



# NORDISKA KOMMISSIONEN FÖR GEODESI

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## MINUTES

### 60<sup>th</sup> NKG PRESIDIUM MEETING

Time: 17 November, 2015 After Lunch - 18 November, 2015 (latest at 2pm)  
Place: Hotel Fredriksdal, Copenhagen

**Item 1) Opening of the meeting (Niels)**

Niels welcomed us to the meeting and Lyngby. Special welcome to Mette and Sören as new Presidium members and replacing Kristian Keller who has left GST.

**Item 2) Approval of the agenda (All)**

The agenda was approved. Since several of the participants are unavailable on the second day the agenda was not followed according to the numbering.

**Item 3) Approval of the Minutes from NKG Presidium meeting No 59 (All)**

The minutes from last meeting was approved. Mikael was asked to send the approved minutes to the Presidium members.

**Item 4) Brief reports on financial and organising issues at the organisations (All)**

**Denmark:**

GST: Denmark held election in June this year after which a new government was established. Part of the political scene means change in governmental structure. This governmental change was no exception. The current GST moved to the Ministry of Energy, Utilities and Climate. During the election campaign, one of the parties discussed relocation of governmental agencies. The result is now that GST will be split in two parts where the registration of land parcels and all issues related to hydrographic datum and charts will be moved to Aalborg (117 employees). The remaining part will stay in Copenhagen but in a new agency called Agency for Data Supply and Efficiency (approx. 200 persons). This will be in effected from 1<sup>st</sup> of January 2016. Geodesy will stay in Copenhagen. Regarding Geodesy, a new strategy on Danish Geodetic Infrastructure is almost approved. In November, the minister will visit Geodatastyrelsen and Geodesy will be given 15 minutes (of his 2 hour visit) to discuss Geodesy with the minister (it has now been delay until January 2016).

DTU: From GST they noted the positive effects by having a Danish astronaut. There is currently more focus on space applications. Besides that, there is pretty much business as usual at DTU Space.

**Norway**

**Kartverket:** The construction at Ny-Ålesund is progressing very much according to plan. Kartverket has taking over the new facilities which means that the work of the construction company is almost done. Buildings and fundamentals are ready.

The VLBI is on time for set up in April, and SLR is under discussions with NASA. Reidun showed the Presidium two videos about the Norwegian contribution to the GGRF: One focused on the geodetic Earth Observatory in NY-Ålesund and the techniques, one on the research and analyses work to improve the



GGRF. These films will be used to facilitate discussions in Norway, in international presentations and general communication work to help build awareness and understanding about the components behind the GGRF.

They are available here:

<http://video.kartverket.no/norways-contribution-to-the-global>

<http://video.kartverket.no/norwegian-analysis-and-research-for-a>

General status, the same budget situation as this year is expected to happen next year. Some increase in expenses due to the new infrastructure in Ny-Ålesund.

Currently three man year (four persons) are operational in Ny-Ålesund but no decisions has been made yet regarding the future need.

Kartverket has invested in an absolute gravimeter (A-10) and relative gravimeter (CG-5) will be ordered. Measurements have started to check the A-10.

A new project on vertical reference frame has started with the aim to merge the land and sea level. Per Christian Bratheim is project leader. The project includes also massive laser scanning to get a test area at Søre Sunnmøre.

Norway promised to share the project plan with Presidium when it is finalised.

**Iceland (Landmaelingar):** This year, the Port Authorities at the municipality Höfn set up a new tide gauge and Landmaelingar Islands (LMI) connected the tide gauge to the Icelandic Vertical Reference Network this summer. There is a land uplift at the IGS station HOFN. LMI surveyed the Hofn area to investigate how far the land uplift had spread, and to determine the magnitude of the land uplift. Last year LMI did surveying work to maintain the Vertical Reference Network in the Highland. It was close to where the Holuhraun eruption took place. This summer LMI resurveyed these benchmarks to determine the deformation in this area. Kartverket is in partnership with LMI consulting the National Land Surveying of Slovenia to establish a new Vertical Reference System. Since 2013 LMI has applied for extra financial contribution from the Alþing to remeasure the Geodetic Reference System. In 2016 Alþing granted a € 96000.- for the project, which will be our main project in 2016.

**Finland: Department of Geodesy and Geodynamic (FGI-GEOGEO):** It has been noted that the bureaucracy has increased since the merge. Markku reported on the three research groups that have been established. These are "Reference systems", "Gravity" and "Space Geodesy". On the positive side it was noted that there are no major budget cuts for the coming year. The UN Resolution has been useful financially already. The renewal of FinnREF has been running for a few years and they are now offering an open navigation service. A report was also given on the updating of Metsähovi where the latest was the SLR Telescope delivered in 2015 for observations to be in operation next year.

**Sweden: KTH:** Anna Jensen, KTH presented a proposal on a new international master in applied geodesy. It has not yet been approved, but it has the support from the Dean and will be presented further at KTH during November and December. There is currently no master education in Geodesy in Sweden, but there is a great need within the public and private organizations. It is also clear that bachelor educations in Sweden would like to have a master in Geodesy to recommend their students to continue to, especially if we note applied Geodesy. The potential recruitment basis is estimated to 20-30 students per year where the main number of students comes from Höskolan i Gävle.



**Lantmäteriet:** Mikael reported that UN GGIM is high on the agenda at Lantmäteriet and having the UN Resolution puts Geodesy on the agenda for the higher management. They have even scheduled a visit to Onsala later in November. Lantmäteriet is also moving towards Open Data-policy with a significant release the 1<sup>st</sup> of January, 2016. One component will be SWEPOS DGNSS. Other than that we could say that it is very much business as usual at Lantmäteriet and Geodesy. Mikael reported that SWEPOS is developing and currently we have more than 360 stations and 3000 users.

**Chalmers:** Jan reported on the development regarding the new twin VLBI telescopes. The building of the concrete monuments are going on. The antennas are arriving in 2016. The timetable is under control. The project Close IIIb, together with SP and Lantmäteriet, is running and one component is PPP on ocean. This project will be reported in January 2016. Jan also reported that they currently have four PhD-students which are very good; the most interesting is that two of them are focusing on VLBI.

Item 5) Summer School 2016, Sweden (Mikael and Jan)

Mikael suggested that the NKG Summer School 2016 should be arranged in Båstad, Sweden during the period 29 August – 1 September and at Hotel Skansen.

The local organising committee will be run by Lantmäteriet and the Scientific Committee will be chaired by Martin Lidberg, Lantmäteriet. Nominations to the scientific committee (1-2 per country) should be sent to Mikael or Martin latest the 1<sup>st</sup> of December. The Scientific committee is asked to report to Presidium before Christmas on theme and time table.

Item 6) VGOS-VLBI (Jan)

Jan presented on VGOS (VLBI Global Observing System). If we look in the Nordic countries, we notice that we have five VLBI2010 telescopes with the upgrade at Ny-Ålesund, Onsala and Metsähovi. The final global VGOS network will consist of 24+ stations. The aim is to conduct 24/7 observations with these new telescopes but this will create huge amount of data (up to 2.1 Pbyte/day). He suggested in his presentation that we should consider to establish a Nordic VGOS correlator, e.g. at Chalmers. It should be operated in collaboration and could be called the NKG VGOS Correlator. It should of course have close cooperation with the other international VGOS correlators with the long term goal of efficient and robust international decentralized correlation and data analysis.

The proposal was discussed. No decision was made but we decided that we will continue the discussion at the next meeting.

Item 7) Campaign-ISNET2016, remeasurment of the Icelandic horizontal reference network (Thorarinn)

Thorarinn presented on the campaign ISNET2016 that includes the re-measurement of the Icelandic geodetic reference network including the definition of a new Datum. Historically four different datums have been used on Iceland. The latest one is ISN2004. ISNET2016 network will consist of 138 benchmarks + the permanent GPS/GNSS stations +115/138 from ISN93/ISN2004. Processing of data will be done in the Bernese software as well as TTC at Landmaelingar, Iceland. Thorarinn noted that they are interested to find someone using GUPSY and GAMIT.

Iceland is discussing to use a semi dynamic datum and would need help on deformation modelling as well as to borrow GNSS-receivers and antennas for GPS and Glonass.



Item 8) NKG Web site (Thorarinn and Niels)

Thorarinn gave a status report on the progress regarding the NKG website. The previous information on the server at FGI needs to be transformed to [www.nordicgeodeticcommission.com](http://www.nordicgeodeticcommission.com). He asked for all minutes from Presidium meetings and working group meetings to publish the on the website.

Item 9) Reports from the working groups. A discussion is needed on the progress of the working groups.

**Positioning and Navigation (Per Knudsen)**

The next meeting is scheduled to the 19-20 November in Norway. Members from Estonia and Lithuania will join the meeting. He is waiting for the response from Latvia. There have not been much other activities since the last meeting. Per will share the agenda for the meeting with the Presidium. This working group is very much on knowledge exchange between the countries and has, currently, no specific task or project running. Since the coming NKG Summer School is considered to have GNSS as a theme this working group was also asked to consider content to the next years NKG Summer School as an input to the Scientific Committee.

**Geodynamics**

Matthew S is currently on paternity leave and Dagny is replacing him during that period. Unfortunately, Dagny could not come either but she had prepared a presentation on the status that Jonas presented. The working group is planning to hold the next meeting in March, 2016 in Tallin, Estonia together with WG on Gravity and Geoid.

*Project: Absolute Gravity Measurements in Fennoscandia*

A kick-off meeting was held in September in Finland. Sweden presented the work with the Swedish data (only FG5-233) at IUGG in Prague in June. This will result in a short paper in the proceedings. A more extended publication with official numbers and all data, will be published during 2016. Lantmäteriet are investigating suspected "jumps" in the time series, mainly due to instrument services. This will be the focus of the IUGG-paper. Miriam Bilker-Koivula Finland is close having something ready for submission. In the Finnish paper all observations (g) up to 2012 and estimated trends (g-dot) will be published. The observations include also JILAG, GABL, IMCC, NOAA, BKG, IfE. She has spent a lot of time on studying old instrument comparisons. This will hopefully be ready to submit by the end of this year. Norway will spend this autumn on their paper. They will publish all their observations and estimated trends including observations from other organizations in Norway. Their main work will be on studying local effects and try to improve models for ocean loading (tidal and non-tidal) as well as atmospheric loading (3D). They will also try to sort out which stations in Norway are reliable and suitable for future AG observations. This will hopefully be ready to submit by the end of this year.

At the meeting in September an agreement was made on a Joint Nordic paper:

- Focus on a compilation of all repeated AG data in Fennoscandia. That is focus on presenting our data rather than on e.g. GIA.
- How to combine data from different instruments with potentially different offsets
- Not trying to cover too much
- The Nordic paper should also cover the Baltic countries and Denmark.
- Per-Anders Olsson, Sweden will lead the work (first author) with the time table to have a paper ready for submission by autumn 2016.



## *Project: NKG2015xGIA*

The timeline for the new empirical land uplift model 'NKG2015LU\_test' is outlined as follows:

1. The new BIFROST solution(s) must be included in this model. It is anticipated that this work will be completed by IUGG in June 2015.

There is still a wait for the new BIFROST solution. Concerning Bifrost, there was a Nordic meeting in October with the conclusion that there may be something ready by end of the year. The GAMIT solution is finished, but the group is waiting for the GIPSY-solution.

2. The underlying GIA model will be provided by Holger – it is thought that this can be achieved by IUGG in June 2015.

Only slightly updated results were presented at IUGG. The ICE models (25) from Lev Tarasov was provided in early September. Holger Steffen is at the moment running 11000 ice models. Some best fitting reminds, but the GIA model will be ready in 2-3 weeks. The other modelers will get the best ice model before Christmas.

3. Latvia, Lithuania and Estonia will provide tide gauge data by end of 2015.

Nothing is provided. The countries are reminded this week.

4. Lithuania will provide levelling data by end of 2015.

The data is revised and analyzed. Almost ready to be used in the new empirical model

## **Geoid and height systems (Jonas)**

Next meeting will be held in Tallinn between 16-18 March together with the working group on Geodynamics. Beside the projects (see below), Jonas also reported on the EU funded project FAMOS Freja as well as the continuation project FAMOS Odin (2016-18), which will contain also real time GNSS (PPP, etc.) for maritime applications. Jonas also reported on two important IAG resolutions from IUGG in June on the definition and realizations of an International Height Reference System (IHR) as well as the establishment of a global absolute gravity reference system. We also noted that BSCD 2000 (EVRS with epoch 2000) will be introduced as common Chart Datum in the Baltic Sea in 2020. We need to establish a study group within NKG to ensure that these resolutions are discussed and handled within the Nordic area. Jonas is asked to report on this at the next presidium meeting.

## **Project: Computation of the NKG2015 geoid model (Jonas)**

The main thing that has happened since the last presidium meeting is that all computation centres has now computed preliminary geoid models. This work was presented as an oral presentation at the IUGG GA in Prague. These geoid models are currently being analysed and it is the intention to choose the final model in 2015 and end the project by writing a joint paper.

## **Project: Empirical land uplift modelling (Jonas)**

This project has turned into a common project with the WG on Geodynamics.

## **Reference frames (Pasi)**

The activity has been low since the last meeting. The next meeting is not yet planned but will properly happen during spring 2016 in Finland. The working group is also planning for a work shop on time series to be held in conjunction to the working group meeting.

## **Project: ITRF – ETRS 89 Transformations. (Pasi)**

The objectives of NKG 2008 are to



- Improve and update the transformations from ITRF to the national ETRS 89 realizations in the area.
- Establish a common reference frame in the Nordic-Arctic region

The project status is

- first version of the manuscript submitted to JGS in January 2015 (part of NKG GA 2014 proceedings)
- major changes suggested by reviewers, e.g.:
  - Common epoch 2000.0 ill-justified, recommendation to keep epoch of the campaign (2008.75)...
  - Use of ITRF2008-PMM leads to ETRF2008 which does not exist due to EUREF TWG recommendation
  - Use of intraplate/kinematic models with ITRFs not approved...
- manuscript revised and re-submitted
  - Common epoch 2000.0 kept but more explanation
  - Otherwise changed methodology

Project: NKG GNSS AC

Currently there are 245 stations that are processed by six national LAC and there are two combination centres. The LAC has been doing daily and weekly solution since GPS-week 1795 (June 2014). The project changed the tropospheric modelling to VMF in GPS-week 1860.

The current plan is that GST will join by end of January but no action still from Lithuania. LAC will be considered to be operational when GST has joined.

Item 10) UN-GGIM and UN Resolution on Global Geodetic Reference Frame (Reidunn)

Since the Resolution was accepted in February, the working group is currently working on the road map. The current important time frame runs till May 2016. Reidunn discussed the key objections and noted that international cooperation is the key. Being involved in the work of the road map is a good opportunity to influence on the work. Members of the Presidium are asked to be active and follow the work on the road map.

Item 11) EUREF (Markku)

Markku discussed two different meetings that concern the EUREF TWG. The first is the EUREF meeting that was held in Leipzig in June where Markku was elected to be the new president, Ambrus Kenyeres elected as chair of TWG and Wolfgang Söhne as secretary. No other elections for EUREF TWG.

The second was the EUREF TWG meeting in Bern the 13<sup>th</sup> October where e.g.

- the ToR under preparation
- the EPN station guidelines updated, available now
- WG on deformation models; Martin L discussed on terminology kinematic-dynamic
- Rinex v.3 is taken in use; also long file names
- EPN reprocessing2 going on
- NKG EPN AC



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- Euref - Epos relation; discussion on MoU; preparation 2016/1
- ITRF2014 coming before the end of \*this\* year
- UN-GGIM Europe GGRF group; MP is chairing that
- Euref 2016 symposaium San Sebastian Spain

Item 12) Other Business (All)

No other business

Item 13) Next meeting of the Presidium (All)

The next meeting: 61<sup>st</sup> Presidium Meeting; Norway, 6-7<sup>th</sup> April, 2016

Current order; Iceland – Denmark – Norway – Sweden – Finland



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## Invited:

Denmark:	Niels Andersen, DTU Space (Chair) Per Knudsen, DTU Space Sören Fauerholm Christensen, GST Mette Weber, GST
Finland:	Markku Poutanen, NLS Jarkko Koskinen, NLS Pasi Häkli, NLS
Iceland	Gudmundur Valsson, LMI Thorarinn Sigurdsson, LMI
Norway:	Torbjørn Nørbech, Kartverket Per Erik Opseth, Kartverket Dagny Lysaker, Kartverket Reidun Kittelsrud, Kartverket
Sweden:	Mikael Lilje, LM (Secretary) Jan Johansson, Chalmers Jonas Ågren, LM Anna Jensen, KTH

## Apologies

Jarkko Koskinen, NLS  
Markku Poutanen on the 18th  
Per Erik Opseth  
Anna Jensen on the 18<sup>th</sup>  
Dagny Lysaker