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
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<tr>
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**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

<table>
<thead>
<tr>
<th>International EUPOS Steering Committee (ISC)</th>
<th>Office of the ISC (ISCO)</th>
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</thead>
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<tr>
<td>Representatives of the EUPOS member countries</td>
<td>EUPOS working groups</td>
</tr>
<tr>
<td>National EUPOS Service Centres (NSCs)</td>
<td>Technical Cooperation with the Industry (TCI)</td>
</tr>
<tr>
<td>EUPOS providers (if EUPOS is not operated by the NSCs)</td>
<td>System Quality, Integrity and Interference Monitoring (SQII)</td>
</tr>
<tr>
<td>Authorized EUPOS resellers</td>
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</table>

**EUPOS users**

- Manufacturers of EUPOS compatible hardware/software
- Resellers of EUPOS compatible hardware/software
**EUPOS National Service Centres structure**

- **national authorities and regulatory bodies** (e.g. ministries, telecom. authority, etc.)

- **International EUPOS® Steering Committee (ISC), working groups**
  - Office of the EUPOS® ISC

- **neighbouring countries' National EUPOS® Service Centres**

- **EUPOS® user community:**
  - surveying, geodesy
  - agriculture
  - mapping
  - disaster management
  - environmental protection
  - forestry
  - GIS
  - security services
  - telematics
  - traffic management
  - water resources management
  - etc.

- **National EUPOS® Service Centre**
  - EUPOS® Know-how Office
  - maintenance and interference monitoring team
  - networking centre
  - real-time data providers
  - private investors, application developers
  - integrity monitoring stations
  - GNSS reference stations

- **International organisation**
- **public sector**
- **private sector**
- **end users**

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Gerd Rosenthal
Office of the International EUPOS® Steering Committee, Berlin, Germany

Baku, 11-15 May 2009
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
Terms of Reference of the EUPOS ISC


Further publication of EUPOS and Berlin


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

EUPOS InterRegional Cooperation (EUPOS-IRC) – part-financed by the European Union

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

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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:

Presentations in the Symposium, only English (downloadable):

Recommendations of the Symposium, only English (downloadable):
http://www.eupos.org/
Examples of EUPOS® and SAPOS® Applications
Thank you for your attention!

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