EUPOS® - European Position Determination System

Status and current issues

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Contents

EUPOS members and present status of the *EUPOS* Differential (D)GNSS infrastructure development

Information on *EUPOS* reference stations provided by the *EUPOS* Station Data Base (ESDB)

EUPOS sub-services

The organisational structure of the *EUPOS*

EUPOS National Service Centres structure

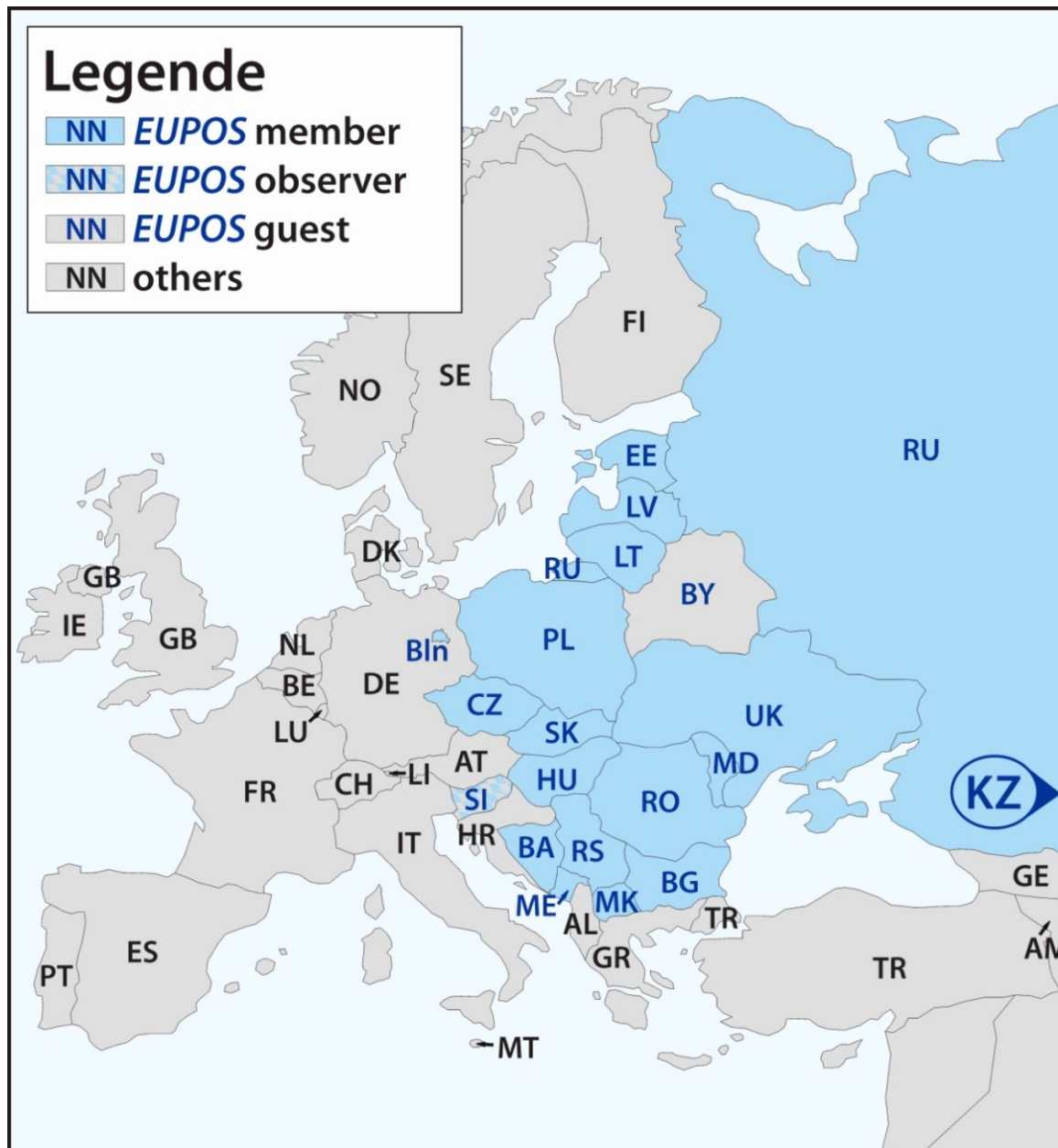*EUPOS'* cooperations with other organisations

Selected *EUPOS* activities in the fields of technical development, administration and cooperation

Web links for more detailed information

Examples of *EUPOS* and German SA*POS* Applications

EUPOS members
Bosnia and Herzegovina
Bulgaria
Czech Republic
Berlin (ISCO)
Estonia
Hungary
Kazakhstan
Latvia
Lithuania
Macedonia
Moldova
Montenegro
Poland
Romania
Russian Federation
Serbia
Slovakia
Slovenia (observer)
Ukraine

EUPOS Country (ISO 3166)	Area [km²]	planned RS	realised RS	EUPOS Country (ISO 3166)	Areal [km²]	planned RS	realised RS
BA	51,000	26	n/a	LT	65,300	25	25
BG	110,950	23	12	MK	25,434	14	14
CZ	78,870	27	27	MD	33,700	15	2
DE/ Berlin	891	4	4	PL	323,520	98	98
EE	45,220	17	9	RO	237,500	73	58
HU	93,030	36	35	RU	17,075,400	n/a	n/a
KZ	2,724,900	500	30	RS	88,360	32	32
LV	64,600	23	20	SK	46,035	25	23

EUPOS Station Data Base (ESDB) map

http://www.eupos.hu/EUPOS-ESDB.php
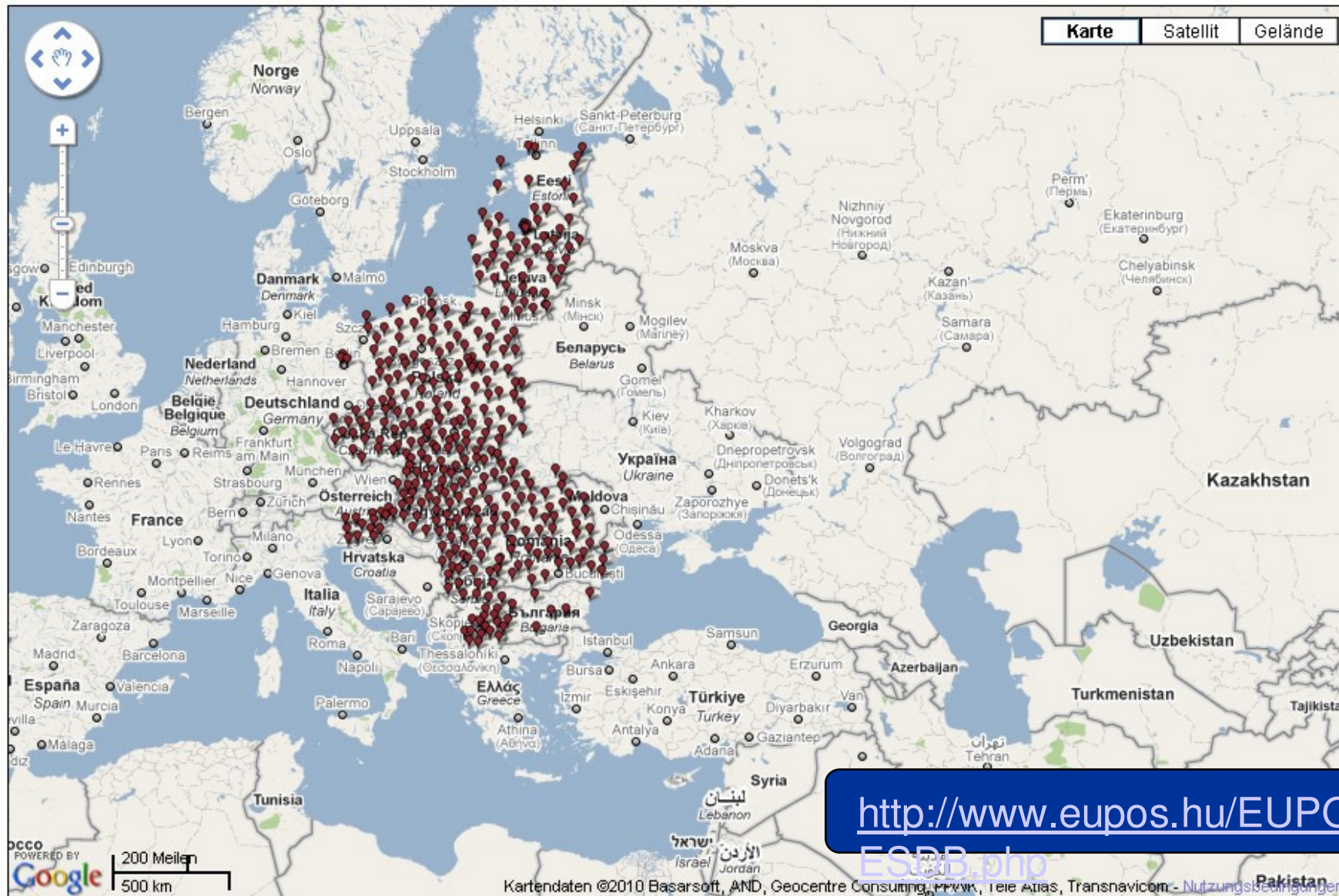
EUPOS Station Data Base (ESDB) station data

Back

For *EUPOS* members:

```
0896_20080526.log

0896 Site Information Form (site log)
International GPS Service
See Instructions at:
    ftp://igscb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt


0.    Form

      Prepared by (full name)  : Schwarz, Lars
      Date Prepared            : 2008-05-26
      Report Type              : UPDATE
      If Update:
       Previous Site Log       : 0896_20080131.log
       Modified/Added Sections : 3.1


1.    Site Identification of the GNSS Monument

      Site Name                : BERLIN-WILMERSDORF
      Four Character ID        : 0896
      Monument Inscription     :
      IERS DOMES Number        :
      CDP Number               :
      Monument Description     : STEEL BOLT AND BRASS PLATE WITH SCREW
        Height of the Monument : 0.1
        Monument Foundation    : ROOF
        Foundation Depth       :
      Marker Description       : OK. STUD BOLT
      Date Installed           : 1989-12-29T00:00Z
      Geologic Characteristic  :
        Bedrock Type           :
        Bedrock Condition      :
        Fracture Spacing       :
        Fault zones nearby     :
          Distance/activity    :
      Additional Information   :


2.    Site Location Information

      City or Town             : BERLIN
      State or Province        : BERLIN
      Country                  : Germany
      Tectonic Plate           : Eurasian Plate
      Approximate Position (ITRF)
```

For unauthorised users:

EUPOS Reference Stations in Berlin			Approximate ETRS 89 Cartesian coordinates			Approximate ETRS 89 Geographic coordinates						
			X	Y	Z	Latitude			Longitude			Height
Station ID	City or Town	RTCM ID	[m]	[m]	[m]	[°]	[']	["]	[°]	[']	["]	[m]
0896	BERLIN	0896	3787400	896200	5036200	+52	29	20	+13	18	40	110
0897	BERLIN	0897	3778800	895000	5042900	+52	35	10	+13	19	30	120
0898	BERLIN	0898	3789600	917000	5030800	+52	24	30	+13	36	10	100

http://www.eupos.hu/EUPOS-ESDB.php

EUPOS sub-services

EUPOS **DGNSS** for real-time DGNSS applications by code and code-phase measurements with accuracy of 2 m up to 0.5 m for dynamic applications, and up to 20 cm for static applications, depending on the applied rover equipment; DGNSS corrections are in standard data format RTCM SC-104.

EUPOS **Network RTK** for real time DGNSS applications by carrier phase measurements with accuracy of ≤ 2 cm (1σ, horizontally). *EUPOS* strives to provide DGNSS correction data that support all existing network RTK solutions: Flächenkorrekturparameter (FKP, area correction parameter), non-physical reference station, and Master Auxiliary Concept (MAC).

EUPOS **Geodetic** for post processing applications by code and phase measurements in static or kinematic mode with decimetre up to sub-centimetre accuracy. User interfaces are GNSS observation data in RINEX 3.0, also for the third GPS frequency L5 and Galileo. It is recommended for a limited period to provide both data formats the former RINEX 2.11 and the RINEX 3.0.

The organisational structure of *EUPOS*

EUPOS organisational structure

EUPOS National Service Centres structure
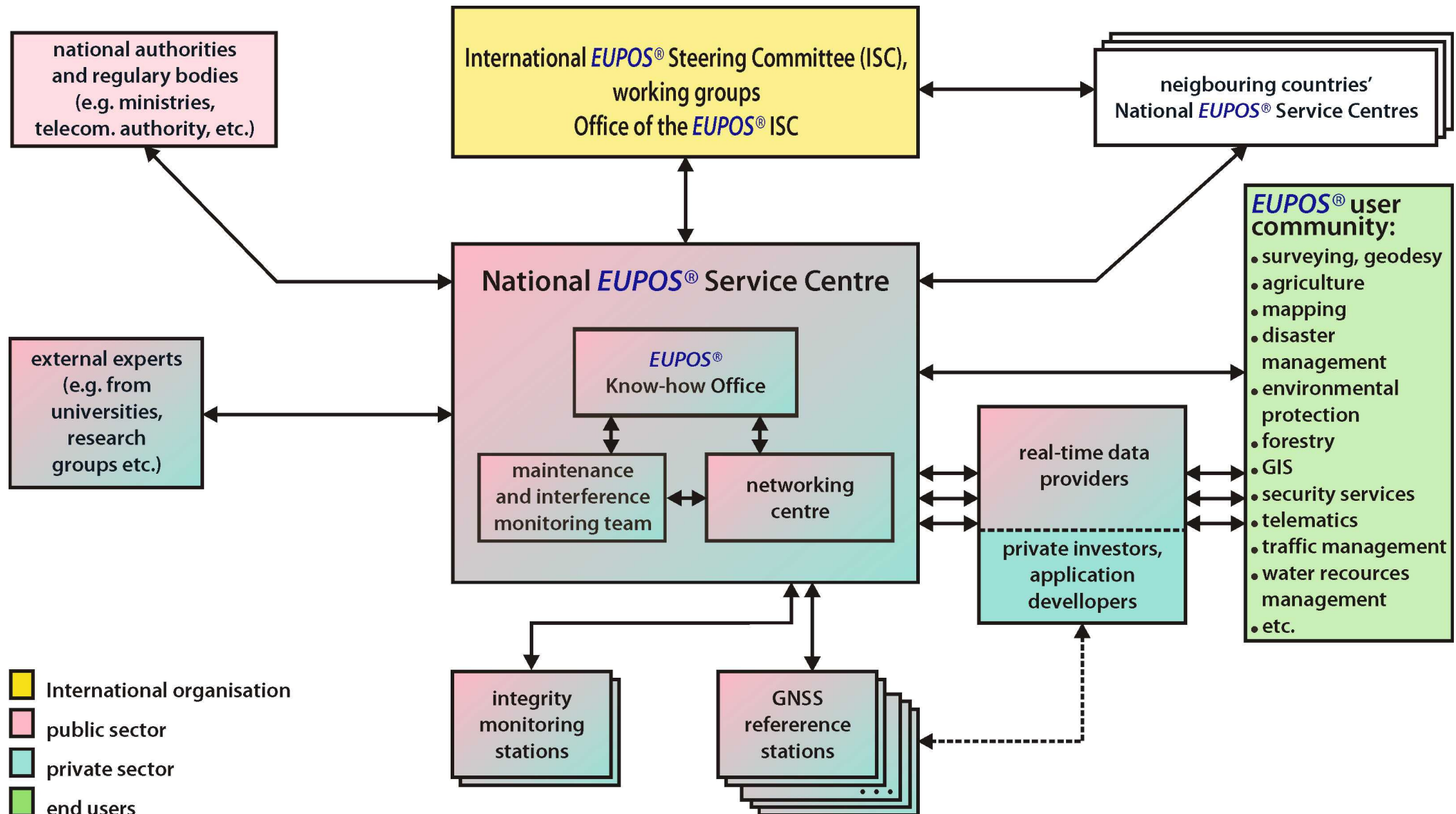
EUPOS' cooperations with other organisations

Cooperation with the United Nations Office for Outer Space Affairs.

EUPOS is an associated member of the International Committee on GNSS.

GALILEO Joint Undertaking accepted the necessity of ground-based GNSS augmentation systems and welcomed *EUPOS*.

EUPOS initiates cooperation of sub-Saharan African countries and GNSS enterprises under patronage of the UN/ ICG to establish "full scale accuracy" ground-based DGNSS demonstration projects. Resumed by TOPCON and Geo++ companies, and Malawi 2010.

Official participation of representatives of both EUREF TWG and *EUPOS* ISC in the other organisation's conferences.

EUPOS is member of the Radio Technical Commission for Maritime Services (RTCM).

EUPOS' cooperation with other organisations
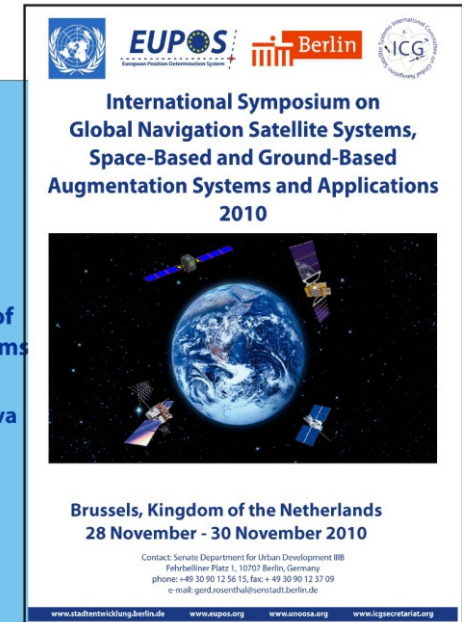
A successful series of UNOOSA/**...** Workshops and Berlin/*EUPOS/* UNOOSA/ ICG Symposia of related themes in the field of GNSS, DGNSS Augmentation and Applications **...**

Current issues

Technical matters

To continue the completion of the DGNSS ground-based augmentation systems in all *EUPOS* countries with entire regard to the *EUPOS* standards and guidelines.

To complete absolute antenna Phase Centre Variation (PCV) calibration of every *EUPOS* reference station .

EUPOS contributes to the Radio Technical Commission for Maritime Services, Special Committee 104 (RTCM 104), e.g. by development of Private Service Messages (RTCM data encryption against falsification or manipulation).

To develop a *EUPOS* self-certification procedure corresponding with the *EUPOS* technical standards, including measurements on the spot.

To develop a method to determine local multipath influences especially at GNSS reference stations.

Current issues

Administrative matters

- complete the establishment of National Service Centres (NSCs) in every *EUPOS* country

- improve information dissemination by two *EUPOS* Newsletters per year with information about the *EUPOS* conferences and news from all *EUPOS* countries.

- transfer applications to other countries and regions.

- cooperate with other infrastructures, organisations and projects, e.g. GOCE.

Contributing to the UN and ICG goals and work

Development of a draft definition of interoperability applicable to ground-based differential GNSS (DGNSS) networks in cooperation with IGS etc.

Organising and hosting the Berlin/ *EUPOS*/ UN/ ICG Symposia on Global Navigation Satellite Systems, Space-Based and Ground-Based Augmentation Systems.

Current issues: *EUPOS* Enlargement

- **Expansion**
  - Membership – *Kazakhstan, April 2009*
  - Membership – Montenegro
  - The user community >8200 registered users, ~50% increase in one year,
- **Technical:**
  - Cross border data exchanges
    - >70 external ref. sta. In some cases >30% of the segment.
  - The EUPOS station data base: 348 station data uploaded
  - Absolute antenna calibrations: 159 (In Garbsen and Berlin)
  - RTCM SC 104 participation, new initiatives in the pipeline
  - EUPOS Combination Centre (ECC) : homogenization, long-term site monitoring, scientific studies

Current issue: *EUPOS* Enlargement

Terms of Reference of the *EUPOS* ISC

EUPOS Terms of Reference ,
revised 2nd Edition, 20 September 2007, updated on March 8th, 2010

Actual technical documents of the *EUPOS* ISC

EUPOS Technical Standards, revised second edition, 24 April 2008

EUPOS Guidelines for Single Site Design, Version 2.1, 4 June 2008

Guidelines for *EUPOS* Reference Frame Fixing, Version 1.0, 21 September 2007

EUPOS Guidelines for Cross-Border Data Exchange, Version 1.0, 21 September 2006

EUPOS downloads:

http://www.eupos.org/index.php?option=com_content&task=view&id=43&Itemid=91

Further publication of *EUPOS* and Berlin

Proceedings of the International Symposium on Global Navigation Satellite Systems, Space-based and Ground-based Augmentation Systems and Applications, Berlin, Germany, 11-14 November 2008, ISBN 978-3-938373-99-6

Proceedings of the International Symposium on Global Navigation Satellite Systems, Space-based and Ground-based Augmentation Systems and Applications, Berlin, Germany, 30 November – 2 December 2010, ISBN 978-3-938373-93-4

EUPOS InterRegional Cooperation (*EUPOS*-I RC),
part-financed by the European Union, INTERREG IIIC East

DGNSS Application Study in the Framework of *EUPOS*-IRC,
Final Report part-financed by the European Union, INTERREG IIIC East

http://www.eupos.org/index.php?option=com_content&task=view&id=43&Itemid=

Useful links for further information on *EUPOS*

EUPOS Website

http://www.eupos.org/

International issues of the Senate Department for Urban Development of the Land Berlin in the field of geoinformation (German language)

http://www.stadtentwicklung.berlin.de/internationales_eu/geoinformation/

EUPOS Newsletters **New**
The *EUPOS* ISCO started August 2009 to provide up to two newsletters p.a. If you would be interested, please mail to: eupos.isco@senstadt.berlin.de

Examples of *EUPOS*® and SA*POS*® Applications

Thank you for your attention!

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Geodetic Reference Systems

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Links:

www.eupos.org

http://www.stadtentwicklung.berlin.de/geoinformation/

http://www.stadtentwicklung.berlin.de/internationales_eu/geoinformation/