



## **57<sup>th</sup> Meeting of the EUREF Technical Working Group in Frankfurt am M., 27-28.10.2011**

**Place:** “großer Sitzungssaal”, BKG building B

**Date:** October 27, 2011      13:00 – 18:00

October 28, 2011      09:00 – 12:00

### **Next Events:**

- EUREF TWG 2012 Spring Meeting: , 27.-28.-02-2012, Bruxelles
- EUREF Symposium 2012 06-08/06/2012 in Saint Mandè

### **AGENDA**

1. Opening (Bruyninx)
2. Minutes of the 56<sup>th</sup> TWG meeting in Chisinau (all)
3. Review of Action Items of 56<sup>th</sup> TWG meeting in Chisinau (all)
4. Procedure for generation of minutes & action items of TWG (Caporali)
5. IUGG G01 symposium, Melbourne
  - a. Structure of IAG Commission I and SC1.3 for the next 4 years (Torres)
  - b. WG “Unified Dense Velocity Field” (Bruyninx)
6. Reports from EPN Coordination Group:
  - a. Reprocessing status (Völksen, Habrich, Kenyeres)
  - b. Application of antenna calibration models in EPN (Bruyninx)
  - c. EPN real-time analysis – Chisinau resolution 5 (Söhne, Weber)
7. Future/new GNSS signals
  - a. RINEX 3 in IGS/EPN (Brockmann)
  - b. IGS Multi-GNSS Global Experiment (Bruyninx)
  - c. GPS L5 –Chisinau resolution 2 (Bruyninx)
8. ETRF Coordinate monitoring – Chisinau resolution 3 (Brockmann)
9. Maintenance of ETRS89 (Lidberg)



10. EUREF campaigns - status of deliverables and web pages (Stangl)
11. Meeting on Chart Datum for the Baltic Sea (Lidberg)
12. ECGN Report (Poutanen)
13. EVRS status (Ihde)
14. INSPIRE
  - a. Questions of the further development of Inspire data with respect to CRS (Ihde)
  - b. Version 2 of the Annexes II and III of the Implementing Rules (Torres)
15. EPOS update (Fernandes)
16. EUREF TWG membership/elections (Caporali)
17. Updates of EUREF web site (Caporali)
18. Status of the proceedings of the EUREF symposium in Chisinau (Caporali)
19. EUREF symposium 2012:
  - a. Organization (Altamimi)
  - b. Symposium Sessions (all)
20. Divers :
  - a. EUPOS ISC meeting and symposium Oct.11- 13 (Kenyerer, Ihde)
  - b. ICG-6 meeting Sept 5-9 (Ihde, Altamimi)
21. Next TWG Meeting (All)  
Brussels, Febr. 27-28 2012
22. Action Items (all)

### **Participants**

#### **TWG member:**

Z. Altamimi

E. Brockmann

C. Bruyninx

A. Caporali

J. Dousa           unable to attend

R. Fernandes

H. Habrich

J. Ihde

A. Kenyerer

J. Makinen       unable to attend

M. Lidberg

M. Poutanen

W. Söhne



G. Stangl

J. Torres          unable to attend

**Guests:**

C. Völksen

G. Weber



## Minutes

### 1. **Opening (Bruyninx)**

In her property as chairwoman of the EUREF Technical Working Group (TWG), C. BRUYNINX opens the 57th meeting of the EUREF TWG and welcomes the participants and expresses her thanks to J. IHDE for the invitation and organization of this meeting. On behalf of the Bundesamt fuer Kartographie und Geodäsie of Germany, the President H. J. KUTTERER welcomes the TWG and submits his 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. **Minutes of the 56<sup>th</sup> TWG meeting in Chisinau (all)**

The minutes of the 56th TWG Meeting in Chisinau, 24.05.2011, were distributed among the TWG members. The final text is published in the EUREF homepage. The winners of the best poster award is D. AMPATZIDIS, Department of Geodesy and Surveying, Aristotle University of Thessaloniki, Greece.

### 3. **Review of Action Items of 56<sup>th</sup> TWG meeting in Chisinau (all)**

### 4. **Procedure for generation of minutes & action items of TWG (Caporali)**

To speed up the procedure of generation and dissemination of the minutes, A. CAPORALI proposes that the proposal of an Agenda Item is accompanied by a short description of the item, as the proponent would like it to appear in the minutes. Such description will be completed by the Secretary with the results of the discussion and the decisions taken. The test phase of this approach will start with this meeting, to verify that a significant improvement can be achieved.

### 5. **IUGG G01 symposium**

#### a. **Structure of IAG Commission I and SC1.3 for the next 4 years (Torres)**

J. IHDE reports on behalf of J. TORRES that the new President of Commission I 'Reference Frames' is T. VAN DAM, while J. TORRES and J. IHDE are President of SC 1.3 'Regional Reference Frames' and SC 1.3a 'Europe' respectively. C. BRUYNINX is chair of the Working Group SC1.3 WG1 'Unified Dense Velocity Field'.

#### b. **WG "Integration of the dense Velocity Field in the ITRF" (Bruyninx)**

CB reviews the activities of the IAG WG 'Regional Dense Velocity Fields' which has now been closed. The goal of this WG was to generate a unique velocity field based on GNSS observations that could also be used as a densification of the ITRF. The main contributors to the WG were the regional reference frame sub-commissions and submitters of global solutions. All of them provided cumulative position/velocity solutions based on a reprocessing and using ITRF2008 discontinuities. In addition, they all provided residual position time series allowing to explain the major disagreements between the submitted solutions. The work of this WG will be continued in a new WG 'Integration of the dense Velocity Field in the ITRF' and EUREF will again be asked to contribute. For that purpose A KENYERES as regional coordinator is computing a weekly combination of the EPN solution with third party solutions. A KENYERES asks the TWG members to foster the submission of long term dense national weekly SINEX solutions supporting the WG. The contributions should be uploaded to the following ftp server:

gnssnet.hu

user : iagvel

pw: densevelo



The contributions may be placed in the "upload" directory creating country-specific directories.

## 6. Reports from EPN Coordination Group

### a. Reprocessing status (Völksen, Habrich, Kenyeres)

The EPN REPRO1 campaign describes the first reprocessing activity conducted by the Local Analysis Centres of the EPN. It consists of the weekly solutions combined by the EPN Combination Centre (based on the reprocessed weekly solutions provided by the participating LACs of the EPN Reprocessing project). Data have been analyzed with BERNESE, GAMIT and GIPSY software packages. The compatibility and quality of the different solutions have been compared in a benchmark campaign, covering the same subset of the EPN stations and using the data from GPSweek 1381. The benchmark campaign has been analysed with Bernese (H.HABRICH) and CATREF (A.KENYERES). The GAMIT and GIPSY solutions were shown certain differences with respect to the Bernese solutions, but finally all LAC solutions were integrated into the weekly combination. The weekly reprocessed combined solutions cover the period 834 until 1407. This part of the analysis was finished in late October. The EPN-REPRO1 multiyear cumulative solution will consist of the weekly combined solutions up to GPSweek 1631, where the data between 1408 and 1631 is taken from the operational combined solutions. The EPN-REPRO1 cumulative solution as the ITRF2008 densification solution (based on the IGS05 PCV models) will be prepared by A.KENYERES by the end of November 2011. The EPN reprocessing working group aims at a second reprocessing campaign (EPN-REPRO2) as soon as reprocessed orbit and clock products based on the IGS08 will become available. First reprocessed products will be made available by CODE by the end of 2011 or early 2012. Another condition for

the EPN-REPRO2 activity is the availability of the new BERNESE 5.2.

### b. Application of antenna calibration models in EPN (Bruyninx)

C. BRUYNINX shows the position differences computed at ROB for the EPN stations (using all EPN data from 1996 till 2010) when using the new EPN\_08.atx antenna calibration model instead of the old model EPN\_05.atx. The computed values agree well with the latitude-dependent correction model developed by P. REBISHUNG based on IGS data (and recommended for use by the IGS in case the exact position jump caused by the change of antenna model is not available). The TWG discusses the best way to create (and regularly update) a cumulative EPN solution tied to the IGS08 frame taking into account the weekly solutions from EPN-REPRO1 (computed using the EPN\_05.atx antenna model) and the recent routine weekly EPN solutions (computed using the EPN\_08.atx antenna model). It is decided that A. KENYERES will re-start producing the EPN cumulative solutions according to the following strategy: each EPN-REPRO1 weekly combined SINEX solutions will be corrected with the position jump resulting from the switch between EPN\_05.atx and EPN\_08.atx. A. KENYERES and C. BRUYNINX will perform several tests (using the position jumps provided by C. BRUYNINX and using the P. REBISHUNG model) and will propose to the TWG the best way to go forward. Based on these results, the "Guidelines for EUREF Densifications" will also be updated.

### c. EPN real-time analysis – Chisinau resolution 5 (Söhne, Weber).

W. SÖHNE reports about the status and the progress of the real-time activities related to IGS and EUREF. Special emphasis is given to the potential real-time products for the EUREF community. He recalls the resolution 5 of the last symposium which invites the EUREF community to test the new ETRS89-related corrections. One orbit and clock correction data stream, transformed from



ITRF2008 to ETRS89 and currently named 'CLK41', is available at the euref-ip broadcaster. The number of different users of this stream varies between two and seven each day with a sum of close to 20 for the whole month. G. WEBER qualifies these low numbers as unacceptable and encourages more promotion for the real-time products. W. SÖHNE presents a plan for additional web pages for EUREF real-time products. C. BRUYNINX agrees to update the EPN web page but likes to see a clear explanation about the derivation of the product and, moreover, about its quality.

## 7. Future/new GNSS signals

### a. RINEX 3 in IGS/EPN (Brockmann)

E. BROCKMANN reviews the archiving at BKG and CDDIS of RINEX3 and RINEX2.11 files. Few stations (8 BKG, 1 CDDIS) submit RINEX 3 files: of these some use BNC, others use the receivers's own generation of RINEX 3. RTCM to RINEX V3 requires the use of the new RTCM precision format, which is still under discussion. TEQC may not support RINEX V3. E. BROCKMANN presented possible difficulties to generate RINEX3 from his experiences made with station ZIM2. A EUREF TWG Galileo WG was proposed in Gaele (suggested members: E. BROCKMANN, C. BRUYNINX, A. CAPORALI, R. DACH, J. DOUSA, H. HABRICH, W. SÖHNE and C. VÖLKSEN). Once this WG is formalized, it will prepare a paper for the next EUREF Symposium. Furthermore, a EUREF-mail should be sent, encouraging the station managers to send RINEX3 data (possibly including already Galileo data). Availability of Galileo SV requires use of RINEX 3.01, even if at the moment we cannot process the data. But beginning 2012 the new Bernese will support Galileo basic functionality. At least the RINEX headers can be checked. A special project, similar to the IGS M-GEX, will not be started.

### b. IGS Multi-GNSS Global Experiment (Bruyninx)

This item is partly skipped as it was already discussed in 7.a. C. BRUYNINX just shows the header of the RINEX3.01 file obtained by the Septentrio POLARX4 receiver. In its present form this header is not conform with the RINEX3.01 requirements and the necessary feedback will be sent by C. BRUYNINX to Septentrio.

### c. GPS L5 –Chisinau resolution 2 (Bruyninx)

C. BRUYNINX shows the evolution of the EPN stations that are including the L5 signal in their RINEX observation file since the EUREF symposium in Chisinau. Only few EPN stations recently included the L5 signal in their RIENX files submitted routinely to the EPN data centers. Although a lot of EPN stations have equipment capable of tracking L5, this observable is often not included in the RINEX observations files. C. BRUYNINX will create a new web page at the EPN C. BRUYNINX to draw the attention of station managers to the interest of EUREF to have access to L5 observations.

## 8. ETRF Coordinate monitoring – Chisinau resolution 3 (Brockmann)

Resolution 3 states: 'The IAG Reference Frame Sub-commission for Europe (EUREF) noting the success of the latest questionnaire on the national adoption of ETRS89 and the use EUREF products and recognising the success of the ETRS89 coordinate monitoring activity and considering the importance of full coverage of this type of information across the EUREF region encourages the member countries of EUREF, who have not already done so, to submit their national ETRS89 coordinates of their EPN stations if possible.' E BROCKMANN reports that five additional countries delivered their national coordinates after the Chisinau symposium. The coordinates for proposed EPN stations are also collected. Their availability is visible on the EPN web-site for "proposed sites". C. BRUYNINX will modify the guidelines for EPN stations,



accordingly. Totally, 29 countries delivered national ETRF coordinates for 159 sites (+ 9 prop. EPN sites). With the exception of Spain and Greece, all data are available on the EPN web.

#### 9. **Maintenance of ETRS89 (Lidberg)**

Given the amount of interplate and intraplate deformation affecting the official ETRF2000 coordinates, M.LIDBERG proposes to develop a roadmap towards a velocity model. This includes Fennoscandia PGR (Post Glacial Rebound), episodic events such as earthquakes, and possibly plate boundary zones. If this initiative proves to be successful, intraplate deformations should be possible to model and correct for while using the reference frame, and thus extend the useful lifetime of a realization of ETRS89. Therefore this work is important for applied geodesy. It is discussed that scientific applications can use an ITRF, but ETRS89 is also useful for presenting results of scientific studies in relation to “stable part” of the Eurasia tectonic plate. M.LIDBERG prepares a document with new ideas on the goals behind the new WG. It is planned to formally establish a new follow up “WG on maintenance of ETRS89” during the next TWG and to nominate the WG members.

#### 10. **EUREF campaigns - status of deliverables and web pages (Stangl)**

G.STANGL reviews the status of the EUREF Campaigns since 2009. For the UK 2009 campaign only the Minimum Constrain SINEX file is recommended for archiving. There is a SW problem interfacing Google Maps with a FTP server. C. BRUYNINX offers that EPNCB hosts the application and Graz works as a client. G. STANGL contacts Faroe Islands and Serbia for missing deliverables.

#### 11. **Meeting on Chart Datum for the Baltic Sea (Lidberg)**

The Baltic Sea Hydrographic Commission (BSHC) is participated by all Baltic Countries. There is a WG on chart datums. The problem

concerns the vertical datum for bathymetry. M.LIDBERG points out that the most obvious choice is EVRS. If GNSS measurements are needed, a geoid and PGR model is needed. It is hoped that the whole model remains stable for 10/20 yrs. J.IHDE expresses the hope that M.LIDBERG or someone else from the TWG participates as regular member to the activities of the BSHC WG on Chart Datum.

#### 12. **ECGN Report (Poutanen)**

M.POUTANEN reports that the Nordic Geodetic Commission project ‘NKG Combined Geodetic Network’ is a pilot project for ECGN. The proposed activity relates to the understanding of the sea level variation in the Baltic Sea. All the four WG of the NKG are involved. At the next TWG M.POUTANEN is expected to report on the developments of this interesting Project.

#### 13. **EVRS status (Ihde)**

J. IHDE reports that additional leveling data are available for Belarus and the European part of Russia. Cross border measurements are needed to insert the data into EVRS DB. M.POUTANEN should inquire with Russian colleagues about the cross border measurements. Several countries are announcing new data for EVRS, so a new adjustment could be realized in 2013.

#### 14. **INSPIRE**

##### a. **Questions of the further development of Inspire data with respect to CRS (Ihde)**

INSPIRE does not require collection of new data. However, after the period specified in the Directive, Member States have to make their data available according to the Implementing Rules. Coordinate Reference Systems (CRS) play a specific role that is quite different from the other themes in the Directive’s annexes. Contrary to the other themes the CRS specification does not concern a downloadable or viewable thematic data set. Furthermore, there is no 3D CRS defined. In a first step transformation parameters and data relating to CRS should be provided. E. BROCKMANN and J.IHDE will





contact the responsible group for the Technical Guidance for INSPIRE Coordinate Transformation Services (Drafting Team "Network Services") to go for acceptance of metadata to describe CRS and to provide transformation parameter as INSPIRE related data.

**b. Version 2 of the Annexes II and III of the Implementing Rules (Torres)**

J.IHDE reports on behalf of J.TORRES that the specifications for Annex 2 and 3 are consistent with the approved IR (Implementing Rule) for CRS (Coordinate Reference Systems).

**15. EPOS update (Fernandes)**

EPOS includes a geodetic component for its solid earth studies. WG4 co-chaired by R.FERNANDES deals with GNSS data and other geodetic data. The survey among potential geodetic partners received 35 answers. A WG4 meeting is scheduled on 21.22 November in Brussels. EPOS is considered an important opportunity to strengthen EU Geodesy and to integrate the different national and trans-national networks in Europe and neighboring regions.

**16. EUREF TWG membership/elections (Caporali)**

A.CAPORALI explains the present status of the TWG membership. According to the ToR "The TWG is constituted by members elected by the plenary, ex-officio members, honorary members and members in charge of specific tasks. The positions for elected members are filled for terms of 4 years which are renewable once. For TWG members in charge of special tasks an additional term can be granted by the TWG." For the 2012 elections the application of the ToR is to be further discussed as some points are presently unclear. Maybe a revision of the ToR will be necessary. In addition, the status of several members already in charge of special tasks needs to be clarified. Several TWG members express the need to regularly

replace TWG members in order to attract new ideas within the TWG.

**17. Updates of EUREF web site (Caporali).**

Thanks to the work of M.VASCONCELOS the EUREF Web site has been kept up to date. In particular:

- a. The minutes of the TWG in Chisinau are available online
- b. The resolutions of Gaele and Chisinau are available online. Work is in progress for the ppt's /pdf's of contributions of Chisinau
- c. MoU with CEGRN is available online.

**18. Status of the proceedings of the EUREF symposium in Chisinau (Caporali)**

A. CAPORALI reviews the papers presented in Chisinau and delivered within the deadline in the prescribed format. Taking into account the point of view of J.MAKINEN (mail dated Oct.16) on the need of timely final contributions, J.IHDE proposes that for the next Symposium the printed papers will concern the Minutes of the TWG meetings, the Resolutions and the papers describing the institutional activities of EUREF and the TWG. The remaining contributions will be published in the Web page by A. CAPORALI and M. VASCONCELOS, without peer review, as soon as they are received in the prescribed format.

**19. EUREF symposium 2012**

- a. **Organization (Altamimi)**  
Dates are fixed 06-08/06/2012 as well the location in Saint Mandè. Registration on line will start February 1., 2012
- b. **Symposium Sessions (all)**  
Symposium sessions should be defined by Dec. 1. , 2011 by the next TWG. It is proposed indicatively:
  - E.BROCKMANN: GPS, GLONASS and Galileo
  - W.SOEHNE: Real-time GNSS





- M.LIDBERG, A. KENYERES: Long term maintenance of ETRS89 using permanent GNSS stations
- J.IHDE: Geoinformation applications of ETRS89
- G.STANGL: National Reports
- M.POUTANEN: Height and gravity

## 20. Divers

### a. EUPOS ISC meeting and symposium Oct.11- 13 (Kenyeres)

G.WÜBBENA presented at the symposium an operational solution for on-site GNSS antenna calibration. This approach may have a significant impact on site coordinate estimation, but is not expected to be widely used in the near future. EUPOS and E-

GVAP will start a cooperation and prepare a MoU about data exchange.

### b. ICG-6 meeting Sept 5-9 ( Altamimi)

Basic issue is interoperability of GNSS's. WG4 is concerned with reference systems. WG4 recommended that GNSS providers are encouraged to submit data of their control stations to IGS in a regular basis, so to facilitate the alignment of their respective reference frames to the ITRF.

## 21. Next TWG Meeting (All)

Brussels, Febr. 27-28 2012