Geodeettinen laitos

National report of Finland

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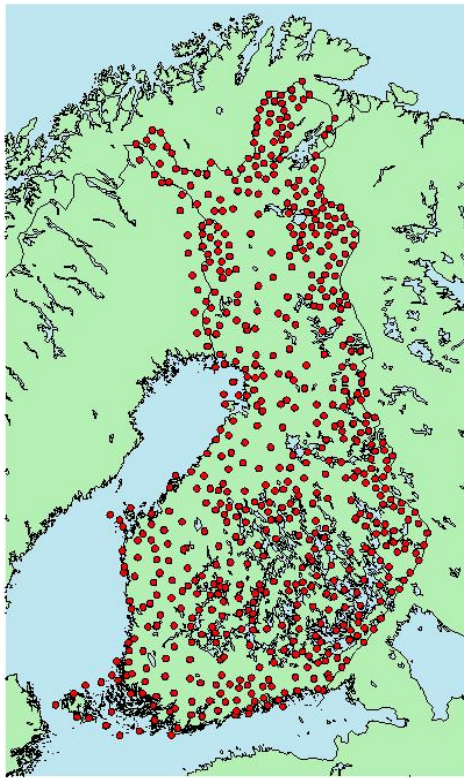

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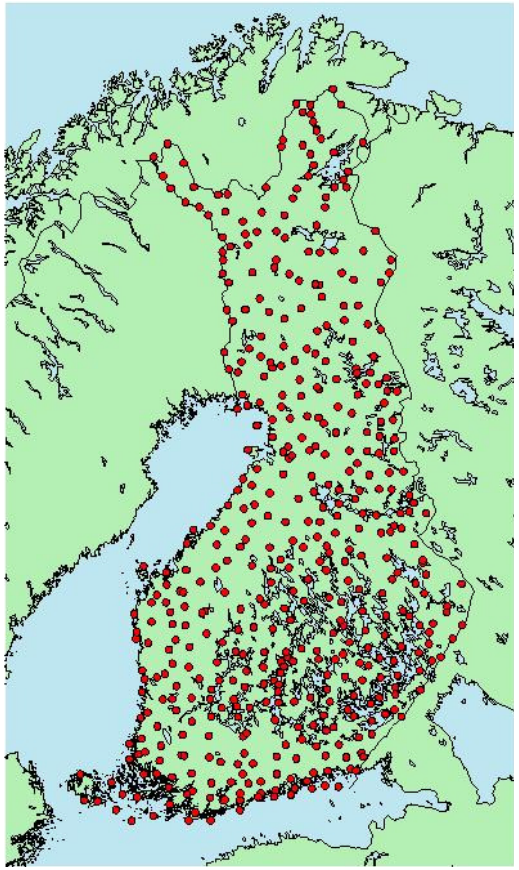
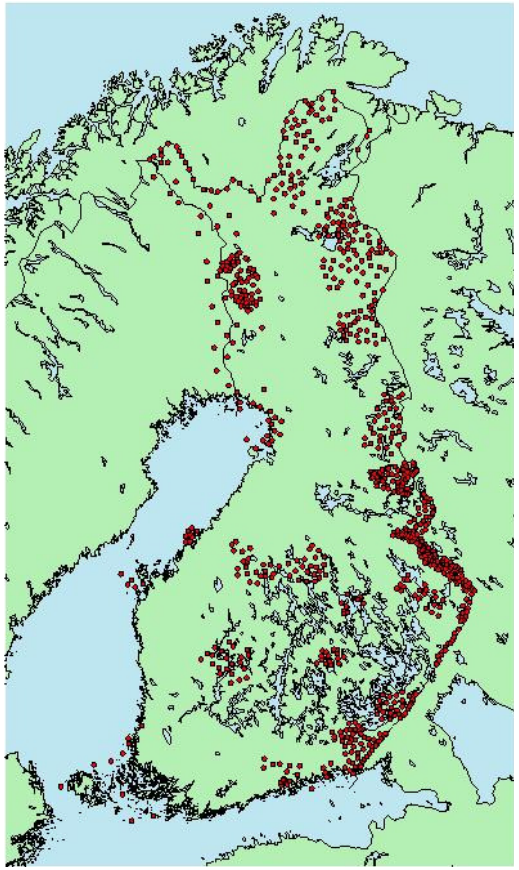
02431 Masala, Finland

EUREF 2004 Symposium, 2-5 June 2004, Bratislava, Slovakia.

The densification of the EUREF network in Finland 1996-2002



ETRF89 points determined by the FGI (1996-1999)



The ETRS89 points determined by the National Land Survey (2001-2002)

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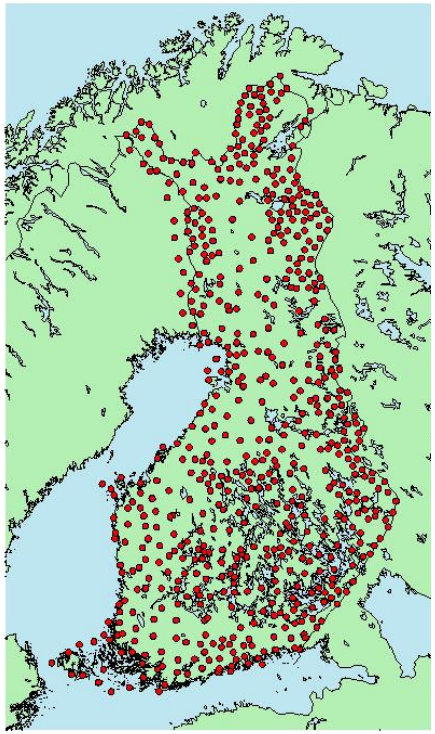
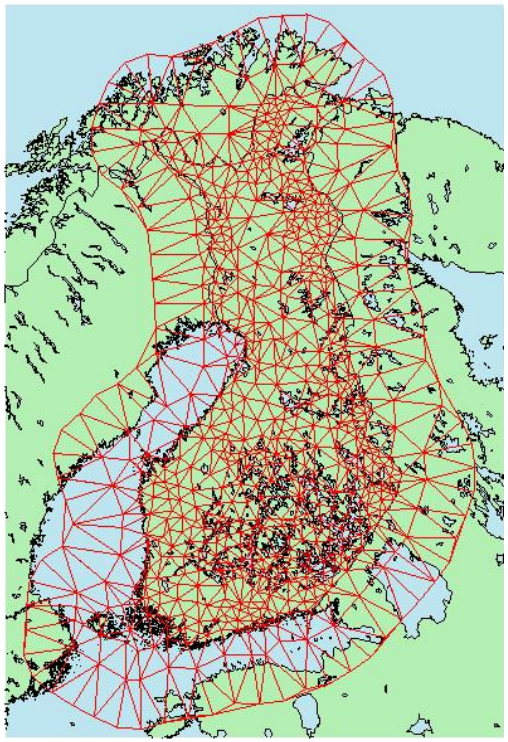
2D transformation ETRF89-TM35 -> Finnish Grid Coordinate System (kkj)



The GPS points used to derive the transformation between the ETRS89-TM35 and the National Grid Coordinate System (kkj).



The triangulation network used for the transformation of the ETRS89-TM35 coordinates to the National Grid Coordinate System (kkj)

Accuracy of 3D transformation ETRF89 -> Finnish Grid Coordinate System (kkj)

The 7-parameter transformation between ETRF89 and National Grid Coordinate system (kkj) show the distortion of the I-order triangulation network.

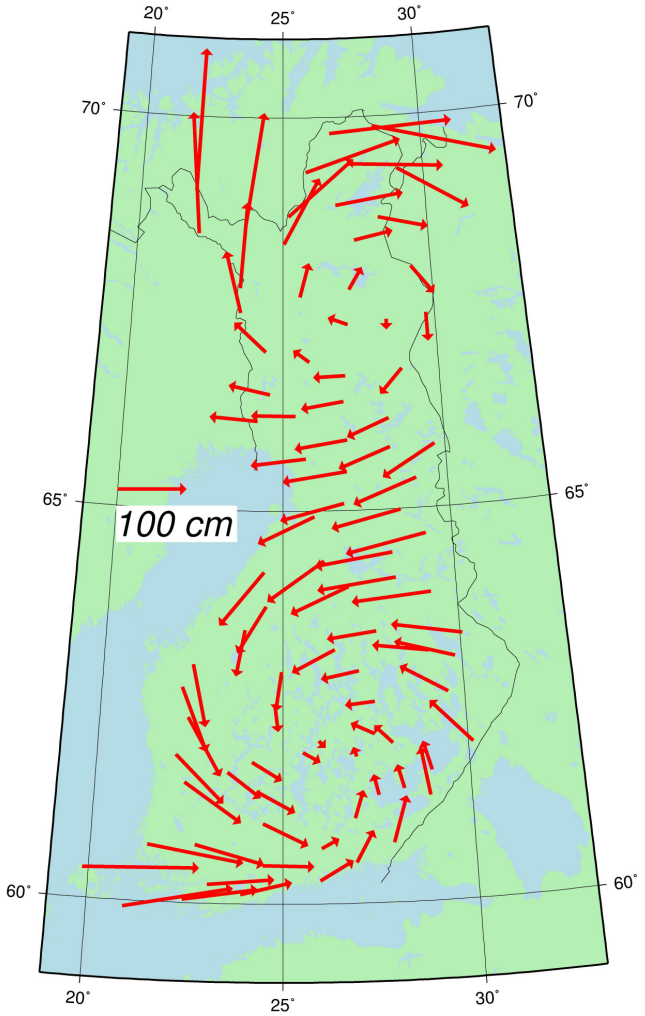
The RMS of the residuals:

N = ±0.52 m, E = ±0.73 m, U = ±0.43 m

Max. residuals:

N = 2.01 m, E = 1.74 m, U = 1.33

Number of stations: 90



Accuracy of 2D transformation ETRF89-TM35 -> Finnish Grid Coordinate System (kkj)

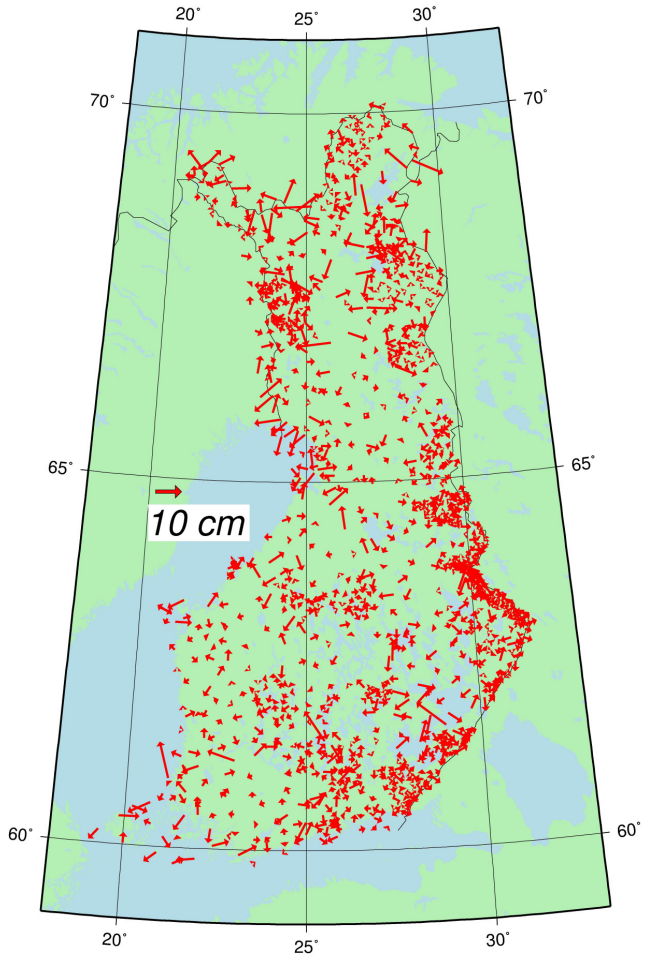
The final transformation is computed using by the *affine transformation* using the coordinates of the vertices of the triangle, in which the point to be transformed is located.

$$x_2 = \Delta x + a_1 x_1 + b_1 y_1$$

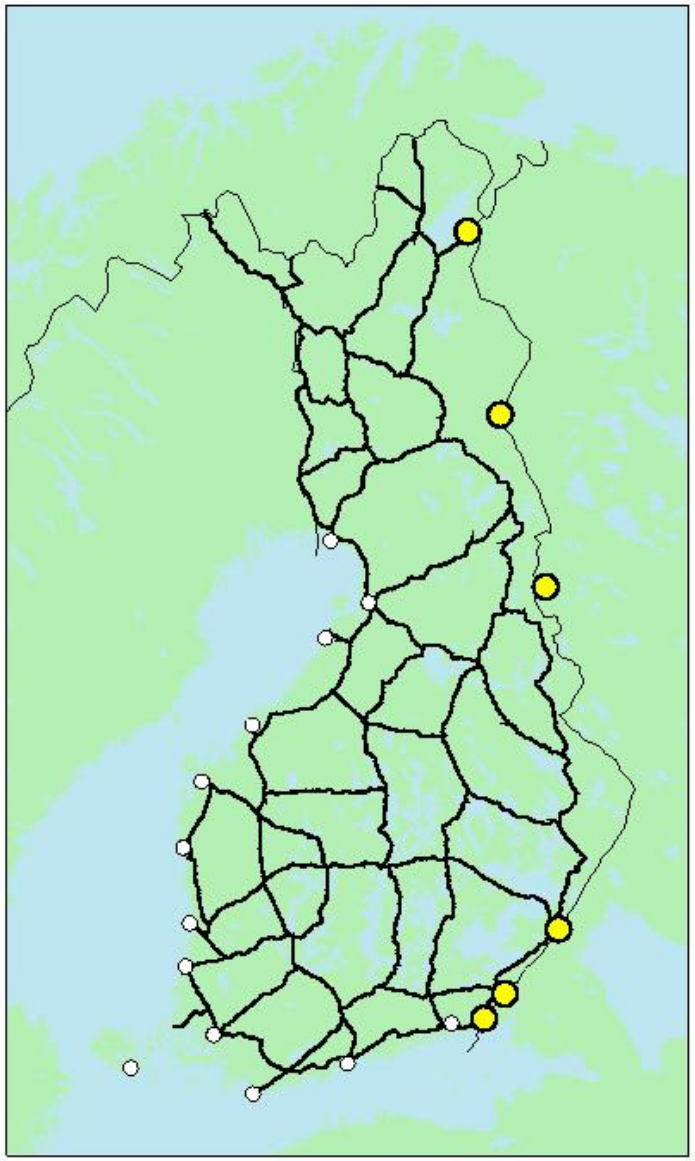
$$y_2 = \Delta y + a_2 x_1 + b_2 y_1$$

RMS of the residuals:
N = ±0.02 m, E = ±0.02 m

Max. residuals:
N = 0.11 m, E = 0.12 m
Number of test points: 684



Precise Levelling



The Third Precise Levelling was continued on the last lines of the network.

About 315 km of double-run levelling was performed in 2003 by three field teams using the Zeiss DiNi12 digital levels.

Field work will be completed in 2004, after which a new national height system will be created for Finland.

Levelling connections to Russia were made in four places by a Finnish and a Russian levelling team. Including the work in 2002 there are now six junctions.

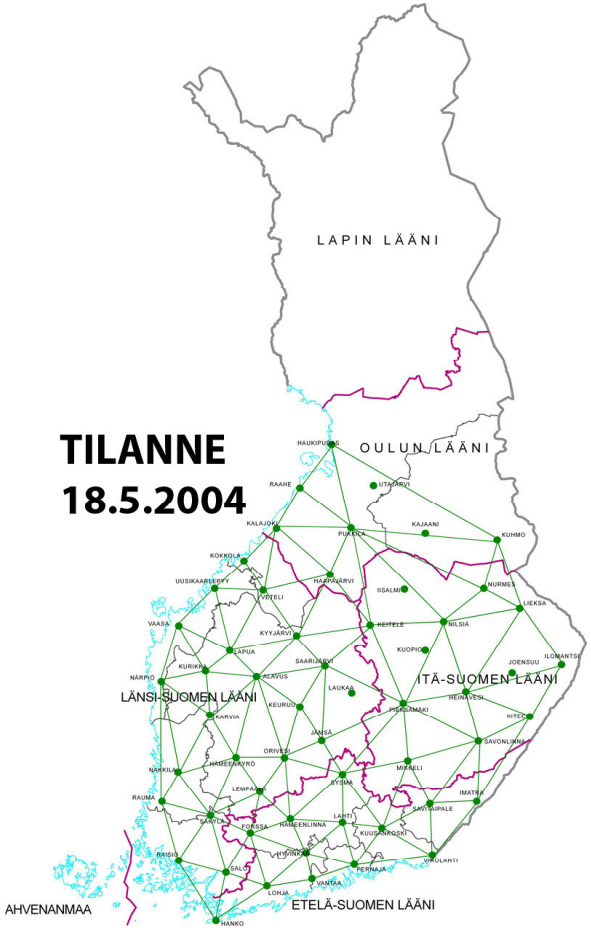
Adjustment of the levelling ring around the Baltic and to the NAP reference bench mark was prepared.

Land uplift models were evaluated.

GPS/geoid and oceanographic ties over the Gulf of Finland and Gulf of Bothnia were studied.

Geodeettinen laitos

Virtual Real Time Kinematic GPS VRS



The active stations of the VRS network of Geotrim Ltd. in 2004 May 18.

http://gpsnet.fi/

The national mapping authorities (FGI and NLS) are not running real time GPS stations in Finland.

There are two differ-ent VRS networks operational, which are operated by Geotrim Ltd and City of Tampere.

FGI studied the Accuracy and per-formance of the VRS concept by field tests in co-operation with Geotrim Ltd and City of Tampere.

FGI will compute the coordinates of the VRS stations in the EUREF-FIN frame of the network of Geotrim in order to con-firm the consistency of the coordinate frame in the VRS network.

Metsähovi Research Station

Geodeettinen laitos

Instrumentation:

Satellite Laser Ranging (SLR)
GPS receiver
GLONASS receiver
DORIS beacon
Superconducting gravimeter
Absolute gravimeter
Seismometer
Geodetic VLBI

SLR:

During 2003 a total of 817 orbits of 17 satellites were observed.

GPS:
Station belongs to IGS, EPN and FinnRef networks and takes part to IGLOS project (International Association of Geodesy GLONASS project).

DORIS:
The French Doris beacon continued its operation.

Superconducting gravimeter:
Vertical motion due to loading by the atmosphere and by the Baltic Sea were studied using the observations of the superconducting gravimeter

Geodetic VLBI
As a co-operation project with the *Metsähovi Radio Research Station of the Helsinki University of Technology*, preparations for geodetic VLBI installation were continued. First tests were made in 2003, and a regular observation schedule as a part of the IVS (International VLBI Service) network is expected for the year.