EUPOS

STATUS AND ACTIVITIES

Dr. Branislav Droščák

EUPOS vice-chairman

Communication Workshop of the PosKEN

April 26.-27. 2018. Brussels, Belgium

WHAT IS *EUPOS*®?

EUPOS®
European Position Determination System

- *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*® provides DGNSS correction data for real-time positioning and navigation and the data for post-processing
- *EUPOS*® supports precise positioning and navigation (metre, sub-metre and centimetre in RT, centimetre and better in PP)
- *EUPOS*® is evolving in both intensive and extensive way by accepting new technical developments
- *EUPOS*® collaborates with other international organizations and scientific institutions acting in the field of GNSS technology

MARCH 2002
EUPOS INITIATIVE FOUNDATION

EUPOS®
European Position Determination System

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

EUPOS FIRST GOAL = RUN THE EUPOS PROJECT

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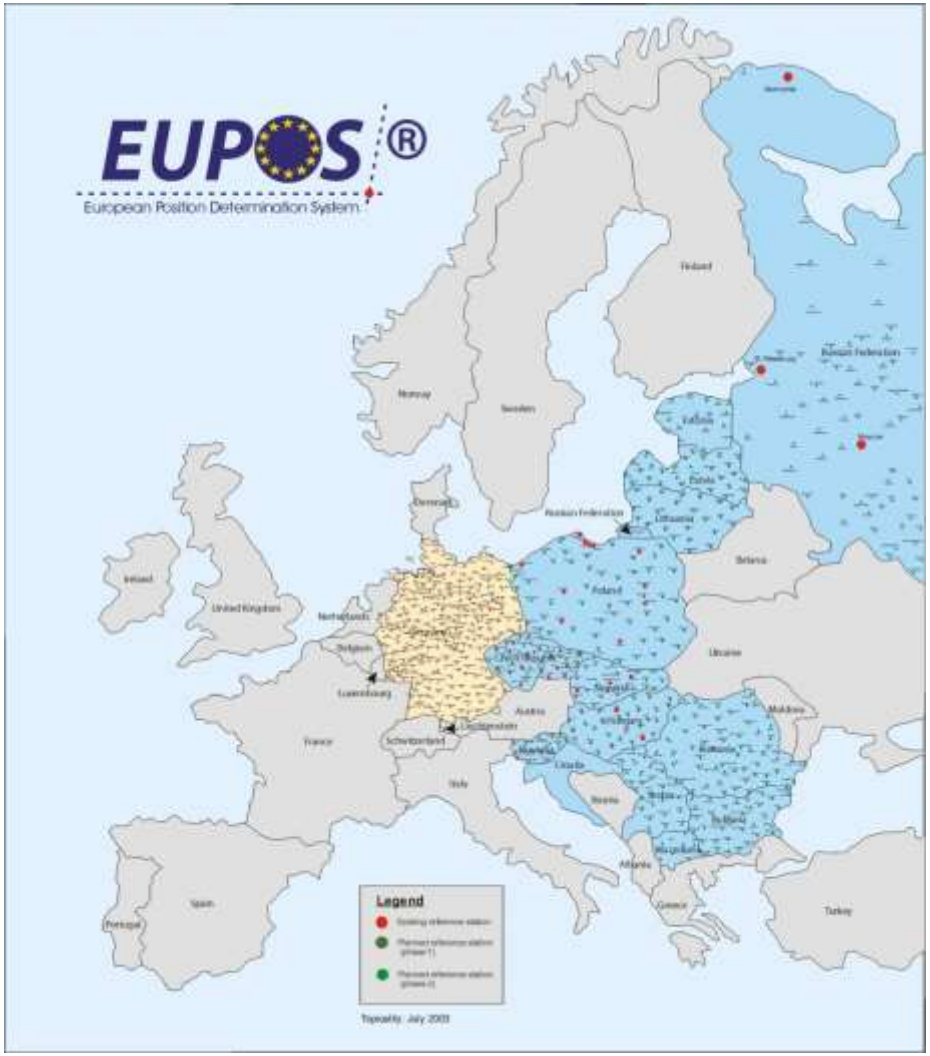
EUPOS Project aim

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

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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

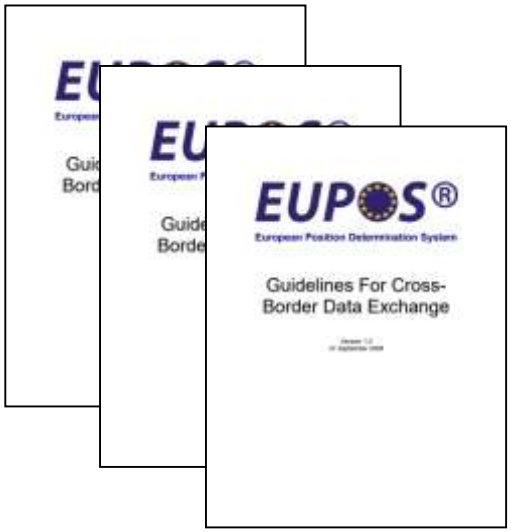
Resellers of *EUPOS* compatible hardware/software

EUPOS common project

EUPOS Head till May 2013

North East South West
INTERREG IIIC

Common Guidelines creation



EUPOS meetings, GNSS symposia organization

EUPOS MEMBERSHIP 2002-2014 (STATUS IN MAY 2014)

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- 22 countries

OCTOBER 2014
EUPOS REORGANIZATION

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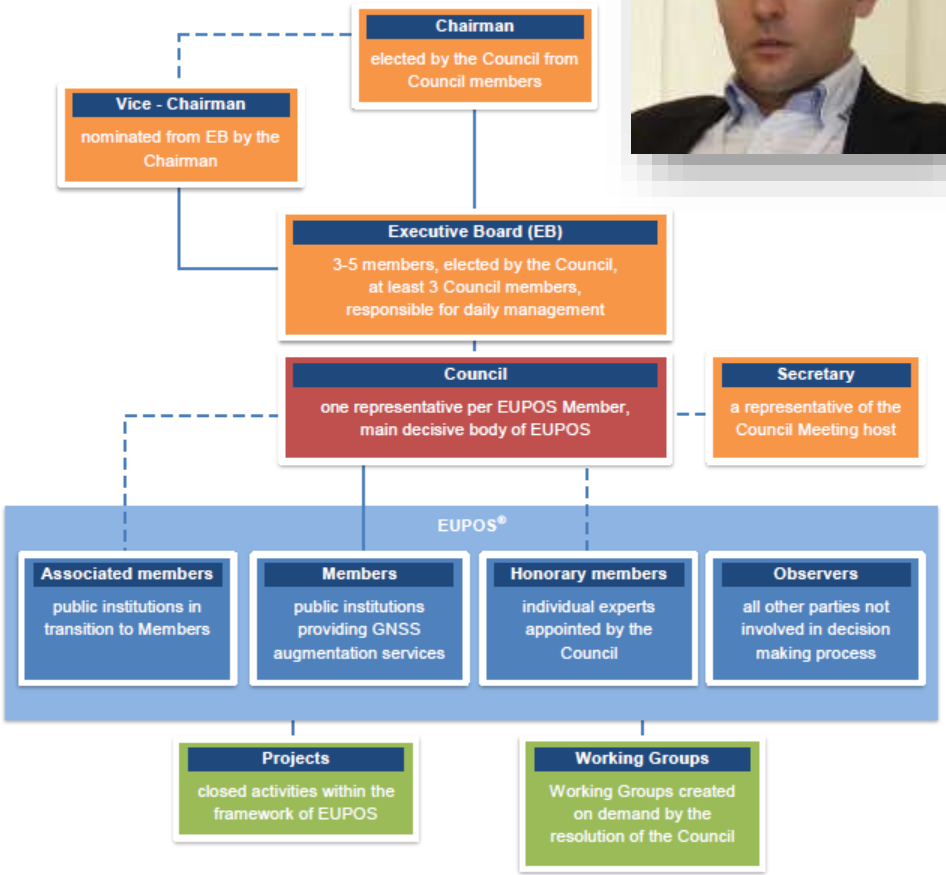
EUPOS meeting in Warsaw

- Revision of the organizational structure
- Revision of the membership



OCTOBER 2014
EUPOS REORGANIZATION

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European Position Determination System

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- Revision of the organizational structure
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EUPOS GOALS AFTER REORGANIZATION

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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

EUPOS GOALS

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- **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,*

EUPOS GOALS

- **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)

EUPOS GOALS

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- **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 (APRIL 2018)

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- **Temporary chairman**:

Jaroslav Šimek (Czech rep.)

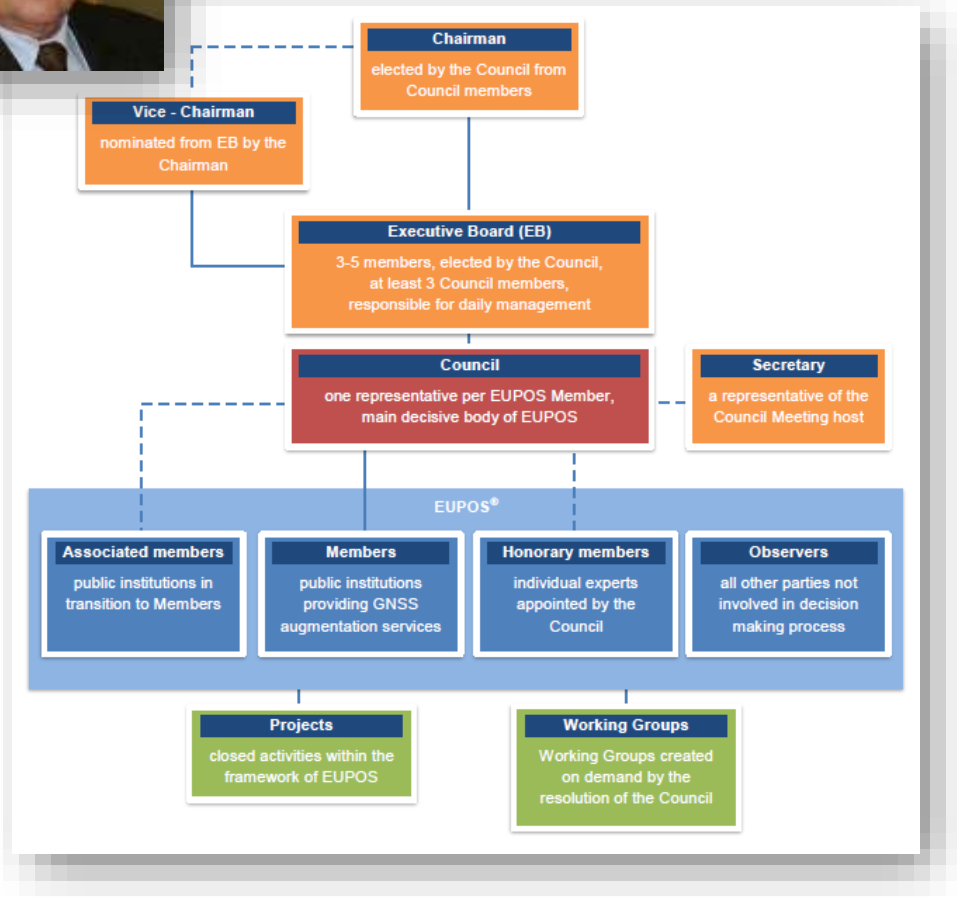
(from 22.9.2015 until new elections)

- **Vice-chairman**:

Branislav Droščák (Slovakia)

(+ liaison for EuroGeographics PosKEN)

- **EUPOS Executive board**:
  - Ambrus Kenyeres (Hunagry)
  - Janis Zvirgzds (Latvia)
  - Szymon Wajda (Poland)



EUPOS MEMBERSHIP (APRIL 2018)

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	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

	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 MEMBERS (APRIL 2018)

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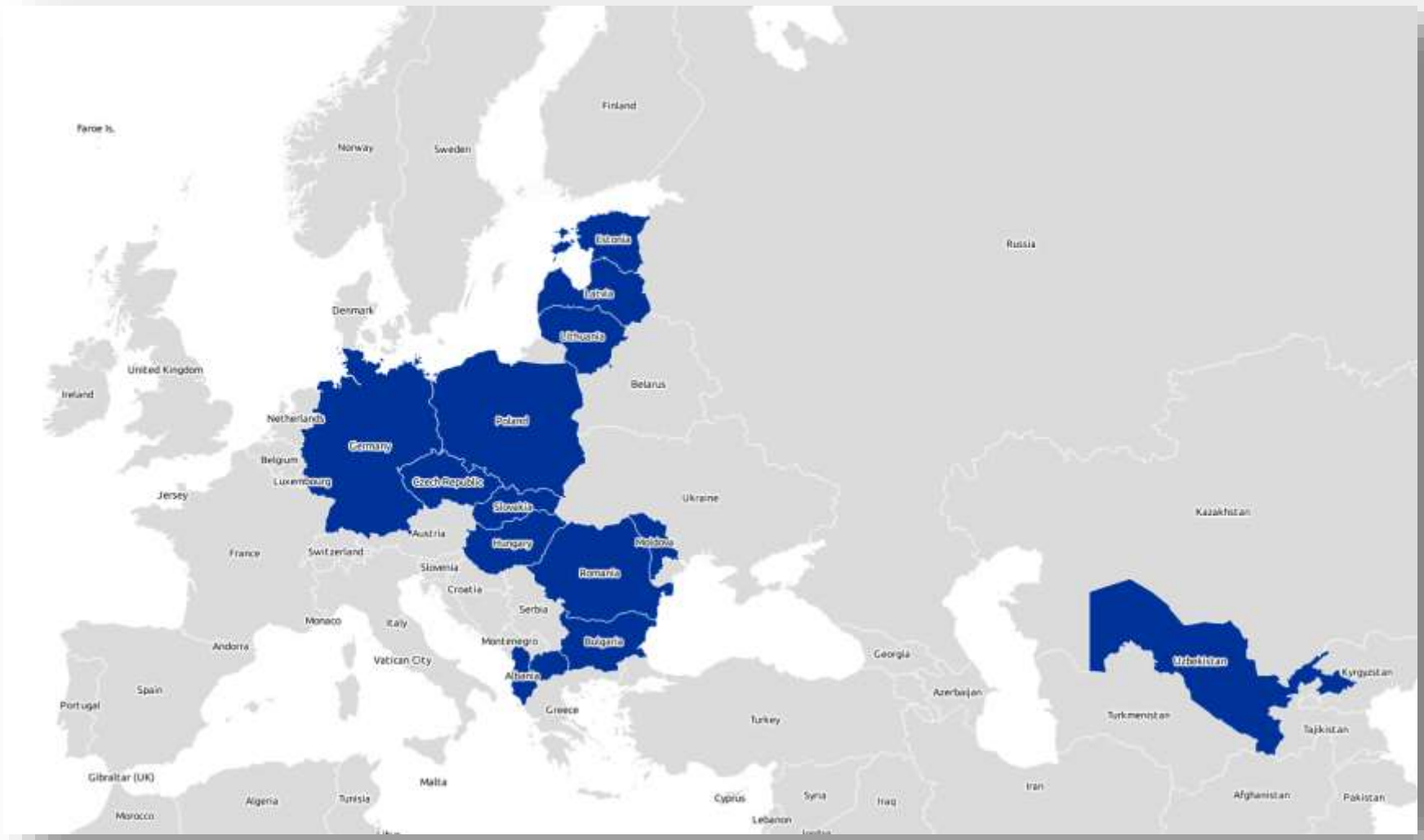
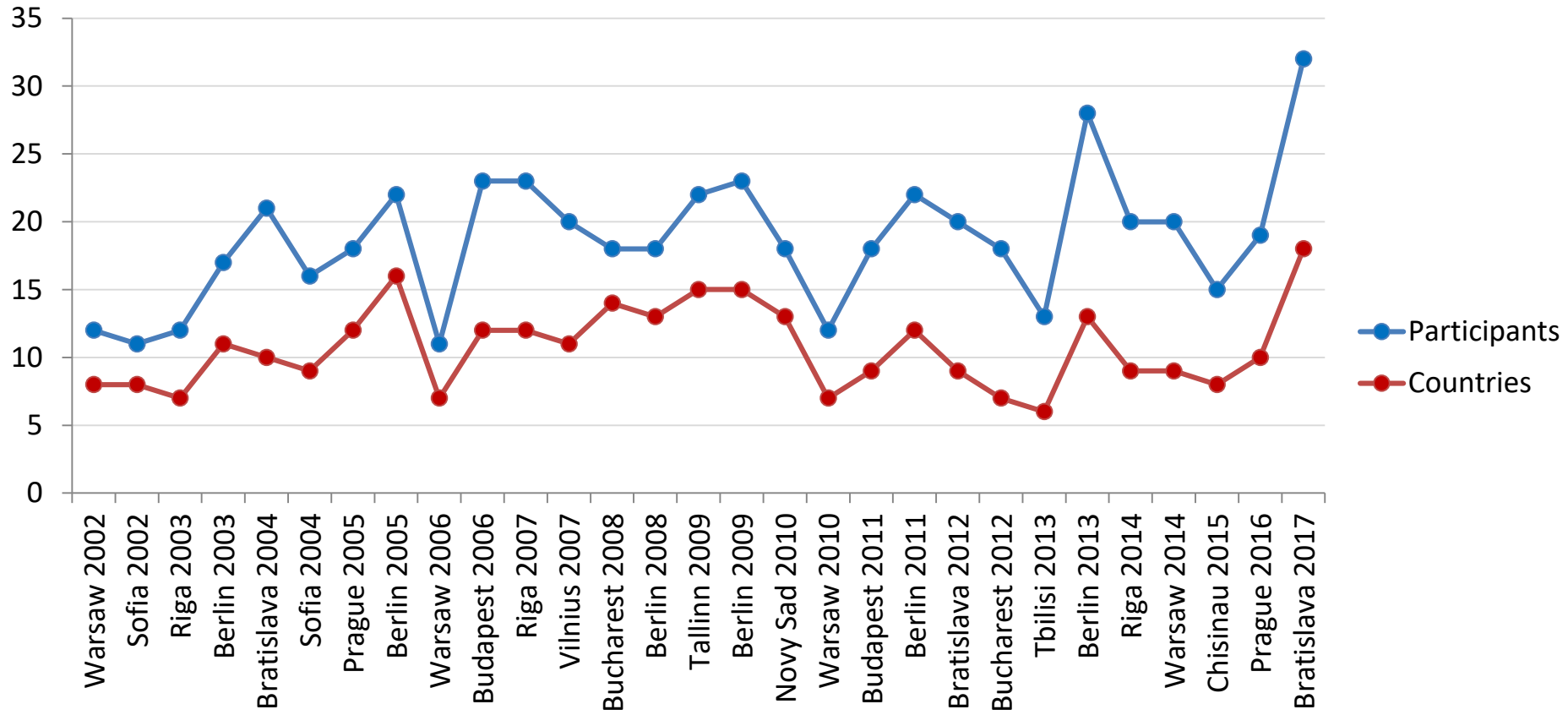


- 14 countries / 18 institutions

EUPOS MEETINGS PARTICIPANTS EVOLUTION (2002 – 2017)

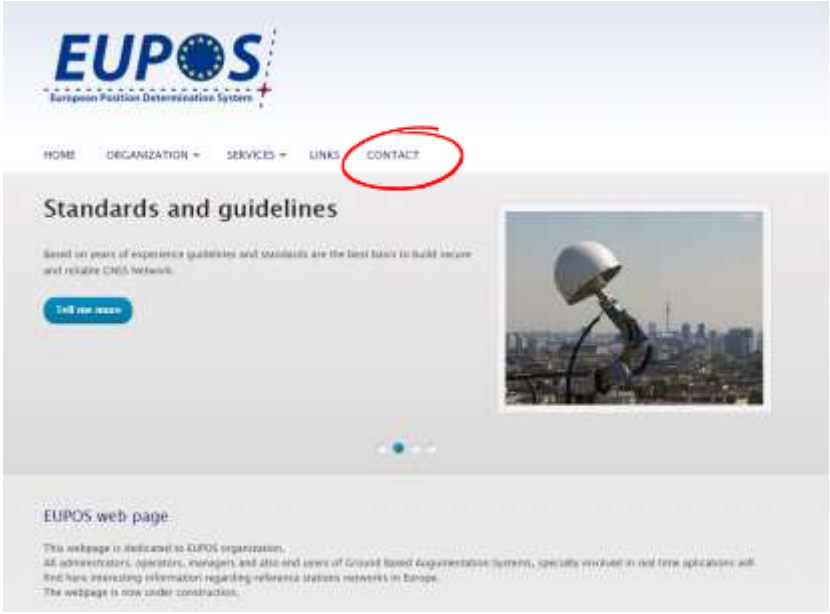


- 29 meetings
- Average numbers: 19 participants / 11 countries

EUPOS WEB PAGE, *EUPOS* OFFICE

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

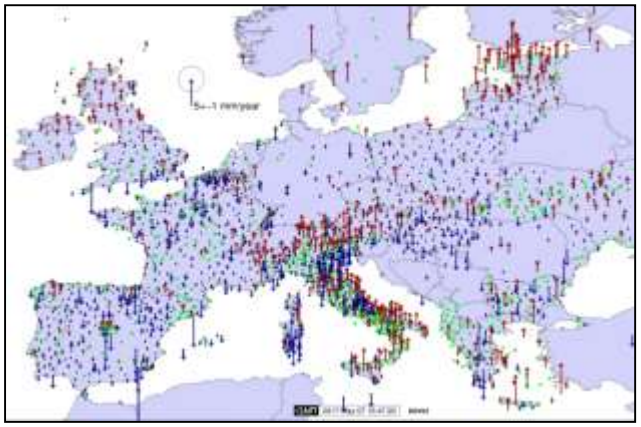
People responsible for EUPOS tasks:

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

EUPOS WORKING GROUPS

EUPOS WG on system quality, integrity and interference monitoring (SQII)

- head: Janis Zvirgzds
- aim: solving EUPOS certification for each service/network



EUPOS Combination Center WG (ECC)

- head: Ambrus Kenyeres
- Aim: EUPOS combination of countries SINEX solutions, coordinates monitoring and estimation of the velocity fields
- Activity transform to EUREF densification project

EUPOS WG on service quality monitoring (SGM)

- head: Branislav Droscak
- Aim: common monitoring of countries network RTK solution
- http://monitoringeupos.gku.sk

EUPOS DOCUMENTS

GUIDELINES AND STANDARDS

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EUPOS Terms of Reference

EUPOS Technical Standards

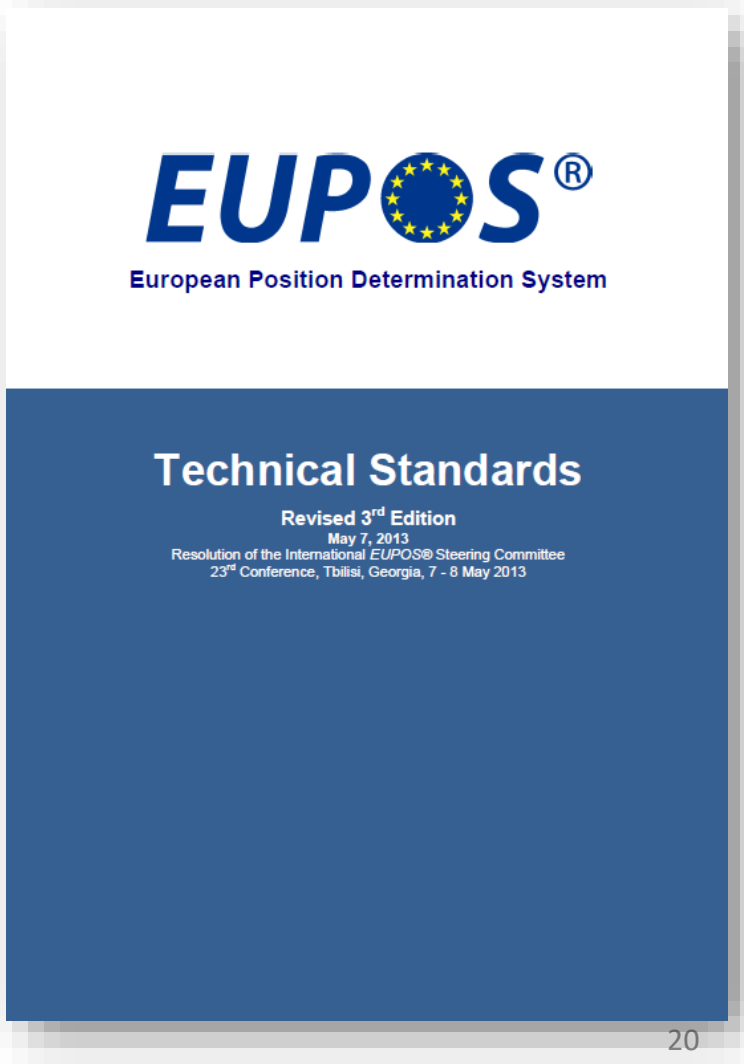
EUPOS Guideline for Single Site Design

EUPOS Guideline for Cross-Border Data Exchange

EUPOS TECHNICAL ISSUES

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



EUPOS = GALILEO POSITIVE

In EUPOS technical standards

- „EUPOS was designed ... to support multi-constellation GNSS ... . Taking into account political and geographical associations, the primary GNSS constellation ....is European system Galileo."

ACHIEVEMENTS AND CHALLENGES

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- Achievements
  - Incentive to building up CORS networks in member countries
  - System of standards and guidelines
  - Outreach activities – collaboration with international organizations and bodies
  - *EUPOS*® symposia (impact on professionals from different fields of activities) – 2005, 2008, 2009 (Berlin), 2010 (Brussels), 2011 (Berlin)
  - *EUPOS*® in international programs and projects

- Challenges
  - EUPOS via members disposes with a large observation data and product volume which represents a potential that can benefit a number of activities, among others in science:
    - Reference frames, velocities
    - Ground based meteorology
    - Geodynamics, neotectonics …
    - Space weather, upper atmosphere studies
    - Gravity field modelling
    - …

SOME TOPICS RECENTLY DISCUSSED WITHIN *EUPOS*

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- **Some topics recently discussed in EUPOS meetings**
  - *GNSS metrology – especially for user rovers*
    - *verification, validation, calibration, ...*
  - *Legislative on Permanent station protection*
    - *what and how to protect*
  - *Common standard or Guideline for RTK/Network RTK surveying*
  - *Cooperation with private permanent networks*

EUPOS 2017 – BRATISLAVA MEETING

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

EUPOS 2017 – BRATISLAVA MEETING
MAIN TOPICS

- "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)
- …

EUPOS 2017 – BRATISLAVA MEETING
MAIN TOPICS - RESULTS

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- 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

Guidelines

- GNSS permanent station protection
  - Physically ensured, legislative nowhere

EUPOS 2017 – BRATISLAVA MEETING
MAIN TOPICS - RESULTS

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- GNSS (RTK network) infrastructure software status
  - all companies are 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/

EUPOS 2018 MEETING

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- Meeting will be held in autumn 2018 in Tallinn
- Host organization: Estonian Land board
- Topics under preparation:
  - Members network news, status
  - Experience with
    - bad receiver / antenna
    - jamming, interference
    - Network RTK measurement with Galileo
  - ….

EUPOS

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THANK YOU FOR YOUR ATTENTION

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