NORDISKA KOMMISSIONEN FÖR GEODESI

Nordic Geodetic Commission, Working Group of Reference Frames, Positioning and Navigation
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Working Group of Reference Frames, Positioning and Navigation

Minutes for the meeting in Copenhagen, Denmark,
May 26-27, 2014

Participants

Denmark	Kristian Keller
	Aslak Meister
	Thomas Knudsen (Tuesday afternoon)
	Simon Kokkendorff (Tuesday afternoon)
	Jakob Jakobsen (Tuesday afternoon)
	Karsten Engsager (Tuesday afternoon)
	Mette Weber (secretary of the meeting)
Estonia	Karin Kollo
Finland	Pasi Häkli (chairman of the WG)
	Sonja Nyberg
Iceland	-
Latvia	Ksenija Kosenko
Lithuania	-
Norway	Oddvar Tangen
Sweden	Lotti Jivall
	Christina Kempe

In the following there will be references to presentations instead of a summary of all the technical details. The presentations can be found at the GST ftp server ftp2.kms.dk.

Agenda and minutes of last meeting

The proposed agenda of the meeting was approved, and the minutes from the last meeting in Iceland March 2013 were approved.

Scientific presentations

- Pasi Häkli et al.: From Passive to Active Control Point Networks – Evaluation of Accuracy in Static GPS Surveying (see presentation).
- Sonja Nyberg et al.: Renewal of the FinnRef GNSS network (see presentation).

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National Reports

Kristian Keller (see presentation):
- New organization at GST in 2013
- New Head of the Data Processing department (contains the geodetic section) in 2014
- New geoid model for DK in 2013 (from DTU Space)
- New strategy for the reference in Greenland; geoid model, uplift model, height system 2014-2015
- 1600 km of levelling in 2013
- GNSS observations and Bernese processing of the future national reference network
- New national height model 2014-2015

Karin Kollo (see presentation):
- Daily update of the database, the user should use the web-service, it is free of charge
- 9 stations in the RTK-network. The network is extended with 11 new stations and will be finished in 2015. 6 stations with meteo-sensors
- GNSS processing with Bernese 5.0 and 5.2, and time series with CATREF
- Development of automatic data downloading procedures
- Future: reprocessing of 1997 and 2008 campaigns. Reprocessing of ESTREF from 2007

Pasi Häkli (see presentation):
- Renewal of the Metsähovi station:
  New SCG early 2014
  New SLR telescope + new dome in late 2014, new building in 2015, operational in 2016
  New VLBI telescope 2015-2017
  New JPL GPS receiver in 2013
  New meteorological station in 2014
  DORIS renewed in 2012 together with a new permanent GNSS station that is now a part of IGS network (METG)
  Extension of network for antenna calibration studies
- FGI is moved to be a part of National Land Survey in 2015

Ksenija Kosenko:
- Establishing new quasi geoid model for Latvia
- Establishing continuously operating 0 order global positioning network
- Have been finished 1st order levelling network and have calculated normal heights in EVRS
- Started levelling of a new 2nd Order network in 2012
- Complete Bernese processing of the NKG benchmark test

Oddvar Tangen (see presentation):

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- A road map for NN2000 shows the procedure for changing to NN2000 in the municipalities. The implementation in the municipalities is ongoing
- 170 permanent GNSS stations, 20 new stations in 2014 and 20 in 2015
- The RTK-network (CPOS) has 2200 users. The accuracy is in the cm range
- Renewal of the observatory in Ny Ålesund

Christina Kempe (see presentation):
- Densification of SWEPOS with 40 stations until 2015
- Upgrading of GNSS equipment on the SWEPOS stations
- CLOSEIII project is starting up
- Implementation of Sweref99 and RH2000 is ongoing. Most municipalities are using Sweref99 and a little more than half of the municipalities are using RH2000.
- Handbook for mapping and Surveying is being updated
- The handbook has two purposes: The user can learn more about surveying and it can be used as support for tenders

Project NKG GNSS AC

The proposed agenda for the project meeting is approved. This agenda is included in the "main" agenda.

Status and what we have achieved so far

Lotti (see presentation):
There have been some issues with Bernese 5.2 to be solved since the meeting in Iceland:
- Time consumption for the processing
- Problems with "empty selection list"
- Scale factor compared to Bernese 5.0
- The benefit of the new ambiguity resolution scheme
- VMF or GMF
- Clustering
- Atmospheric Tidal Loading (ATL)

Lotti has written a report about testing of VMF and GMF. It shows that it is better to use VMF than GMF (VMF is also used in the NKG processing for EPN).

Lotti has also written a report about testing of different methods for clustering. She has developed an alternative clustering method because the standard method could be problematic in some cases.

See both reports in an e-mail from Lotti on 10/2 2014. Also available at the GST ftp server under NKG_GNSS_AC/Definition_phase/Tests_on_processing_setups.

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Lotti has prepared 3 different PCF's – see more details about it in the e-mail from Lotti on 19/2 2014.

Status report from the participants

Lotti (see presentation):
Results from the LM network consisting of 66 Swedish stations, 18 "non-Swedish" EPN (7 for constraints), 11 stations are connecting stations to the neighbour network, 9 EPN stations are constrained. She has not decided yet which PCF to use.

Oddvar:
Experiencing problems with the clustering methods (both the standard method and Lottis method) when using VMF instead of GMF. He has seen difference in the height of 8-10 cm! He has tested it on week 1740 and Lotti will also try to process this week.

He will select 40 stations for the GNSS AC project.

Due to the uncertainties concerning the VMF and clustering, we decided to switch to GMF in the GNSS AC project.

Each Local AC should then change the BPE setup in the following programs and panels:
- Change to DRY_GMF in GPSEST in PID 502, 602 and 702
- Panel 1.1; the grid file is not needed
- Panel 3.2 and 6.1.1; use DRY_GMF and WET GMF, respectively
- Remember to change in both the 3, 10 and 25 degree solution

Sonja:
Benchmark test went well – have no clustering. The processing is running almost automatically, but new stations have to be handled manually. Sonja has made perl scripts for extracting relevant results. The scripts can be found at the ftp server together with a readme file. The summary files can then easily be used for plotting of e.g. resolved ambiguities and Helmert RMS values. The scripts can freely be modified if needed.

Karin:
Is still running Bernese 5.0 – it is running well. Bernese 5.2 is installed and she is testing it. She has not used clustering yet.

Ksenija:
No national solution for the benchmark test yet. Is running Bernese 5.2., but had to change computers just before NKG meeting.

Mette:
No national solution for the benchmark test yet. Is running Bernese 5.2.
FTP-archive

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Mette has in cooperation with Lotti written a short document about folder structure, file names and access to the ftp server.

We agreed on:

- To use the proposed folder structure (with an extra folder added for each LAC)
- To upload the proposed files – also the troposphere files
- To use the proposed file names; here each LAC will rename the files after the processing (the names are not changed in the BPE setup)
- Two combined solutions is enough (but if others also want to do this it is of course ok)
- New logins for each LAC (EST, FGI, GST, LAT, LM, LV and SK – Iceland and Lithuania can of course also get a login if necessary)
- Old nkg login will be changed to read/download-only rights. This will not be changed until the new logins are created!

Details for new logins at ftp server:

- The folders "2003 Campaign" and "2008 Campaign":
  Read access for all LAC's, read+write access for FGI and LM

- The folder "WG RefPosNav meetings":
  Read+write access for all LAC's

- The folder "NKG_GNSS_AC":
  Read+write access for all LAC's for all folders except "Products"

- Each LAC will get read+write access to its own production folder and read-only access to other LAC's production folder, e.g.:

  \Products\Operational\wwww\3DEG\FGI\:
  FGI read+write access, other LAC's read-only access.

  \Products\Operational\combined_FGI\:
  FGI read+write access, other LAC's read-only access.

LM is using Bernese for the combination of solutions and FGI is using CATREF. CATREF is not producing a CRD file, but it can be extracted from the SNX-file. Sonja will send the names of the relevant files from CATREF to Lotti and Mette.

Concerning back up of the ftp server: No regular back up of the ftp server right now, but this will be changed. Mette will find out something about back up and how often it can be done.

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First steps to combine nat. solutions and steps to get into operational mode

Lotti and Sonja have a presentation each on testing of combined solutions. Some issues were discussed and we agreed on:

- The STA file from each LAC should also be uploaded together with the daily/weekly solutions. This file should contain all historical information about each station.
- It is a national decision to use either type or individual calibrated antenna parameters, except for EPN stations where the parameters used in the EPN processing should be used. This is important because EPN solutions are used in the combined NKG solution.
- Problems with duplicate names can probably occur. Stations with both name and dome number should be no problem, but other stations without dome number can be a problem. We have to think of guidelines for stations with no official name+dome number.
- Stations with antenna and receiver changes are excluded from the national solutions the particular day and in the corresponding weekly solution (EPN guidelines). The antenna and receiver changes are listed in the STA file, we don't need other files for this.

Benchmark test:

- 20/6 2014: Each LAC produces a new Bern52 solutions using GMF and upload it to the ftp server.

Operational mode:

- 20/6 2014: Each country will decide which stations to be included in the national sub-network. A file containing the station+coordinates is uploaded to the ftp server; a CRD and FIX file.
- 27/6 2014: Lotti will report back on the selected stations to each LAC.
- 4/7 2014: Upload results from the sub-network processing of week 1785. This week is used to check that everything is working as it should.
- 15/8 2014: Upload results from the sub-network processing of week 1795 (start June). This week is the preliminary start of production. GST and SK cannot promise to be ready with a solution for week 1795 at that date.
- EST and GST prefer to set up automatic processing procedures for the operational mode instead of delivering results from "manual" processing. EST will be ready with these procedures probably in September 2014. GST will be ready during the autumn 2014. Until the automatic processing is ready EST and GST cannot contribute with routine processing.
- As stated at the meeting in Iceland 2013, SK will contribute with solutions according to their own schedule, because they cannot meet the deadlines for the routine processing.

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Project ITRF-ETRS89 transformations

An urgent mail from Martin Lidberg was delivered to the participants (27/5 2014). The NKG2014 geoid project needs transformations between the national ETRS89 realizations and a common reference frame at the epoch 2000.0. Deadline not set at the time of the meeting, but ASAP. Martin has proposed a method for doing this. Pasi and Martin will take action on this task.

Furthermore, Martin and Pasi are also working on the original transformation project, they will have something ready for the NKG GA in September. For both transformation projects we need to be sure of that the correct national ETRS89 coordinates is used. We agreed on:

- 6/6 2014: Each country will check if the national ETRS89 coordinates at the ftp server are correct. The coordinates should agree with the conditions in 2008.75 (the epoch of the GNSS campaign).

Report of the use and status of current/future NKG transformations

Karsten (see presentation):
DTU Space and GST have developed the transformation programme "GNSSTrans". It contains the transformations between each national ETRS89 and ITRFYY at an arbitrary epoch. It also contains the transformations recommended by EUREF. Users of the international positioning services are asking for transformations between ITRFYY and ETRS89. This programme will be available for the user later this year.

Karin:
EST is not using the transformations, and no users are asking for transformations between ITRF and ETRS89.

Pasi (see presentation):
FGI has developed transformation approach that includes the NKG uplift model. The selected approach is slightly different from the official NKG approach. Finland has new official recommendation for the public administration that includes e.g. guidelines for processing of different kinds of GNSS networks. For large scale networks wider than 200 km or if inconsistency between free and fixed/biased adjustment is above 25mm uplift should be taken into account. These networks should be processed in ITRF. Small networks can be processed in ETRS89.

Ksenija:
LAT has developed a transformation between ITRF2000 and ETRS89 Latvian national realization LKS-92, because it was needed for aviation application. This transformation is not available for the user.

Oddvar (see presentation):

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SK has developed a transformation between IGS05N_epoch2009.85 and ETRS89. It is implemented in the transformation programme SKTrans.

Lotti:
LM has developed transformation parameters between ITRF2005 and ETRS89/Sweref99 based on the NKG2003 transformation. Lotti and Tina have made a document on this, which is available on www.lantmateriet.se. The parameters are not implemented in a transformation programme yet. In addition, LM has developed transformation parameters for maritime applications based on the 7-parameter transformation. Two sets of parameters are developed; one set to be used in the Nordic area and one to be used in the rest of Europe. In LM they are not using any of these transformation parameters: Instead they use the uplift model to "correct" the coordinates in a first step and in a second step a reference frame transformations (Helmert-fit) is performed.

Summarizing the current WG period

We had no time to discuss this item at the agenda, but Pasi encouraged us all to send comments and ideas to him and the WG in an e-mail.

Closing of the meeting

The meeting ended Tuesday at 16.00.