



EUPOS

European Position Determination System

MEDZINÁRODNÁ ORGANIZÁCIA EUPOS A HORÚCE TÉMY PREBERANÉ NA JEJ POSLEDNÝCH ZASADNUTIACH

Ing. Branislav Droščák, PhD.

Vedúci odboru GZ / EUPOS chairman

Geodetický a kartografický ústav Bratislava

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XI. medzinárodná vedecko-odborná konferencia
Geodézia, kartografia a geoinformatika 2019
10. - 13. október 2019, Demänovská dolina, Nízke Tatry

WHAT IS *EUPOS*[®]?

- *EUPOS*[®] is a free association of European public institutions aiming at establishing a uniform DGNSS based infrastructure in Central and Eastern Europe
- *EUPOS*[®] is a ground based European regional GNSS augmentation system
- *EUPOS*[®] is a mosaic of national DGNSS segments operating according to common standards
- *EUPOS*[®] supports precise positioning and navigation (metre, sub-metre and centimetre in RT, centimetre and better in PP)
- *EUPOS*[®] collaborates with other international organizations and scientific institutions acting in the field of GNSS technology

MARCH 2002

EUPOS INITIATIVE FOUNDATION

EUPOS initiated by the Berlin Senate Department for Urban development and supported by the European Academy of Urban Environment (EA.UE) in Berlin

Workshop
**Multifunctional GNSS Reference
Station Systems for Europe**
4 - 5 March 2002
Berlin



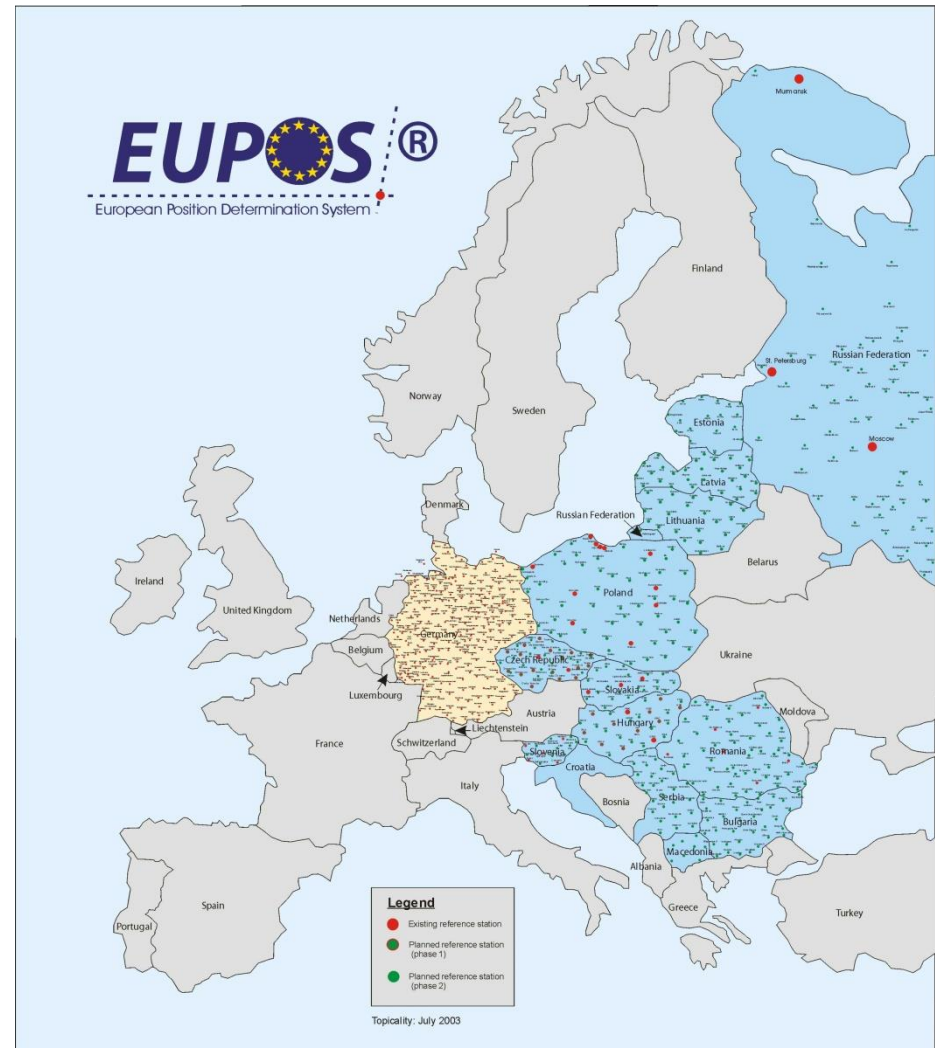
EUPOS FIRST GOAL = RUN THE EUPOS PROJECT

EUPOS Project aim

Set up common permanent station
GNSS networks and positioning
services on the territories of CEE
countries following the example of
German service SAPOS

EUPOS project parameters (in 2003)

- Anticipated number of permanent stations: more than 870
- Anticipated costs: 86 mil. €
- Anticipated financial support:
 - EU funds:
 - ERDF – EU member countries
 - ISPA – pre-accession countries
 - CARDS – Balkan countries
 - TACIS - Russia



EUPOS BETWEEN 2002-2014 YEARS

- International **EUPOS®** Steering Committee (ISC)
Representatives of all **EUPOS®** member countries | Office (ISCO)
- National **EUPOS®** Service Centers (NSCs)
EUPOS® providers, if not the same
- Authorized **EUPOS®** resellers
- EUPOS®** users
- Manufacturers of **EUPOS** compatible hardware/software
- Resellers of **EUPOS** compatible hardware/software

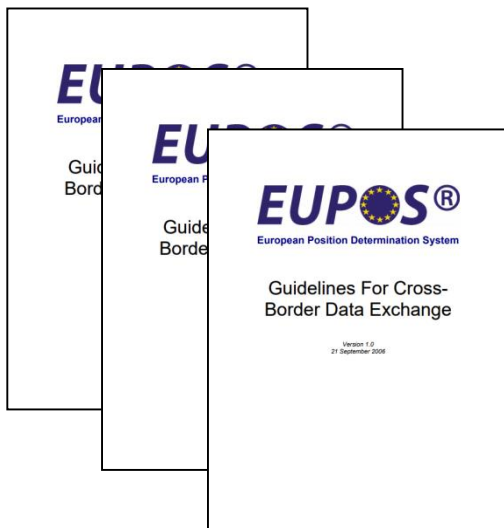
~~EUPOS
common
project~~



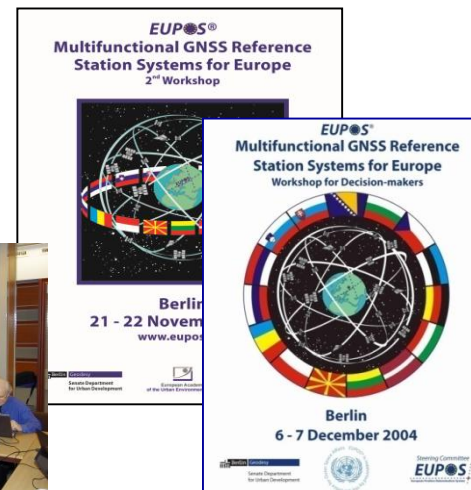
EUPOS Head till May 2013



Common Guidelines creation



EUPOS meetings, GNSS symposia organization



EUPOS MEMBERSHIP 2002-2014 (STATUS IN MAY 2014)



- 22 countries

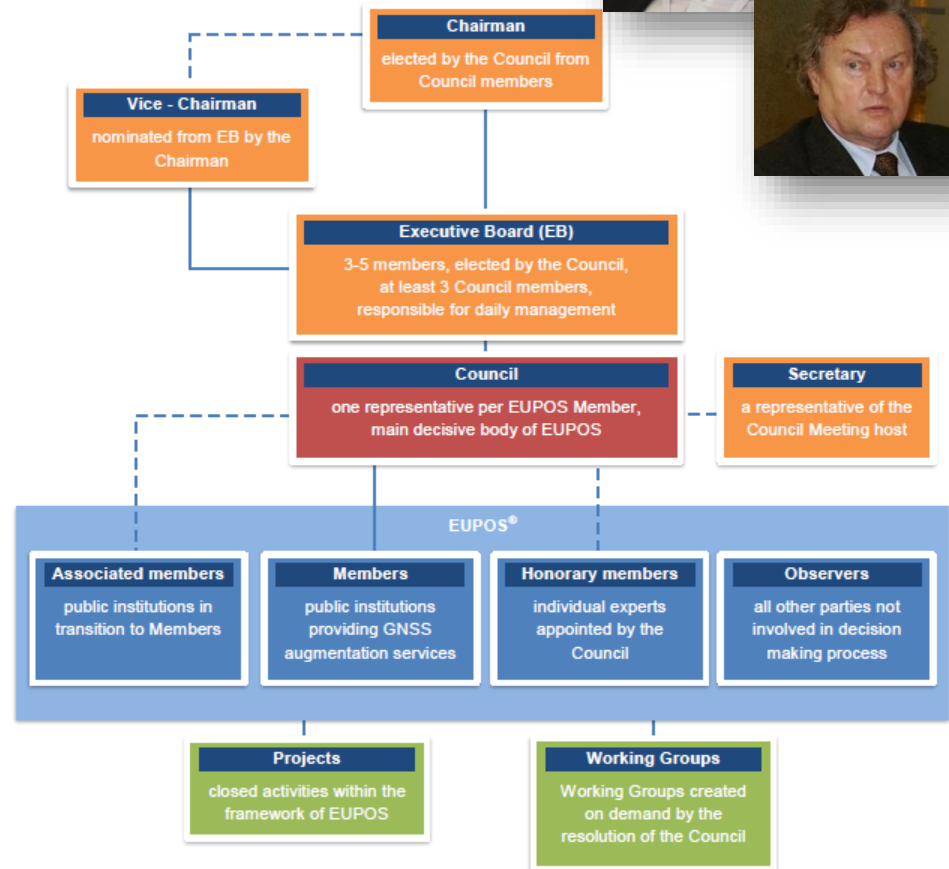
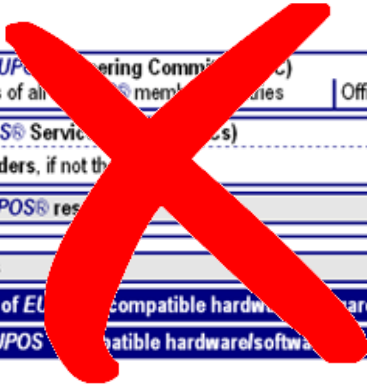
OCTOBER 2014

EUPOS REORGANIZATION

EUPOS meeting in Warsaw

- Revision of the organizational structure
- Revision of the membership

International EUPOS Steering Committee (ISC) Representatives of all EUPOS member countries	Office (ISCO)
National EUPOS Service Providers (NSPs) EUPOS providers, if not the NSP	
Authorized EUPOS resellers	
EUPOS users	
Manufacturers of EUPOS compatible hardware/software	
Resellers of EUPOS compatible hardware/software	



OCTOBER 2014

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- **Act as a European-wide DGNSS service providers branch organization**
- **Collaborate with international organizations and bodies to represent European DGNSS service providers**
- **Collaborate with scientific institutions and promote scientific use of EUPOS data**

- **Act as a European-wide DGNSS service providers branch organization to:**
 - *protect the common interest of DGNSS service providers on the GNSS market,*
 - *further influence the GNSS manufacturers with development requests for a significant customer group,*
 - *identify common problems with software or hardware to better serve customers and quicker resolve the support requests to manufacturers,*
 - *provide common standards and guidelines for the providers or specific user groups,*
 - *identify the development directions in which networks should evolve to be competitive,*
 - *revitalize the EUPOS brand introducing service certificates and the brand identification system,*

- **Collaborate with international organizations and bodies to represent European DGNSS service providers** (*potential for success in reaching external funding for the development*):
 - ~~RTCM (SC 104)~~ – finished in September 2015 due to high fee and lack of interested person
 - UN (including ICG/UNOOSA) – EUPOS is ISG member,
 - EUROGEOGRAPHICS – founder of PosKEN,
 - EUREF – MoU signed in June 2014,
 - EUMETNET – MoU signed in May 2013,
 - EC (GSA) – GSA representatives are regularly invited to EUPOS meetings
 - former EUPOS WG Technical cooperation with Industry (TCI)

- **Collaborate with scientific institutions and promote scientific use of EUPOS data by:**
 - *identifying the scientific potential in EUPOS data and offering it to the science-oriented user groups,*
 - *introducing data policy guidelines,*
 - *creating common products for science or transforming them into production services.*

EUPOS CHAIRMANSHIP (SINCE NOVEMBER 2018)

■ Chairman:

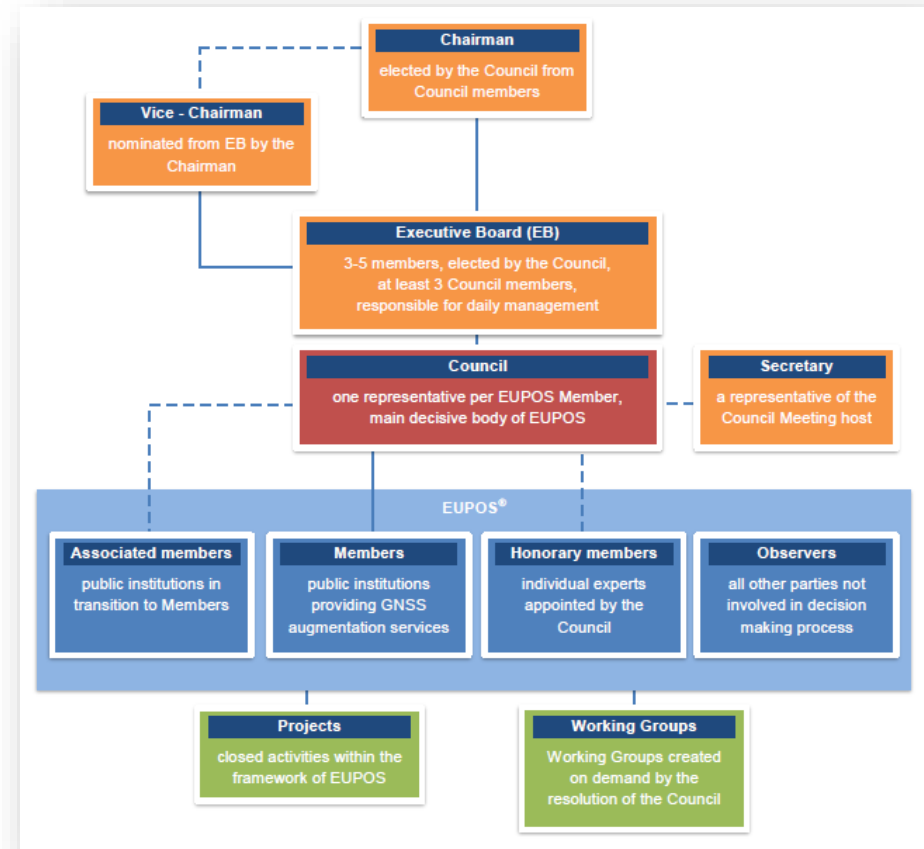
Branislav Droščák (Slovakia)

■ Vice-chairman:

Ingus Mitrofanovs (Latvia)

■ EUPOS Executive board:

- Jaroslav Šimek (Czech rep.)
- Ambrus Kenyeres (Hungary)
- Janis Zvirgzds (Latvia)
- Szymon Wajda (Poland)
- Jan Řezníček (Czech rep.)

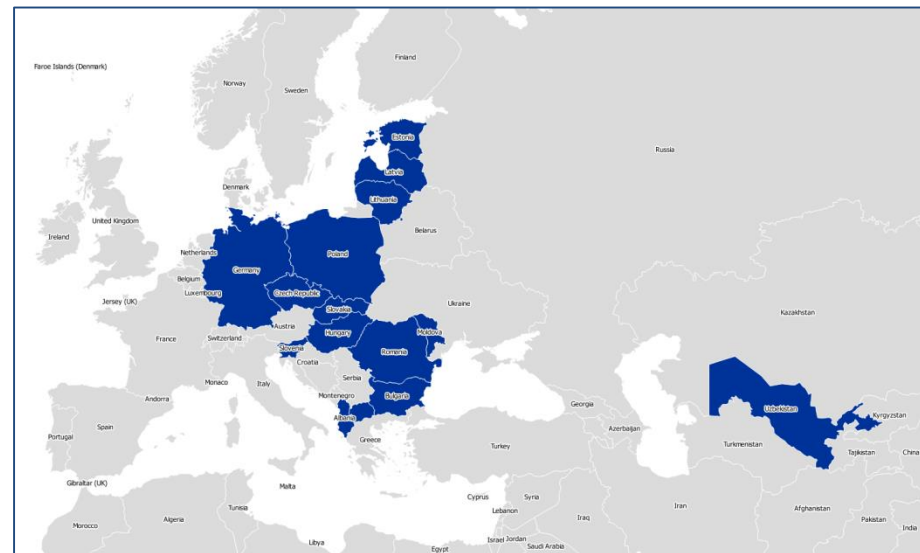


EUPOS MEMBERSHIP (SINCE NOVEMBER 2018)

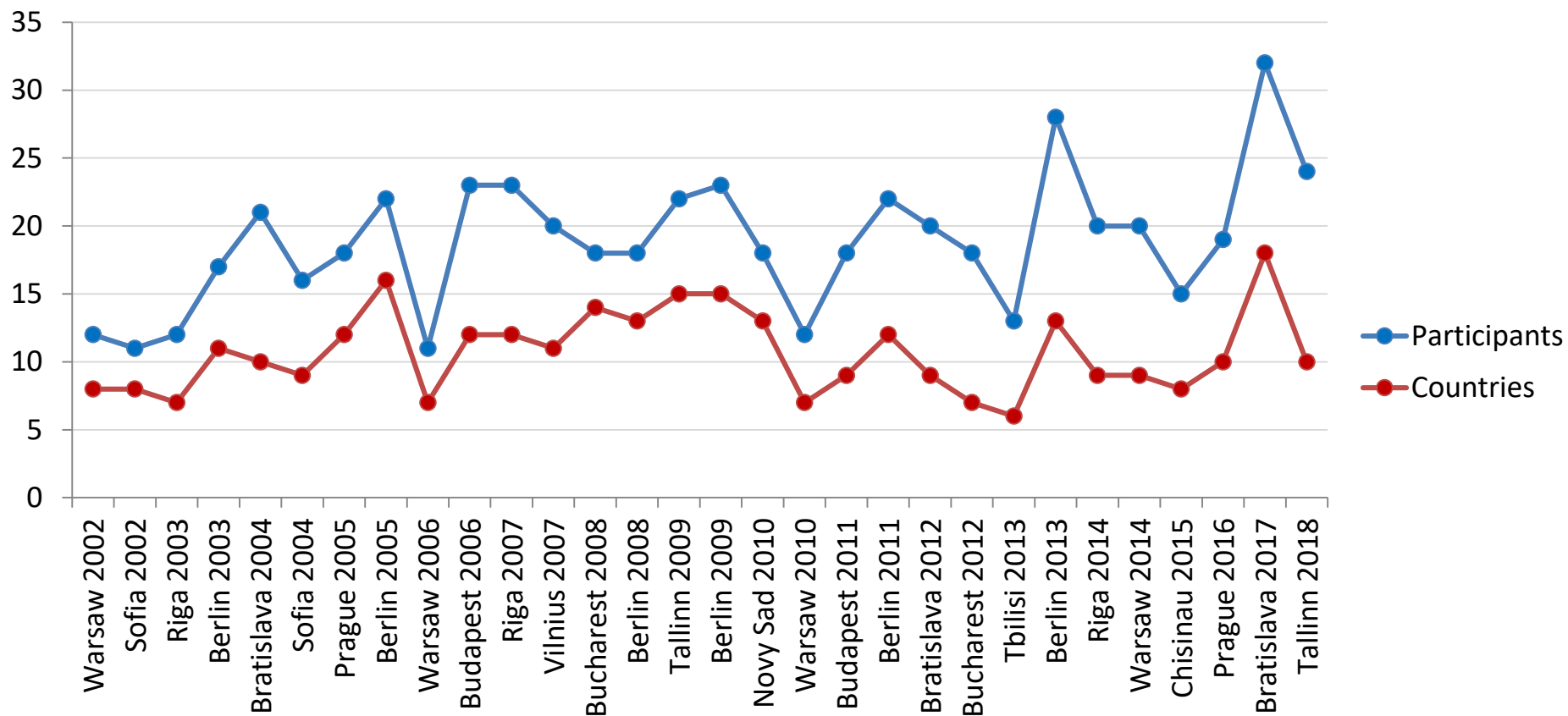
	Member / Abb. of the Institution	Country
1	GKÚ Bratislava	Slovakia
2	VUGTK Zdiby	Czech republic
3	ZÚ Praha	Czech republic
4	SGO Penc	Hungary
5	Land Board Tallinn	Estonia
6	GuGIK Warszawa	Poland
7	Academy of science	Bulgaria
8	NAfCaLR	Romania
9	University of Latvia	Latvia
10	Riga City Council DD	Latvia
11	LGIA	Latvia
12	AfLRaC	Moldova
13	AREaC	Macedonia
14	Senatstadt Berlin	Germany
15	Geodetic Institute	Lithuania
16	Surveying and mapping authority of Slovenia	Slovenia

	Observer / Abb. of the Institution	Country
1	BKG Frankfurt u/Main	Germany

	Associated member / Abb. of the Institution	Country
1	National Uzbekistan university	Uzbekistan
2	IPRO Albania	Albania



EUPOS MEETINGS PARTICIPANTS EVOLUTION (2002 – 2018)



- 29 meetings
- Average numbers: 19 participants / 11 countries

Web page

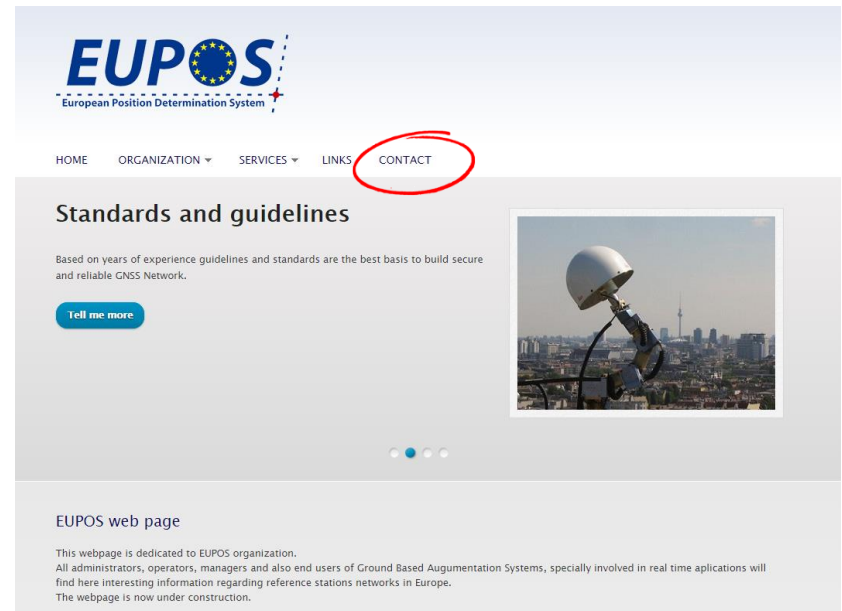
- www.eupos.org
- Administrator: Szymon Wajda

EUPOS Office

- no official EUPOS address
- virtual address via EUPOS web page (Contact item) and email office@eupos.org

People responsible for EUPOS tasks:

- EUPOS chairman
- EUPOS vice-chairman
- EUPOS Executive board members



The screenshot shows the EUPOS website interface. At the top, the EUPOS logo is displayed with the tagline 'European Position Determination System'. Below the logo is a navigation menu with the following items: HOME, ORGANIZATION, SERVICES, LINKS, and CONTACT. The 'CONTACT' item is circled in red. Below the navigation menu, there is a section titled 'Standards and guidelines' with a sub-heading 'Based on years of experience guidelines and standards are the best basis to build secure and reliable GNSS Network.' and a 'Tell me more' button. To the right of this text is a photograph of a GNSS antenna on a rooftop. Below the photograph are three small circular indicators, with the middle one being blue. At the bottom of the screenshot, there is a section titled 'EUPOS web page' with a short paragraph of text.

EUPOS Terms of Reference

EUPOS Technical Standards

EUPOS Guideline for Single Site Design

EUPOS Guideline for Cross-Border Data Exchange



EUPOS technical standards

- Structure of the network
- Equipment and settings
- Quality measures
- User interface
- EUPOS services
 - DGNSS for RT positioning and navigation, accuracy 2m – 0.5m for moving objects and 0.2m for static
 - **Network RTK for precise RT positioning - 2 cm**
 - Geodetic, post-processing – 1 cm and better
 - Data streams transmitted via Internet
 - NTRIP technology, RTCM SC104 format
 - Additionally radio or TV VHF broadcasting
 - System availability on the level of at least 99%
 - Availability upgrade up to 99.9% is realistic



Technical Standards

Revised 3rd Edition
May 7, 2013
Resolution of the International EUPOS[®] Steering Committee
23rd Conference, Tbilisi, Georgia, 7 - 8 May 2013

- **Some topics recently discussed within EUPOS technical meetings**
 - *Experience with Network RTK measurements with Galileo*
 - *GNSS signal interference, jamming*
 - *GNSS metrology – especially for user rovers*
 - *verification, validation, calibration, ...*
 - *Common standard or Guideline for RTK/Network RTK surveying*

- 4. EUPOS council (only for members) and technical meeting (members + invited)
 - 32 participants / 18 countries



- “Country “ reports focused on:
 - GNSS network infrastructure (status + news + ready for Galileo)
 - GNSS metrology – how is it solve in each country
 - Existence of Guidelines for users for RTK network surveying
 - GNSS permanent station protection – status in each country
 - EUPOS Technical standards fulfilment
- GNSS (RTK network) infrastructure software status (invited representatives from Trimble, Leica and Geo++):
 - Current status + news
 - Galileo ready and restrictions
 - Third party receivers support
- EUPOS WG status, Galileo status (GSA), Antenna calibration robot (Geo++)
- EUREF (Kenyeres) and RTCM news (Wubbena)
- ...

- GNSS metrology for rovers
 - Czech version – calibration baseline
 - Hungarian version – static measurement
- Existence of Guidelines for users for RTK network surveying
 - Special guideline in Slovakia
 - In other countries different type of instructions, information instead of solo guideline
- GNSS permanent station protection
 - Physically ensured, legislative nowhere



Guidelines



- GNSS (RTK network) infrastructure software status
 - all companies prepared for Galileo and all GNSS and their frequencies
 - each company has its own solution how to handle increasing number of satellites and frequencies to reduce processing time
- Antenna calibration robot
 - calibration robot will be able to compute PCV for Galileo in near future
- More results from presentations available on meeting web page: <http://www.skpos.gku.sk/eupos/>

- 5. EUPOS council (only for members) and technical meeting (members + invited)
 - 24 participants / 10 countries



- “Country “ reports were focused on:
 - GNSS network infrastructure status + news
 - Galileo readiness
 - Experience with signal jamming, interference, ...
 - Experience with mixture of hardware brands
 - Users’ feedback - most criticized issues
- Experience with Network RTK measurements with Galileo (invited representatives from the Netherlands, Sweden)
- GNSS signal interference by radio amateurs (APOS)
- Problematic CORS HW/monumentation detection (SKPOS)
- Double stations and network densification experience (SWEPOS)
- CLGE needs for GNSS RTK service operators (Kakko)

- Experience with Network RTK measurements with Galileo
 - Implementation of Galileo in Sweden (2016) does not show and great improvement – we have to wait
- GNSS signal interference by radio amateurs
 - It was recognised in Austria (APOS stations)
 - L2 GLONASS frequency was affected
 - Solution: radio amateurs switched from UHF 32 cm to different frequency
 - New Septentrio receivers with adoptive filter were not affected
- Problematic CORS HW/monumentation detection
 - life time of GNSS antennas caused degradation of stations coordinates time series
 - some antennas need to be changed every 10 years



- The nearest meeting will be held in October 30-31 2019 in Budapest
- Host organization: Satellite geodetic observatory Penc
- Topics under preparation:
 - Members networks news, status
 - Experience with
 - Galileo
 - jamming, interference
 - InSAR and GNSS collocation
 - EPSG standards
 -

The logo for the European Position Determination System (EUPO) is centered in the upper half of the image. It features the word "EUPO" in a bold, blue, sans-serif font, followed by a circular emblem containing the twelve yellow stars of the European Union flag, and then the letter "S" in the same blue font. Below the text, a horizontal dashed line spans the width of the logo, with a small red dot at its right end. The background of the top half of the image shows several European Union flags waving in front of a building with a grid of windows.

EUPO

European Position Determination System

THANK YOU FOR YOUR ATTENTION

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