



**NLS**  
FINNISH GEOSPATIAL  
RESEARCH INSTITUTE  
FGI

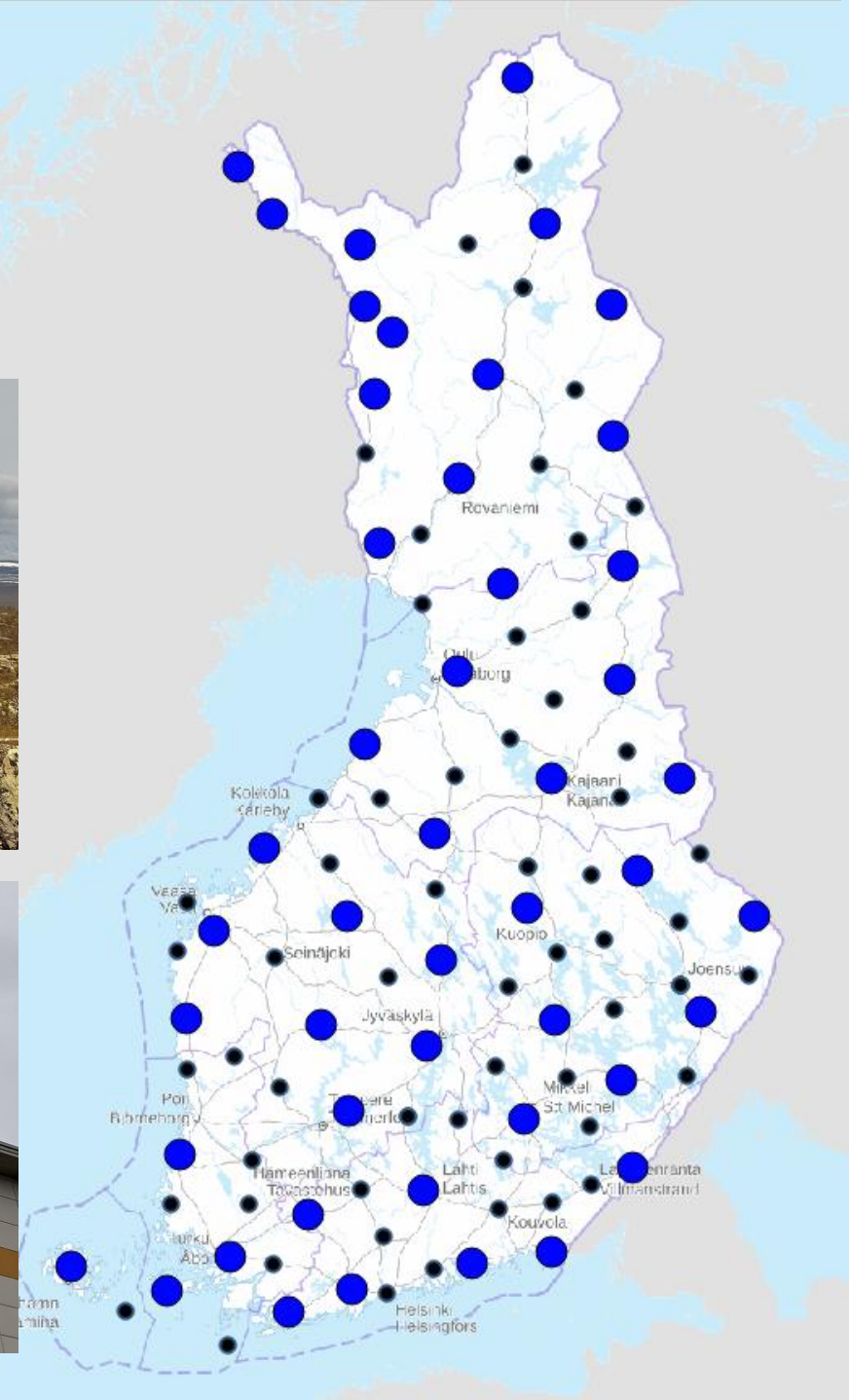
# National Report - Finland

NKG WGRF meeting,  
Helsinki, Finland, 24-25 March 2026

Pasi Häkli

# FinnRef: Backbone of Finnish reference systems

- FinnRef: 47 CORS
  - 2 IGS
  - 20 EPN
  - 47 EPND
  - For reference frame purposes, mostly founded on bedrock
  - Long GNSS time series
- FINPOS: >50 CORS (+FinnRef)
  - Mostly rooftops
  - For NRTK positioning service
- FinnRef will connect terrestrial, vertical and gravity reference frames

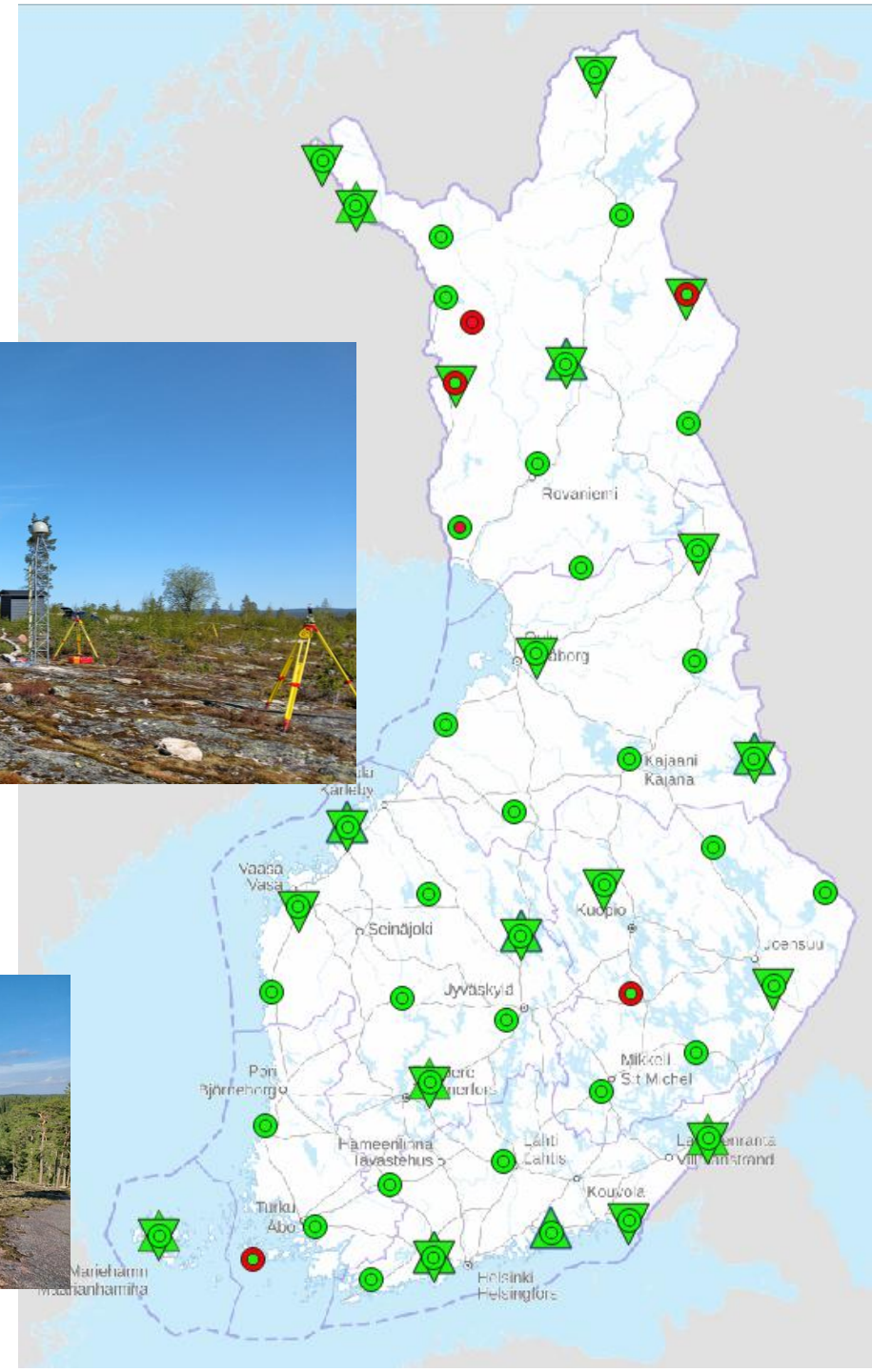


# FinnRef: Backbone of Finnish reference systems

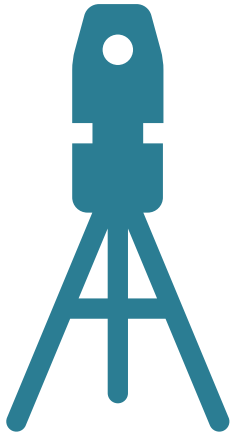
- **Connection to N2000 height system**
  - **Precise levellings** for all (or most of the) stations by ~2026
    - Now 42/47 (2025: 2 stns done, 2026: 2 stns)
  - **Centering measurements** (heights from the reserve markers to the GNSS antenna)
    - Now 45/47 (2025: 9 stns done, 2026: 6 stns)

- ▼ **Gravity: repeated absolute gravity measurements**
  - 20/47 stations with AG pillar, measured every 3 years

- ▲ **SAR reflectors**
  - 2025: reference coordinates determined for SOD3 and SINT



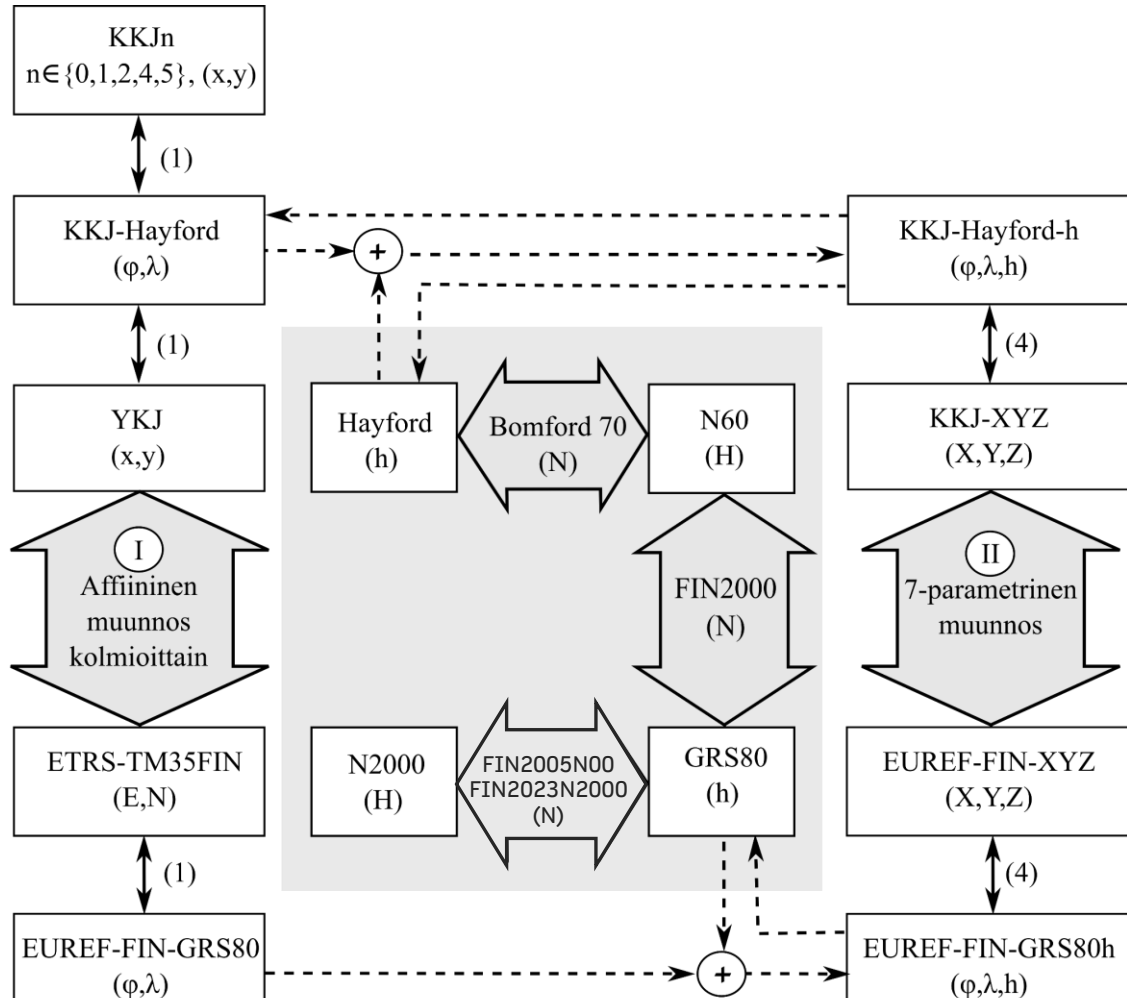
# 2025 & 2026 Levelling & Centering



- Levelling of FinnRef stations (now 42 out of 47 levelled)
  - 2025 Jyväskylä, 76 km, Tornio, 80 km
  - 2026 Kolari, Pieksämäki
- Tide gauge levellings
  - 2025 All: Hamina, Emäsalo, Hanko, Turku, Föglö, Helsinki, Rauma, Pori, Kaskinen, Vaasa, Pietarsaari, Kemi, Oulu & Raah
- TarGeOp project 2024-2025
  - Diploma work on redesign and optimization of the 1st order levelling network
  - Result: Optimization tool in QGIS
- Centering of FinnRef stations in Lapland
  - 2025 9 stations in Lapland + 2 SAR reflectors (Sodankylä, Sinettänturi)
  - 2026 6 stations

# EPSG: NKG2020 transformation

Example Finland, similar codes for Nordic-Baltic countries

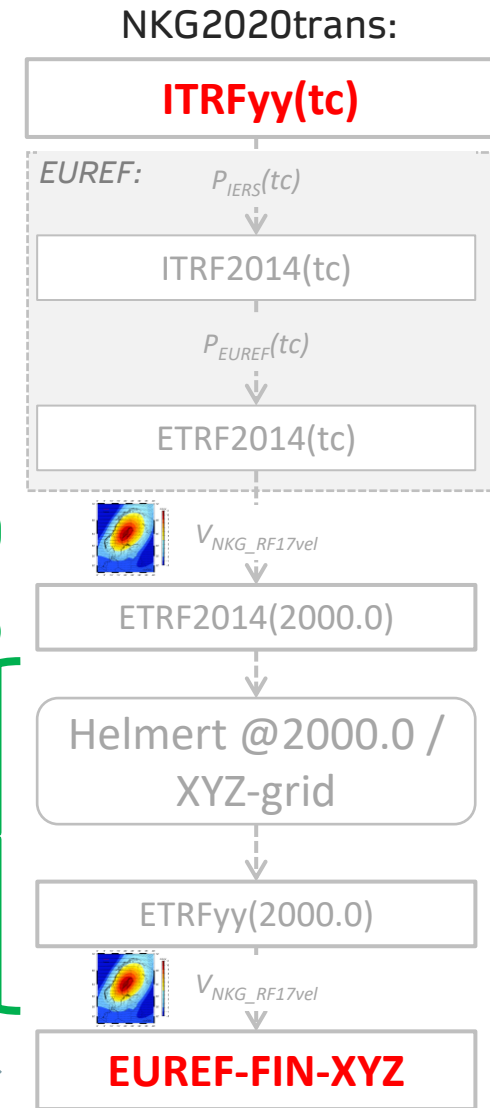


\* Several codes: ITRF2020, ITRF2008,... or transformations ITRF2014 $\leftrightarrow$ ITRFyy

- EPSG:OK\*
- EPSG:OK\*
- EPSG:7789
- EPSG:8366
- EPSG:8401
- EPSG:10809
- EPSG:10805

EPSG:10810

EPSG:10688

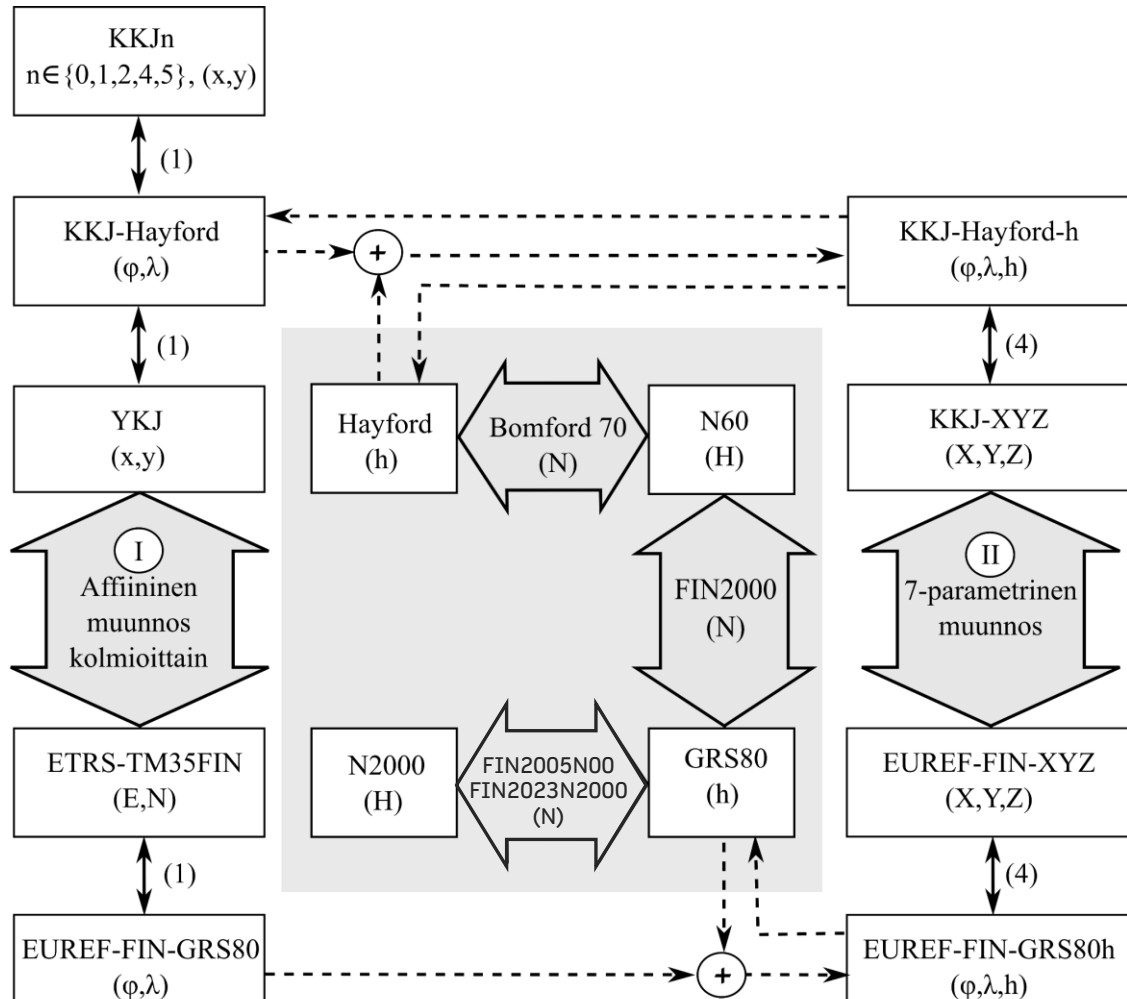


Dynamic

Static

# EPSG: NKG2020 transformation

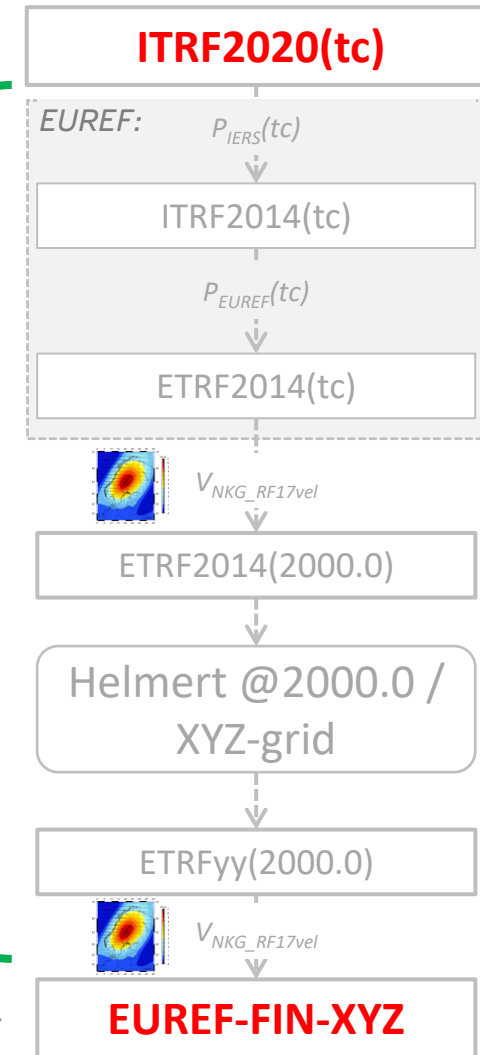
Concatenated transformation [ITRF2020<->EUREF-FIN](#)



EPSG:10869

EPSG:10688

NKG2020trans:



Dynamic

Static

# Metsähovi

- GNSS, gravimetric, and DORIS measurements have continued without any issues
- Commissioning of the VGOS system is progressing
- Finalizing the commissioning of the Metsähovi SLR telescope and the SLR system
- SLR system update for space debris observation
- Local tie measurements are planned to be repeated in Q2/2025
- Planning of replacement of technical facilities that are still in old building



# NLS, FGI, GEOGEO News



- NLS 2030 – NLS reform
  - Majority of changes will take effect in early 2027
  - No major impact on GEOGEO department
- GEOGEO
  - 5 persons hired since last meeting + 2 diploma workers + 2 summer trainees
  - 2 persons retiring in summer
  - 2026: 2 research positions opening
    - + 2 diploma workers, 2 summer trainees, 1 visiting researcher
  - Finishing projects
    - 2025 NKG2020 transformation added to EPSG
    - 2023-2025 GEMOP (EUSPA) - Galileo and EGNOS Monitoring Of Performances
    - 2024-2025 TarGeOp (MMM) - Tarkkavaaitusverkon ja geoidimallien optimointi tulevaisuuden korkeusjärjestelmää varten

# Projects that started in 2025



- 2025-2027 TULANET Postdoc program
- 2025-2028 ScanClouDT (EURAMET EMP) - Traceability for industrial 3D digitalization by advanced scanning systems
- 2025-2028 DynEAnt (RCF) - Understanding the dynamic Earth in East Antarctica with multitechnique geodetic measurements
- 2025-2028 EXQALIBR (RCF) - EXceptional Queen mAud Land Ice mass Balance incRease – causes and effects
- 2025-2028 EPOS-Finland (RCF FIRI) - European Plate Observing System
- 2025-2029 EQUIP-G (EU Horizon) - European QUantum Infrastructure Project for Gravimetry
- 2025-2028 SPACEECONOMY (RCF Strategic Research) - Advancing Sustainable Economic Growth through Space Economy



# Projects starting in 2026

- 2026-2027 GEMOP (EUSPA) - Galileo and EGNOS Monitoring Of Performances by Member States
- 2026-2027 Q-Sense (MATINE) – Usability of quantum gravimeters for object detection
- 2026-2027 (MMM) – Reference Frames
- 2026-2029 ERIGMEA (EURAMET EMP) – Gravimetry Metrology project



# Knowing the Earth – Securing the future

