NORDISKA KOMMISSIONEN FÖR GEODESI

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MINUTES

68th NKG PRESIDIUM MEETING

Time: 31st January 2018, Skype meeting

Item 1) Opening of the meeting
Niels opened the meeting.

Item 2) Approval of the agenda
The purpose of the meeting is to discuss the proposal for future focus areas for NKG, prepared by part of the Presidium at a meeting in Norway the 13th of December 2017. This proposal was then modified and shared by Lantmäteriet to the group on the 26th January 2017 (see appendix A).

The next step will be to send a proposal to the working groups for discussions and then bring it to the Presidium meeting in March in Denmark. A draft version to be ready to be presented to Lill-chefsmötet in April.

Item 3) Nordic geodetic cooperation in the future – future focus areas for NKG
With input from all Nordic countries, a proposal for future focus areas was prepared at a meeting in Norway in December. Based on the paper and some internal discussions, Sweden decided to send in proposal for amendments (see appendix 1). Finland mentioned that they have started an internal working group on future height system. At this meeting, no longer discussion or comments were made regarding this version. Norway asked the meeting to be focused on discussing priorities among the proposed areas.

We all could agree that, even if jamming and spoofing is important and interesting, that this is perhaps not an area that NKG as a body should focus on.

Norway was very clear that they prefer to more work on Dynamic Reference Frames as well as Future Positioning Services and less on e.g. geoid modelling. The meeting reflected and discussed on this and noted that we can agree on that we need to focus on DRF but we need to accept that we have difference thoughts, visions and tempo. We will not be able to have a common goal on when a DRF is implemented in the various countries, but there are nevertheless many questions that need to be discussed in common. Also, future positioning services are important, but the main challenge here will be to get our “quiet working group” to start working.

The meeting discussed concerning geoid modelling, geodynamics, our important products as gravity databases, GNSS analysis centres and more. We noted that some of the existing working

groups have a good momentum that we should be careful not to lose. We also noted that it is important to ensure the current quality of databases and services, so that we - at least - do not decrease the quality. Also, if some countries are more interested in a certain area than others then it is OK to continue to work together. It has always been the case in NKG that the countries have given different priorities to different tasks.

The meeting did not decide on any priority, but it was good to discuss the different views of the various countries. The next step will be to send the proposal to the working groups and then to have more discussions at the upcoming NKG Presidium meeting.

Item 4) Next meeting of the Presidium (All)

The 69th Presidium Meeting; 21-22 March, Copenhagen, Denmark

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

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Invited:

Denmark:	Niels Andersen, DTU Space (Chair) Sören Fauerholm Christensen, SDFE
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 Matthew Simpson, Kartverket Oddgeir Kristiansen, Kartverket
Sweden:	Mikael Lilje, LM (Secretary) Jan Johansson, Chalmers Jonas Ågren, LM

Apologies
Pasi Häkli, NLS
Gudmundur Valsson, LMI
Torbjørn Nørbech, Kartverket
Matthew Simpson, Kartverket

APPENDIX. Notes from meeting 13th December 2017, modified by Lantmäteriet 26th January.

NKG structure 2018-2022
Focus areas for coming period

Dynamic Reference Frame

Vision / goal:

Develop a realization of ITRF for the Nordic countries based on GNSS time series and possibly other space geodetic techniques. Make sure that future updates of the reference frame can be done on regularly basis.

Clarify the concepts and describe the merits of static, semi-dynamic and dynamic reference frames, including the "two frame concept" where ITRF and national realizations of ETRS89 are used in parallel for various applications.

Evaluate the different concepts as basis for our geospatial data sets and for various positioning and surveying techniques.

Add something from the application and use? Add something on legislation? If impossible – what are the alternatives?

Keywords:

Milestones:

1. Test of InSAR as a source for local deformations, and evaluate if local deformations are relevant in the velocity model.
2. Testing algorithms that combines GNSS timeseries, GIA data and maybe InSAR to carry out a high-resolution Nordic deformation model
3. Setting up a Nordic calculation center that continuously updates the reference frame based on the Nordic deformation model (automated process)
4. Figure out: How to organize the geospatial data to make an efficient upgrade of the reference frame when needed
5. Figure out: How to deal with dynamic cadaster data? What about legislation?
6. Outreach work – setting up a common campaign to convince the owners of the geospatial data.
7. Finalizing the Icelandic case study and draw conclusions.
8. Define a new test area (outside Iceland) and set up a full-scale test of a dynamic GIS.

Future Height System

Vision

1) In the intermediate future (5-15 years?) we have methods for effective use of our Nordic/Baltic realizations of EVRS in parallel to IHRS and its first realizations through IHRF, both on land and for maritime applications, including the Baltic Sea and other surrounding sea areas
2) We are continuously well aware of the progress on "the Global Height System" and involved in its development. Thereby we are well prepared for its first use and for possible adoption in the future
3) By 202X, we have studied and developed theory and methods to maintain, upgrade or create a modern height system in the Nordic area that is up-to-date w.r.t. the uplift. We have also investigated different alternatives for a future unified Nordic height system/frame, taking European and International developments into account (EVRS/EVRF and IHRS/IHRF, respectively).

4) By 202X we have studied and developed methods to utilize new techniques for practical usage of the height system and height determination with or without traditional levelling but without losing the accuracy of levelling

Keywords

height system, gravity, levelling, height determination, EVRS, BSCD2000, IHRS/IHRF

Milestones

1/2) Develop a common Nordic realization of IHRF (International Height Reference Frame) and derive relations to the existing national height systems (realizations of EVRS with land uplift epoch 2000.0)
1) study on capabilities of new techniques and their suitability, accuracy and limitations for height determination
2) apply improved land uplift model (3D) and geoid model
3) Choose and define the basis of new Nordic height system
4) choose and develop method(s) for maintenance of the height system
5) develop practical methods to utilise new technique for height determination applying the new Nordic height system

Geoid – 5 mm

Vision and goals

The goal for the NKG cooperation is to support NKG's effort to work towards creation a common Nordic geoid model. The objective is a Nordic geoid model with an accuracy uncertainty of approx. 5 mm (1 sigma, for the gravimetric geoid model), which makes it possible to determine accurate heights by use of GNSS.

Keywords

All Nordic countries have in their strategic geodetic infrastructure plan a wish for an accurate geoid.
It is economically interesting to improve the accuracy of the geoid model.
With the improvement of the geoid model, NKG focuses over time to reduce the overall level of need for leveling.
Accurate geoid models are developed through international collaborations.

Milestones

1. Gravity data from the common Nordic and Baltic FAMOS project (and its extended projects) covering the sea areas between Finland and Sweden/Sweden and Denmark will be available for geoid computation
2. Determined research on how data already collected (during many years) can improve the present geoid
3. Based on 1 and 2 define the 'gap' for reaching a 5 mm geoid. Create a plan for additional observations and research methodological improvements in order to reach 5 mm.

The Nordic contribution to GGRF

Vision / goal:

Achieve a Nordic robust level of competence for the operations of the three observatories, a VLBI correlator and the analysis of the data from the Nordic fundamental sites.

Keywords:

Milestones:

1. Achieve long-term committed financing of the three sites with necessary staff.
2. Establish a common team to take care of the operations.
3. Common financing of a Nordic VLBI correlator –
4. Setting up a common Nordic analysis center for IVS and ILRS, based on our common resources.
5. Continues active participation in the UNGGIM subcommittee on Geodesy.

Future Positioning Services and its applications

Vision / Goals*:*

- *The respective national geodetic infrastructures prepared to support autonomous vehicles and other high demanding applications.*
- *A clear view of future positioning services and their demand on the national (or Nordic) geodetic infrastructure*
- *A Nordic platform for testing and verifying Galileo and EGNOS positioning services and other GNSS developments.*
- *Ability to handle low to high accuracy services*

Keywords*:*

Services, Professional users, mass market, applications, accuracy, GNSS, Galileo, Geodetic infrastructure, PPP

Milestones*:*

White paper on future positioning services in 2019. To be presented to DG

Joint project with car industry to define future demands on the geodetic infrastructure.

GNSS Security - Spoofing / Jamming

Responsibilities / Possibilities*:*

- Capability of Nordic NMA's to help government authorities to detect Jamming & spoofing
- Awareness and capability rising among the government authorities
- 24/7 online detection through national reference GNSS network (FinnRef, SWEPOS….)
- possibility to set detectors in import and HUBs (airports etc.)

Keywords*:*