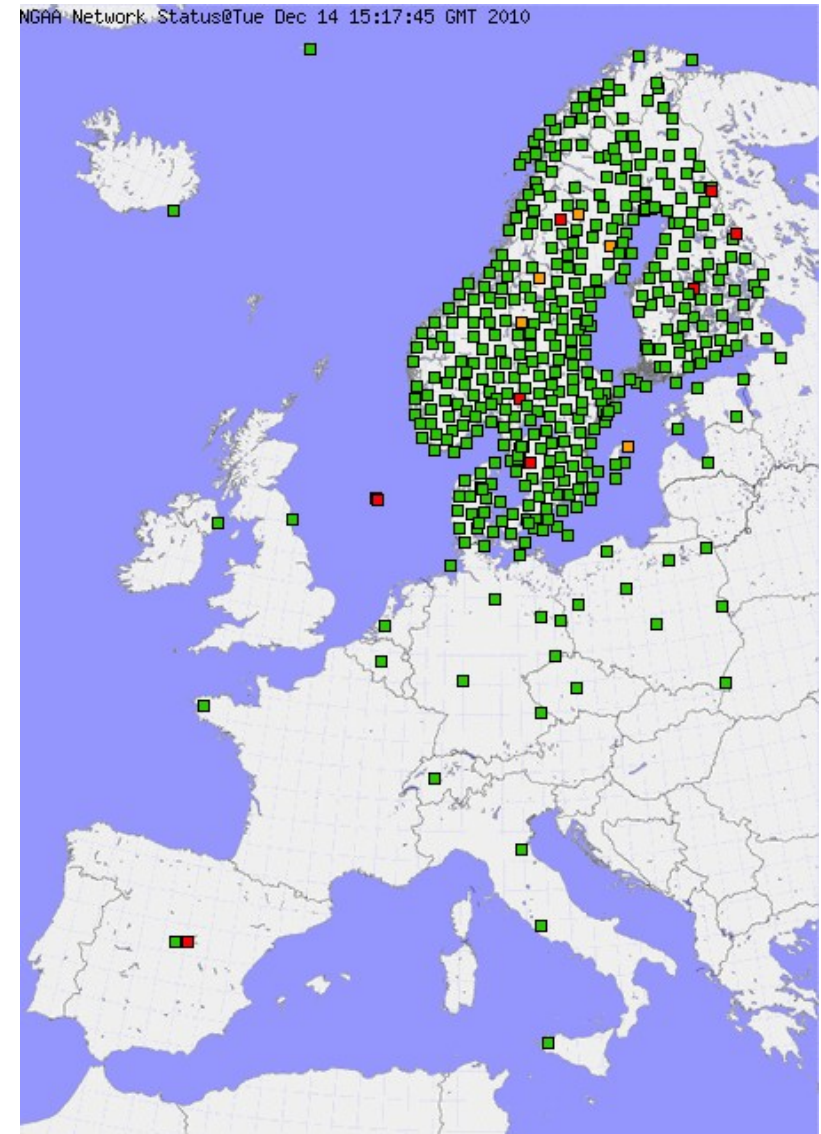
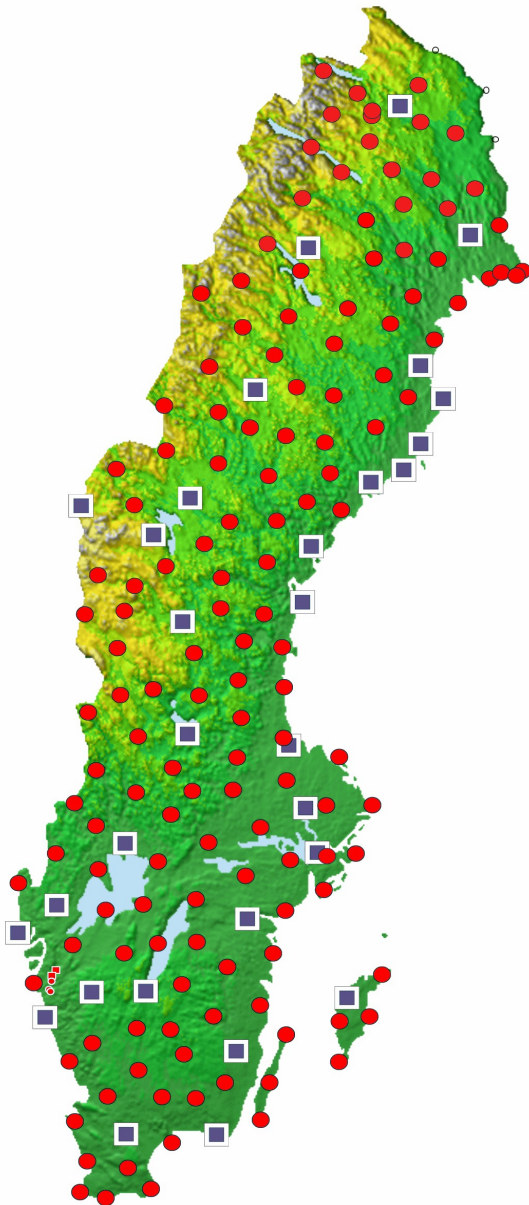


NGAA – EGVAP

- GNSS data processing hosted at the SMHI operational center since 2007
- Data from Denmark (~30), Finland (~100), Iceland (~3), Norway (~100), Sweden (~160), oilrigs (8) and surrounding countries (~30).
- The map (→) is missing stations in Greenland, Svalbard and Russia.
- Data from the previous hour is processed and results (integrated tropospheric content) for all stations delivered to EGVAP about 45 minutes after full hour.
- In total NGAA is processing > 400 stations





SWEPOS



National network of 200 (2011-10-20)
permanent reference stations:

- Established 1992-93
- **Operated by the National Land Survey**
- **Identical antennas and configuration**

NGAA status:

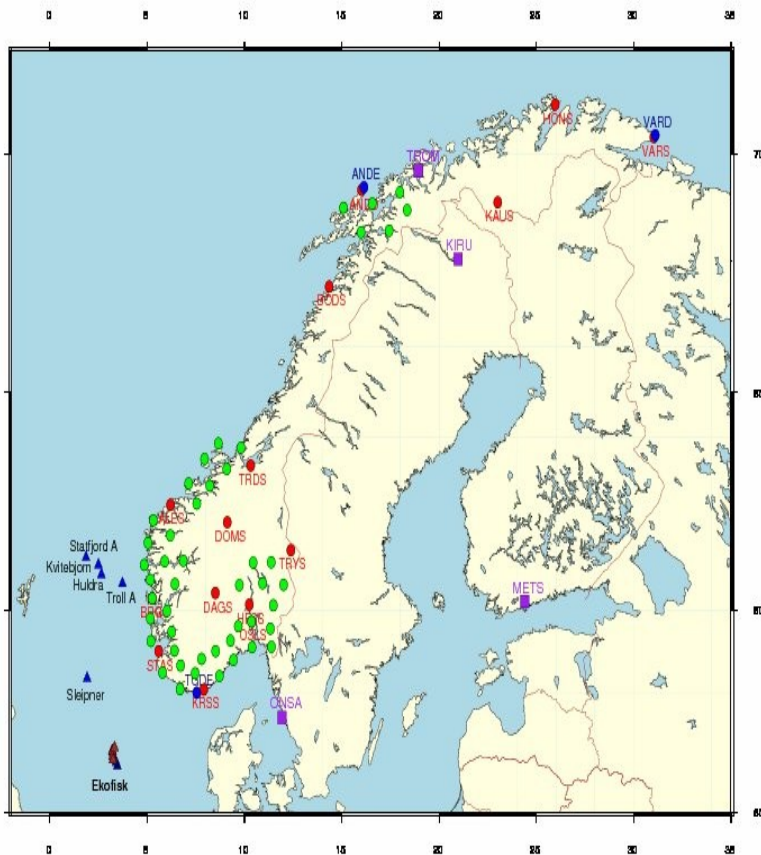
- We use ~ 160 due to limitations in processing capacity
- **FTP-server at National Land Survey, good contact**
- 200 stations since spring 2010 with complete national coverage and denser networks in Stockholm and Gothenburg

GPSnet.dk Denmark Status 2011-10-2



- GPSnet.dk is a permanent network of 26 stations in Denmark
- 3 additional stations from KMS/IGS
- 4 additional stations is delivered from KMS including Faroe Islands but not yet included.
- 30 station Leica network could be included.
- GPSnet.dk push data to the Onsala FTP-server,

SATREF (Norway) status 2011-10-20



- Data from > 100 stations available to NGAA.
- Data from GNSS stations on 8 oilrigs in the North Sea is being processed but data flow is not stable.
- FTP-server at Statens Kartverk with very good quality and timeliness since 2008-01-01.

8 Aug 10 14:02:54 | Permanent GPS stations in Norway and in the North Sea

FGI + GPSnet.fi network Finland (2011-10-20)



Permanent network of **13 (FGI)** and **88 (GPSnet.fi)** stations in Finland

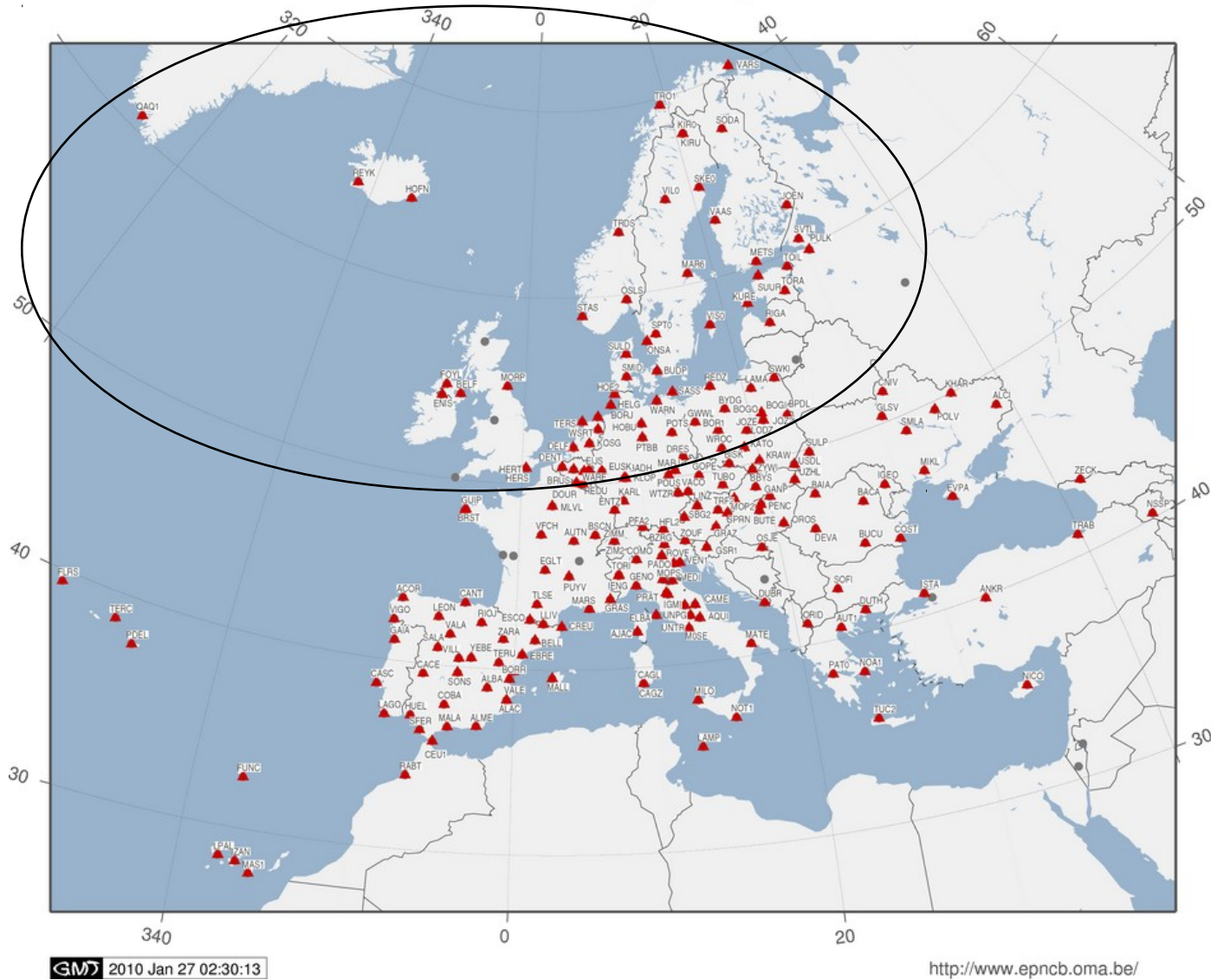
GPSnet.fi:

- Commercial network delivering data free of charge to NGAA
- FTP-push from GPSnet.fi to FMI-server. SMHI get data from FMI-server.

Unfortunately data has been delivered one hour too late over the summers 2009 and 2010. The problem is now solved by running all involved computers on UTC/GMT time.

EUREF Permanent Tracking Network

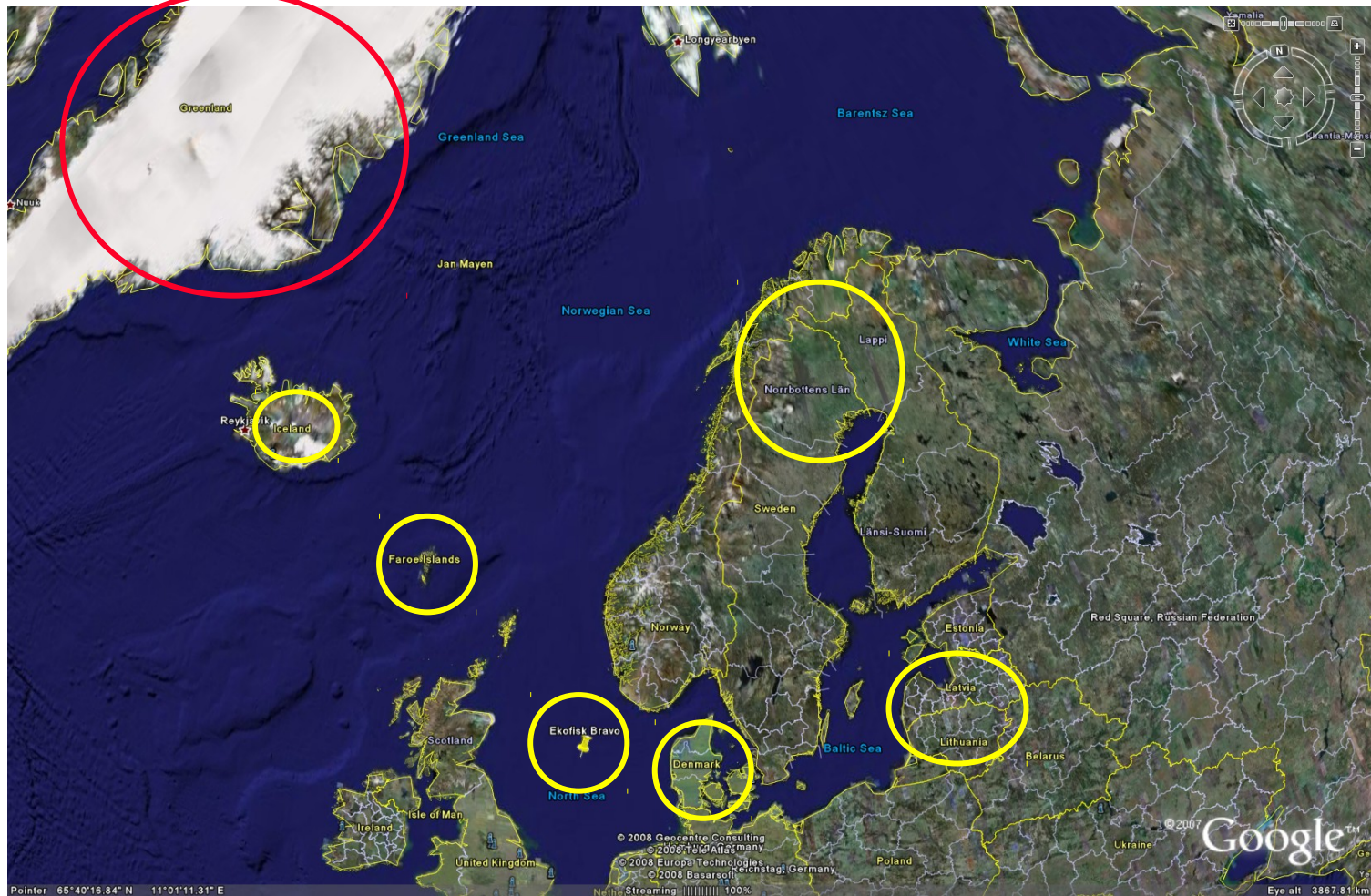
Stations submitting hourly data



○ Soon to be processed

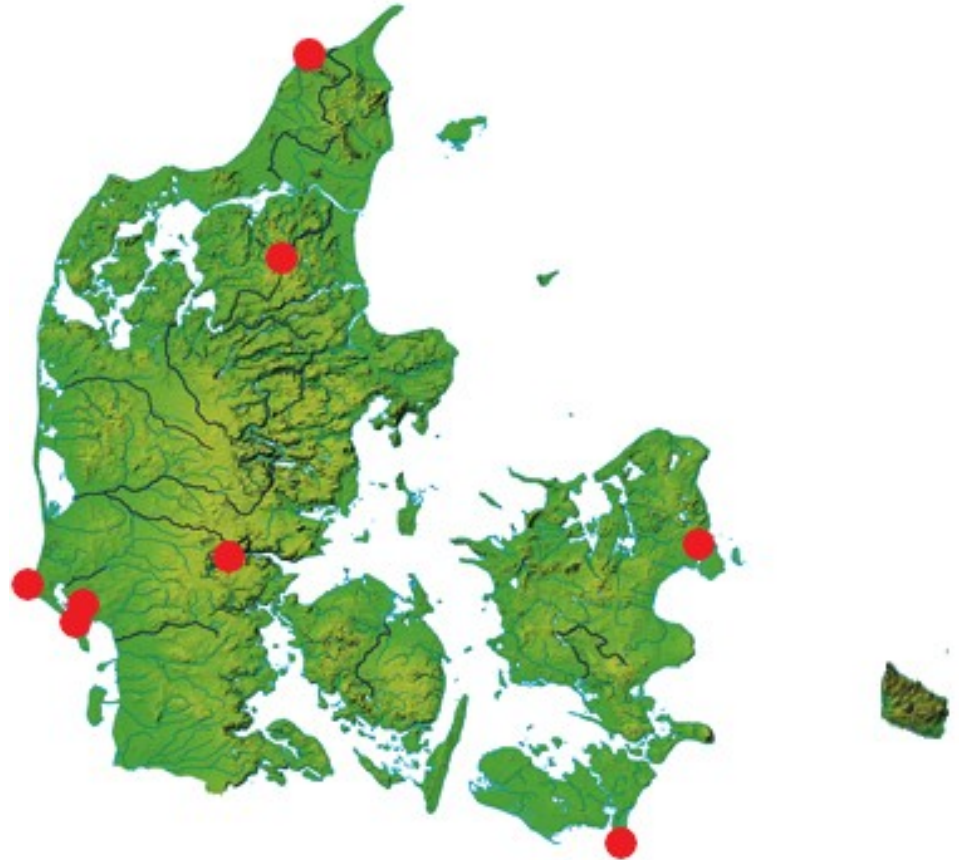
○ Not so soon ...

New stations

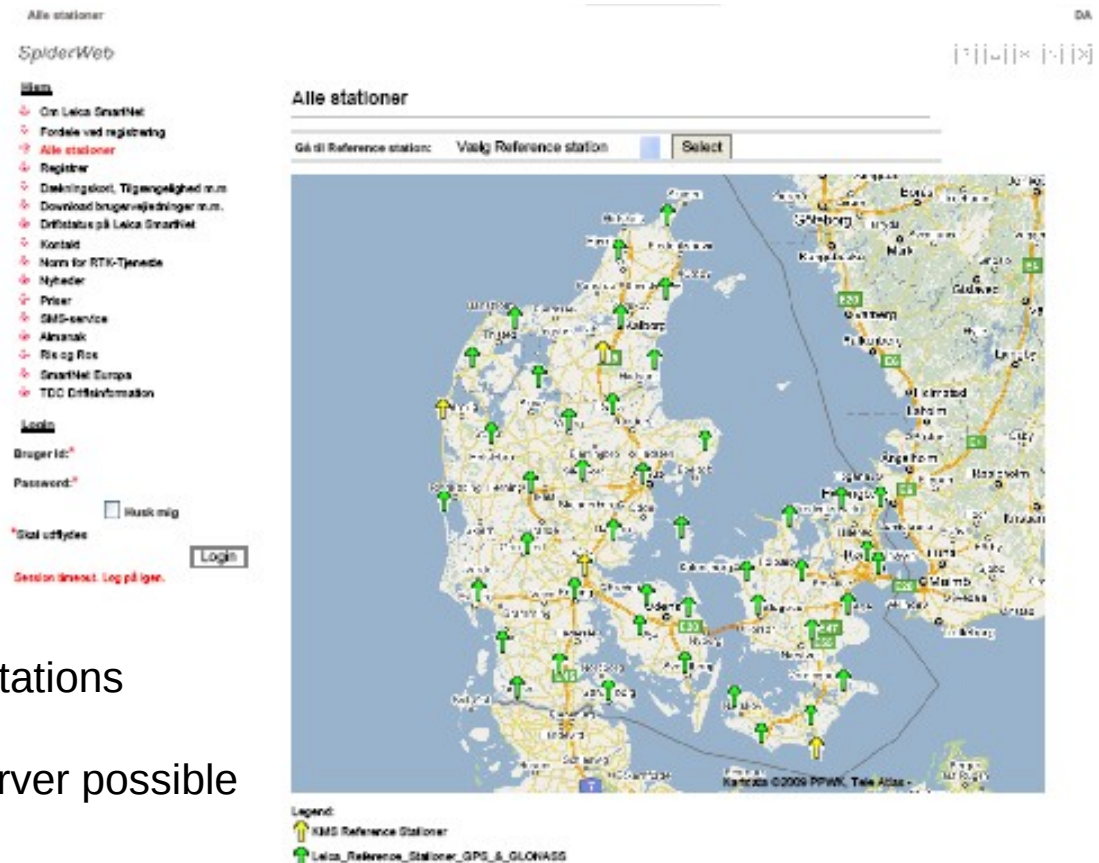


New stations operated by KMS in Denmark

- KMS in Denmark operates 8 stations in Denmark and 1 in Faroe Islands
- We have access to all data via FTP-push to Onsala FTP-server
- We only use 3 due to limitations in data processing capacity



Leica SmartNet.dk



- SmartNet Denmark consists of 46 stations
- Hourly FTP-push to receiving ftp-server possible
- Time delay has to be investigated

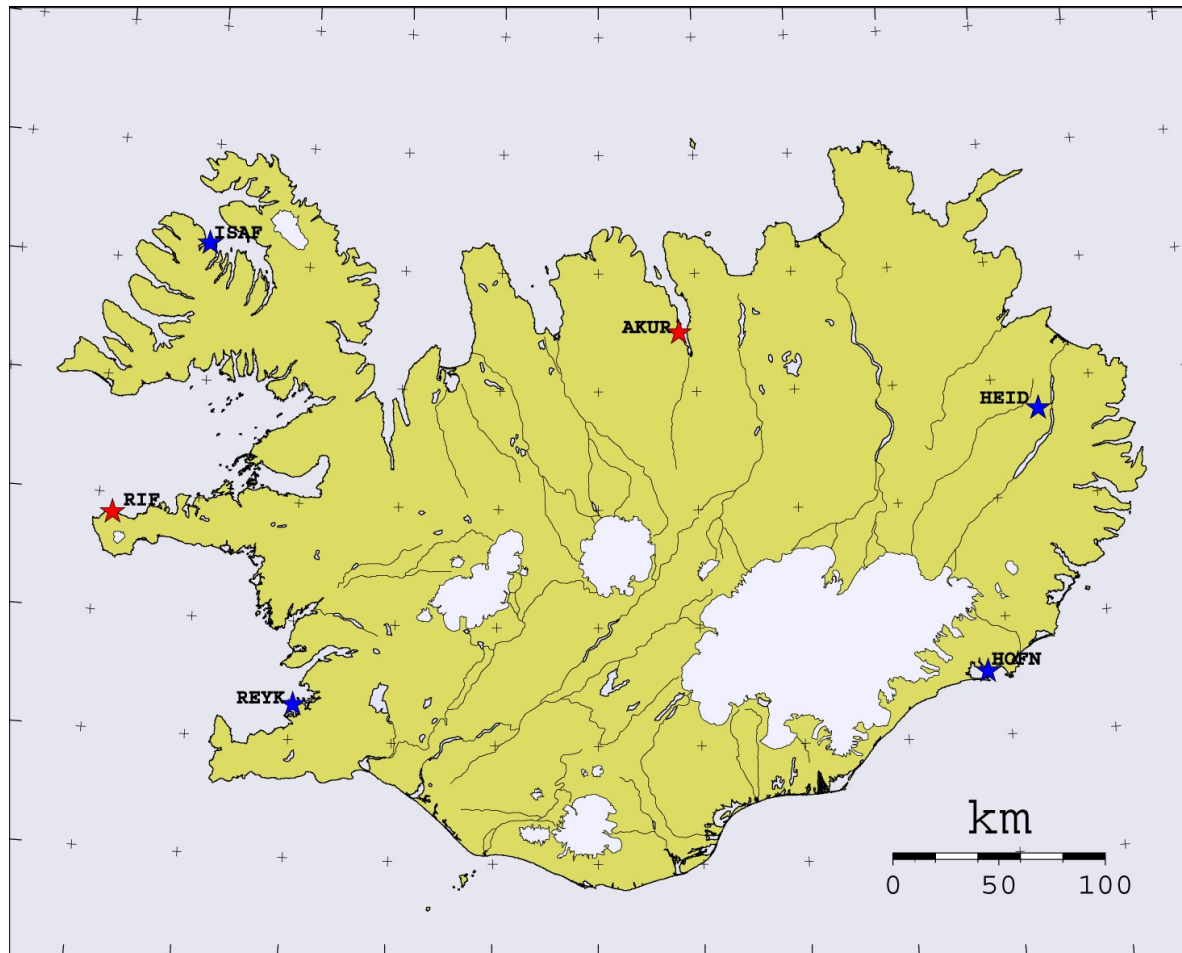
Leica Realtime GNSS Networks in Europe

- Network in Denmark (46)
- Network in Norway (71 – but many in common with SATREF)
- Network with 16 stations in Lithuania
- Network with 19 stations in Latvia



Iceland GNSS Network

(16 stations at the end of 2011)



- get_orbits: Ultra rapid orbits & clocks from IGS or GFZ
 - get_global_data
 - network_1h: Orbit improvement and clock estim.
- (~5 minutes CPU, Linux PC)

Part 2 a - PPP Analysis:

- get_SWEPOS (Sweden)
 - qm4ppp: Editing and quality check
 - point_1h: Estimation of trop. parameter using PPP
- (~ 25 minutes CPU for 150 stations on a standard, Linux PC)

Part 2 b - PPP Analysis:

- get_satref (Norway), get_finnnet (Finland), get_IGS (Europe)
 - qm4ppp: Editing and quality check
 - point_1h: Estimation of trop. parameter using PPP
- (~ 20 minutes CPU for 120 stations on a standard, Linux PC)

Part 2 c - PPP Analysis:

- get_dannet (Denmark)
 - qm4ppp: Editing and quality check
 - point_1h: Estimation of trop. parameter using PPP
- (~ 10 minutes CPU for 26 stations on a standard, Linux PC)

Part 3 – Combined ZTD and Quality

- costprod_file: Merging the solutions and delivery of “cost-file”
 - ftp SMHI and UKMO (COST-server)
- (~2 minutes CPU, Linux PC)

NGAA Status and Plans 2011-10-20

- Satellite orbit & clock generation (Part 1 in prev. slide) is the weak point in NGAA processing. Now solved by using IGS real time products. Implemented October 2011.
- Data delivery problems from oilrigs (not solved)
- Computer and communication capacity at the NGAA center
 - Addition of a third computer at SMHI (250 stations per machine)
 - Processing also on DMI and MET.NO computers for processing and communication redundancy
 - Latest version of GIPSY-OASIS (JPL/Caltech software) being implemented
- Upgrade will make it possible to
 - Increase the total number of stations to > 500 by **2012-01-01**
 - Speed-up the data delivery to < 30 minutes after full hour by **2012-01-01 for Swedish and Norwegian sites**

NGAA Activities and plans 2010

- Include about 100 new stations e.g. Baltic region, Iceland and Arctic region, Faroe Islands, and Denmark by **2012-01-01**
- Include another 10 stations common to all EGVAP analysis centers (for evaluation of products) **2012-01-01**
- 30 new stations in Sweden and 40 in Norway To be included by **2012-01-01**.
- New additional computer and new version of GIPSY-OASIS **2012-01-01**