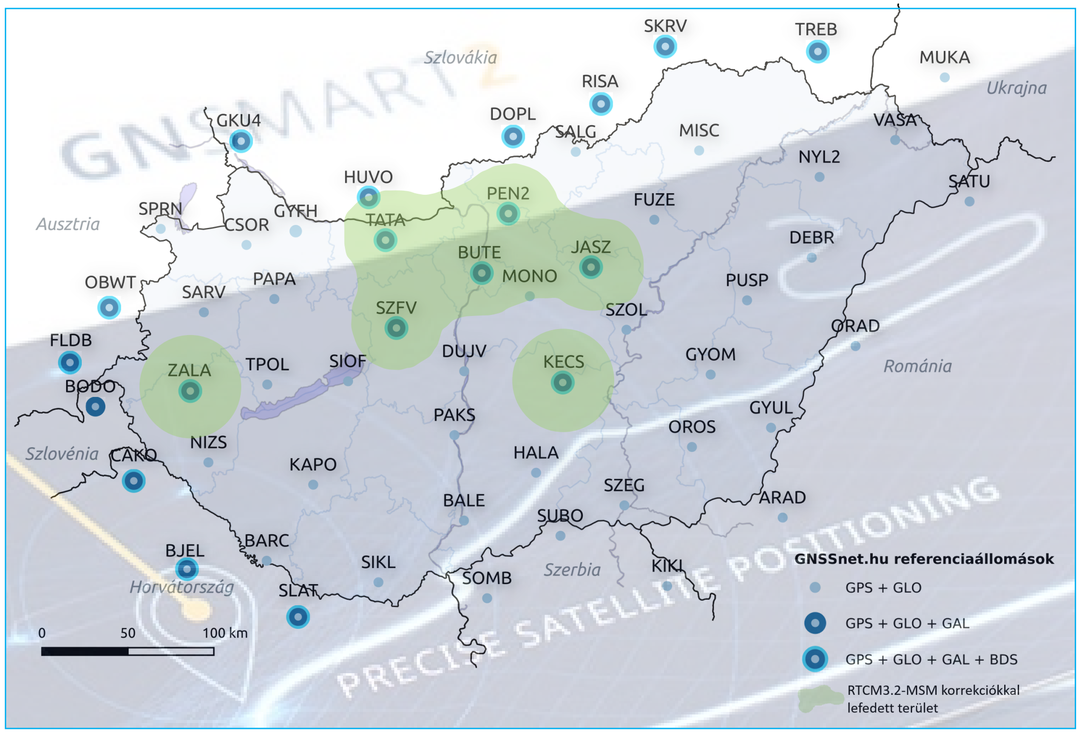
National Report of Hungary

EUPOS Council and Technical Meeting

November 9-10. 2021. - Bucharest, Romania



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Lechner Nonprofit Ltd., Hungary

Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability

Date	08-2019	10-2020	03-2021	08-2021
Real-time Service	4-GNSS **single base correction** provided **by GNSMART2 in test mode**	4-GNSS **single base RTK corrections** from the receivers provided **by self developed caster in the service**	4-GNSS **single base RTK corrections** from the receivers provided **by self developed caster in the service**	4-GNSS **network RTK corrections** provided **by GNSMART2 in the service**
4-GNSS stations	**5**/35 stations	**5**/35 stations	**7**/35 stations	**7**/35 stations

- **Just two more 4-GNSS capable stations**
- **A public procurement in progress now for 6 new receivers+antennas**
- **Until next spring the number of the 4-GNSS capable stations will be almost doubled**
- **Another public procurement hoped in 2022**

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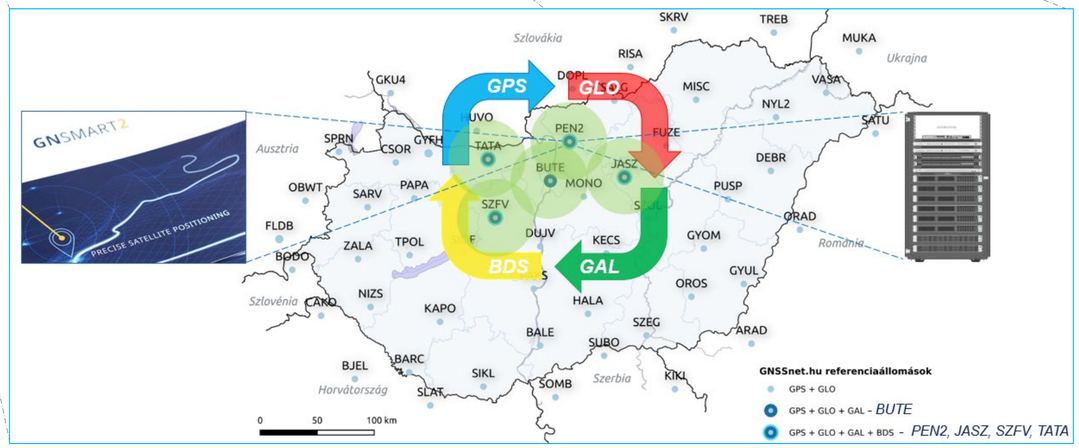

Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

4-GNSS single base RTK corrections provided by self developed caster

Date	08-2019	10-2020	03-2021	08-2021
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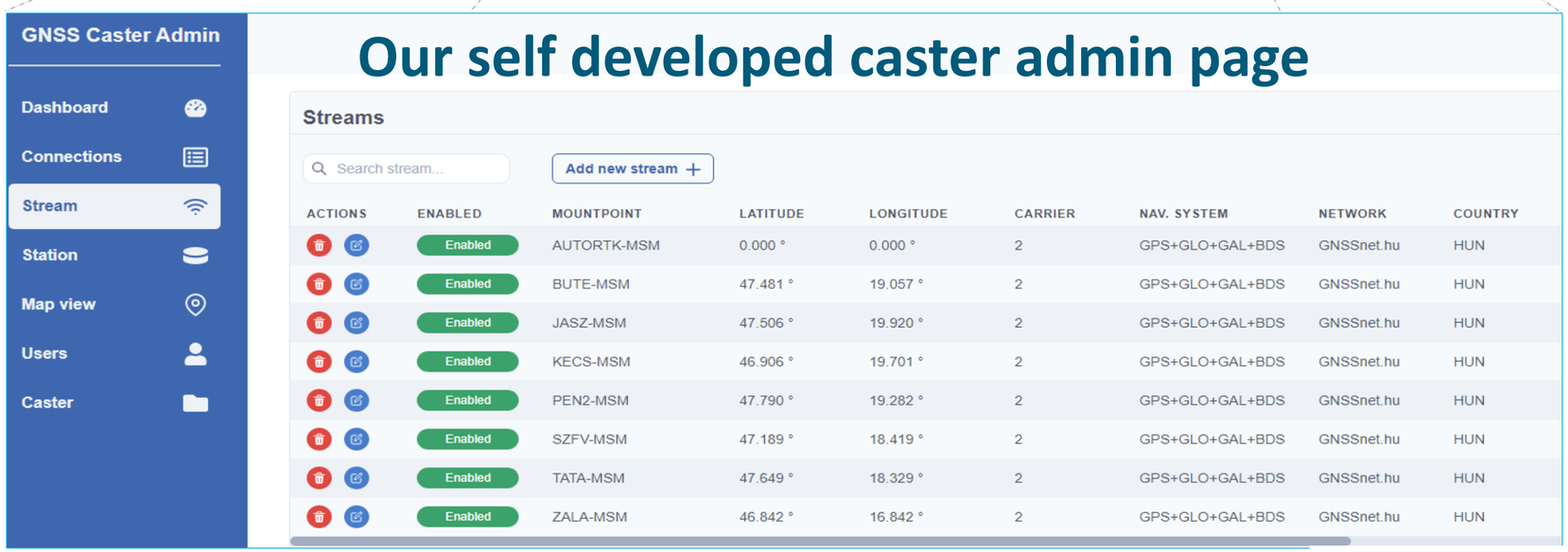
Our self developed caster admin page



Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

4-GNSS network RTK corrections by GNSMART2

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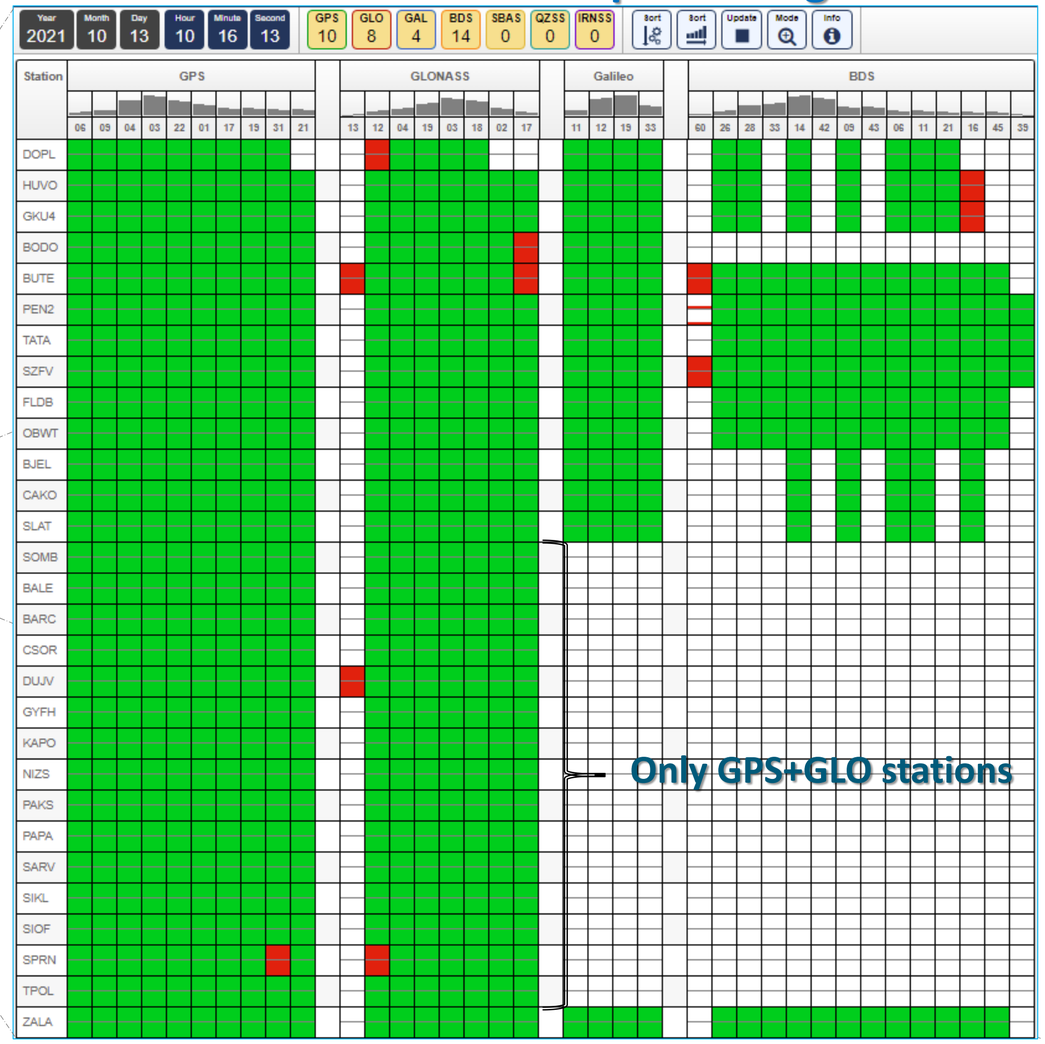
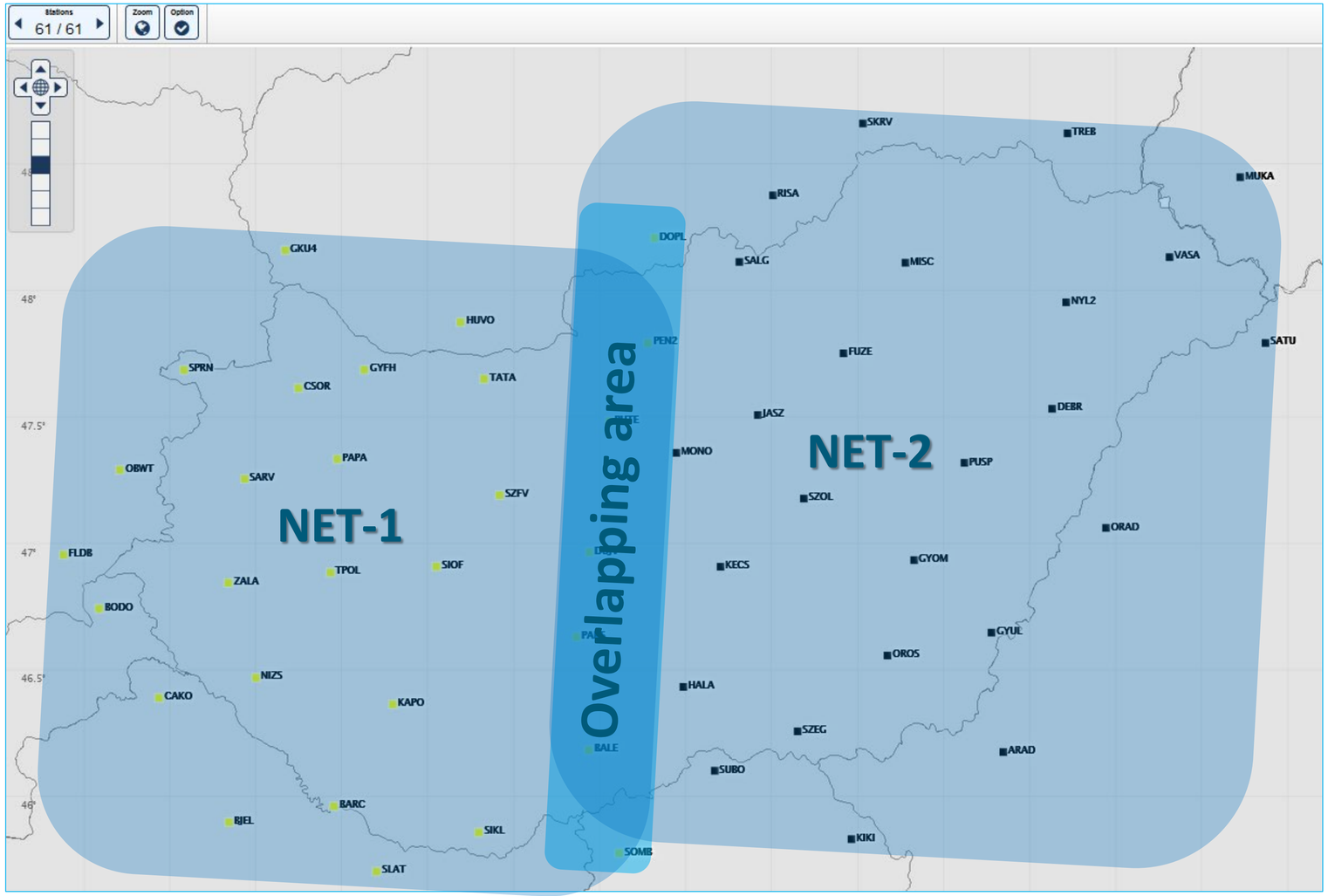
NET-1 network processing



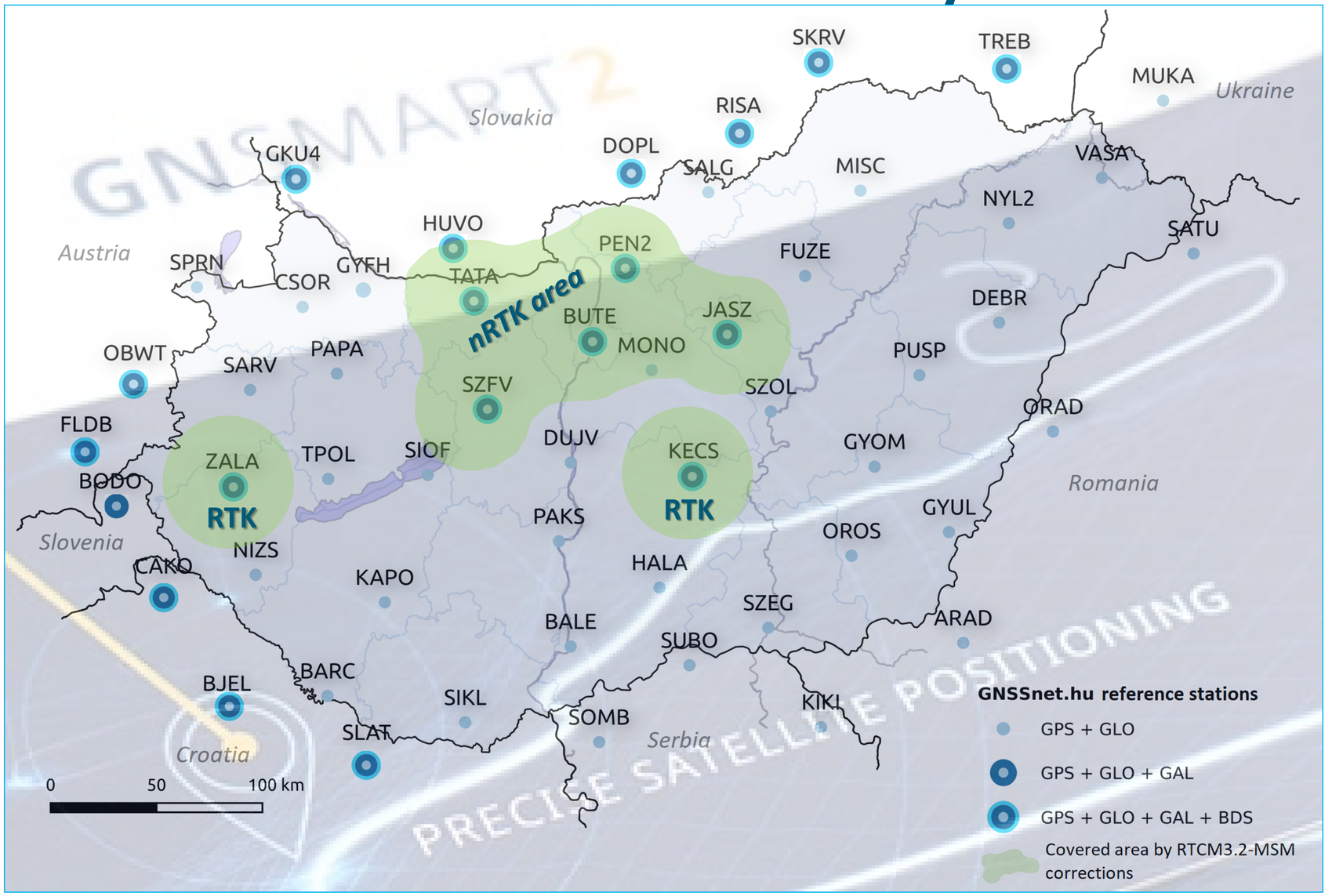
Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

NET-1, NET-2 network processing



Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

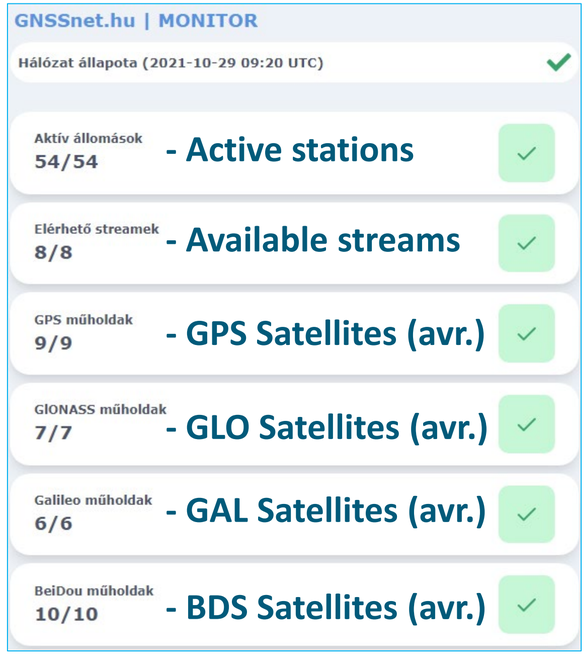
4-GNSS network RTK corrections by GNSMART2



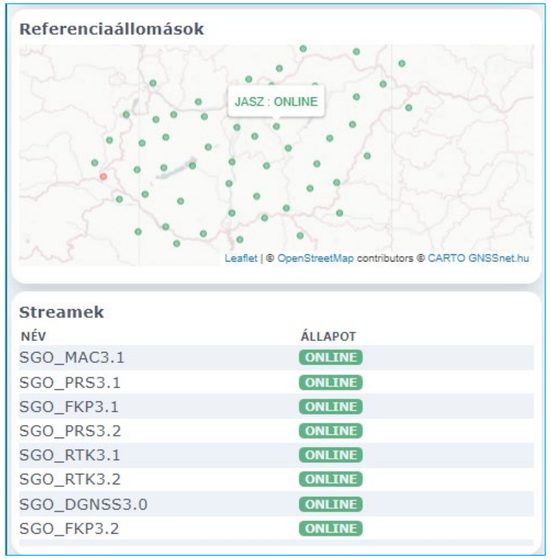
Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

New monitor site for GNSMART-2 service

Start page with the most important information of the network



Reference stations and available streams



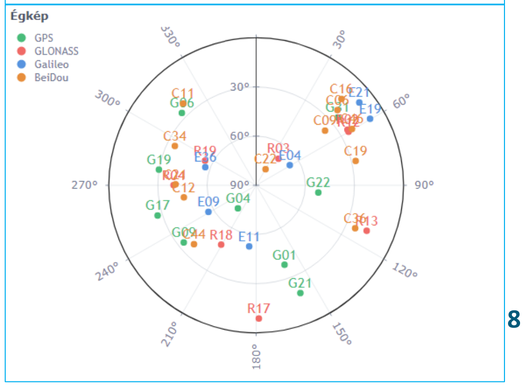
SGO_xxx3.1 – RTCM3.1 (GPS/GLO data)

SGO_xxx3.2 – RTCM3.2 (GPS/GLO/GAL/BDS data)

Detailed satellites data of the reference stations

Skyplot; Satellites data

MŰHOLD	MAGASSÁGI SZÖG	AZIMUTH SZÖG	IRÁNY
G01	40°	160°	↓
G19	30°	281°	↓
G04	70°	218°	↑
G09	32°	231°	↑
G31	26°	52°	↓
G22	53°	95°	↓
G21	21°	157°	↓
G06	25°	315°	↑
G17	28°	255°	↓
R19	55°	299°	↑
R18	50°	212°	↓
R17	10°	179°	↓
R13	15°	114°	↑
R12	24°	62°	↑
R04	38°	268°	↑
R03	70°	253°	↓
R02	26°	57°	↓
E36	56°	292°	↑
E21	9°	53°	↑
E19	10°	59°	↓
E12	9°	157°	↓
E11	54°	187°	↓
E09	55°	239°	↑
E04	67°	59°	↓
C46	22°	61°	↑
C44	39°	228°	↓
C36	23°	115°	↑
C34	35°	298°	↑
C22	80°	23°	↓
C21	39°	269°	↑
C19	29°	75°	↓
C16	16°	44°	↓
C12	46°	263°	↓



Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

Temporarily three independent real-time service

GNSMART-1, GPS/GLO data: Caster address - ntrip1.gnssnet.hu:2101
Nationwide coverage

GPS GLO

GNSMART-2, 4-GNSS data: Caster address - ntrip2.gnssnet.hu:2101
Partial coverage (7 stations)

GPS GLO GAL BDS

GPS/GLO/adatokkal: Nationwide coverage

GPS GLO

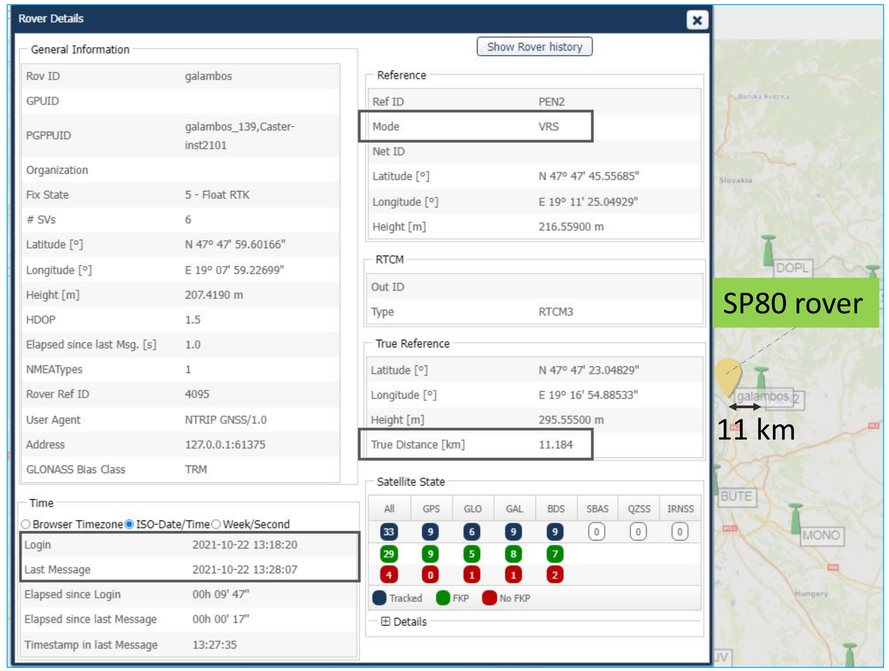
Single base, 4-GNSS data by self developed caster: ntrip2.gnssnet.hu:2102
Partial coverage (7 stations)

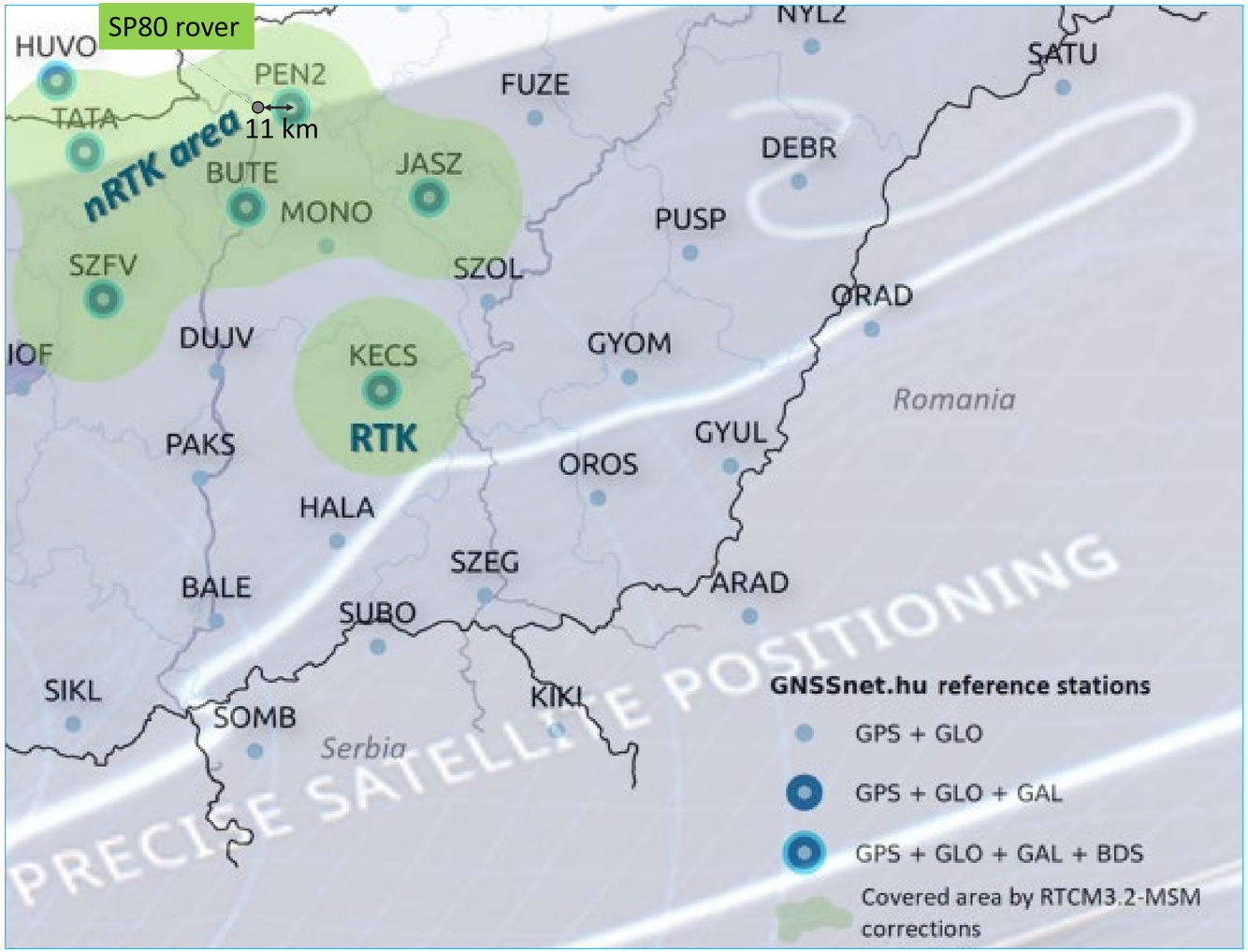
GPS GLO GAL BDS

After a slow transition from GNSMART-1 to GNSMART-2, GNSMART-1 service will be stopped!

Experiencies with Galileo and Beidou: About the test measurements

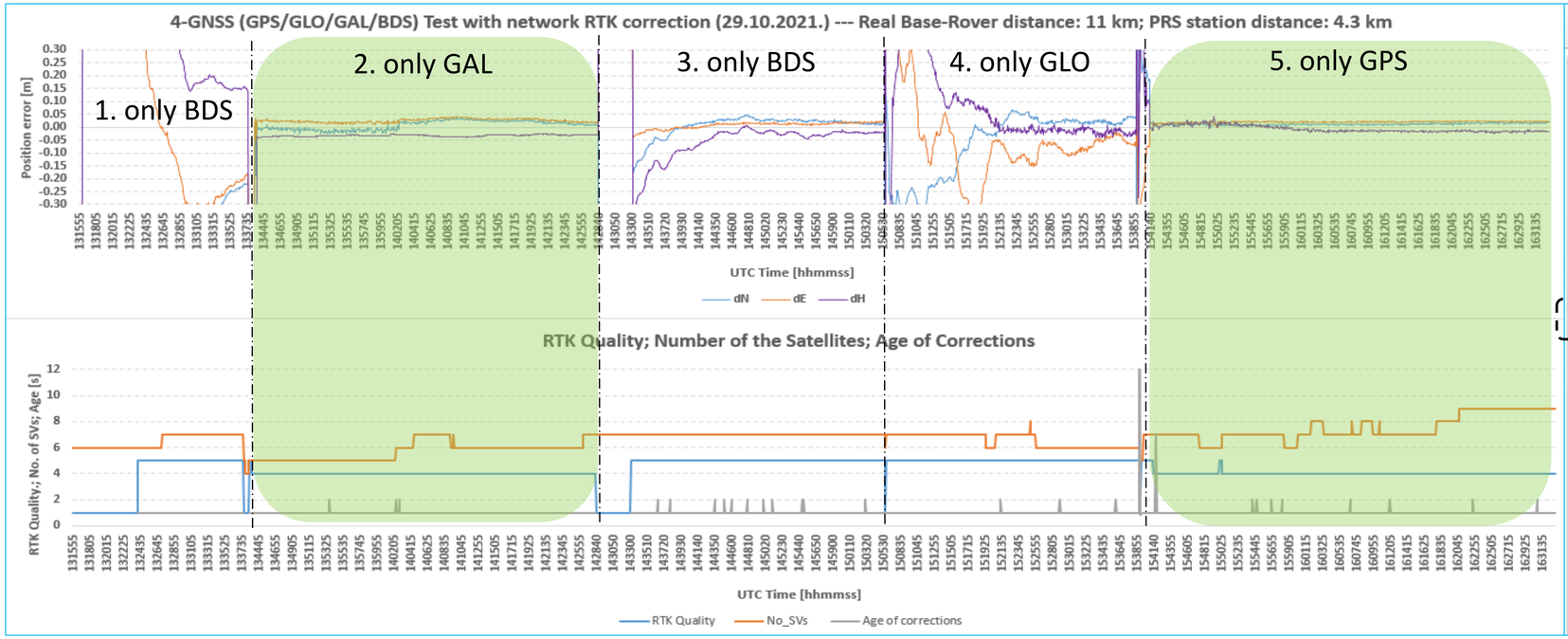
Rover type	*Spectra Precision 80*
Date	*October 2021*
Location	*11 km far away from station PEN2 (SGO)*
Measurement	*Continuous for hours*
Correction type	*Network RTK PRS correction by GNSMART2*
Data logging rate	*Every 5 seconds*
Elevation mask	*5° but partially obscured location (at the 1th test) and significantly obscured location (at the 2nd test)*

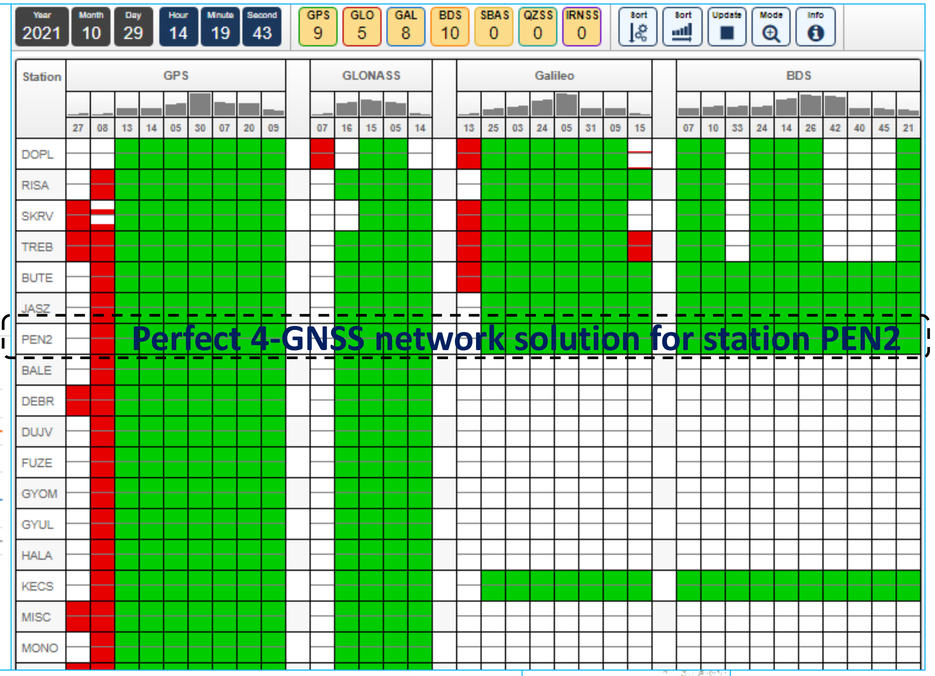




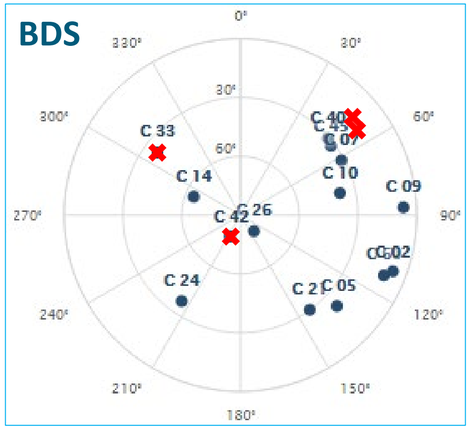
Experiencies with Galileo and Beidou:

Test measurement with GNSS systems separately





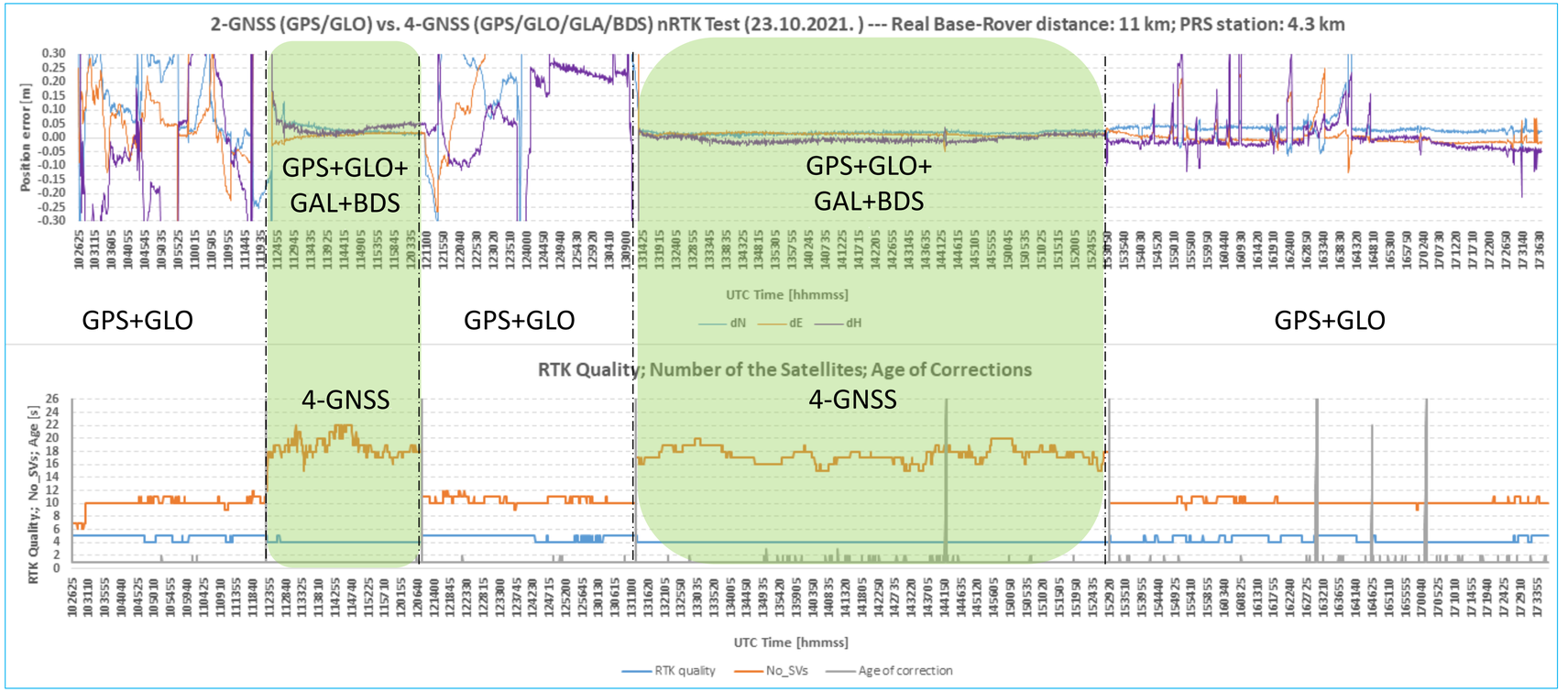
- Only GPS gave perfect positioning, GAL almost perfect
- Our rover can not use all BDS SVs (only between C1-29)
- 4-GNSS together working very well



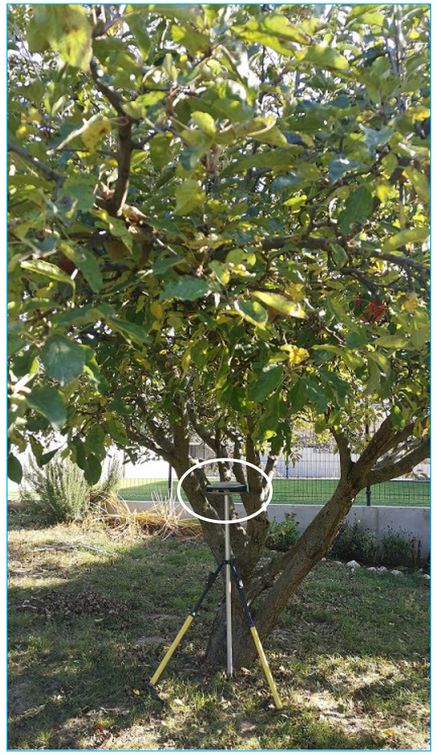
Partially obscured location

Experiencies with Galileo and Beidou:

Test measurement in difficult conditions



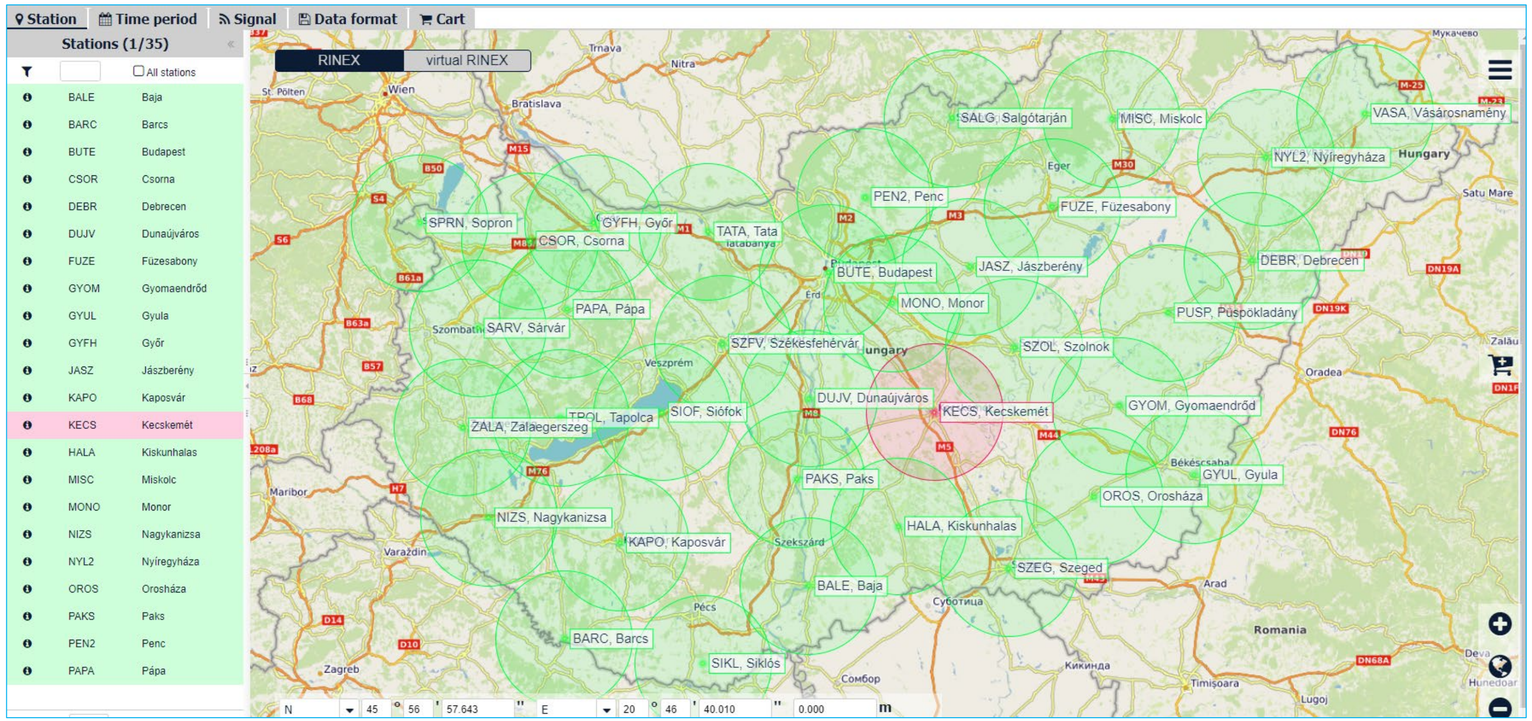
Spectacular benefit using 4-GNSS system vs. 2-GNSS on obscured location



Significantly obscured location under a tree

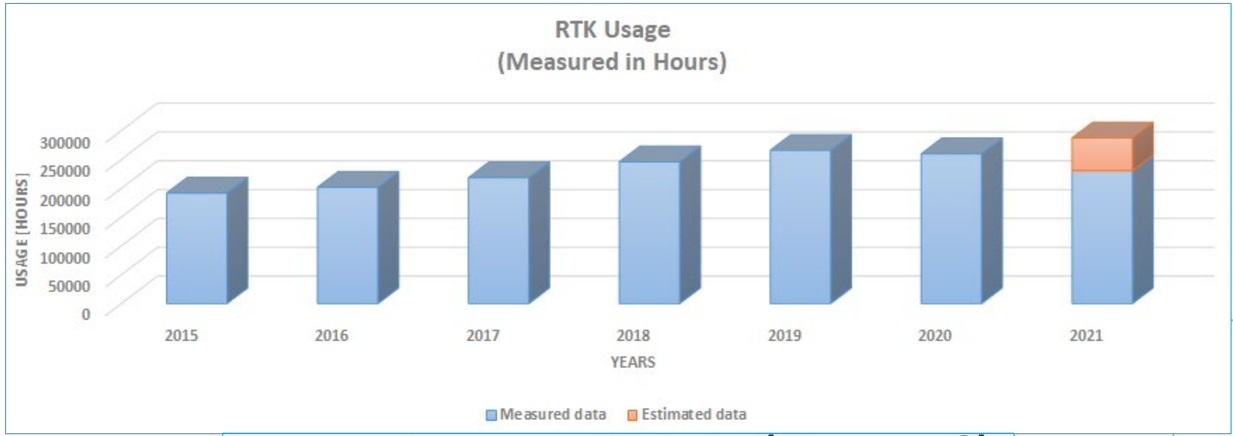
Main events of the last two years towards GPS/GLO/GAL/BDS (4-GNSS) capability:

New website for post-processing data (GPPWEB)

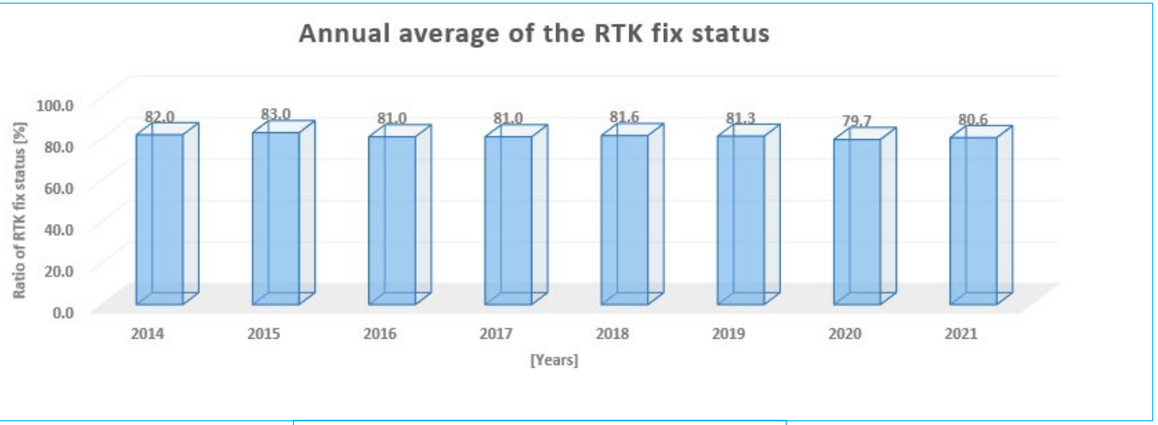


- RINEX and virtual RINEX data with 2.11 and 3.x versions
- GPS/GLO/GAL/BDS data from 7 stations

Statistics



Decreasing usage in 2020 (COVID19?) but increasing trend again in 2021



Approximately 80%

Near 100%

Thank you for your attention!

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www.lechnerkozpont.hu
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