

XXXVIth Meeting of the EUREF Technical Working Group in Prague, 8.-9. November 2004

Next events:

- EUREF TWG spring meeting: Brussels, Monday, March 14 - Tuesday, March 15, 2005 (noon to noon)
- EUREF TWG meeting Vienna, Tuesday May 31, 2005 (whole day)
- EUREF 2005 Symposium: Vienna, Wednesday June 1, - Saturday, June 4, 2005

Meeting place:

Czech Technical University, Faculty of Civil Engineering, street Thakurova 7, CZ-166 29 Praha 6, Room B169, ground floor

Time schedule:

8.11.2004, begin:13.00; end:18.00

9.11.2004, begin:09.00; end:12.30

Agenda

1. Minutes of the 35th TWG Meeting in Bratislava
2. Campaign validations
 - a) Romania 2003
 - a) Armenia 2002 – ARMRWF02
3. EGNOS methodology validation – letter formal approval
4. EUPOS representative to TWG
5. Special session and invited lectures for EUREF Symposium
6. EUREF presentation at the next IAG Scientific Assembly
7. Certification of Non-EUREF GPS Permanent Stations
8. Galileo proposals - GGSP
9. Short information on ITRF2004 and IERS CPP
10. EUREF contribution to UN WG on Site Quality, Integrity and Interference Monitoring
11. Special Project Troposphere Parameter Estimation, status report
12. EUREF-IP Pilot Project, Status Report
13. EPN CB report
14. EPN Guidelines
15. EPN Data Flow
16. Short information on GOP EPN Data Center
17. ESEAS Workshop report
18. Legal entity for EUREF
19. Joint adjustment of Nordic leveling networks: Status report
20. Spectral analysis of EPN time series
21. DORIS processing by Bernese Software
22. ECGN status
23. Current works of the ExG G of EuroGeographics
24. Varia
 - a) Next TWG meeting

Participants

ZUHEIR ALTAMIMI, Paris (Chairman)

ELMAR BROCKMANN, Berne

CARINE BRUYNINX, Brussels

ALESSANDRO CAPORALI, Padova

JAN DOUSA, Prague (guest) 9.11.

WERNER GURTNER, Berne

HEINZ HABRICH, Frankfurt (perm. guest)

HELMUT HORNIK, Munich (Subcomm. Secretary)

JOHANNES IHDE, Frankfurt

AMBRUS KENYERES, Budapest

JAKUB KOSTELECKY, Prague (guest)

JAAKKO MÄKINEN, Helsinki

apologized: CLAUDE BOUCHER, Paris

HANS VAN DER MAREL, Delft

MARIAN MARJANOVIC, Zagreb (guest)

LEOS MERVART, Prague (guest) 8.11.

PETER PESEC, Graz (guest)

TIBERIU RUS, Bucharest (guest)

HERMANN SEEGER, Bad Neuenahr-Ahrweiler (perm. guest)

JAROSLAV SIMEK, Prague

GÜNTER STANGL, Graz (perm. guest)

PETR STEPANEK, Prague (guest) 9.11.

JOAO AGRIA TORRES, Lisbon (Subcomm. President)

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, some texts are published on the EUREF homepage (http://www.euref-iag.net/TWG/EUREF%20TWG%20minutes/Agenda_2004_Prague/TWG_Prague2004.html).

The chairman of the EUREF Technical Working Group, Z. ALTAMIMI opens the XXXVIth Meeting of the EUREF TWG. Z. ALTAMIMI welcomes the participants and guests. He heartily thanks the hosts for the invitation to Prague, especially Prof. Dr. L. MERVART, director of the Institute of Geodesy, University of Technology, Prague, as well as J. SIMEK for organizing the meeting. On behalf of the hosts, L. MERVART welcomes the EUREF TWG expressing his wishes for a successful meeting.

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

1. Minutes of the 35th TWG Meeting in Bratislava

The minutes of the XXXVth TWG Meeting Bratislava, June 1 2004, are accepted after some small corrections. The text can be found in the EUREF homepage (http://www.euref-iag.net/TWG/EUREF%20TWG%20minutes/Agenda_2004_Bratislava/TWG_Bratislava.html).

2. Campaign validations

a) Romania 2003

A report prepared by T. RUS was distributed by e-mail. T. RUS explains the background for this campaign and summarizes the main items and results. A first attempt to install a modern control network in Romania was made in 1994 with the *Establishment of a GPS High Accuracy Geodetic Network in Romania* comprising 7 epoch stations. These results were not validated by EUREF. In 1999 the EUREF-EPN station BUCU was established by the BKG Frankfurt a.M. Finally the *EUREF-RO - Campaign* was observed in

2003, June 16-21, the results of which are presented now. The initiative was undertaken by the National Office for Cadastre Geodesy and Cartography (NOCGC), the Institute for Cadastre, Geodesy, Photogrammetry and Cartography (ICGFC) and the Military Topography Directorate (DTM). Altogether 12 stations were observed in Romania, 3 of the are permanent ones, 9 others are epoch stations. As fiducial points the EPN/IGS stations Graz, Bucharest, Jozefoslaw, Penc and Sofia were introduced. For the data processing and analysis support was given by colleagues from the OLG in Graz. Two solutions were computed, for the final one Graz, Jozefoslaw and Sofia were held fixed relating to ITRF2000/epoch 2003.46. The transformation from the epoch of observation onto the ETRS89 was done by the formulae by BOUCHER & ALTAMIMI, version 5/12-04-2001. On behalf of the National Agency for Cadastre and Land Registration (NACLR), T. RUS asks the TWG for validation of the EUREF-RO 2003 campaign. He further announces that the NACLR decided to establish 2-3 new EUREF-EPN stations in Romania.

In the discussion Z. ALTAMIMI appreciates this new contribution to the EUREF network filling up a gap in the existing network. A. KENYERES means that for some antennae non-accurate heights may have influenced the results. It is mentioned that even the ITRF coordinates of the EPN station Bucharest which is relatively new possibly could be not so reliable being influenced by such effects. Recent detailed laboratory investigations in Berne confirmed these assumptions. In the case of the Romanian campaign also incorrect NGS values may have been used. Concerning the earlier activities in Romania, H. SEEGER mentions the discrepancies in the 1994 solution between the evaluations by the NGS and the BKG. These discrepancies amounted some cm, unfortunately the attempts to clear this problem were not continued. Z. ALTAMIMI recommends to skip the problematic 1994 solution and to concentrate on the new campaign alone. Basing on the new results the NGS values then could be recomputed more accurately. In any case the

results are to be investigated carefully and discussed again. For the updated report W. GURTNER requests a more detailed presentation of the used methods and data estimation. He suggests to consider the possibility of a small test campaign to prove whether the results are correct or not should be carried out. E. BROCKMANN and G. STANGL are asked to investigate the results in this view.

H. SEEGER asks whether the number of proposed EUREF stations fits with the guidelines or if better a reduced number should be declared as official stations and the others be evaluated as well with the same quality but labelled as internal ones. H. v. D. MAREL adds to introduce strictly only such stations which really will be maintained in future.

It is concluded to recompute the Romania 2003 Campaign and to present an updated report to the next TWG meeting. G. STANGL is asked to arrange the activities. Then the final data are to be submitted to the data base manager (H. v. D. MAREL).

b) Armenia 2002 – ARMRWF02

With concern to the previous discussion on antennae problems, A. KENYERES suggests to reprocess also the ARMRWF02 campaign presented to the 2004 EUREF Symposium in Bratislava (http://www.euref-iag.net/symposia/symposia_2004_Bratislava.html, there see session 4, report # 2). It should be proved carefully whether the results keep consistent using the official LEICA antennae values. L. JIVALL and E. BROCKMANN are asked to recompute the ARMRWF02 campaign and to discuss together the results whether these are consistent also for new insights. The IGS should also be asked to check the models concerning antenna problems considering the newest state of art.

3. EGNOS methodology validation – letter formal approval

Z. ALTAMIMI remembers the discussions to topic 8 of the agenda for the Bratislava TWG meeting (http://www.euref-iag.net/TWG/EUREF%20TWG%20minutes/Agenda_2004_Bratislava/TWG%20Bratislava%20minutes.pdf). On this occasion H.-P. PLAG had requested the TWG to validate the estimation method used for EGNOS (European Geostationary Navigation Overlay Service). Due to the doubts of the TWG whether the TWG can evaluate a method in general, the decision was postponed. Z. ALTAMIMI distributed a letter among the TWG, some members responded with their comments. After this conclusion the TWG chairman submitted an answer to H.-P. PLAG, who now asks for changing some sentences in their wording. It is concluded that Z. ALTAMIMI will re-formulate the text approving the validation for the presented technology used for EGNOS and send the new text to H.-P. PLAG. It should clearly be mentioned that the TWG can approve a method but no data which relate sites not involved in the EUREF and/or located outside of Europe.

4. EUPOS representative to TWG

On behalf of EUPOS (European Position Determination System) G. ROSENTHAL has directed the question to EUREF for cooperation in order to ensure that in EUPOS the

EUREF guidelines for point positioning are observed. Z. ALTAMIMI suggests not to enlarge the existing groups but to ask J. SIMEK who is already involved in EUPOS as well as the EUREF TWG to act as representative of each group within the other one.

5. Special session and invited lectures for EUREF Symposium

J. TORRES suggests to reflect whether it might be useful and necessary to change the structure of the future EUREF symposia in such a way that the successful way EUREF has done is reliably kept but also new ideas are introduced. For example special sessions or invited lectures to important topics could be introduced. Moreover colleagues not directly involved in EUREF could be invited to give keynotes concerning actual problems. The final goal should be to make EUREF better known to the public and to meet new requests by other groups who might be interested in the EUREF work. H. v. D. MAREL proposes to consult generally the participants of previous symposia for their impressions and suggestions for useful new topics to be announced. On the other hand it is emphasized that the principles of the goals of EUREF are strictly be kept and the symposia not become a playground for any personal interests outside of EUREF. Moreover the well-tried time frame should not be enlarged too much as the majority of the colleagues hardly can spend more days for meetings.

J. TORRES mentions the problem of the generally rather late arrival of the titles and abstracts for presentations, so the agenda has to be set up immediately before the meetings. G. STANGL emphasizes the idea to open generally the EUREF symposia for the interested public, as example a half day session with a “product show” could be hold for this purpose.

J. TORRES will distribute a letter by EUREF-mail asking for suggestions of new topics for the coming EUREF symposia. This request should also be submitted to the IGS.

6. EUREF presentation at the next IAG Scientific Assembly

The IAG/ IAPSO/ IABO Joint Assembly 2005 under the title *Dynamic Planet 2005* will take place Cairns, Australia, from August 22-26, 2005 (<http://www.dynamicplanet2005.com/>). One of the main topics relates reference frame definition. J. TORRES reports on the invitation for presentations, the deadline for the submission of abstracts is end of April 2005. He suggests to prepare a report by EUREF as done for previous IAG Scientific Assemblies. The planned session of the IGS for regional densifications would be the adequate part for a contribution by EUREF.

7. Certification of Non-EUREF GPS Permanent Stations

J. TORRES presents an updated version of the one presented to the Bratislava Symposium (<http://www.euref-iag.net/symposia/book2004/2-8.pdf>). A main purpose is the validation of permanent GPS stations which are not involved in the EPN but are on a comparable quality level. The original initiative had been undertaken by C. BRUYNINX and then A. CAPORALI by his engagement in working package 6 of

CERGOP. J. TORRES classifies 3 types of stations, i.e. category A – public stations routinely processed by a LAC, generally EPN sites, category B – public stations not routinely processed by a LAC, which may be considered as a campaign type, for ETRS89 densification, and category C – private stations. The quality label for non EPN permanent sites could urge national NMAs or private institutions operating permanent GPS sites to maintain their stations on a long term high quality level and also give a benefit for EUREF as an established notation for positioning quality. For the analysis of local networks such stations can help to analyse the data thoroughly using non EUREF permanent stations.

The TWG considers the ideas proposed as useful. However, it has to be guaranteed that these stations are maintained on their quality level also without the permanent analysis by the EPN. At present the colleagues engaged in the EPN have no capabilities to enlarge their activities in the analysis of a large number of additional stations and the computer storage facilities are limited in the same. Therefore clear guidelines have to be formulated how to direct the responsibility for non EPN stations to station managers and instructions how to operate these sites and how to analyse the data and combine them with official EPN data.

This item should be put on the agenda of the next EUREF TWG meeting again.

8. Galileo proposals – GGSP

Z. ALTAMIMI remembers the discussion to this topic at the Bratislava TWG meeting how EUREF can contribute to the GGSP (Galileo Geodesy Service Provider). Proposals are to be submitted to the GJU (Galileo Joint Undertaking). In the consortium the ESOC, BKG and IGN France are engaged. The IGN plans to provide a combination solution similar to the procedure in IGS and EUREF. Another proposal is submitted by the Norwegian Statens Kartverk in cooperation with CNES.

9. Short Information on ITRF2004 and IERS CPP

Z. ALTAMIMI reports on the progress for the computation of the ITRF2004. The input data comprise time series of weekly solutions of GPS, DORIS, SLR., VLBI etc. The data will allow to find a best possible consistent frame basing on a 14 parameters solution (7 traditional and additionally their rates). The solution will comprise all available old data which seem useful. As computing centers the IGN, the DGFI and the NRCAN (Natural Resources, Canada) are acting. There are plans to include besides the data provided by the IGS also those provided by EUREF, SIRGAS and others. In order to avoid constraints, these data, however, have to be based on a free solution.

Parallel to these activities M. ROTHACHER is initiating a IERS Combination Pilot Project using accumulated weekly combined solutions. In this case the correct use of the local ties for each solution might be a problem. Z. ALTAMIMI presented an alternative study starting with the ITRF2004 as initial reference and the combination with the new weekly data records. A thorough investigation of the yielded time series for at least one year has to be done to

get an impression on the quality of this method. Then it will be decided whether to continue or stop the attempt.

10. EUREF contribution to UN WG on Site Quality, Integrity and Interference Monitoring

A. KENYERES presents the concepts of the planned International WG on Site Quality, Integrity and Interference Monitoring for the UN/USA Meeting on GNSS initiated by the United Nations Office for Outer Space Affairs in Vienna, 13-17 December 2004 Joint UN/USA GNSS meetings. The objectives of the group comprise

- promote existing international standards
- review and disseminate best practices
- develop new procedures, recommendations and guidelines for site quality, integrity and interference monitoring (if not yet exists)
- assist developments in new regional and continental networks (AFREF!)

The group is led by I. FEJES. A close cooperation with SAPOS (Europe – national), CEGRN Consortium and EUPOS / EUPOS ISC (Europe – regional), EPN (EUREF) (Europe), AFREF (Africa), SIRGAS (America), APRGP (Asia – Pacific), IGS, IAG, etc. (international organizations) is considered as necessary for a successful work. A. KENYERES expresses the urgent desire for an engagement of EUREF in these activities, especially considering the experiences in large data sets, long time series and data quality.

The TWG approves the ideas to install this group and asks A. KENYERES to report on the further progress. As soon as the group will be established, EUREF will support the activities as far as the working plan coincides with the goal of EUREF.

11. Special Project Troposphere Parameter Estimation, Status Report

In his report G. WEBER mentions the test comparison of his data with those of IVS solution of the TU Vienna. The data are fitting very well. More comparisons of GPS data with others are planned.

H. V. D. MAREL gives a summarized report on the COST 717 activities. The project is closed now, the final report will be published in the internet. A new action is planned in about 1½ years.

12. EUREF-IP Pilot Project, Status Report

G. WEBER informs on the progress of the project. In September 2004 the EUREF's Ntrip became RTCM Standard. This situation is very welcome as much equipment is now available which can fulfill the requests. For the status of the Real-time GNSS Networks Europe G. WEBER shows the large number of sites of very different origin contributing to the project. For AFREF a small TrigNet campaign South Africa is carried out. Other networks are planned in Australia and South America. For demonstrating the application of Real-time GNSS Geo-Referencing an example for a Pipeline/Cable Cadaster in Europe is shown. In March 2005 a Ntrip Workshop / Sym-

posium in Frankfurt will be held with special sessions for techniques, applications and standards.

G. WEBER expresses the need for support as the daily routine work exceeds the personal capabilities which are available in the BKG.

13. EPN CB report

Since the last TWG meeting altogether 5 new stations have been included in the EPN (UK -1, Greece -2, Italy -1, Hungary -1). C. BRUYNINX explains the current situation of two stations located in near vicinity in Medicina. These stations are operated by different agencies and some trouble arose because the use of two stations on the same place. Normally EPN stations should be well distributed and their number is limited according to the size of the respective country. In this special case, however, both stations might be useful for getting interesting comparable data records for the fundamental station. Medicina where various techniques are applied and long time series are produced. In order to clarify the problems the TWG chairman is asked to write a letter to the ASI explaining the use of these two permanent stations, emphasizing the highly welcome work of the ASI and asking for further cooperation with EUREF.

14. EPN Guidelines

On October 28 C. BRUYNINX distributed a draft for the updated Guidelines for EPN Stations & Operational Centres by mail among the TWG. The submitted comments were considered and a new update is presented. C. BRUYNINX emphasizes the efforts which have to be undertaken in setting up clear and comprehensive guidelines, on the other hand they clearly help to avoid continuous questions, errors and misunderstandings. The new guidelines will be put into the EUREF homepage for general use.

A. KENYERES mentions the increasing amount of antennae used for permanent stations. C. BRUYNINX will contact an antenna specialist and prepare a new report for the next TWG meeting on this item.

15. EPN Data Flow

On behalf of the EPN Coordination Group (B. BRUYNINX, H. HABRICH, G. STANGL) a report is given on the status of the BKG RDC mirroring. G. STANGL complains that the problem of a probable loss of data in the case of an outage within the BKG is still not sufficiently solved. The installation of a second permanently operating data center could naturally solve the problems, however, the facilities in personnel and computers are rather limited. Another idea was to establish a DC which only reacts in case of emergency. This option seems more economical, the practical application, however, seems not to be reliable due to problems of informing the LACs and users in time, missing storage transparency and missing access rights. Theoretically these problems seem rather unimportant, practically they will occur in some way in the cases of an outage. Therefore the OLG has started to operate as a real second data center with end of November 2004.

W. GURTNER emphasizes the urgent need to secure the continuous data records of all available data. Special

guidelines have to be developed to ensure the correct data flow and the security of the data records.

The new ideas will be presented at the next TWG meeting.

16. Short information on GOP EPN Data Center

Besides its tasks as Czech national data center the Geodetic Observatory Pecny (GOP) is internationally involved in various activities (EPN, IGS, NRT data projects etc.). J. DOUSA offers to take part in other activities, too, as far as the needed manpower is available.

17. ESEAS Workshop report

From November 1-3, 2004, an ESEAS Workshop was held in Malta. H. HABRICH as EUREF representative gives a summarizing report. The EC funded project ESEAS is coordinated now by B. BENTE-LILJA, Norwegian Statens Kartverk. H. P. PLAG keeps his position as chairman of the scientific committee. The agenda of the workshop was subdivided into sessions for 1 – Observing local sea level, 2 – Vertical land movements and other factors contributing to local sea level, 3 – Observing sea level on regional to global scale: satellite altimetry, 4 – Diagnostic of inter-annual sea level variations, 5 – Modelling inter-annual sea level variations, 6 – Understanding inter-annual sea level variations.

R. BINGLEY (chair of the technical committee) expressed his apologies for not having yet responded to the EUREF proposal, but the ESEAS governing board will prepare a letter to EUREF in the next future expressing its request for contribution of EUREF to ESEAS. ESEAS uses basically daily solutions to study the time series, so the daily solutions of EPN stations that are located at tide gauges would be highly welcome. H. HABRICH proposes that a definite list of stations in which ESEAS is interested should be sent to him and he then will contact some EPN Local Analysis Centers to provide daily solutions directly to ESEAS.

In the discussion it is pointed out that the EUREF real time activities are rather similar, the users have to register for taking any data. So it should be reflected whether the EUREF data should be made freely available to ESEAS or a real data exchange vice versa is to be requested.

The TWG concludes to wait for the official answer by ESEAS concerning a close cooperation between both groups and then discuss the item again in detail.

18. Legal entity for EUREF

J. IHDE remembers the extensive discussion at the Bratislava TWG meeting then the group was asked to validate a method for data not being part of EUREF. At present EUREF is concentrated on scientific tasks, however in future also operational tasks (services, generating products) might become a broader part in the activities. In the IAG currently the services play an increasing role, so it should be reflected also for EUREF whether the establishment of some kind of legal entity is useful.

As motivation for EUREF, J. IHDE points out the following items:

- NMAs or similar institutions could ask EUREF for certifications or validations of data,
- in the EUREF group basically a considerable amount of expertise is available, however, any statement should be formulated carefully with respect to any responsibility or claim of recourse,
- as EUREF is no national institution, it cannot be compared e.g. with the NGS or NMAs which have defined duties on their level,
- EUREF is strongly related to the IAG and EuroGeographics which have certain official tasks,
- GALILEO automatically involves some degree of safety,
- at present no European group exists to take over the duties of an official expert group in geodesy,
- the cooperation with other groups by contracts needs to be based on clearly defined rules.

Legal entities describe an individual or organization which is legally permitted to enter into a contract, and to meet its contractual obligations, further contracts (the binding agreement between two or more parties for performing, or refraining from performing, some specified act(s) in exchange for lawful consideration (private, economy, trade, national, international, European law)) and finally obligations (any debt, written promise, or duty (e.g. guarantee, payment, product delivery)).

As possible options the following solutions are characterized:

- connection to existing legal bodies (e.g. EUROSTAT, Galileo Supervisory Authority, EuroGeographics),
- foundation of a new legal European body on national or European law e.g. an European Mapping Agency (e.g. company like EuroGeographics, association like EuroSDI),
- one legal member body of EUREF by order of the other involved institutions or with subcontracts between involved institutions
- keep the current status.

Z. ALTAMIMI, J. IHDE (chair), J. MÄKINEN and J. A. TORRES together with all colleagues within the TWG are asked to discuss this item to develop a strategy for the future and propose their findings to the next TWG Meeting.

19. Joint adjustment of Nordic leveling networks: Status report

In his report J. MÄKINEN describes the status of the various activities. To connect the continental UELN-95/98 network with the Scandinavian parts observations via the Danish streets and also "non-orthodox" connections across the Aland Sea or the Gulf of Finland are considered. The background for these activities is the availability of a large amount of data and the need to clarify the discrepancies at the borders before combining them with the UELN. Especially the final completion of the Baltic Ring represents the fulfilment an old desire. Much attention is given to the modelling of the post glacial rebound, various attempts as proposed by EKMAN, MILNE et al. (BIFROST), LAMBECK et al. and now VESTÖL are investigated and tested. the

investigations for the Baltic Ring yielded interesting insights in effects such as irregular surface currents or unexpected salinity in special areas of the Baltic Sea. The computed values for the mean sea level at the tide gages along gulf of Finland shows gaps up to 50 mm.

J. IHDE as coordinator of the UELN adjustment appreciates this exemplary work by the Scandinavian colleagues and suggests that EUREF should officially ask the Nordic Geodetic Commission to make available their data for UELN.

20. Spectral analysis of EPN time series

A. CAPORALI presents his findings for the thorough investigation of GPS permanent stations time series. It is tried to eliminate noise effects in order to separate real signals for trends. In most cases periodic signals on a 1-year level are still found although the causing effects such as polar motion, Earth tides etc. are already eliminated. In all the spectral analysis shows that time series often are not as continuous as expected. The investigations will be continued.

21. DORIS processing by Bernese Software

P. STEPANEK informs on his detailed work for DORIS which was initially installed in 1982 for the POSEIDON mission and firstly used in 1990 for SPOT 2. DORIS is used as one of the four IERS techniques, the activities are coordinated by the International Doris Service (IDS). At present about 50 stations are processed. The approach is similar to one used for GPS. For the data computations the Bernese software is used.

22. ECGN Status

J. IHDE gives a summarizing report on the European Combined Geodetic Network (ECGN). The ECGN was initiated by the IAG Sub-Commission for Europe EUREF (SC1.3a) and the IAG Sub-Commission for Europe of the International Gravity and Geoid Commission (IGGC). The principles are based on the GGOS Observing System with time series and periodic observations, combination of space geodesy and gravity at terrestrial reference stations (local ties), use of available infrastructure and standards as far as possible, stepwise realization (1 – network infrastructure, 2 – data processing, combination) and levels of combination (1 – at the stations, 2 – in the network, 3 – with external observations (e.g. GRACE)). For all contributing data (GPS, gravity measurements, levelling, tide gauges, local ties) strict quality requests are defined. As objectives of the ECGN are mentioned

- realization of a terrestrial reference system and maintenance of long time stability with an accuracy 10⁻⁹ for Europe especially in the vertical component,
- in-situ combination of space geodesy (GPS) with Earth gravity parameters (gravity, heights),
- modelling of influences of time depended parameters to TRF (of the solid Earth of the Earth gravity field, the atmosphere, the oceans, the hydrosphere),
- modelling of terrestrial gravity field components to validate satellite gravity missions,

- geodetic platform in Europe for geo-initiatives (GMES, INSPIRE, GEOSS, GGOS).

In mid August 2004 about 72 stations in 20 countries were gathered to contribute to the ECGN. Due to some delays the second call for participation was postponed to 2005.

More detailed information such as ECGN website guidelines and forms with links to guidelines and forms for the different observation techniques are found in the ECGN homepage <http://www.bkg.bund.de/ecgn>.

23. Current works of the ExGG of EuroGeographics

As the majority of the members in the EUREF TWG and the ExGG of EuroGeographics are the same persons, the ExGG usually meet before the TWG meetings. In the morning of November 9, the group met in the same place, the chairman, J. IHDE, reports on this meeting. As members of the group, at present Z. ALTAMIMI, E. BROCKMANN, H. HABRICH, B. G. HARSSON, J. IHDE (chair), A. KENYERES, C. LUZET, J. MÄKINEN, J. SIMEK, G. STANGL, J. A. TORRES, G. WEBER, M. MARJANOVIC are appointed. As recent main topics for the activities J. IHDE mentions the agreement with the EuroGeographics Head Office in August 2004 to the EUREF Terms of Reference (ToR) (http://www.euref-ia.net/html/Overview_of_EUREF_Terms_of_reference.html) as well as the Work Plan of the ExGG, status June 2004.

The Expert Group 17 held a general assembly in Athens from October 17-20, 2004. A revision of ISO 19111 – Spatial Referencing by Coordinates was started, new projects (EuroBoundaries, GEORAIL) in close connection to the ExGG are in preparation. The working plan of the ExGG comprises

- a catalogue of geodetic products,
- the implementation of the European Vertical Reference System (EVRS),
- Time GNSS Service / Densification of EPN,
- an information system for European Coordinate Reference Systems (CRS-EU) (cf. <http://crs.bkg.bund.de/crs-eu>).

The TWG concludes to discuss the ExGG catalogue of geodetic products prepared by H. HABRICH in detail at the next TWG meeting.

24. Varia

a) Next TWG meeting

C. BRUYNINX invites the TWG to hold its spring 2005 meeting in Brussels. The TWG gratefully acknowledges the invitation. As date Monday, March 14 - Tuesday, March 15, 2005 (noon to noon) is fixed.