EUPOS®: Example of a regional full scale accuracy ground-based differential (D)GNSS infrastructure

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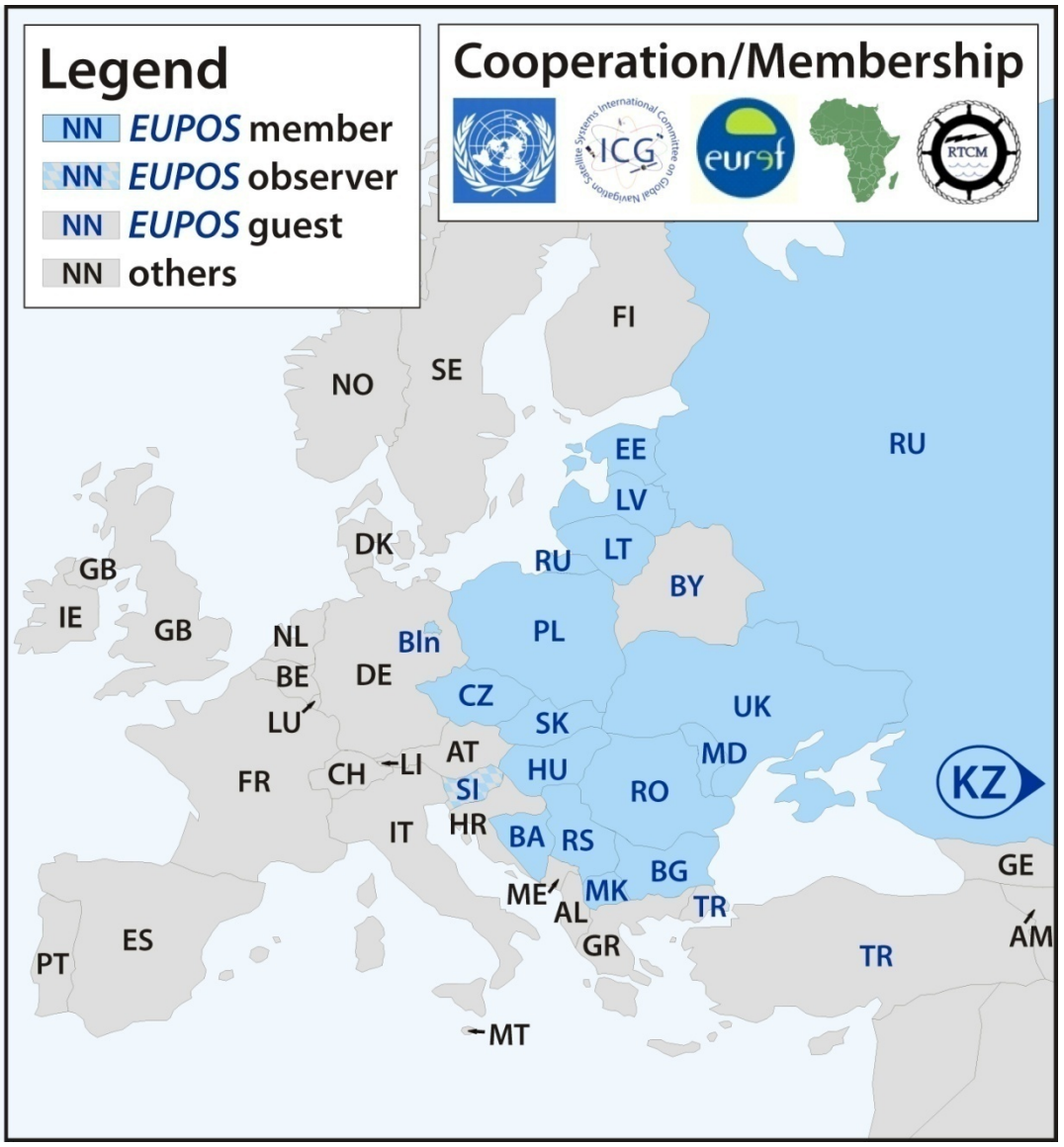
Web links for more detailed information

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



EUPOS members

Belarus (will be invited)
Bosnia and Herzegovina
Bulgaria
Czech Republic
Berlin (ISCO)
Estonia
Hungary
Kazakhstan
Latvia
Lithuania
Macedonia
Moldova
Poland
Romania
Russian Federation
Serbia
Slovakia
Slovenia (observer)
Turkey (invited guest)
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	*(in 2009)*	LT	65,300	25	25
BG	110,950	23	12	MK (FYROM)	25,434	14	7
CZ	78,870	27	27	MD	33,700	15	2 *(in 2009)*
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	0	RS	88,360	32	32
LV	64,600	19	19	SK	46,035	21	21
LV/ Riga City	307	5	5	UA	603,700	27	9
SI (Observer)	20,270	15	15	Sum	21,688,987	977+RU	404+RU

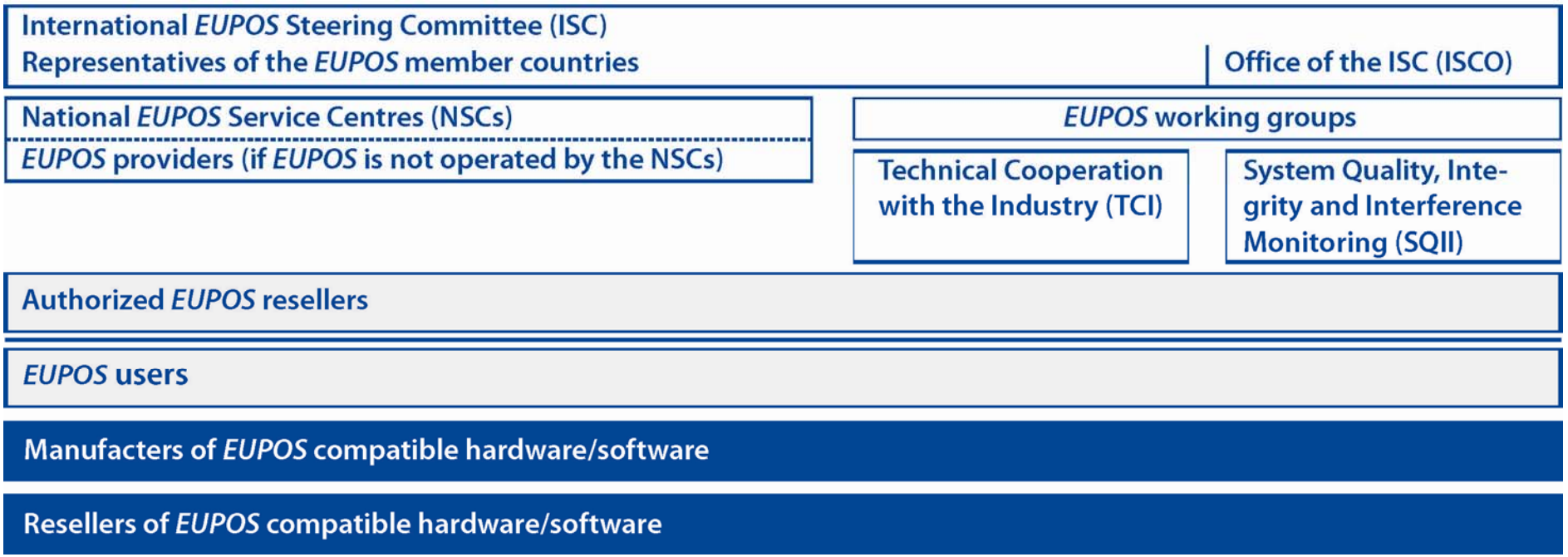
EUPOS sub-services

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.

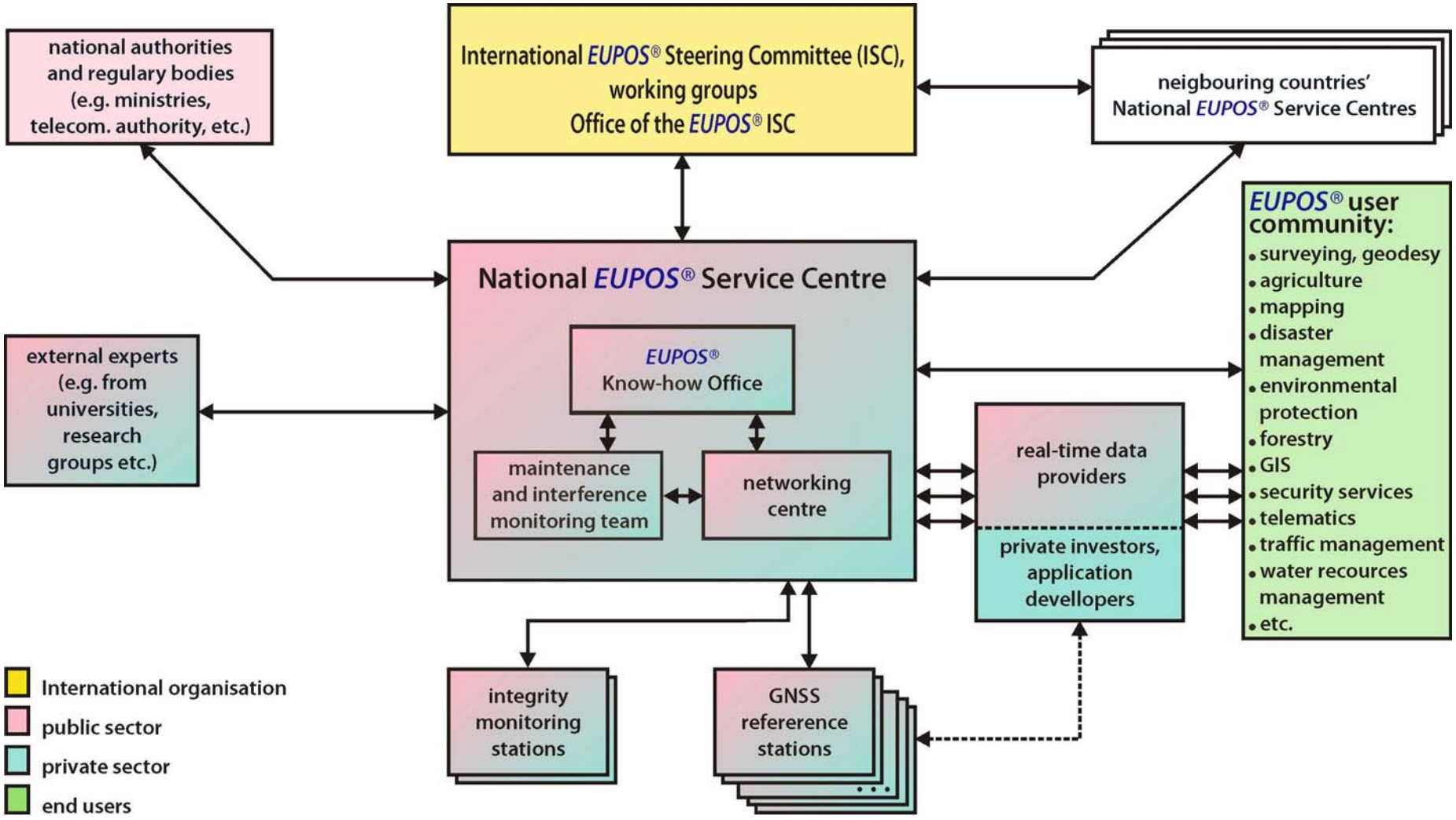
EUPOS **Network RTK** for real time DGNSS applications by carrier phase measurements with accuracy of $\leq$ 2 cm (1σ, horizontally). *EUPOS* strives to provide DGNSS correction data that support all existing network RTK solutions: Flächenkorrekturparameter (FKP, area correction parameter), non-physical 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 National Service Centres structure



EUPOS' cooperation 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.

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).

Selected *EUPOS* activities

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.

To support the development of low-priced DGNSS-receivers (code phases) with an accuracy of about 50 cm in cooperation with appropriate GNSS companies.

Selected *EUPOS* activities

Administrative matters

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

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

To transfer applications to other countries and regions.

To 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., and

(non financially) support of DGNSS "full scale accuracy" demonstration projects in sub-Saharan Africa in cooperation with the industry, and to organise a GNSS/geodetic reference workshop together with UNOOSA, ICG, etc.

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


Photo: SenStadt Berlin

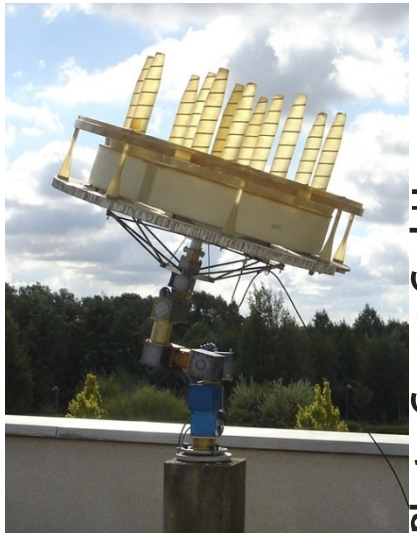


Photo: Geo++ GmbH

Terms of Reference of the *EUPOS* ISC

EUPOS Terms of Reference , revised 2nd Edition, 20 September 2007, updated on 23 April 2008

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 *(only available as book, not downloadable)*

DGNSS Application Study in the Framework of EUPOS-IRC, Final Report – part-financed by the European Union

EUPOS InterRegional Cooperation (*EUPOS*-I RC) – part-financed by the European Union

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

EUPOS
European Position Determination System

Links for information about the International Symposium on GNSS, DGNSS, Space-Based and Ground-Based Augmentation Systems, Berlin, Germany, 11-14 November 2008

Report and photos, only German:

http://www.stadtentwicklung.berlin.de/internationales_eu/geoinformation/de/projekte/gnss2008/index.shtml

Presentations in the Symposium, only English (downloadable):

http://www.stadtentwicklung.berlin.de/internationales_eu/geoinformation/de/projekte/gnss2008/programm/index.shtml

Recommendations of the Symposium, only English (downloadable):

http://www.stadtentwicklung.berlin.de/internationales_eu/geoinformation/de/projekte/gnss2008/recommendations.shtml

http://www.unoosa.org/pdf/pres/2008/berlin2008-recom.pdf

http://www.eupos.org/

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

Thank you for your attention!

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