XXIXth Meeting of the EUREF Technical Working Group in Ponta Delgada, June 4, 2002

Meeting place: Biblioteca Pública and Arquivo Regional de Ponta Delgada, Largo do Colégio, Ponta Delgada
Begin: 04.06.2002, 9.00 am; end: 04.06.2002, 17.30.

Agenda

1. Minutes of the TWG Meeting in Berne, March 14/15, 2002
2. EUREF Campaign Validations
   – ETRF-Austria 2001 (Höggerl, Stangl)
3. EPN Reports
   – CB activities (Bruyninx)
   – Data Analysis (Habrich)
   – Data Coordination (Stangl)
   – Troposphere Project (Habrich for Weber)
   – Time Series (Kenyeres)
4. New Project EPN-I (Ihde)
5. FP-6, Expressions of Interest
   – SCIGAL (Bruyninx, van der Marel)
   – EPISTAGE (Ihde)
   – EUROLAS CALNet (Gurtner)
6. Realtime activities (Ihde for Weber)
7. The future of EUREF (Torres)
8. Final EUVN report (Ihde)
9. EUVN densification (Kenyeres)
10. EUREF Symposium, Azores (Pinto, Torres)
11. Future Symposia (Torres)
12. Varia
    – SGRN Slovakia (Gurtner)
    – How to deal with jumps in station coordinates (Bruyninx)
    – Galileo (Gurtner)
    – EUREF name protection (Harsson)

Participants

JÓZSEF ÁDÁM, Budapest
WOLFGANG AUGATH, Dresden
ZUHEIR ALTAMIMI, Paris (perm. guest)
CARINE BRUYNINX, Brussels
ALESSANDRO CAPORALI, Padova
DUSAN FERIANC, Bratislava (guest)
ERICH GUBLER, Berne-Wabern (delegate of EuroGeographics)
WERNER GURTNER, Berne (Chairman)
HEINZ HABRICH, Frankfurt (perm. guest)
BJØRN HARSSON, Honefoss
NORBERT HÖGGERL, Vienna (guest)
HELMUT HORNIK, Munich (Subcomm. Secretary)
JOHANNES IHDE, Frankfurt (perm. guest)
AMBRUS KENYERES, Budapest
MATEJ KLOBISIAK, Bratislava (guest)

HANS VAN DER MAREL, Delft
TORBEN NORBECH, Honefoss (guest)
PETER PESEC, Graz (guest)
JORGE PINTO, Lisbon (guest)
HANS ROHDE, Monacco (guest)
HERMANN SEEGER, Bad Neuenahr – Ahrweiler (perm. guest)
GÜNTER STANGL, Graz (perm. guest)
JOAO AGRIA TORRES, Lisbon (Subcomm. President)

Apologized: CLAUDE BOUCHER, Paris; JOROSLAV SIMEK, Prague; GEORG WEBER, Frankfurt

Minutes

Remark: The presented papers and view graphs can be received, as far as available, on request from the EUREF secretary. Furthermore, the texts are published on the EUREF homepage (http://www.euref-iag.org/Symposia.html#11.).

The TWG chairman, W. GURTNER, opens the XXIXth meeting of the EUREF TWG in Ponta Delgada .and thanks the Local Organizing Committee of the EUREF Symposium 2002 in Ponta Delgada for hosting this meeting. On behalf of the Local Organizing Committee, J. Pinto welcomes the participants and wishes a pleasant stay as well as good success in Ponta Delgada.

The agenda was distributed among the TWG members by mail and is adopted by the plenary after some small changes.

1. Minutes of the TWG Meeting in Berne, March 14/15, 2002

The minutes of this meeting have been distributed. The plenary accepts the text after some corrections, to topic 7 it is mentioned that the authorization to accept new stations is up to the coordination group and in general the TWG has not to be asked. The minutes will be published in the next proceedings volume (cf. also EUREF homepage http://www.euref-iag.org/TWG_Berne.pdf).

2. EUREF Campaign Validations

ETRF-Austria 2001

N. HÖGGERL presents a report on the new *ETRF-Austria 2001* which was initiated in cooperation of the Federal Office of Metrology and Surveying (BEV) and the Technical University of Vienna. The goal is to renew the existing reference system within Austria and to install an improved network including partly the old already existing sites as well as new ones, some of them operated by private companies. The free access to these private sites is confirmed. 10 sites belong to the campaign of 1994/95, 6 old ones are withdrawn. The majority of the 5 new ones are permanent sites connected to the EPN or IGS. For the data processing the Bernese software and IGS orbits were used, observation records shorter than 5 minutes were deleted. The solution was based on EPN sits. Various tests showed that the station Pfänder is not as reliable as expected.

In the discussion it is emphasized that the campaign is principally alright, the computation, however, should be repeated by referring the computation explicitly not to weekly EPN solutions but clearly to one epoch. i.e. the newest available ITRF solution. This rule should strictly be observed, even if the numerical influences are not significant, but to ensure the users that the guidelines are followed and the best possible quality standard is permanently guaranteed. Transformations to other epochs, however, are naturally possible. The authors of the Austrian report are asked to recompute the evaluation and present the report again on the next TWG meeting.

As general demand it is emphasized that especially such sites should be selected as EUREF sites which were/are/will be used in other (GPS-)campaigns/techniques, too. Another demand is the guaranteed free access and the permanent long-term maintenance of these sites. Concerning the privately operated sites it is emphasized that besides the free access the long term maintenance should carefully be observed. All new domes numbers should be delivered to Z. ALTAMIMI to be put into the stations catalogue.

3. EPN Reports

CB activities

C. BRUYNINX reports[1] that by the inclusion of some newly accepted stations the EPN now comprises at all 130 sites. Meanwhile about 55% of them provide hourly data. By a new analysis strategy the height repeatability could be improved. The EUREF mail which was run by the Astronomical Institute of Berne for many years is issued now by the Royal Observatory of Belgium in Brussels. The TWG expresses its thanks to the Bernese colleagues who did this work for so many years. C. BRUYNINX also presents a new EPN flyer which will be also put into the web.

Data Analysis

H. HABRICH explains the progress in processing since the last symposium[2]. Since May estimated troposphere parameters allow a considerably better (factor 3) estimation of the heights. These findings also will be presented to the next IGS Workshop 2002.

[1] BRUYNINX C. et al.: *EPN network monitoring: current status and future plans*

[2] HABRICH H.: *EUREF Permanent GPS Network Analysis Update*

Data Coordination

Introducing W. GURTNER states that meanwhile much experience has been won with uploading hourly files. It should be discussed whether to continue to transfer daily as well as hourly data or switch to hourly files only. Hereby the reliability as well as the possibility to check the reliability has to be considered. Daily files could be a useful tool to check the hourly data. However, the storage of both data records needs enormous much storage, so the daily files could be deleted after having been used for testing the hourly files. H. HABRICH mentions that some stations already only submit hourly data records.

In all it can be stated that the use of hourly files helps to get more continuous data records. If one hour is missing the rest of the day can be used, but when using daily files this relatively small gap will induce the loss of a whole day.

Concerning the decision on the future politics it is mentioned that meanwhile the data centers generally use automatic analysis procedures, so the submission of hourly data files will not induce much more human work than had to be done before. Anyway, this decision should be let to the data centers. However, it might be possible that in future a general recommendation for a common procedure will be formulated.

Troposphere Project

H. Habrich reports for G. WEBER on the special project for troposphere parameter estimation within the EPN[3]. The investigations have shown interesting details of the correlation of troposphere and height which hopefully will lead to a considerable improvement of the data quality. In this context is has to be reflected whether to deliver these data records also to the IGS to be used for global solutions.

It is decided to submit the combined troposphere EUREF solution to the IGS to be used for the global solution. So the LACs are to be urged to deliver their data in time in order to enable this attempt.

Time Series

A. KENYERES reports that his extensive investigations[4] have proved that numerous apparent terrain movements are not or only partly due to real motions, but mostly antenna problems, technical problems or gaps in the data registration and other effects which cause such apparent effects. As example he explains in detail the earth quake near Merano (Alto Adige region) on 17.7.2001 registered by the EPN site Bolzano/Bozen and other nearby stations. He expresses his hope to formulate in the near future more detailed guidelines how to analyse the data for improving the reliability of the determined heights. A list of all EPN sites for which offsets were found should be published and discussed commonly.

Z. ALTAMIMI mentions that GPS is an highly accurate technique, but very sensitive to any changes. For guaranteeing long term highly accurate results the guidelines are to be considered carefully. This item has to be explained to all station managers in detail. W. GURTNER states that these findings also should be submitted to the IGS because they are rather essential but not sufficiently known..

4. New Project EPN-I

J. IHDE presents a report[5] on this item which already was discussed at the last TWG meeting in Berne (cf. the minutes, topic 18). A working group (J. IHDE, A. KENYERES, J. ADAM, C. BRUYNINX and J. SIMEK) has been installed and met in April 2002. J. IHDE emphasizes the good cooperation between the colleagues from the gravity and positioning part respectively as well as the advances to connect the tide gauges.

In the following it is discussed how this project should be organized within the IAG. J. IHDE proposes to use the well organized EUREF community as a suitable platform for the realization of the EPN-I. It is concluded that A. KENYERES distributes the proposal by J. IHDE among the gravity commission to motivate the colleagues there for active participation. The already existing working group should be enlarged by other competent colleagues especially for the gravity sector. Moreover it is suggested to search for a more adequate name than EPN-I.

5. FP-6, Expressions of Interest

Introducing W. Gurtner informs on the FP-6 (6th European Framework Program). A considerable amount of money is available also for geodetic aspects, so adequate proposals should be submitted in time. It should be observed that some other disciplines such as aeronautics, global change etc. also use geodetic methods, so geodetic groups could also participate in such neighbouring projects.

SCIGAL

H. VAN DER MAREL explains the objectives of the integrated SCIGAL (Earth Science Applications using GALILEO) project. It is stated that EUREF is requested by the geodetic community to participate in this project which presumably will be run over some years and could play a key role there. It is concluded that EUREF officially expresses its interest for participation in this project. C. BRUYNINX and H. V. D. MAREL are asked to coordinate the activities.

EPISTAGE

J. IHDE gives some comments on this initiative of the IERS in which a platform for an integrated geodetic approach for geodata should be installed. Europe could take over the leadership in this project, so also EUREF would be involved. Before an active engagement the plans and goals should be proved carefully.

[3] SÖHNE W., WEBER G.: *EUREF Special Project "Troposphere Parameter Estimation" – Status Report*

[4] KENYERES A.: *EPN Special Project on "Time Series Analysis": Results of the Retrospective Analysis of the EPN Time Series (1996-2001)*

[5] IHDE J.: *Development of an European Integrated Permanent Network (EPN-I)*

EUROLAS CALNet

W. GURTNER explains shortly the goals of the European Laser Ranging Precise Calibration and Orbit Evaluation Network, initiated by K. HAMAL and I. PROCHASKA/Prague.

6. Realtime activities

J. IHDE reports for G. WEBER on the progress in this work. An extended test phase including Germany, Italy, Spain and Switzerland is going on, Norway has also announced its interest in DGPS correction signals. The software for DGPS can be achieved freely by EUREF members. The IGS plans to instal a relevant service with DGPS on the accuracy level of 1 m.

7. The future of EUREF

J. TORRES presents the plans for the future structure of the IAG and his ideas how to keep EUREF in this renewed organisation. In any case EUREF should be maintained as it is, the organisational position within IAG, however, could change. One possibility would be to keep EUREF as a subcommission with liaisons to other IAG structures. It is concluded to discus this question extensively in the EUREF symposium and to formulate there a resolution[6]. This resolution has to be submitted till June 17, 2002 to the IAG Vice-President, G. BEUTLER.

8. Final EUVN report

J. IHDE declares that a considerable part of still missing stations (e.g. laser stations) which were planed to be included into the EUVN are rather important in the sense of an integrated approach. The station managers were contacted, however, few or even no reaction has come. W. GURTNER asks what can be learnt from all these positive as well as negative experiences and how to proceed under the conditions as they are. J. IHDE adds that the European Mean Height Level is related to a global one and the UELN is not related to real tide gauges. So the next steps towards a kinematical height system and the modelling of the surface topography can be undertaken. although it would be rather interesting to connect the tide gauges as planned with the EUVN.

Summarizing it is emphasized that an extensive brainstorming on the use of the EUVN results as well as the experiences and ideas is necessary in order to increase the efficiency of similar future projects. The EUVN WG is asked to prepare a detailed report on the EUVN experiences and results to be submitted to the next IUGG General Assembly.

9. EUVN densification

Pointing out the relatively small but obviously systematic difference between the EGG97 and EUVN geoids, A. KENYERES explains the need to compute an improved geoid which is free of distortions due to incorrect height information. He mentions that a considerably densificated EUVN would help much to achieve the needed data for a European subdecimeter geoid[7]. An optimal densification would imply GPS sites or/and levelling points within 50 km distance and the collection and analysis of all existing measurements. The data collection should be finished to mid 2003, necessary new measurements be carried out till autumn 2004 and the final EUVN densification data base be completed till spring 2005. A. KENYERES is asked to formulate a call for participation concerning this project. In the proposal regions with weak/erroneous levelling areas should be marked.

10. EUREF Symposium, Azores (Pinto, Torres)

J. PINTO and J. TORRES explain the details of the following EUREF symposium. A list of announced presentations is distributed. G. ANDRE, Z. ALTAMIMI, W. AUGATH, W. GURTNER, J. IHDE, J. MÄKINEN and J. TORRES are appointed for the resolution committee.

11. Future Symposia

The EUREF President, J. TORRES, announces that each two countries invite the EUREF Subcommission for the 2003 as well as the 2004 Symposia. The place of the 2003 Symposium has to be decided by the symposium plenary, the place of the 2004 symposium will be discussed again next year.

12. Varia

SGRN Slovakia

The report[8] by the Slovak colleagues is discussed. The authors and some members of the TWG are asked to have a short meeting while the symposium to discuss some open questions and to prepare guidelines for a revised presentation to the next meeting.

EUREF name protection

B. HARSSON informs on the progress for the protection of the name "EUREF". The majority of the European countries assembled in the "Madrid Convention" has agreed, Denmark and Germany, however have refused.

[6] Resolution No. 4 of the EUREF Symposium in Ponta Delgada: The IAG Subcommission for Europe (EUREF)
- *welcomes* the proposed new structure of the International Association of Geodesy (IAG) and
- *looks forward* to continue its activities in the frame of the new Commission I - Reference Frames

[7] Resolution No. 4 of the EUREF Symposium in Dubrovnik, 16-18 May 2001.

[8] KLOBUSIAK M., LEITMANNOVA K., PRIAM S., FERIANC D.: *SKRF 2001 - Slovak Kinematic Reference Frame 2001*