



# National report of SLOVAKIA

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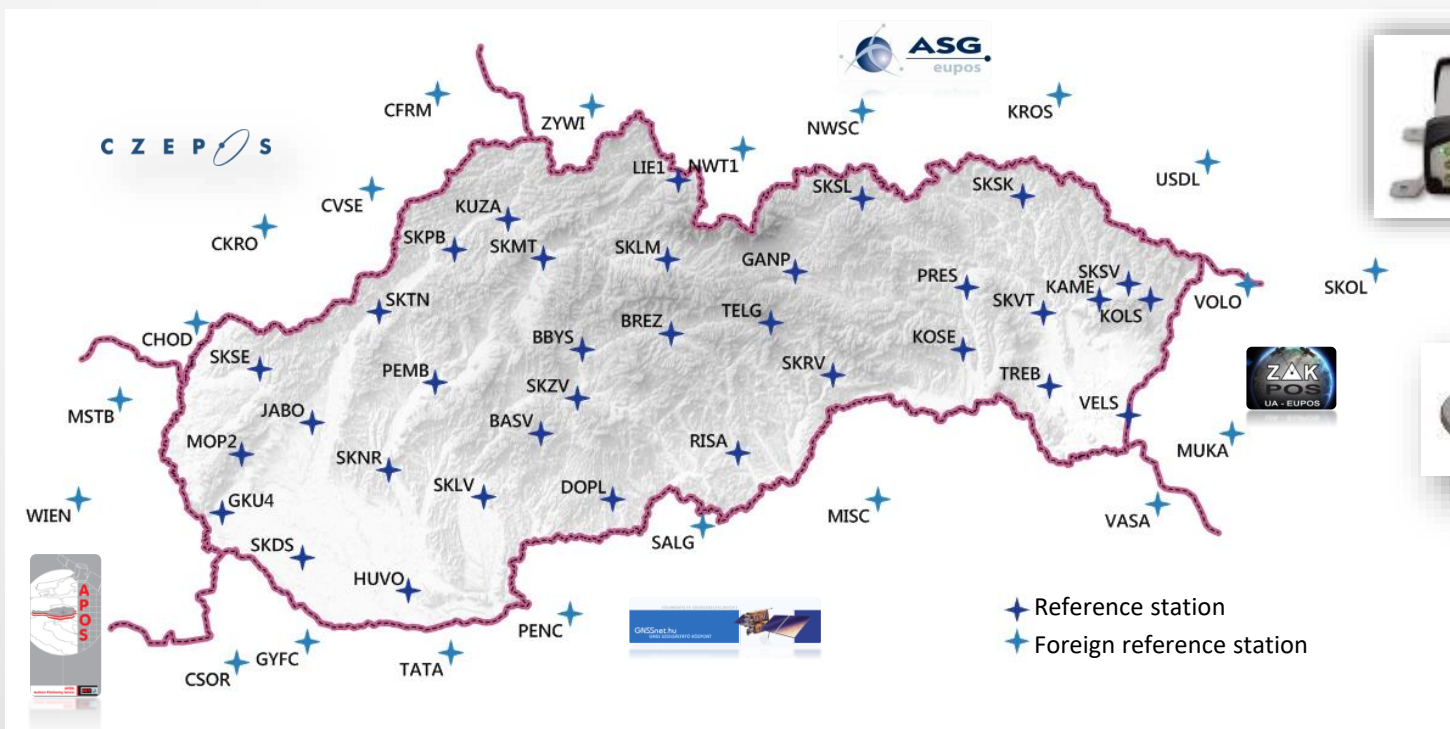


5<sup>th</sup> EUPOS<sup>®</sup> Council and Technical Meeting  
November 14-15, 2018. Tallinn, Estonia

# SKPOS stations infrastructure

## Status in November 2018

- **34 Slovakian permanent stations**
  - All stations with TRIMBLE receivers and antennas
  - All stations observe GPS + GLONASS + Galileo + BeiDou
- **21 foreign permanent stations (APOS, gnssnet.hu, CZEPOS, ASG-EUPOS, ZAKPOS)**



# SKPOS stations infrastructure

## Receivers changes

- 4 new Trimble Alloy receivers



Trimble NetR8

**Full Galileo capability**



CORS: GANP, SKNR, VELS



Trimble Alloy

# SKPOS stations infrastructure

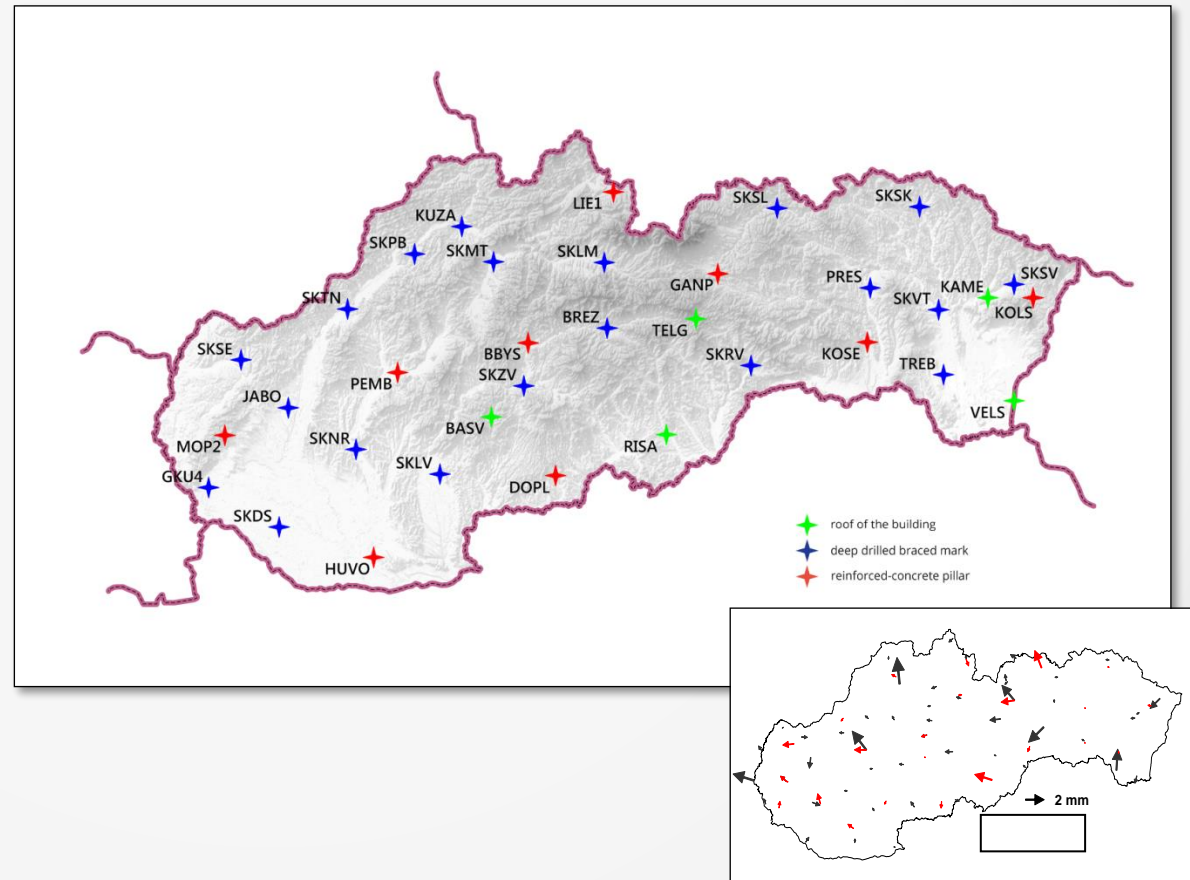
## 2 stations relocation in 2017 year

- Reinforced-concrete pillar instead of roof monumentation
- Contribution to geokinematics reseach (multipurpose usage of CORS = GKÚ philosphy)



# SKPOS stations infrastructure geodynamics research monumentation

- together 14 of 34 slovakian SKPOS permanent stations (41%) have monumentation suitable for geodynamic research purposes

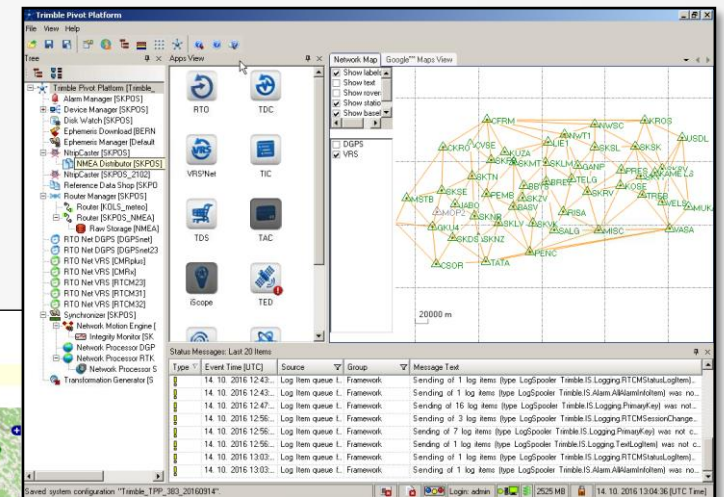
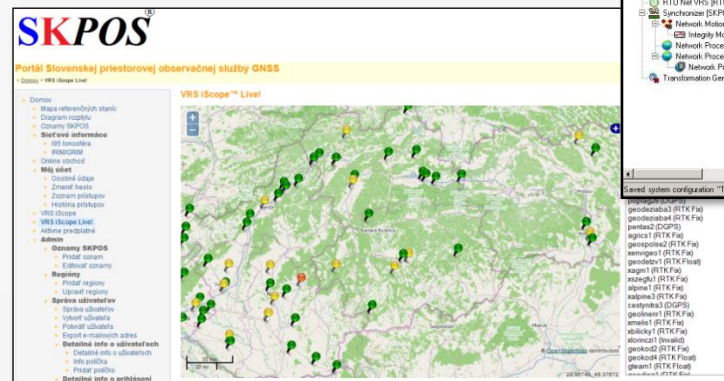


# SKPOS

## control software






- Trimble® Pivot™ Platform GNSS Infrastructure Software
  - Main software: version 3.10.5
  - Back-up software: version 3.10.5
  - RTXNet Processor **NEW**

- Receivers firmware
  - Trimble receivers: version 5.37



# SKPOS – Galileo and BeiDou

Full capability Galileo and BeiDou

SKPOS	Component	GPS + GLONASS + Galileo + BeiDou
Hardware	Antennas	 34 (34)
	Receivers	 34 (34)
Software Trimble Pivot	RINEX CORS, VRS	
	RTK VRS  2018-10-16	



# SKPOS – User's experience with Galileo

- More satellites = better precision
- sufficient # of satellites in problematic regions
- Better accessibility for measuring in forests
- Better accessibility for measuring in urban areas





# Experience with mixture of hardware brands

- All Slovakian stations equipped by Trimble receivers and antennas
- Foreign stations use Trimble or Leica hardware
  - Trimble Pivot support only Leica GR30 and Leica GR50
  - Extra Non-Trimble license needed

# SKPOS portfolio

## data formats – content - charges

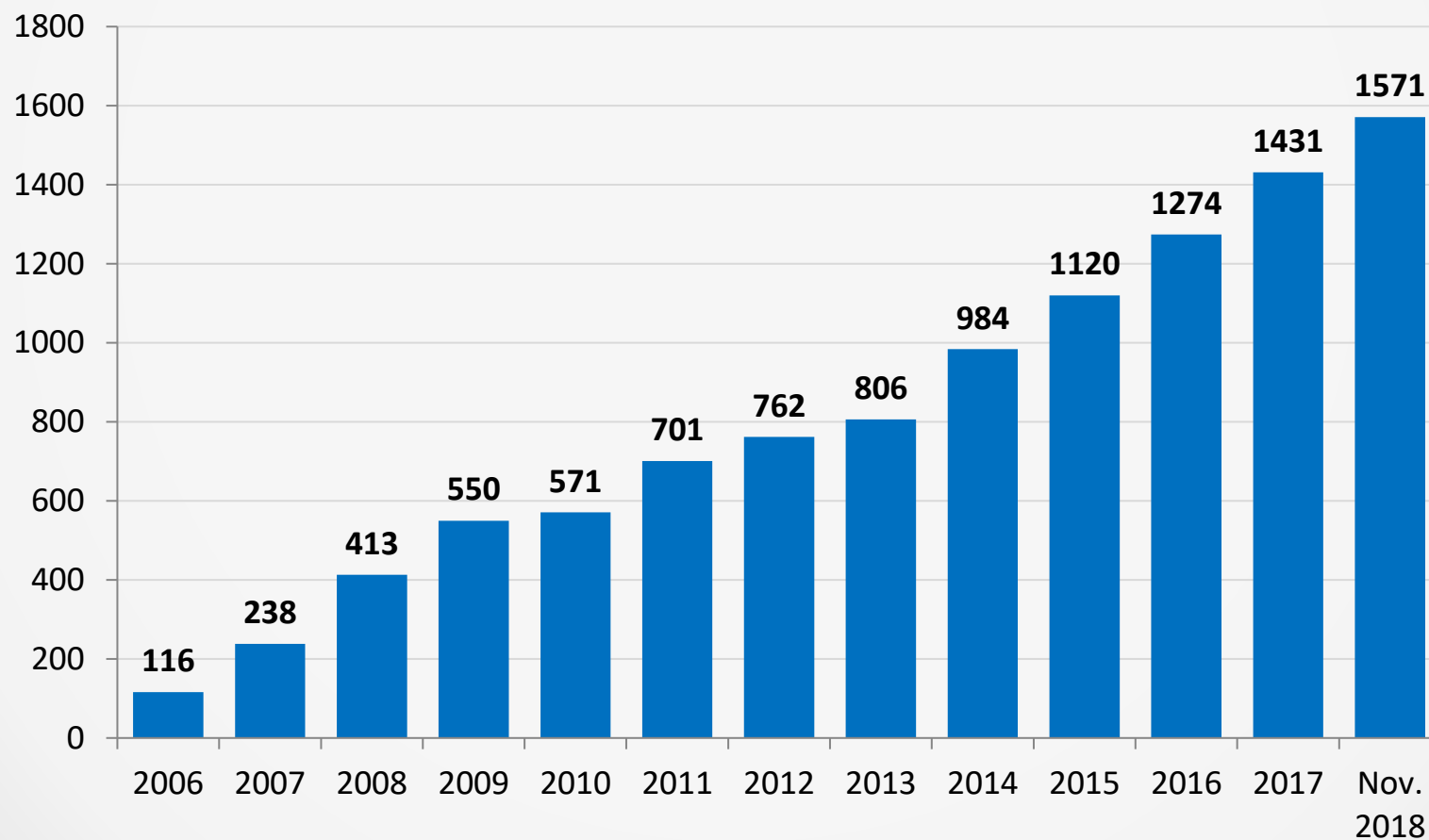
Only network solution (Network RTK in VRS concept) is provided.  
No single RTK!

Package	Content	Duration	Format	Flat rate
SKPOS_mm	RINEX 1000 h	year	RINEX 2.x, 3.x	50 €
SKPOS_cm (year)	RTK unlimited + 50 h RINEX	year	RTCM 2.3, 3.1, RTCM 3.2 MSM, CMRx, CMR+	50 €
SKPOS_cm (month)	RTK unlimited	month	RTCM 2.3, 3.1 RTCM 3.2 MSM, CMRx, CMR+	19 €
SKPOS_dm	DGNSS unlimited	year	RTCM 2.1, 2.3	20 €

# SKPOS

## number of users

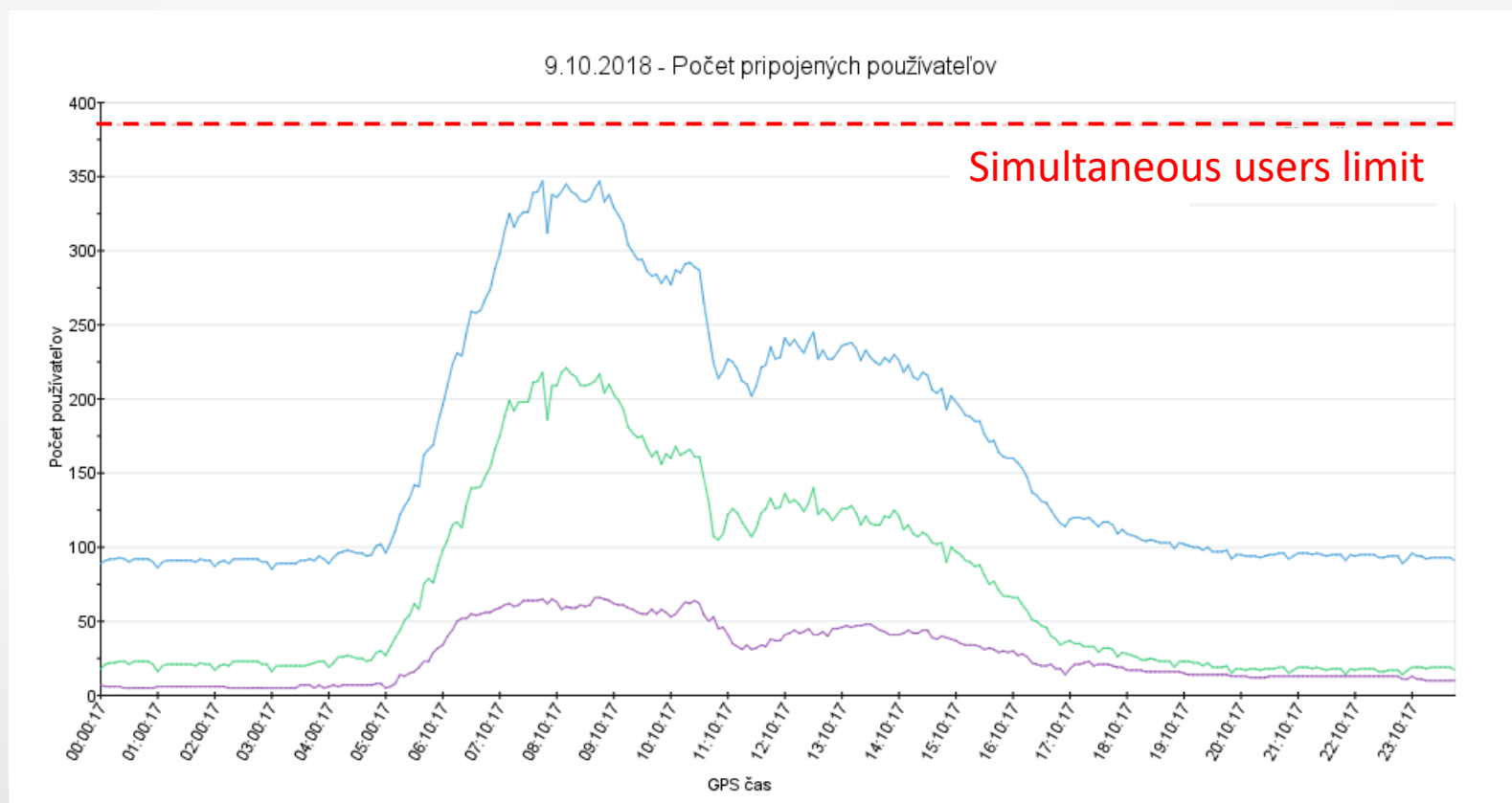
- almost 1,600 registrations (Nov. 2018)



# SKPOS

number of users – 100 new user license

- Most busy days only 40 licenses under limit
- Purchased 100 new licenses for simultaneous user connections – now 485 simultaneous licenses



# SKPOS

Type of users (precise values from registration forms)

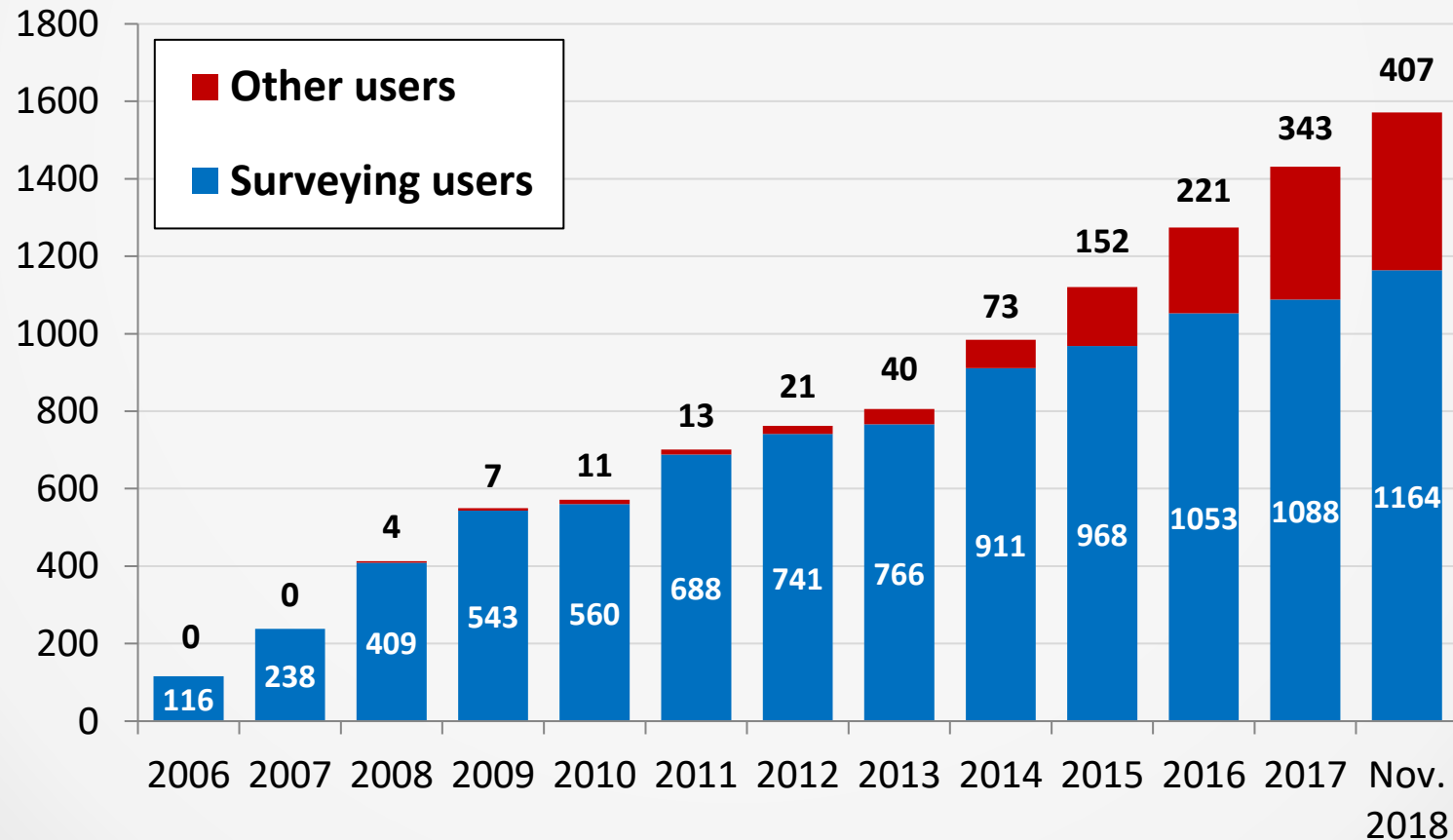
- Surveying fields (cadastre, surveying, mapping, GIS) – **73 %**
- Other fields (precise agriculture, machine guarding) – **27 %**



# SKPOS

## Type of users (precise values from registration forms)

- In 2017 more new SKPOS users were from non geodetic field






# SKPOS web page

## new items

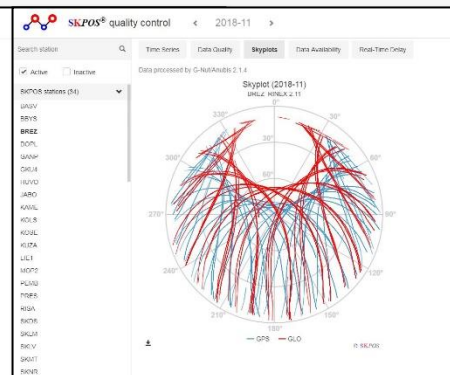
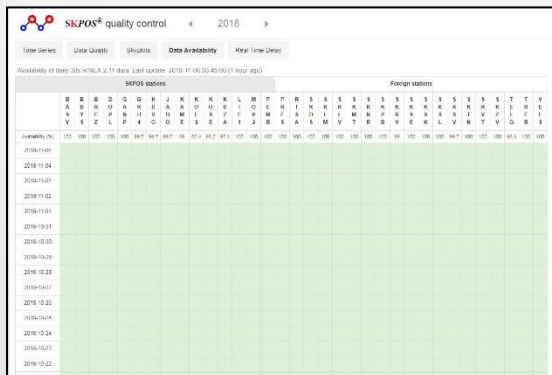
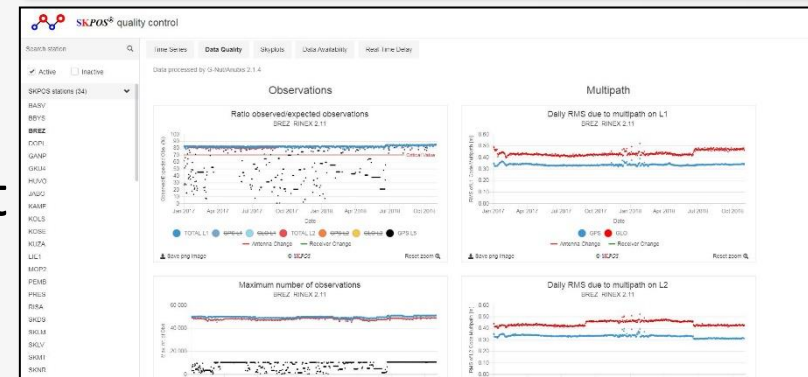
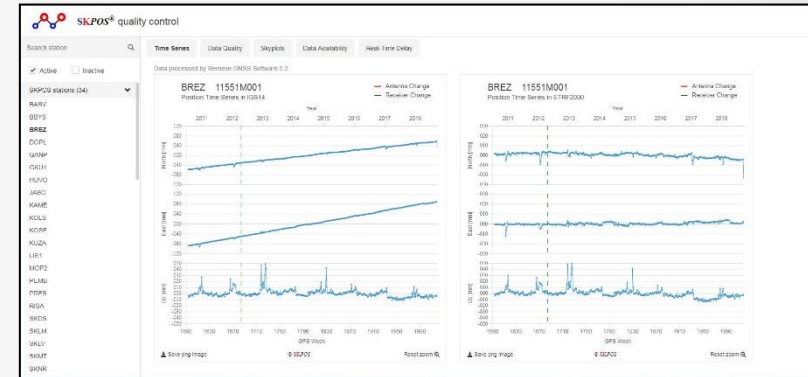
- list of reference stations
- coordinates
- antenna calibration files
- sitelogs

### Reference stations

#	Reference station	Location	Coordinates <small>Change format</small>			Antenna	Receiver
			ETRS89 (ETRF2000) epoch 2008.5				
			X (m)	Y (m)	Z (m)		
1	BASV	Banská Štiavnica	4009952.2193	1374556.6500	4750511.3543	TRM55971.00 NONE	TRIMBLE NETR9
2	BBYS	Banská Bystrica	3980359.1445	1382291.8716	4772771.7709	TRM59800.00 NONE 	TRIMBLE NETR9
3	BREZ	Brezno	3963889.0095	1414440.8746	4777131.8796	TRM55971.00 NONE 	TRIMBLE NETR9
4	DOPL	Dolné Plachtince	4019049.1891	1408890.6541	4732383.5840	TRM55971.00 NONE	TRIMBLE NETR9
5	GANP	Gánovce	3929181.8684	1455236.5018	4793653.7059	TRM59800.00 SCIS 	TRIMBLE NETR9

# New App – SKPOS Quality Control

- Time Series
- RINEX Data Quality
- Skyplots
- Data Availability
- Real-time Delay
- More features under development





# Users' feedback - most criticized issues

- Web survey for users
- 53% responses
- Average rating **1.8** (1 best, 5 worst)
- Only a few negative ratings:
  - Weak internet coverage
  - Notification of outages via SMS or e-mail
  - Problems with increased ionosphere activity



**Thank you for your attention**

**Karol Smolík**

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