



NORWEGIAN MAPPING
AUTHORITY

NATIONAL REPORT FROM NORWAY

SPATIAL DATA – FOR BENEFIT OF THE SOCIETY

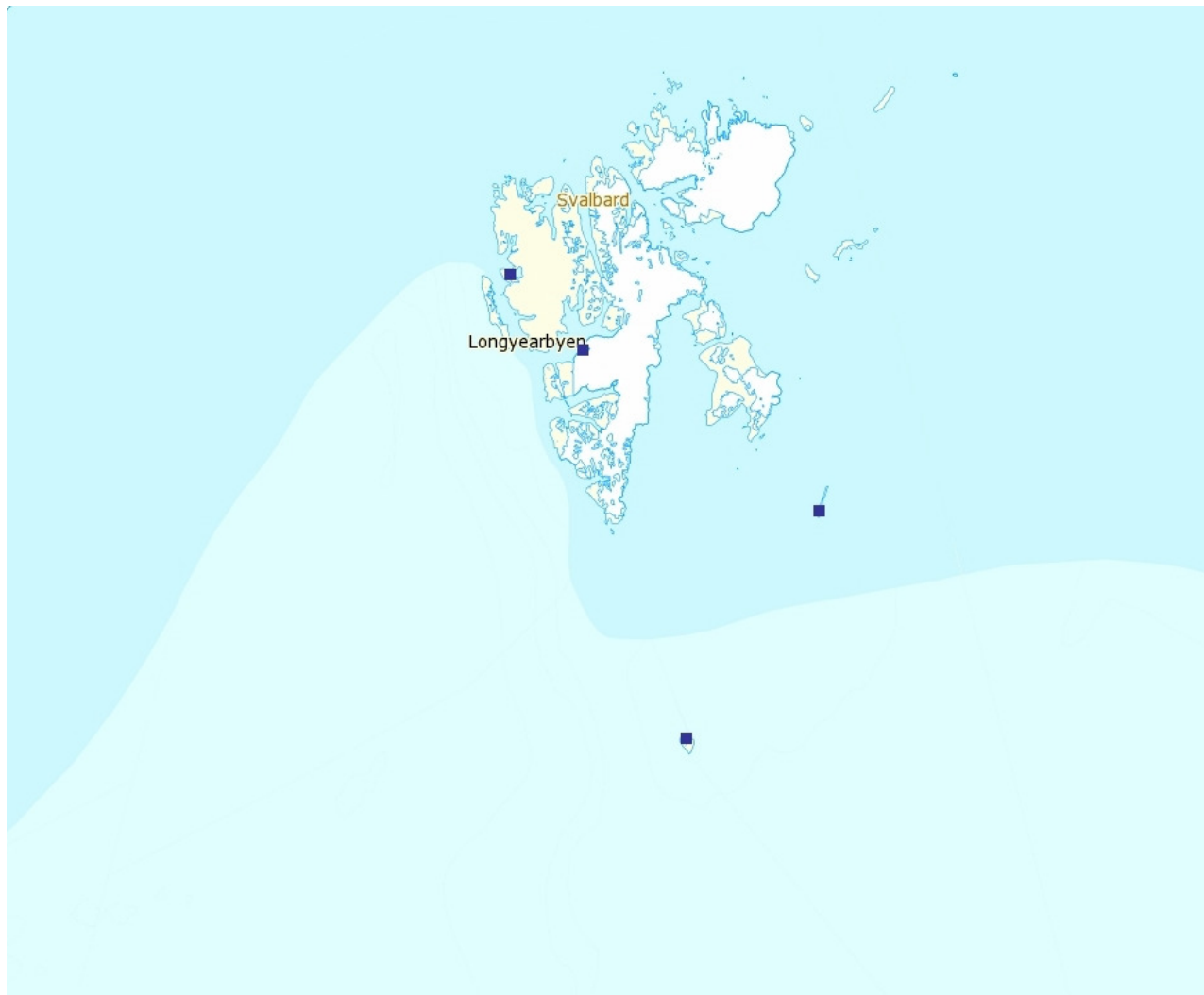
PERMANENT GNSS STATIONS

Main Land



PERMANENT STATIONS

In the Arctic



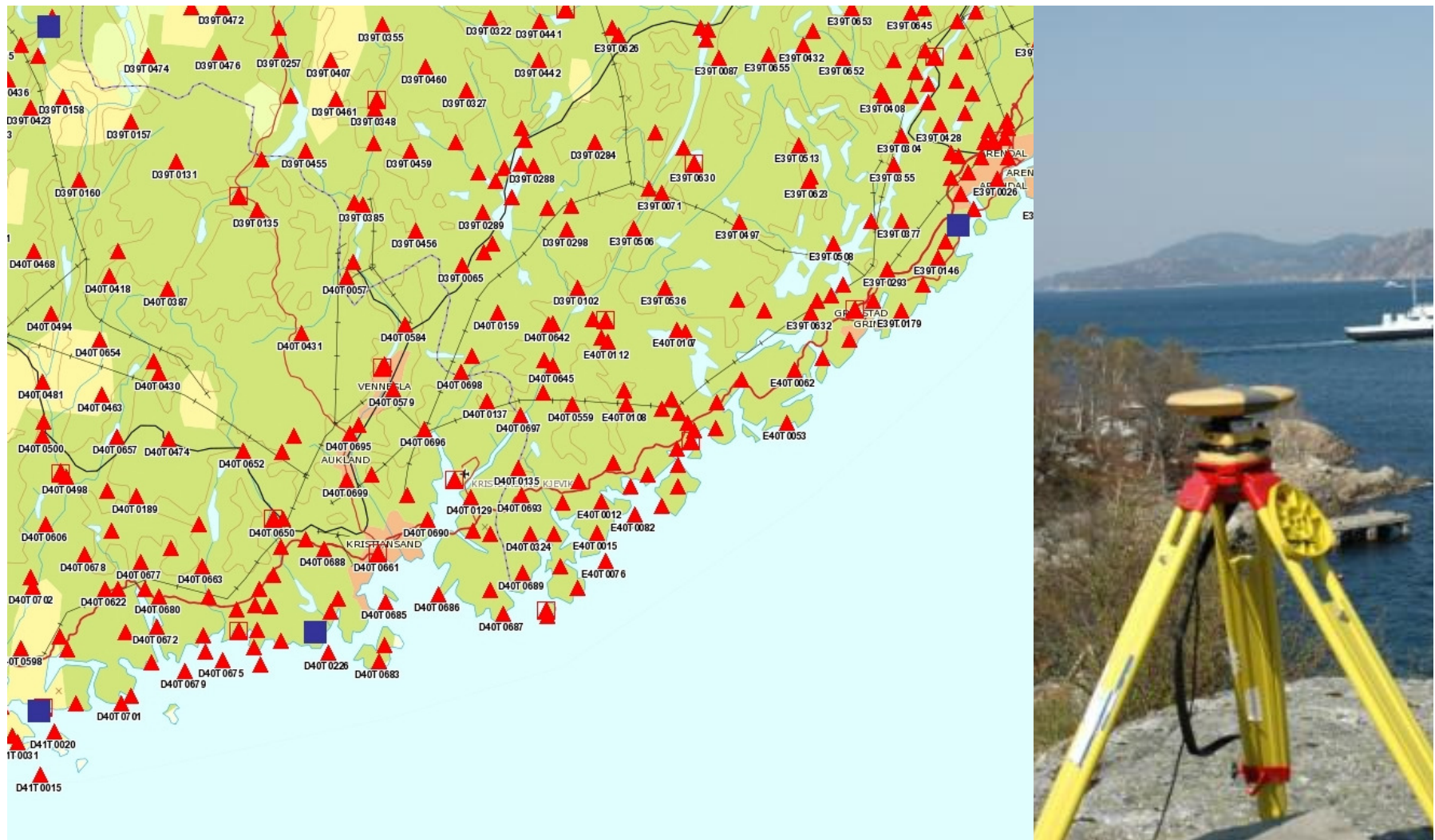
REFERENCE NETWORK

First order, called Stamnett



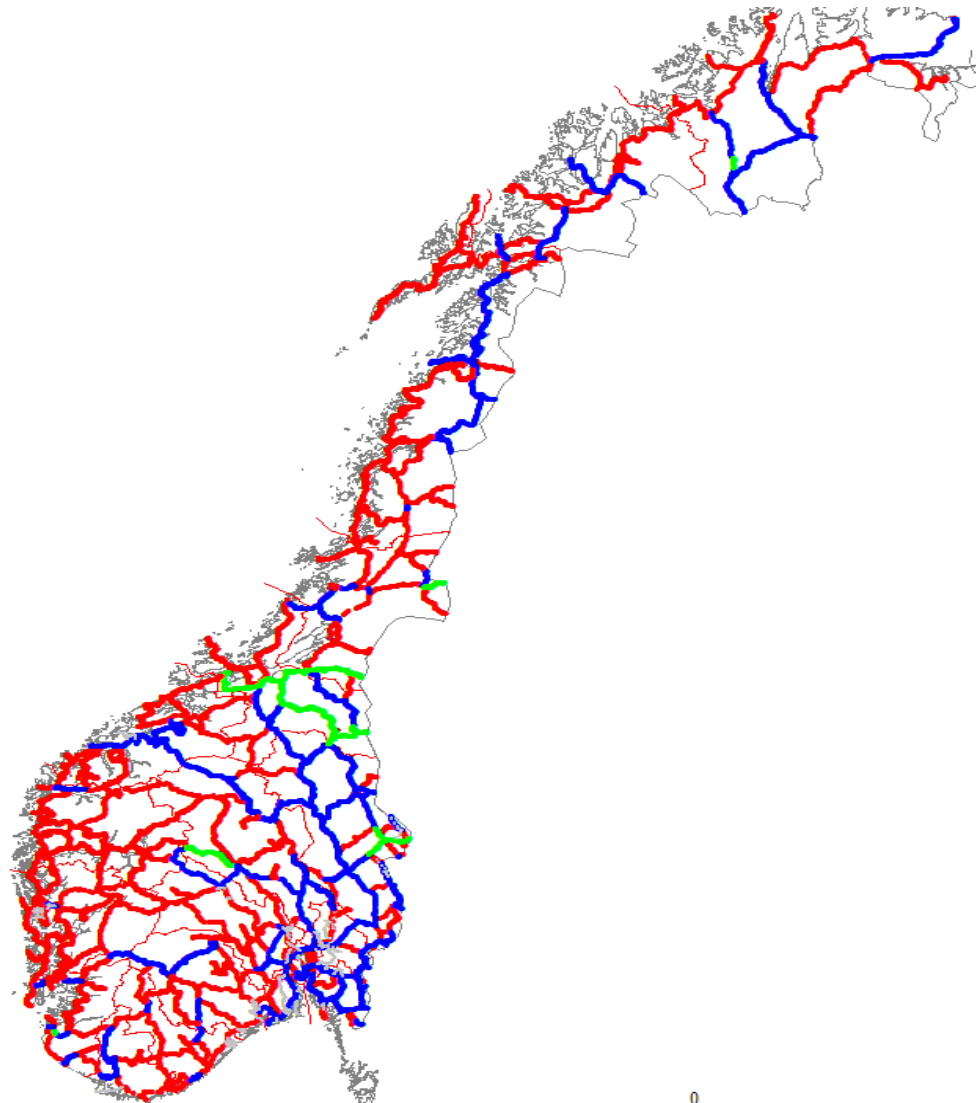
REFERENCE NETWORK

Second order, called Landsnett.



LEVELLING NETWORK

First order





STATUS

Reference frames

136 permanent GNSS stations

Almost covering the entire main land Norway

About 70 km between them

Stamnett, our 1st order reference network was completed in 1996

Consists of 790 points with an average of 20 km between them

Landsnett, our 2nd order reference network completed in 2008

Consist of a homogenous network covering the whole main land of Norway

An average distance of 5 km between the points.

EUREF89, our ETRS-realization, implemented in all municipalities

NN2000, our new height system, calculated in 2008



NN2000 – New height system

Final calculation December 2008

27000 levelling bench marks calculated

1. and 2. order points

Railway levelling network

Extension of the Swedish RH2000- and the Finnish N2000 network

Deviates 0 – 1,9 cm from EVRF2007, NN2000 always highest

Part of the Nordic Levelling Ring

Southwestern part is preliminary due to problems crossing
Sognefjorden.

12 municipalities have started implementation projects



GPS/LEVELLING POINTS

Connection between geometrical and geophysical reference frame

2800 leveled points in the Reference Network

Validation of gravity based geoid models

Connection points for Height Reference Models

More points necessary

No municipality centre more than 15 km to the nearest GPS/Levelling point

No location on the highway (Riksveg) more than 15 km to the nearest
GPS/Levelling point

NN2000 in the reference network will be calculated using a Height Reference
Models

About 1000 km remain to be levelled to obtain more GPS/levelling points

A NEW REFERENCE FRAME, IGS05

A new scientific reference frame

Uncertainty about the accuracy of the ellipsoidal heights in our existing reference frame EUREF89

Main focus in 1996 was the horizontal components

Re-measuring points in our reference network to a spacing of 30 km

Five days of continuous measuring

Possessed with the Bernese GPS software

Recalculating the whole reference network, 1st - and 2nd order network

Make a grid model of differences for transformation purposes

High quality ellipsoidal heights important for implementation of NN2000 in our reference network



Thank you for the attention!