

XXXth Meeting of the EUREF Technical Working Group in Delft, November 7 – 8, 2002

Meeting place: Delft University of Technology, Dept. of Geodesy

Begin: 07.11.2002, 13.30 am; end: 08.11.2002, 12.00 am

Agenda

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14. EUPOS Meeting, Sofia, Nov. 5 – 6, 2002
15. Varia
 - TWG Chairman
 - GSAC (seamless archive) status
 - New RINEX version
 - Next meeting
 - New GPS receivers in Belgium

Participants

WOLFGANG AUGATH, Dresden (7.11.)
 WOLFGANG AUGATH, Dresden
 ZUHEIR ALTAMIMI, Paris (perm. guest)
 CARINE BRUYNINX, Brussels
 ALESSANDRO CAPORALI, Padova
 ERICH GUBLER, Berne-Wabern (delegate of
 EuroGeographics)
 WERNER GURTNER, Berne (Chairman)
 HEINZ HABRICH, Frankfurt (perm. guest)
 BJØRN HARSSON, Honefoss
 HELMUT HORNIK, Munich (Subcomm. Secretary)

JOHANNES IHDE, Frankfurt (perm. guest)
 LESZEK JAWORSKI, Warsaw, guest
 AMBRUS KENYERES, Budapest
 ANTON KOESTERS, Delft, guest
 CLAUDE LUZET, Paris, guest (7.11.)
 HANS VAN DER MAREL, Delft
 JAROSLAV SIMEK, Prague
 HERMANN SEEGER, Bad Neuenahr – Ahrweiler
 (perm. guest)
 GÜNTER STANGL, Graz (perm. guest)
 JOAO AGRIA TORRES, Lisbon (Subcomm. President)

Apologized: JOZSEF ADAM, Budapest

Minutes

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

The TWG chairman, W. GURTNER, opens the XXXth meeting of the EUREF TWG in Delft and thanks the colleagues of the Delft University of Technology, Dept. of Geodesy, as well as the Netherlands Geodetic Commission for all arrangements.

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

1. Minutes of the XXIXth TWG Meeting in Ponta Delgada

The minutes of the meeting in Ponta Delgada, 4.6.2002, 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. Campaign validations

Austria 2002

G. STANGL distributes a paper (http://www.euref-iag.org/book2002/twg%20_%20Delft/EUREF%20Austria%2002.pdf) describing the observation of the Austrian campaign. A first campaign was observed in 2001, the TWG, however, advised the Austrian colleagues to improve the data and to present the results once more. After the inclusion of new data the campaign was computed again by the OLG in Graz and the Technical University Vienna, the results are presented.

Some of the included sites are operated by private companies, the access for the public is guaranteed. It is pointed out to

assure that these sites are not changed without official announcement.

The site Hafelekar turned out to be not reliable and was excluded in the presented solution, the coordinate differences may be caused by seasonal influences and movements in the monumentation. The deviations have to be investigated in detail and then the sites will possibly be included in the data set. C. BRUYNINX declares that similar results already were received in the analysis of the EPN. Some variations are rather similar to station Patscherkofel which is located not far off and may be caused by special meteorological influences, but there are obviously still other considerable motions. H. SEEGER adds that this site is also included in the German GREF, the relevant data therefore should be tested for their quality.

Some markers of the former GPS networks are no more used in the new *ETRF-Austria 2002*, so H. V. D. MAREL is asked to remove them from the EUREF data base. Moreover, the dome numbers should be defined for all sites and listed in the final report as well as put into the data base.

The solution is accepted as part of EUREF on class B level. The report should be presented to the plenary at the next symposium in 2003.

EUREF-POL'2001 GPS Campaign

L. JAWORSKI presents a report (http://www.euref-iag.org/book2002/twg%20_%20Delft/EUREF%20Pol2001.pdf) on the new Polish EUREF Campaign. This presentation is an update of the one already presented at the last symposium. The new data set should replace the old data from 1992. The campaign, observed in September 2001, covers 9 EUREF-POL'92 points and 1 EUVN97 point, further 5 EPN stations within Poland and 7 EPN stations located outside of the Polish territory to fix the network. As reference the ITRF2000, epoch 2001.75, was used. Due to various problems at least 6 stations (Graz, Metsahovi, Wettzell, Onsala, Borowiec, Jozefoslaw) were introduced.

After an extensive discussion the solution *EUREF-POL'2001* is accepted as part of EUREF on class B level. Z. ALTAMIMI is asked to check the report carefully and instruct the authors to prepare an updated version (clear observance of the EUREF guidelines, test of impact of other campaigns although this influence may be neglected in practice, investigation of the coordinates for station Riga, list of final coordinates). Furthermore Z. ALTAMIMI is asked to prepare an update of the existing guidelines for the next meeting.

3. Re-observation of the Hungarian EUREF subnetwork

A. KENYERES reports on his investigations of the Hungarian GPS network observed in 1991. By comparing the coordinates with other solutions it was found out that deviations up to some cm occur which may be caused by eccentricity errors in the old fiducial points. So it was decided to re-observe the network in September 2002 including Slovakia and the Czech republic. As fiducial points the EPN stations in this region were used. A detailed report will be presented to the next meeting.

4. Status EPN

Network

C. BRUYNINX reports that since June 11 all IGS and EPN stations have switched to the new site log format. Showing the data records of station Penc she explains the considerably improved access to the data and the necessary tests. The test generally are carried out automatically. If blunders are found the operators of the relevant station are contacted automatically in order to check the original data.

4 new stations were included in the EPN in the last period (Boras/Sweden, Qaqortoq/Greenland, Borowa Gora/Poland, Morpeth/UK. As new analysis center the SUT (Slovak University of Technology) is operating since September 2002, increasing the number of ACs to 16.

From November 11-13, 2002, a SCIGAL (Earth Science Applications Using GALILEO) Conference will take place in Brussels. Detailed information can be found in the internet.

Data flow, guidelines for hourly data file concatenation

G. STANGL reports on his experiences with the processing of the concatenation of hourly RINEX files to daily ones, especially the handling of data arriving (too) late. A strict limit for deleting late files can hardly be formulated because these data can still be used after a delay in order to fill up gaps in the data records which would occur if a strict time limit would be applied.

G. STANGL is asked to formulate updated guidelines for the data flow and distribute them among the community.

Analysis, guidelines

A paper *Guidelines for EPN Analysis Centers* by H. HABRICH has been distributed (http://www.euref-iag.org/book2002/twg%20_%20Delft/EPN%20Guidelines.pdf). It is proposed to distribute this paper among all analysis centers asking for comments (deadline: end of 2002) and then after a

possible update submit to C. BRUYNINX to be put into the web. The guidelines should also be transmitted to other groups which are dealing similar objects as the EUREF EPN. The TWG thanks H. HABRICH for his efficient work.

Troposphere Project

G. WEBER distributes a short report concerning this item. A test campaign for 20 weeks in mid 2002 (GPS weeks 1143 – 1163) took place, 5 LACs contributed to the work. The project will be continued, so final results are not yet available.

5. Status Realtime Project

A circular by G. WEBER concerning this item has been distributed. Within a test campaign which ended one month ago it was tried to gather experiences in the management of the enormous amount of data which is to be processed. A specific software is to be developed, e.g. for splitting the duties to be carried out among several computing centers. Special procedures also must be written if the clients should be charged for using specific results as well as for the registration of the users.

The goal is to make available data for mobile mapping, real time information for construction purposes, GIS and positioning. For the practical use still more EPN sites are to be connected to the internet in real time.

6. Status TIGA

H. HABRICH reports on the installation of the TIGA (Tide Gauge Benchmark Monitoring Pilot Project). Detailed information is available in a report by T. SCHÖNE (http://techinfo.jpl.nasa.gov/igs/files/directory/schoene_t/schoene_t.pdf).

7. ECGN

Position of the IGGC to the ECGN project / Specification of the project contents / Constitution / Members of the ECGN WG / Call for participation

The idea to install the ECGN (originally named EPN-I) was created at the TWG meeting in Padova, October 1-2, 2001. J. IHDE gives a detailed report on the development and goals of the ECGN (European Combined Geodetic Network) project, a paper with proposals for the further steps is distributed. Considering the present situation, the ECGN aims to complete the EUVN on an extended basis and thus related to the vertical component.

At the EUREF Symposium 1996 in Ankara the plan to create the EVS2000 as a kinematic network covering the European continent was firstly worked out (resolution no. 4). The original plan to use the UELN data for this purpose could not be followed because only few countries have reliable levelling data covering more than one epoch. Thus only regional investigations could be carried out. Another item is the enormous effort to collect, check and prepare the data. Considering these aspects it was decided to extend the input data and to use all kind of usable data such as gravity data; individual points with time series of absolute or super-

conducting gravity measurements, tide gauges etc. Special interest should be given to the combination of gravity and GPS time series. It is emphasized that the connection of the individual sites and possible eccentricities are to be handled with the utmost care (1 mm level) to avoid distortions of the whole network.

In resolution no. 2 of the EUREF Symposium 2002 in Ponta Delgada the International Gravity and Geoid Commission (IGGC), Subcommission for Europe, as well as the International Hydrographic Organisation (IHO) are asked to contribute to the proposal to develop the ECGN. The co-operation between EUREF and IGGC could help both groups as both of them need the results of the respective other group. J. TORRES as EUREF President and J. IHDE as ECGN chairman are asked to distribute a letter among the gravity community with the description of the ECGN project, the exact formulation of all kind of requirements (costs, hardware, exact guidelines etc.), a proposal for its realization as well as a call for participation. It has to be pointed out that such an experiment has to be prepared very well because there is few experiences of earlier projects. The EUVN already comprises about 20 sites for which absolute gravity data exist, so these sites could be used as a suitable start. The maximum distance between GPS sites and gravity points or tide gauge stations should not exceed 1 km.

W. GURTNER emphasizes that in the beginning much research has to be done, moreover it should be tried to form a working group consisting both of members of the positioning and gravity community who care on the observation as well as analysis part. According to the future structure of the IAG, it should be tried to create an intercommission committee to deal with this subject. The common working group should comprise about each 4 colleagues from EUREF and IGGC. The installation of the group should be arranged, as far as possible, in the next time to start the work. The group is asked to report in detail to the next EUREF symposium. J. IHDE and A. KENYERES should formulate a common proposal by EUREF and IGGC to be submitted to the board of IAG. If possible, it should also be tried to receive support by the European Union.

8. Final EUVN report

J. IHDE informs that the final report of the EUVN campaign is completed now to be printed. A first report, concerning the GPS observations and analysis, has been issued in *Subcommission for Europe (EUREF), Publication No. 7, Vol. II, Mitteilungen des Bundesamtes für Kartographie und Geodäsie, Frankfurt a.M., 1999*. Now the report *European Vertical Reference Network (EUVN) – Final Documentation* will be published as *Subcommission for Europe (EUREF), Publication No. 11, Vol. I and II, Mitteilungen des Bundesamtes für Kartographie und Geodäsie, vol. 25 + 26, Frankfurt a.M., 2002, 90 + 235 pages* and distributed with the beginning of 2003.

9. Status EUVN densification, Call for Participation

A. KENYERES remembers the development of this project. After previous attempts at the symposia in Tromsø (2000) and Dubrovnik (2001), the EUVN densification was extensively discussed in the TWG meeting in Ponta Delgada, 2002, and presented to the plenary of the EUREF symposium. The plenary accepted the project, a call for participation was distributed.

The countries gathered in the EUVN can roughly be subdivided into 3 categories: countries with high quality data, with data of less quality but where an improvement can be adopted and, finally, those where no usable GPS levelling network exists and also will not be available in the near future. Considering the experiences of projects before, it is concluded not to wait too long for new data in order to continue with the project. The point distance should be about 100 km, however, if the distance is larger, the available data should be used in any case instead of waiting years for new data which possibly never will be delivered. An extensive check of the input data should help to identify errors, distortions and drifts in the levelling networks, outliers and systematic errors. As a next step a list of the already existing data will be produced to show the available data set. A circular explaining the project and working out the differences to the ECGN Project will be distributed.

E. GUBLER points out that the ECGN and EUVN densification have several similar aspects, so the relevant call for participation and other papers should clearly point out the respective goals as well as the common topics. The TWG agrees to the proposal by J. TORRES to send out an explaining letter for this purpose especially. A draft for this circular should be prepared till the next TWG meeting to be discussed there and then mailed. It has to be considered that many NMA's are planning their activities for 2003 already now, so the schedule should be set up in time.

J. IHDE remembers that in the EUVN about 7 years were needed to complete this project which comprises about 100 points and still some questions are to be solved. Considering the fact that the EUVN densification requests an accuracy of 1 mm, the needed time could be more. So a strict concept for the time schedule is urgently needed in order to come to a results within a suitable time. It is pointed out that terrestrial levellings for large areas will hardly be done because this work is too expensive. So it has to be tried to use other data. Possibly more accurate space techniques will deliver such data.

10. The future of EUREF

J. TORRES informs that the IAG Board welcomes resolution no. 4 of the EUREF 2002 symposium concerning the future status of EUREF within the IAG (... *to continue its activities in the frame of the new Commission I – Reference Frames.*)

11. Protection of the EUREF name (short comm.)

B. Harsson informs that altogether 27 European countries were contacted to certificate the word *EUREF* in the sense of the Madrid convention. 2 countries (Norway, UK) responded positively, 21 did not respond, which means no refusal. However, it has to be considered that the rules have been changed recently and the dead line for reaction is May 4, 2003. 4 countries (Denmark, Germany, Spain, Ukraine) refused, but it is hoped to come to a positive result.

12. European project INSPIRE (INfrastructure for SPatial InfoRmation in Europe)

E. GUBLER reports on the meeting of the expert group this morning. More information is found on the website <http://inspire.jrc.it/>. The expert group will formulate a working document and present it at the next TWG meeting. The group will also meet before the next TWG.

13. Alternative approach to the definition of the European Vertical System

J. SIMEK informs that a written report will be prepared.

14. EUPOS Meeting, Sofia, Nov 5-6, 2002

J. SIMEK reports that the German SAPOS could serve as example for a system all over the central and eastern European countries. At present the NMAs as well as some private companies of about 10 countries including Russia have signified their interest in these activities.

15. Varia**TWG Chairman**

W. GURTNER informs that he became chairman of the ILRS Governing Board, the TWG expresses its congratulations. Therefore he asks the TWG to search for a successor for

him in his property as TWG chairman after the next IUGG General Assembly.

GSAC (seamless archive) status

H. HABRICH mentions that in the BKG software packages exist to install a catalogue for the availability of GPS and simultaneous meteorological data. Some routines are still to be improved. On the question how many users ask for the data it is answered that the plan is still under development and some advertising will be necessary. Detailed information is available in the web.

New RINEX version

The IGS has set up a group to formulate a new procedure to include GALILEO data. Interested colleagues are welcome to join and should therefore contact W. GURTNER.

Next meeting

The EUREF TWG spring meeting 2003 will be held in St. Mandé/Paris from Thursday noon, March 6 – Friday noon, March 7. The usual meeting before the EUREF symposium will take place in Toledo on June 3, 2003. The TWG fall meeting will be held in Frankfurt, the date is not yet fixed.

New GPS receivers in Belgium

C. BRUYNINX presents the properties of the Septentrio receiver. The costs of this receiver only amount 5000 EURO. More information is available at http://www.euref-iaig.org/book2002/twg%20_%20Delft/Septentrio.pdf.

IUGG Sapporo

Some reports (Z. ALTAMIMI, J. IHDE, H. V. D. MAREL, G. WEBER etc.) will be prepared. J. TORRES will prepare an abstract for the common EUREF report and distribute it in the next time to be discussed among the TWG.

