NATIONAL AGENCY FOR CADASTRE AND LAND REGISTRATION

National Center for Cartography

ROMPOS

Romanian Position Determination System

STATUS
REPORT 2019

Bucharest 2020

7th EUPOS® Council and Technical Meeting

Network Map

Leica 1200 Series

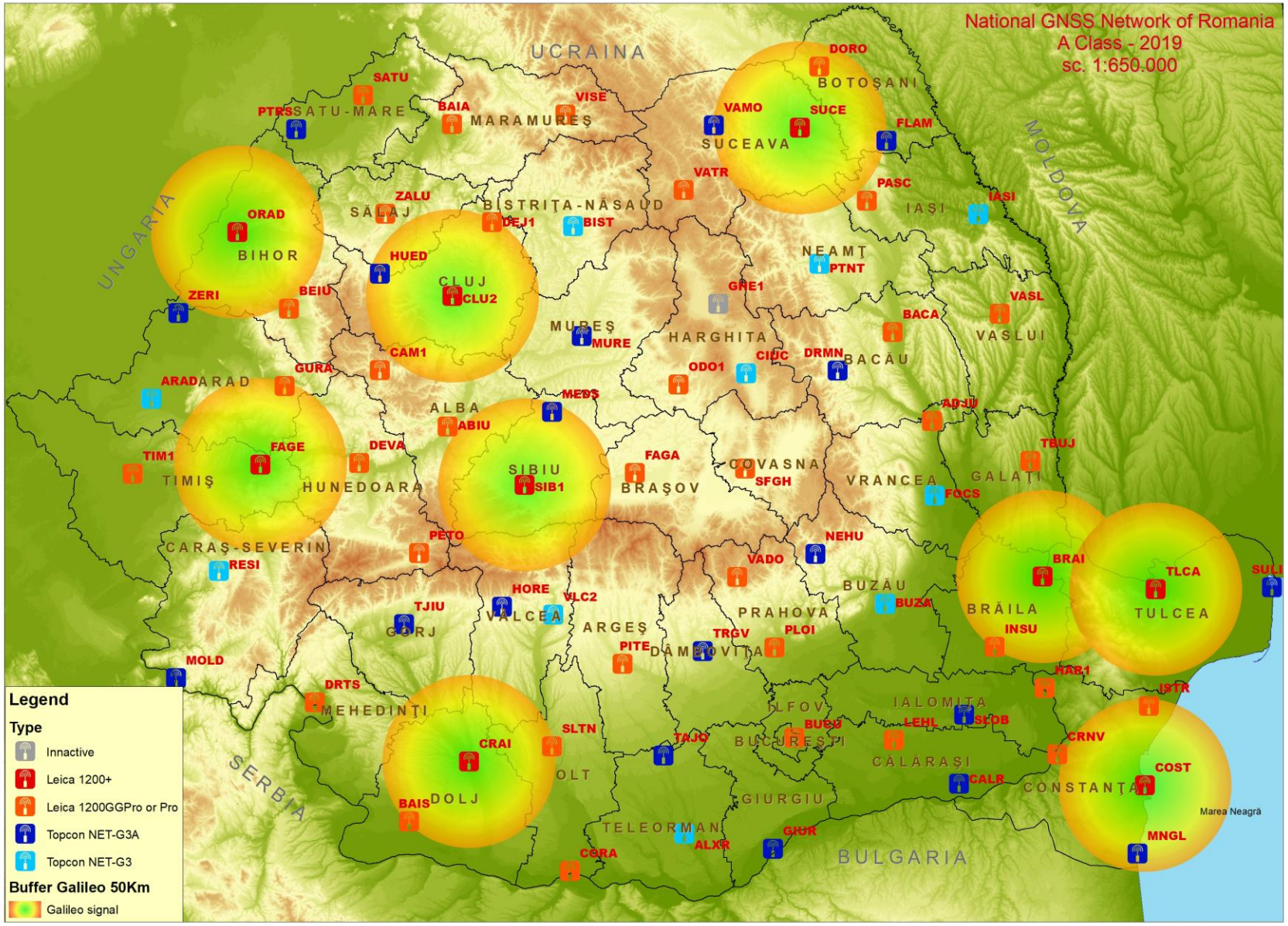
45

GGPRO 31 (1 out of use)
PRO 5
PLUS 9

Topcon NET-G3

29

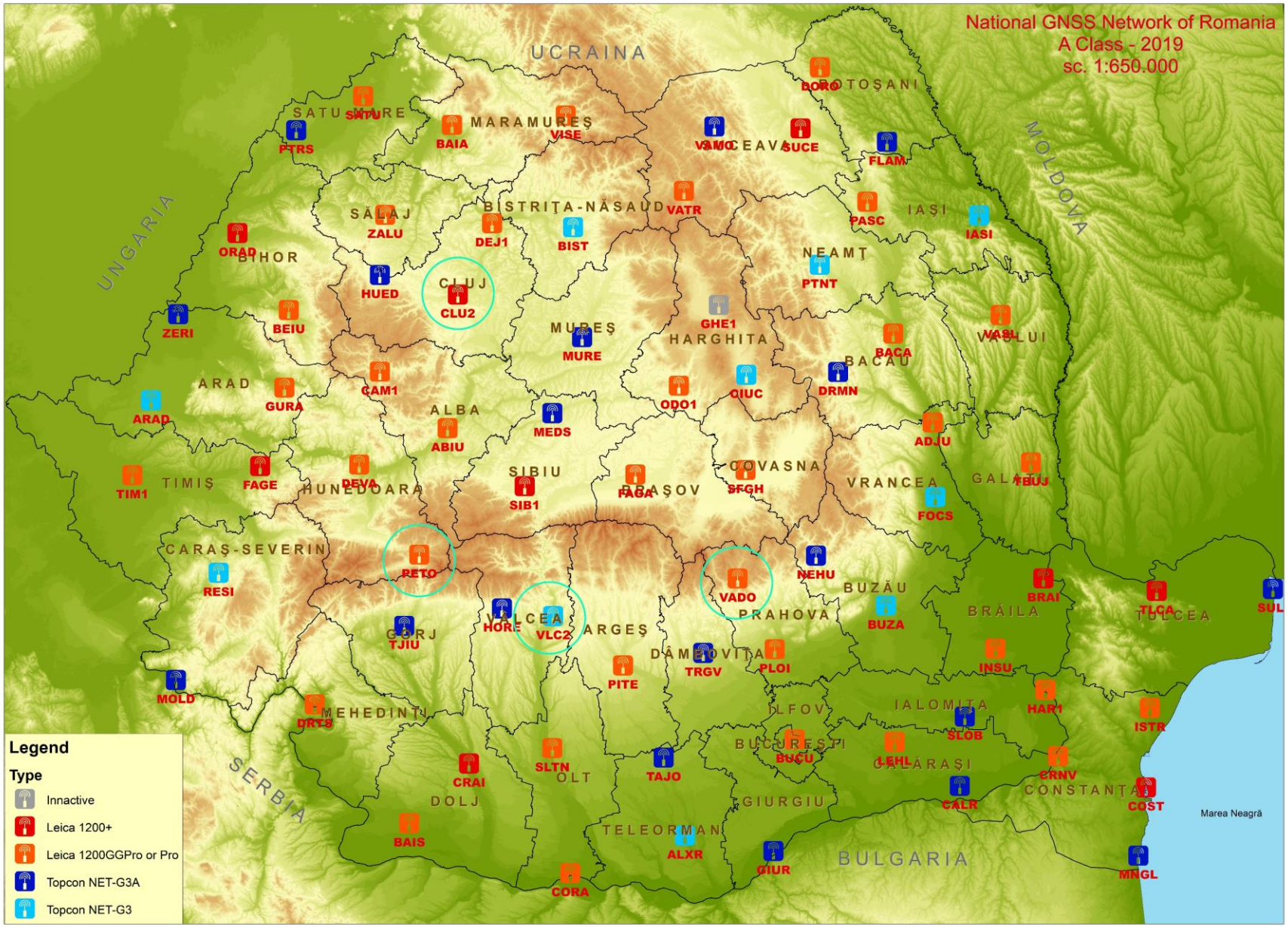
G3A 15



Relocated Stations

4

3 Leica
1 Topcon

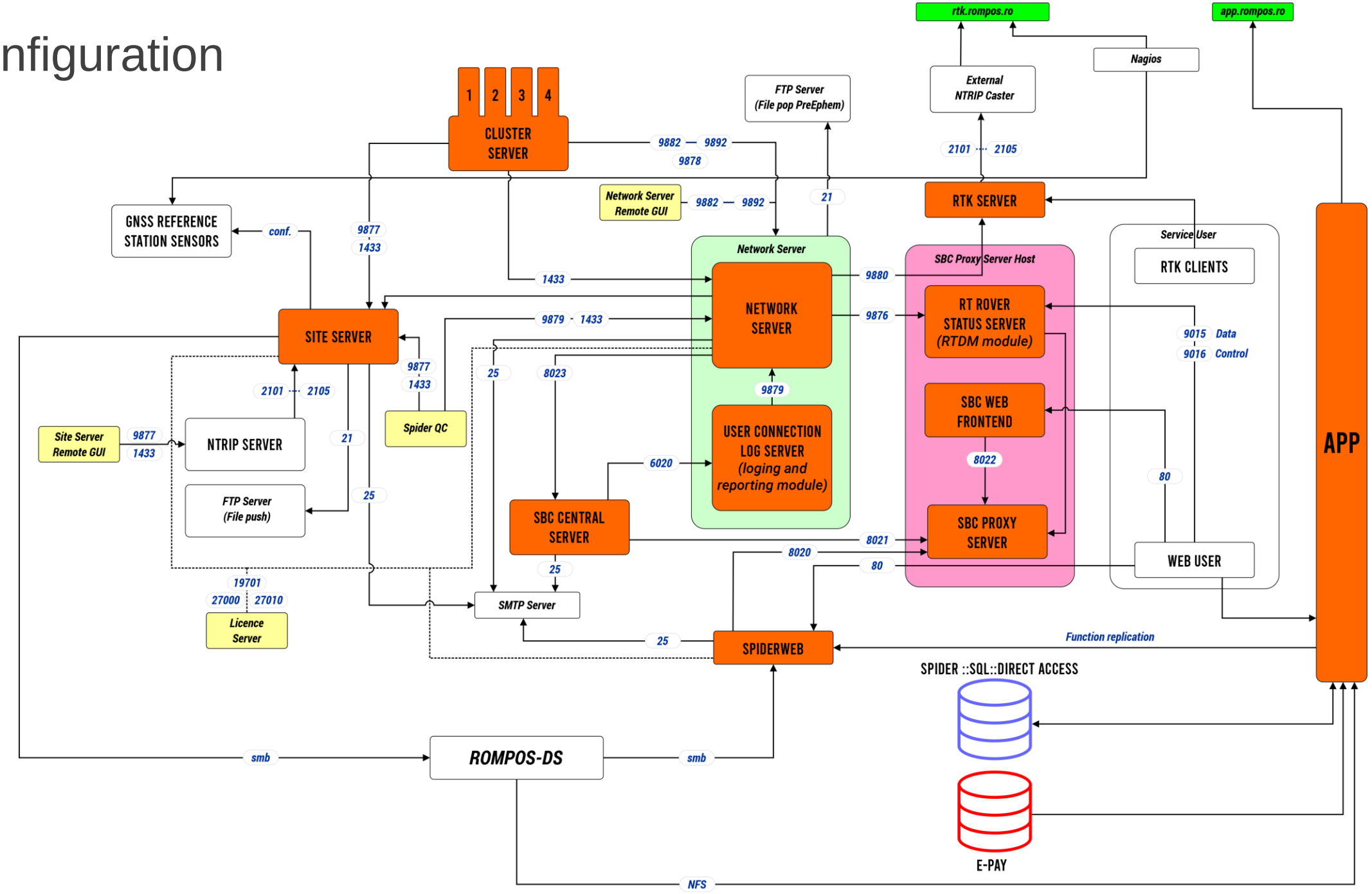


Legend

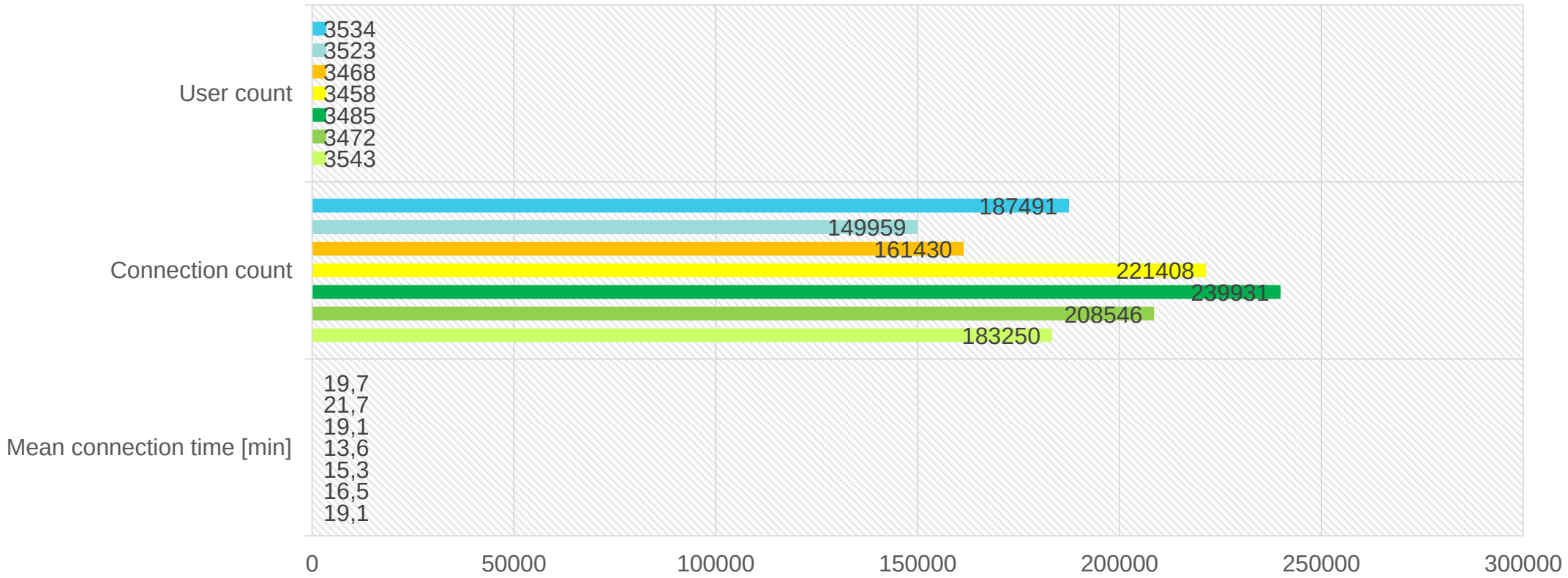
Type

- Innactive
- Leica 1200+
- Leica 1200GGPro or Pro
- Topcon NET-G3A
- Topcon NET-G3

Configuration



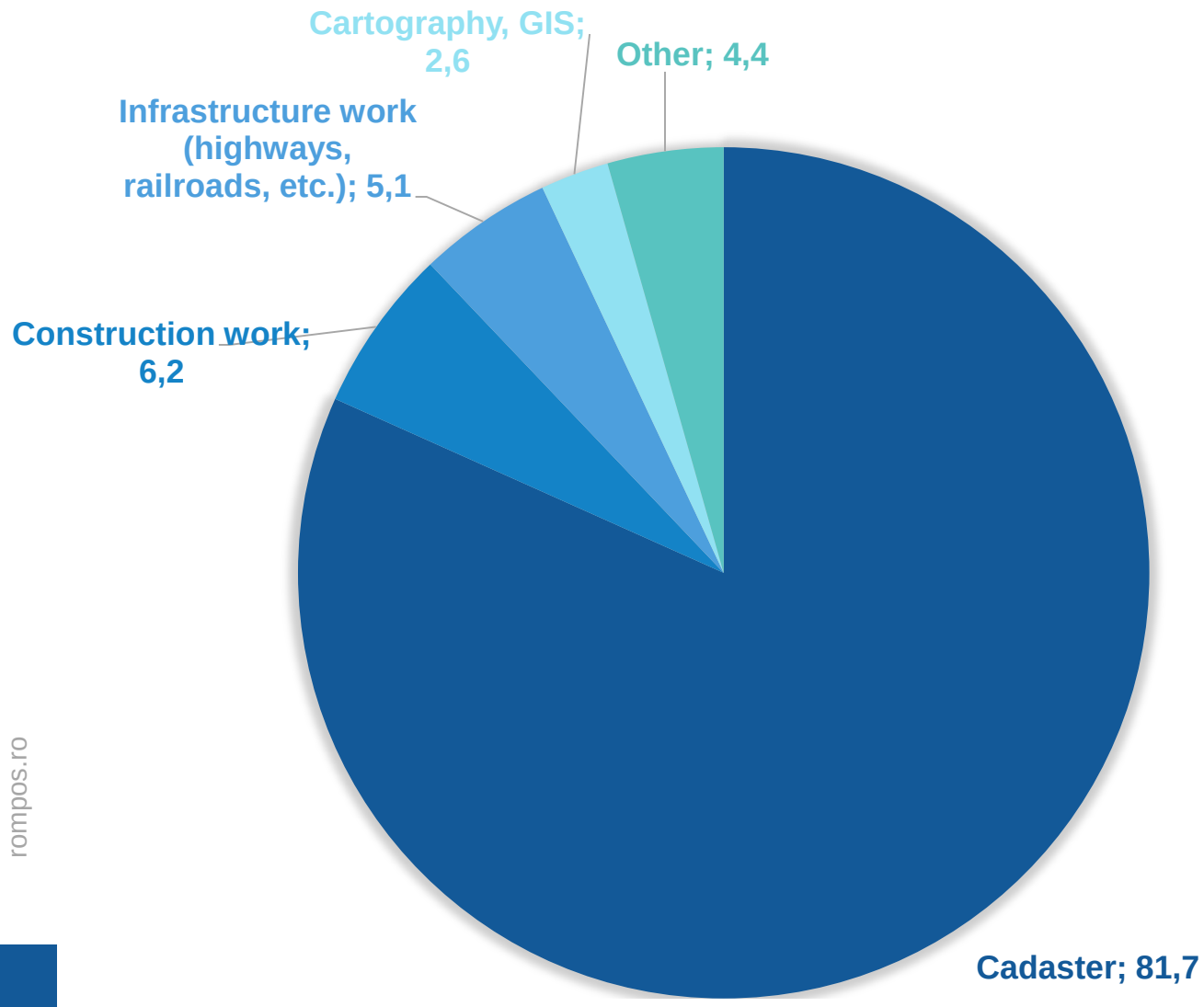
RTK Services Usage

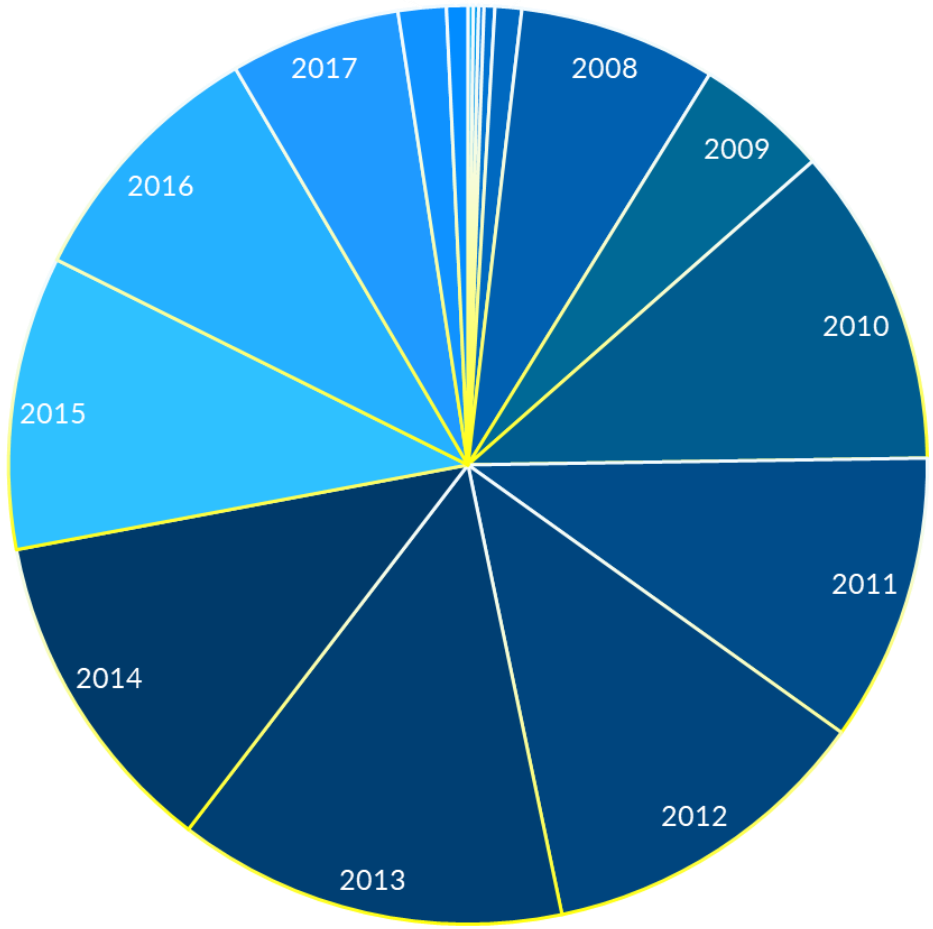


	Mean connection time [min]	Connection count	User count
March	19,7	187491	3534
April	21,7	149959	3523
May	19,1	161430	3468
June	13,6	221408	3458
July	15,3	239931	3485
August	16,5	208546	3472
September	19,1	183250	3543

March April May June July August September

RTK Service usage vs user age in the system





splunk>enterprise App: Search & Reporting

Administrator Messages Settings Activity Help Find

Search Analytics Datasets Reports Alerts Dashboards

Search & Reporting

New Search

Save As New Table Close

```
host="I7-Miluta" sourcetype="csv"| timechart count by StartDate limit=10
```

Since 3/1/19

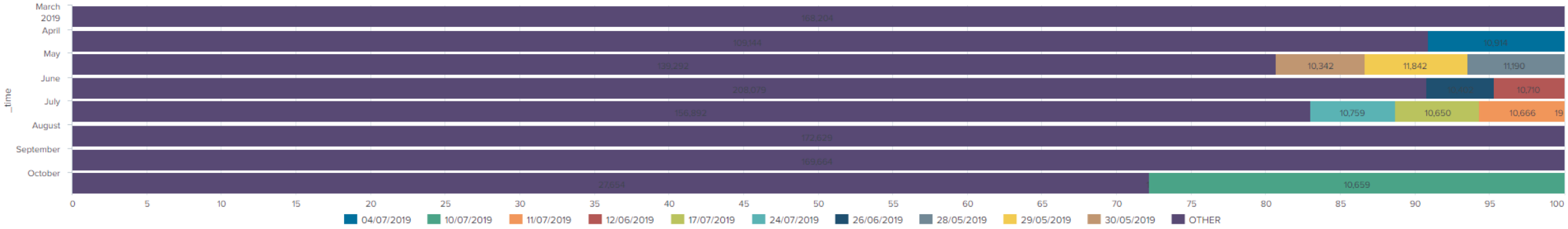
✓ 1,259,712 events (3/1/19 12:00:00.000 AM to 10/28/19 9:42:18.000 PM) No Event Sampling

Job Smart Mode

Events Patterns Statistics (8) Visualization

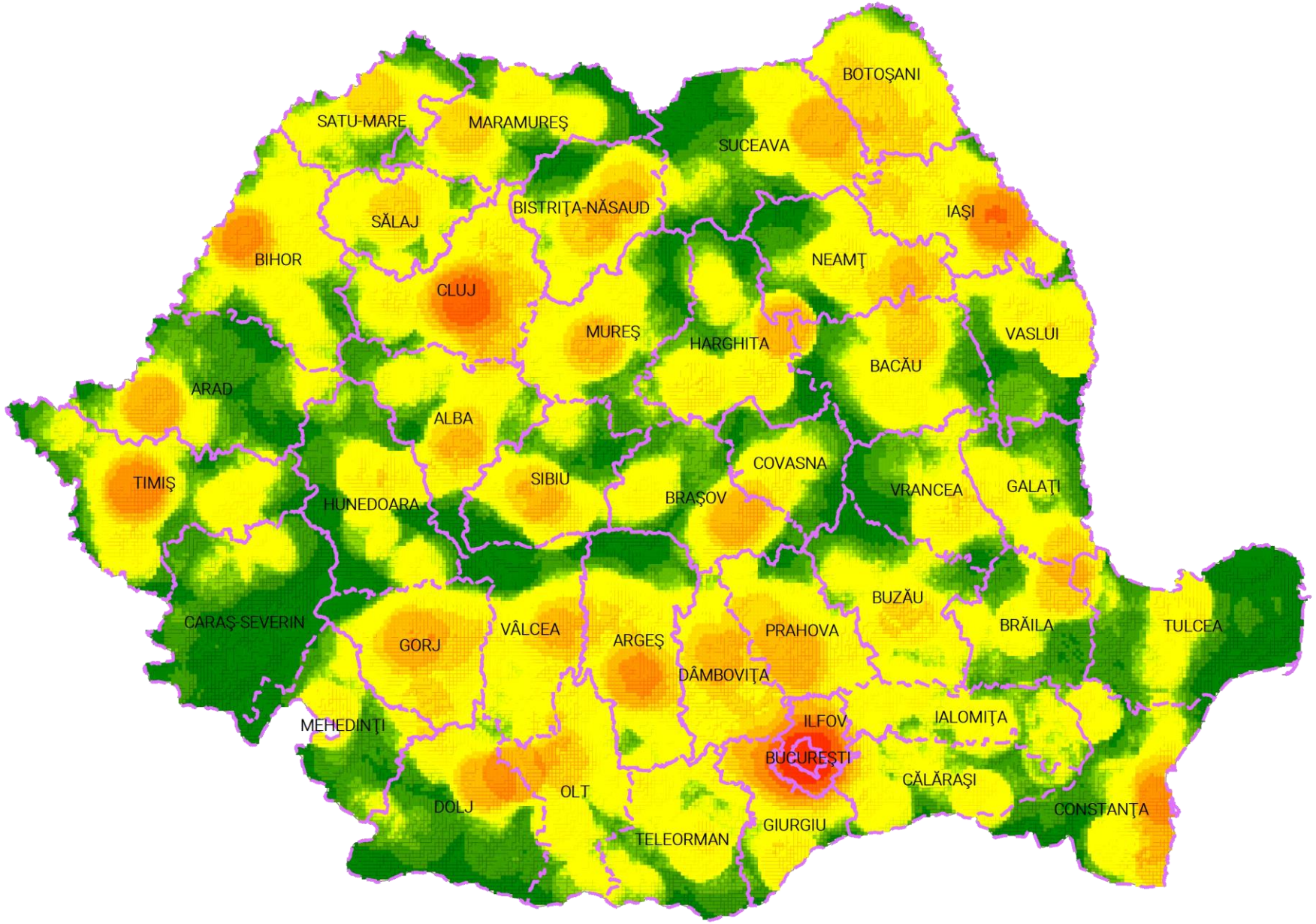
Select visualization

Bar Chart Format Trellis

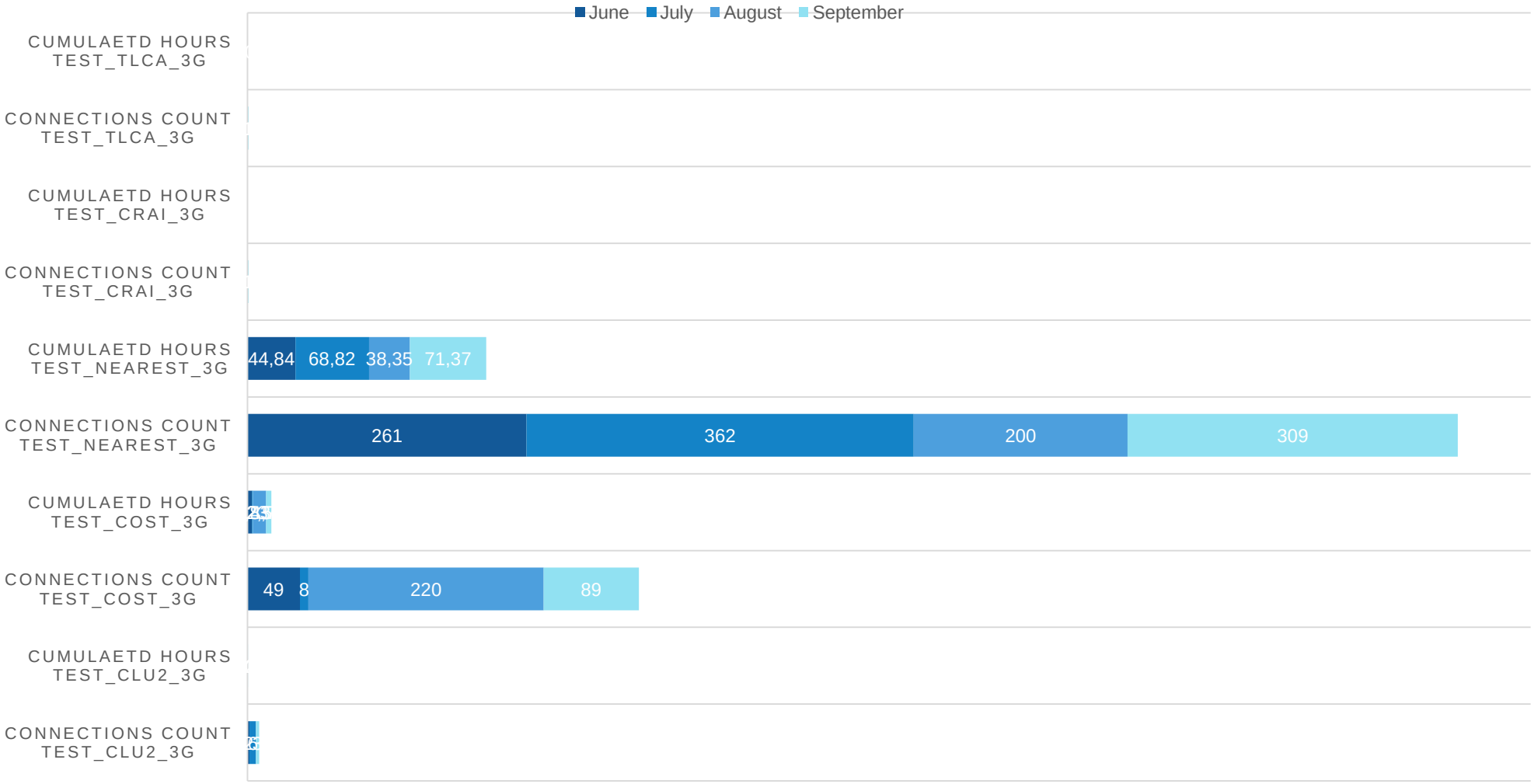


_time	04/07/2019	10/07/2019	11/07/2019	12/06/2019	17/07/2019	24/07/2019	26/06/2019	28/05/2019	29/05/2019	30/05/2019	OTHER
2019-03	0	0	0	0	0	0	0	0	0	0	168204
2019-04	10914	0	0	0	0	0	0	0	0	0	109144
2019-05	0	0	0	0	0	0	0	11190	11842	10342	139292
2019-06	0	0	0	10710	0	0	10402	0	0	0	208079
2019-07	0	19	10666	0	10650	10759	0	0	0	0	156892
2019-08	0	0	0	0	0	0	0	0	0	0	172629
2019-09	0	0	0	0	0	0	0	0	0	0	169664
2019-10	0	10659	1	0	0	0	0	0	0	0	27654

RTK Service usage heatmap for a month



CONNECTION COUNT VS HOURS FOR GALILEO TEST PRODUCTS



Paid Services starting February 2019

Yearly/Rover

1000 lei

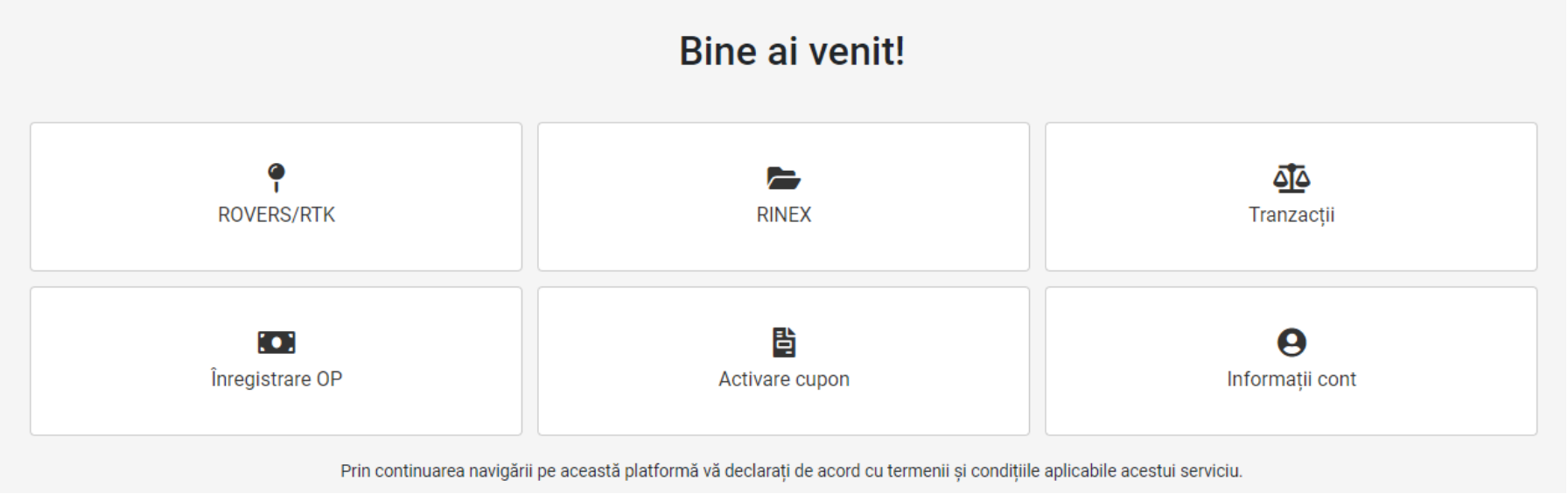
≈210 EUR

Monthly/Rover

100 lei

≈21 EUR

New App



- Multiple rovers management
- RINEX file download
- Transaction history
- Bank Payment validation
- Coupons
- Account Info

New App – RINEX Order interface

Comandă nouă

Atentie! Timp UTC!!

Comanda fișiere RINEX

Stația* BACA

Anul* 2019

Luna* Octombrie

Calcul credite

Disponibile -56

Necesare 0

Cum comand

1. Alege statia, anul, iar apoi luna
2. Alege orele dorite din cele disponibile
3. Apasa Salveaza

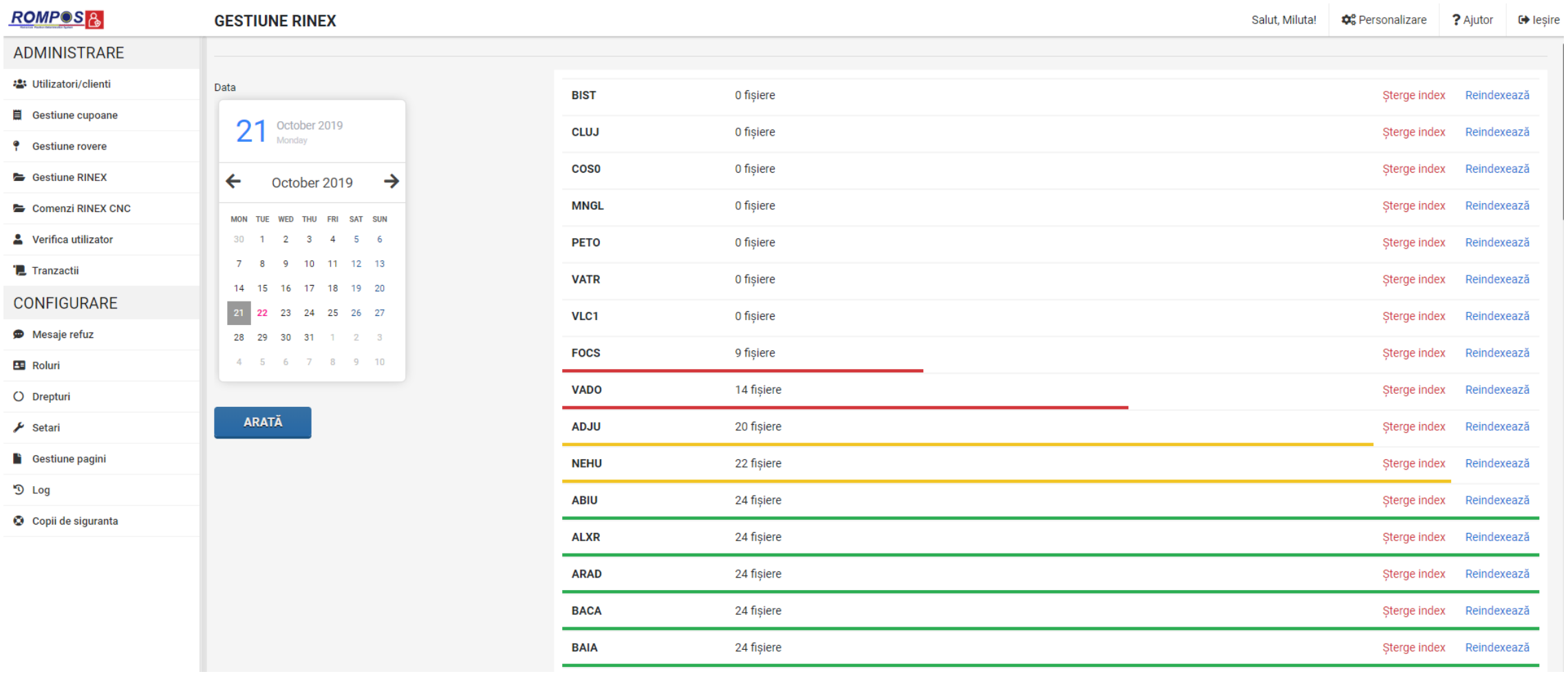
Sfaturi

- Clic pe inceputul randului (albastru) va selecta/deselecta intreg randul
- Pe orizontala sunt orele din zi, iar pe verticala sunt zilele din luna selectata
- Orele in care sunt date disponibile vor fi evidentiate cu galben
- La selectare, o ora selectata devine albastra

Legenda

- Timpul local (TL): TL = UTC + 2h (iarna); TL = UTC+ 3h (vara)
- UTC - Timp Universal Coordonat
- O - Observation file
- N - GPS navigation message file
- M -Meteorological data file
- G - GLONASS navigation message file
- L - Galileo navigation message file
- P - Mixed GNSS navigation file

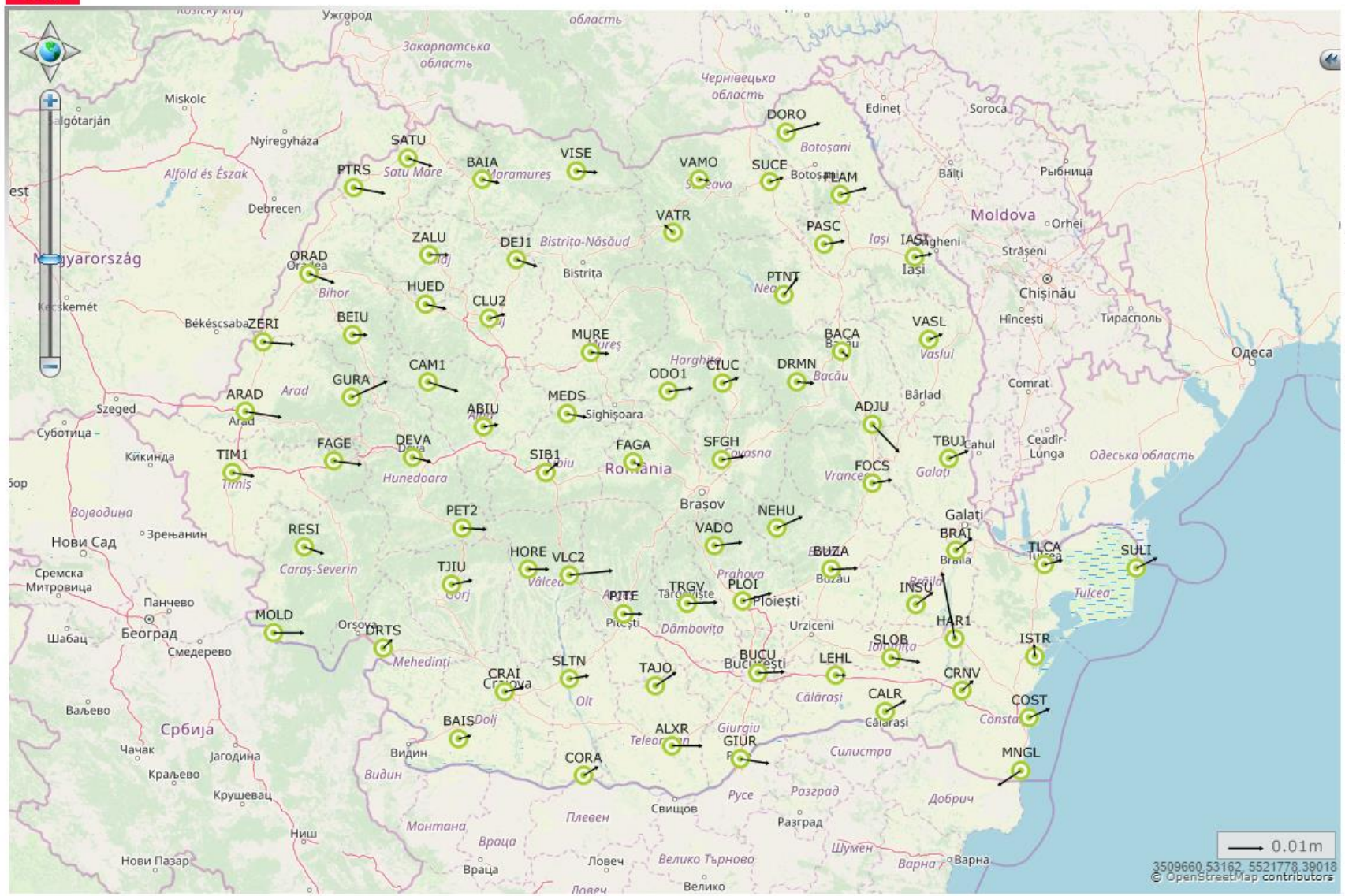
New App – Admin Interface



Crosscheck service - Overview

You are here: ROMPOS

Map



Display

Points	Show status
Point labels	Show all

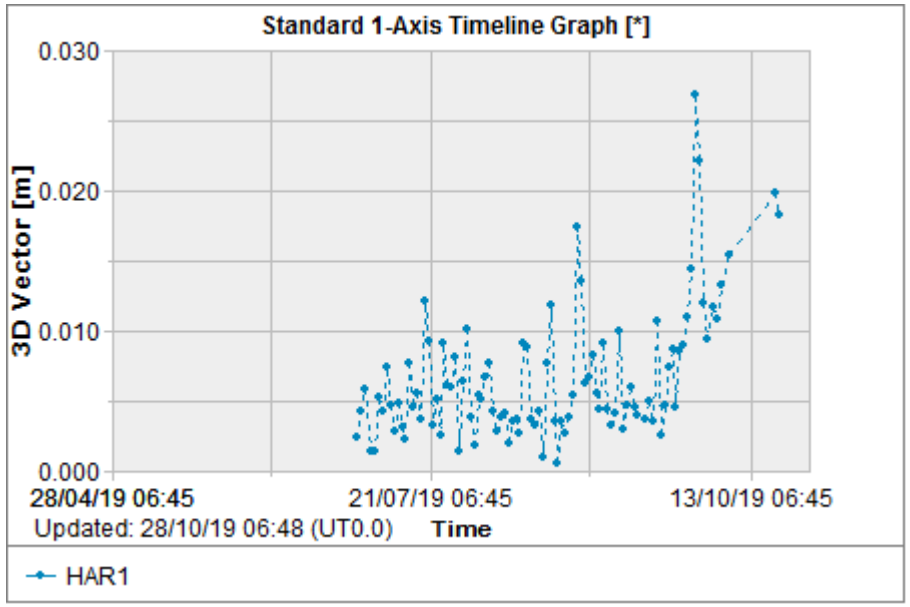
Displacement

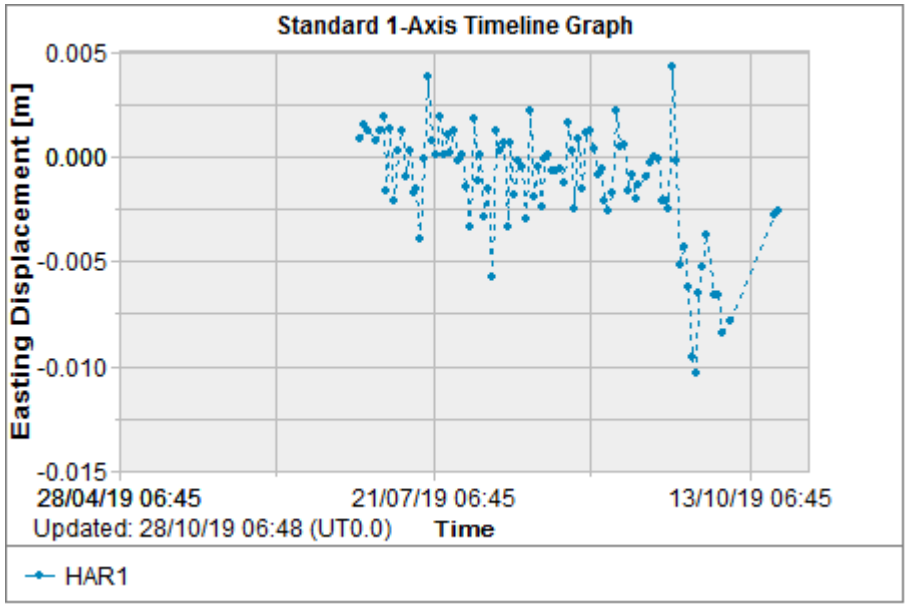
Vector type	2D
Vector 2D style	Resulting
Ref.	Start time
Ref. length	0.01

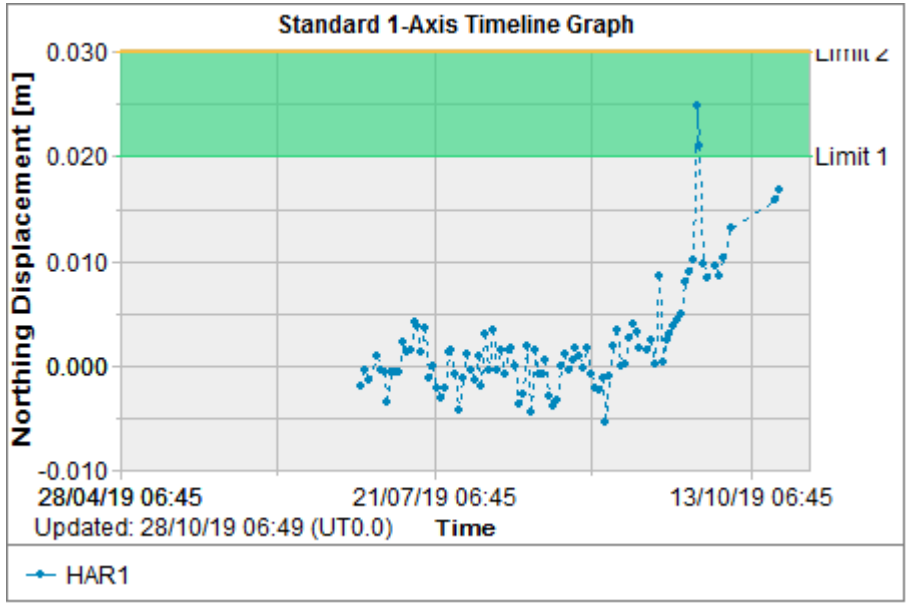
Select time

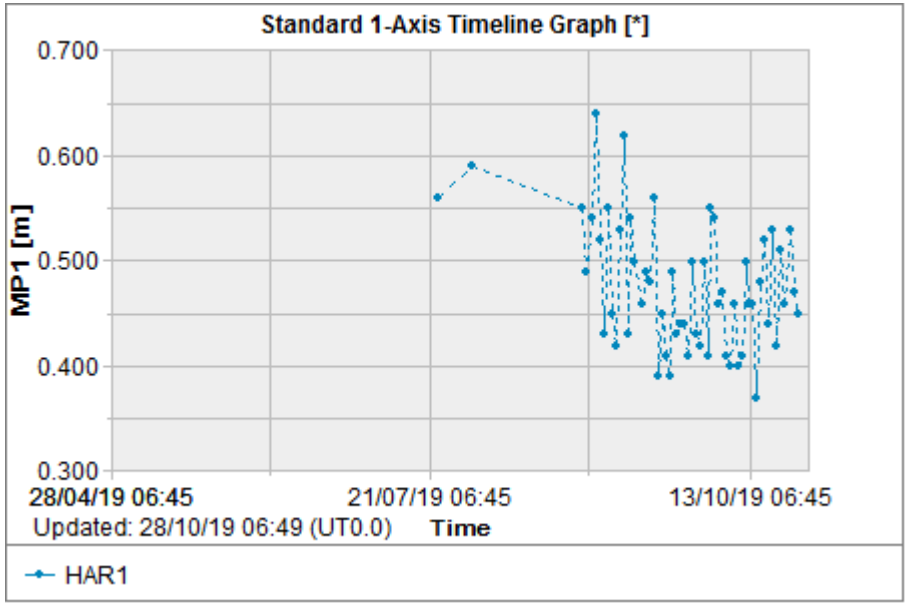
Fix time	6 months
Start	28/04/2019 06:45
End	28/10/2019 06:45
Refresh	

Crosscheck service – Site Graphs

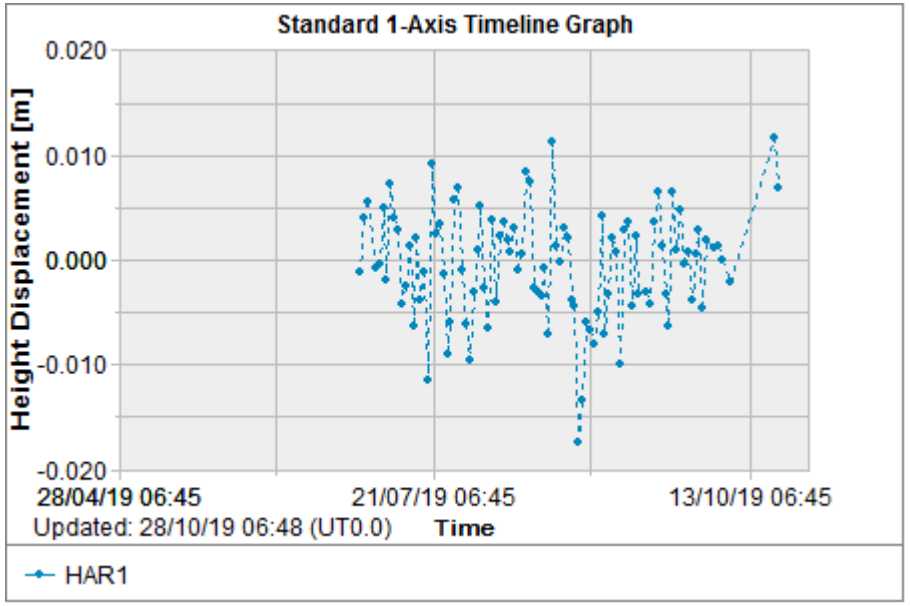


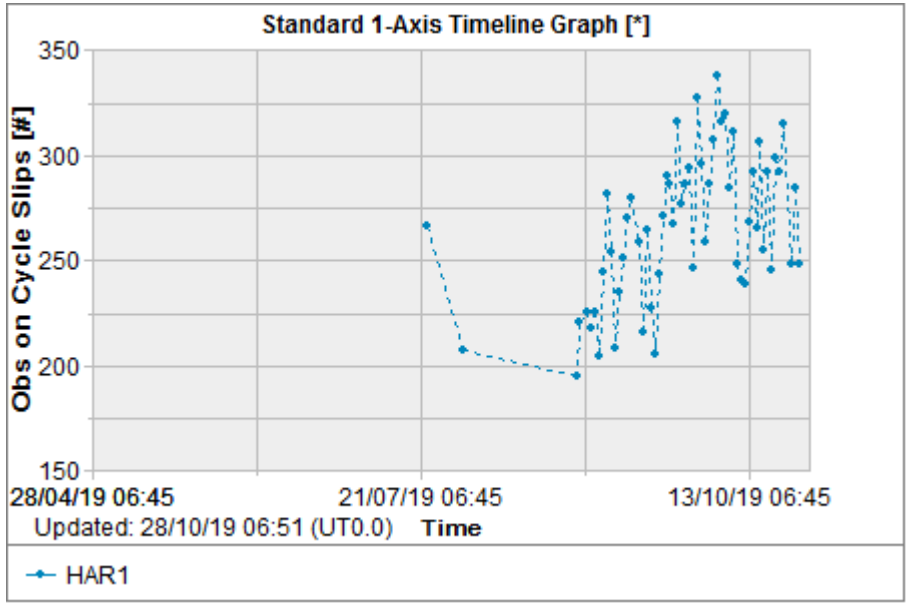


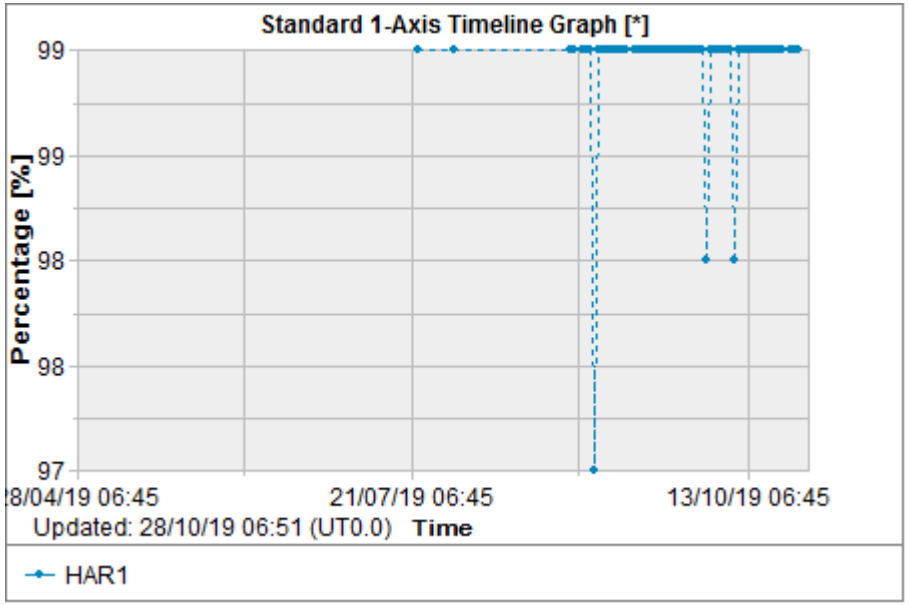


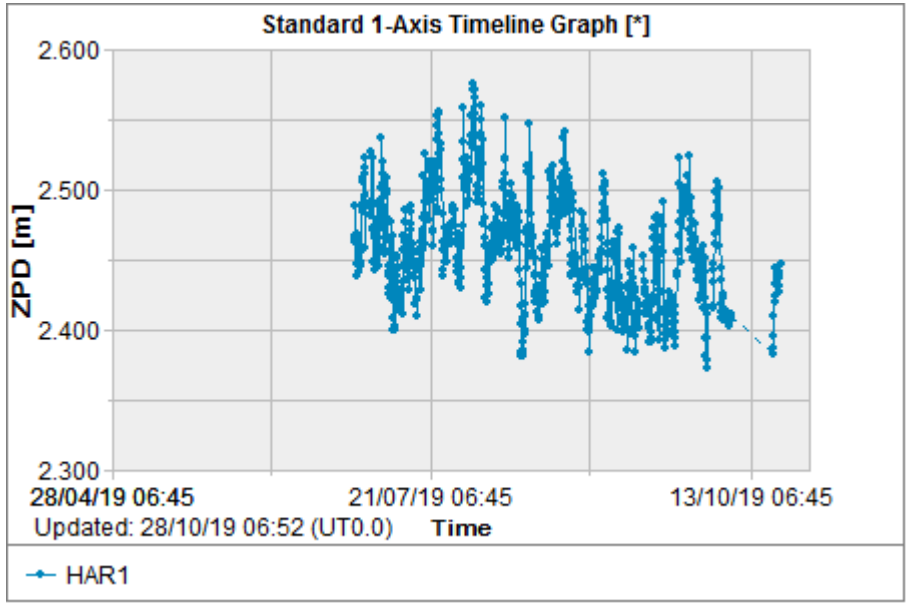


Crosscheck service

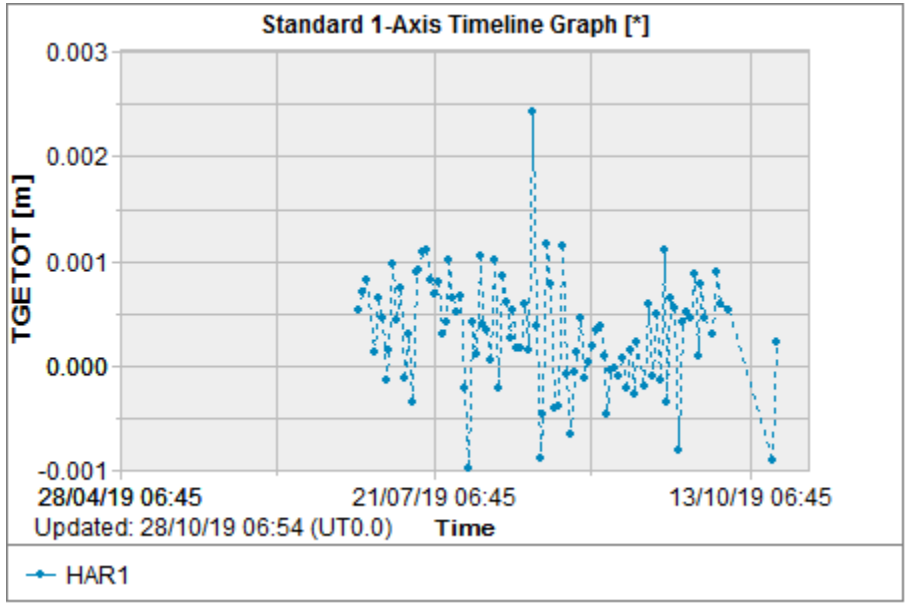


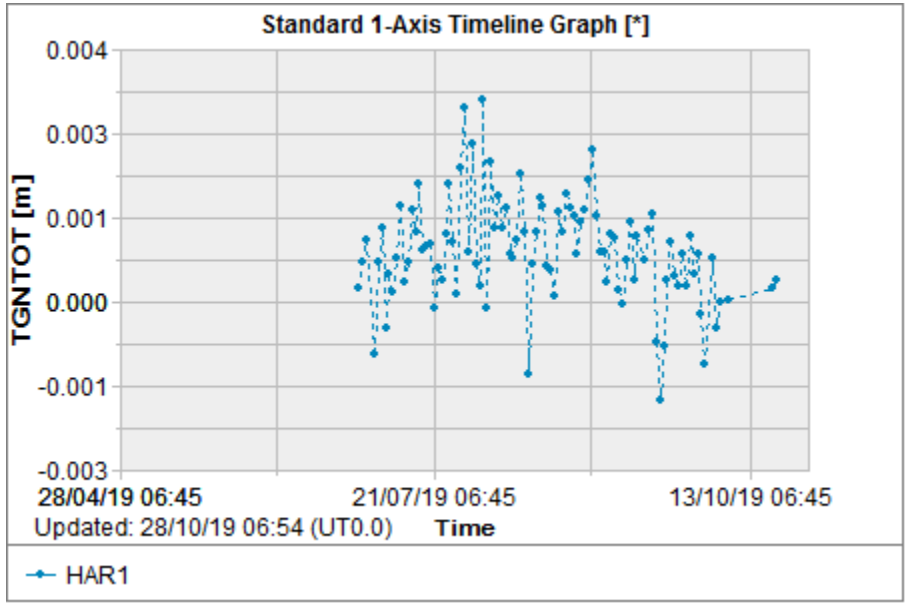






Crosscheck service



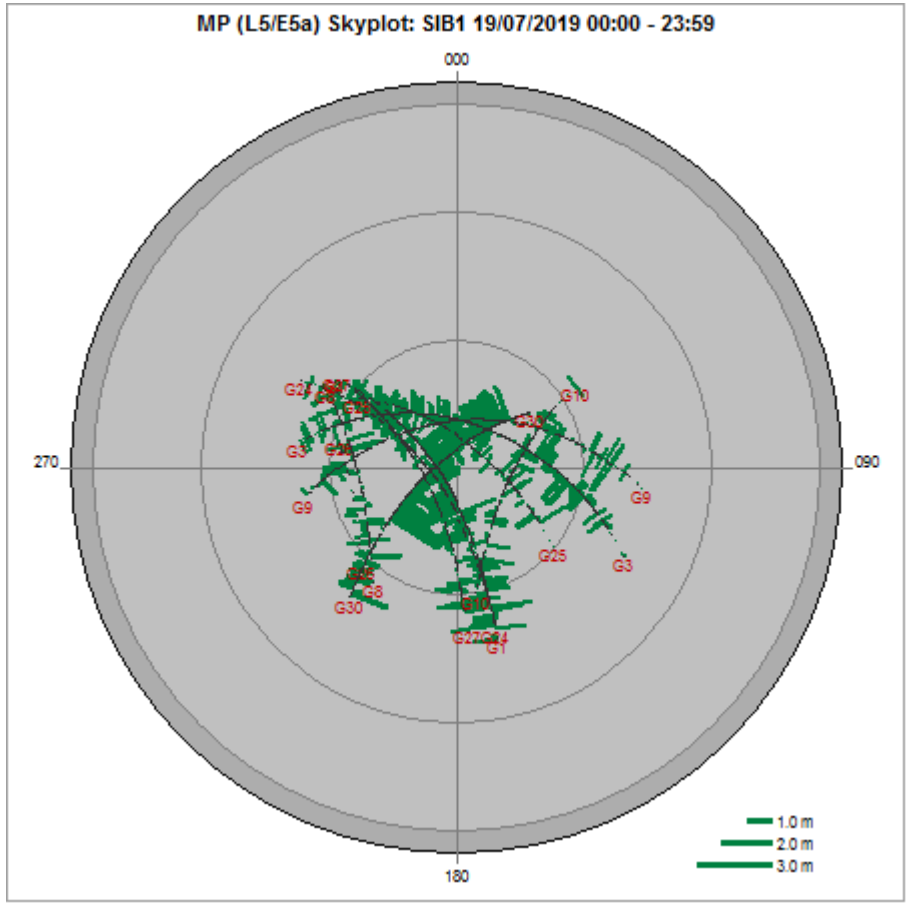


Galileo Quality Control

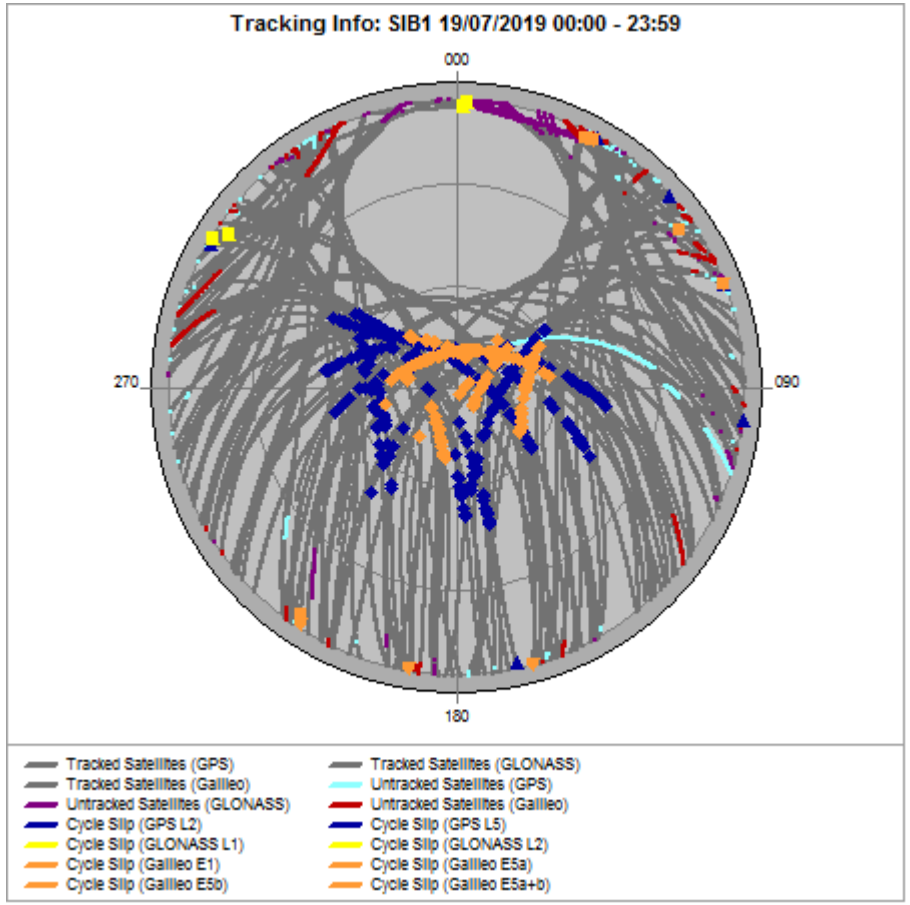
Galileo sites with problems in obtaining fix solutions

SUCE	Cluster1_2	8 / 24	4 / 11	4 / 6	0 / 7	11:33:43
SIB1	Cluster1_1	16 / 25	11 / 12	5 / 6	0 / 7	11:34:31
CLU2	Cluster1_1	12 / 23	7 / 11	5 / 5	0 / 7	11:33:59
CRAI	Cluster2_2	8 / 25	6 / 12	2 / 6	0 / 7	11:34:45
COST	Cluster2_1	7 / 22	5 / 11	2 / 4	0 / 7	11:34:51
ORAD	Cluster1_1	20 / 21	9 / 9	6 / 6	6 / 6	11:34:21
FAGE	Cluster1_1	22 / 25	11 / 12	6 / 6	6 / 7	11:34:45
FAGE	Cluster2_2	22 / 25	11 / 12	6 / 6	6 / 7	11:34:45
SIB1	Cluster2_2	23 / 25	12 / 12	6 / 6	6 / 7	11:34:31
BRAI	Cluster2_1	23 / 24	12 / 12	5 / 5	7 / 7	11:34:48
TLCA	Cluster2_1	21 / 22	10 / 10	5 / 5	7 / 7	11:34:53

Galileo Quality Control with Leica QC

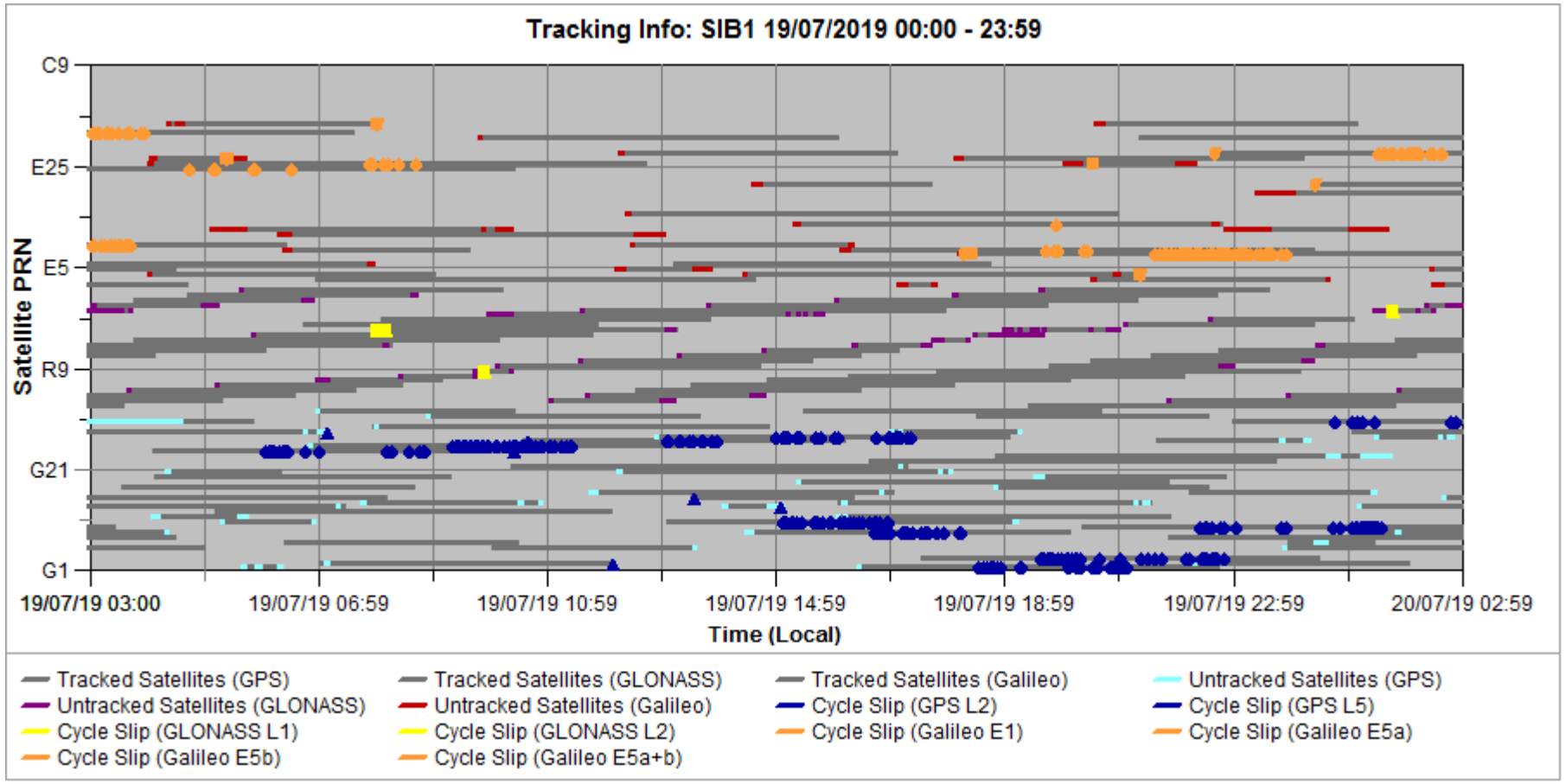


MP Residual Skyplot GPS L5



TrackingInfo Skyplot

Galileo Quality Control with Leica QC



TrackingInfo TimeSeries

SWOT ANALYSIS

STRENGTHS

- Large coverage that extends to border areas
- Up to date software
- Distributed configuration on 10 virtual machines
- Reliable live support (chat, website, manuals, phone support)
- Support team capable to quick fix software related problems
- A variety of RT products

OPPORTUNITIES

- Data exchange with neighboring countries
- 4 Stations in EPN and 1 IGS
- 73 stations in EUPOS Quality Check
- Agreements with similar institutions
- Support team capable to quick fix software related problems

WEAKNESSES

- Outdated receivers with high risk of failure (legacy unsupported)
- Lack of redundant data connections (different mediums LAN vs GSM)
- Long intervention times caused by the local administrators
- Problems caused by the communication infrastructure (low bandwidth, high latencies, legacy components)
- Communication infrastructure is not managed by NCC
- Bad management of archive data
- No station logs prior to 2018

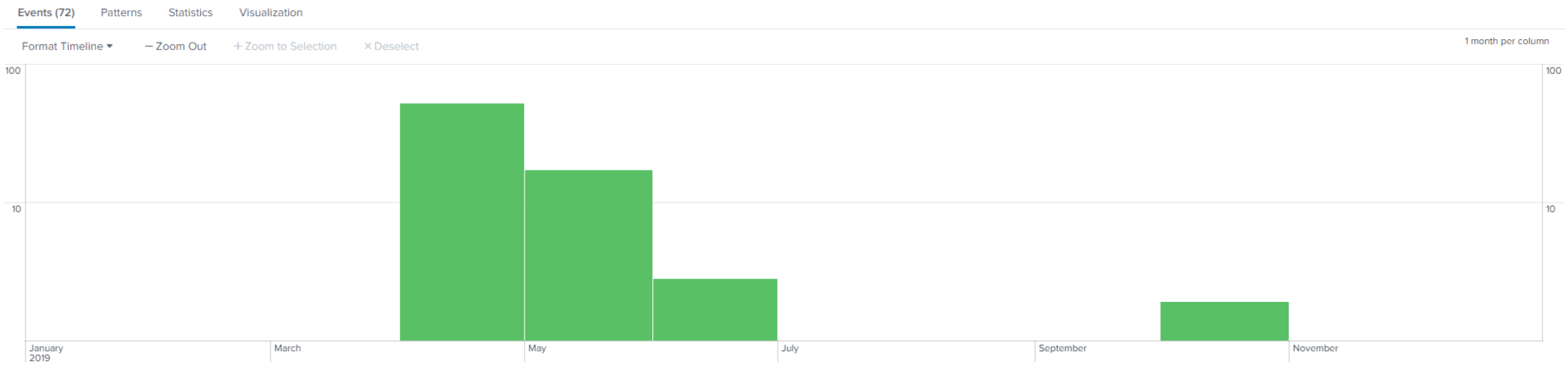
THREATS

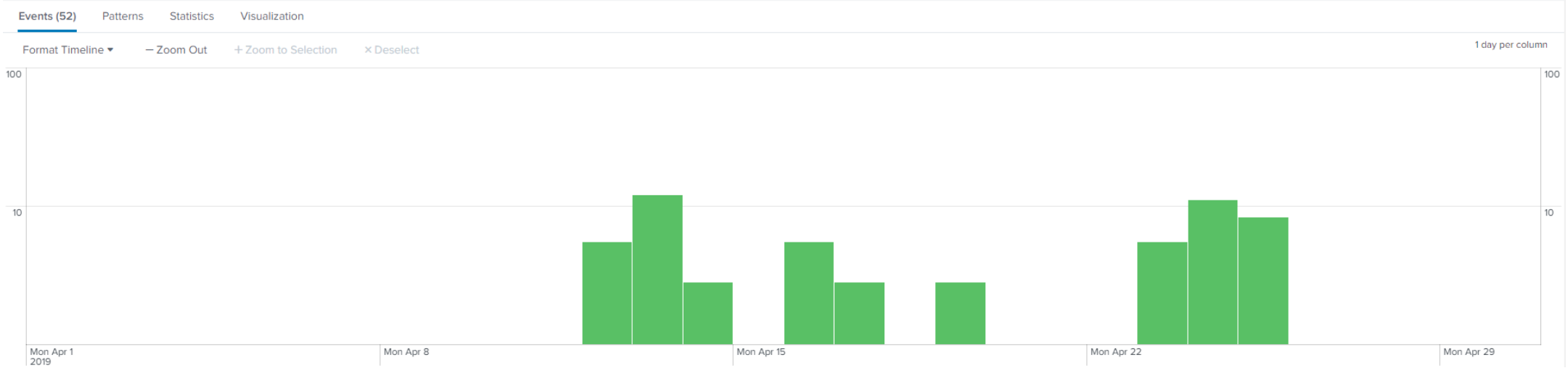
- Long intervention times of ISP in case o public IP addresses
- Lack of technical support for legacy receivers
- Unable to handle new types of errors

MAJOR EVENTS

- **GPS ROLLOVER (Firmware update)**
- **Sep 29th – Oct 4th GLONASS PROBLEMS**

Firmware Update Campaign





Sep 29th – Oct 4th GLONASS PROBLEM

Problem

The observed behavior on rover side is, that rovers connect to GNSS Spider and do not get a fixed position for several minutes.

This happens for any Network RTK RT-Product and all Single Site RT-Products using NULLANTENNA that are providing GLONASS. The reason for the rover not obtaining a fixed position is, that the data stream provided by GNSS Spider does not contain any observation messages after the connection is established. In case the rover stays connected long enough, after a few minutes, GNSS Spider will start transmitting the observation messages and the rover is able to obtain a fix.

The ambiguity fixing in network processing itself looks good for all constellations.

RT- and PP-Positioning is not affected.

The cause if this issue is, that since Sunday 29.09.2019 GLONASS satellites are transmitting almanac information for satellite R10, which are not conform to the GLONASS ICD. For GLONASS satellite R10 a slot number of 7 is transmitted and now also published on the GLONASS constellation status portal (https://www.glonass-iac.ru/en/GLONASS/index.php), while the ICD only specifies values between -7 and 6. Receivers using the older measurement engine generation ME3 are transmitting this information to GNSS Spider, where it is unfortunately not rejected properly in the calculation of the NULLANTENNA. Receivers using the newer ME generations (ME4 and OEM7), e.g. the GR/GM-Series or GRX1200+ and GRX1200+ GNSS, are not affected – the receiver firmware already filters out the wrong almanac information. Consequently, GNSS Spider works fine in networks using only such newer generation receivers.

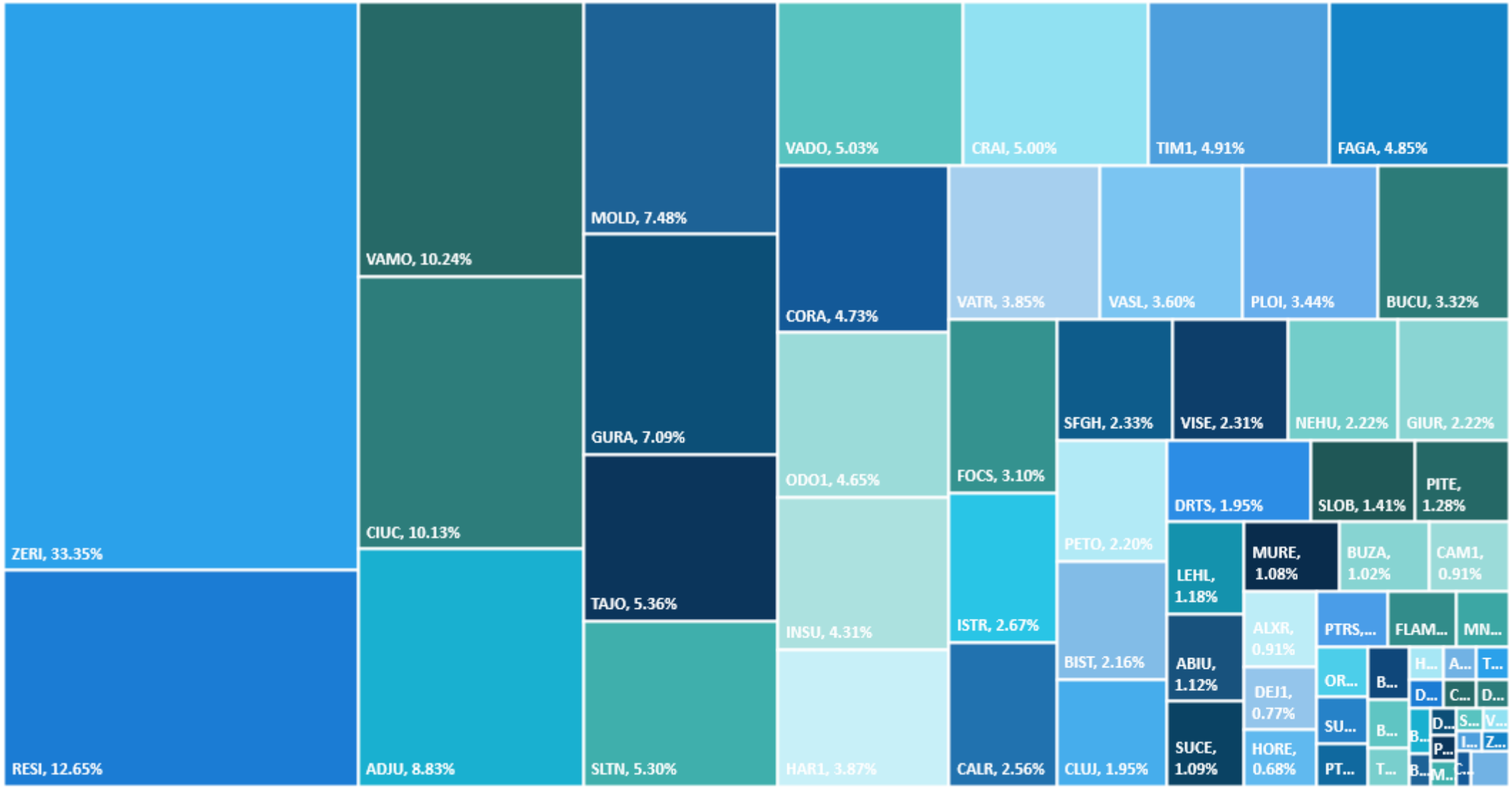
Affected version of GNSS Spider: all (including v7.4.0)

Affected receiver types: any using ME3 with any firmware (e.g. GRX1200GGPRO, various GMX902 variants)

Affected RT-Products: any using GLONASS and NULLANTENNA setting

Site Availability

Station downtime percentage/year



Further plans

Procurement

New GNSS Stations

Processing

Multi-annual Network Processing

Log Analysis

Advanced analysis for general and detailed logs of RTK connections by using a big data solution as Splunk or Qlik Sense

Site Performance

Advanced analysis on site stability and data quality

THANK YOU!