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ŽEMĖS ŪKIO MINISTERIJA



**VILNIUS  
TECH**

Vilnius Gediminas  
Technical University



# NATIONAL REPORT OF LITHUANIA TO NKG General Assembly 2022

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University*

**NKG General Assembly 2022, Copenhagen,  
2022-09-08**

# Content

## WG Reference Frames

- CORS Network **LitPOS**
- Vertical network

## WG GEOID

- Gravity survey
- Marine gravity survey

## WG Geodynamics

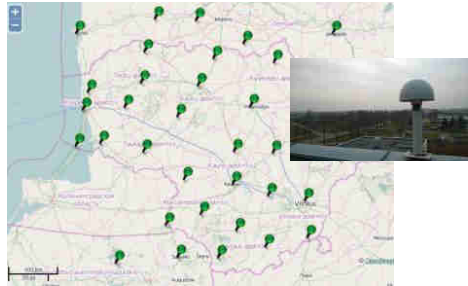
### AOB

- Harmonization of Lithuanian and Latvian geodetic systems
- Geomagnetic secular variations





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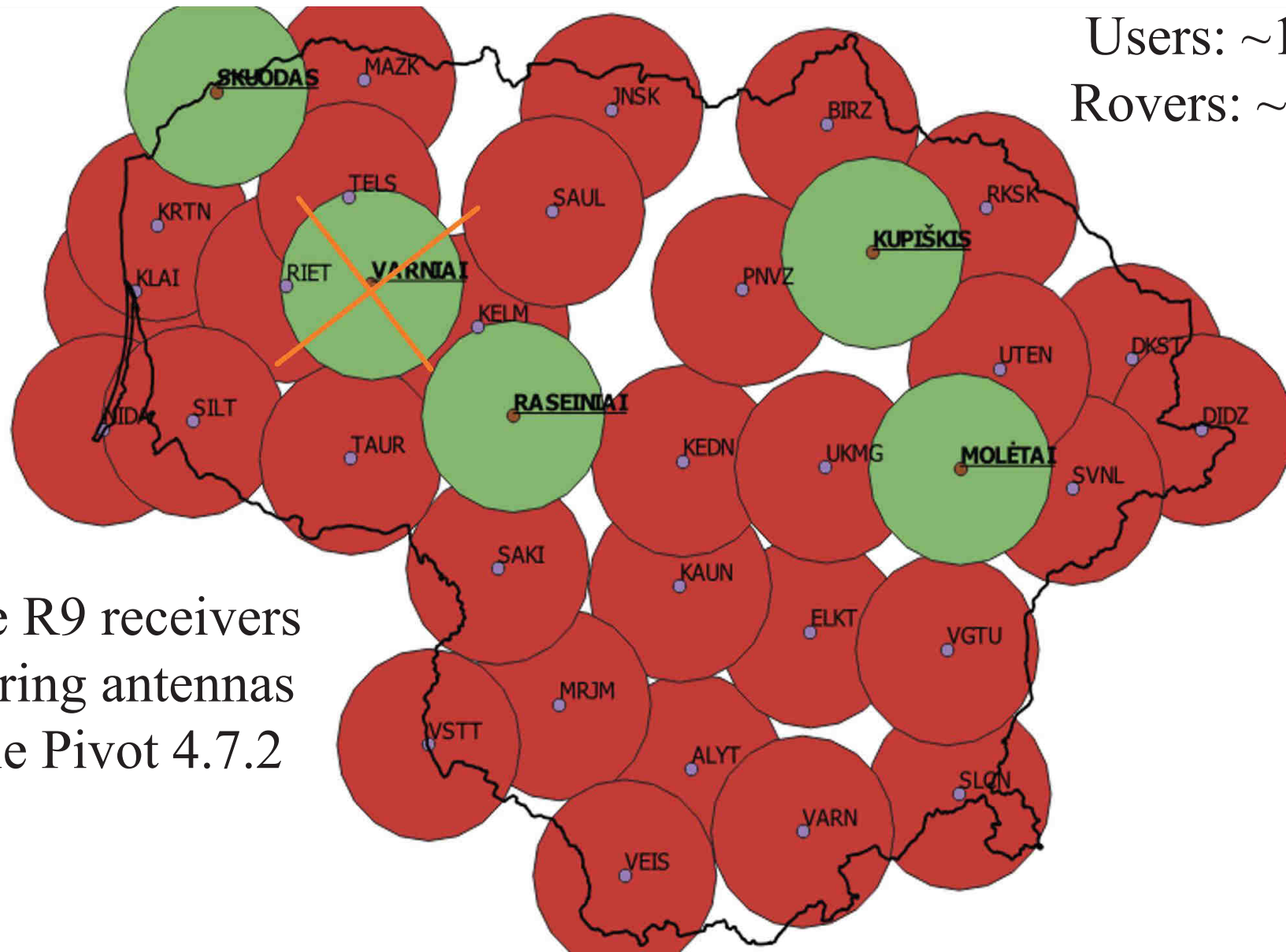


- CORS Network **LitPOS**



## LitPOS new stations (31+4)

Users: ~1900  
Rovers: ~5000



Trimble R9 receivers  
Choke ring antennas  
Trimble Pivot 4.7.2

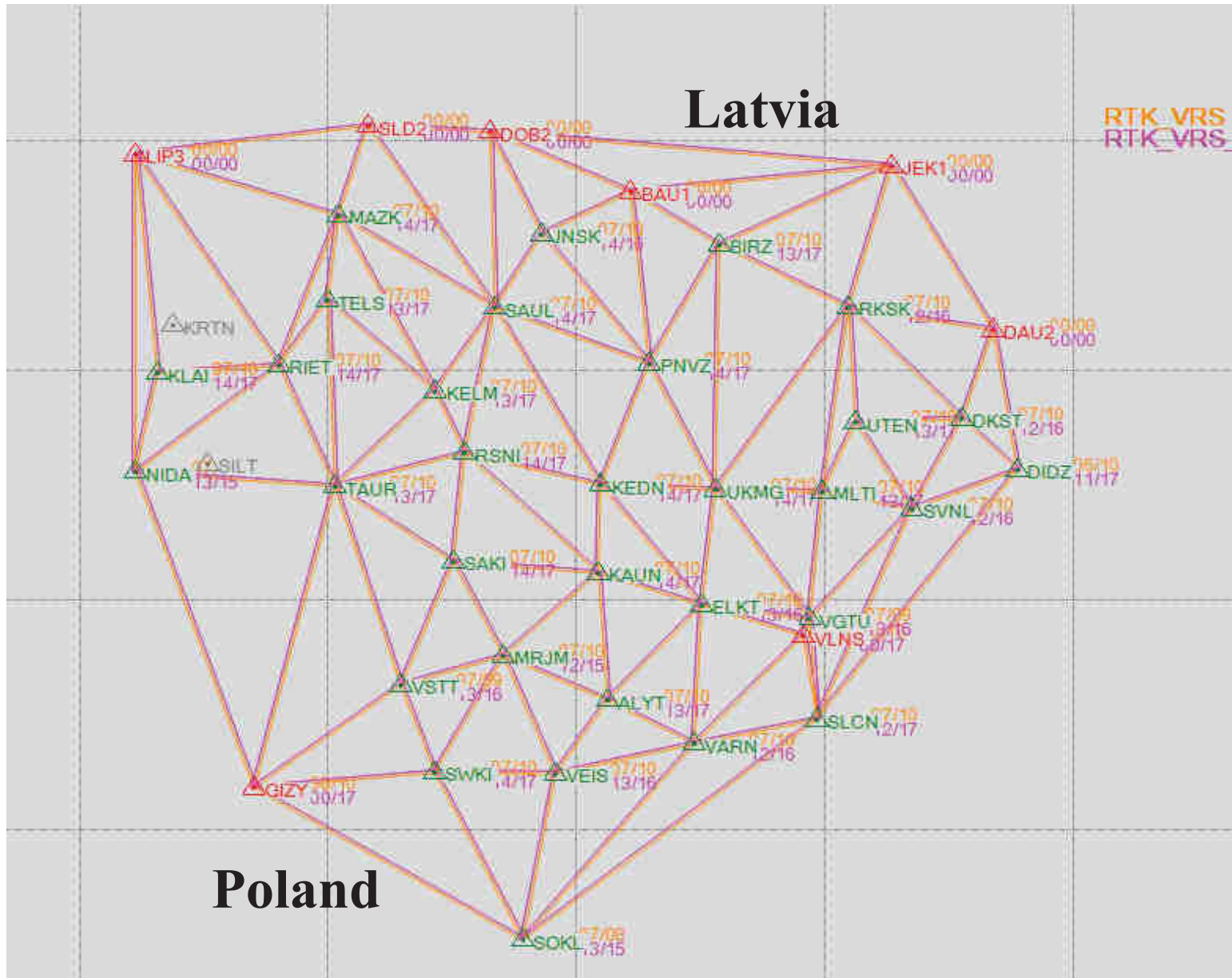
# LitPOS connections





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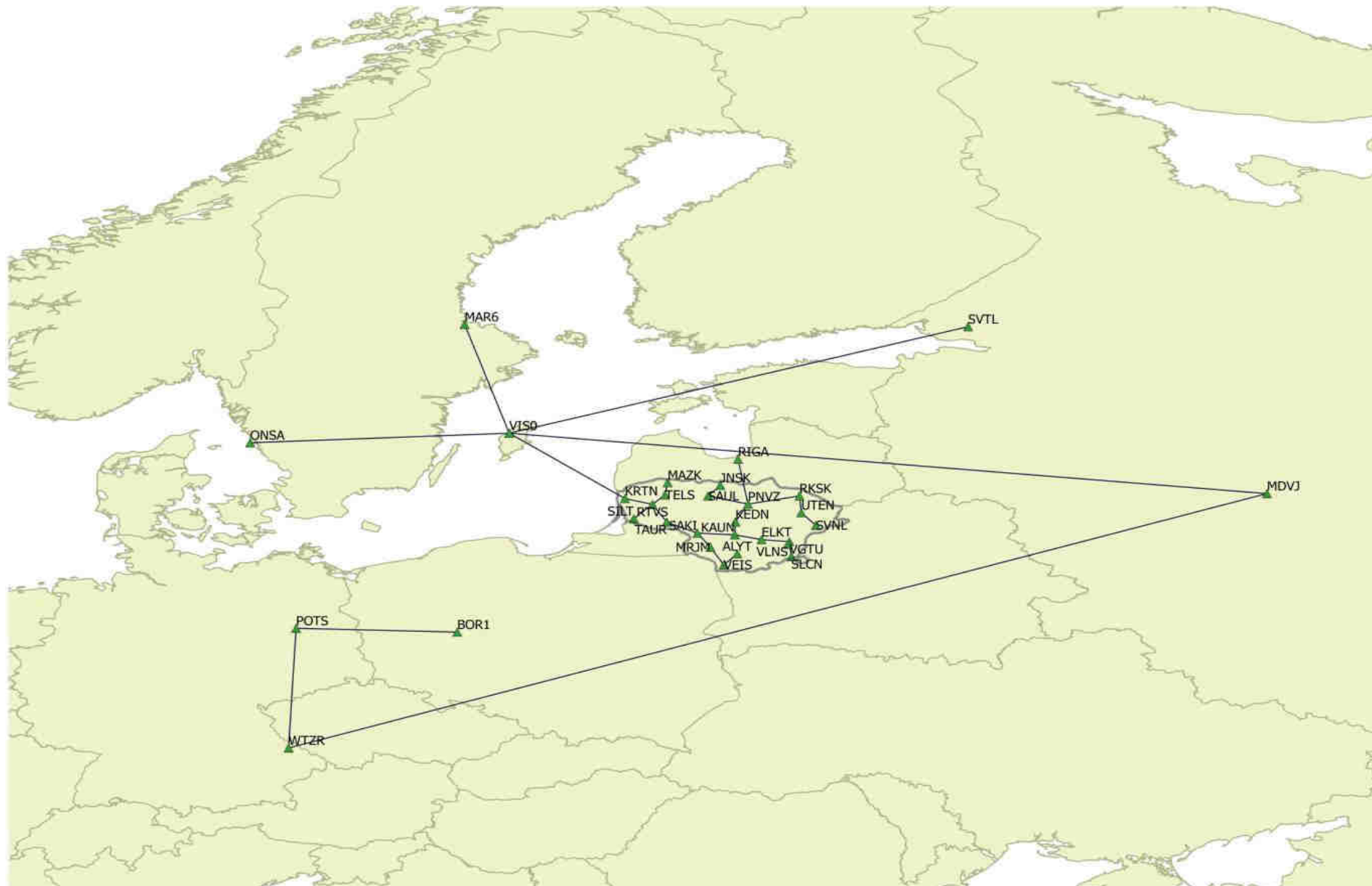
# LitPOS connections





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# LitPOS processing



# LitPOS processing

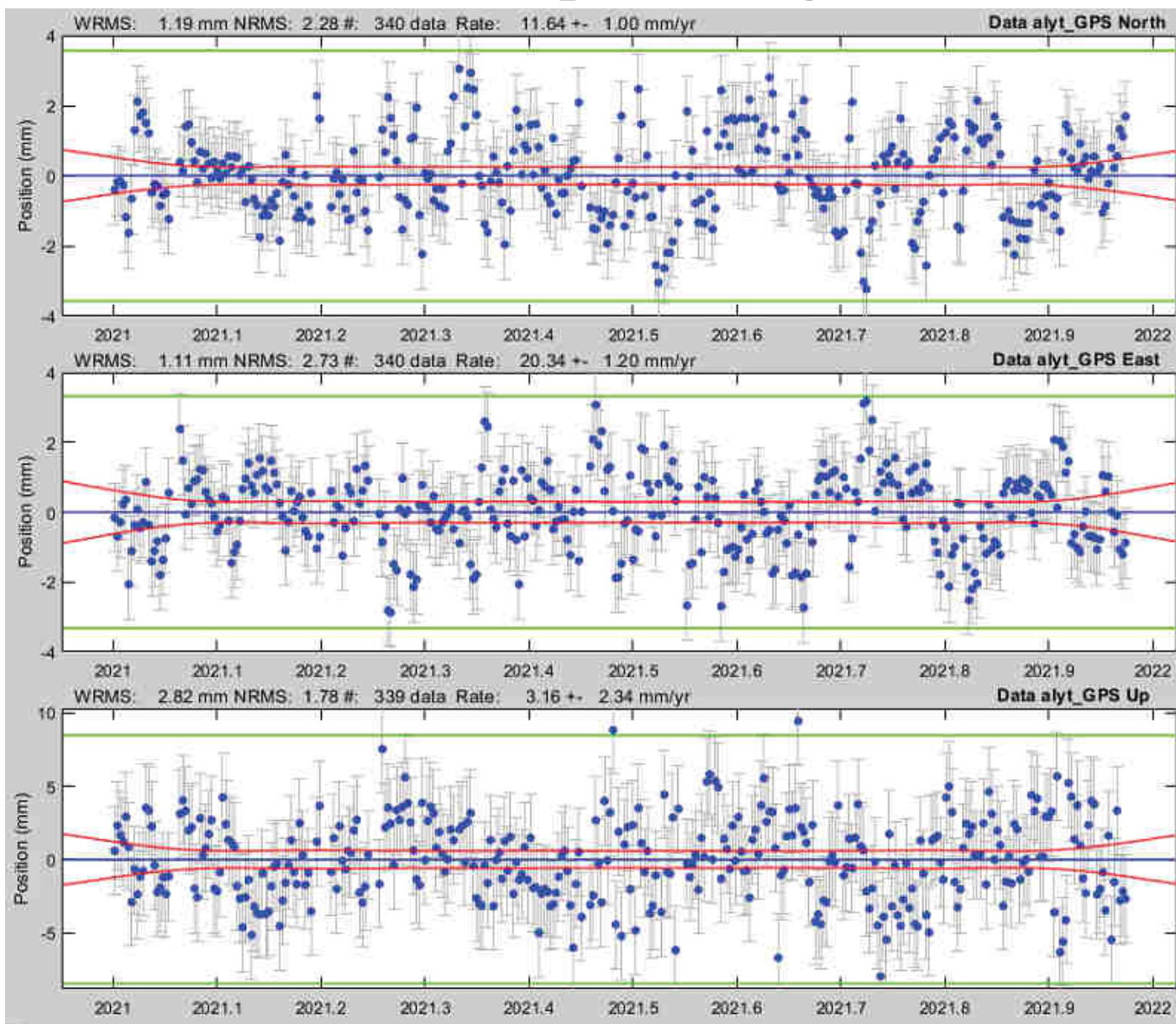
- **Operational processing** started from **GPS week 1934**.
- Currently working on **2220** week processing.
- Manual processing ☹️
  
- **2008-2021 weekly SINEX** files (with **COV matrix**) was uploaded to **EPN ftp server** with intention to fill the gap of Lithuania in European dense velocity field.



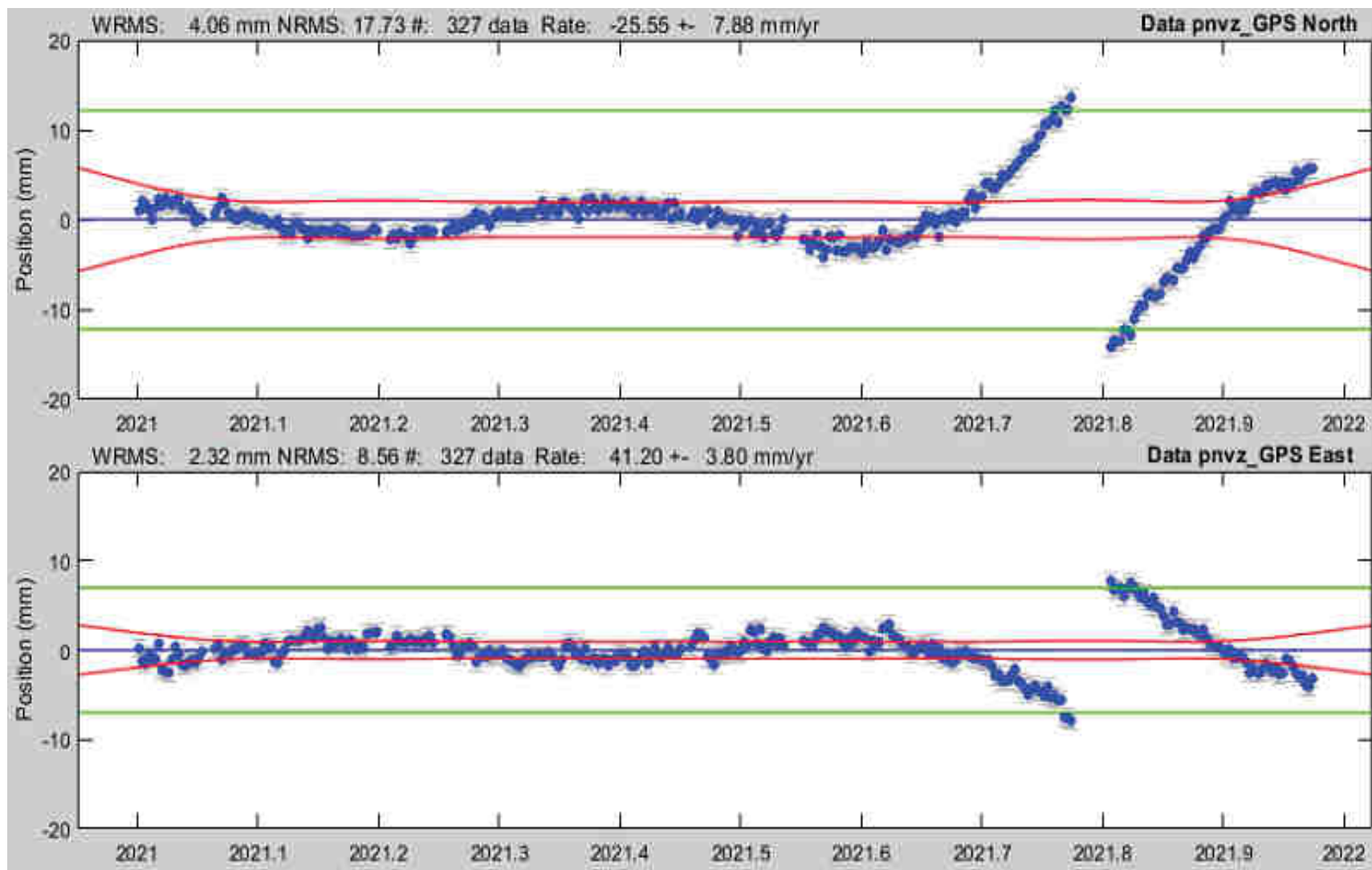


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# LitPOS processing

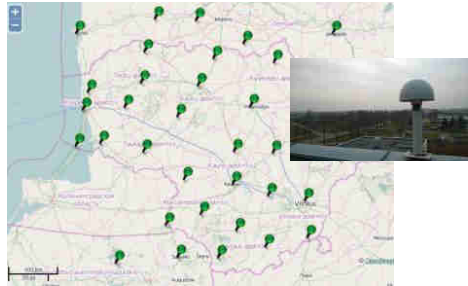


# LitPOS processing





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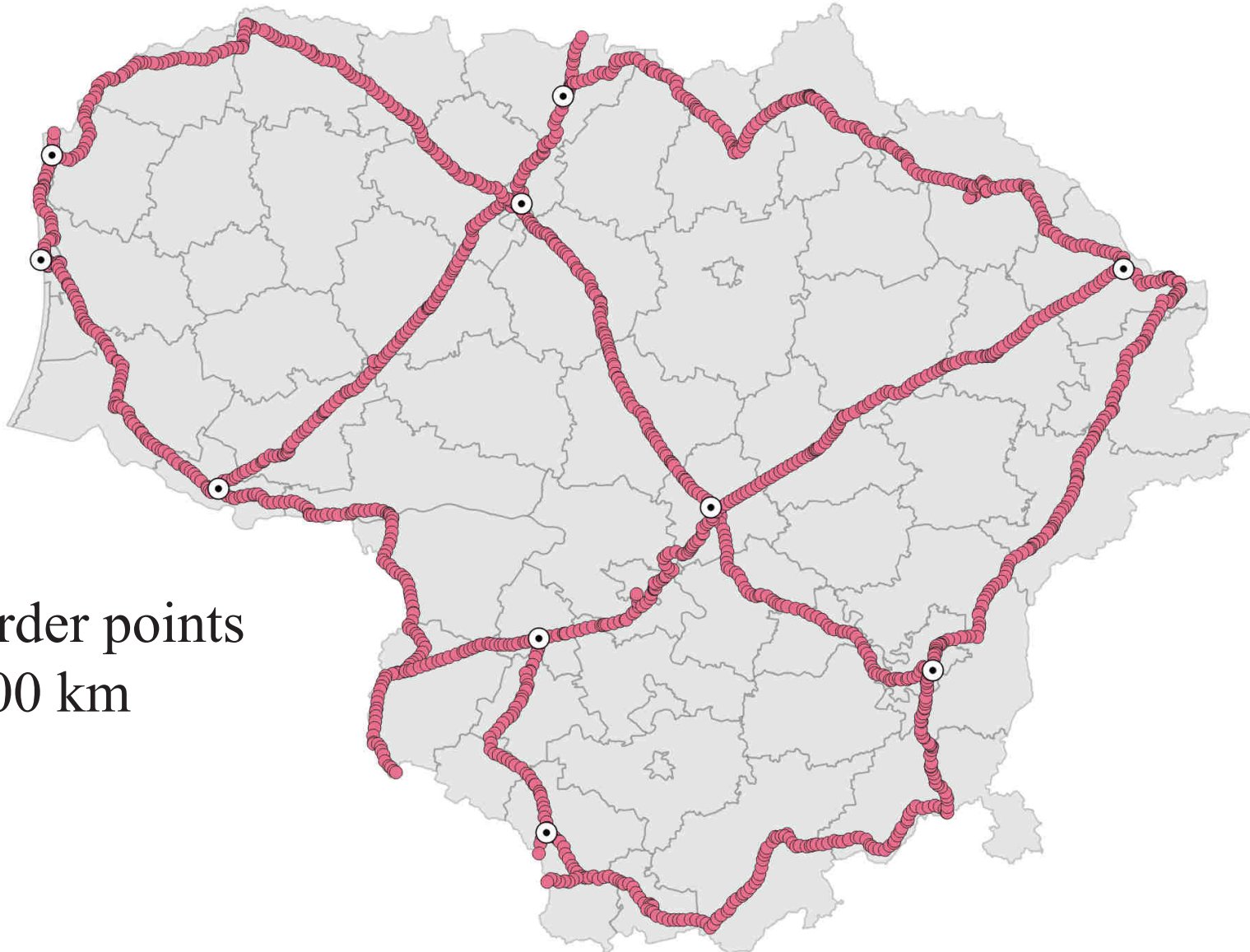
- Vertical Network





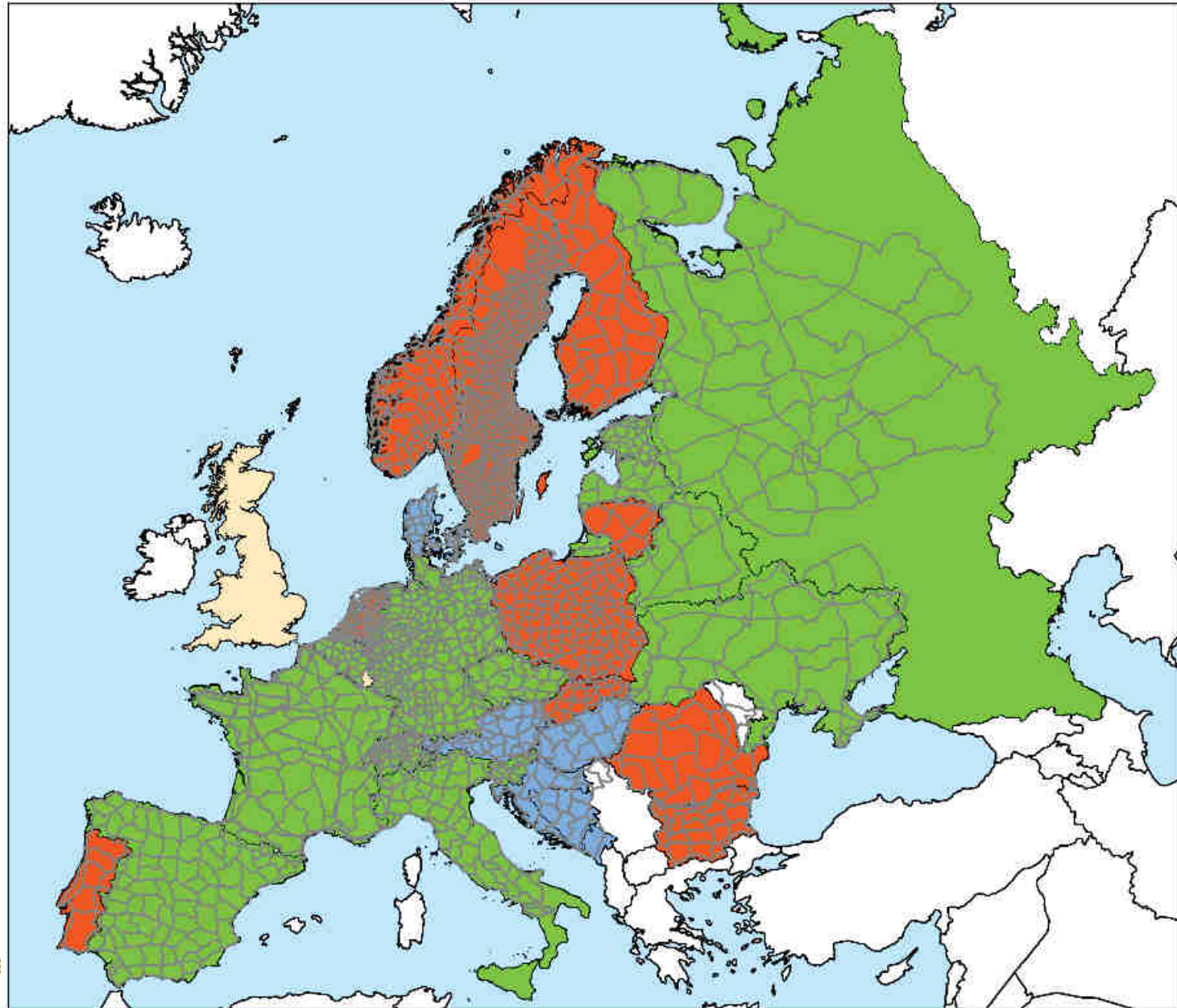
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# The Zero and 1<sup>st</sup> order Vertical Networks of Lithuania



10 zero order points  
~1800 km

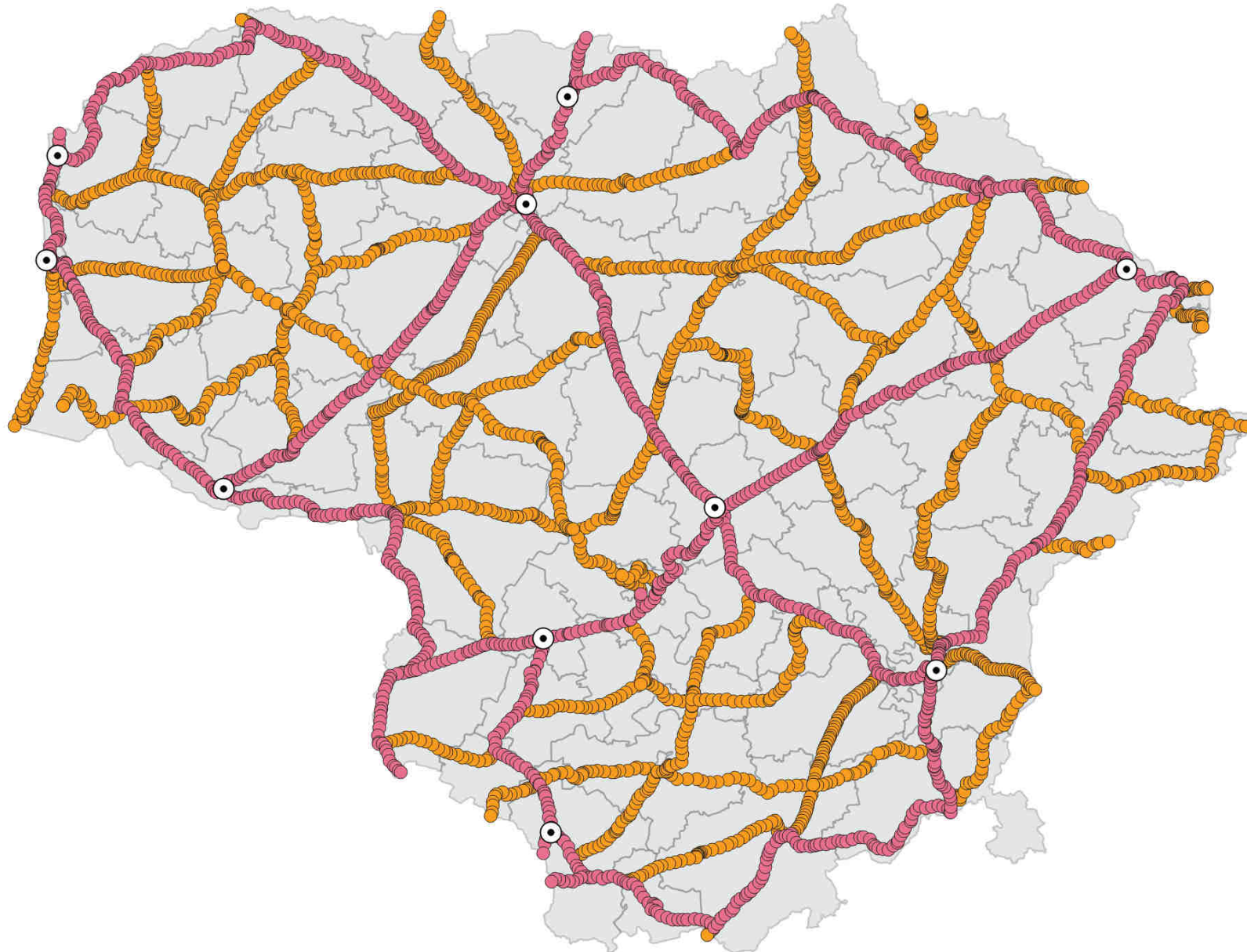
# The Zero and I<sup>st</sup> order Vertical Networks of Lithuania – part of **UENL**



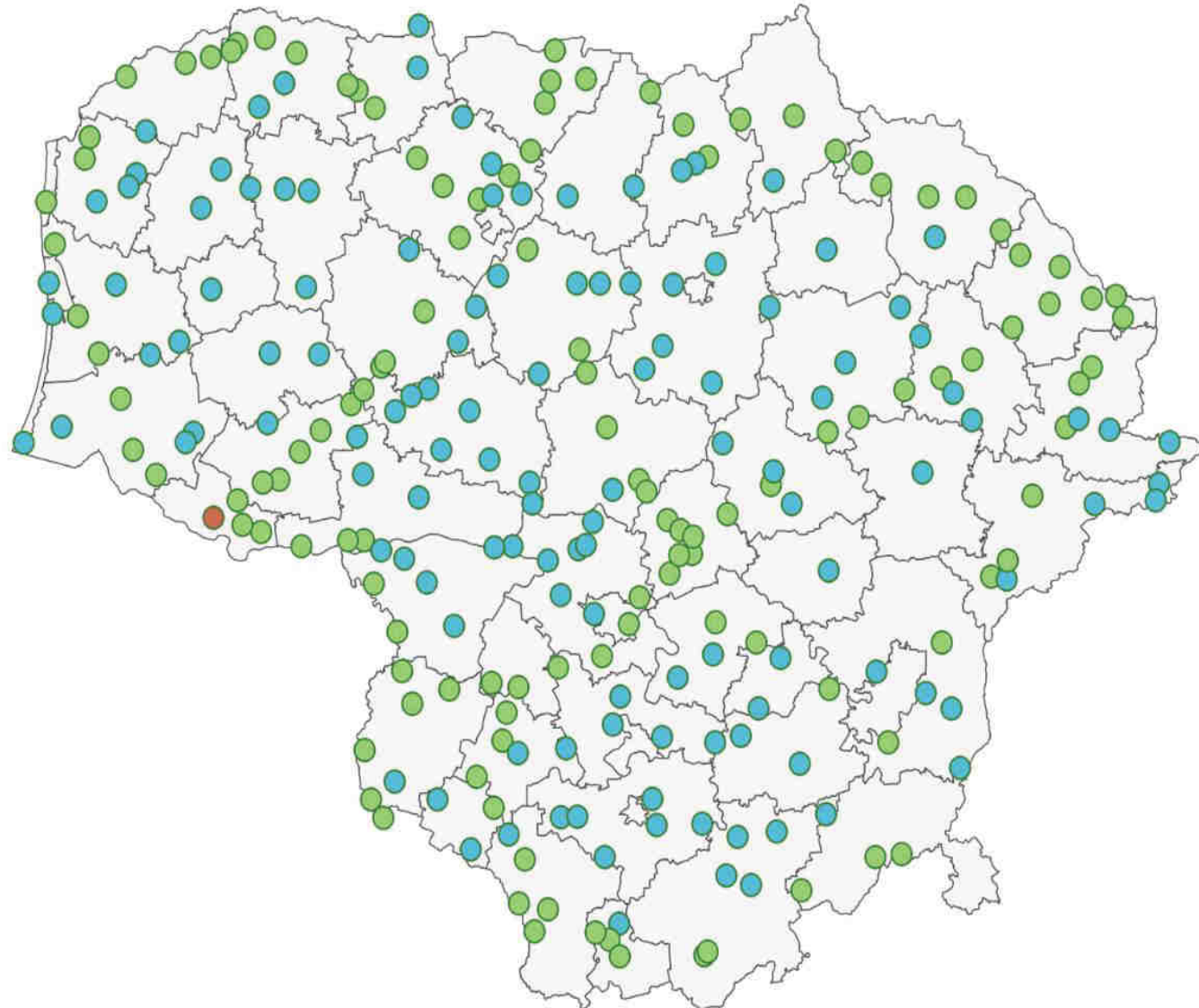


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## II<sup>nd</sup> order Vertical Network of Lithuania



# Determination of Ellipsoidal heights of First and Second order vertical networks points (250)

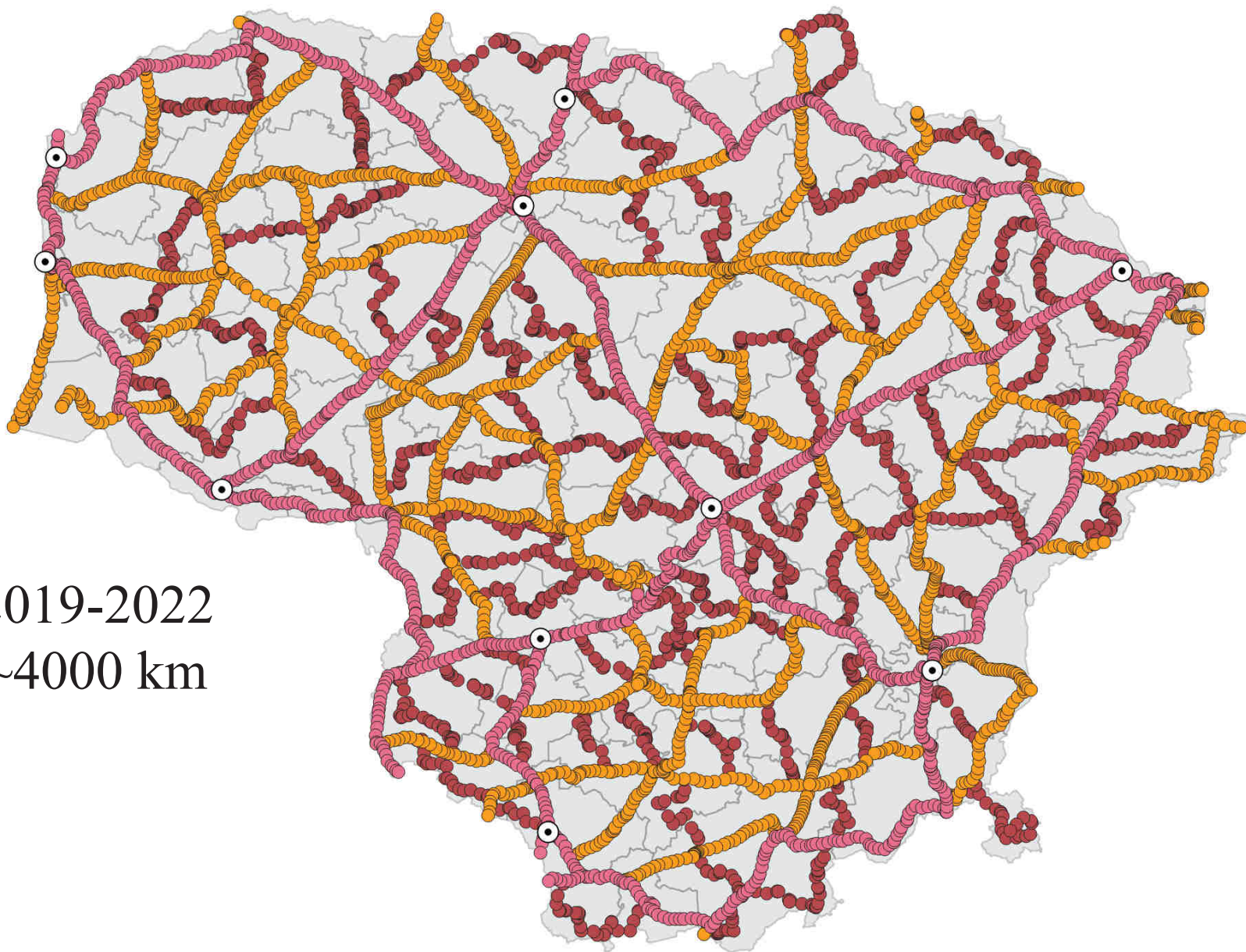


- 0 – red
- 1 – green
- 2 - blue



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## III<sup>rd</sup> order Vertical Network of Lithuania

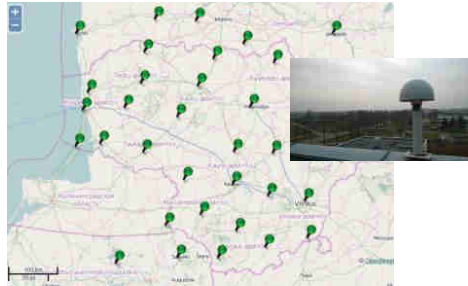


2019-2022  
~4000 km





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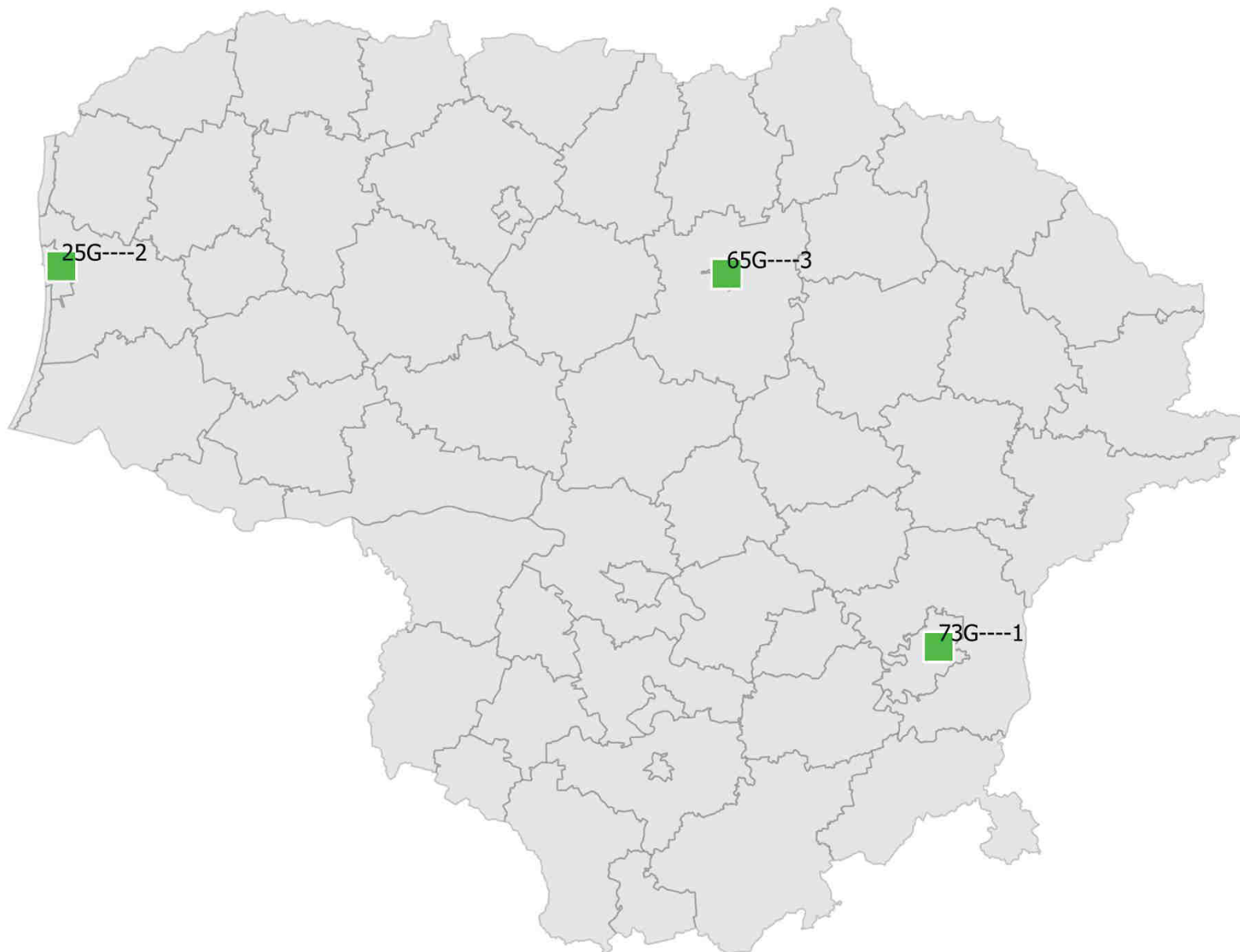
- **Gravity survey**



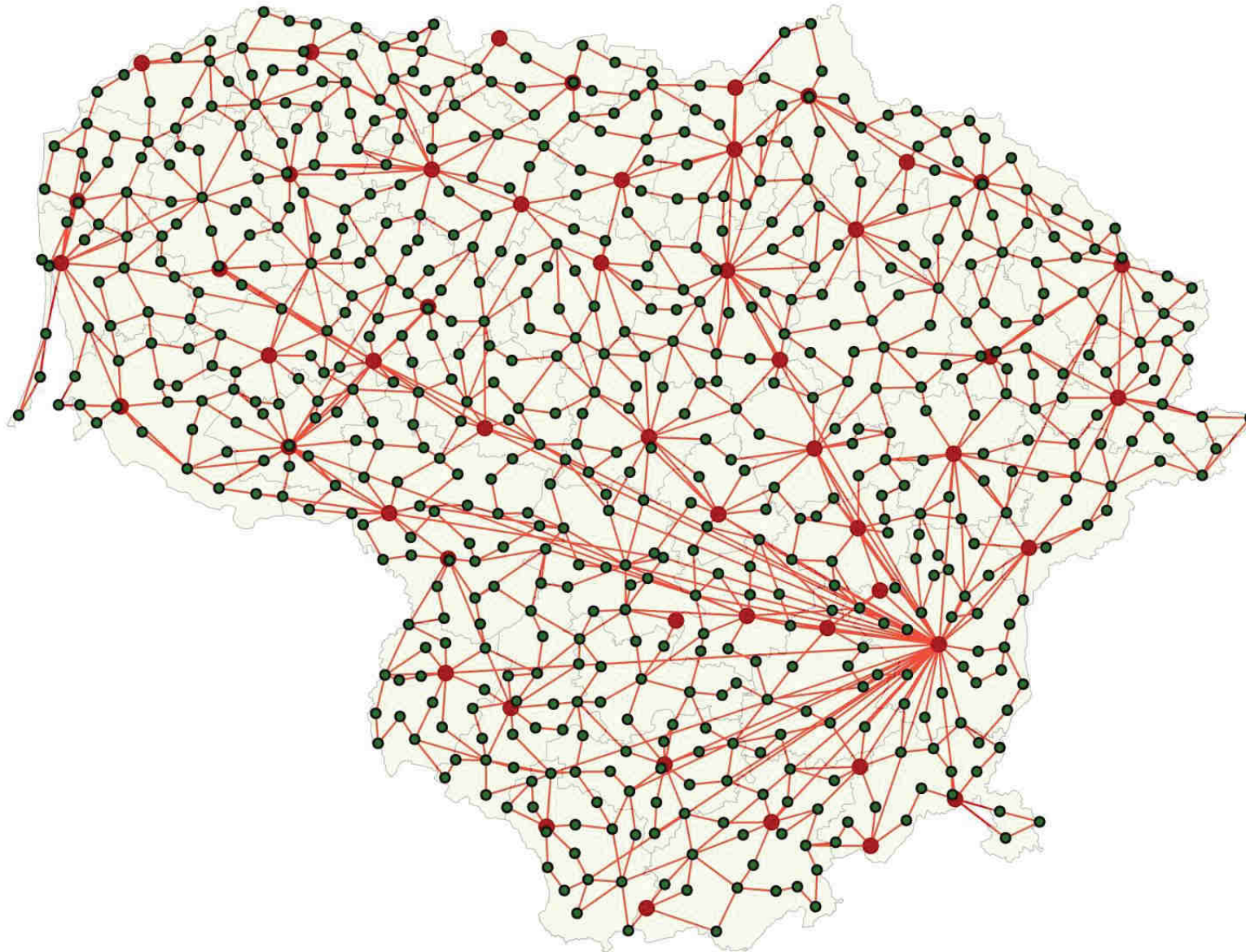


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# Absolute gravity points



# I<sup>st</sup> and II<sup>nd</sup> order Gravity Network of Lithuania

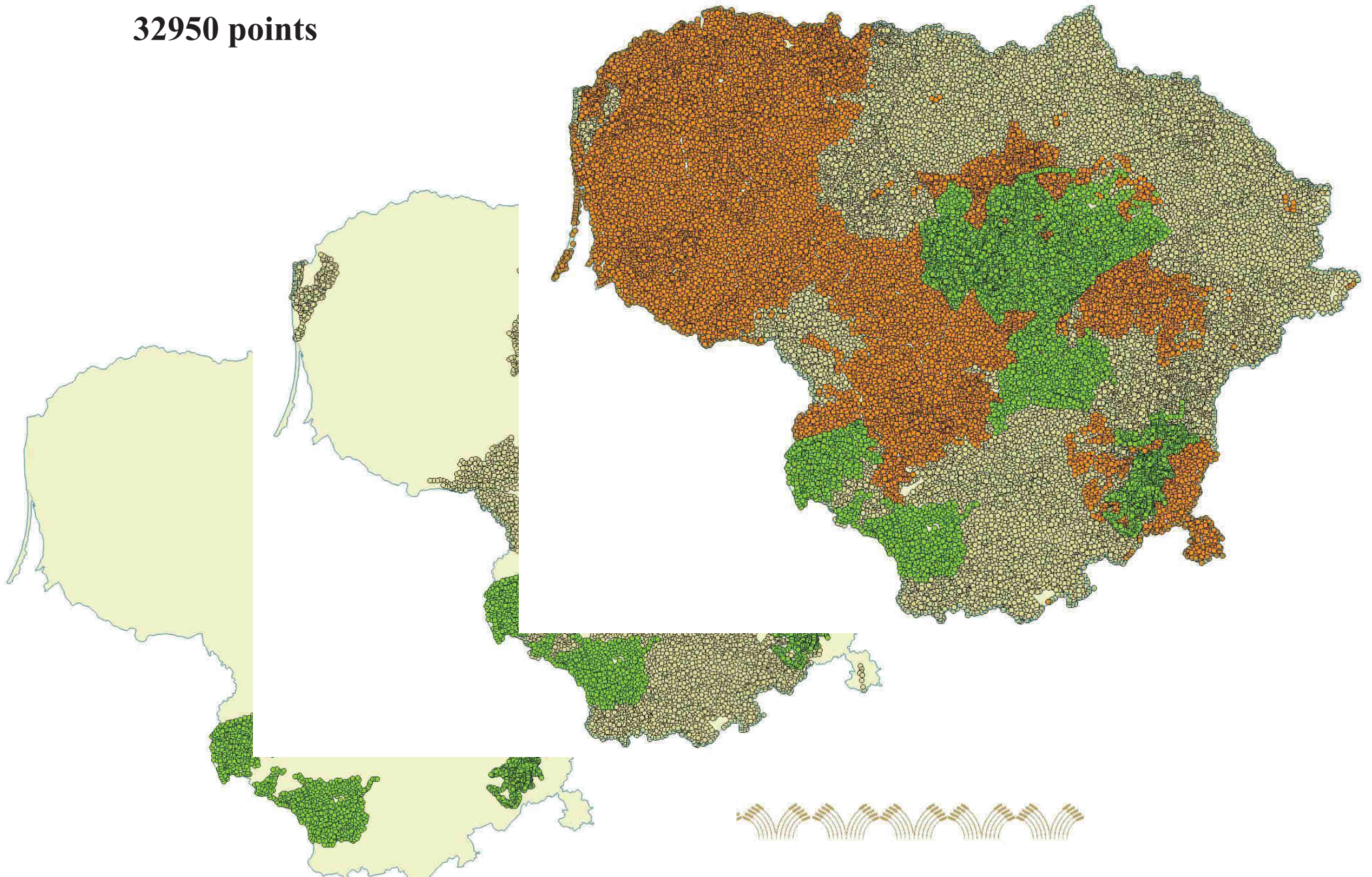




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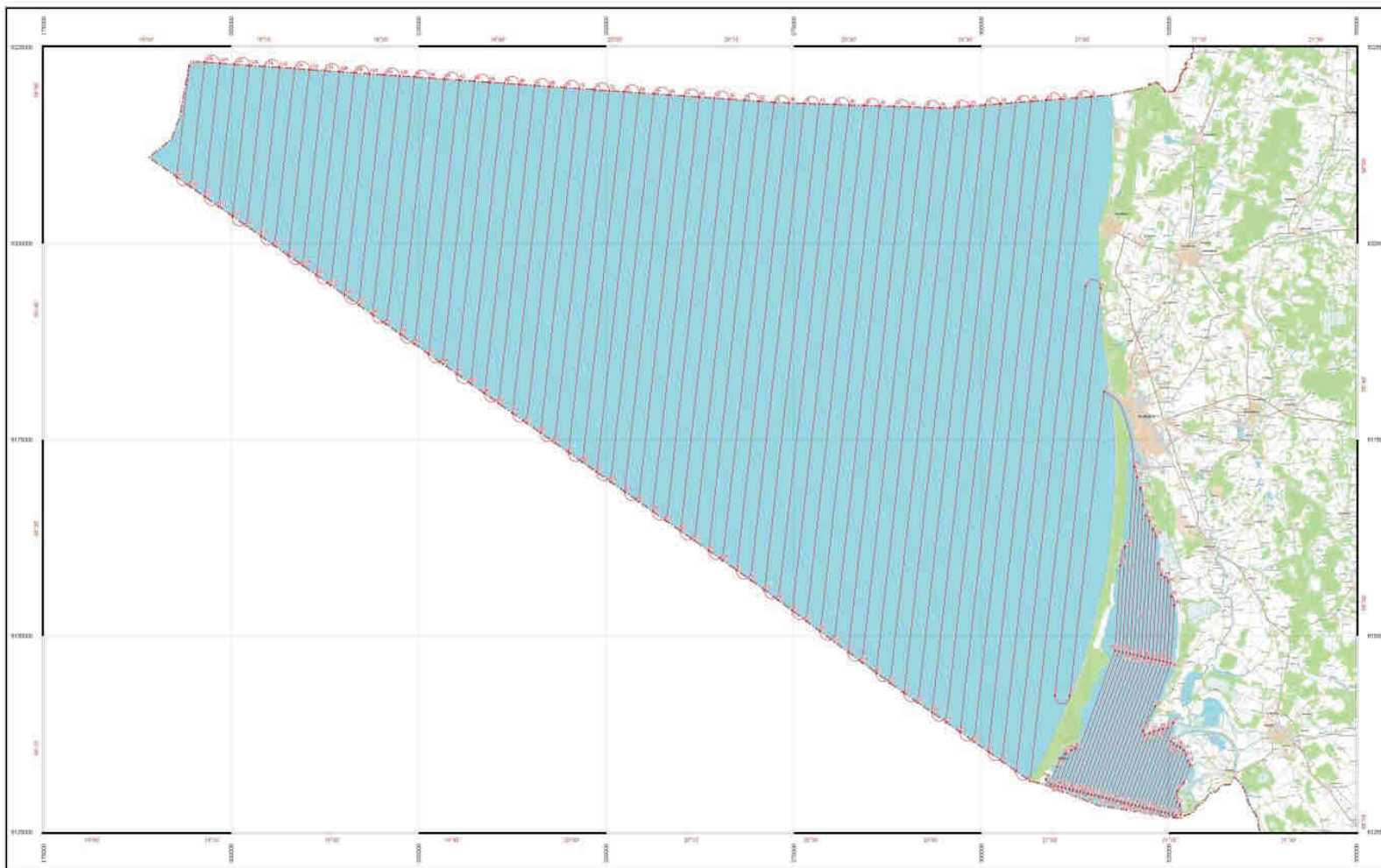
# GRAVITY SURVEY IN 2016-2017-2018

32950 points



# Gravity survey in the Baltic sea (Lithuanian waters)

ŽEMĖS SUNKIO LAUKO NEVIENALYTIŠKUMO TYRIMŲ GEOIDO MODELIIUI PATIKSLINTI LIETUVOS RESPUBLIKOS TERITORIJOJE GRAVIMETRINIŲ MATAVIMŲ REISŲ IŠDĖSTYMO SCHEMA  
Mastelis 1 : 250 000



# Gravity survey in the Baltic sea (Lithuanian waters) 2021

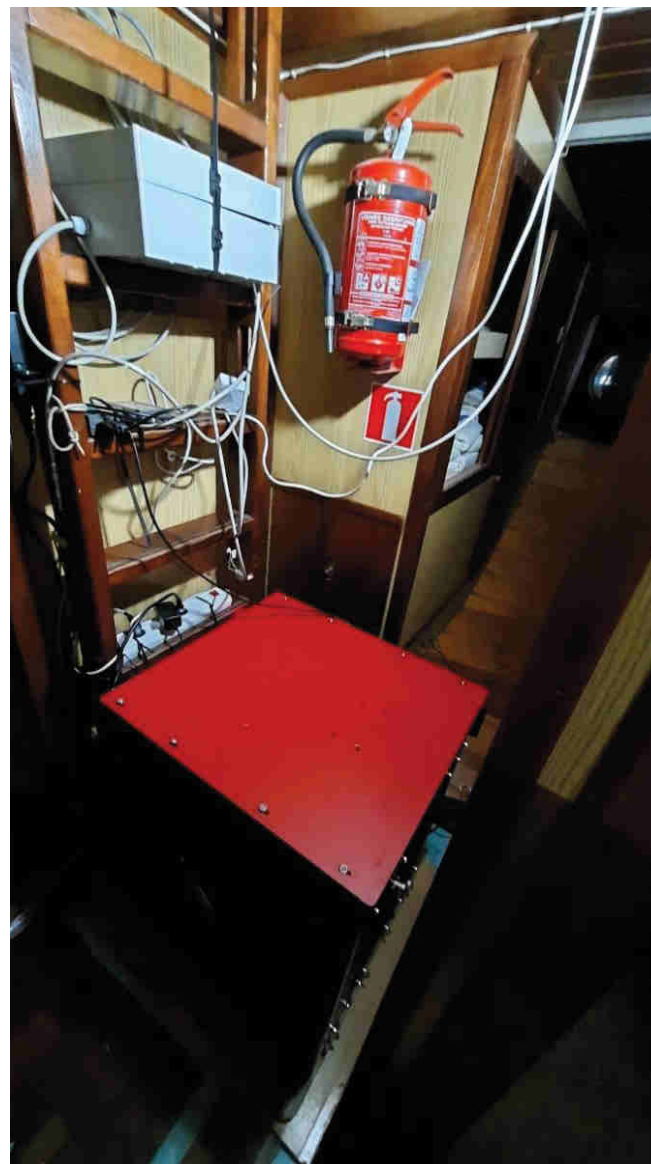


Brabander

# Gravity survey in the Baltic sea (Lithuanian waters)



Cooperation with **Gdańsk  
University of Technology**



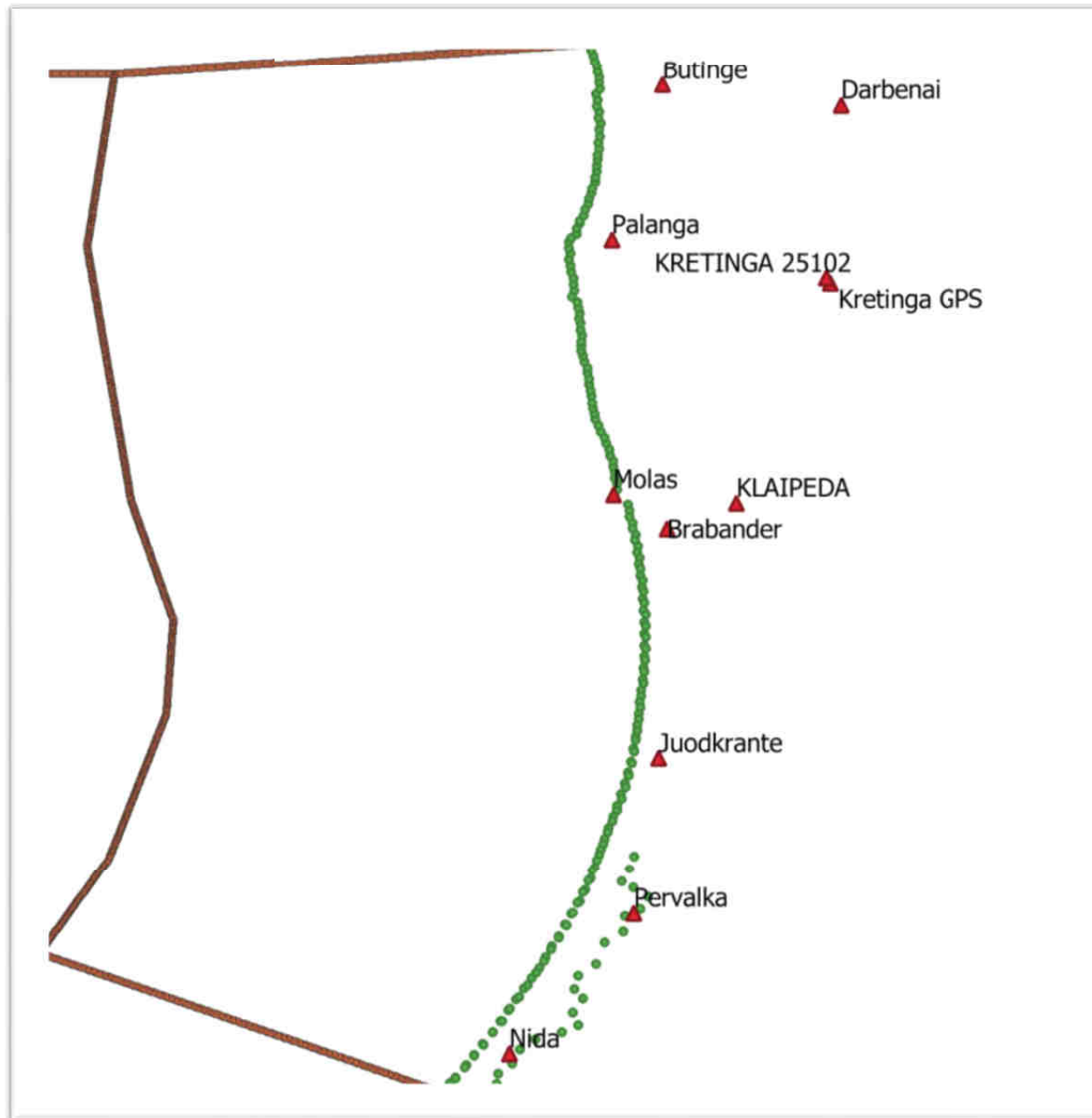
MSG-6

# Gravity survey in the Baltic sea (Lithuanian waters)

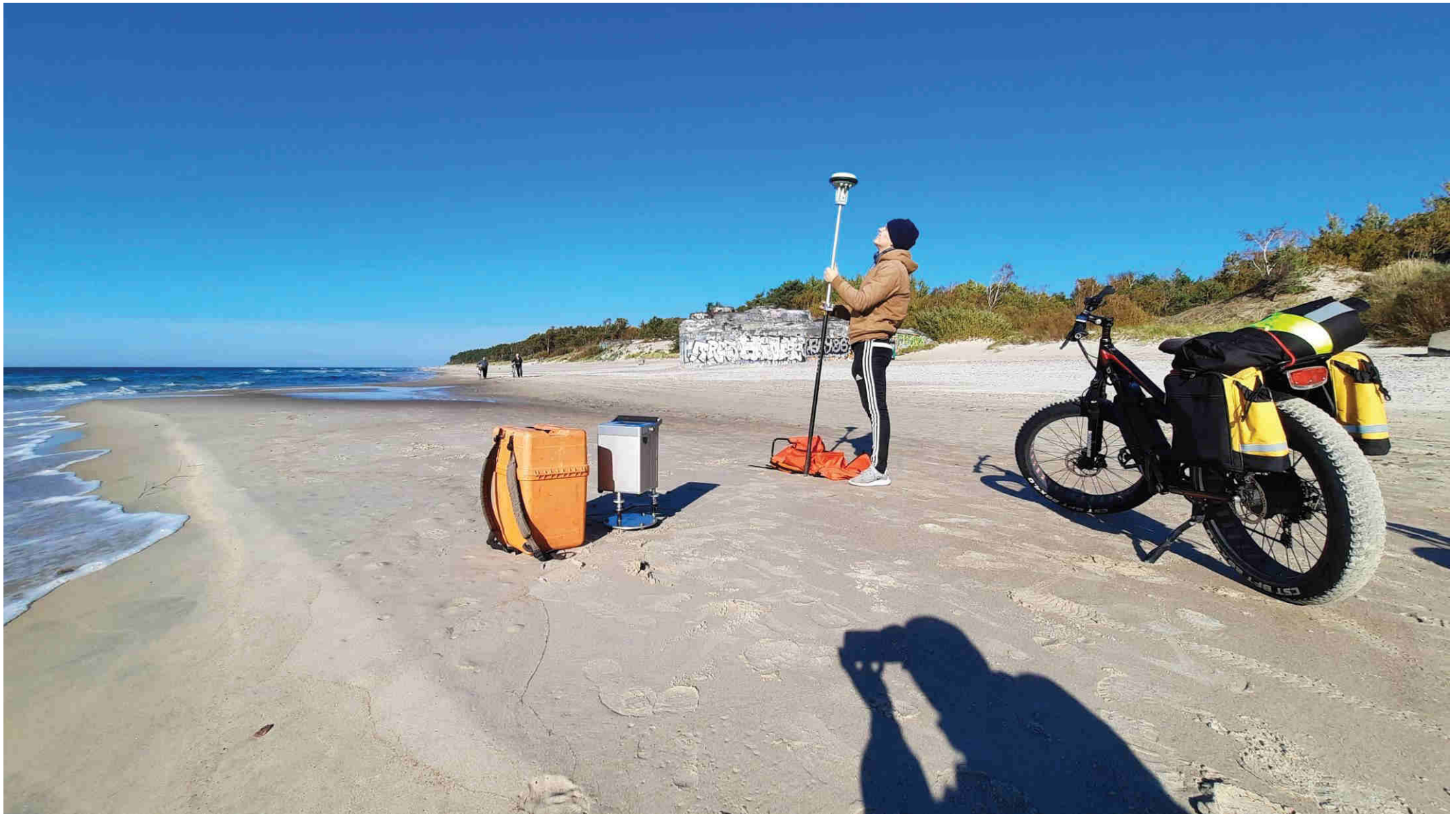




# Gravity survey in the Baltic sea



# Gravity survey in the Baltic sea (Lithuanian waters)



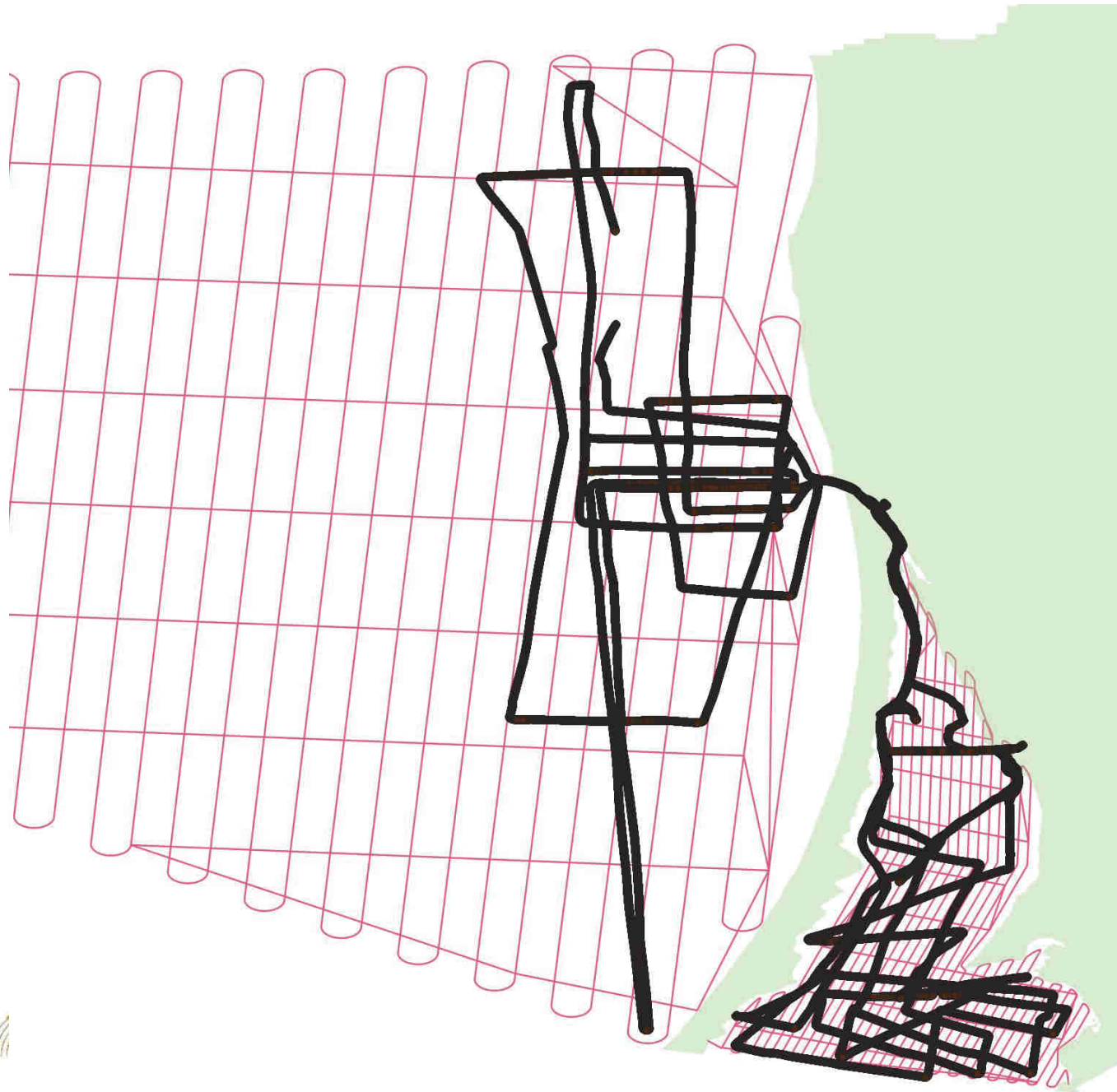
# Gravity survey in the Baltic sea (Lithuanian waters) 2022



# Gravity survey in the Baltic sea (Lithuanian waters)

2022

~1200 km



# Gravity survey in the Baltic sea (Lithuanian waters) 2022



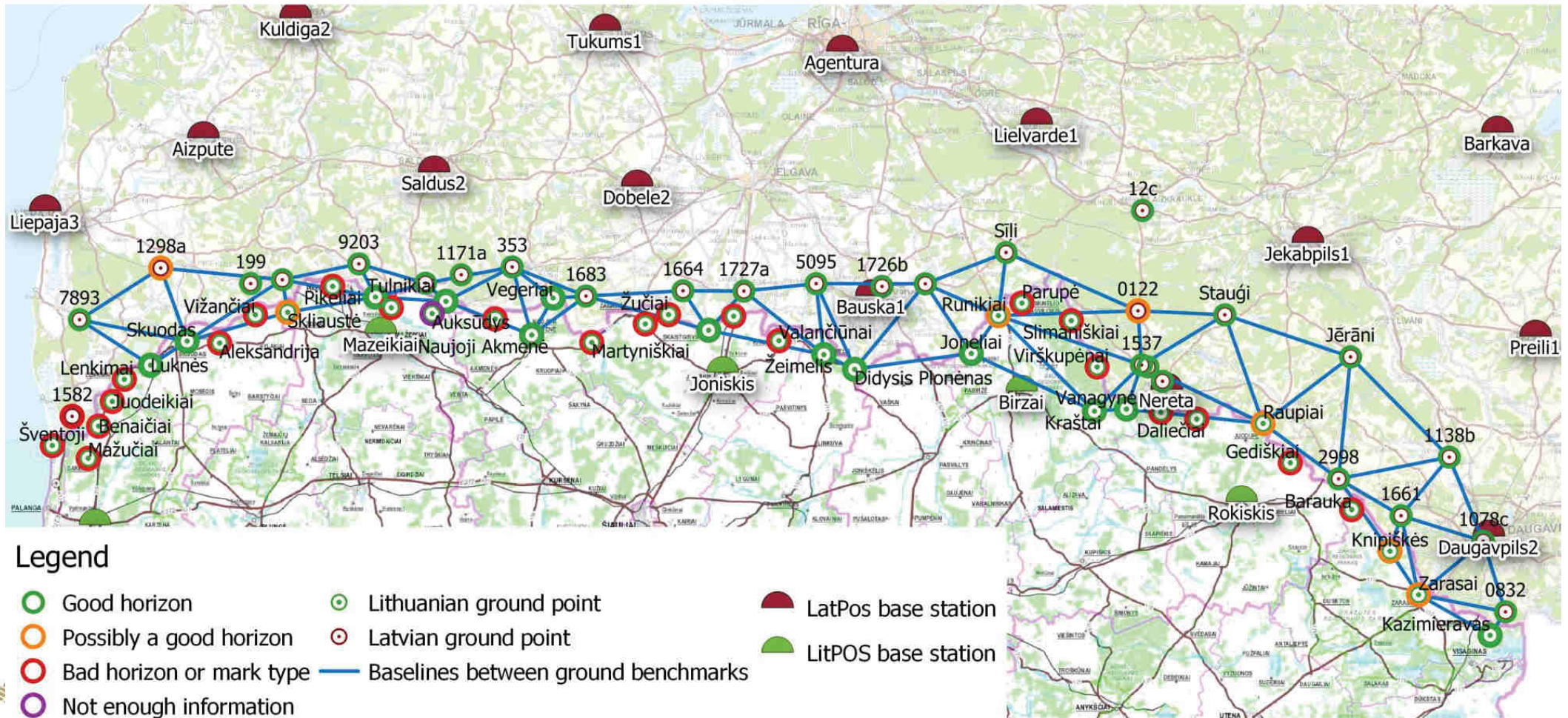


- Harmonization of Lithuanian and Latvian geodetic systems



# Harmonization of Lithuanian and Latvian geodetic systems in border areas

Scheme of Lithuanian and Latvian cross border GNSS observations





# Harmonization of Lithuanian and Latvian geodetic systems in border areas







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# Geomagnetic secular variations



# Geomagnetic Secular Variations



1999, 2001, 2004, 2007, 2016, 2021

# Geomagnetic Secular Variations

## Geomagnetic Secular Variations 2016.5 – 2021.5

No	Point	Secular variations (5 years period)			Average secular variations per year		
		$\delta D$ o ' "	$\delta I$ ' "	$\delta F$ nT	$\delta D$ ' "	$\delta I$ ' "	$\delta F$ nT
1	Žiežmariai	0 47 12	8 18	319	+9 26	+1 40	64
2	Dusetos	0 47 42	9 06	316	+9 32	+1 49	63
3	Parovėja	0 48 36	8 24	309	+9 43	+1 41	62
4	Šaukotas	0 50 06	9 00	286	+10 01	+1 48	57
5	Tryškiai	0 39 54	8 00	330	+7 59	+1 36	66
6	Šyliai	0 50 18	7 48	304	+10 04	+1 34	61

# Publications

- Skeivalas Jonas; Paršeliūnas Eimuntas Kazimieras; Šlikas Dominykas. The predictive model for the universe rotation axis identification upon applying the solar system coordinate net in the Milky Way galaxy. Indian journal of physics. Kolkata: Indian Association for the Cultivation of Science (IACS). ISSN 0973-1458. vol. 96, iss. 6 (2022), p. 1625-1634.
- Petroškevičius Petras; Paršeliūnas Eimuntas Kazimieras; Obuchovski Romuald; Šlikas Dominykas; Birvydienė Rosita; Putrimas Raimundas; Krikštaponis Boleslovas; Kolosovskis Ričardas; Būga Arūnas; Popovas Darius. The gravity survey and the gravimetric map of the territory of Lithuania. Baltica. Vilnius: Gamtos tyrimų centras. ISSN 0067-3064. vol. 35, no. 1 (2022), p. 71-79.
- Metrikaitytė Gustė; Sužiedelytė Visockienė Jūratė; Papšys Kęstutis. Digital mapping of land cover changes using the fusion of SAR and MSI satellite data. Land. Basel: MDPI. vol. 11, iss. 7 (2022), p. 1-20.
- Skeivalas, Jonas; Paršeliūnas, Eimuntas Kazimieras; Šlikas, Dominykas; Obuchovski, Romuald; Birvydienė, Rosita. On analysis of seismic vibrations data applying Doppler effect expression // Advances in civil engineering. London : Hindawi Ltd. ISSN 1687-8086. eISSN 1687-8094. 2021, vol. 2021, art. no: 8839828, p. 1-9.
- Tumelienė Eglė; Sužiedelytė Visockienė Jūratė; Malienė Vida. The influence of seasonality on the multi-spectral image segmentation for identification of abandoned land. Sustainability. Basel: MDPI. ISSN 2071-1050. vol. 13, iss. 12 (2021), p. 1-16. [M.kr.:T 004; T 010] [Aut.lankų sk.: 1.143]



# Publications

- Daugėla Ignas; Sužiedelytė Visockienė Jūratė; Kumpienė Jūratė; Suzdalev Ivan. Measurements of flammable gas concentration in landfill areas with a low-cost sensor. *Energies*. Basel: MDPI. ISSN 1996-1073. vol. 14, iss. 13 (2021), p. 1-15.
- Skeivalas, Jonas; Paršeliūnas, Eimuntas Kazimieras; Putrimas, Raimundas; Šlikas, Dominykas. On statistical estimations of vehicle speed measurements // *Metrology and measurement systems*. Warsaw : Polish Academy of Sciences. ISSN 0860-8229. eISSN 2300-1941. 2019, vol. 26, iss. 3, p. 551-559.
- Sužiedelytė Visockienė Jūratė; Tumelienė Eglė; Malienė Vida. Identification of Heracleum sosnowskyi-invaded land using earth remote sensing data. *Sustainability*. Basel: MDPI. ISSN 2071-1050. vol. 12, iss. 3 (2020), p. 1-14. [M.kr.:T 004; T 010] [Aut.lankų sk.: 1.000]
- Daugėla Ignas; Sužiedelytė Visockienė Jūratė; Skeivalas Jonas. Analysis of air pollution parameters using covariance function theory. *Ecological chemistry and engineering S-Chemia i inzynieria ekologiczna S*. Opole: Society of Ecological Chemistry and Engineering. ISSN 1898-6196. vol. 27, iss. 4 (2020), p. 555-565.
- Sužiedelytė-Visockienė Jūratė; Tumelienė Eglė; Malienė Vida. Analysis and identification of abandoned agricultural land using remote sensing methodology. *Land use policy*. Amsterdam: Elsevier Ltd. ISSN 0264-8377. vol. 82 (2019), p. 709-715.
- Skeivalas, Jonas; Paršeliūnas, Eimuntas Kazimieras; Putrimas, Raimundas; Šlikas, Dominykas. An influence of the correlation due tracking the same satellite on the accuracy of the GPS time dissemination // *Measurement*. Oxford : Elsevier Ltd. ISSN 0263-2241. eISSN 1873-412X. 2018, Vol. 121, p. 62-65.

# Geodesy and Cartography



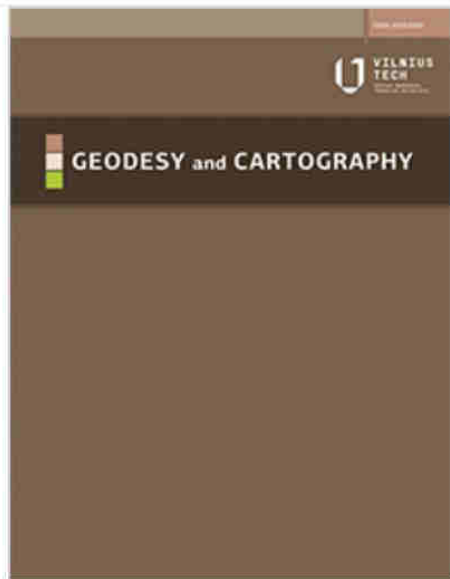
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Q3

General Earth and Planetary Sciences

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**1.6**

SJR 2021  
**0.322**

SNIP 2021  
**0.820**

Elsevier, 2022

<https://journals.vgtu.lt/index.php/GAC/about/submissions>

# Future plans

- Gravity survey in the Baltic Sea in 2023-2024 (4000 km).
- Second Re-measurement of the I<sup>st</sup> order Vertical Network of Lithuania in 2022-2026 (1800 km)



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**Thank You for your attention!**

