

## **XXXVIII Meeting of the EUREF Technical Working Group in Vienna, 31. May 2005**

### **Next events:**

- TWG Fall Meeting: Monday, November 7 - Tuesday, November 8 (noon – noon), Berne

### **Agenda**

1. Opening (Altamimi)
  - Welcome by A. Hochwartner, Head of the Federal Office of Metrology and Surveying
2. Minutes of the 36th TWG Meeting in Brussels (Hornik)
3. General Information (Torres)
  - a) Terms of Reference
  - b) Mid-term report to IAG
  - c) Tsunamis research in Europe
4. INSPIRE and EUREF (Torres)
5. EUREF Guidelines (Torres)
6. Update of the ETRS89 questionnaire (Ihde)
7. ITRF2004 status (Altamimi)
8. EPN CB report (Bruyninx)
9. EPN Analysis Progress (Habrigh):
  - a) Usage of Bernese 5.0 for EPN
  - b) Test of daily sub-network combination
  - c) Benefit of GLONASS observations for EPN
  - d) EPN contribution to ITRF2004 densification
10. Report on Time Series Special Project (Kenyerer)
11. AFREF Workshop Jan 2006 in Cape Town (Altamimi)
12. Special Project Troposphere Status Report (Weber)
13. EUREF-IP Pilot Project (Weber)
14. Report on 2nd IGS GNSS WG/Galileo Project meeting (Gurtner & v. d. Marel)
15. Absolute Gravity observations and the ECGN (Gurtner)
16. Status and next steps of UELN, ECGN, EVRS (Ihde)
17. Report on EUVN-DA (Kenyerer)
18. The Status of the Baltic Levelling Ring (Mäkinen)
19. Programme of EUREF Symposium (Torres, Hornik)
20. Organization of EUREF Symposium (Höggerl, Pesec)
21. Varia
  - a) Next TWG meeting

## Participants

ZUHEIR ALTAMIMI, Paris (Chairman)  
 LOLA BAHL, Copenhagen (guest)  
 ELMAR BROCKMANN, Berne  
 CARINE BRUYNINX, Brussels  
 ALESSANDRO CAPORALI, Padova  
 WERNER GURTNER, Berne  
 HEINZ HABRICH, Frankfurt (perm. guest)  
 AUGUST HOCHWARTNER, Vienna (guest)  
 NORBERT HÖGGERL, Vienna (guest)  
 HELMUT HORNIK, Munich (Subcomm. Secretary)  
 JOHANNES IHDE, Frankfurt

AMBRUS KENYERES, Budapest  
 JAAKKO MÄKINEN, Helsinki  
 HANS VAN DER MAREL, Delft  
 HERMANN SEEGER, Bad Neuenahr-Ahrweiler (perm. guest)  
 JAROSLAV SIMEK, Prague  
 MATTHEW SHIMELL, Feltham (guest)  
 GÜNTER STANGL, Graz (perm. guest)  
 JOAO AGRIA TORRES, Lisbon (Subcomm. President)  
 GEORG WEBER, Frankfurt

apologized: CLAUDE BOUCHER, Paris

## Minutes

Remark: The presented papers and view graphs can be received, as far as available, on request from the EUREF secretary. Furthermore, some texts are published on the EUREF homepage ([http://www.euref-iag.net/TWG/EUREF%20TWG%20minutes/Agenda\\_2005\\_Vienna/TWG\\_Vienna2005.html](http://www.euref-iag.net/TWG/EUREF%20TWG%20minutes/Agenda_2005_Vienna/TWG_Vienna2005.html)).

### 1. Opening

The chairman of the EUREF Technical Working Group, Z. ALTAMIMI opens the XXXVII<sup>th</sup> Meeting of the EUREF TWG. Z. ALTAMIMI welcomes the participants and guests. He heartily thanks the hosts for the invitation to Vienna, especially the President of the Federal Office of Metrology and Surveying (Bundesamt für Eich- und Vermessungswesen – BEV), A. HOCHWARTNER. On behalf of the hosts, A. HOCHWARTNER welcomes the EUREF TWG. He emphasizes the traditionally good and manifold relations between Austria and the other European countries as well in general as in geodesy. Located in the heart of the European continent, Austria often had the function of a bridge between east and west which is still today a characteristic. In the 19th century the former Austrian-Hungarian Monarchy was rather active in the Europäische Gradmessung and all other common work. He remembers the 1991 General Assembly of the IUGG in Vienna, on this occasion the EUREF Sub-Commission has also met in the BEV for one of its first meetings. In order to meet the challenges of the modern society, in the last decades enormous progress on the field of georeferencing has been done. EUREF plays an important role in this context and is accepted as a standard of methods and quality. Moreover, the procedures and numerical results are to be made comprehensible for the public in order to be accepted as a necessary and useful tool.

A. HOCHWARTNER also informs on the recent activities to establish a cost refunding for data and an adequate protection of the copyright of data. The Austrian government will adopt a relevant law in the next future. A. HOCHWARTNER emphasizes that all these ideas are developed in close

cooperation with the EC in order to find a common European agreement in this field. This development will lead to a more secure way of providing data with guaranteed quality.

The agenda was distributed among the TWG members by mail and is adopted by the plenary.

### 2. Minutes of the 36th TWG Meeting in Brussels

The minutes of the 36th TWG meeting in Brussels, 14.-15. March 2005, were distributed by H. HORNIK among the TWG members. The text is adopted after some corrections and will be put into the web.

### 3. General Information

#### a) Terms of Reference

J. TORRES remembers the development and discussions on the Terms of Reference ([http://www.euref-iag.net/html/Overview\\_of\\_EUREF\\_Terms\\_of\\_reference.html](http://www.euref-iag.net/html/Overview_of_EUREF_Terms_of_reference.html)) and which were already adopted by the TWG. Some small changes are proposed. These changes are to be considered as permanent “editing”, so there is no need for a plenary approval. The text will be presented to the plenary for final adaption by the Sub-commission.

The letter to the national committees should be sent out once more as up to now only rather few answers concerning the nomination of national delegates have been received.

#### b) Mid-term report to IAG

A mid term report for the IAG General Assembly from 22-26 August 2005 in Cairns, Australia, describing the activities of the EUREF Sub-commission had been compiled and sent to the President of IAG-Commission 1, H. DREWES. The text is available in the EUREF homepage <http://www.euref-agnate/documentation/Other documents/EUREF%20report%202003-2005.pdf>.

Z. ALTAMIMI expresses his thanks to J. TORRES as main author for the compilation of this report. Normally these

reports are presented to the IAG General Assemblies, however, in fact many groups do not deliver adequate texts.

### c) Tsunamis research in Europe

An highly interesting document *Tsunami Research Needs in Europe* by S. TINTI has been distributed on demand by C. Bruyninx. J. TORRES has contacted the Portuguese expert V. MENDES offering the cooperation for tsunami research. G. Weber points out that due to the enormous tsunami event in Sumatra now numerous groups are busy in this field, however, serious and careful work needs real long time observation records delivering at least near-real time data. It can be stated that especially the EPN products represent long period data files, but adequate real time and high rate observations on a large basis and sufficient infrastructure are not yet available. On the other hand, EUREF could contribute with valuable input concerning high precise reference frames. H. HABRICH adds that real time records are naturally necessary for the monitoring of nature disasters, but for the establishment of reliable reference frames post processing for studying effects of data trends etc. will be also needed in future. J. IHDE mentions the advantageous use of sites equipped with multiple instrumentation which allows the study of systematic trends of observation data or differences in the data analysis.

Reflecting all these facts Z. ALTAMIMI asks whether EUREF should step forward in this direction. If not, a great chance of the cooperation in this important topic could be missed, if yes, enormous efforts will be necessary to work out good results. In any case, the engagement on this field of research should be directed on various aspect of disaster prediction.

A study group C. BRUYNINX, W. GURTNER, H. HABRICH, H. V. D. MAREL, G. STANGL, G. WEBER (chair)) is formed to work out a proposal whether EUREF can contribute efficiently to this topic and to check the possibilities for the necessary long term investigations for which funds will be needed as well as contacts with other groups for adequate cooperation.

## 4. INSPIRE and EUREF

J. TORRES reports that EUREF is registrated as SDIC (spatial data interest community) and H. HABRICH and A. CAPORALI are proposed as experts for meta data and data specification.

J. TORRES will fill out a questionnaire by ISO / TC211 on standardization of data provider and send it back.

## 5. EUREF Guidelines

J. TORRES remembers the various guidelines and specifications formulated till now:

- Memo: Specifications for reference frame fixing in the analysis of a EUREF GPS campaign; C. BOUCHER, Z. ALTAMIMI; last Version 5 : 12-04-2001
- Deliverables for EUREF campaigns; H. v. d. Marel; version 2.0, March 2002
- Guidelines for EPN Analysis Centres; EPN Coordination Group and the EPN Central Bureau; last update: Dec. 03, 2002

- Guidelines for EPN Data Centres; EPN Coordination Group and the EPN Central Bureau; last update: March 13, 2003
- Guidelines for EPN Stations & Operational Centres; EPN Central Bureau; last update: Dec. 14, 2004
- EUREF Permanent Network – Processing Options Table; last update: Oct. 27 2003
- Procedure for Becoming an EPN Station; EPN Coordination Group and the EPN Central Bureau; last update: Feb. 11, 2005
- EUREF Product Catalogue List
- EUREF GUIDELINES Working Group; C. BOUCHER, C. BRUYNINX, W. GURTNER, J. IHDE, J. MÄKINEN, H. V. D. MAREL, J. TORRES
- CST guidelines for "The International Space Geodetic and Gravimetric Network (SIGN)"; last update: Jan. 11, 2001
- Monumentation Design and Implementation Recommendations (Source: IGS); last update: Sept. 30, 2003.

On the other hand there exist products which are not clearly described. So a definite table of products should be installed containing only such products which are definitely defined.

Concerning the task to develop guidelines for the certification of private permanent GPS stations fulfilling the quality standard of EUREF and could density the EPN is not very urgent in the moment, however, the guidelines should be formulated within the near future.

## 6. Update of the ETRS89 questionnaire

J. IHDE had sent out a questionnaire to 41 European countries asking whether the ETRS89 is introduced as official reference system or – if not – which other system is used and which relations to the ETRS89 exist. From altogether 27 countries answers were received. In 21 countries the ETRS89 is used as official datum, some others are planning to join.

The BKG has set up a new version of transformation procedures CRS – ETRS89 for altogether 55 systems in the web. There also measures for the accuracies of the transformations are given. The formulae have been tested together with the relevant NMAs. In this context J. IHDE emphasizes that up to now many different systems are still in use, so they are clearly to be distinguished and described. For this purpose possibilities should be sought to promote the general knowledge of the public on geodetic/geographical reference systems at all.

H. V. D. MAREL mentions that in the Netherlands a definite law regulates the transformation of coordinates, so this algorithm could be put into the web for the use of the public. Other countries should be asked whether comparable laws exist. As a practical demand for the need of precise transformation formulae the presentation on the *Georail Project* by T. ENGEL is mentioned.

J. TORRES will present this topic on the symposium. Further Z. Altamimi announces to write an update of the memo *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign* by C. BOUCHER and Z. ALTAMIMI.

## 7. ITRF2004 status

Z. ALTAMIMI explains the progress of the ITRF2004 computation. The final solution is based on a multi techniques combination, for the first time now also time series are used. For SLR meanwhile records covering 13 years exist. In a meeting a few weeks ago the strategy for the computation has been discussed again. It is not yet clear how to handle discrepancies between the different intertechniques solutions and those of the computation centres (LAREG, DGFI). According to the planning the final solution should be presented to the IAG General Assembly in Cairns in August 2005. The densification e.g. by regional solutions (EUREF, SIRGAS, NAREF etc.) will be done later when the final basic computation is completed and analysed.

## 8. EPN CB report

C. BRUYNINX gives the usual report of the EPN CB. Since the last TWG meeting in Brussels, March 2005, 14 new stations have been included in the EPN, so now in total 171 permanent stations are gathered in the EPN. One site has been removed from the network due to structural instability of the building and local large movements.

In order to avoid that candidate EPN stations remain indefinitely in the list of proposed stations, it is decided that the proposed station submits its commitment letter to the EPN within a period of 6 months.

Several EPN stations are proposed to contribute to ECGN resp EUREF-IP. Meanwhile 74% of the EPN sites submit hourly data whereas in 2000 only 38% could deliver such data records. However, about 80% of the data arrive too late. A secondary data flow of the EPN data via Graz is now realized, so that in the case of a failure of either BKG or OLG no problems should arise anymore. Nevertheless, the data flow has still to be improved and made more stable. W. GURTNER emphasizes in this context that EUREF coordinates basically stands for a high level of quality, therefore this standard has to be kept in any case for all kinds of EUREF products such as the EUREF-IP and others. In order to verify the quality standard, H. HABRICH and G. WEBER will check the compatibility of EUREF-IP and EPN coordinates on an example. E. BROCKMANN, A. CAPORALI and G. WEBER will develop a plan how to proceed with the validation of EUREF-IP coordinates.

## 9. EPN Analysis Progress

### a) Usage of Bernese 5.0 for EPN

H. HABRICH presents his contributions for the EUREF symposium. 5 LACs now have changed from the Bernese 4.0 to version 5.0

### b) Test of daily sub-network combination

H. HABRICH had performed different test on the quality of daily solutions. In all the weekly solutions turned out to be more stable. Moreover it has to be discussed whether there is any realistic need of daily solutions. At present a practical use could be adopted for atmospheric investigations, however, for this purpose hourly data would be more adequate.

### c) Benefit of GLONASS observations for EPN

The inclusion of GLONASS data would offer a considerably number of common baselines. The GPS/Glonass combination by the BKG showed no satisfying results, however, it has to be checked in detail whether the analysis was done correctly or inconsistencies occurred in the corrections.

### d) EPN contribution to ITRF2004 densification

H. HABRICH informs on the contributions of the EPN for the densification of the ITRF2004 and the working plans for SP-time series.

## 10. Report on Time Series Special Project

A. KENYERES gives a summarized review of his presentation for the symposium. The used software has been changed to CATREF. Different investigations for the separation of noise and derived point velocities have been performed. The analysis shows regional distributed systematic effects. The investigations will be continued.

## 11. AFREF Workshop

Z. ALTAMIMI gives some informations on the AFREF Working Group Activities on the FIG GSDI Working Week Cairo, 16-21 April 2005. Another workshop will take place in Cape Town in January 2006. Z. ALTAMIMI points out that the expertise gathered in the EUREF community could help much to develop the AFREF project and asks all colleagues for help with practical ideas for the progress of AFREF. J. V. D. MAREL declares that EGNOS runs about 50 stations in Africa and the archive will be opened for use to serve for reference frame determination.

## 12. Special Project Troposphere Status Report

This topic is cancelled, a concerning report will be presented at the EUREF Symposium.

## 13. EUREF-IP Pilot Project

G. WEBER informs that a new programme version Ntrip 2.0 is now adapted. According to the modern technological possibilities and challenges the need for (near-)real time data will grow substantially e.g. for natural debater research, atmosphere investigations, DGPS etc. As an essential topic G. WEBER characterizes the permanent contact with all present and potential future users in order to develop the systems in a practically usable way. Formerly real time methods were not possible as practical method due to missing tools, but meanwhile internet and mobile phones enable new possibilities. He encourages to adapt also the Bernese software in this field of use.

## 14. Report on 2nd IGS GNSS WG/Galileo Project meeting

H. V. D. MAREL gives a summarized report on the 2nd IGS GNSS WG/Galileo Project, ESOC, 17 April 2005. As topics satellite and inter frequency biases, GSTB-V2 status, GPS/GLONASS experiment, laser ranging, RINEX, GGSP and EGNOS data are to be mentioned. Presentations from

EUREF side were given by R. WEBER, S. SCHAER, H. V. D. MAREL and T. SPRINGER.

W. GURTNER informs that both GSTB-2 satellites will be tracked by the ILRS, some basic discussion within the SLR community are still necessary. It is intended to include EGNOS data into the IGS.

### 15. Absolute Gravity observations and the ECGN

For Zimmerwald as example, W. GURTNER mentions that for the ECGN stations no usable guidelines concerning absolute as well as permanent gravity observation exist in the web. Such guidelines represent an essential part for a common understanding, we run one in Zimmerwald, ask us what to do with these data, find no guidelines, in general need to develop a common understanding for the project. J. IHDE says that this problem will be cleared soon as far as THE ECG is involved.

### 16. Status and next steps of UELN, ECGN, EVRS

J. IHDE presents a detailed report on the UELN, ECGN and EVRS. This report will also be presented to the EUREF Symposium. At present 74 stations in 21 countries contribute to the ECGN with different techniques. 8 core stations equipped with all techniques have been selected. All data should be freely accessible, unfortunately the absolute gravity data are partly available only with much delay or restrictions. It is planned to install a meta data base in the web in which all useful data should be collected. Moreover the observation and access to gravity data should be guaranteed by the responsible national agencies.

Concerning the UELN, J. IHDE informs that nearly all countries have delivered their data. The Danish network has been replaced by a new one. The Baltic Loop still cannot be closed due to the missing data from Russia. A new datum definition instead of the old pile Amsterdam will be necessary basing on national reference points.

### 17. Report on EUVN-DA

A. KENYERES informs that the original plan to finish the project till the year 2006 will not be reached. For Northern Europe complete sets of densified data are available,

however from South the majority of data is still missing and the responsible agencies do not react on requests. Unfortunately height data become more and more restricted and are made only available for payment. So at all the project has to be started using an incomplete data set, however, this way seems to be better than to wait without any predictable date.

### 18. The Status of the Baltic Levelling Ring

J. MÄKINEN announces to deliver the Scandinavian data in the next future. The records will be completed by tide gauges and sea surface topography. For closing the Baltic Ring the missing data from Russia will be replaced by sea-surface topography and geoid data.

### 19. Programme of EUREF Symposium

J. TORRES presents the programme and time schedule for the symposium. He proposes to enlarge the information for the future symposia so that the participants will be more informed and will be enabled to prepare themselves in a better way. J. TORRES mentions especially the announced contribution by C. CALVERT on *Can EU law benefit Geodesy?* and expresses his hope that in future more such contributions referring also random parts of EUREF will be presented.

### 20. Organization of EUREF Symposium

On behalf of the hosts of the EUREF symposium Vienna, N. HÖGGERL reports on the organisation and events of this symposium. Z. ALTAMIMI expresses his thanks to the organizers for their successful efforts for EUREF.

### 21. Varia

#### a) Next TWG meeting

E. BROCKMANN invites the TWG to hold its next fall meeting 2005 in the Swiss Federal Office of Topography in Wabern near Berne. The meeting is fixed for November 7-8, noon to noon. On behalf of the TWG, Z. ALTAMIMI thanks for the invitation. The former EUREF President, E. GUBLER, will retire with the end of 2005. It is proposed to invite him to the meeting for saying goodbye.