NKG Working Group: Reference Frames, Positioning and Navigation

March 27–28, 2012, Norwegian Mapping Authority, Hønefoss, Norway

Minutes of the meeting

Participants:

Denmark	Marianne Knudsen
Estonia	Karin Kollo
Finland	Pasi Häkli (Chairman of the WG)
	Sonja Nyberg
Iceland	Þórarinn Sigurðsson
Latvia	Ksenija Kosenko
Norway	Torbjørn Nørbech
	Oddvar Tangen
	Christian Rost
	Michael Dähnn (March 28)
Sweden	Lotti Jivall
	Anders Alfredson

1. Welcome + practical information

Torbjørn welcomed everybody and informed about some practical issues. Pasi informed about the agenda of the meeting. The agenda was approved. Due to some new members of the working group everybody was introducing themselves to the working group.

2. Status

The project discussions in the previous working group meeting (March 15–16, 2011) were presented at the NKG presidium meeting in March 2011 (Masala, Finland) and in October 2011 (Onsala, Sweden) and the project plans for the two proposed projects were prepared according to the feedback from the NKG presidium. The project "ITRS-ETRS89 transformations" was approved in January 17, 2012 (telephone conference with NKG presidium) and for the project "NKG GNSS Analysis Centre (NKG AC)" the presidium wants a more detailed plan.

3. Brief national reports

Finland (Pasi)

Jarkko Koskinen, the new director general of Finnish Geodetic Institute started in June 1, 2011 (5 years term).

The station Metsähovi will be modernized during the next five years (2012–2017) for 8.1 M Euro. This includes SLR, VLBI, SCG, infrastructure (e. g. SLR building) and several other instruments. Permanent FinnRef network will be renewed by ca. 20 stations.

The new recommendations for the public administration (JHS) for measuring control points in EUREF-FIN reference frame (national ETRS89 realization) is waiting for confirmation.

Leica has started to establish a network-RTK service that will include ca. 100 GNSS stations in Finland.

Denmark (Marianne)

The new director, Henrik Studsgaard will start on May 1, 2012.

The network of permanent GNSS stations is fully developed (10 stations). The Danish primary GPS reference network, REFDK (98 points) has been remeasured and recalculated.

The new strategy for reference network "*Referencenet for Danmark – Strategi og udvikling*" is finished, see http://www.kms.dk/NR/rdonlyres/C123D2DF-6EED-4354-8D5C-F70C800580D6/0/KMSnetstrategi2012.pdf.

Estonia (Karin Kollo)

The GNSS network consists of nine stations now. Week solution for the whole network as well as for the Trimble and Leica stations were computed. Ten more stations are planned for the next years.

Iceland (Þórarinn)

In 2011 the work on the first edition of a common vertical reference system for Iceland was completed. A report was published which shows the vertical reference of all permanent bench marks, which are over 3000 in number.

The National Land Survey of Iceland (NLSI) in cooperation with DTU in Denmark are calculating a new Geoid for Iceland.

The NLSI CORS network is more or less a GPS network. NLSI is involved in cooperation with local and foreign organisations regarding the development of the permanent station system and further work will continue during the next years. Up to 5 (7) new GNSS/GPS stations are planned for this year. A huge problem is the access to electricity and suitable data line (problem: "talk before data stream").

Bernese software is used since last year for processing GNSS data.

Latvia (Ksenija)

Measurements for the 1st order levelling network were finished in 2010 (start 2000). GPS (GNSS) measurements will be done on the levelling network points. Planning to make Geoid model more accurate and precise by using global positioning data, levelling data and gravimetric data with accuracy less then 1 cm. Gravity measurements were finished. Latvian Positioning network Latpos includes 23 stations.

Norway (Torbjørn)

The Norwegian Government has decided to build a new geodetic observatory (VLBI 2010 and SLR) in Ny-Ålesund (Svalbard).

Upgrading the reference frame – form "classical" reference frame to "active" reference frame (ca. 40 permanent GNSS stations). The physical heights defined by levelling lines and height reference model. NN2000 (new height reference system) is replacing NN1954.

Sweden (Lotti, Anders)

The amount of GNSS stations within the SWEPOS network (275 + 28) will be increased to reach a maximum station distance of 35 km. The new network software (Trimble VRS3) brings a switch from relative antenna calibration corrections to absolute antenna calibration corrections.

The fundamental stations have been upgraded with an additional monument (steel mast).

SWEREF 99 is operative in 233/290 municipalities.

300 control points covering the whole country are used to validate the SWEREF 99. 50 control points were measured during one year.

4. Projects

a) NKG GNSS AC

Introduction (Pasi, Lotti)

EPN stations should be used as a "back bone". Every country is processing its own data. Norway will deliver RINEX data if desired. A reprocessing by the Norwegian Mapping Authority itself is not provided due to lack of human capacity. The EUREF resolution no. 4 should be taken into account.

Questionnaire (Lotti)

Result of the questionnaire was discussed and updated during the discussion.

Status in each participating country

Finland (Sonja, Pasi)

- 13 FinnRef stations have been processed once a year until now but the FGI is planning to move to continuous processing this year. The FinnRef data history of 15 years is to be re-processed this year as well.Daily based processing will probably cover also private networks.
- problems with Metsähovi possible due to clock problems

Norway (Oddvar)

- daily as well as weekly solution for all Norwegian reference stations

Iceland (Þórarinn)

- Bernese processing will be started as soon as possible
- possible use of scientific stations

Latvia (Ksenija)

- The Latvian contribution will be coordinated between the University of Latvia and the Latvian Geospatial Information Agency. The answer to the questionnaire will be updated accordingly (April 16)

Discussion and action

- benchmark test with EPN stations, stations and time period will be defined by June 15, 2012
- The possibility of a GPS/GLONASS solution will be tested. All parties involved send a list with proposal of their EPN/IGS-stations to be included in their subnet and a list with the stations observing both GPS and GLONASS to Lotti via e-mail (April 16, 2012).
- Decision concerning the use of Bernese software version 5.0 or 5.2 was delayed to the EUREF meeting (Paris, June 6-8, 2012) where we probably hear the latest news on release of version 5.2.
- the test results will be probably discussed during a project meeting in November/December 2012. The meeting will be held if necessary and the date will be decided later.
- no further discussion on the proposal until the benchmark test has been finished
- project proposal was updated

b) ITRS-ETRS89 transformations

The project was already approved by the Presidium and should start as soon as possible. Pasi was giving a short introduction into the project proposal. Denmark has to figure out which person should participate in the project. The project starts with finalizing the NKG2008 campaign including constraining of the solution to an ITRF solution and transformations. The ITRF solution will be

updated and finalized after some constraining studies. A possible program to use for the finalization could be CATREF. The project proposal was updated during the meeting. Parts 4 to 7 in the project proposal will be discussed more in detail on a later stage.

5. Workshop on land uplift

The NKG working group Reference Frames, Positioning and Navigation will present a short presentation about the NKG GNSS AC project (Pasi). Martin Lidberg will show a presentation about the maintenance of SWEREF 99. Torbjørn suggested that he could make a presentation about "Maintenance of ETRS89 in Norway".

6. Other activities

Pasi informed about the NKG summer school in Lammi, Finland this year (September 3–7) and the EUREF Symposium to be held in Paris, France (June 6–8).

7. AOB

Pasi showed some examples of the (RINEX) quality check which will be done in future for all permanent GNSS station data in Finland as a part of data archiving.

8. Next meeting

The WG will meet in spring 2013 in Iceland.

9. End of meeting

The meeting was ended at 11:45 pm on March 28, 2012.