New application for SKPOS quality control

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Introduction

- **S**K*POS*® - most used service within the geodetic control services

- Permanent operation = archiving a lot of data

- Many projects are supported by data from **S**K*POS*®:

    - EPN, IGS, EUREF densification

    - Cross border data exchange

    - Space emergency system

    - E-GVAP programme

    - ...

SKPOS quality control

- Application allows automated data analysis and visualization
- Inputs:
  - RINEX, SINEX, Real-Time Delay data
- Outputs:
  - Tables and charts:
    - Position Time Series
    - Observations, cycle slips, multipath
    - Skyplots
    - RINEX data availability
    - Real-Time delay of data from stations to TPP software
- Visualization inspired by EPN solution

SKPOS quality control

- Client/Server application accessible via web browser
- App available only for SKPOS administrators
- Used programming languages
  - HTML
  - CSS
  - Javascript (Angular 5)
  - PHP
  - MySQL
  - Batch file

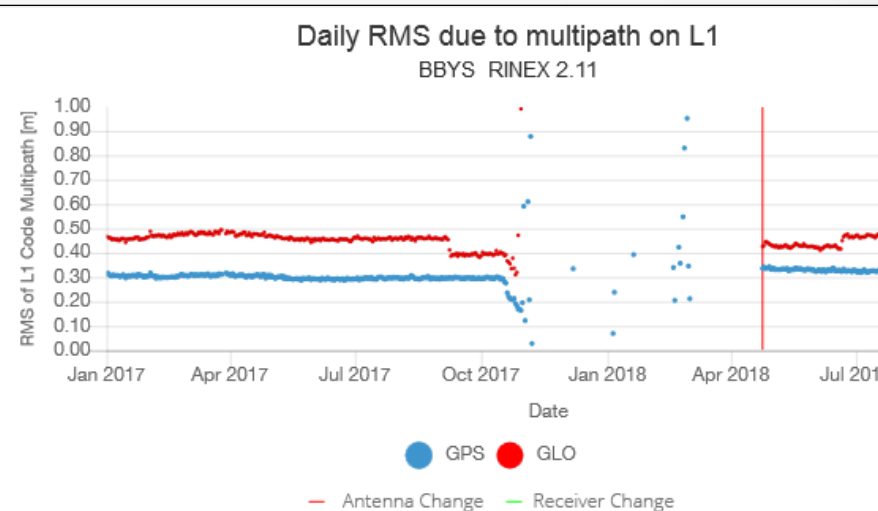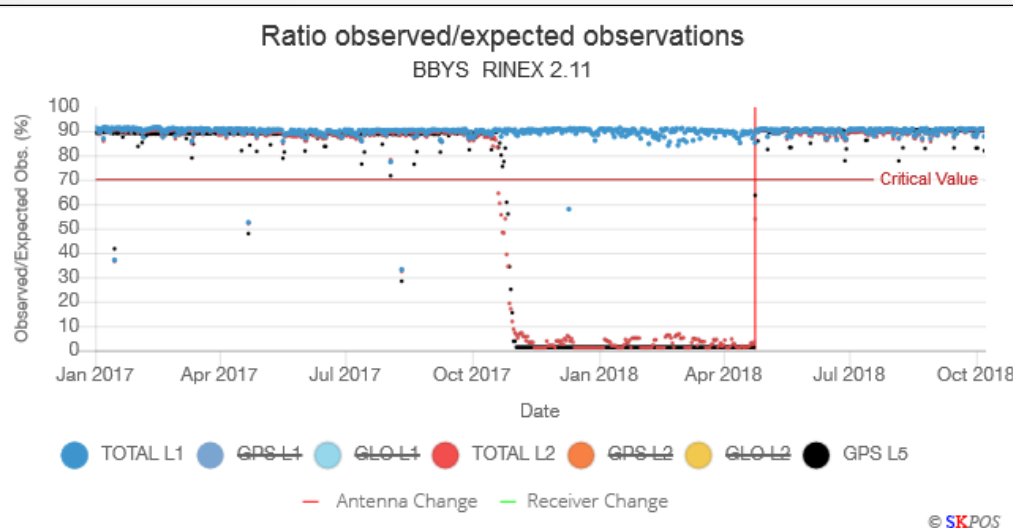# SKPOS quality control – Time Series

- Automated rendering position time series of permanent stations in IGS14 and ETRF2000
- Input: SINEX files processed by Bernese GNSS software
- Equipment changes visualisation
- Zoomable chart
- Export chart to image
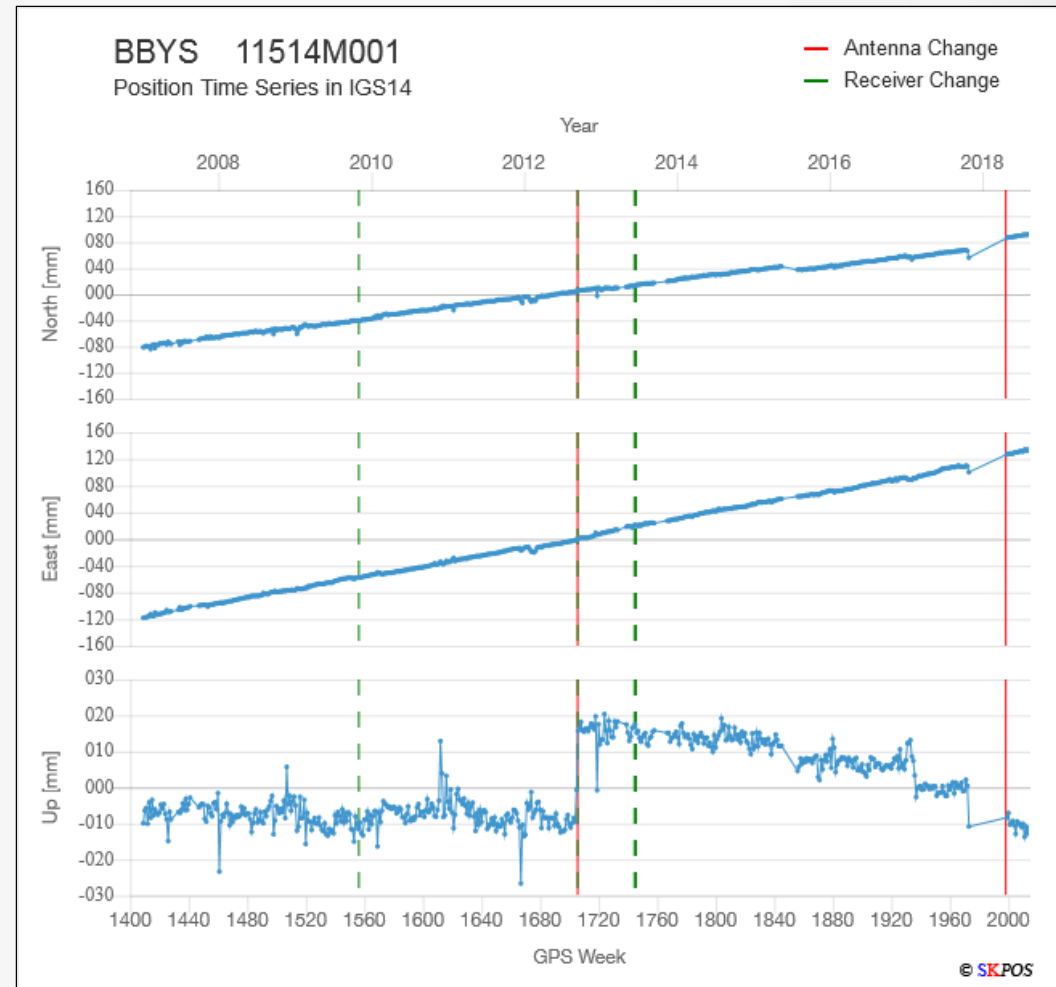
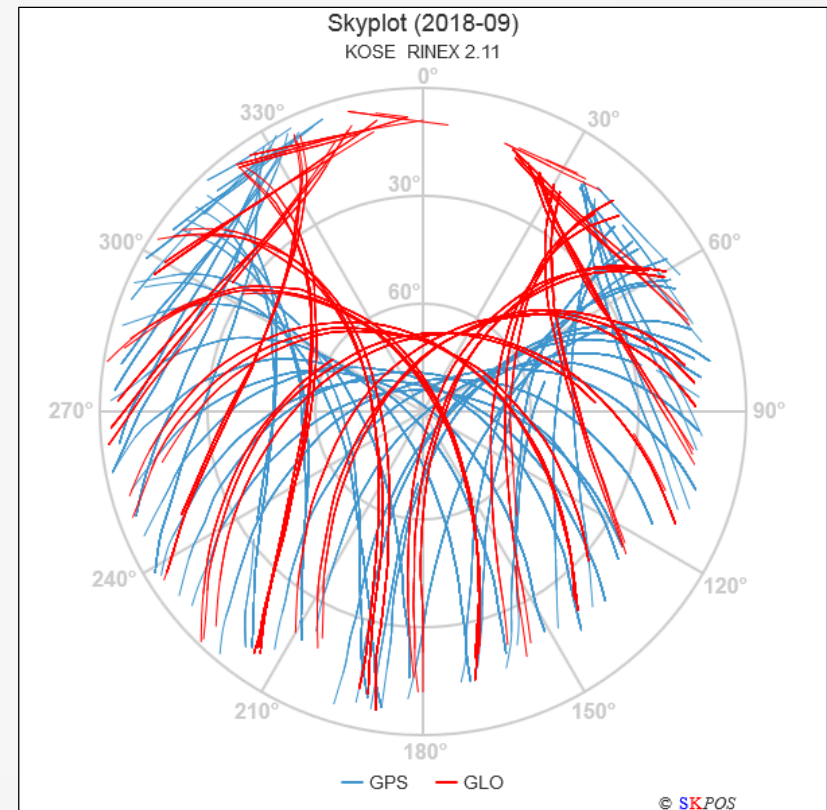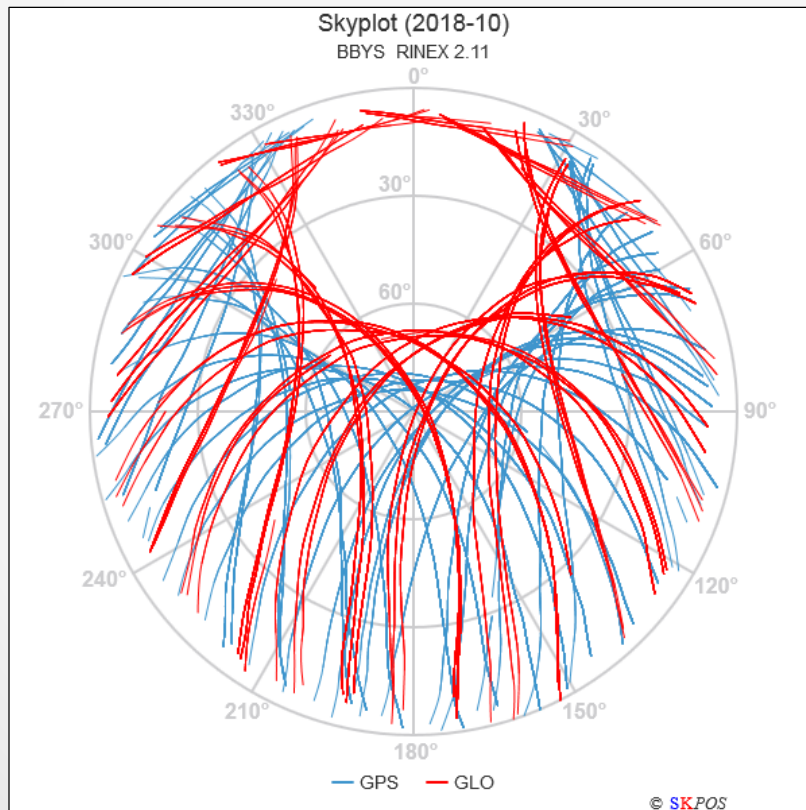# SKPOS quality control – Data Quality

- Daily RINEX 2.11 files processed by G-Nut/Anubis tool
- Output charts:
  - Ratio observed/expected observations
  - Number of observations
  - Number of cycle slips
  - Multipath on L1, L2, L5
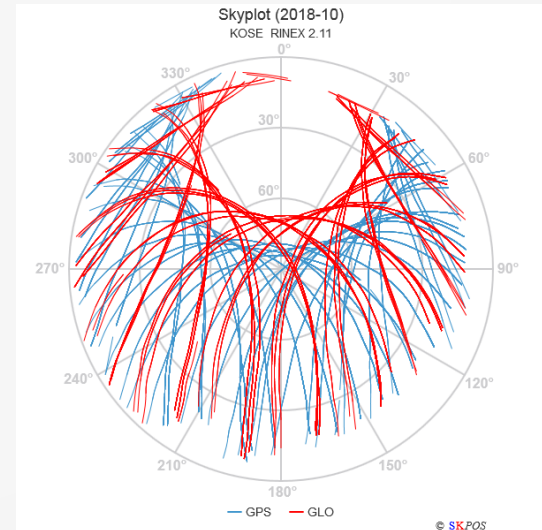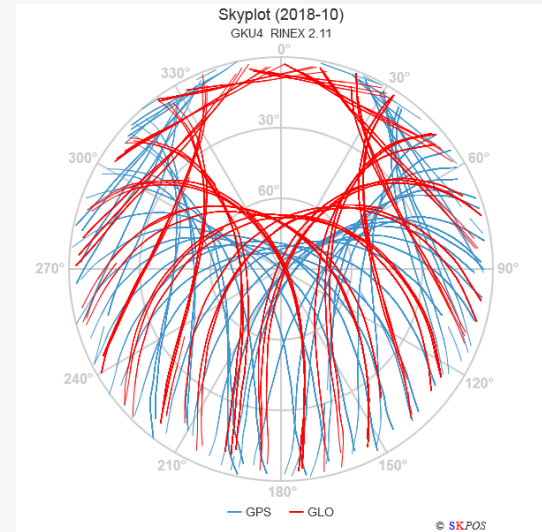
SKPOS quality control – Skyplot

- Daily RINEX 2.11 files processed by G-Nut/Anubis tool
- Output chart:
  - Monthly snapshots of satellite tracking

SKPOS quality control – Skyplot
## Pillar vs roof monumentation

SKPOS quality control – Data Availability

- Availability of daily 30s RINEX 2.11 data

SKPOS Quality Control – Real-Time Delay

- Delay of data from stations to Trimble Pivot Platform in real-time

SKPOS stations			Foreign stations	
Station	**Last Delay**	**Average Delay**	**Maximum Delay**	**Show in chart**
BASV	50 ms	137 ms	88 554 ms	☑
BBYS	239 ms	72 ms	87 266 ms	☑
BREZ	63 ms	187 ms	70 032 ms	☑
DOPL	39 ms	110 ms	6 891 ms	☑
GANP	0 ms	159 ms	58 090 ms	☑
GKU4	2 ms	129 ms	52 150 ms	☑
HUVO	36 ms	119 ms	24 040 ms	☑
JABO	33 ms	182 ms	58 274 ms	☑
KAME	81 ms	216 ms	48 113 ms	☑
KOLS	50 ms	183 ms	46 956 ms	☑
KOSE	63 ms	185 ms	60 973 ms	☑
KUZA	23 ms	105 ms	153 571 ms	☑
LIE1	51 ms	158 ms	32 000 ms	☑
MOP2	28 ms	30 ms	89 232 ms	☑

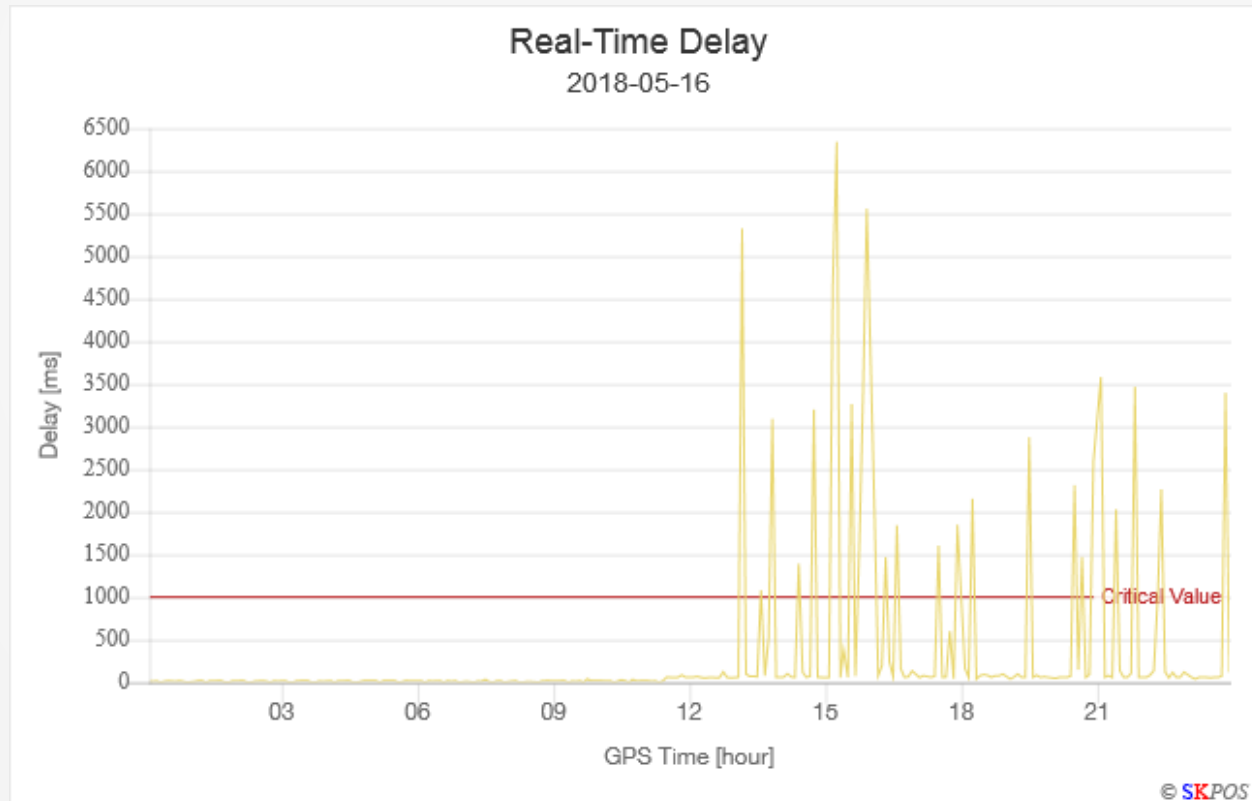Real-Time Delay
2018-10-04
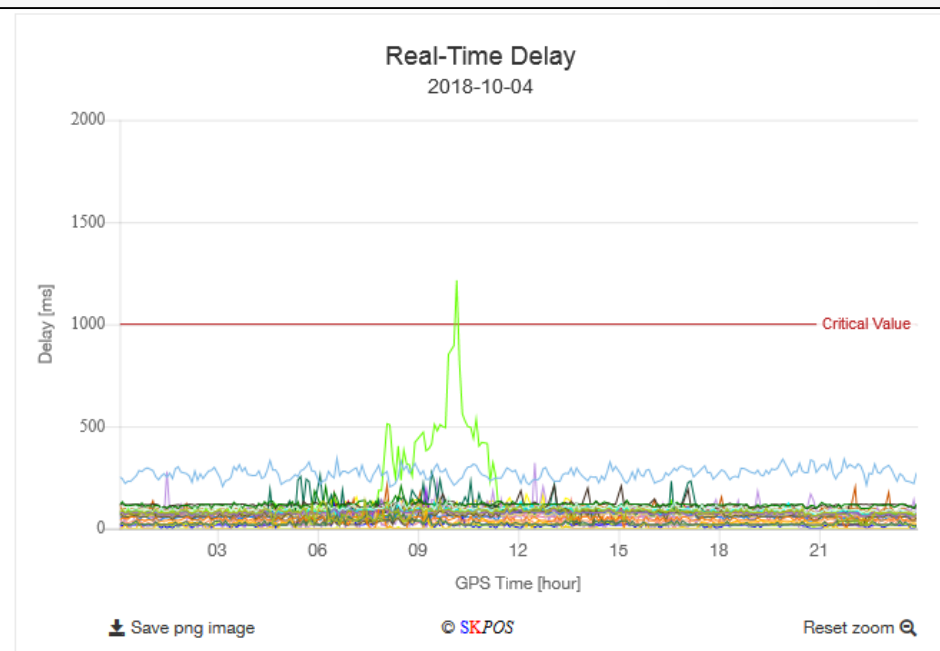
SKPOS Quality Control – Real-Time Delay

- Detection of high latency on foreign station
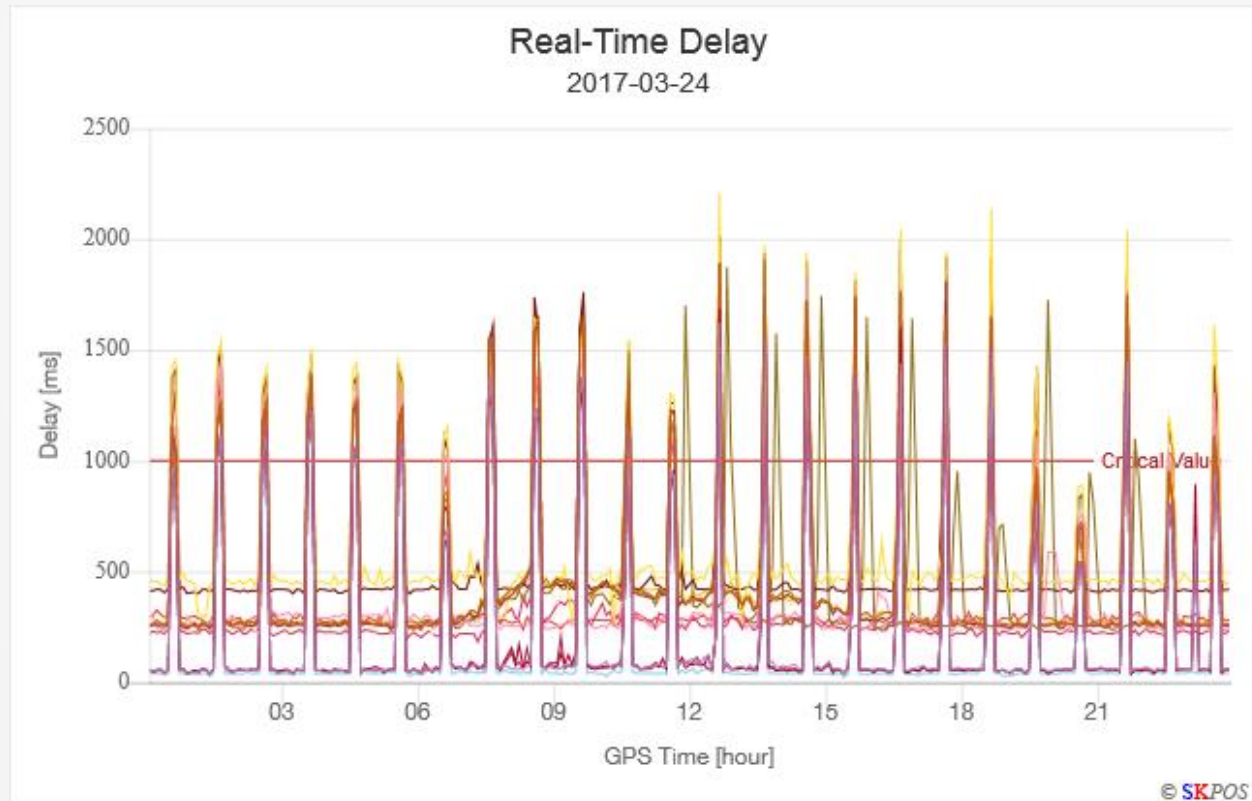
SKPOS Quality Control – Real-Time Delay

- Detection of problem with internet connection

Thank you for your attention