

FIG

FIG WORKING WEEK 2017

Helsinki Finland

29 May - 2 June 2017

*Presented at the FIG Working Week 2017,
May 29 - June 2, 2017 in Helsinki, Finland*



Surveying the world of tomorrow -
From digitalisation to augmented reality

Organised by



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Finnish Permanent GNSS Network, FinnRef

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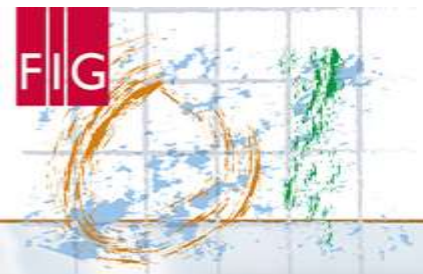


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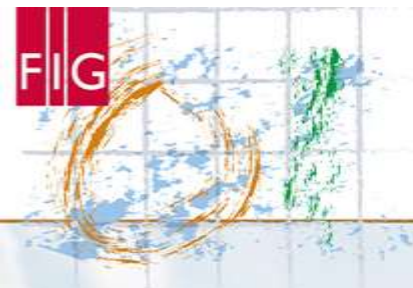


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Finnish Permanent GNSS Network, FinnRef, 1995-2017



1995
GPS network
of 13 stations

1997
EUREF-FIN

2013
GNSS network
of 20 stations

2015
Open DGNSS
and RINEX
data



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FinnRef as a part of National Land Survey of Finland



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FinnRef as a stable reference

- All stations are on stable bedrock
- Internationally connected (IGS, EPN)
- Individually calibrated antennas
- GNSS capable
- Defines coordinate system of Finland
- Main tool to monitor deformations of coordinate system



Checking stability of bedrock with a gravimeter



GNSS antenna calibration

Photo: Geo++



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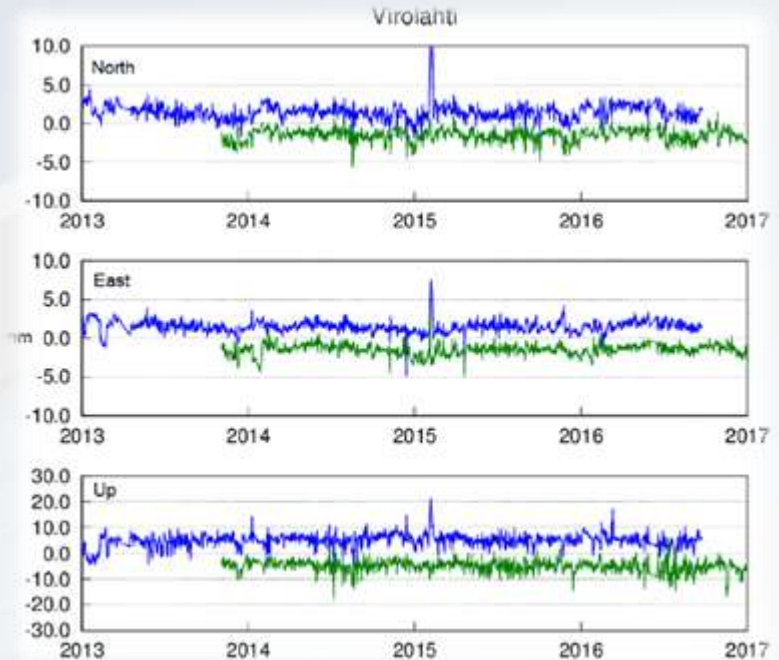
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Continuity is the key

- Dual stations
- Stability is controlled by
 - Tacheometers
 - Time series
- Unnecessary changes are avoided



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Open GNSS data by the NLS

For everybody	Comment
DGNSS service	Through IP (NTRIP/RTCM)
Rinex data	

FIGI can open any GNSS data including NRTK for research purposes by

- Universities
- Research institutes
- Companies
- Education
- Research projects



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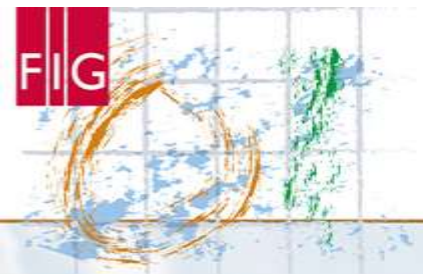


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seSolstorm



Mean ROTI observed at ground locations [TECU/min] 2017-05-30 11:10 UTC

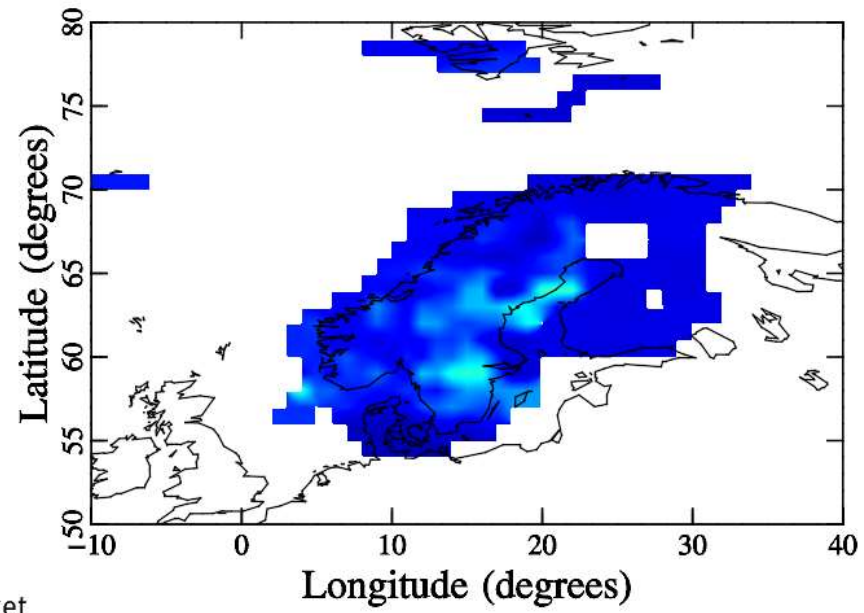




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Survey vessel Airisto.
(LOA 30.5 m / B 8.9 m / Draft 2.8 m)



Co-financed by the European Union
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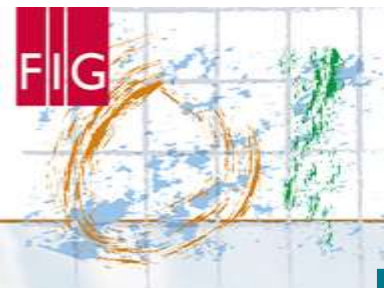


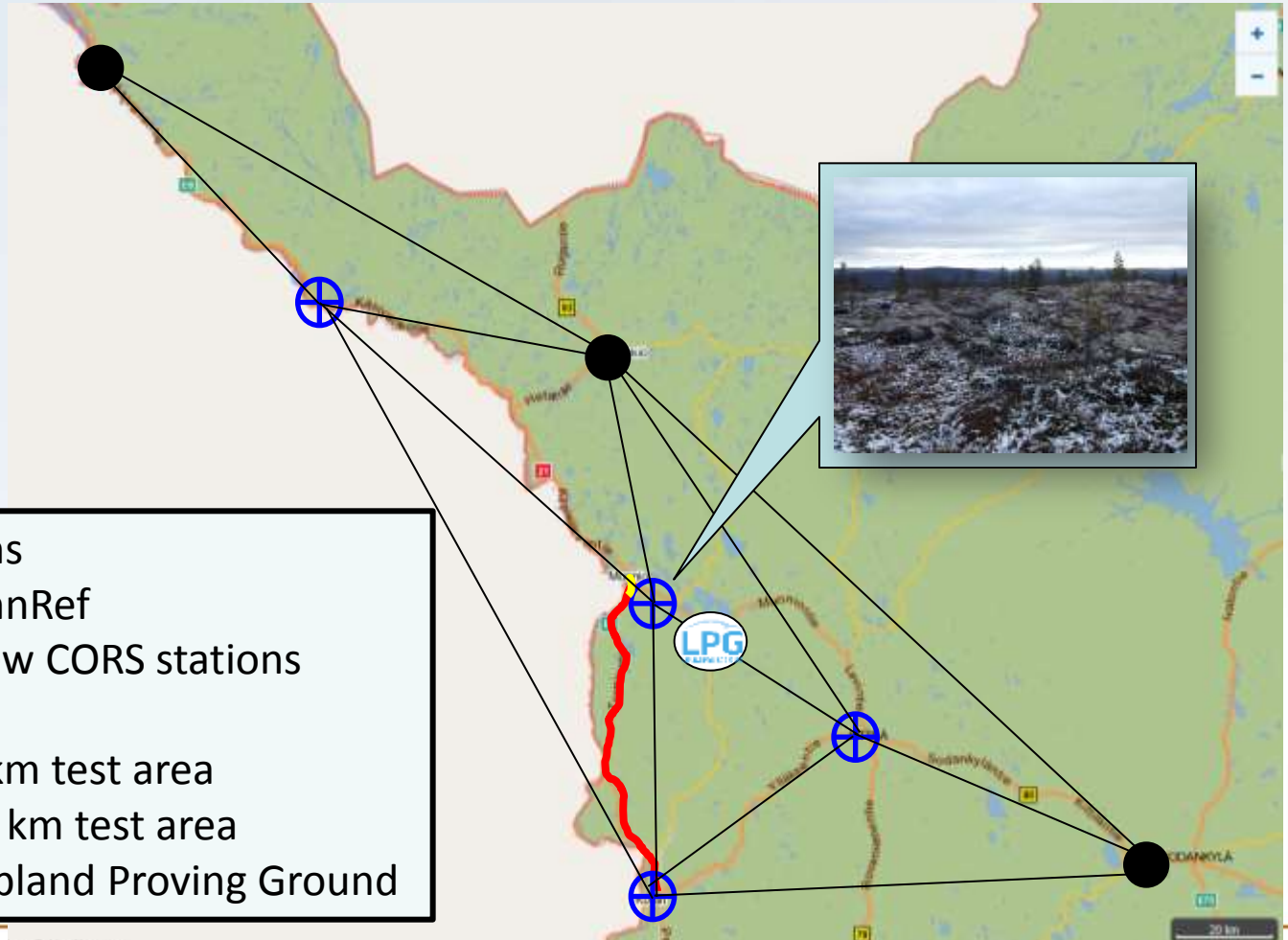
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E8 and Aurora test areas



GNSS stations

- FinnRef
- ⊕ New CORS stations

Test Areas:

- 9 km test area
- 75 km test area

Lapland Proving Ground

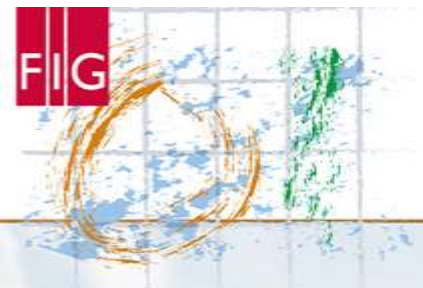


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Future perspectives of FinnRef



2017 Open data for research

2019 GNSS network of 40-50 stations: NRTK for internal use

2020 Infrastructure for coordinate, height and gravity reference

202X National positioning infrastructure

Guided by the Spatial data policy of the Parliament



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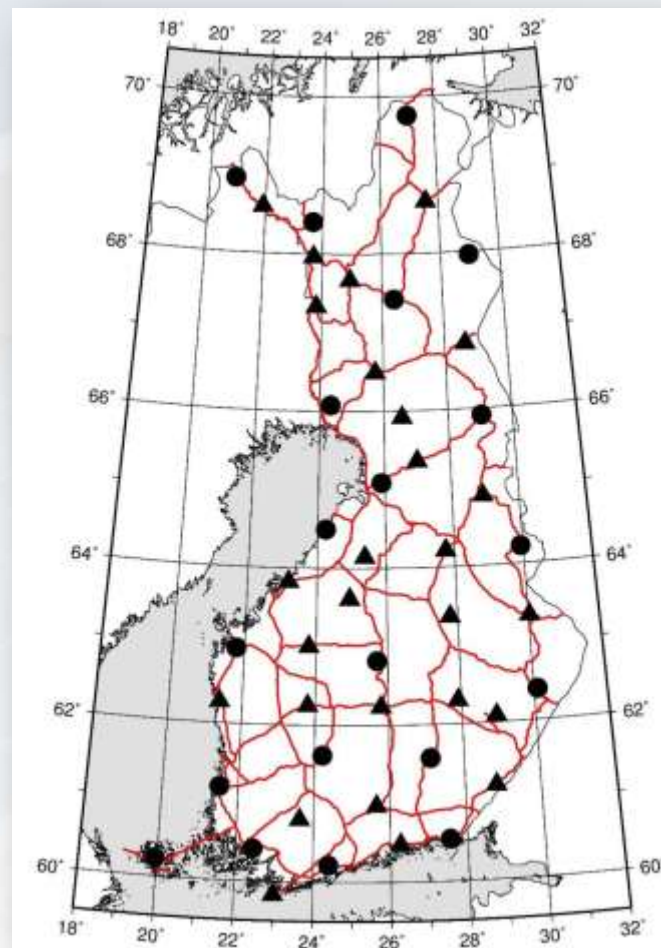
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Future: FinnRef is the Reference of everything 😊

- 40-50 FinnRef stations for
 - **Coordinate reference**
 - Coordinate transformations
 - NRTK
 - GNSS weather
 - **Height reference**
 - All stations will be precise levelled
 - **Gravity reference**
 - Selected stations will have a pillar for gravity observations (FG5)



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