



# NEWS FROM SLOVAKIA 2016

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EuroGeographics

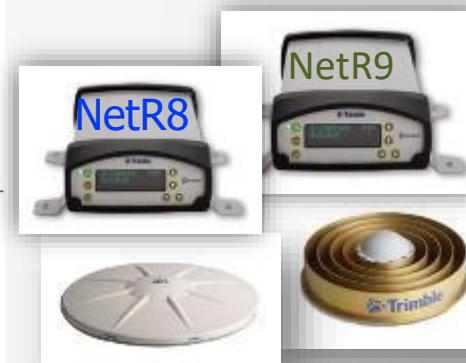
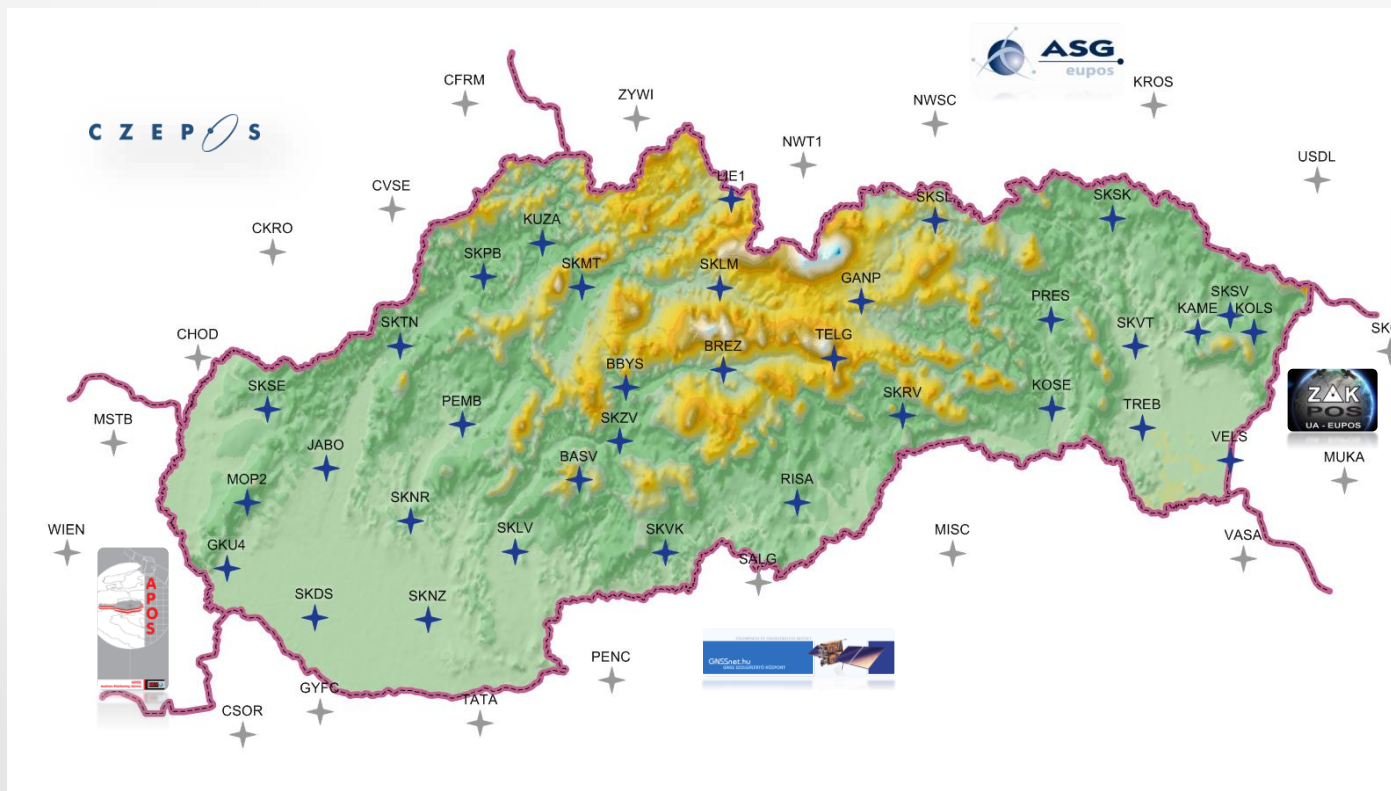
3<sup>rd</sup> meeting of the PosKEN

November 15-16, 2016. Prague, Czech Republic

# SKPOS infrastructure

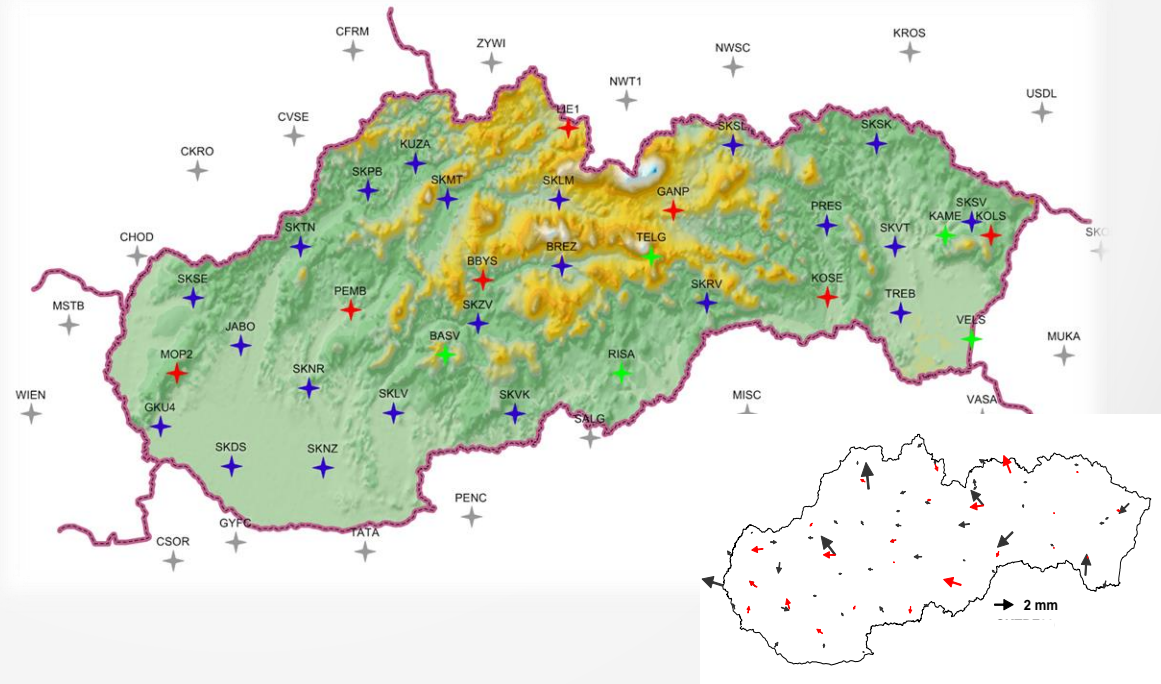
## Status in October 2016

- **34 Slovakian permanent stations (14 individual calibrated)**
  - All stations with TRIMBLE receivers and antennas
  - All stations observe GPS+GLONASS signals
- **19 foreign permanent stations (APOS, gnsnet.hu, CZEPOS, ASG-EUPOS, ZAKPOS)**



# SKPOS infrastructure for geodynamics research

- 12 of 34 slovakian SKPOS permanent stations have monumentation suitable for geodynamic research purposes
  - 7 stations reinforced-concrete pillar monumentation
  - 5 stations deep drilled braced mark monumentation (5m deep)



# SKPOS infrastructure

## new stabilization

- Preparation for the relocation of two stations
  - reinforced-concrete pillar monumentation



# SKPOS

## control software & receivers firmware versions

- Trimble® Pivot™ Platform GNSS Infrastructure Software
  - Main software: version 3.8.3
  - Back-up software: version 3.8.3
- Receivers firmware
  - Trimble NetR9 receivers: version 5.14
  - Trimble NetR8 receivers: version 4.87

**SKPOS**  
Portál Slovenskej priestorovej observačnej služby GNSS

**Trimble NetR9**

Receiver Type: NetR9  
System Name: GK14  
Serial Number: 5212943237  
Ethernet IP: 192.168.244.218  
Firmware Version: 5.14  
2018-05-20

Message Text  
User 36521469/ceritek3 was not connected to mountpoint SKPOS\_CM\_OMRplus. Reason...  
User 36521469/ceritek3 was not connected to mountpoint SKPOS\_CM\_OMRplus. Reason...

# SKPOS

## services portfolio

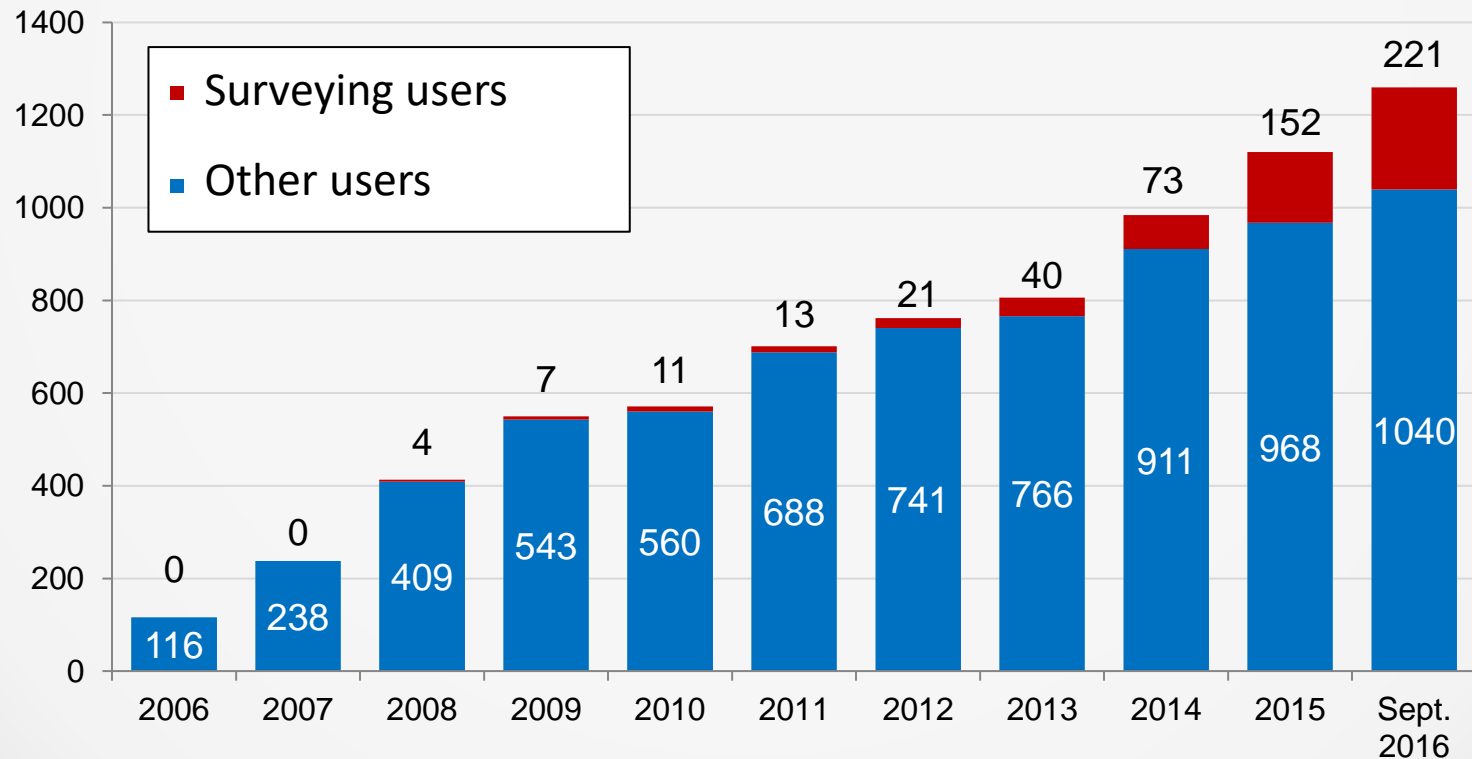
Only network solution (Network RTK in VRS concept) is provided.  
No single RTK!

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, 3.2, CMRx, CMR+	50 €
SKPOS_cm (month)	RTK unlimited	month	RTCM 2.3, 3.1, 3.2, CMRx, CMR+	19 €
SKPOS_dm	DGNSS unlimited	year	RTCM 2.1	20 €

# SKPOS

## number of users

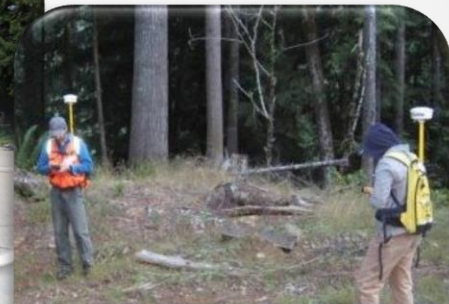
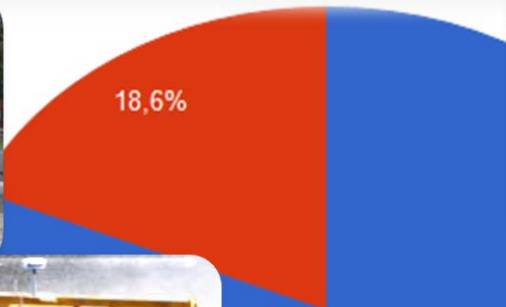
- over 1260 registrations (Sept. 2016)
- number is still increasing



# SKPOS

## type of users

- Surveying fields (cadastre, surveying, mapping, GIS) - 81%
- Other fields (precise agriculture, machine guarding) - 19%



81,4%



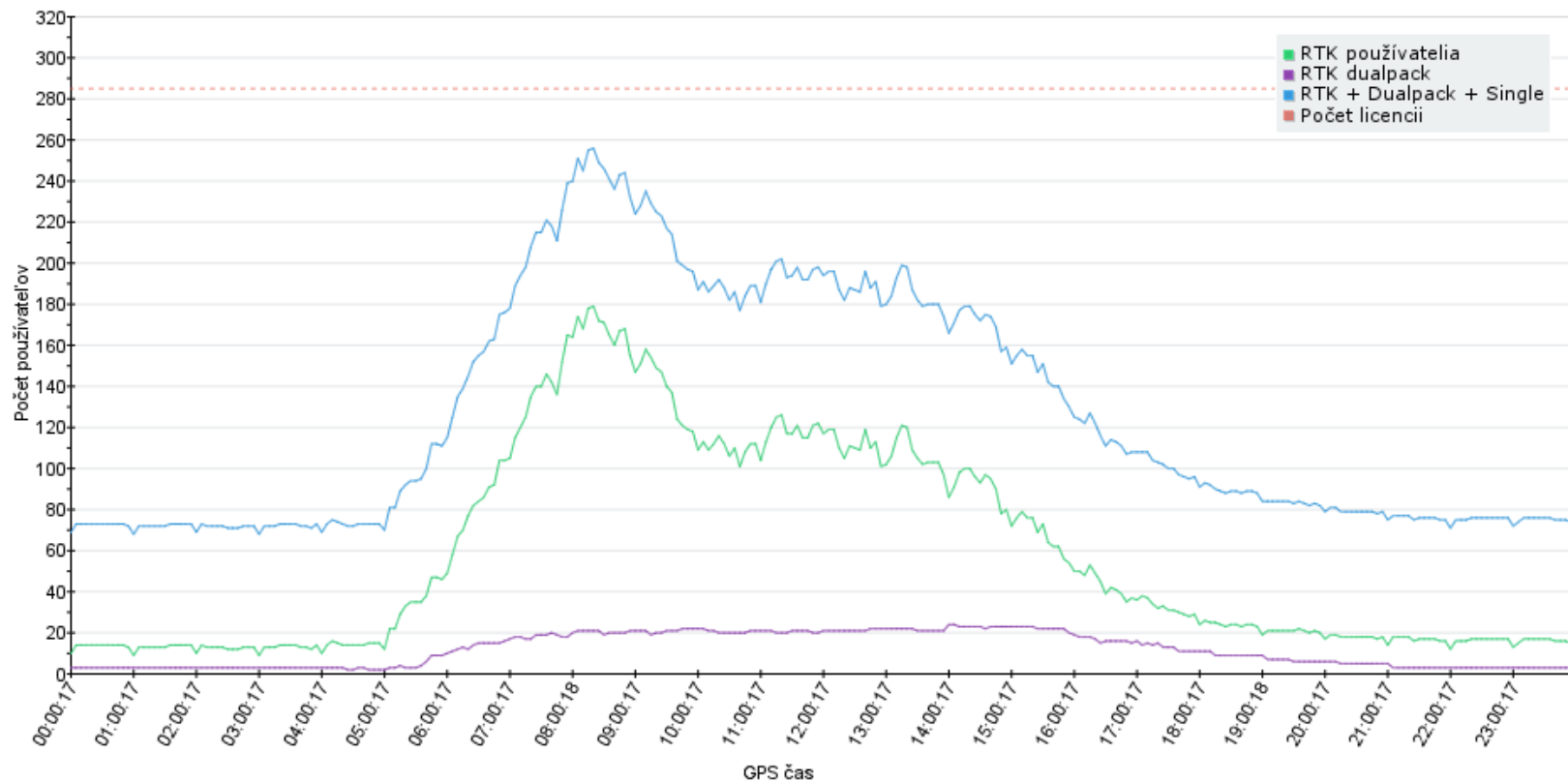


# SKPOS

## simultaneous logins

- Maximum: 256 simultaneous logins (12/4/2016)

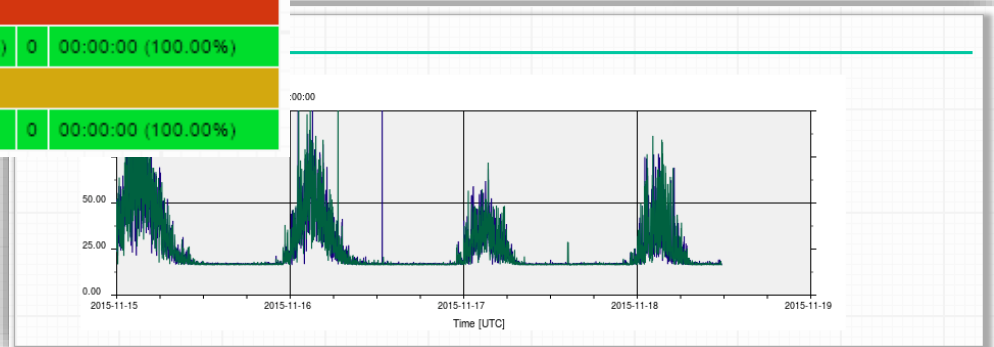
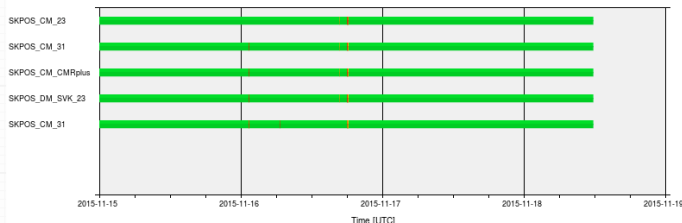
12.04.2016 - Počet pripojených používateľov



# Alberding Checkstream application

- Independent NTRIP Caster monitoring tool
- Check the availability and consistency of mountpoints on specific caster
- Message type and update rate monitoring **New**

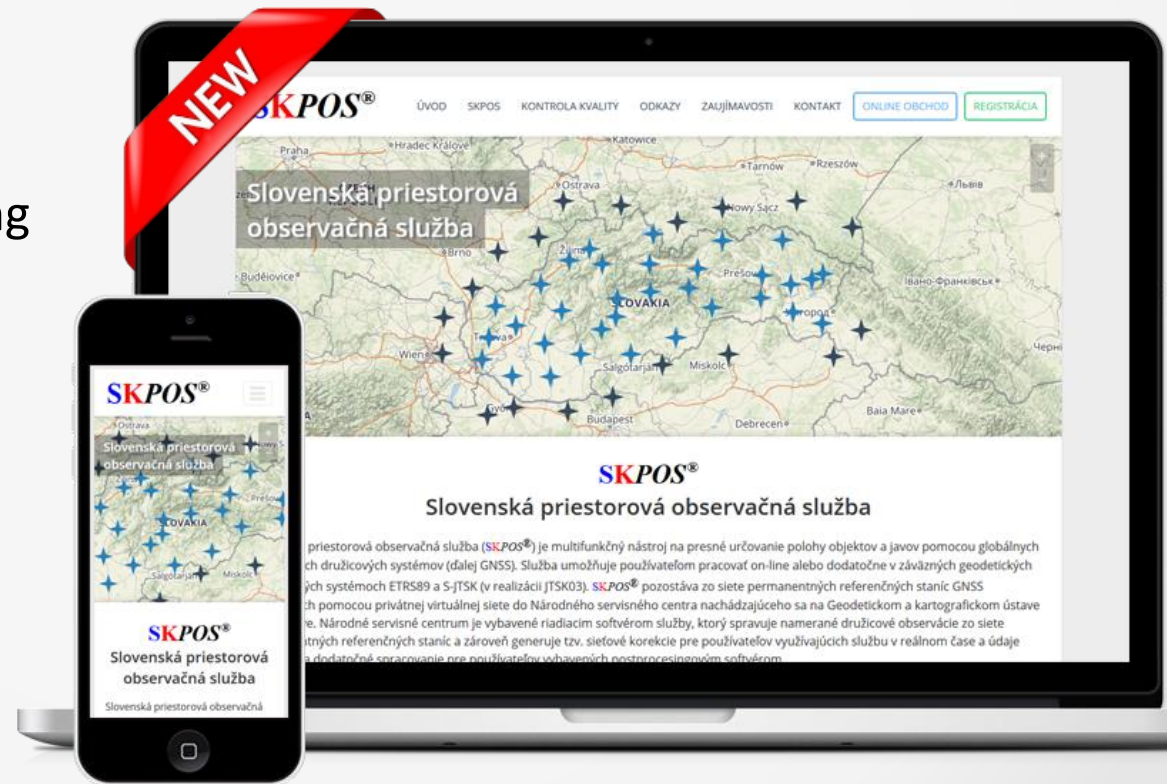
Last Accessed	Connection		Message		Data Age	
	Σ	Last Error(24h),(NWH)	Σ	Last Error(24h)	Σ	Last Error(24h)
00:00:08	3	01:48:05 (90.51 %),(90.51 %)	3	01:50:05 (89.27%)	0	00:00:00 (100.00%)
00:00:07	0	00:00:00 (100.00 %),(100.00 %)	0	1 d 15:08:05 (100.00%)	0	1 d 15:12:05 (100.00%)
00:00:06	0	19:48:05 (51.81 %),(51.81 %)	0	19:50:05 (51.81%)	0	00:00:00 (100.00%)
-	no connection!					
00:00:08	0	1 d 15:02:05 (100.00 %),(100.00 %)	0	1 d 15:24:05 (100.00%)	0	00:00:00 (100.00%)
-	message error!					
00:00:08	0	00:00:00 (100.00 %),(100.00 %)	0	00:00:00 (100.00%)	0	00:00:00 (100.00%)



# New SKPOS web page

- 13.10.2015 – new (redesign) web page was launched
- Full of interesting information (SVK/ENG):
  - News
  - Infrastructure
  - Packages and prices
  - Quality Monitoring
  - Availability Monitoring
  - Registration
  - ...

<http://skpos.gku.sk>



# New SKPOS registration and ordering system

- Complete new system for user registration and ordering subscriptions
- User management and automatization numerous processes
- Fixing inconvenient Trimble registration module
- Registration via web form (no paper agreement)

Vytvoriť účet

### Registrácia nového používateľa

Zvoľte typ účtu

Registrácia nového používateľa

Fakturačné údaje

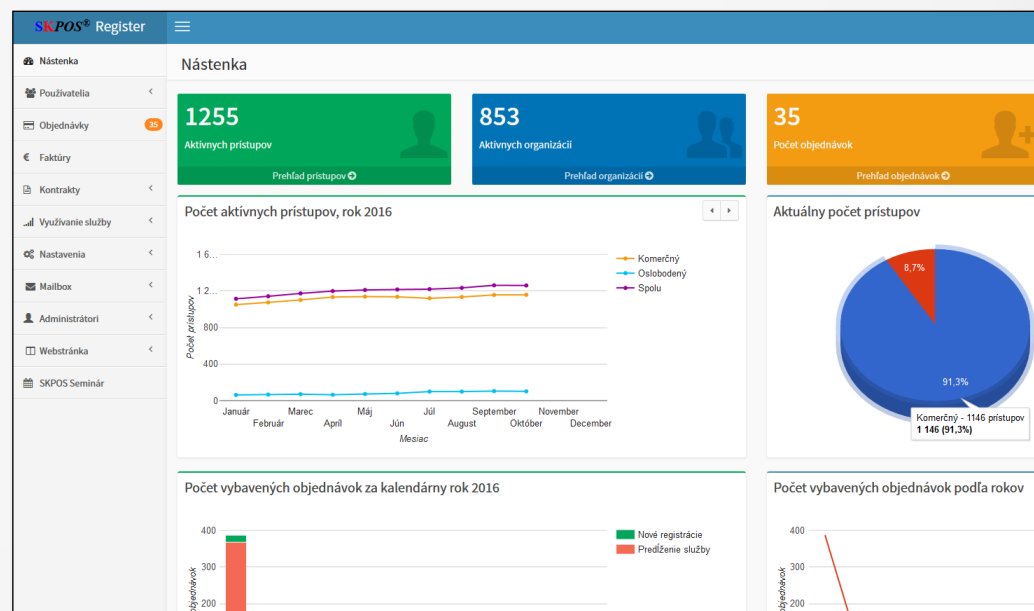
Právnická osoba

Zvoľte typ používateľa

- Fyzická osoba bez živnostenského listu
- Fyzická osoba so živnostenským listom
- Právnická osoba**
- Rezortná organizácia ÚGKK SR
- Orgány štátnej správy - príspevkové organizácie
- Orgány štátnej správy - rozpočtové organizácie
- VÚC, mesto, obec

Formát: 0123456789

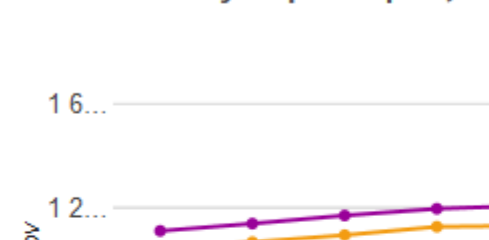
IČ DPH: IČ DPH



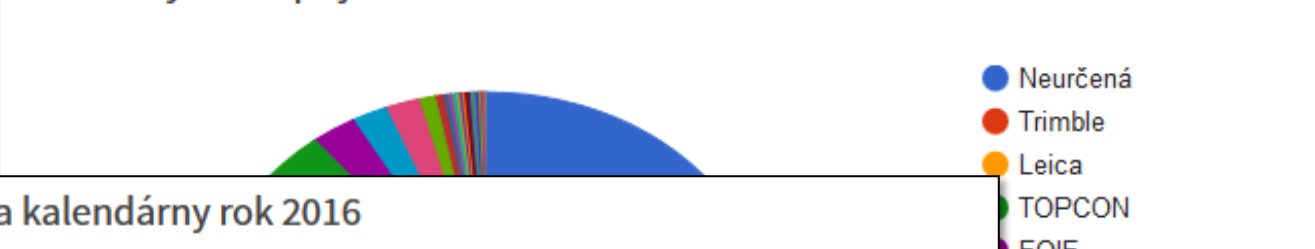
# New SKPOS registration and ordering system

Back office - automatic generation of statistics

Počet aktívnych prístupov, rok 2016



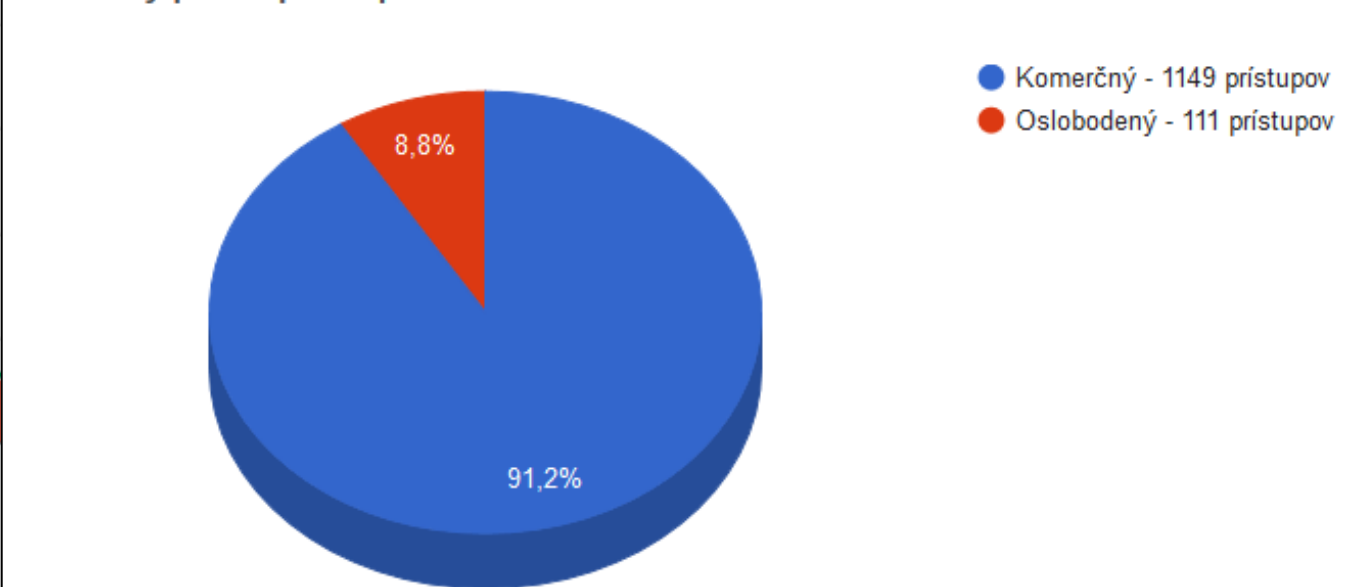
Značka výrobcu prijímača



Počet vybavených objednávok za kalendárny rok 2016



Aktuálny počet prístupov



# New SKPOS registration and ordering system

## Back office – orders management

Nové objednávky

Typ objednávky: [Predĺženie služby](#) | [Nová registrácia](#) | [Nový prístup](#) | [Nový prístup aj používateľ](#)

Hľadaj:

Dátum registrácie	Login	Kontrola údajov	Vyžiadanie faktúry	Vloženie faktúry	Odoslanie faktúry	Potvrdenie platby	Aktivácia	Vymazať
2016-10-13 08:23:13	gasparek	Kontrola	Vyžiadať faktúru	Vložiť faktúru	Odoslať faktúru	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-12 20:13:53	xgpszvolen2	Kontrola	Vyžiadať faktúru	Vložiť faktúru	Odoslať faktúru	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-12 15:55:36	xjavor1	Kontrola	Vyžiadať faktúru	Vložiť faktúru	Odoslať faktúru	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-12 07:54:47	infraservices1	Miroslav Steinhubel 2016-10-12 08:12:55	Miroslav Steinhubel 2016-10-12 08:13:10	Miroslav Steinhubel 2016-10-12 12:18:32	Miroslav Steinhubel 2016-10-12 12:19:26	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-12 06:58:51	jrislama1	Elena Beňová 2016-10-12 07:03:01	Elena Beňová 2016-10-12 07:03:07	Elena Beňová 2016-10-12 08:35:13	Elena Beňová 2016-10-12 08:35:19	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-11 16:39:03	korexnet1	Elena Beňová 2016-10-12 04:08:56	Elena Beňová 2016-10-12 04:09:00	Elena Beňová 2016-10-12 08:38:10	Elena Beňová 2016-10-12 08:38:14	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-11 08:01:37	vvssk1	Elena Beňová 2016-10-11 08:31:28	Elena Beňová 2016-10-11 08:31:31	Elena Beňová 2016-10-11 10:39:10	Elena Beňová 2016-10-11 10:39:21	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-11 06:21:29	3dscv1	Elena Beňová 2016-10-11 06:23:24	Elena Beňová 2016-10-11 06:23:28	Elena Beňová 2016-10-11 08:32:13	Elena Beňová 2016-10-11 08:32:19	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-10 10:20:38	baugeo1	Elena Beňová 2016-10-10 10:21:57	Elena Beňová 2016-10-10 10:22:03	Elena Beňová 2016-10-10 12:21:57	Elena Beňová 2016-10-10 12:22:01	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-10 06:03:47	xharsany1	Elena Beňová 2016-10-10 06:30:40	Miroslav Steinhubel 2016-10-10 06:12:31	Elena Beňová 2016-10-10 08:45:02	Elena Beňová 2016-10-10 08:45:08	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-07 10:59:16	vwspo1	Elena Beňová 2016-10-07 11:06:39	Elena Beňová 2016-10-07 11:06:43	Elena Beňová 2016-10-10 04:23:05	Elena Beňová 2016-10-10 04:23:09	Potvrdiť platbu	Aktivovať	Vymazať
2016-10-07 08:27:32	vinicaas1	Elena Beňová 2016-10-07 11:06:20	Elena Beňová 2016-10-07 11:06:25	Elena Beňová 2016-10-10 04:24:46	Elena Beňová 2016-10-10 04:24:52	Potvrdiť platbu	Aktivovať	Vymazať

# 10 years of SKPOS



**2006 - 2016**

# 10 years of SKPOS

## Conference for users

- Two days with the same topics
- More than 150 participants

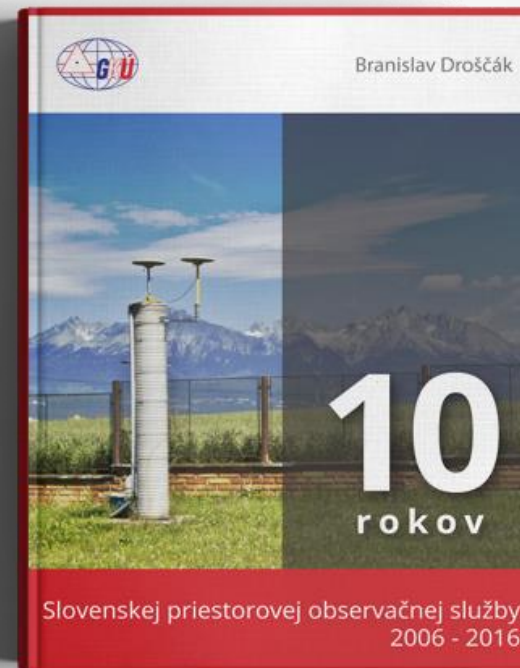




# 10 years of SKPOS

## Conference for users

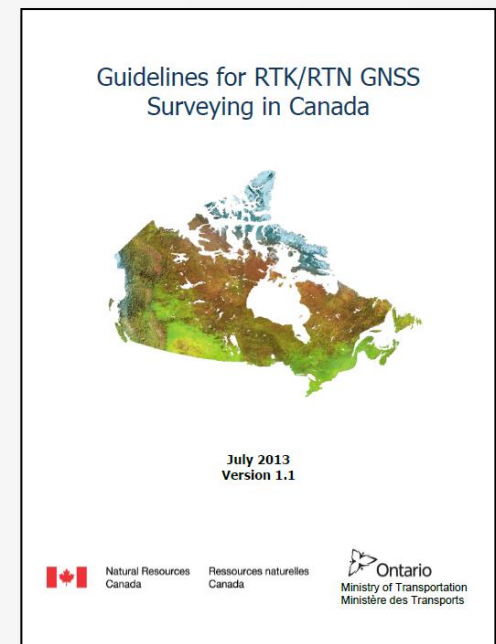
- SKPOS promotional brochure
- Book 10 years of SKPOS









# Guideline: Usage of Slovak real-time determination system for surveying

- Table of contents
  - Introduction
  - About SKPOS
  - Planning and practical recommendations for RTK/RTN measurements
  - Planning and practical recommendations for post-processing
  - Summary and Conclusions
- Mandatory for all measurements adopted into a cadastral documentation
- It will be launched later this year

## Inspired By



# SKPOS and Galileo

SKPOS	Component	GPS + GLONASS + Galileo + BeiDou
Hardware	Antennas	 34 (34)
	Receivers	 29 (34)
Software Trimble Pivot	RINEX CORS	
	RINEX VRS	
	RTCM 3.2 MSM	
	RTK/RTN	

# RINEX 3

EPN, IGS stations

Raw data - t02

↳ Convert2rinex - RINEX 3.02

↳ Check data, edit header: gfzrnx – RINEX 3.03

↳ Longname e.g. *GANP00SVK\_R\_20162880000\_01D\_30S\_MO*

↳ Send to OLG, BKG

# RINEX 3

## SKPOS stations

- Data from CORS includes observation of all GNSS

Available on  
SKPOS online datashop

```
00 00.000000 0 34C02C05C08C10C14C15E02E08E11E12E24G01
G10G11G12G13G15G17G18G19G20G24G28G30
R02R03R04R12R13R14R21R22R23S20
```

25157309.305	25157309.988	132202570.032	7
98722694.958 8		47.400	
48.900			
24984231.727	24984232.363	131293020.126	7
98043488.692 8		47.700	
48.800			
26109299.703	26109298.727	137205306.507	7
102458509.021 6		42.400	
40.200			
27512595.336	27512594.473	144579685.346	7
107965360.204 7		44.200	
42.600			
26239227.742	26239240.559	137888103.377	8
102968446.953 7		48.000	
46.000			

# RTCM 3.2 MSM

- 21/6/2016 – new mountpoint RTCM 3.2 MSM
- Only for **GPS** and **GLONASS**
- Control software does not support network solution for Galileo and BeiDou

Trimble® Pivot Platform GNSS Infrastructure Software

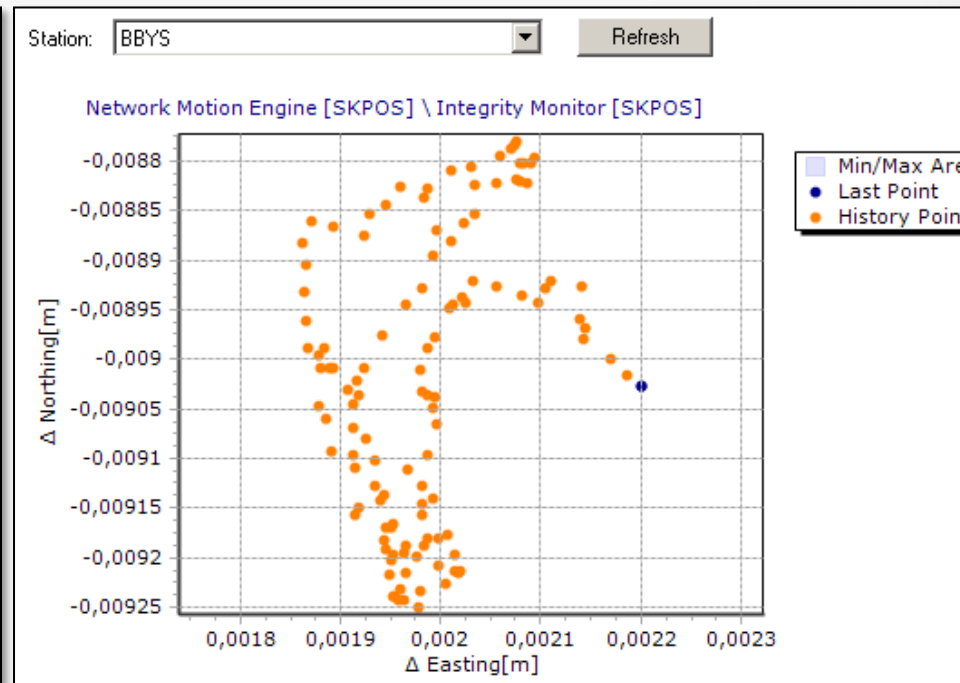
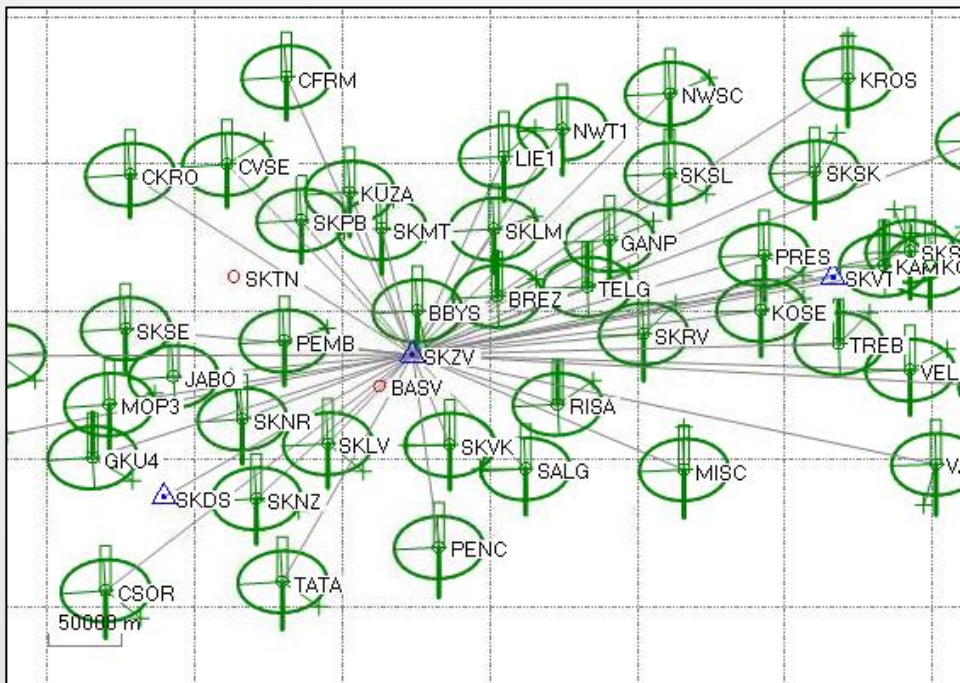
The screenshot displays the Trimble Pivot Platform software interface. The main window shows a network diagram with various nodes (e.g., CFFM, ANWSC, AKROS, AUSDL, etc.) connected by lines, representing a GNSS infrastructure. The interface includes a menu bar (File, View, Help), a toolbar, and a sidebar with icons for different components like RTD, TDC, VRSNet, TIC, TDS, TAC, Scope, and TED. A status message window at the bottom shows a list of events and messages, including log items and framework messages.

Type	Event Time [UTC]	Source	Group	Message Text
	14. 10. 2016 12:43...	Log Item queue L...	Framework	Sending of 1 log items (type LogSpooler Trimble IS Logging.RTCMStatusLogItem)...
	14. 10. 2016 12:43...	Log Item queue L...	Framework	Sending of 1 log items (type LogSpooler Trimble IS AlarmAlarmInfoItem) was no...
	14. 10. 2016 12:47...	Log Item queue L...	Framework	Sending of 16 log items (type LogSpooler Trimble IS Logging.PrimaryKey) was not...
	14. 10. 2016 12:56...	Log Item queue L...	Framework	Sending of 3 log items (type LogSpooler Trimble IS Logging.RTCMsessionChange...
	14. 10. 2016 12:56...	Log Item queue L...	Framework	Sending of 7 log items (type LogSpooler Trimble IS Logging.PrimaryKey) was not c...
	14. 10. 2016 12:56...	Log Item queue L...	Framework	Sending of 1 log items (type LogSpooler Trimble IS Logging.TextLogItem) was not c...
	14. 10. 2016 13:03...	Log Item queue L...	Framework	Sending of 1 log items (type LogSpooler Trimble IS Logging.RTCMStatusLogItem)...
	14. 10. 2016 13:03...	Log Item queue L...	Framework	Sending of 1 log items (type LogSpooler Trimble IS AlarmAlarmInfoItem) was no...

Saved system configuration "Trimble\_TPP\_383\_20160914"

# Quality check

- Continuous monitoring of the network integrity







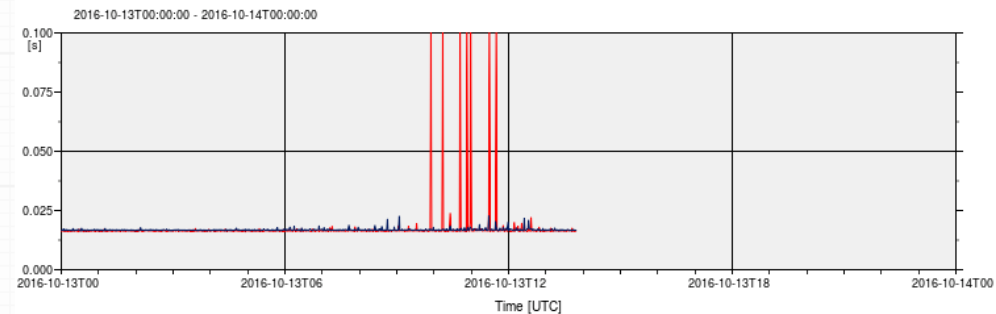
# Quality check

- Monitoring of the service availability, data flow, corrections and delay

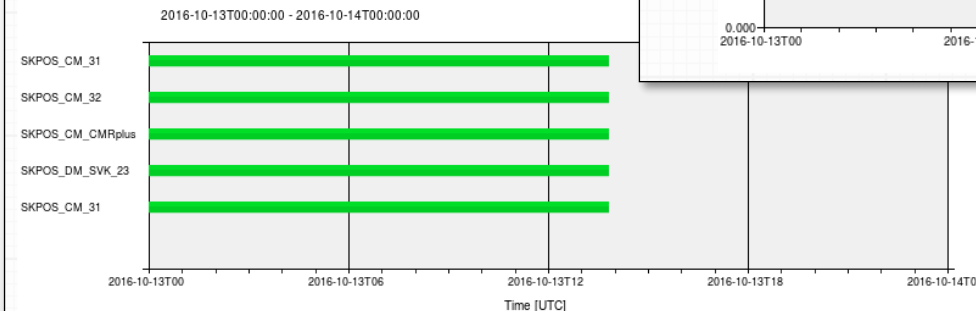
## Statistics

Stream	Caster	Subnet	Activation	Last Accessed	Σ	Connection	
						Last Error(24h),(	
SKPOS_CM_31 [0]	195.28.70.16.2101	SKPOS	2015-05-27T09:23:20	00:00:09	0	00:00:00 (100.00 %),	
SKPOS_CM_32 [0]	195.28.70.16.2101	SKPOS	2015-05-27T11:04:45	00:00:09	0	00:00:00 (100.00 %),	
SKPOS_CM_CMPlus [0]	195.28.70.16.2101	SKPOS	2015-05-27T09:23:20	00:00:09	0	00:00:00 (100.00 %),	
SKPOS_DM_SVK_23 [0]	195.28.70.16.2101	SKPOS	2015-05-27T11:05:19	00:00:09	0	00:00:00 (100.00 %),	
SKPOS_CM_31 [0]	195.28.70.17.2101	SKPOS	2015-05-27T09:23:20	00:00:09	0	00:00:00 (100.00 %),	

## Ping Server

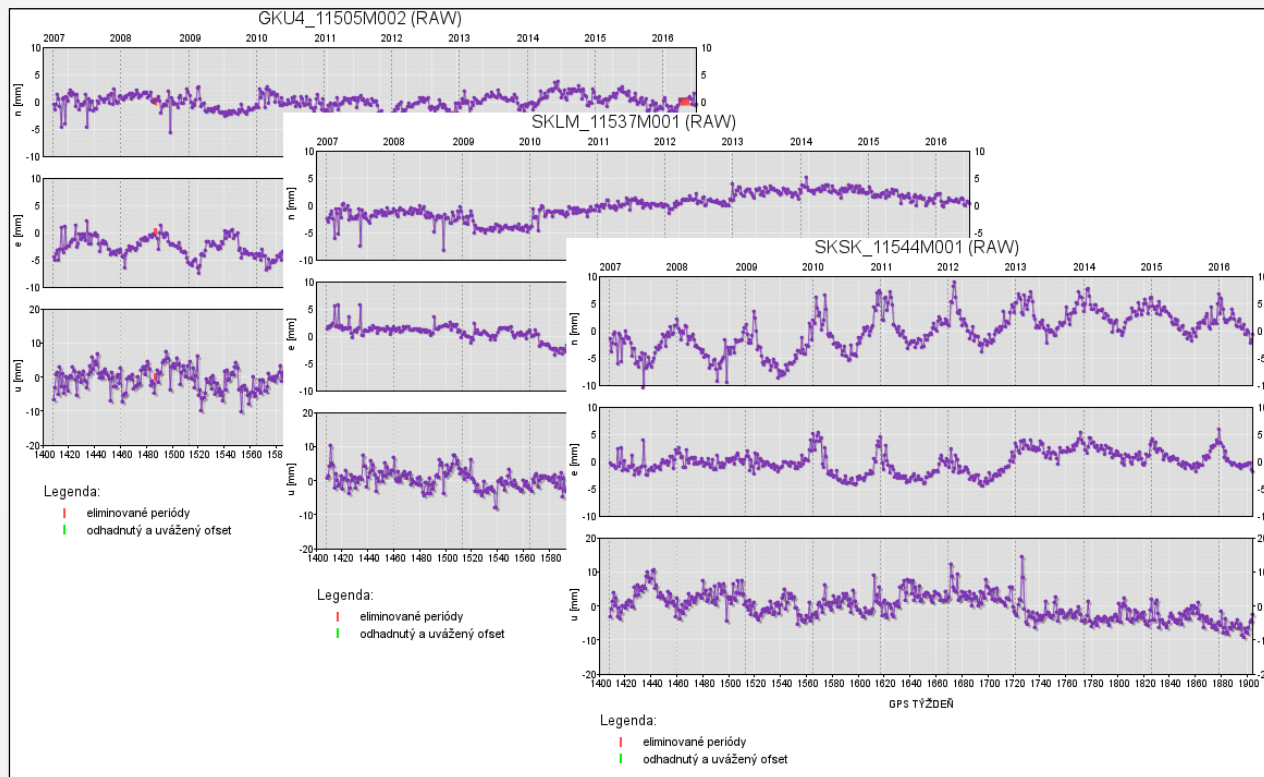


## Availability Plot



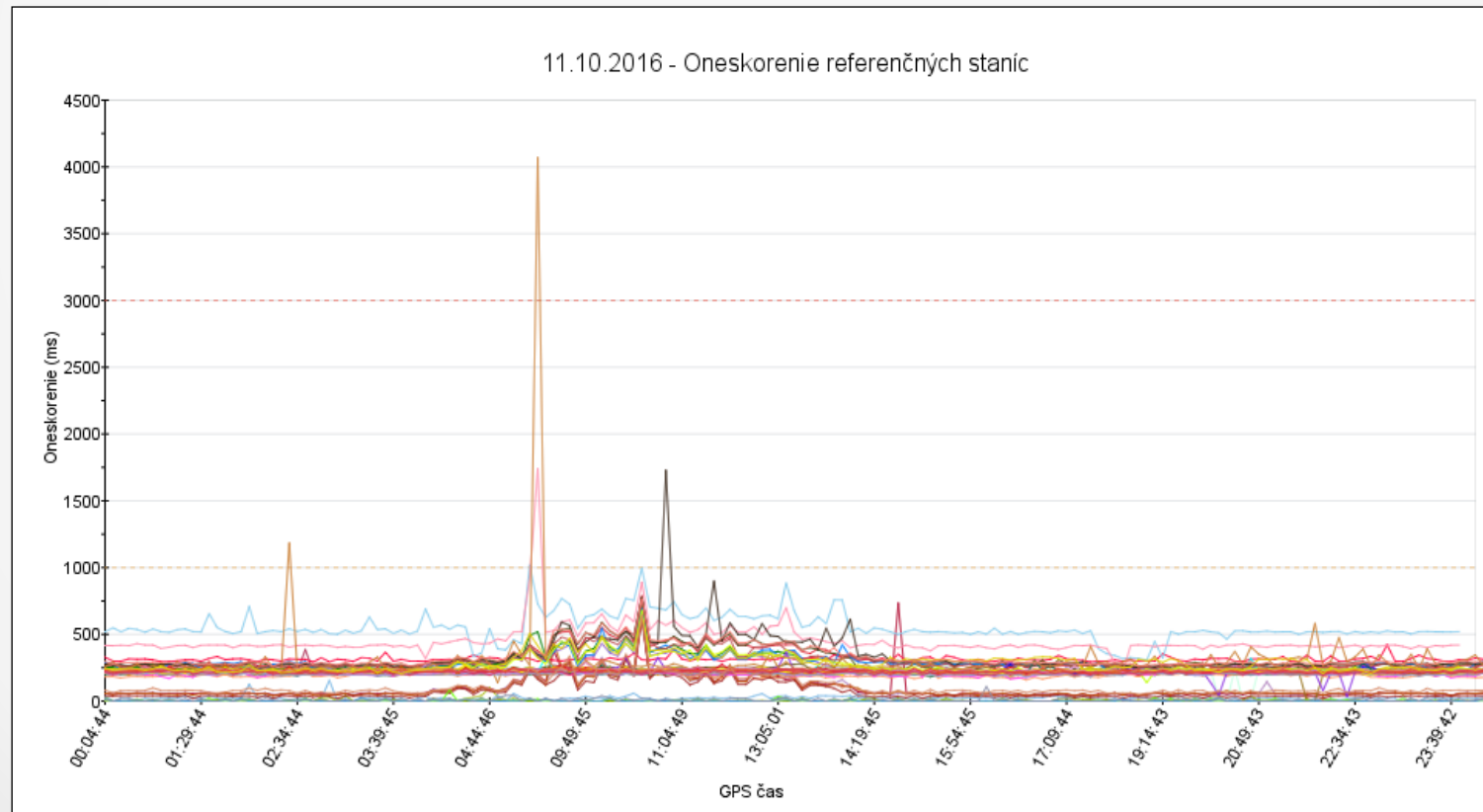
# Quality check

- Plot and analyze the time series topocentric coordinates of reference stations



# Quality check

- Continuous monitoring delay from reference stations



**Thank you for your attention**

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