EUPOS® countries network RTK quality monitoring tool

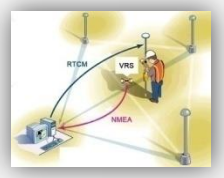
Karol Smolík & Dr. Branislav Droščák

Geodetic and Cartographic Institute BRATISLAVA
Europe Positioning Determination System Initiative

karol.smolik@skgeodesy.sk, branislav,droscak@skgeodesy.sk

EUPOS service quality monitoring tool
General information

- Concept copies the design of SK*POS*® network RTK solution quality monitoring application
- Monitoring independent from the GNSS service provider control software
- Fully automatic solution
- Virtual solution (no real monitor stations)



- Monitoring of the whole territory of countries
- Random generation of (virtual) test points
- Baseline processing by open source RTKNAVI software

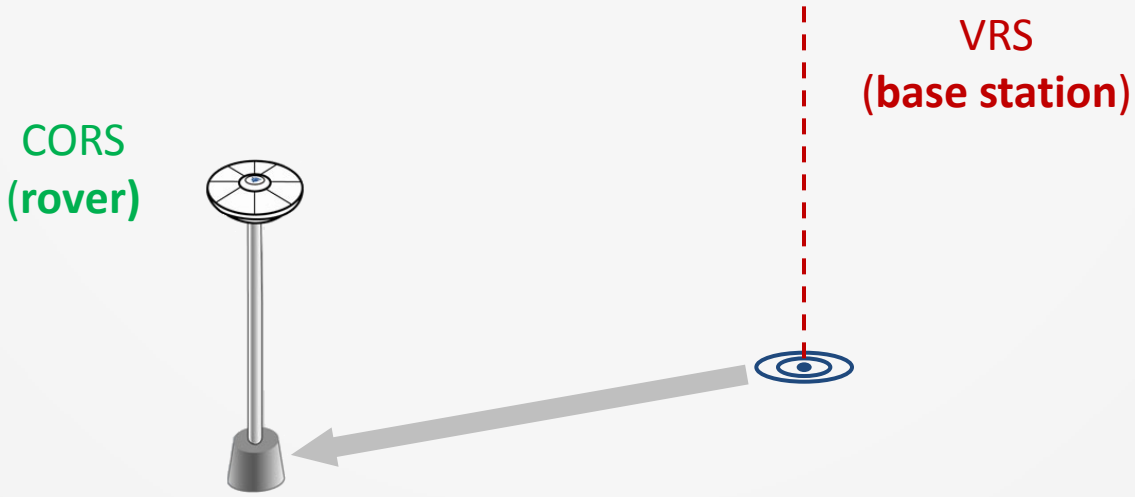
RTKNAVI
www.rtklib.com

- Results available via web/mobile application

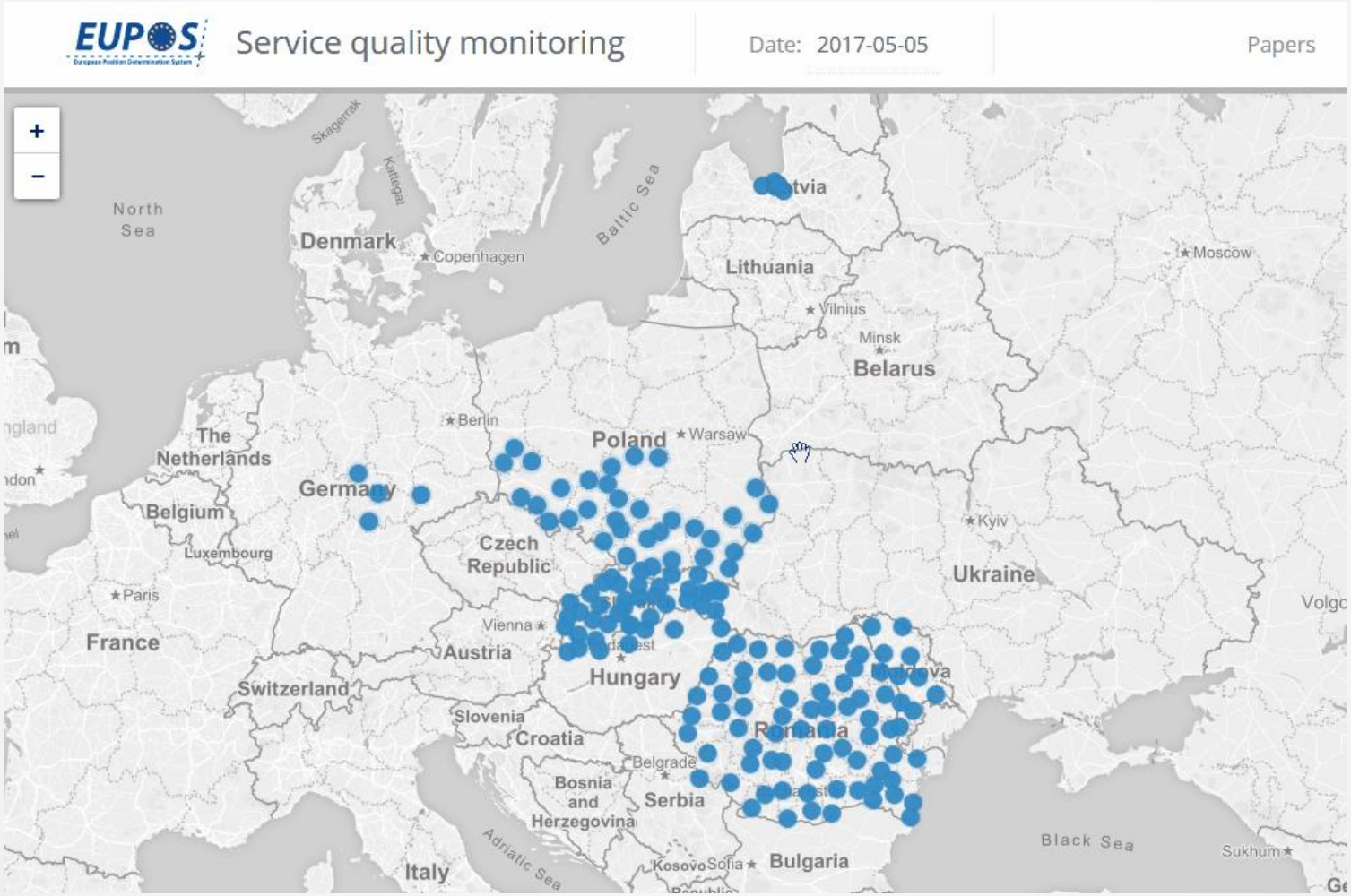
EUPOS service quality monitoring tool Principle

- RTKNAVI computes the baseline composed of VRS (which simulates the rover position in field) and the nearest reference station. VRS is fixed and the coordinates of the reference stations are computed and compared with original ones.

RTKNAVI
www.rtklib.com

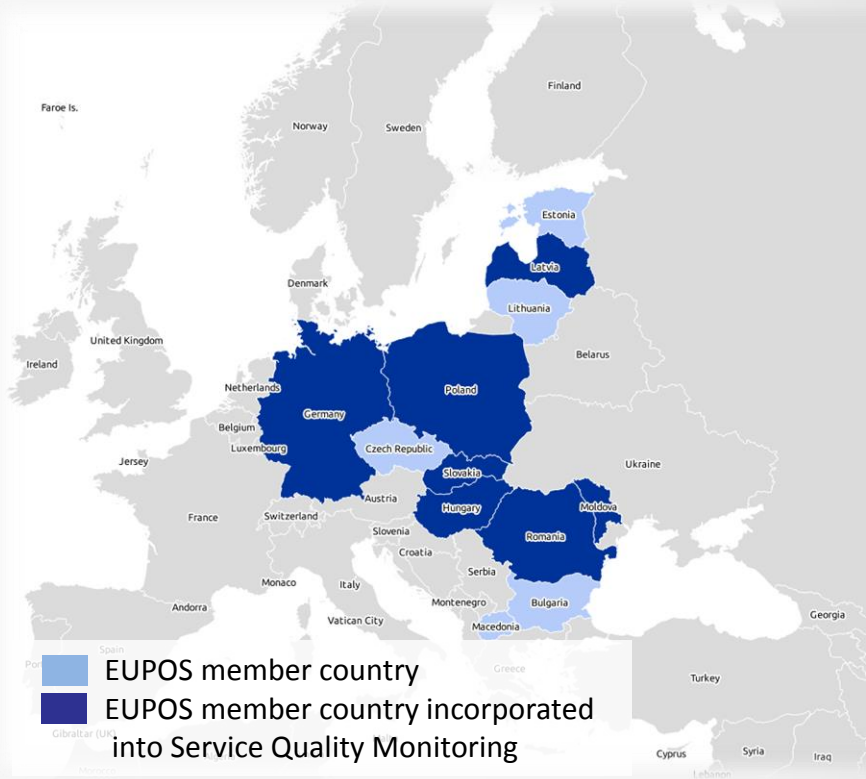


EUPOS service quality monitoring
User interface



EUPOS service quality monitoring Status (May 2017)

SKPOS	34 stations
ASG eupos	32 stations
GNSSnet.hu GNSS SZOLGÁLTATÓ KÖZPONT	7 stations
ROMPOS Romanian Position Determination System	68 stations
SAPOS	4 stations
RIGA EUPOS	5 stations
MOLDPOS	10 stations
	160 stations



GNSS receiver manufacturers

- Trimble
- Leica
- Topcon
- Javad
- Astech

Network softwares:

- Trimble Pivot Platform
- Geo++ GNSMART
- Leica Spider

EUPOS networks deviations comparison Statistics

RTK network		SKPOS	ASG eupos	GNSSnet.hu GNSS SZOLGÁLTATÓ KÖZPONT	ROMPOS	SAPOS	RIGA EUPOS	MOLDPOS	EUPOS
Software		Trimble Pivot Platform	Trimble Pivot Platform	Geo++ GNSMART	Leica Spider	Trimble Pivot Platform	Geo++ GNSMART	Leica Spider	Σ
Time period		1 399 days	1 009 days	913 days	877 days	667 days	559 days	137 days	
Number of monitored stations		34	34	7	68	4	5	10	**160**
Number of values		1 038 838	552 128	149 336	1 211 405	50 490	64 854	30 508	**3 097 559**
Maximal	ne	49.9 cm	44.6 cm	48.6 cm	49.7 cm	49.9 cm	35.3 cm	12.8 cm	
	u	49.8 cm	49.2 cm	49.9 cm	49.9 cm	37.5 cm	49.3 cm	19.1 cm	
Average	ne	1.1 cm	0.9 cm	1.2 cm	1.2 cm	0.9 cm	1.0 cm	1.0 cm	**1.0 cm**
	u	2.4 cm	1.2 cm	1.3 cm	2.6 cm	1.4 cm	1.8 cm	1.3 cm	**1.7 cm**
No fix		14%	7%	15%	18%	9%	25%	28%	**17%**

HZ RMS ≤ 2 cm
EUPOS TS Confirmed!

Service quality monitoring
Not only for determination of deviations

- Archived results can serve for different analysis and can reveal interesting connections and experience
- Analyzes of deviations according to:
  - GNSS service provider control software
  - reference stations density
  - dependency on high ionosphere (day/night deviation comparison)
  - testing points extrapolation (on RIGA-EUPOS network)
  - type of receiver
  - dependency on position

Thank you for your attention

Karol Smolik
Geodetic and Cartographic Institute BRATISLAVA
karol.smolik@skgeodesy.sk