



**NLS**  
FINNISH GEOSPATIAL  
RESEARCH INSTITUTE  
FGI

# National Report - Finland

NLS/FGI

Pasi Häkli & Geodesy and Geodynamics Department  
Finnish Geospatial Research Institute, NLS

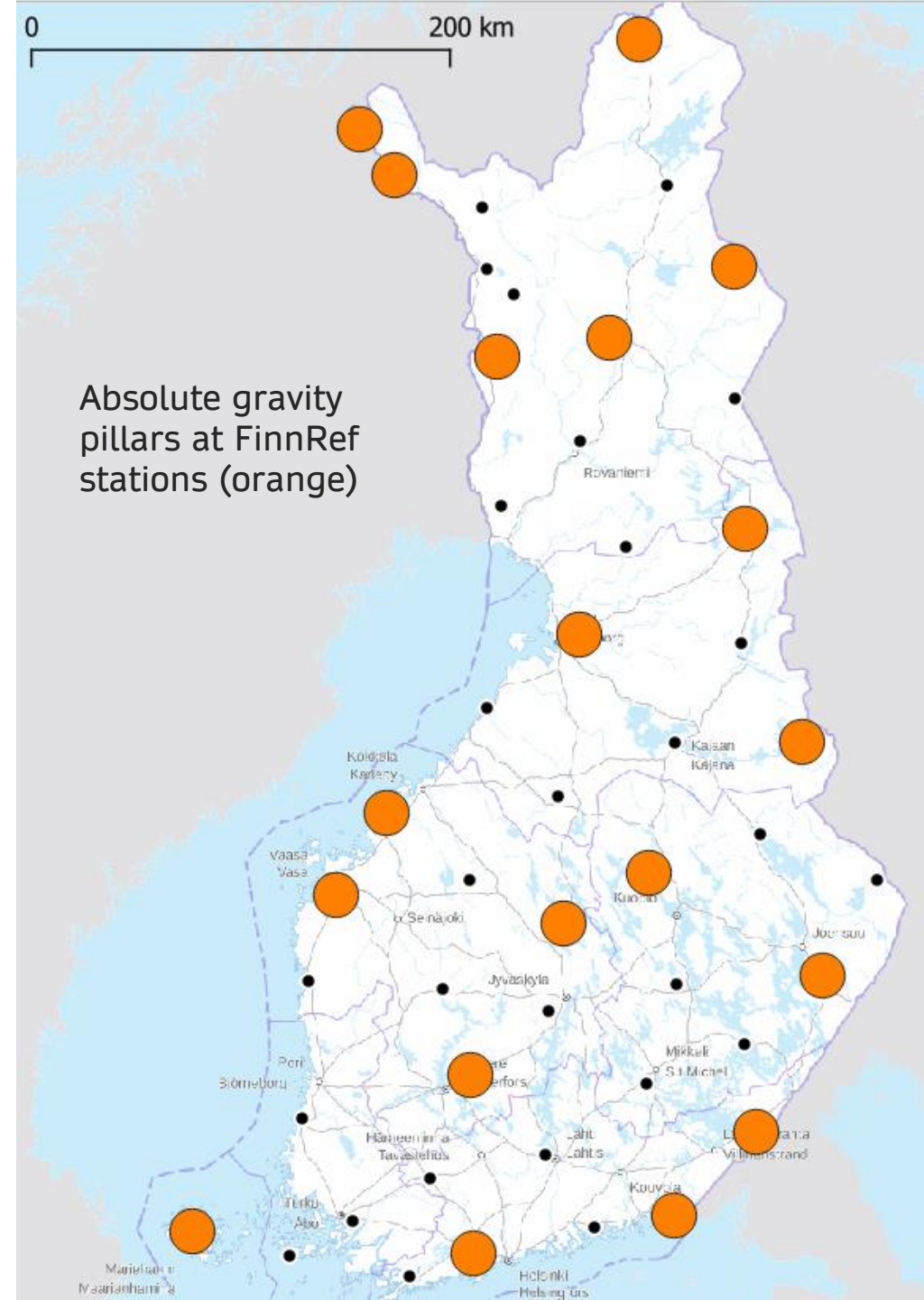
# FGI 2022

- In April the FGI moved from Masala to Otaniemi  
New address: Vuorimiehentie 5,  
2150 Espoo
- 30.8.2022 Official opening of  
Metsähovi (after renewal) by the  
Minister of Agriculture and  
Forestry Antti Kurvinen
- New Metsähovi main building  
was taken into use



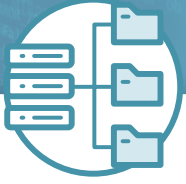
# FinnRef: Backbone of Finnish reference systems

- Finnish [Geodesy strategy](#) 2017-2026: FinnRef will be the backbone of the national coordinate, height and gravity reference systems
- **Precise levelled N2000 (EVRIS) heights** for all (or most of the) stations by ~2025
  - Now 32/47
- **Centering measurements** (heights from the reserve markers to the GNSS antenna)
  - now 32/47
- **Repeated absolute gravity measurements**
  - 20/47 stations with AG pillar
  - Measured every 3 years



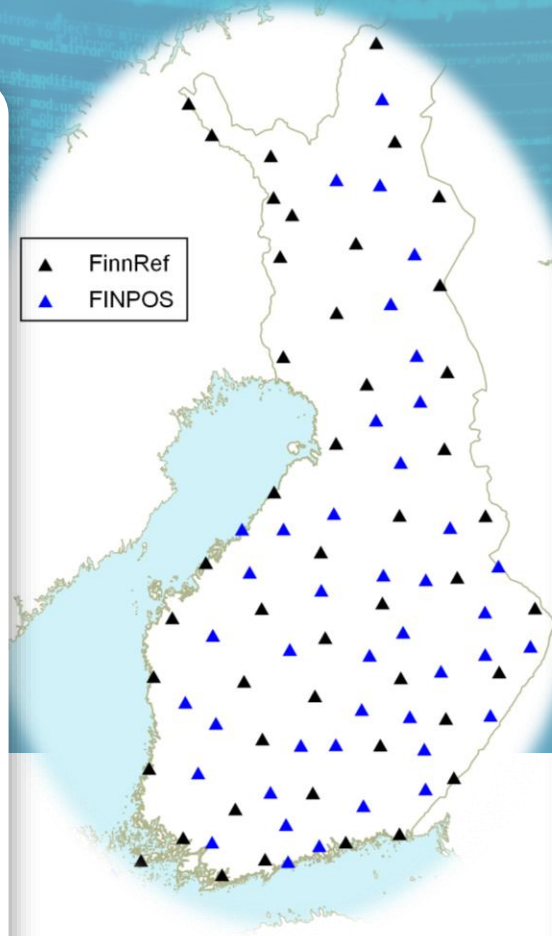


# GNSS Network of the NLS



## FINREF

- 47 stations
- All will be levelled
- 20 has AG pillar
- SAR targets will be installed
  - 11 in total
  - 6 Zarges
  - 5 MK3D



## FINPOS

- ~100 stations (FinnRef and FINPOS)
- Open DGNSS service
- Rinex data
  - Open service
- Raw data streams
  - Commercial service
  - EPN data open
- Positioning service for internal use only

# Levelling 2022

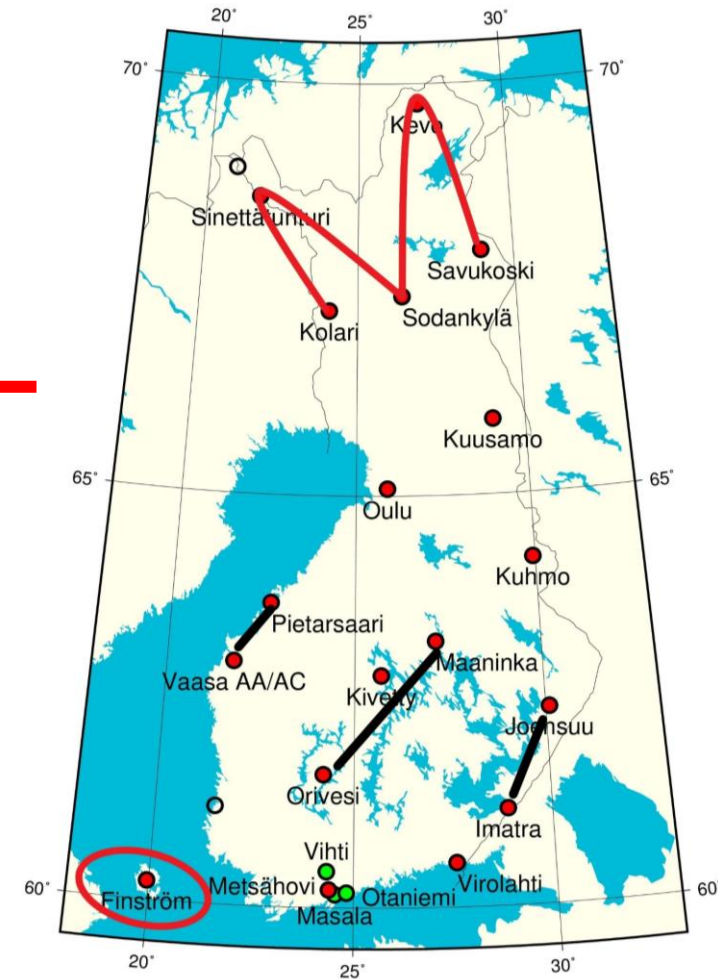
- Levelling to the tide gauges (every 3 years) ▲
- Connection of FinnRef station to the precise levelling network ▲
  - MIK3 (Mikkeli)
  - ROM2 (Romuvaara)
  - RAAS (Raasepori)
  - OUL2 (Oulu)
  - TUO2 (Tuorla)
  - OLK2 (Olkiluoto)
- Rod and levelling system calibration laboratory moved to new laboratory space in Otaniemi

Total 112.6 km (double run)



# Gravimetry

- Absolute Gravity
  - 2022: 6 stations: Lapland + Finnström — NKG CAG 2022 – AG comparison
  - 2023: 7 stations: Central Finland — CCM.G-K2.2023 - ICAG
- Otaniemi – (Masala –) Vihti calibration line for relative gravimeters
  - 2022: AG & RG: Masala – Otaniemi – Vihti  
RG Otaniemi tie & gradient
  - 2023: AG & RG: Otaniemi – Vihti  
RG: Otaniemi tie & gradient



# Geoid

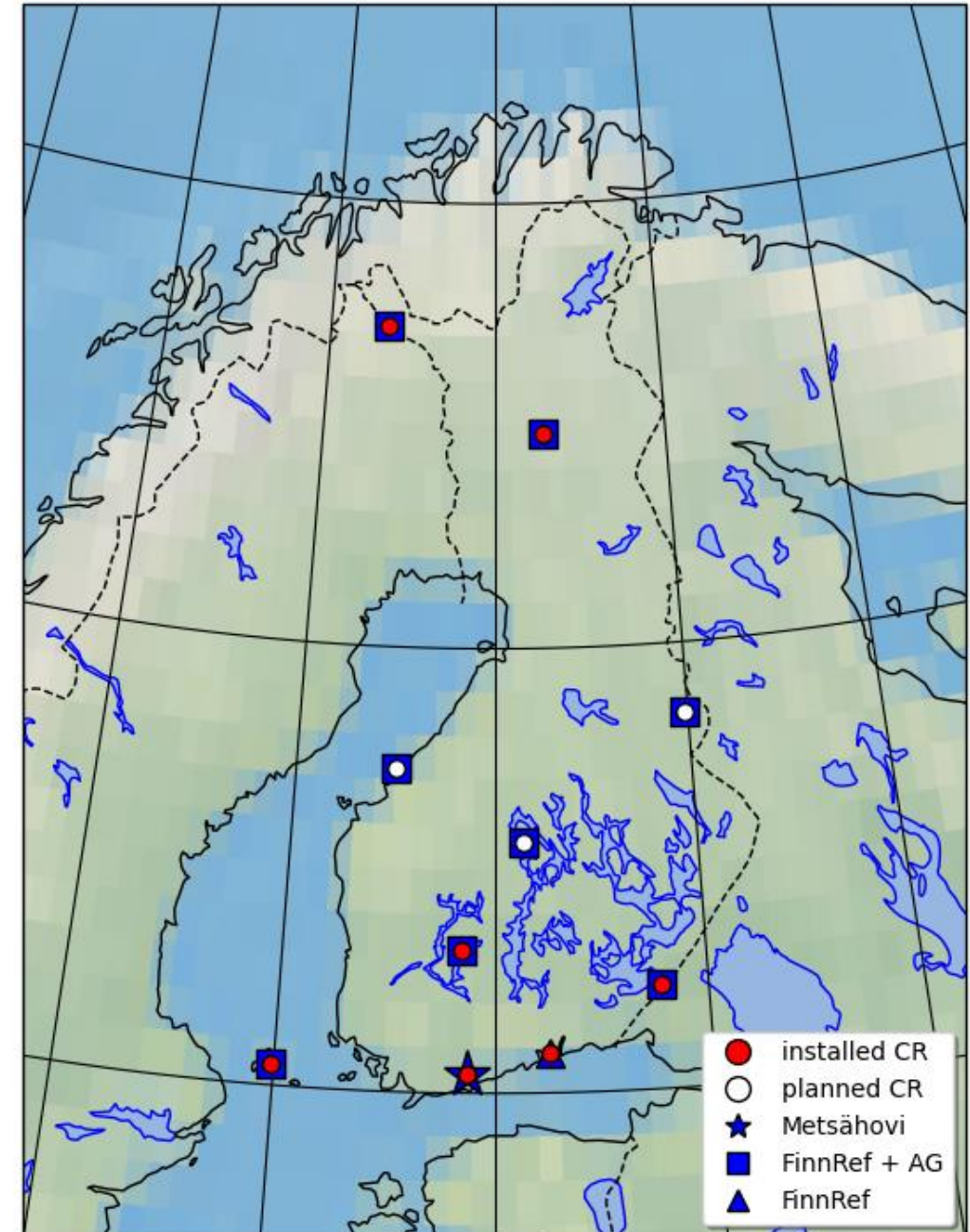
- 2022-2023 GeoVaPaa project – Requirements of future geoid models for gravity data – *Funded by the ministry of Agriculture and Forestry*
- 2023: New geoid model fit to GNSS/levelling → New and better national height conversion surface
- 2022-2024 BalMarGrav project – Homogenized marine gravity maps of southern and eastern Baltic Sea for modern 3D applications in marine geodesy, geology and navigation  
– *Co-funded by the European Union under the Interreg Baltic Sea Region Program*



# SAR reflectors

- Installed
  - Sodankylä – Zarges
  - Sinettäntunturi – MK3D
  - Imatra – MK3D
  - Orivesi – MK3D
  - Finnström – MK3D
  - Loviisa – Zarges
  - Metsähovi – Zarges
- Planned
  - Metsähovi – Zarges & MK3D
  - Kuhmo – Zarges
  - Pietarsaari – Zarges
  - Kivetty – Zarges

FGI SAR targets



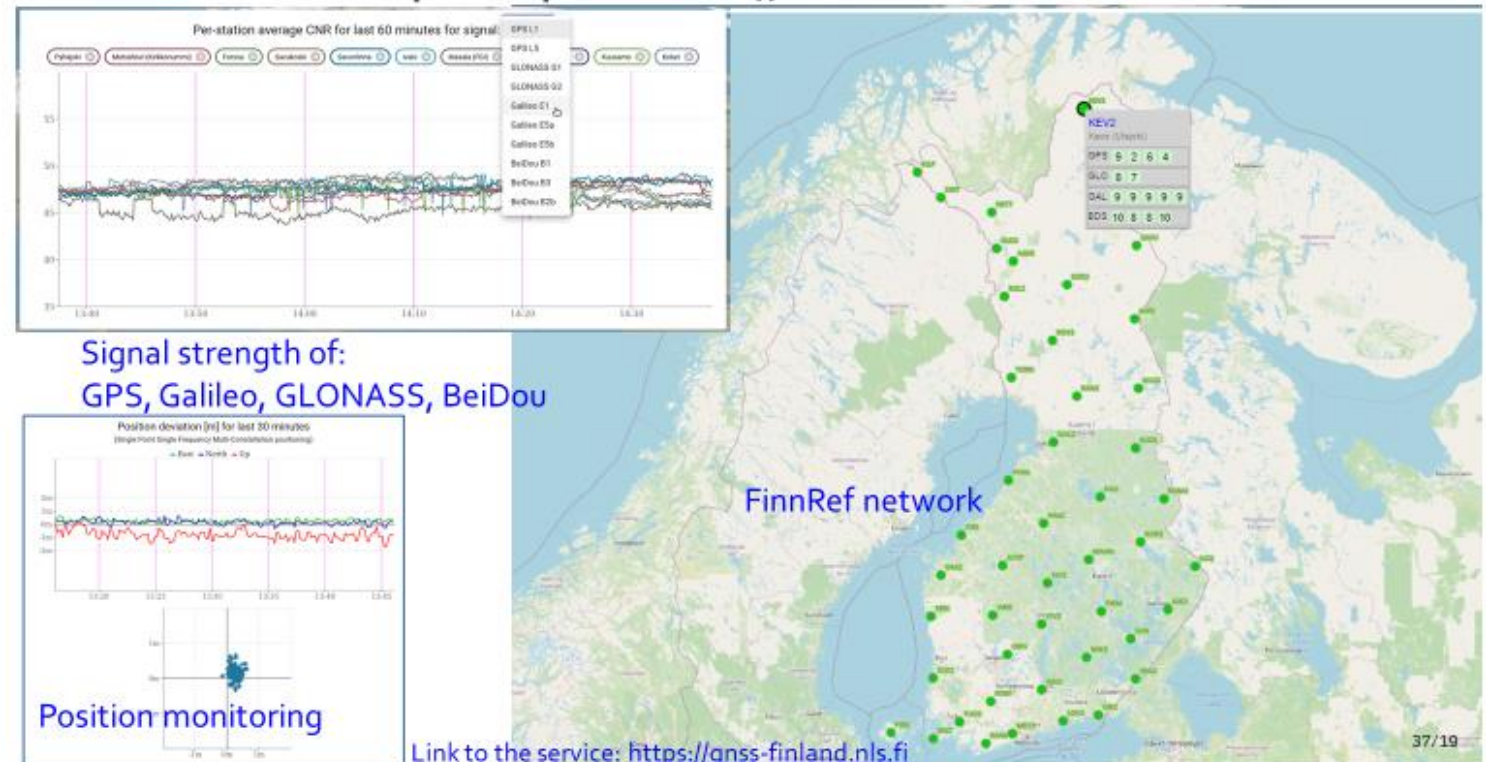




# Reliability of GNSS

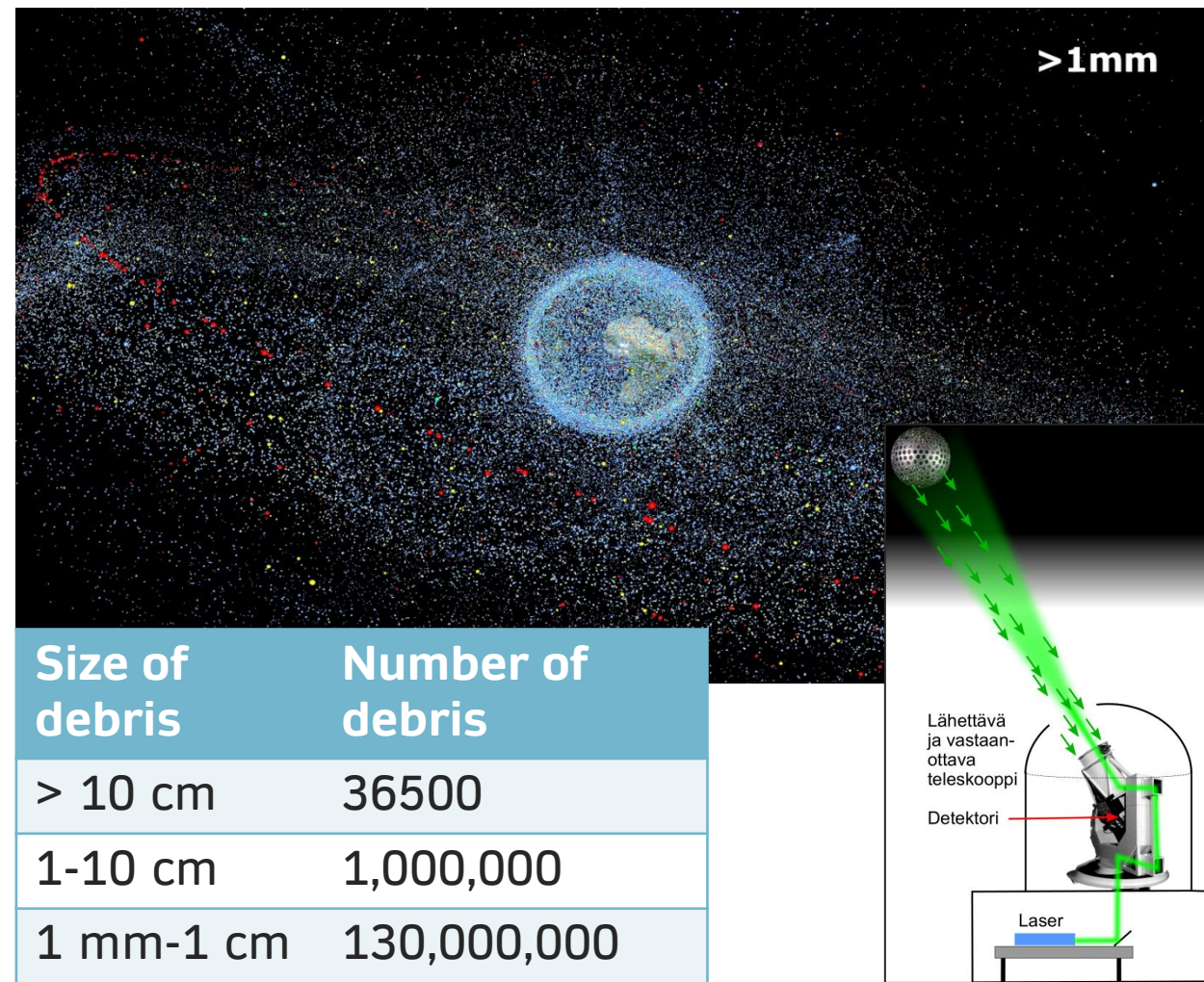
- Background study (interviews) of different GNSS user groups
- What kind of information would be useful for them?

**GNSS-Finland Service: Monitoring GNSS signal quality on all global constellations in multiple frequencies in 47 FinnRef stations**



# National Space Situation Centre

- Finland joined the European Space Surveillance and Tracking (EUSST) in 2022
  - Debris threatens the space business and European space programs!
- National Space Situation Centre will be established at the FMI
- Metsähovi SLR can be upgraded for space debris measurements as a national contribution to EUSST



# Governance

- Director General Arvo Kokkonen retired 1.10.2022
- New Director General of the NLS Pasi Patrikainen started 10.10.2022
- New unit for Geodetic Infrastructures 1.1.2023 –
  - FinnRef/FinPos operational work
  - RIMS stations
  - Metsähovi Geodetic Research Station
    - Technical people will be hired
    - 2023-2024 concentrates on SLR and VLBI





# Other news

- Emeritus Professor Juhani Kakkuri passed away 6.8.2022
- PhD defences:
  - Sonja Lahtinen 27.5.2022: Reference frame densifications for Nordic and Baltic countries - From local analysis to common and consistent GNSS solutions.
  - Timo Saari 12.12.2022: Investigations of geoid models in Finland - Towards GNSS-related height system.
- Mirjam Bilker-Koivula appointed as Professor of Practice in Geodetic applications in Geoinformatics (20%) at Aalto University starting 1.9.2022

# Advancing together

