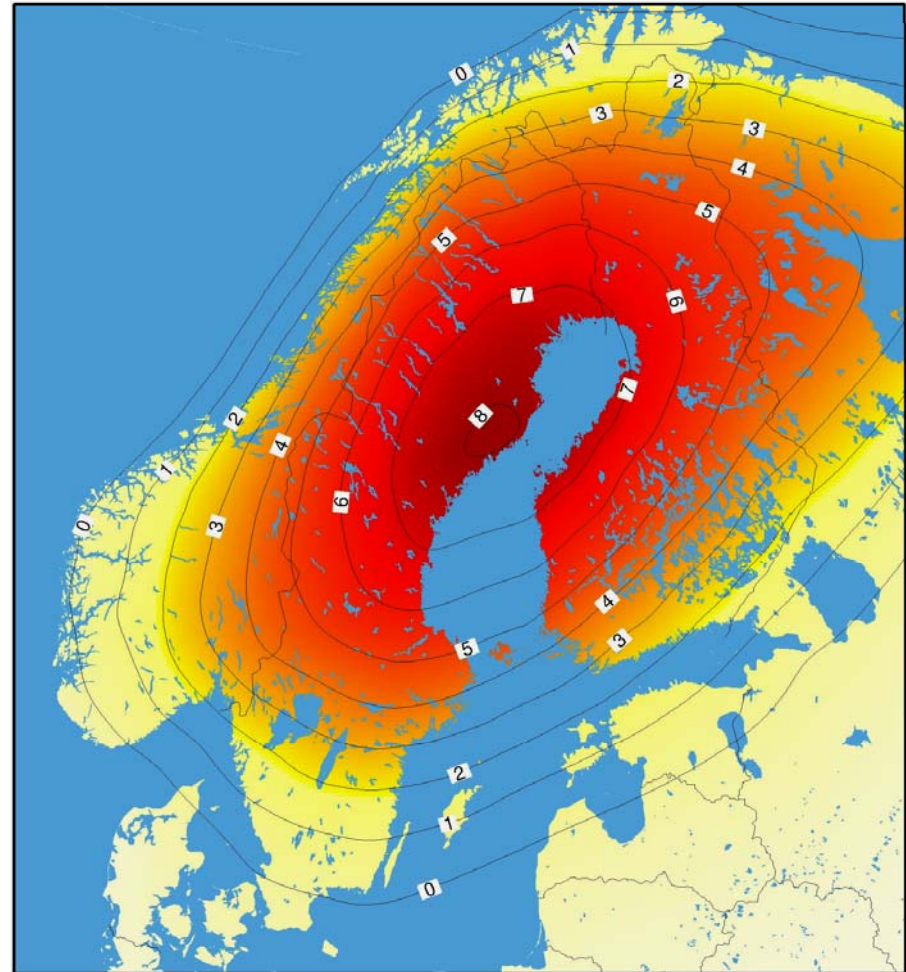


National Report of Finland

M. Poutanen & P. Häkli
Finnish Geodetic Institute

Maintenance of ETRS89 coordinates

- ETRS89 realised through ITRF96(1997.0) leading to **ETRF96(1997.0)**, called **EUREF-FIN**
- **coordinates kept fixed** even if the post-glacial rebound is deforming the crust – approx. 3-10 cm uplift since 1997.0, also small horizontal component
- NKG has developed a **geodynamical model** to transform ITRF2000 coordinates accurately to national realisations



Maintenance of EUREF-FIN coordinates *at permanent stations*

- no changes in instrumentation (=antennas) since the beginning to avoid jumps in timeseries
- regular monitoring independently from GPS: centring measurements of the mast/pillar with precision tacheometry
- regular precise levellings of the antennas started 2007
- upgrade to GNSS planned in the future, present plan: old stations remain untouched – new stations next to the old ones



EUREF-FIN and densifications

I order network

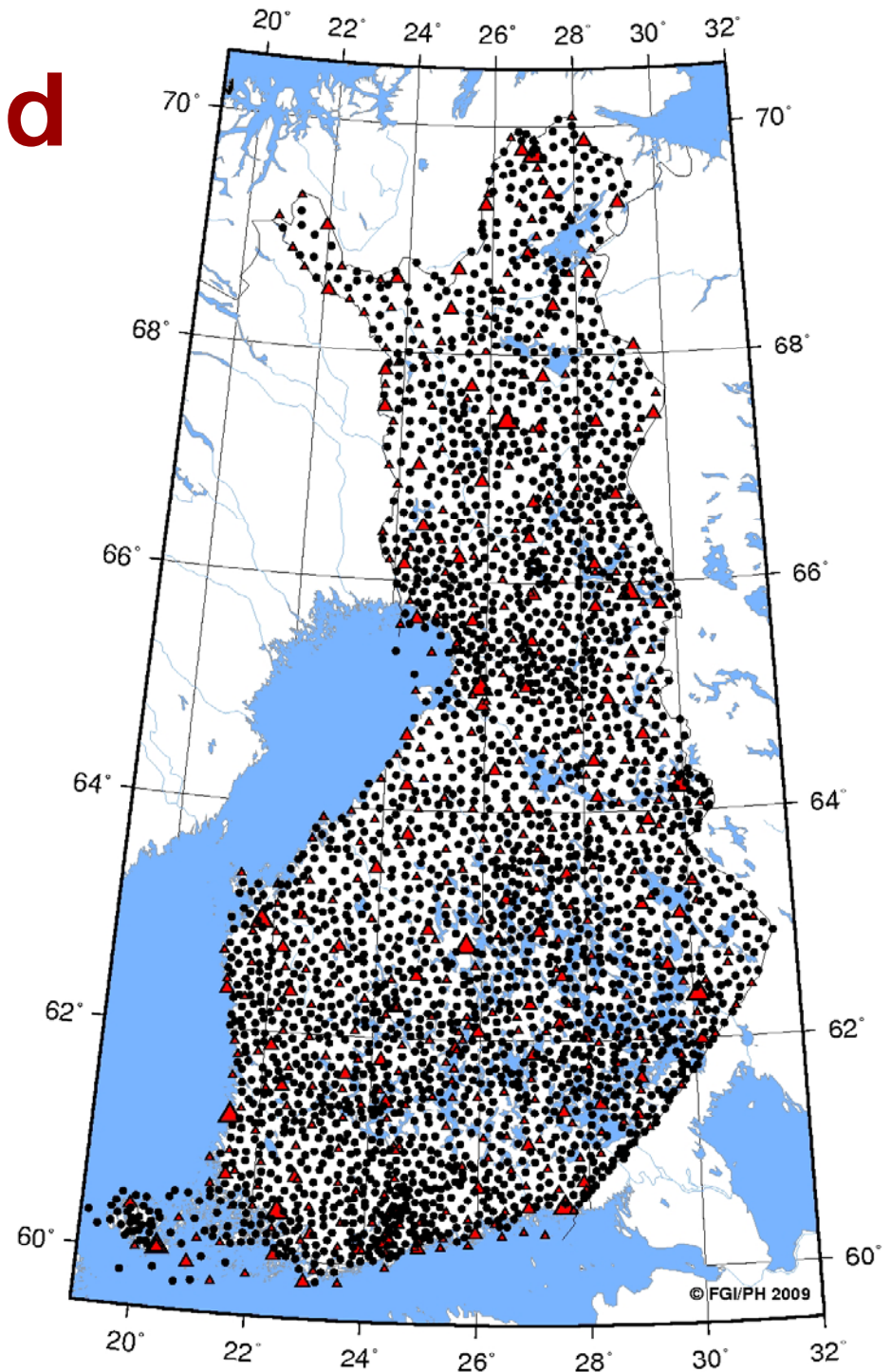
- FinnRef Permanent GPS network – 13 stations
- Realization 1996-97 – 100 points

Ib order network

- Densification 1998-99 – 350 points

II order network

- Densifications by NLS
 - **completed in 2008**
 - approx. 2500 points



Coordinate transformation web application

- Transformations between national reference frames
- Data
 - geoid models
 - transformation grids
- Information about Finnish reference frames
- ITRFs not (yet) available
- Free of charge

<http://coordtrans.fgi.fi>

The screenshot shows the FGI Coordinate Transformation Service web application running in a Windows Internet Explorer browser. The address bar displays <http://coordtrans.fgi.fi/transform.jsp>. The page has a navigation bar with links for "Front page", "Transformations", "Data", and "Help". On the right side, there are links for "Change language" (suomi, English), "Login", and "Registration".

The main content area is divided into two panels: "Input properties" and "Output properties".

Input properties:

- Coordinate Reference System:**
 - Datum: EUREF
 - Coordinate Reference System: ETRS-TM35 (Projected)
 - Height system: N2000
 - Projection zone: ETRS-TM35
- Description:** (button)
- Text file / Keyboard:** (radio buttons, Keyboard is selected)
- Table:** A table with three columns: "Easting [m]", "Northing [m]", and "Height [m]". It contains 10 empty rows for data entry.
- Transform:** (button)

Output properties:

- Coordinate Reference System:**
 - Datum: KKJ
 - Coordinate Reference System: KKJ (Projected)
 - Height system: N60
 - Projection zone: KKJ zone 3 / YKJ
- Description:** (button)
- Text file / Screen:** (radio buttons, Text file is selected)
- Variables for text files:**
 - Decimal precision: ~ 0.1 mm
 - Line separator: Windows / DOS
 - Angle pattern: (dropdown)
 - Decimal separator: ☒ dot, ☐ comma
 - Column delimiter: ☐ comma, ☒ tab, ☐ space
 - Write a header: ☒
 - Use id in front: ☒
 - Coordinates reversed: ☐
 - Line ends to output: ☐
 - Use cardinals (N,E,W,S): ☐

The status bar at the bottom indicates "Error on page." and "Internet" connection.

GPS+GLONASS

+DORIS

Metsähovi



AG

SCG

SLR

geoVLBI



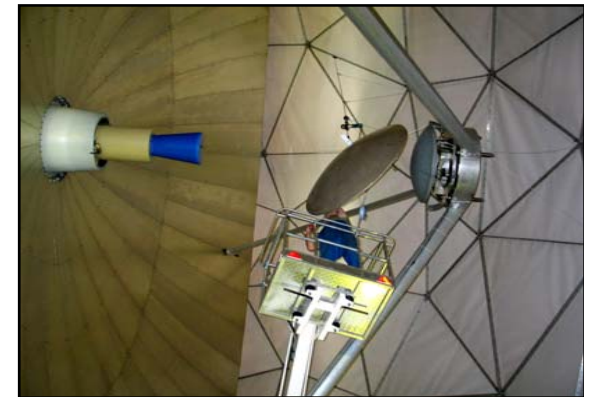
regular
measurements



continuous



under renovation



8 campaigns in 2008

Metsähovi local ties - VLBI

- Current tie measurements started 2007
 - precision tacheometry
 - GPS
- Reference point dependent on:
 - Time
 - Temperature
 - Azimuth/elevation

→ 1mm accuracy difficult to achieve
- Centring with GPS
 - 2 GPS antennas mounted to telescope
 - Tests with static and kinematic data
- Results by the end of 2009



National Standards Laboratory

– Acceleration of free fall

- Absolute gravity measurements
 - 10 points in Finland
 - 7 points in Estonia
 - 2 comparisons in Metsähovi



National Standards Laboratory – Length

- EMRP (European Metrology Research Programme)
 - Calibration of the BEV baseline in Innsbruck
 - Extended uncertainty ($k=2$)
 7×10^{-7} (0.77mm for 1080m)
with respect to the definition of the metre
- EDM/GPS measurements in Kyviskes, Lithuania
- Scale transfer to Vääna, Estonia

