

3rd meeting of the Positioning Knowledge Exchange Network (PosKEN)

November 15-16, 2016 (beginning at 13:30 until 13:00 the second day)

**venue: Czech Office for Surveying, Mapping and Cadastre,
6th floor – conference room**

address: Pod sídlištěm 1800/9, 182 11 Prague 8 - Kobylisy, Czech Republic

Date: Tuesday 15 – Wednesday 16 of November 2016

Place and Time: Czech Office for Surveying, Mapping and Cadastre,
Prague, Czech Republic

Subject: PosKEN meeting

Attended in person: Altiner Yüksel, BKG, Germany
Babáček Michal, GSA - European GNSS agency
Degainis Ivars, Latvian Geospatial Information Agency
Dobelis Didzis, Latvian Geospatial Information Agency
Droščák Branislav, GKU, Slovakia
Horváth Tamás, Alberding GmbH, Germany
Hriscu Alina, GSA - European GNSS agency
Kakko Mairot, CLGE, Estonia
Kenyeres Ambrus, Hungary
Kollo Karin, Estonian Land Board, Estonia
Marjanovic Marijan, State Geodetic Administration, Croatia
Řezníček Jan, CUZK, Czech Republic
Smolík Karol, GKU, Slovakia
Šimek Jaroslav, CUZK, Czech Republic
Urbanas Saulius, EuroGeographics
Wajda Szymon, GUGiK, Poland
Wiklund Peter, Lanmateriet, Sweden
Zvirgzds Janis, Latvian Geospatial Information Agency
Bock Fabian, Senatsverwaltung fur Stadtentwicklung und Umwelt
Berlin, Germany

Attended by webinar:

Ceizel Pavol (Slovakia), Mitrofanovs Ingus, Piętka Dominik (Poland), Prizginiene Dalia (Iceland), Pruchnik Dawid (Poland), Soehne Wolfgang (Germany), Katsina Andriana (Greece), Lesparre Jochem (Germany)

Minutes produced by: Nágl Jaroslav and Saulius Urbanas

Presentations and records: Presentations and records of the presentations are available through the PosKEN page [Public Meetings](#)

Major conclusions

- Attendees kindly support the activities of the Positioning KEN. However, a dialogue and agreements shall be arranged avoiding possible duplications between EuroGeographics (PosKEN), EUPOS, EUREF, and CLGE.
- Members benefit from the possibility in sharing experience amongst NMCAs and discussing with GSA experts on GALILEO implementation.
- PosKEN workplan shall consider developing guidelines and best practice examples related to GNSS terminology, use of GNSS in Europe, national standards and GNSS metrology.

Actions

- EuroGeographics to appoint the new PosKEN chair and review the composition of the Coordinating Committee.
- New chair under support of EG (S. Urbanas) to initiated the discussion in the Coordinating Committee (CC) about the scope of activities in 2017.
- EuroGeographics (S.Urbanas), CLGE (M.Kakko) and EUPOS (B.Droscak) to share the event calendars amongst EUPOS, EUREF and CLGE, consider PosKEN representation in the events of the collaborating organisations.
- EuroGeographics to present the revised scope of activities / objectives for PosKEN and request members' representatives in PosKEN
- EuroGeographics to consider applying to the membership in the RTCM Committee. This includes the annual subscription. The individual representing NMCAs (PosKEN) shall be competent and be ready briefing PosKEN members about major news from RTCM as well as expressing NMCAs demands to RTCM.
- EuroGeographics continue inviting GSA representatives to PosKEN meetings.
- CC to organize webinar(s) briefing PosKEN members about the best practice guidelines on GNSS metrology, possibly to develop the guidelines.

NOTES OF THE MEETING

Welcome, Agenda, Introductions

The meeting was started on November 15, 2016 at 13:30. S. Urbanas from EuroGeographics welcomed participants on the meeting as well as participants on the simultaneous webinar and introduced the agenda. Each participant introduced himself/herself.

Host presentation: Introduction of host organisation

J. Řezníček apologized on behalf of K. Brázdiil, Director General of Land Survey Office, who couldn't participate in person, and introduced the organizational structure of Land Survey Office - public body established by Czech Office of Surveying, Mapping and Cadastre. He informed about main tasks and responsibilities of the Land Survey Office.

Host presentation: Geodetic activities of Land Survey Office

In the following presentation J. Řezníček focused on present state of geodetic activities of the Land Survey Office. He mentioned current need of precise transformation between national and pan-European coordinate reference system, which are important for international cooperation with respect to interoperability requirements especially needed for INSPIRE directive implementation and EuroGeographics project with cross-border cooperation. The Land Survey Office administrates Czech network of permanent stations

CZEPOS and corresponding monitoring applications. CZEPOS hardware is able to receive Galileo signal, but software must be upgraded for possibility to provide Galileo signal for users. Other management areas are maintenance of geodetic control points (positional, leveling and gravity points) and information about these points, which are available via internet or mobile application. Geodetic activities at the state boundaries are performed in cooperation with Ministry of Interior. The Land Survey Office has actively participated in EruroGeographics project "State Boundaries of Europe (SBE)" since 2013.

Update on Galileo developments and the available services

A. Hriscu introduced the GSA (European GNSS Agency). The number of staff is 135. Headquarter is located in Prague, Czech Republic. The GSA's mission is to support European Union objectives and achieve the highest return on European GNSS investment.

We got also some information about EGNOS system. It is Satellite Based Augmentation Service (SBAS), which improves GNSS performance, has European coverage and is available free of charge.

Presented Galileo system is worldwide navigation system "made in EU". This system is fully compatible with GPS. Galileo is offering four services:

- Open Service (OS) – freely accessible service for positioning and timing,
- Public Regulated Service (PRS) - Encrypted service designed for greater robustness and higher availability,
- Search and Rescue Service (SAR) - Assists locating people in distress and confirms that help is on the way,
- Commercial Service (CS) - Delivers authentication and high accuracy services for commercial applications.

The full operation capability is planned in 2020. 14 satellites have been launched, 4 satellites will be launched in Q4 2016 and 14 satellites will be launched by 2020.

Alberding GNSS solutions supporting Galileo

T. Horváth introduces Alberding, that is German GNSS software and hardware development company. This company is specialized in GNSS data communication, management, processing and monitoring. They have experience in data processing from GNSS area (real-time positioning, post-processed PPP positioning, DGNSS VRS networking, atmosphere modeling). They offer software for monitoring of GNSS networks and have experience in processing of multi-GNSS data including Galileo signals. The company offers also GNSS hardware.

Update on major EuroGeographics activities, collaborative aspects

S. Urbanas introduced EuroGeographics association, which is responsible for geodetic, cadastral, land registry and mapping activities. There are 61 members from 46 European countries. Last EuroGeographics General Assembly was in Budapest in October 2016. There was signed renewed agreement between EuroGeographics and the European Environment Agency (EEA), which enables the Copernicus Emergency Mapping Service to quickly produce maps for crisis management using geospatial data from EuroGeographics' members.

Communication with the EuroGeographics office is possible via the most popular communication channels (official web site, Facebook, Twitter, YouTube).

On 11 November 2016 was passed final review of the ELF (European Location Framework) project, where EuroGeographics is one of forty partners. ELF is the gateway to pan-European maps, geographic and land information from national sources. Users can view

topographic or cadastral maps via demo version on <https://demo.locationframework.eu>. The transition to ELS (European Location Services) is in process.

The KEN (Knowledge Exchange Network) activities help to share solutions to common challenges. There are 8 active KENs, one of them is KEN for positioning. Topics are providing a networking platform for experts, establish the European Positioning System, coordinate GNSS service, create standards etc.

There is a cooperation between EuroGeographic, PosKEN, CLGE, EUREF, EUPOS.

Update on major CLGE activities, collaborative aspects

Vice-president M. Kakko informed about CLGE (The Council of European Geodetic Surveyors) activities in 2015-2016. CLGE has 38 member countries and 3 observing members. CLGE is the leading representational body for the surveying profession in Europe. The projects include Marine Cadastre, Blueparking.eu, CLGE Student Contest or declaration of Surveyor of the Year. Within PosKEN group, CLGE represents users of permanent GNSS networks for precise positioning, especially surveyors, a large group of users of GNSS precision applications.

There are conclusions from the workshops, that everybody are looking for Galileo and more than 50% of end-users equipment is ready for Galileo. Surveyors are not the biggest group of users, but exact and reliable positioning is important for developing other technologies.

CLGE stands for positive effect to European GNSS developments through experience and feedback from users. CLGE works on better cooperation between state GNSS networks with private ones.

Update on major EUREF activities, collaborative aspects

A. Kenyeres, chair of EUREF Technical Working Group, informed about EUREF activities. EUREF is representing scientific community, working on reference frames and operating a GNSS network as densification of the global IGS (International GNSS Service) network. There is planned introduction of ITRF2014 (International Terrestrial Reference Frame). There was improved realization of terrestrial reference system. Depending on this, there is planned new realization of ETRS89 (European Terrestrial Reference Frame).

The area of interest is EUREF Permanent Network (EPN). EPN is used as a backbone network. Data are tested, filtered and homogenized. Velocity and time series product can be used by geophysics groups. The target of EPN densification is combination of national weekly SINEX solutions to realize homogenous, dense European level position and velocity database, considered as a densification of the ITRF and ETRS89. There are 118 countries contributing to the solution. The EPN densification website is <http://www.epncb.oma.be/densification>. The future plans are deepening cooperation with geophysics groups and filling in the white spots (Balkan, Fennoscandia).

Update on major EUPOS activities, collaborative aspects

B. Droščák mentioned the history of EUPOS, which was founded in March 2002. A project was initiated by the Berlin Senate Department for Urban development and supported by the European Academy of Urban Environment in Berlin. The goal was to set up permanent station GNSS networks and positioning services on the territories of Central and Eastern European countries. In October 2014 was realized revision of the organizational structure and revision of the membership. The current number of members is 15 from 12 countries. There is also 1 observer, Y. Altiner from BKG in Germany. It should be set one representative per EUPOS member. EUPOS community is open to other countries. The

official web page is www.eupos.org and web page of official EUPOS station database is <http://www.eupos.hu/EUPOS-ESDB.php>.

EUPOS collaborate with international organizations to represent European DGNSS service providers and with scientific institutions and promote scientific use of EUPOS data. The goals are to protect the common interest of DGNSS service providers on the GNSS market, identify common problems with software or hardware, provide common standards and guidelines, identify the development directions, revitalize the EUPOS brand introducing service certificates and the brand identification system etc.

There are 3 working group under EUPOS, WG on System Quality, Integrity and Interference Monitoring, WG on Service Quality Monitoring and WG on EUPOS Combination Centre.

Overview of Struve Geodetic Arc activities and initiatives commemorating the Central European Meridian (30 deg)

S. Urbanas introduced Struve Geodetic Arc, that is realized by the chain of triangulation triangles almost through the meridian of 26 degree. This chain covers 10 countries with total length 2 822 km, which was surveyed in 1816 – 1855. The final report was submitted by prof. F.G.V. Struve.

The National Land Service of Finland initiated the commemoration of SGA as UNESCO's World Heritage Property in 1993 (34 selected points were commemorated). There are also available themed postmarks or coins.

Outstanding universal value consists in the first accurate measuring of a long segment of a meridian, helping in the establishment of the exact size and shape of the world exhibits an important step in the development of the Earth sciences.

There are initiatives following the UNESCO resolution on making investigations and commemorating the so called Central European Arc – the chain of triangulation networks along 30 degree meridian. The initiative organisers like to start the investigation with public authorities and universities in Poland, Slovak R, Czech R, Romania, Serbia, FYROM and Greece. The point of contact for joining this initiative is prof. Ivan Aleksic from Serbia.

National presentations

This section is open to the national reports with news from member countries.

Czech Republic (J. Řezníček)

The Czech network CZEPOS provides data from 28 stations (7 EPN stations) via Leica Spider software. Next 27 stations are operated by neighboring countries. Hardware of all CZEPOS stations is compatible with Galileo system. Software doesn't completely support Galileo. The upgrade of SW is planned on December 1, 2016.

Czech Republic (J. Šimek)

There was introduced GNSS research in the Czech Republic. Research is carried by Czech Technical University or Geodetic Observatory Pecny. The great contribution is in the implementation of the monitoring stations. The Research Institute of Geodesy, Topography and Cartography develops G-Nut software for GNSS networks. Another area of interest is satellite system DORIS and related research activities.

Slovakia (K. Smolík, B. Droščák)

The network SKPOS has 34 permanent stations (14 individual calibrated) and 19 foreign permanent stations. The control software in SKPOS is Trimble Pivot Platform. SKPOS provides only network solution. The price for accurate service is € 50 per year. New SKPOS

web page <http://skpos.gku.sk> was launched in October 13, 2015. There is available also new registration and ordering system. The hardware of SKPOS is prepared for Galileo, but the software is not completely prepared. There is available the guideline Usage of Slovak Real-time Determination System for Surveying, which was inspired by Guidelines for RTK/RTN GNSS Surveying in Canada.

Latvia (J. Zvirgzds)

The LatPos network includes 27 station (4 station receive Galileo signal). LatPos includes also data from 11 stations in the territory of neighboring countries. There are registered 674 users. RINEX files are provided free of charge and the price of RTK data depends on the size of region and time period.

Sweden (P. Wiklund)

There was introduced main focus at the Geodesy Department, e.g. provision of national horizontal and vertical height systems, providing of transformations between local and national systems, a research, providing of GNSS corrections through the network of permanent stations SWEPOS etc. SWEPOS provides real-time and post-processing data and connection to the national reference system SWEREF99. DGNSS data are free of charge for users from January 2016. SWEPOS has more than 3 500 users. The plan is to provide Galileo signal in the network during 2017

Croatia (M. Marjanovic)

The network of GNSS permanent network CROPOS was upgraded for providing Galileo corrections. The price for users is € 650 per year.

Estonia (K. Kollo)

The GNSS network of Estonia ESTPOS has 27 reference stations. On the territory of Estonia are 4 EPN stations. Software is based on Leica Spider. Estonia participates in data exchange with Latvia and Finland. RINEX files are available for users free of charge. It is planned reconstruction using the Swiss program.

Poland (S. Wajda)

ASG-EUPOS is state owned GNSS network. The network includes 101 reference stations established in Poland by GUGiK, universities and research centres, 26 stations working in neighbouring countries. With National Geological Institute new monitoring stations will be established very soon. Stations are operated by 2 independent centers located in Warsaw and Katowice. The used software is Trimble Pivot Platform (version 3.8.3). There is new internet system for purchasing ASG-EUPOS services, where user can create login in Trimble Pivot Platform and place order for required subscription. Network RTK service is processed within EUPOS service quality monitoring <http://monitoringEUPOS.gku.sk>.

36 receivers and antennas were exchanged in 2015 year. Northern-east part of Poland was without GPS+GLONASS signal (12 reference stations with only GPS tracking possibilities). Now there is finished the exchange of equipment on those reference stations and whole area of Poland is covered by GPS+GLONASS correction data. Most of the receivers and antennas are Galileo and Beidou tracking.

The price for usage is € 360 per year, € 200 per 6 months, € 43 per month, € 43 per week. There are 5629 registered users.

Germany (Y. Altiner)

There was summarized the activity in the field of leveling, gravity and GNSS. The department of Geodesy and Cartography of Federal Agency for Cartography and Geodesy (BKG) has 5 divisions. One of them is GNSS navigation. There is operated GNSS centre for providing GNSS data to the users. The technical equipment is prepared for Galileo.

Discussion on collaborative aspects

During the discussion M. Kakko mentioned primary objectivities of PosKEN. For the community of surveyors it is useful information. PosKEN provide information and can give feedback from users to higher authorities. There are more authorities, which work on parallel projects.

The contribution of PosKEN to EuroGeographics works on long term vision. We need more actual topics. The good idea is organizing webinars. There were suggested new topics for next meeting, e.g. GNSS metrology, Galileo system and there was suggested to invite more participants from west Europe.

It is assumed, that physical meetings will be organized once a year.

Organizational aspects

One of the objectives of PosKEN is creating a big EU GNSS family. It is important to share a lot of information. As mentioned during the discussion, we have to avoid parallel works and work on growing of number of users. The most important adding values of PosKEN membership are:

- dissemination of experience and active application of lessons learned,
- quick and efficient collection of knowledge and especially specific knowledge,
- preparation and implementation of new technologies.

S. Urbanas introduced PosKEN basecamp. Many information about PosKEN is available on website <http://www.eurogeographics.org/content/posken-positioning>.

End of the meeting

The PosKEN meeting was officially closed. S. Urbanas thanked for participation and thanked CUZK and in particular J. Řezníček for the organization of the meeting.