



Geodetický a kartografický ústav Bratislava

(Geodetic and Cartographic Institute)



SKPOS 2013

Ing. Miroslav Roháček

9th July 2013



Outline

- **SKPOS** – Slovak real time positioning service
 - Status
 - Activities related to *EPN*
 - application for **SKPOS** network solution quality control
 - application for **SKPOS** monitoring and RTK users performance



Status

Act number 423/2003 from September 2003,

change and fill up act number 215/1995 related to Geodesy and Cartography



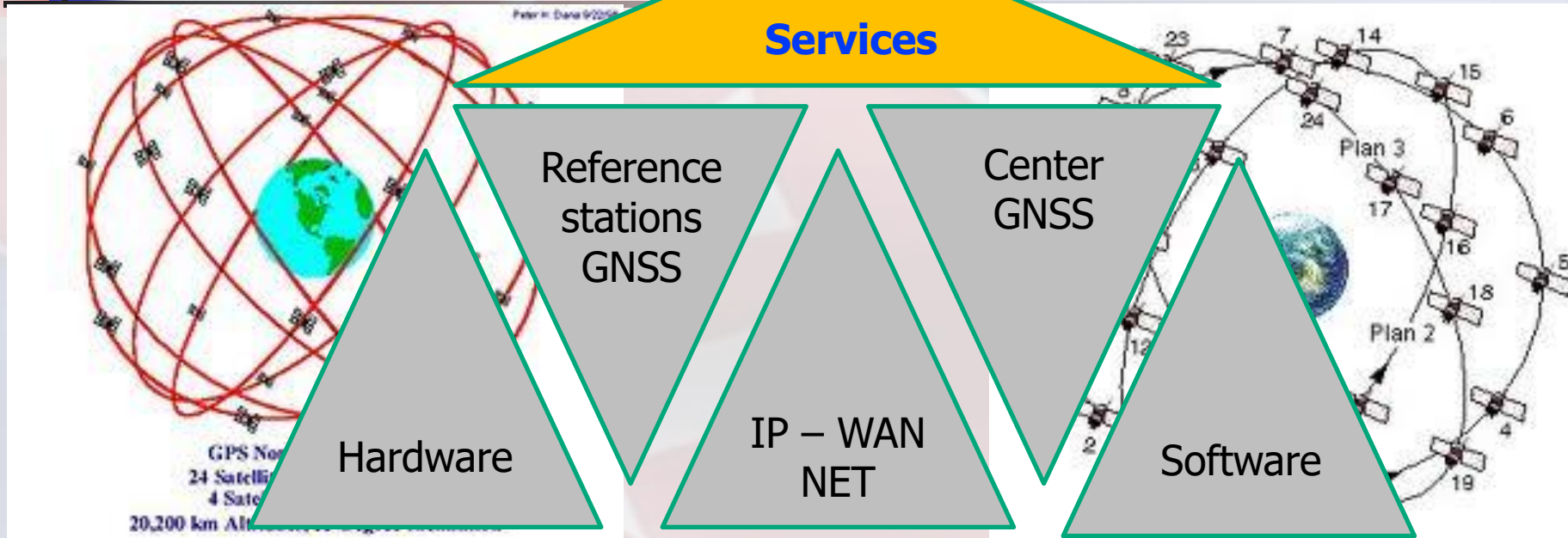
§ 2 is fill up with:

(16) Permanent service GNSS is a network of cooperated stations, which execute and in real time provide geocentric coordinates for precise localization objects and cases.

§



Infrastructure SKPOS®



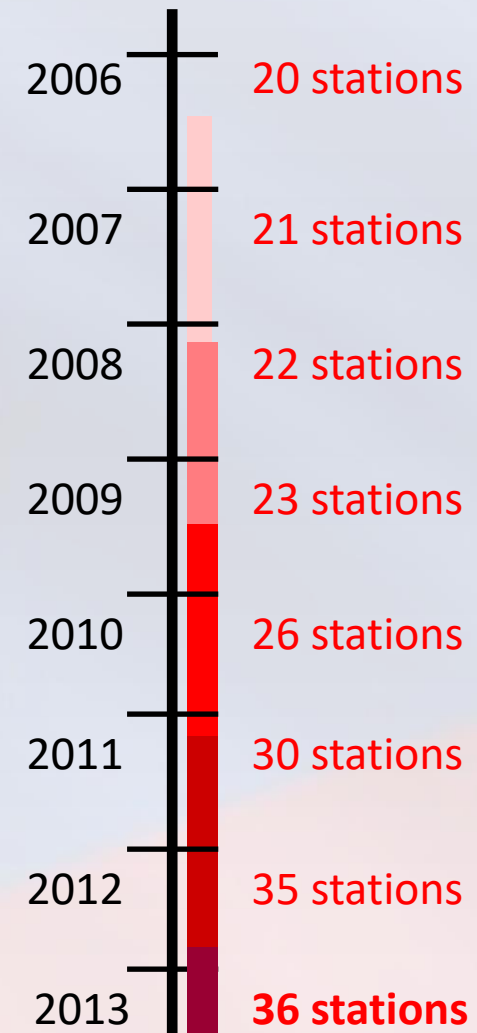
Legislation





Chronology SKPOS®

- **2006.05**
 - 20 SKPOS® Trimble NetR5
- **2006.11**
 - start of test operation SKPOS®
- **2007.05**
 - +1 = 21 PEMB
- **2008.08**
 - +1 = 22 MOP2
- **2009.09**
 - +1 = 23 SKMT
- **2010.05**
 - + 3 = 26 SKVT, BREZ, JABO
- **2011.11**
 - + 4 = 30 MUKA(UA), ZYWI(PL), MSTB(A), TATA(H)
- **2012.04**
 - upgrade 25 stations for NetR9
- **2012.11**
 - + 5 = 35 BBYS, KOSE, PENC(H), SKNR, SKPU, SKSO
- **2013.01**
 - +1 = 36 SKPB, USDL(PL)





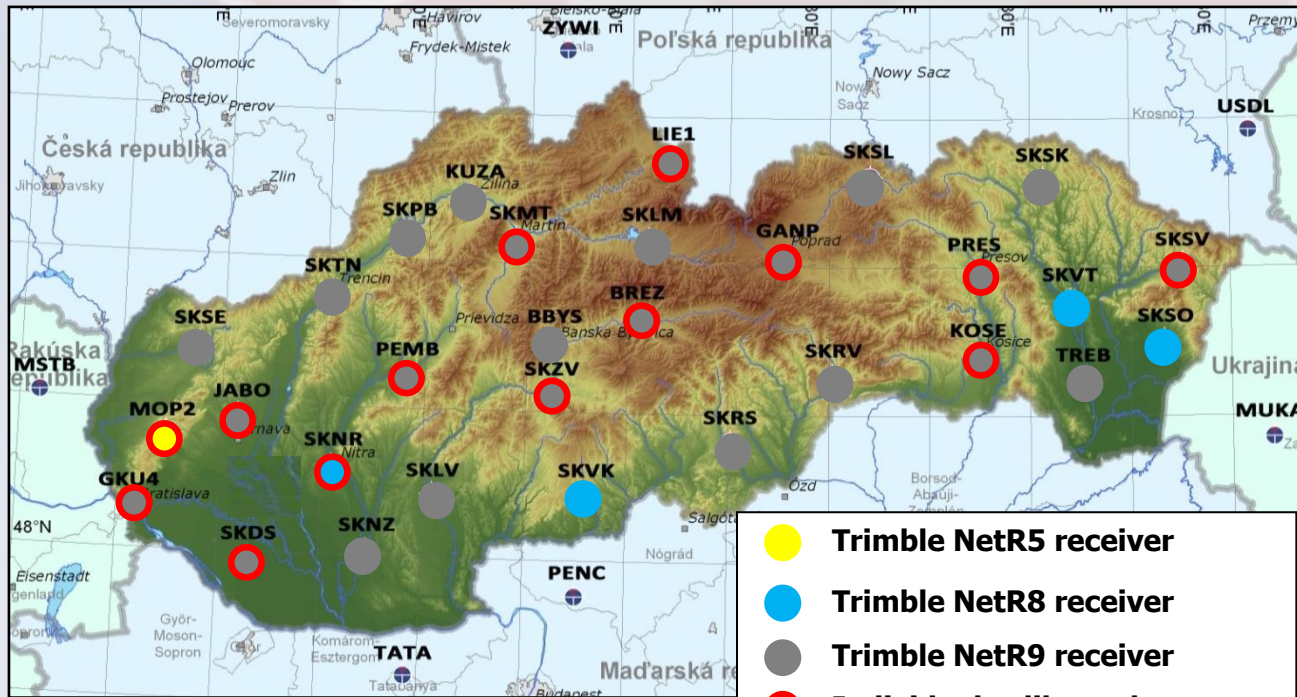
Reference stations **SKPOS**



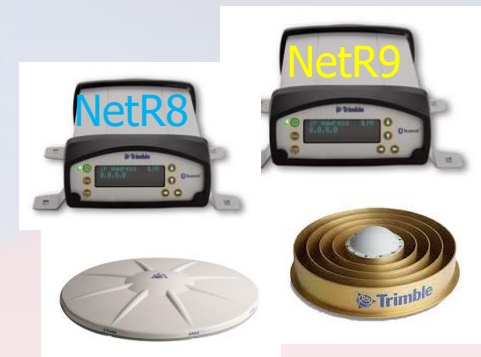


Status in June 2013 SKPOS

- **30 Slovak + 6 foreign permanent stations**
 - all stations equipped with TRIMBLE receivers and antennas
 - all stations observe GPS+GLONASS signals, all NetR9 Galileo
 - 14 antennas with individual absolute calibration

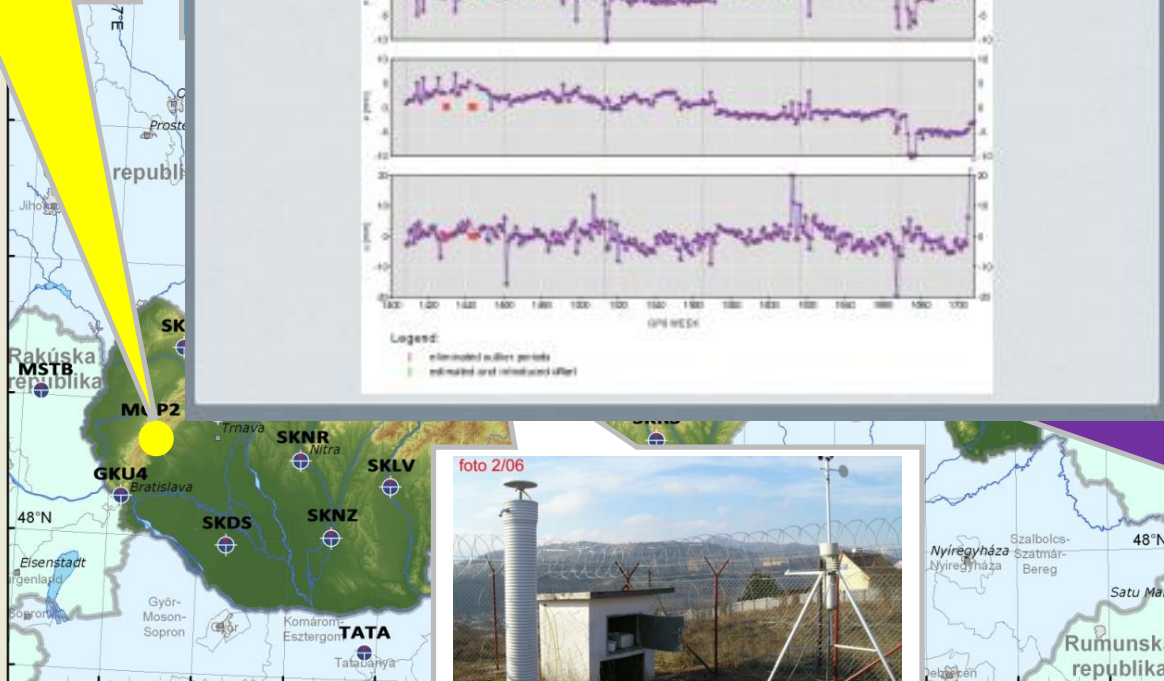


- Trimble NetR5 receiver
- Trimble NetR8 receiver
- Trimble NetR9 receiver
- Individual calibrated antenna





Special pillar stabilizations SKPOS





Activities related to EPN Slovakian stations in EPN (May 2013)

MOPI

From 1996
only GPS
admin: SUT



EUREF Permanent Network

NETWORK & DATA

Station list, Maps, Tracking status, Access, Proposed sites, Site log, Site picture submission

PRODUCTS & SERVICES

Data analysis, Weekly EPN solutions, Coordinates, Time series, Tropospheric delays, ETR58S/ITRS transformation

DOCUMENTATION

Formats, Guideline calibration, Papers

BBYS

From 2007
GPS+GLONASS+Galileo
SKPOS
admin: GKÚ+TOPU



Interactive

Legend

Station status (active, inactive)

Active

Inactive

Locate site on map

Select a station

Site criteria selection

Receiver manufacturer:

ASHTECH

JAVAD

GPS

GLONASS

Galileo

Antenna manufacturer:

ASHTECH

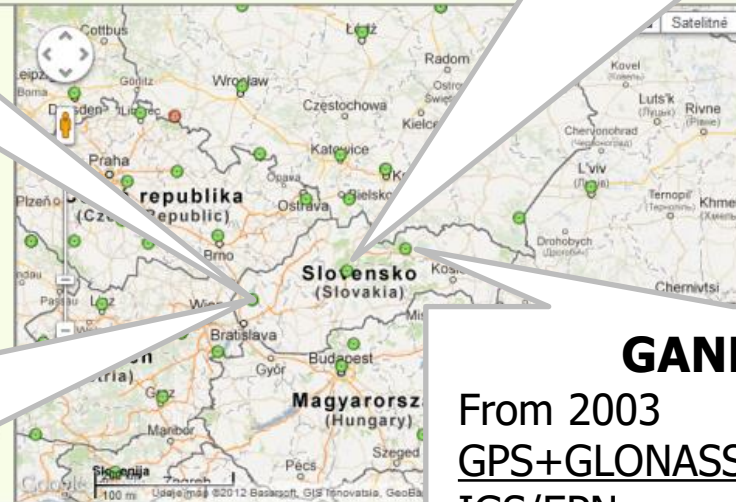
ASHTECH

Status:

ACTIVE

INACTIVE

FORMER



MOP2

From 2008
GPS+GLONASS
SKPOS
admin: SUT



GANP

From 2003
GPS+GLONASS+Galileo
IGS/EPN
SKPOS
admin: GKÚ





BBYS 11514M001 EPN station upgrade

September 2012

EUREF Permanent Network

ROB *****
GNSS Research Group
EUREF eur-1

ORGANISATION	NETWORK & DATA	PRODUCTS & SERVICES	DOCUMENTATION	NEWS, EVENTS & LINKS
Creation, Management, Structure, Relation to IGS, Projects	Station list, Maps, Tracking status, Data access, Proposed stations, Station log submission, Station picture submission	Data analysis, Weekly EPN solutions, Coordinates, Position time series, Tropospheric delays, ETRS89/ITRS transformation, Satellite Orbit & Clock Correction Streams	Formats, Guidelines, Equipment & calibration, Papers, FAQ	News, Mails, Calendar, Workshops, FTP server, Site map, Web history, Links

NETWORK & DATA > STATION LIST > **BBYS_11514M001**

Station Description

LOCATION: Banska Bystrica, Slovakia

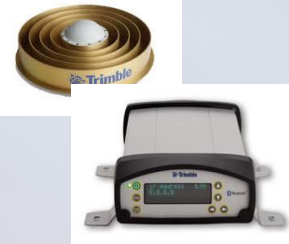
LOG FILE: bbys_20130304.log (current) View



OPERATIONAL CENTRE	GKU
OTHER NETWORKS	IGS, IGS, EGN
EPN INCLUSION	Since 035/2007 (GPSweek No 1413).
INACTIVITY PERIODS	None
COORDINATES	Published positions/velocities in ITRS and ETRS89
INDIVIDUAL ANTENNA CALIBRATIONS	None



Trimble 5700
2005 - 2012
GPS only



Trimble NetR9
2012 -
GPS+GLO+GAL
L5


Activities related to EPN

EUREF-IP – 2 slovakian stations

- **GANP**
 - active
 - RTCM 3.0, 3.1

- **MOP2**
 - active
 - RTCM 3.0, 3.1

REAL-TIME



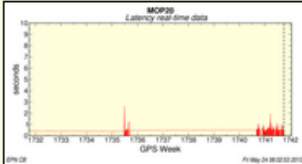
ACCESS : free, using [Ntrip](#)

AVAILABLE FROM

BKG ([broadcaster](#), [registration](#))
MOP20 : RTCM 3.1 (1004(1),1005(5),1007(5),1012(1))

ROB ([broadcaster](#), [registration](#))
MOP20 : RTCM 3.1 (1004(1),1005(5),1007(5),1012(1))
MOP2 : RTCM 3 (1(1),3(10),20(1),21(1))

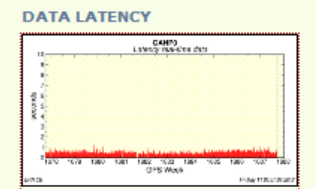
DATA LATENCY



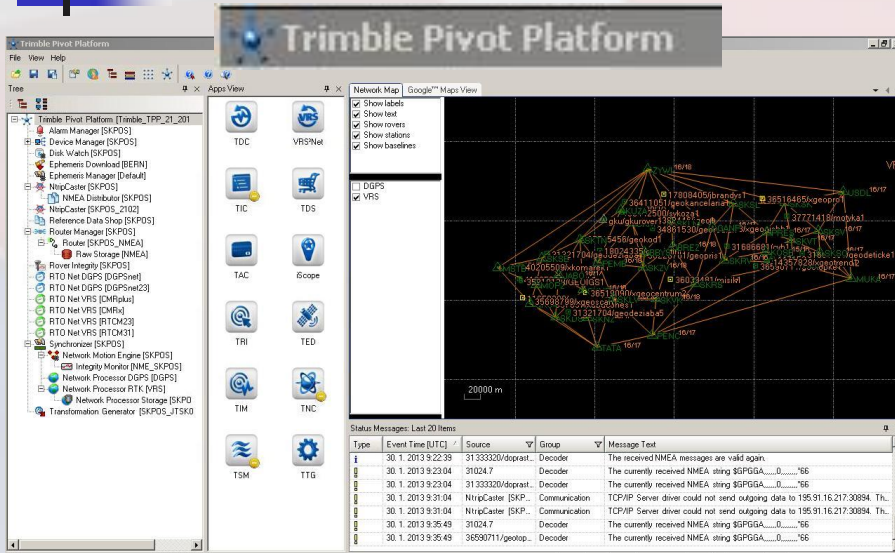
12007(4),12008(10),12009(10),12010(1),1013(10),1033(10))

BKG ([broadcaster](#), [registration](#))
GANP0 : RTCM 3.0
(1004(1),1006(10),1008(10),1012(1),1013(10),1033(10))

ROB ([broadcaster](#), [registration](#))
GANP0 : RTCM 3.0
(1004(1),1006(10),1008(10),1012(1),1013(10),1033(10))



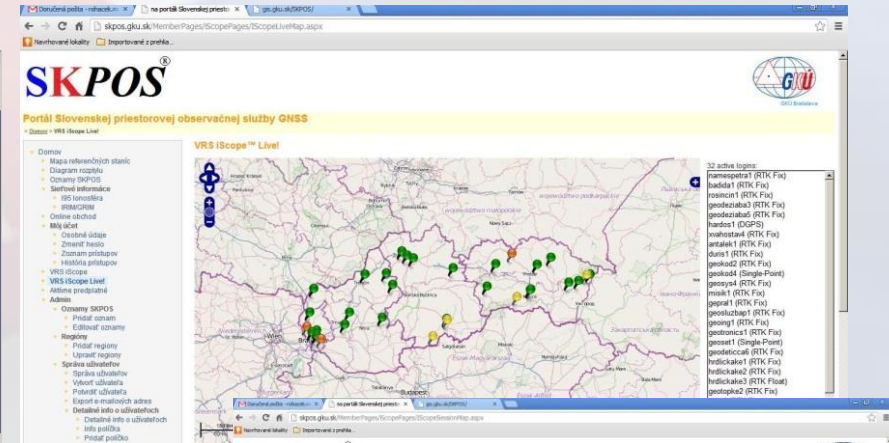
Slovak real time positioning service - SKPOS software TPP and web



Trimble Pivot Platform - Network Map

Status Messages: Last 20 items

Type	Event Time [UTC]	Source	Group	Message Text
I	30.1.2013 9:22:39	31333320/doprav...	Decoder	The received NMEA messages are valid again.
I	30.1.2013 9:23:04	31024.7	Decoder	The currently received NMEA string \$GPGGA_0...._56
I	30.1.2013 9:23:04	31333320/doprav...	Decoder	The currently received NMEA string \$GPGGA_0...._56
I	30.1.2013 9:31:04	NrtzCater [SKP...	Communication	TCPIP Server driver could not send outgoing data to 195.91.16.217.30994. TL
I	30.1.2013 9:31:04	NrtzCater [SKP...	Communication	TCPIP Server driver could not send outgoing data to 195.91.16.217.30994. TL
I	30.1.2013 9:35:49	31024.7	Decoder	The currently received NMEA string \$GPGGA_0...._56
I	30.1.2013 9:35:49	3859071/geom...	Decoder	The currently received NMEA string \$GPGGA_0...._56

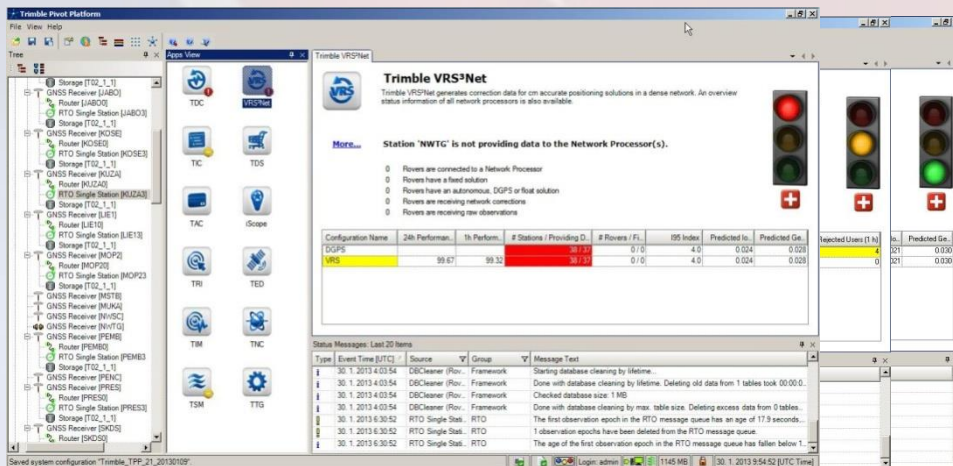


SKPOS - Portál Slovenskej priestorovej observačnej služby GNSS

VRS (Scope™) Level

32 active logins:

- farmarskate1 (RTK Fix)
- budisa1 (RTK Fix)
- rosnica1 (RTK Fix)
- geodetizubab1 (RTK Fix)
- geodetizubab (RTK Fix)
- hadzica1 (DGPS)
- vrstovstav1 (RTK Fix)
- artakal1 (RTK Fix)
- cais1 (RTK Fix)
- geonag1 (RTK Fix)
- geonag2 (RTK Fix)
- geonag4 (Single Point)
- geonag3 (RTK Fix)
- mesak1 (RTK Fix)
- geonag1 (RTK Fix)
- geonag2bap1 (RTK Fix)
- geonag1 (RTK Fix)
- geonag1c1 (RTK Fix)
- geonag1 (Single Point)
- geodeticu1 (RTK Fix)
- hadzicak1 (RTK Fix)
- hadzicak2 (RTK Fix)
- geotopuk2 (RTK Fix)



Trimble VRSNet

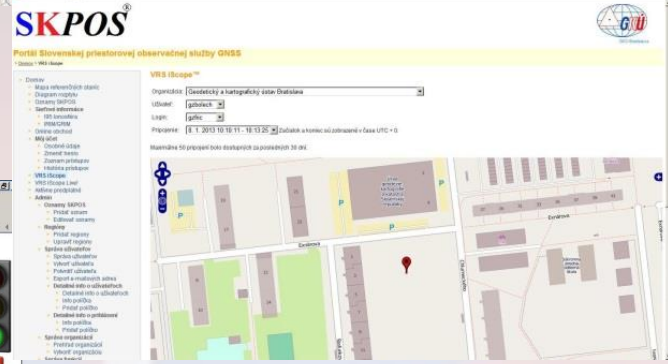
Trimble VRSNet generates correction data for cm accurate positioning solutions in a dense network. An overview status information of all network processors is available.

Station 'NWTG' is not providing data to the Network Processor(s).

Configuration Name	24h Perform.	1h Perform.	# Stations / Providing 0s	# Rovers / FL	IS Index	Predicted IS	Predicted Gs	Expected Users (1h)	IS	Predicted Gs
DGPS	99.67	99.33	71/2	0/0	4.0	0.034	0.033	0	821	0.936
VRS			71/2	0/0	4.0	0.024	0.023	0	821	0.936

Status Messages: Last 20 items

Type	Event Time [UTC]	Source	Group	Message Text
I	30.1.2013 4:01:54	DBCleane (Rov...	Framework	Starting database clearing by lifetime.
I	30.1.2013 4:01:54	DBCleane (Rov...	Framework	Done with database clearing by lifetime. Deleting old data from 1 tables took 00:00:0.
I	30.1.2013 4:01:54	DBCleane (Rov...	Framework	Checked database size: 1 MB
I	30.1.2013 4:01:54	DBCleane (Rov...	Framework	Done with database clearing by max. table size. Deleting excess data from 0 tables.
I	30.1.2013 4:30:52	RT0 Single Stat...	RT0	The first observation epoch in the RT0 message queue has an age of 17.8 seconds.
I	30.1.2013 4:30:52	RT0 Single Stat...	RT0	1 observation epochs have been deleted from the RT0 message queue.
I	30.1.2013 4:30:52	RT0 Single Stat...	RT0	The age of the first observation epoch in the RT0 message queue has fallen below 1.



SKPOS - Portál Slovenskej priestorovej observačnej služby GNSS

VRS (Scope™) Level

Geodetic and cartographic system: Bratislava

Users: [dropdown menu]

Login: [input field]

Prípustnosť: [1.1.2013 16:11 - 18:13:25] (zobrazí a nakoní od uživateľa v čase UTC + 0)

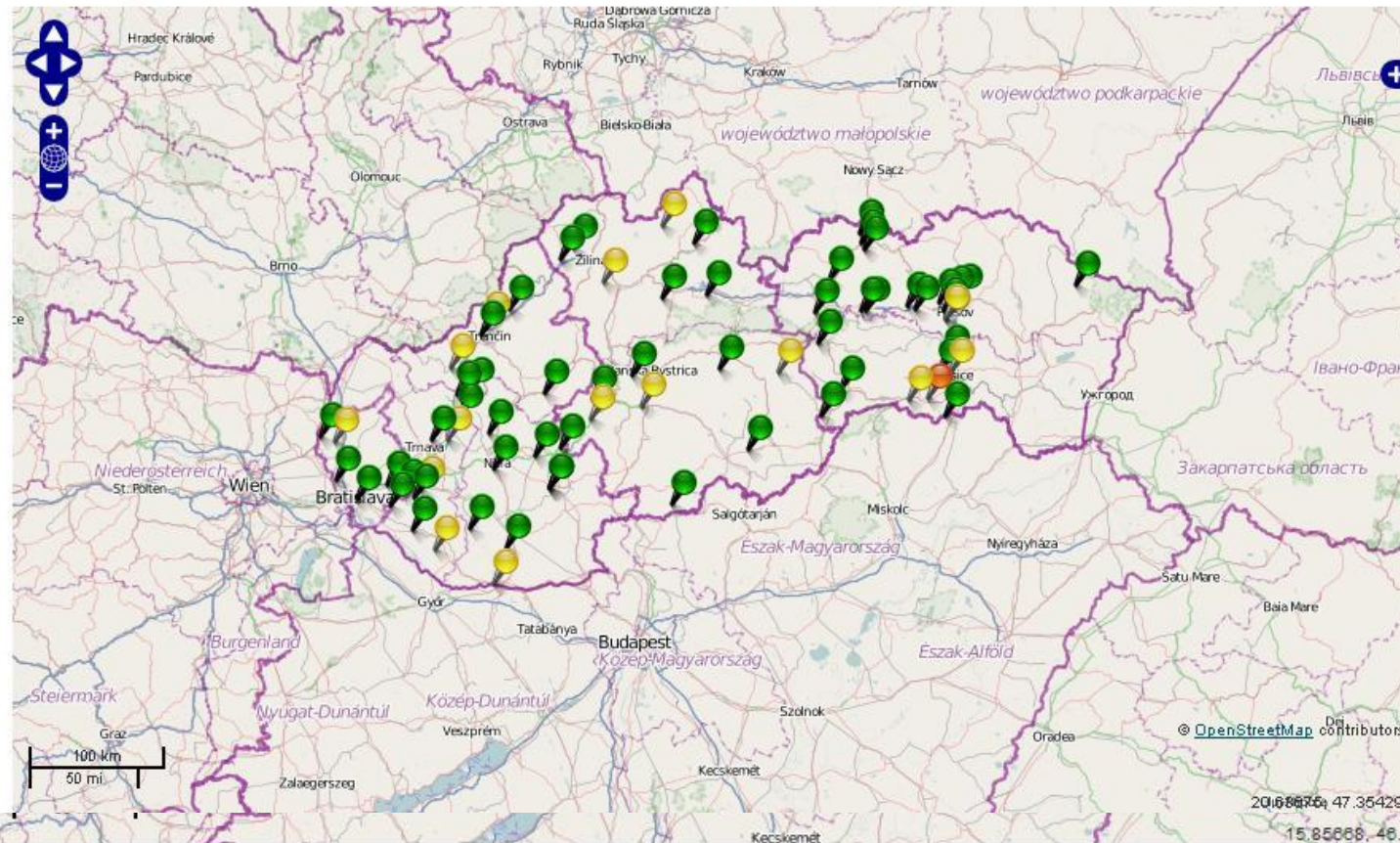
Maximálne 10 prístupov k údajom dostupných za posledných 30 dní.



VRS i Scope - live - SKPOS

VRS iScope™ Live!

VRS iScope™ Live!



71 active logins:

- dpp2 (RTK Fix)
- dpp1 (RTK Fix)
- xeurovia5 (RTK Fix)
- geoske1 (Single-Point)
- xgeovia1 (RTK Fix)
- geokod2 (RTK Fix)
- geoma1 (RTK Fix)
- geoprojektpo1 (RTK Fix)
- kgza3 (RTK Fix)
- geodeticke2 (RTK Float)
- igeo1 (RTK Fix)
- lvs1 (RTK Fix)
- xgeotipbb1 (RTK Fix)
- geodsluzba1 (RTK Fix)
- geovis1 (RTK Fix)
- geoss1 (RTK Fix)
- geotopba1 (RTK Fix)
- pvps1 (RTK Fix)
- xgeodetsn1 (RTK Fix)
- gsspol1 (RTK Fix)
- geodeticca7 (RTK Fix)
- geolinenr1 (RTK Fix)
- geat1 (RTK Fix)
- assptn1 (DGPS)
- misik1 (DGPS)
- namespetra1 (RTK Fix)
- xszegfu1 (RTK Fix)
- neninana1 (RTK Fix)

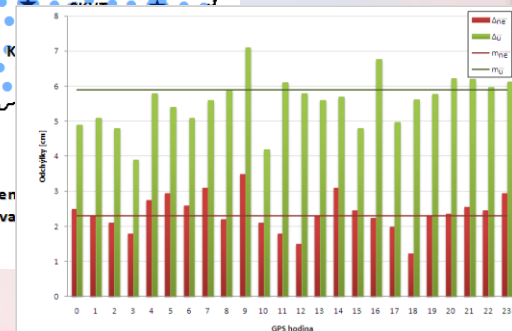
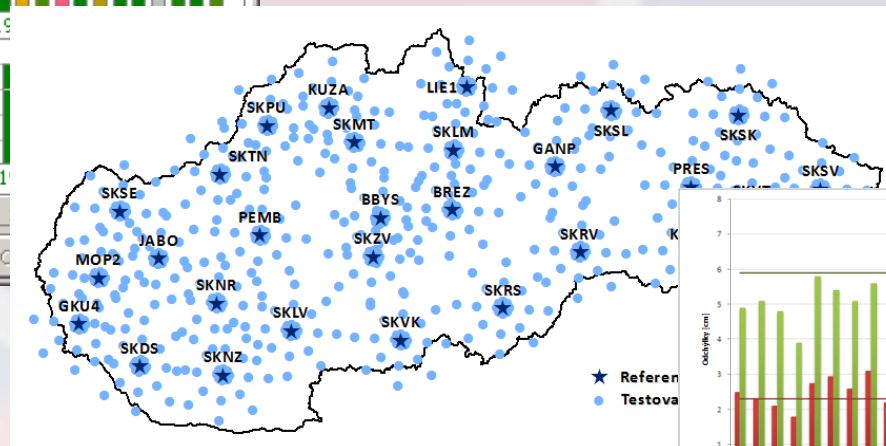
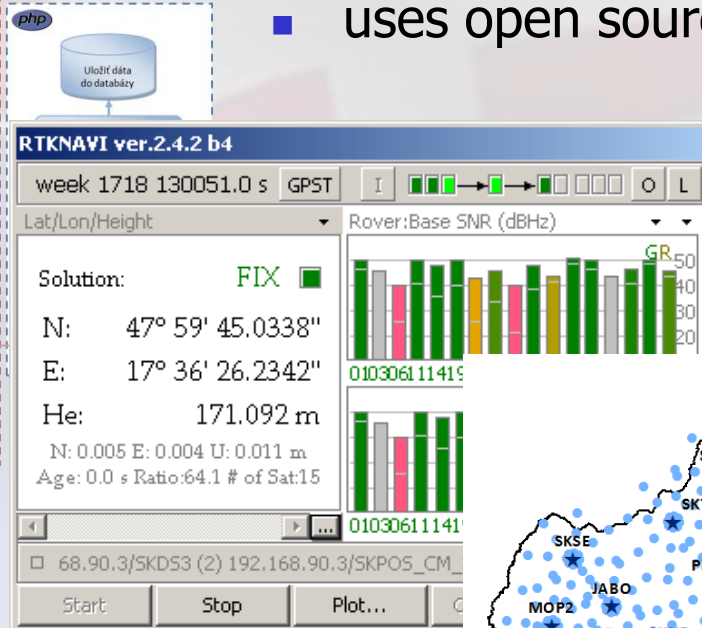
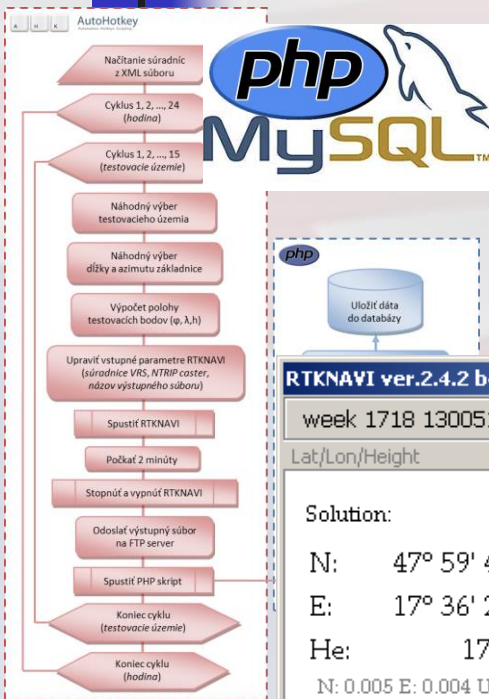


Services SKPOS®

service	precision	data format	interval
SKPOS_MM post-processing (VRS station or reference station)	mm - cm	RINEX 2.10, 2.11, 3.0, DAT, TGD, T01, T02	1 sec. – x sec.
SKPOS_CM_23 SKPOS_CM_31 SKPOS_CM_CMRX SKPOS_CM_CMR+ RTK (VRS concept)	2 – 4 cm	RTCM 2.3 RTCM 3.1	1 sec.
SKPOS_DM_SVK SKPOS_DM_SVK_23 RTK (VRS concept)	0,3 – 1 m	RTCM 2.1 RTCM 2.3	1 sec.

Slovak real time positioning service - **SKPOS** network solution quality monitoring

- new application for monitoring of **SKPOS** network solution (corrections) quality
- written in PHP coding language
- uses open source software RTKLIB





Slovak real time positioning service - **SKPOS** network solution quality monitoring

Firefox

Doručená pošta (2) - brano.droscak@...
Univerzita naregata.sk - Prvé preteky u...
EUREF Permanent GNSS Network > N...
Mapový klient ZBGIS
Google Translate
Quality monitoring of network soluti... x

172.16.5.146/monitoring/?lang=en#

SKPOS[®]

Quality monitoring of network solution SKPOS

Home > Quality monitoring

Home

- Quality monitoring
- About
- Test the application
- Back to the SKPOS portal

Locality selection

Choose date: 20.04.2013

Location: GKU4 2013-04-20

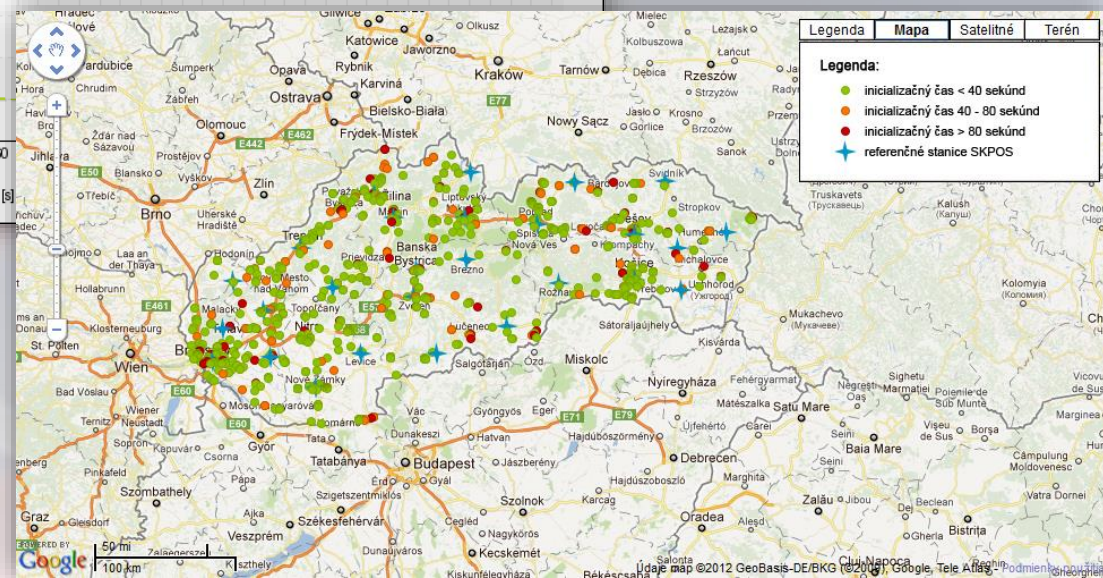
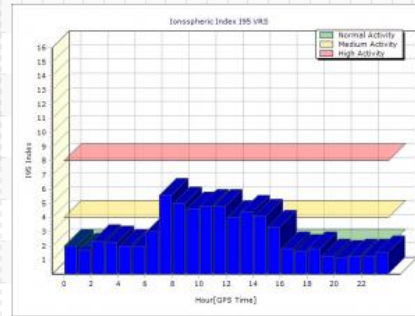
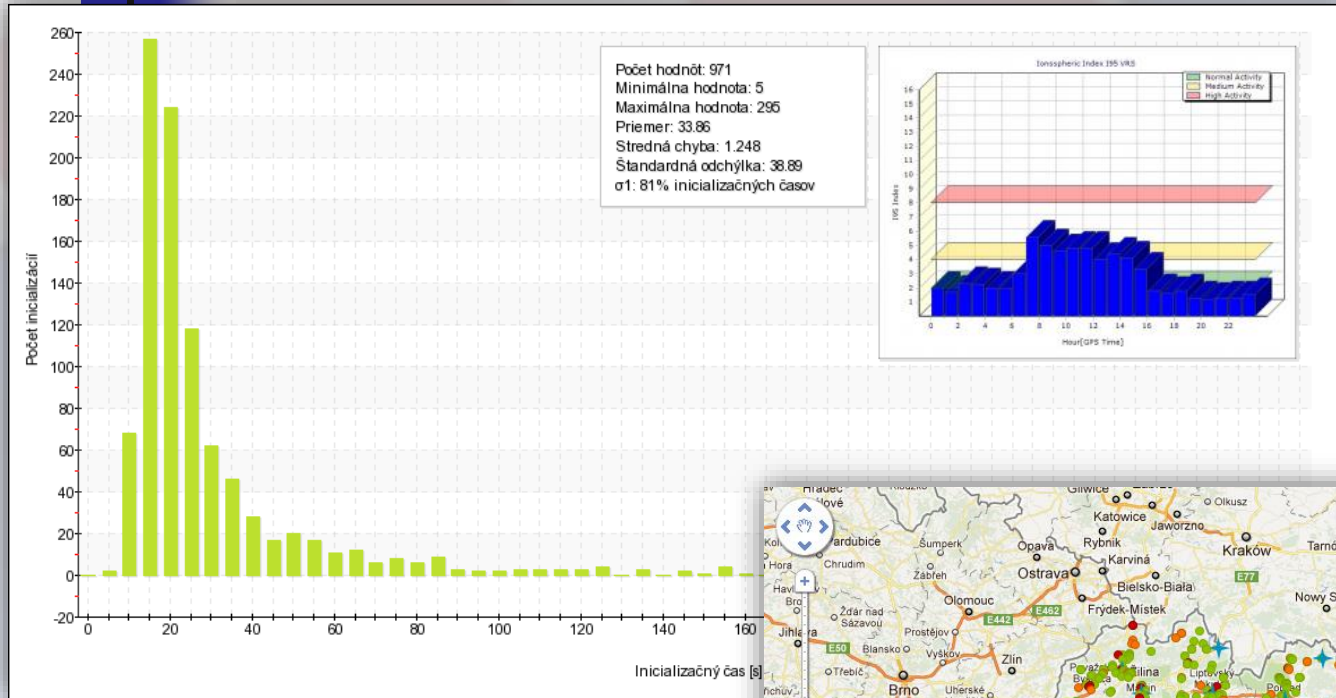
GPS time [hod]	ne [cm]	u [cm]
0	0.8	3.5
1	0.4	2.5
2	0.2	2.3
3	0.9	0.9
4	1.9	5.8
5	0.1	3.1
6	1.1	2.1
7	0.7	1.8
8	1.0	1.5
9	0.9	0.1
10	0.7	2.7
11	1.8	4.8
12	0.4	3.0
13	0.1	0.1
14	4.4	2.8
15	0.1	0.1
16	2.7	1.0
17	0.4	2.0
18	0.3	2.9
19	1.6	3.8
20	2.3	0.1
21	0.8	0.9
22	0.1	0.1
23	0.6	2.8

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15:11
24.5.2013



Application **ASMARUP** Application for SKPOS monitoring and RTK users performance





Thank you for your attention!