver) for position. These tests point to some critical elements in the Densification Project: use of temporary DOMES numbers for sites with no DOMES numbers is likely to lead to a conflict with official DOMES numbers once they are released by IGN; renaming of duplicate 4 chars station names should also be made in collaboration with IGN (Bruno Garayt). Editing of spurious data and introduction of new solution numbers is sometimes a subjective decision and may not reflect just equipment changes but also other events (e.g. earthquakes, local site instabilities..). AC suggests that this 'cleaning' and 'internationalization' activity is delegated to the contributing ACs on the basis of specific Guidelines, so that the workload on the Reference Frame Coordinator is minimized.

f) EPN Repro2 (Brockmann)

EB reports on behalf of Ch. Voelksen. Work is well underway by the ASI, GOP and IGE Analysis Centers and should be completed by the end of 2014. LPT submitted already, as well as MUT. MUT is testing several options concerning atmospheric load, individual PCV and Atmospheric Mapping Function. Combination of the final products is expected to start in early 2015. It is agreed that AK will be ready to combine daily Repro2 solutions with CATREF.

5. CEGRN Network Densification (Zurutuza, Caporali)

JZ presents the procedures used to compute 10 Weekly Campaigns in Central Europe spanning the interval 1996 to 2013 and involving several Central European Nations. All the processing work complies with Repro2 standards (orbits, EOP's, antenna models, ...) based on CODE products. Relative to usual Campaign validation leading to Class B coordinates, the CEGRN activity features a stacking of the 10 weekly campaigns, so that velocities need also to be validated. While it is clear that all the work has been done following strictly the Guidelines for EPN Densification, it is pointed out that a few items remain to be clarified before the coordinates and velocities are validated : i) Time series of sites with solution numbers should be presented before and after the introduction of breaks, so that the effect of the introduction of the solution numbers can be appreciated; ii) Synthetic tables with mean and rms repeatabilities should be presented ; iii) The lists of sites for which coordinates and velocities are to be validated should be kept separate from the list of 'epoch' sites, for which coordinates at a specific epoch are presented. For these latter sites, the repeatability within the respective weekly campaign should be given, as usual for Class B.

6. EUREF

a) EUREF product catalogue (Söhne)

The Catalogue has been implemented by Manuela Vasconcelos on the EUREF Web page. The pdf at the EuroGeogaphics web site will also be updated.

b) EUREF ToR (Ihde, Torres)

ToR are being reviewed. JI has considered the ToR of IGS, although

it is very different organization relative to EUREF, particularly in relation to the different positions within IAG. However, the IGS ToR are better organized, as they outline the infrastructure and the relation to the people. So they could serve as an example. JI propose some restructuring. A flow chart of the EUREF Organization is presented. Connection to PosKen, EUPOS, vertical reference are still missing and will be added.

c) EUREF elections 2015 (Altamimi, Ihde)

ZA, JT, ML, RP and GS have been forming the Nominating Committee. As a results, two nominations are presented: MP for EUREF chair, and AK for TWG chair. If there are more candidates, it is unclear who will be the active voters (e.g., the Plenary).

d) EUREF contribution(s) to IUGG 2015 (all)

JI will present a paper on EUREF.

7. Working Groups

a) Multi-GNSS WG (Brockmann et al.)

RINEX QC monitoring at Swisstopo is made with Anubis, in TEQC style. Several plots are created. Format issues are resolved, e.g. for Trimble/Beidou. BNC is also used for Quality checks. Because the number of plots is very large, to setup some alarms is considered.

AC presents an update of the multiGNSS analysis he is doing on a daily basis for several MGEX sites in Europe, with a variety of receivers. Of particular relevance are the GNSS to GPS Time Offsets and Receiver dependent time biases, for the various GNSSs. It is shown that since mid August the Glonass to GPS Time Offset has gone to ca -400 ns to ca -200 ns. This seems to be an intentional clock steering by the Russian Authorities, according to a source quoted by O. Montenbruck of DLR. Rinex 3.02 is stable.

CB further reports on format RINEX 3 format monitoring activities at ROB. Conversion to Rinex 3.02 is a major software problem and not all products available from the Vendors and used at the various GNSS stations work correctly.

The transition phase must include IERS; the problem of duplicate 4 char id is only partially solved by the different DOMES number. In fact within a Sinex file the duplicate use of a 4 char id is dangerous and should be avoided.

Concerning the use of long names for the Rinex files, IGS sites within the EPN will have the long names, whereas for the other EPN sites the transition will require more time.

8. Short Notes

a) Status of EPOS (Fernandes et al.)

The preparatory phase is over and a H2020 proposal for the implementation phase is presently under preparation. EPOS IP is considered to be a 3 years project where GNSS is one work package of approx. 15-20. EPOS ERIC will last longer. During the EPOS IP, an interface with the EPN data and products will be developed so that they can contribute to EPOS. The contribution of EUREF to EPOS is fundamental.

b) WG on Deformation models (Lidberg et al.)

Roadmap and web page are reviewed. The good news is that densified velocities will be soon available to scientists. Geophysical deformation models should be properly georeferenced, and could help in better defining the reference frame. A database of deformation models could be started. Optimal gridding techniques for velocities should also be investigated.

c) EuroGeographics PosKEN (Ihde, Bruyninx)

KEN is a Knowledge Exchange

Network and Pos stands for positioning. CB and JI gave both a presentation at the first meeting, hold in Warsaw in October. The basic idea behind PosKEN is a European Positioning System. However, the focus is not on the network, but rather on metadata and communications. CLGE, EUPOS, EUREF and EuroGeographics are the partners of PosKEN. A cooperation agreement with RTCM SC104 is envisioned.

d) Towards the World Height System (Ihde)

Within IAG there has been discussion on the most relevant results of the past 4 years, and it turns out that no significant progress on the vertical system has been announced, although significant work has been made. A significant result would be a global height system. There is a proposal for a new W_0 and a new GRSXX level ellipsoid. It is proposed to use the mean tidal system for the height. The proposal will be presented at the IUGG 2015.

e) UN-GGIM GGRF (Altamimi)

Committee of experts met in New York and adopted resolution on the Global Geodetic System. Now the text needs to be adopted by ECOSOC after which it needs to be endorsed by the General Assembly (Aug 2015). There are good reasons to believe that the resolution will be eventually endorsed.

f) Status of ITRF2013 (Altamimi)

Submissions from some techniques (e.g. Doris, IVS) are still missing. In turn some ACs are providing unclear solution to the combined IGS solution. So there will be a strict deadline on end February 2015.

g) EUREF contribution to ICG (Altamimi et al.)

h) COST Action ES1206 (Pacione, Dousa)

A summer school and working meeting in Bulgaria took place. Minutes have been distributed and are available on the COST Web site. Next workshop will take place in Thessaloniki (Greece) in May 2015. Benchmarking with central Europe data will be used to check the software and analysis procedures. There is a high interest in the EPN Repro2 data to be used as reference. Tropo Sinex standardization is being considered, with respect to different techniques. All this is made in coordination with the IGS Tropospheric WG.

9. Next meetings

a) Spring 2015 TWG meeting (all)

There is an offer from MUT at Warsaw, however ROB would also like to host the meeting. Negotiations will be made between CB and KS/AA.

b) EUREF 2015 symposium and tutorial (Ihde, Söhne)

The tender for the Conference Venue is published and a selection is expected. Sponsorships are needed but will need approval by the German Ministry of Interior. Web page preparation is underway. WS and HH are responsible for the scientific part and G. Liebsch for the tutorial. Renaming of sessions is envisioned and suggestions are accepted by TWG with minor changes. Session 5 should be on the Harmonization for Positioning Systems in Europe. The tutorial will focus on the height reference system but proposed content should be more restricted.

10. Action Items (all)

AI1_66_item4a_1 on RD: give instructions to the LAC on how to cope with the duplicate 5-char antenna serial number in the frame of individual calibrations and inform on required adaption of BSW metadata files (e.g. STA file).

AI2_66_item4a_2 on JI: to prepare a

flow chart for the entire EUREF.

AI3_66_item4d_1 on WS: to check and update the EUREF IP mailing list.

AI4_66_item4d_2 on CB, RP and WS: Finish the Guidelines for EUREF Broadcasters and report at the next TWG.

AI5_66_item4d_3 on WS: contact the BNC development group on ways to handle the null antenna correction in the streams, so that the AC's are aware of the corrections.

AI6_66_item4e_1 on AK: form a WG on the EPN Densification with AC, GS, ML, CB. Work on Guidelines for Densification solutions.

AI7_66_item6a_1 on WS: send pdf of new EUREF product catalogue to EuroGeographics.

AI8_66_item6b_1 on JI: to provide a first proposal or draft version of the ToR to be distributed to the TWG.

AI9_66_item6c_1 on JT: to solicit by a EUREF mail proposals for candidates for future EUREF chair to the Nominating Committee.

AI10_66_item7a_1 on EB: based on the discussions of today give an answer to Nacho Romero within two weeks on the use of long names for Rinex files of non IGS EPN sites.

AI11_66_item8_1 on JI: Contact A. Oruba to propose C. Bruyninx as EUREF representative for PosKEN management committee.

AI12_66_item9b_1 on WS and HH: they are named scientific coordinators of the EUREF 2015 Symposium and are responsible for the scientific program be available at least two weeks before the Symposium.

AI13_66_item9b_2 on JI: Prepare EUREF 2015 symposium web site by January 2015.

AI14_66_item9b_3 on AK and JI: before the EUREF 2015 Symposium the EUVN DA data should be reviewed.