

EUREF 2025 SYMPOSIUM



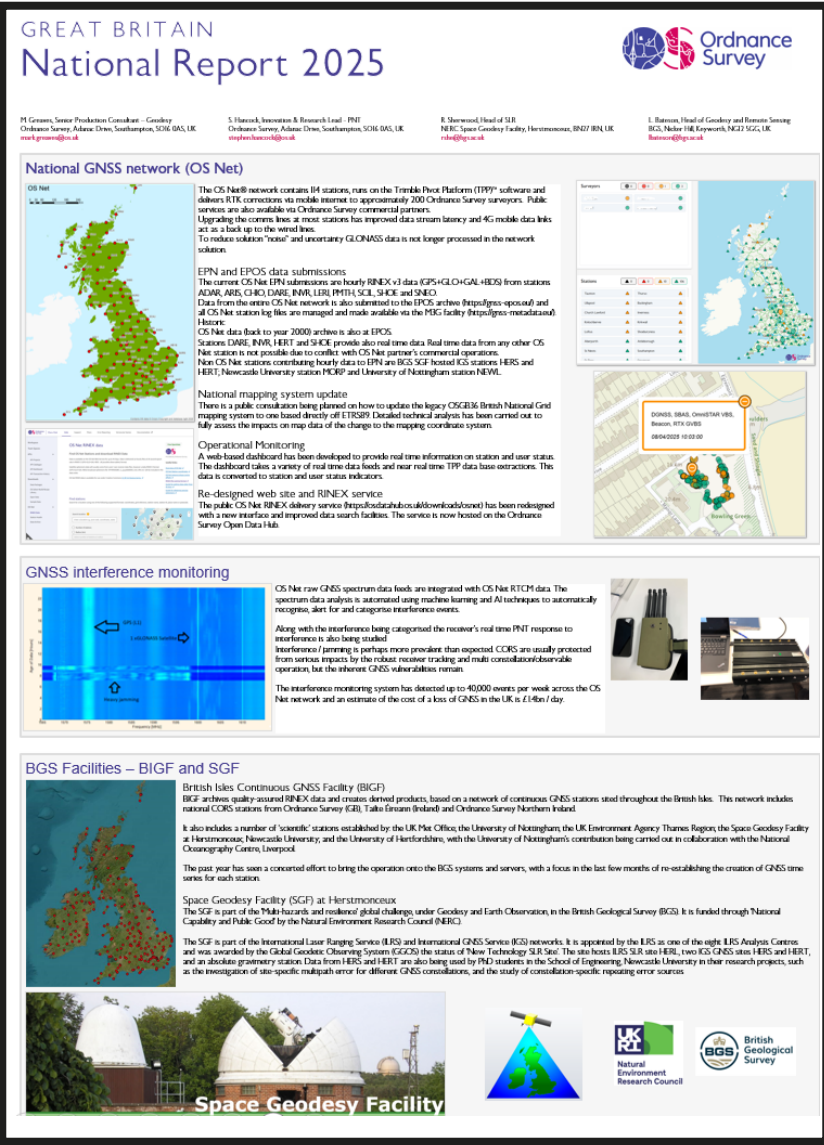
National Reports Posters



National Report of Great Britain

POSTER

M. Greaves
(Poster) Presentation to EUREF 2025



Reminder, resolutions at:
<https://tinyurl.com/EUREF2025Resolutions>
<https://shorturl.at/scUU8>

Thank you

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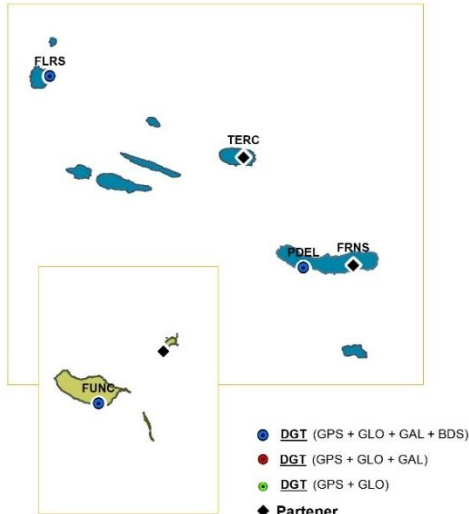
National Permanent GNSS Stations Network (ReNEP)

42 mainland; 4 in Azores; 1 in Madeira

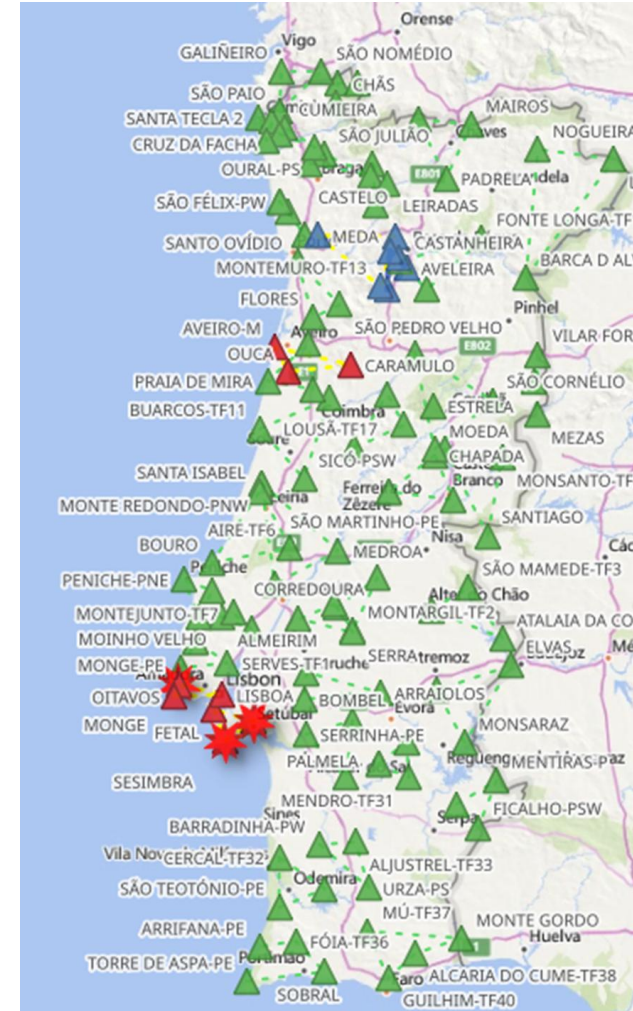
- 39 EP with GPS, GLONASS, GALILEO and BEIDOU
- 5 with GPS, GLONASS and GALILEO
- 3 EP GPS & GLONASS



ReNEP



GNSS Observation of Geodetic Marks



In order to enable the block adjustment of the new RGN configuration, GNSS observations were carried out in static mode of 130 geodetic vertices with connection to ReNEP.



ReNEP data for International Networks:

- 3 CORS for the International GNSS Service (IGS)
- 7 CORS for the European Permanent Network (EPN)
- 47 CORS for European Plate Observation System (EPOS)
- 47 CORS for the EPN densification network

DGT - Tide Gauges

- Definition of the vertical reference
- Determination of mean sea level



Datalogger



Radar sensor

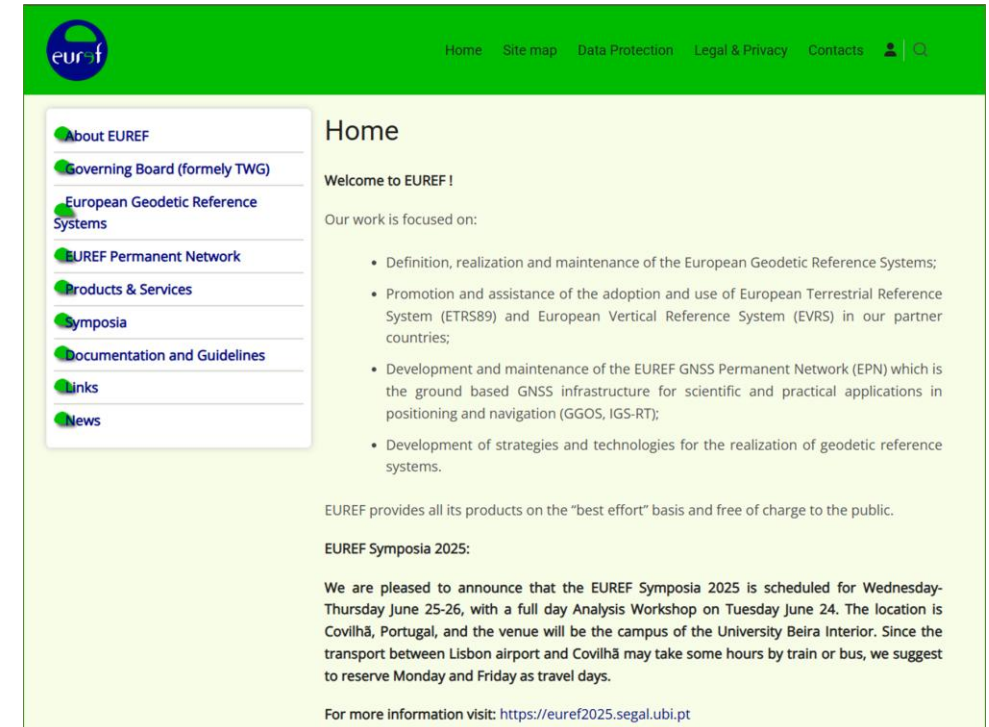
Annual observation with High Precision Geometric Leveling for checking the stability of reference marks



- RADAR technology for water leveling sensors
- Real-time data logging and uploading data to DGT servers and other users
- Sensors for measuring water temperature, air temperature and pressure

EUREF Web Page

<https://www.euref.eu/>



Regional Permanent GNSS Stations Networks

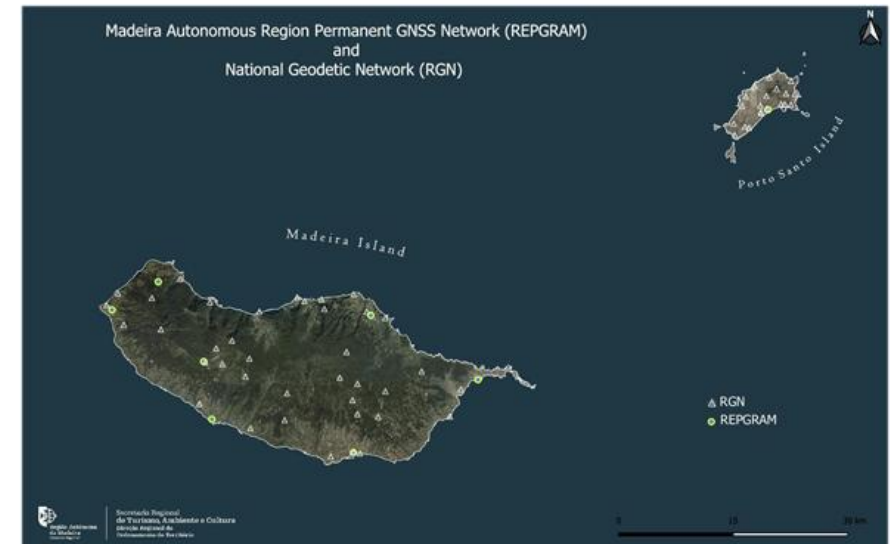
Azores Region

REPRAA (Açores CORS Network)



Madeira Region

REPGRAM (the Madeira CORS Network) and Geodetic Marks observed in 2025





Kingdom of Belgium

National Report



National Report of IGE Spain

Miguel González Hidalgo¹ (mghidalgo@transportes.gob.es), Esther Azcue Infanzón¹, José Antonio Sánchez Sobrino¹

Spanish GNSS Permanent Stations Network (ERGNSS)

The **Network of GNSS Permanent Stations of Spain (ERGNSS)** consists of more than 120 permanent GNSS stations distributed throughout the national territory. 26 stations are integrated into the **EUREF Permanent GNSS Network**, and 9 stations are part of the **IGS Network**.

This year 5 stations have been included on the IGS network: **ALAC, CACE, CANT, MALL and RIO1(00ESP)**.

IGN also operates 8 permanent stations in Antarctica and 40 more in Canary Islands for volcanic monitoring.

All data are available via HTTPS server in daily (30-second rate) and hourly (1-second and 30-second rate) data products.



Fig. 2. Antarctic campaign



Fig. 1. ERGNSS Network

Additionally, GNSS data from 317 stations are provided through the national EPOS data node.

Real Time Positioning Service (SPTR)

A real-time positioning service is provided to users **free of charge**, offering centimeter-level accuracy. This service delivers consistent and continuous coverage across Spain, operating **24-hours** a day. It is based on a network of 270 GNSS stations, including both IGN stations and those from regional networks.

The service provides different solutions: VRS, MAC, FKP or NEAREST network bases and single station.

It is a multi-constellation service: GPS, GLONASS, GALILEO and BEIDOU.

In 2025 the service is used by over 16000 users, and the number is growing.

More than 60% of users belong to the agricultural sector. Other key applications include:

- Topography
- Civil Engineering
- Geographic Information Systems (GIS)
- Precision navigation

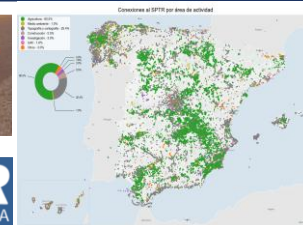


Fig. 3. SPTR Connections by area of activity

IGE GNSS Analysis Centre

International projects

- As a **Local EUREF Analysis Centre**, IGE processes a subnetwork of 99 EPN stations. This year two additional stations, AAER00FRA and IGNP00FRA, were added. IGE contributes to EPN by providing positions and tropospheric parameters in final (weekly and daily) and rapid (daily) solutions.
- Additionally, IGE is contributing to **EPN Repro-3**, submitting in October 2024 the reprocessed historical data covering the period from 1996 to 2022.
- Since 2008, through the **E-GVAP Project [1]**, the AC is delivering near real-time ZTD data from approximately 350 stations across Spain and Portugal, in two different solutions.

National projects

- The **IBERRED Project** comprises the analysis of around 430 stations distributed across Spain and its surrounding regions. IBERRED main goals are geodetic and geodynamic, providing precise geocentric coordinates, temporal series and tropospheric data (ZTD). This solution is sent to the **EPN-D Project**.
- Another initiative is the **assessment of the national coordinates** of the GNSS stations in Spain, combining the solutions processed by different organizations (IGE, ICGC, ITACYL).



Fig. 5. Stations processed in E-GVAP Project

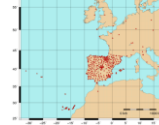


Fig. 6. IBERRED Project - Processed Network

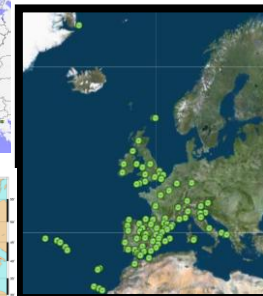


Fig. 4. IGE EUREF Network

All these projects are performed using **Bernese software (version 5.4 [2])** processing GNSS data.

IGE VLBI Analysis Centre

Since IGN was designed as an Official **IVS Analysis Centre** in 2020, 24-hour R1, R4 and VGOS sessions have been routinely processed. The contributions include participating in the ITRF2020 update, and maintaining historical dataset processed.



Fig. 7. VLBI antennas in Yeves Observatory

The analysis is performed using **Where [3]** and **VieVS [4]** software. In addition, collaborative research with the University of Alicante is conducted on topics such as Earth Orientation Parameters (EOP) prediction using machine learning or RAEGE data exploitation.

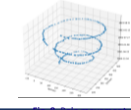


Fig. 8. VLBI observation geometry

SLR Analysis Centre

A new SLR station at Yeves Observatory is operational and has joined the ILRS. With this system the observatory becomes a **GGOS Core Site** (VLBI, SLR, GNSS, local-tie, gravimetry).



Figs. 9-10. SLR Station in Yeves

Since 2020, IGN operates an **ILRS Associated Analysis Centre**, IGN-Yebes, providing to the ILRS centre of mass corrections for geodetic satellites and performing QC solutions to monitor the Yeves station.

¹ National Geographic Institute of Spain, Madrid, Spain

[1] The EUREFNET for GNSS water vapour programme, wvnet.dmi.dk
[2] Bernese, P. et al. (2018) Bernese GNSS Software Version 5.2 User manual, Astronomical Institute, University of Bern, Bern Open Publishing. DOI: 10.7892/born.72297. ISBN: 978-3-039018-05-6
[3] Gries, A. et al. (2017) Where - A New Software for Geodetic Analysis, 23th EUGA Working Meeting & IAGG IVS Analysis Workshop.
[4] Böhm, J. et al. (2018) Vienna VLBI and Satellite Software (VIVS) for Geodesy and Astrometry, Publications of the Astronomical Society of the Pacific, vol. 130(986), 944503.



National report of Serbia

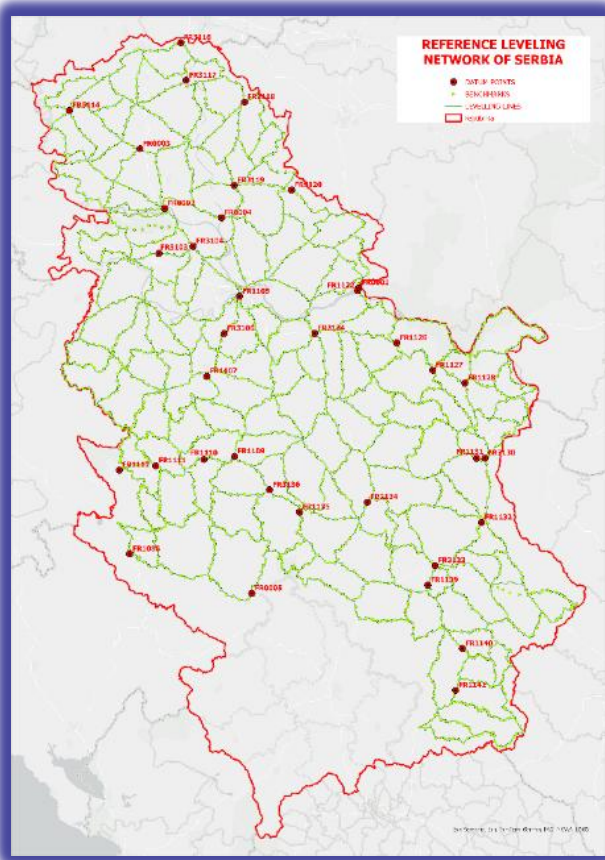
J. Matić Varenica, F. Kostadinović



REPUBLIC GEODETIC AUTHORITY
OF SERBIA



ACTIVITIES FOR COMPUTATION OF NEW SQM2026 FOR SERBIA

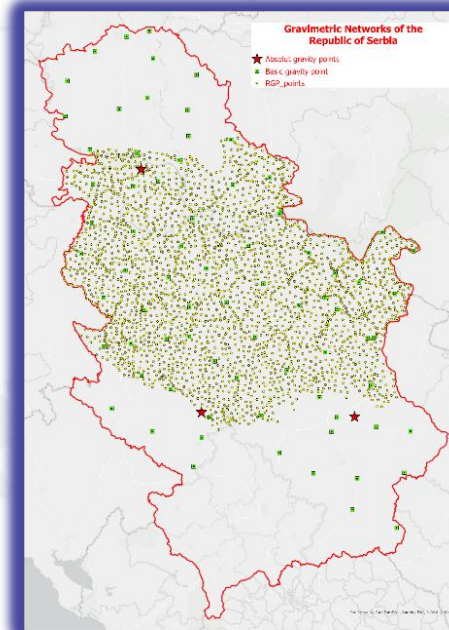
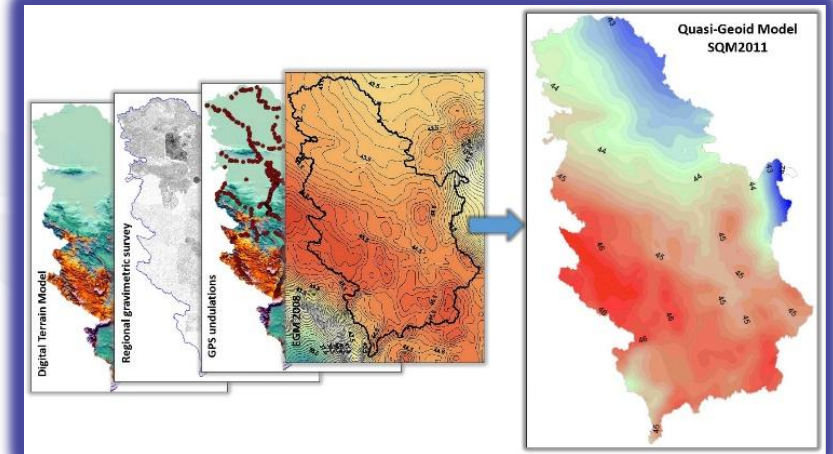


Serbian Quasi-Geoid Model - SQM2011

Reference Leveling Network of the Republic of Serbia

Gravimetric Network of the Republic of Serbia

NEW SQM2026 FOR SERBIA





NEW ACTIVITIES IN GNSS SECTION

New GNSS Regulation

AGROS Control Centre

Local Analysis Centre
(RGA LAC)

Регистар перманентних ГНСС мрежа

← ПОВРАТАК НА ПОИШТУ СТАНЦИЈА

	ИД	Име мреже	Организација	Датум регистрације	Датум последње регистрације	Позивни број	Адреса контролног центра	Организација	Напомена на доступне сервисе
	1	AGROS	Републички завод	15.12.2005.		Република Србија	БУЛЕВАР КОЛОДЗЕ МЕДИЈА 20 - БЕОГРАД (САВОЈИ ВЕНАЦ/САВОЈИ ВЕНАЦ)	Слава Левић	RTX.NET, TCOMING, REP_3.0, OK
	2	VelcomNet	Велко Гет д.о.о.	16.05.2019. 23.10.2024. - OK		Република Србија	ТОДРА ДИМИТРИЈЕВИЋ БЕОГРАД (ВОЈВОДИНА/ВОЈВОДИНА)	Горан Степановић	MAX, MAX, VRS, OK
	3	GeotafNet powered by GeotafARS	Гео Таф д.о.о.	27.11.2019.	9.10.2023.	Део територије Републике Србије по статусу КО	УСТАВНИКА 63/23- БЕОГРАД (ВОЈВОДИНА/ВОЈВОДИНА)	Станислав Васиљевић	СТАСИКА КО КОЈЕ ПОДРЖАВА МРЕЖА
	4	GeotafARS	Гео Таф д.о.о.	10.10.2023.		Република Србија	НИКОЛЕ УЗДОВИЧА 104- НИС (МЕДИЈА/МЕДИЈА)	Предраг Јовановић	Модерно опремљено мрежно станице

Врхунак: 4





Thank you for your attention

For additional information, please visit:

www.rgz.gov.rs

Email:

office@rgz.gov.rs

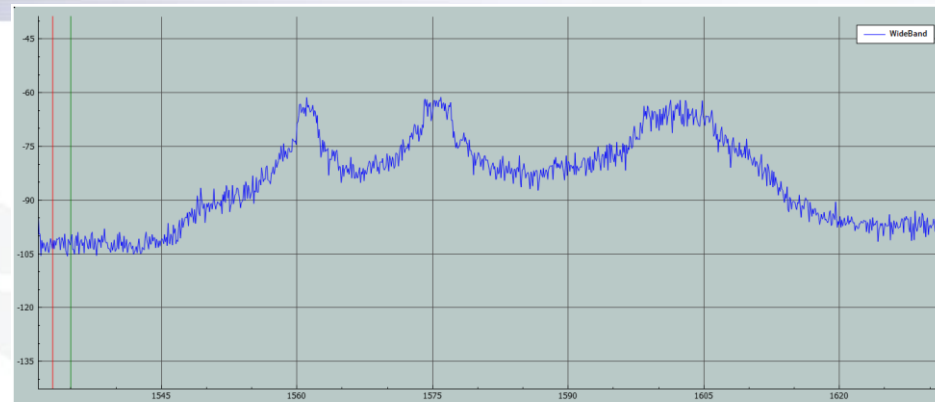
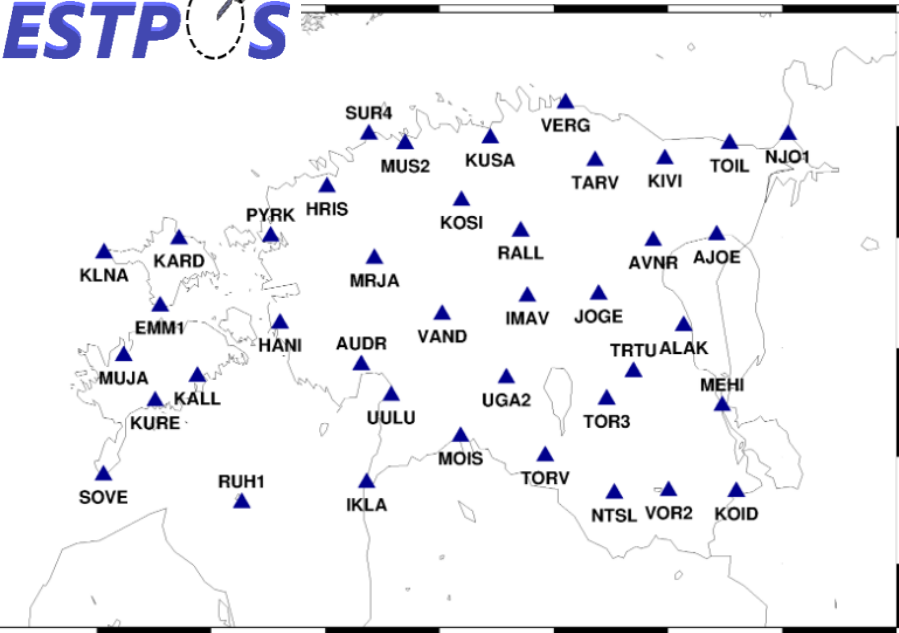
gs@rgz.gov.rs



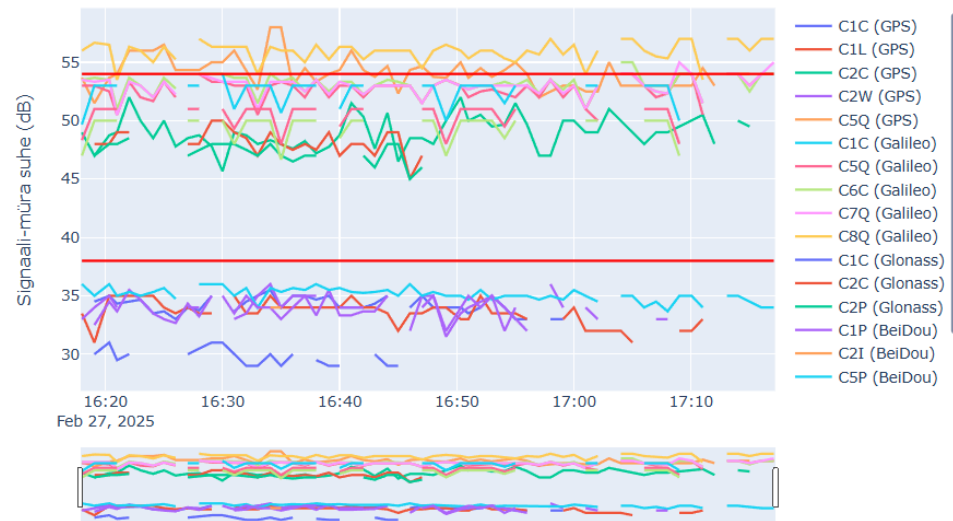
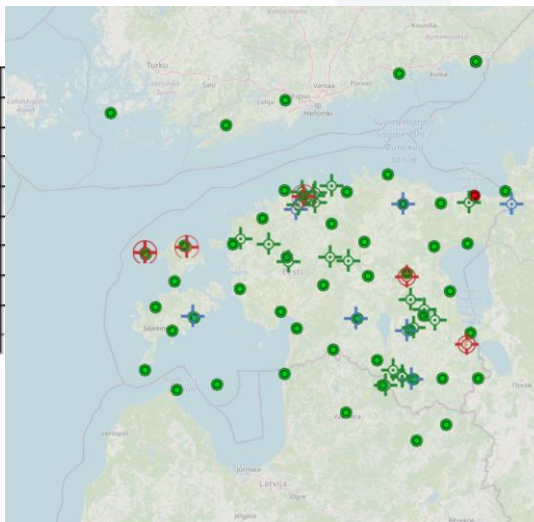
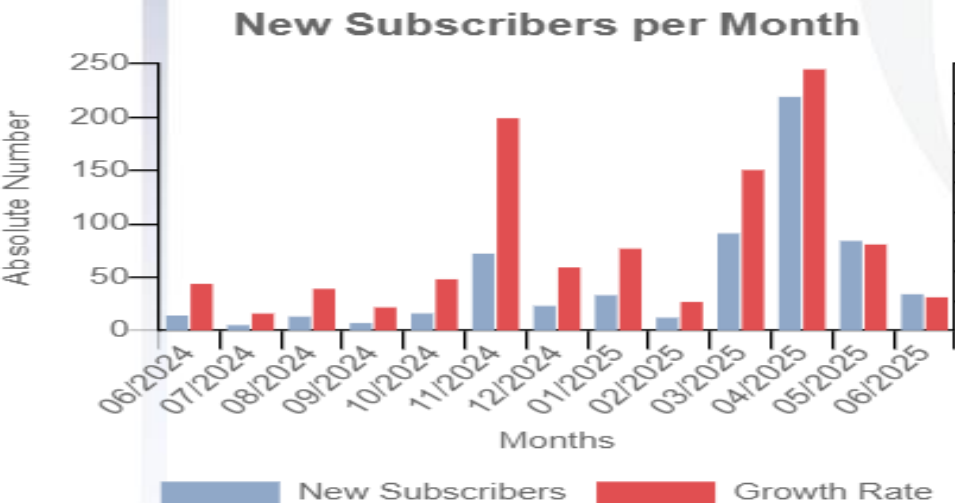
MAA- JA RUUMIAMET

National Report of Estonia

ESTPOS



Signaali-müra suhe



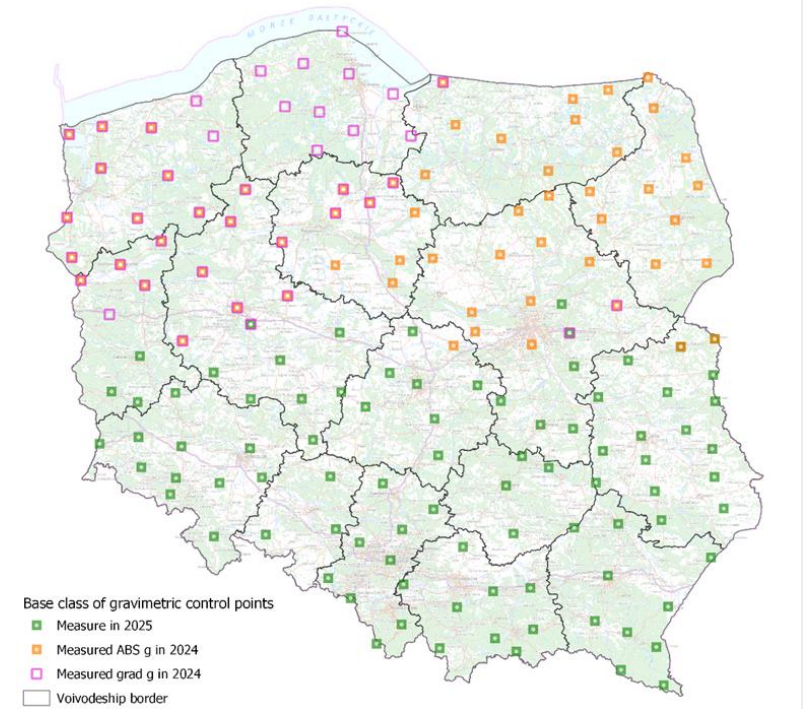
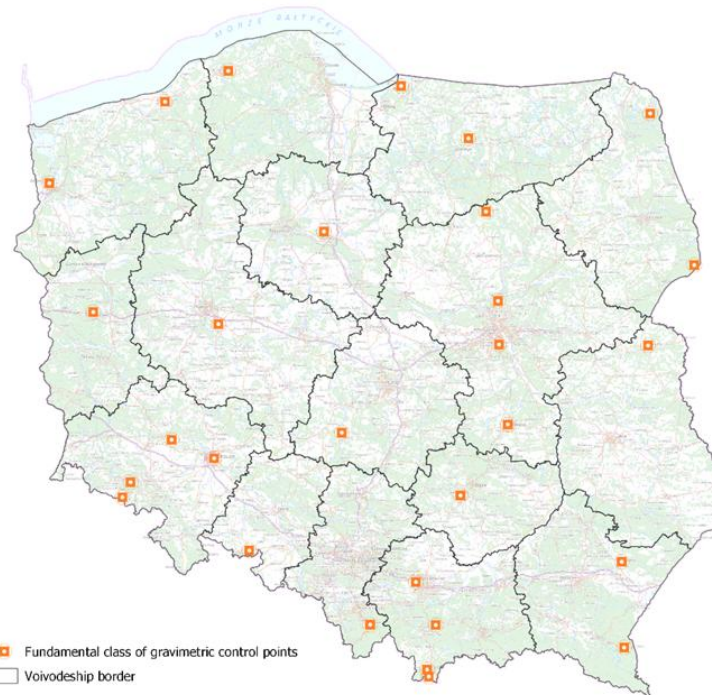
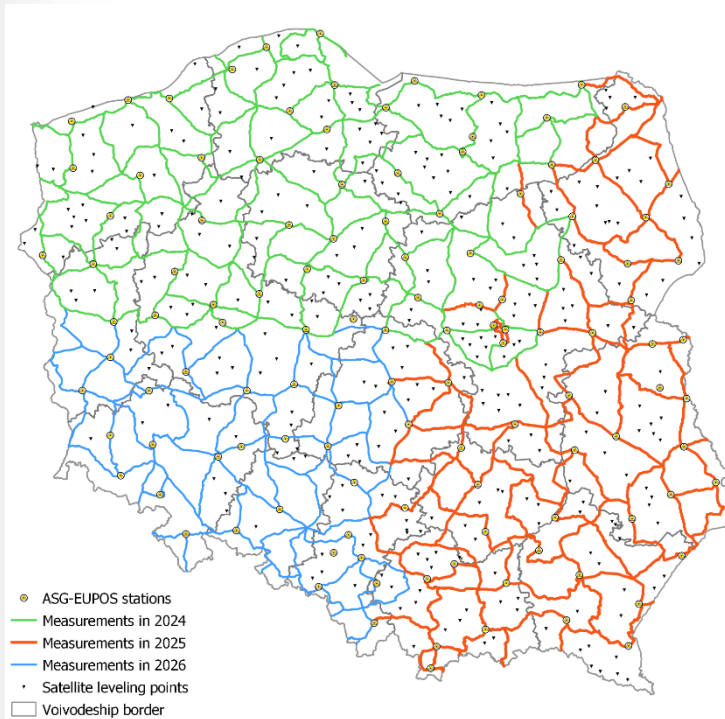
Funded by the European Union
NextGenerationEU



Investing
in your future

National Report of Poland

In 2024 Head Office of Geodesy and Cartography (GUGiK) continued works referred to National Registry of basic geodetic, gravimetric and magnetic control points about measurements of the basic **vertical** geodetic network and the **gravimetric** fundamental and basic control points.



National Report of Poland

The **ASG-EUPOS** system's station network has expanded by **13 new locations** – 11 in places with large distance to existing stations and 2 based on agreement with:

- Silesian University of Technology (GLIW)
- Tatra Volunteer Search and Rescue (ZAKO)

In consortium with the National Institute of Telecommunications, the **GUGiK** applied to the European Space Agency in the NAVISP-Element 3 programme for funding for a pilot project to build a real-time GNSS band interference monitoring system - **RTGMS**.



NATIONAL AGENCY FOR CADASTRE AND LAND REGISTRATION

National Center for Cartography



NATIONAL REPORT OF ROMANIA TO EUREF 2025

Miluță FLUERAȘ

Head of Geodesy and ROMPOS
miluta.flueras@cartografie.ro



ROMPOS CORS Network

Current status



50 receivers upgraded in 2024
(Jan 17th –Feb 6th)

24 receivers upgraded in June - July 2024
+20 stations from neighboring countries

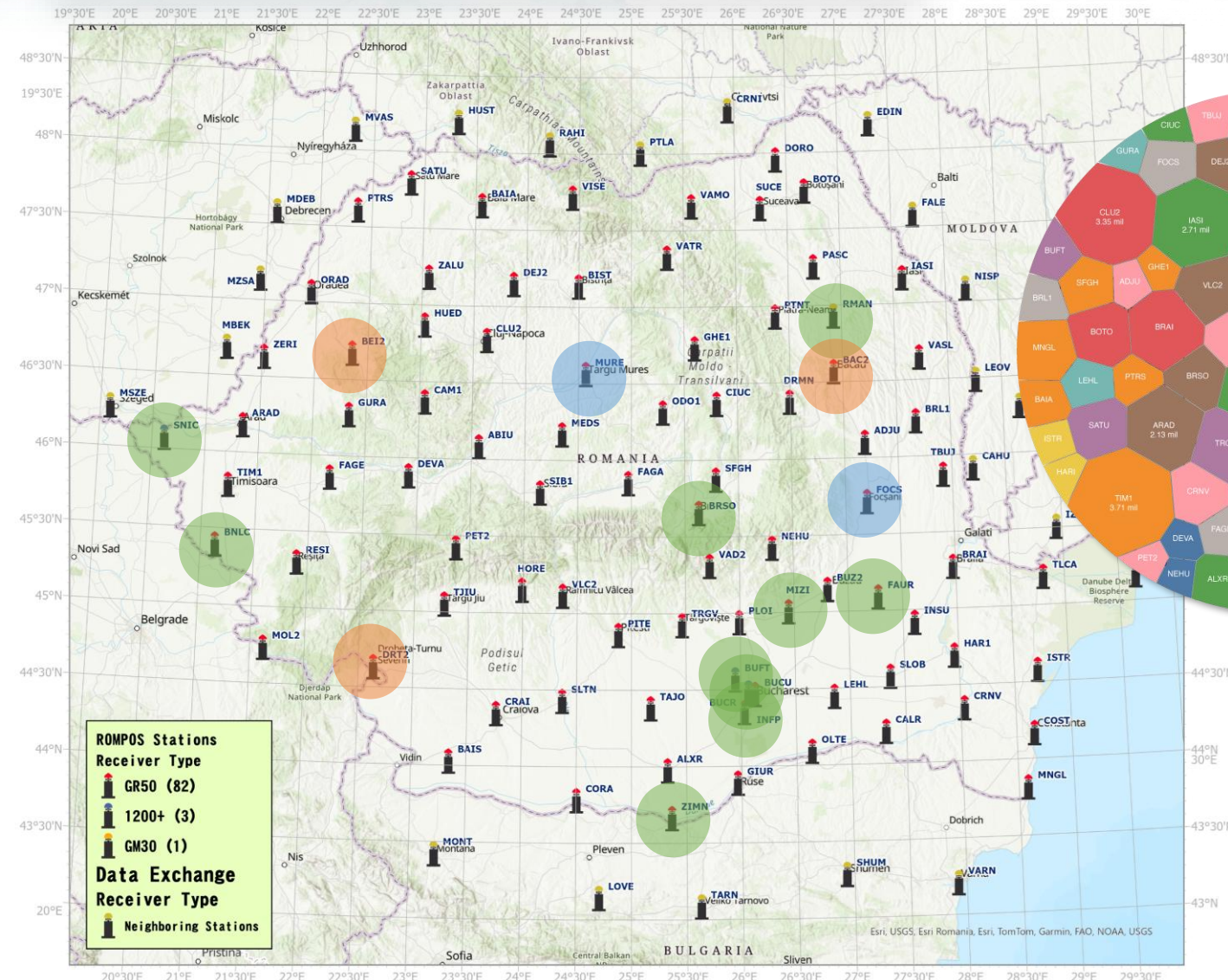
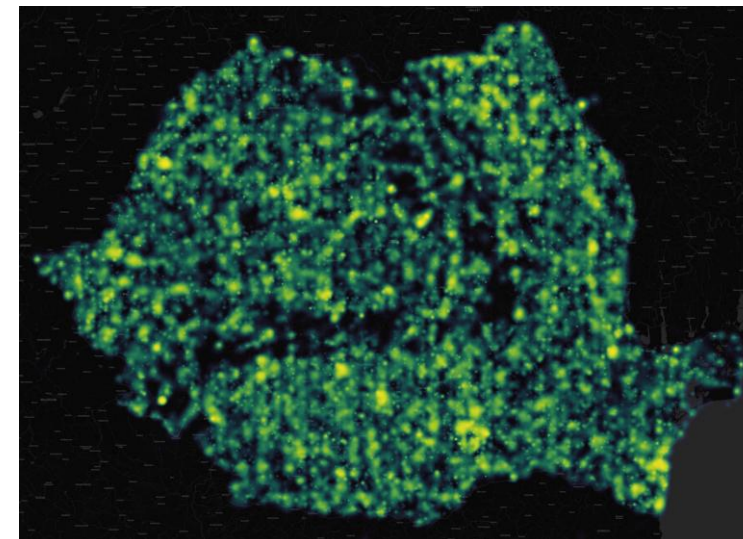
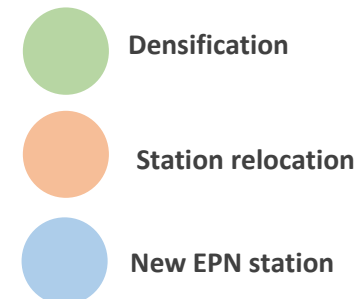
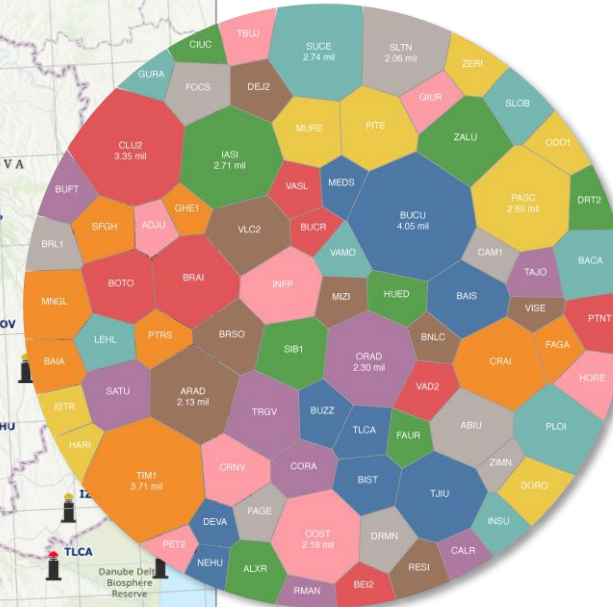
Signed data exchange agreement with Serbia

1 EPN station decommissioned (BACA)
2 new station integrated in EPN (FOCS and MURE)

11

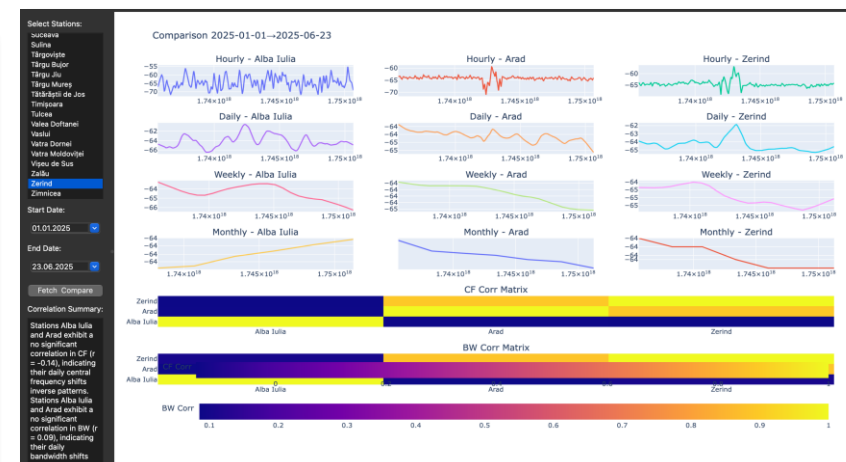
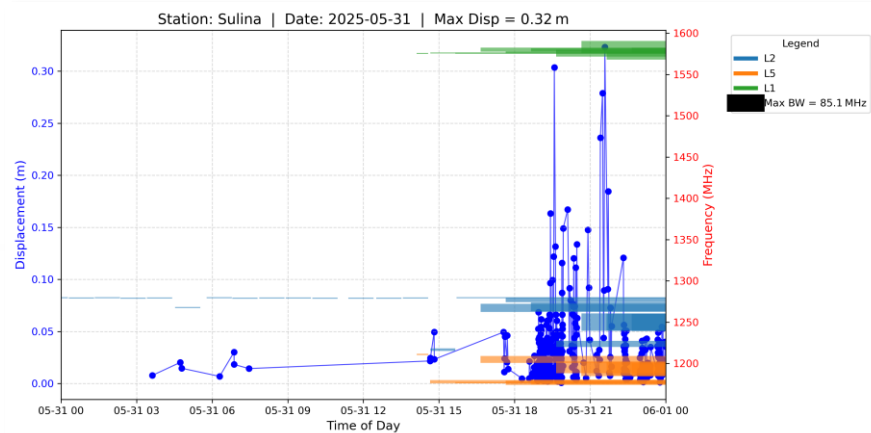
New stations

(82 Leica GR50) -74 with VADASE*
1 Leica GM30
3 Leica 1200+

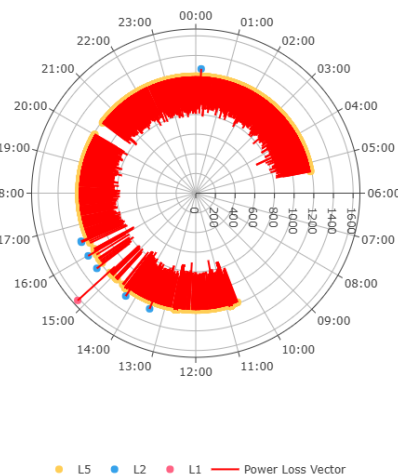


*Leica Velocity and Displacement Autonomous Solution Engine

Available at
<https://github.com/cartografie-ro/>



Constanța - 14 February 2025 - 1671 interference events



Abstract: Update of Geodetic Control in Lithuania (2025)

Ministry of Environment, National Land Service & Vilnius Gediminas Technical University"

Authors: Jokūbas Ogintas, Eimuntas Paršeliūnas, Saulius Urbanas, et al.

Publication: Results in *Geodesy and Cartography* journal

•CORS Network (LitPOS):

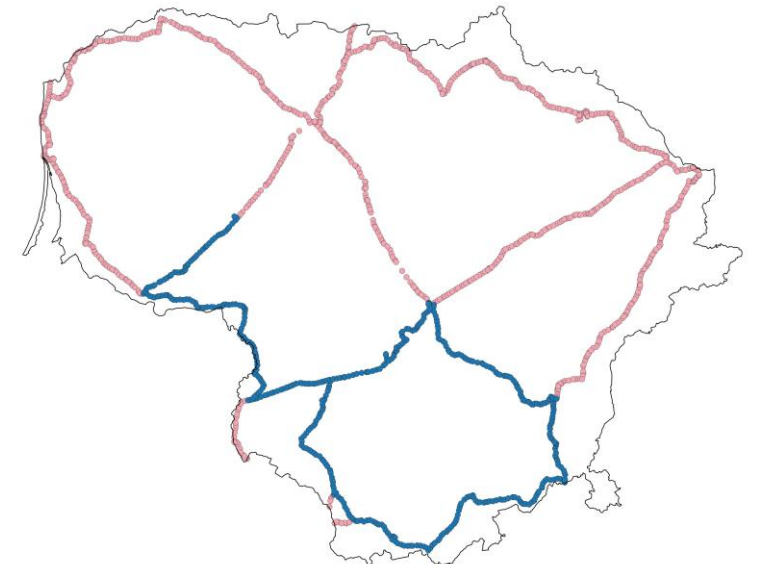
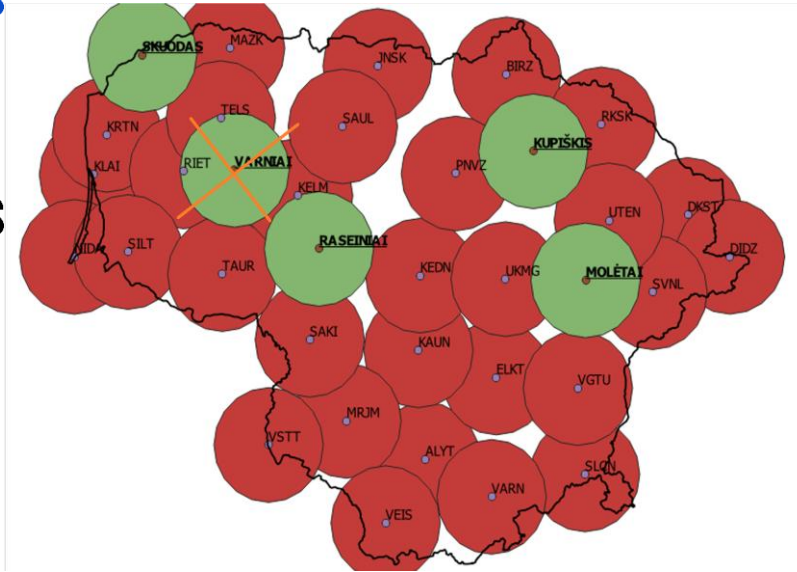
- 35 stations (Lithuania) + 6 LatPOS (Latvia) + 3 ASG-PL (Poland)
- Trimble R9 receivers, choke ring antennas, BERNESE 5.4 software
- ~2,200 users, ~6,000 rovers

•Vertical Network:

- Second levelling of first-order network (~2,000 km)
- 2024 updates shown in blue

•Gravity Survey:

- 2024 campaign: ~5,000 km coverage
- NZ55 & ZLS D13 equipment





National Report of The Netherlands 2025

Dutch Partnership for Geodetic Infrastructure (NSGI)

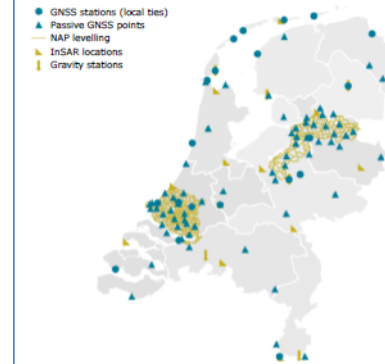


National report of The Netherlands 2025

Topics:

- Survey campaign 2025
- GNSS reprocessing
- NAP data quality control
- Caribbean Netherlands
- GNSS/levelling points (presentation)
- Reference frame validation (presentation)

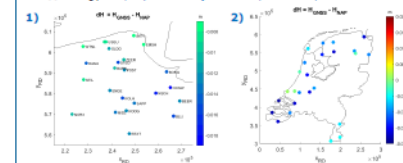
Survey campaign 2025



In 2025 the NSGI will survey 30 local ties, 66 passive GNSS points, 15 InSAR reflectors, 6 absolute gravity stations and perform 3000 km levelling.

GNSS/levelling of permanent stations

• Validation of the Dutch height transformation using permanent GNSS stations as GNSS/levelling points (see presentation by Alberts et al., EUREF2025).



Differences between transformed GNSS heights and levelled NAP heights for 1) IGRS network (std.dev = 0.3 cm) and 2) Nationwide GNSS network (std.dev = 0.6 cm).

Reference frame validation

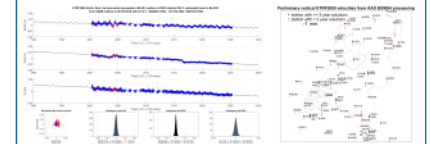
• Validation of the reference frame provided by the products of GNSS service providers using the Grid Check approach (see presentation by Huisman et al., EUREF2025).



Collaboration with the Ordnance Survey and a provider in Great Britain to test the Grid Check method in a larger country than the Netherlands.

GNSS reprocessing

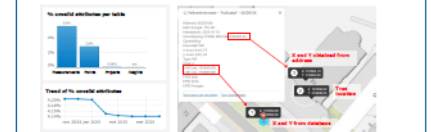
A reprocessing of Dutch GNSS stations was started using the IGS Repro3 products and Bernese GNSS software version 5.4. The strategy is similar to the EPN-Repro3 strategy, e.g. using GPS, GLONASS and Galileo observations, antenna type Calibrations, the FEIG2014b ocean loading model, VMF1 for atmospheric mapping. Atmospheric tidal loading is applied and the solutions are minimally constrained to IGS20 reference frame stations. The network design was done in close collaboration with colleagues from the National Geographic Institute (NGI) of Belgium. A common set of fiducial IGS reference frame stations was selected and includes the EPN stations in Belgium as well as a selection of the Belgian nation wide GNSS network close to the Dutch border.



Available time series for station DELF (left) and preliminary vertical velocities for the processed stations in and close to the Netherlands (right).

NAP data quality control

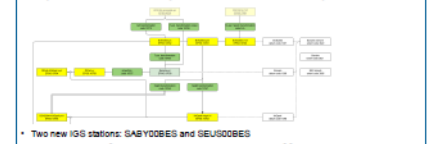
• Dashboard: The NAP database contains heights, measurements and benchmark information dating back to 1975. To improve and maintain the high quality of the data, an automated periodic quality assessment has been developed. Using a range of selected attribute rules the validity and consistency of the database tables can be checked and visualised on a dashboard.



• XY locations: Many NAP benchmarks lack accurate xy coordinates. By using the registration of addresses and buildings (BAG), xy coordinates can be checked and improved automatically.

Caribbean Netherlands

• CRSs and transformations via EPSG Geodetic Parameter Dataset in GIS software



• Two new IGS stations: SIBY00BES and SEUS00BES

• Experiment: Mean Sea Level model by vessel-based PPP-GNSS measurements



Elipsoid height of MSL near Sabia in a 1st-order model (left) (M.P.J. Peeters, 2024), and overview of SEUS00BES (right).

