



NORDISKA KOMMISSIONEN FÖR GEODESI

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THE PRESIDIUM OF THE NORDIC GEODETIC COMMISSION (NKG)

MINUTES OF 48TH MEETING

ONSALA, SWEDEN

OCTOBER 3-4, 2011

PARTICIPANTS

Denmark:	Niels Andersen, DTU Space (Chair) Per Knudsen, DTU Space
Finland:	Markku Poutanen, FGI Jarkko Koskinen, FGI Pasi Häkli, FGI
Iceland	Guðmundur Valsson, LMI
Norway:	Dagny Lysaker, SK Torbjørn Nørbech, SK
Sweden:	Mikael Lilje, LM (Secretary) Jan Johansson, Chalmers Jonas Ågren, LM Väino Tarandi, KTH (item 7) Clas-Göran Persson, KTH (item 7) Rüdiger Haas, Chalmers (item 7)



ITEM 1. OPENING OF THE MEETING

Gunnar Elgered welcomed the Presidium to Onsala Space Observatory and wished for a good and fruitful meeting. Niels Andersen then opened the meeting. Per-Erik Opseth, Anne Jørgensen, Þórarinn Sigurðsson and Lola Bahl sent their apologies for not being able to participate. A special welcome was given to Jarkko Koskinen, the new Director General at FGI, who replaces Risto Kuittinen in the Presidium.

ITEM 2. APPROVAL OF THE AGENDA

The agenda was accepted with the change to start with item 7, which was motivated by that Clas-Göran Persson, Väino Tarandi and Rüdiger Haas could only participate at the beginning.

ITEM 3. MINUTES FROM PREVIOUS NKG PRESIDIUM MEETINGS

The minutes from NKG Presidium meeting no 47 (March, 2011) were accepted and will be published on the NKG website.

It was decided to look upon the meeting in Melbourne in July 2011 for a Business Meeting instead of a Presidium Meeting.

The actions from the presidium meeting 46-47 were reviewed and unfinished actions were revised, see appendix 1 for still open actions.

Action: Mikael to publish the minutes from the NKG Presidium meeting 47 in March 2011 on the NKG website.

ITEM 4. BRIEF REPORTS ON FINANCIAL AND ORGANISING ISSUES AT THE NORDIC NATIONAL MAPPING AUTHORITIES

Denmark:

Since Lola was not present we were not given an extended report on the situation at KMS, more than that Niels reported that a new Director General had been appointed at KMS, whose name is Susanne Juhl.

Niels reported that at DTU the budget for 2012 has been decided, which is in line with what was expected. DTU has also developed a new educational program called "Earth and Space Physics and Engineering". DTU have built new sites and monuments near the main IGS station in Greenland that are prepared for Galileo. In a joint DTU-KMS collaboration a new height system for Greenland will be developed. This task is planned to be done in collaboration with Canada, which is presently developing a new national height system to be released in 2013 (ellipsoidal height + geoid model). DTU and KMS have further introduced new reference systems on the Faroe Islands. Finally, Niels mentioned that DTU will move to the University Campus in May/June 2012.



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Sweden

Jan mentioned that there is much focus on Geodesy and Geophysics at Onsala for the moment. Onsala has also applied for grants concerning the development of VLBI2010.

Mikael reported from Lantmäteriet that Bengt Kjellson has been appointed as new Director General. More important news for NKG is that Bo Jonsson no longer works for Lantmäteriet and has been replaced by Peter Wiklund. Lantmäteriet is currently changing from GPSNet to VRS3. All our servers will also be moved to Lantmäteriet's Server hall. These tasks should be completed by February 2012. Lantmäteriet is also working on procurement of Geodetic Measurements, which should be sent out later this year. Relative gravity is further something that Lantmäteriet is focusing on. The aim is to develop a new gravity system within a few years, needed for instance to improve the future geoid models. During the summer, absolute gravity measurements have been made using the A10 from Poland. Lantmäteriet is also very much involved in overseas projects in Serbia, Belarus, Georgia and FYR Macedonia.

Norway

Torbjörn and Dagny reported about the current situation in Norway and at Statens Kartverk. As in most countries the budget process has started. This is the reason for Per-Erik not being able to attend to this Presidium meeting. Statens Kartverk has made some tests in the Oslo area regarding height determination by Network-RTK using a correction surface (geoid model). Also, our Polish colleagues have been in Norway with their A10 absolute gravimeter. Measurements to test and improve the physical reference frame are done both in the Sognefjord area as well as in a more Eastern part of Norway. Statens Kartverk is taking part in a consortium concerning the Arctic testbed. Torbjörn finally reported that Björn Engen now has retired.

Finland

From Finland Markku reported that the new Director General Jarkko Koskinen has been appointed. The NKG Presidium especially welcomed Jarkko to his first meeting. FGI is also in the budget process and even if no decisions are made yet the expectation is to have a small decrease for next year. However, extra funding is proposed for the renovation of Metsähovi (1,5 million Euro per year for five years). Markku reported that the first order gravity measurements were completed. This year has been spent on gradient and tie measurements. Next year, additional measurements between old and new points will be made. The new gravity system will probably be adjusted in two years. It was discussed at the meeting that the definition of the gravity system is a topic that should be discussed on the NKG level in coming meetings, both by the Presidium as well as by the Geodynamics and Geoid and Height System working groups. Several of the Nordic countries are doing the same thing and could learn much from each other. It is also very important that the new gravity systems will be defined in compatible ways, for instance concerning the postglacial land uplift epoch.

Iceland

From Iceland, Guðmundur reported that there are still constraints on the budget. This year they have been able to utilise students for field work, which has helped a lot. They are working on the final definition of the Height system on Iceland together with FGI (Finland). The intention is to connect the height system to ITRF with a Global Gravity field model along with a set of well



distributed, reference levelling points with precisely measures geopotential numbers and ITRF coordinates.

ITEM 5. CHAIRMAN'S AND SECRETARY'S REPORT

Niels reported about the IUGG meeting in Melbourne. His comments were that it was well organised with lot of good presentations. The Nordic area was well represented both with presentations and delegates. The next major IAG event is in Prague in 2013 and the next IUGG General Assembly is in Potsdam in 2015.

The annual meeting of the NMA Director Generals was held in August. Per-Erik Opseth was present and made a good presentation on the status of NKG. The meeting discussed if we should encourage the NMAs to also invite the NKG President to these meetings. Niels is to contact responsible agency for the meeting next year.

Mikael noticed that NKG has not yet officially invited the Baltic countries to join the working groups. He will prepare a letter and send it to the Baltic countries.

Action: Niels to contact responsible agency for next years NMA Director General meeting to seek invitation for the NKG President.

Action: Mikael to send a letter to the Baltic countries inviting them to join the NKG Working Groups.

ITEM 6. NKG AUTUMN SCHOOL 2012, FINLAND

Markku summarised the status of the preparation for NKG Autumn School in 2012. Finland proposed the school to be held at the Lammi Biological Station in Finland 3- 6 September, 2012 (noon to noon). Maximum number of participants is about 60. Lammi is situated about 120 km north of Helsinki.

It was objected that the proposed length of the school is too short. The meeting agreed that Markku should extend the reservation in Lammi to the 7th of September and that the school should take place **3 - 7 September 2012 (noon to noon)**. If needed, this might be shortened to the original proposal later.

The Local Organising Committee will be formed by Finland.

Possible themes were discussed and some suggestions at this and previous meetings are;

- Monitoring and modelling of Sea Level Change
- Climate change
- Geodetic observing techniques
- Dedicated gravity field satellite missions (GRACE and GOCE)

The Science Committee will make the decision on the theme.



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There was a discussion on the format and how to get the participants more active during the Autumn School. Participants could present their research and perhaps we can also have computer exercises.

Action: All countries to confirm their member in the scientific committee within two weeks.

ITEM 7. COOPERATION ON EDUCATION

Clas-Göran started the discussion by presenting the work he has done at KTH as an Adjoint Professor. During the first years, his focus has been on developing the education, but in the coming years the focus will be in the process to find a suitable successor of Lars Sjöberg as well as trying to develop the Geodesy related research. The present intention is that the new Professor will focus more on Applied Geodesy. To try to understand the situation and needs at KTH, Clas-Göran and Hans Mattsson have investigated the situation at similar institutions in Europe. They have also discussed the question with several Swedish companies. At the same time as the report was published, Sweden took the decision that non-EU students have to pay for their studies in Sweden. That decision has worried not only KTH but most universities in Sweden. The result has been that almost all non-EU students prefer not go to Sweden, meaning that the courses get even fewer students and lower income to the institutions. The full report can be found at the NKG website. A general trend is that too few students are interested in the education at KTH. The number of "Swedish" students during last years has been very low, something like 3-5 per year. There have been a number of non-EU students, but after obtaining their degree they normally leave Sweden. In the long term, this is not a good situation. There is a need to have an education that not only attracts students but also make them interested to stay and work in Sweden. The Bologna process consisting of Bachelor (3 years) + Master (2 years) is now being introduced. Another new thing is that the Royal Institute of Technology, Lund University, HIG and Lantmäteriet have written a modern compendium on Geodesy in collaboration. The compendium is available free-of-charge at www.lantmateriet.se/HMK as well as on the NKG webpage.

Jan continued by adding some information about the situation at Chalmers, even though Chalmers do not offer a "pure" Geodesy education. Chalmers has introduced a new Master's programme. From the Geo group they try to push for Geodesy courses at several Master's programmes. The courses are fairly popular and many students also prefer to write their Master of Science Thesis in this area. The situation is perhaps not perfect but good enough.

Markku; Geodesy education in Aalto University is suffering of diminishing resources. Professor Lauri Pesonen in geophysics at the University of Helsinki is retiring next year and there have been discussions whether the next professorship could be more Geodesy oriented. There is a joint professorship sponsored by FGI at the University of Helsinki in "Planetary Geodesy" and the second one in "Laser Scanning and forestry research" is under negotiation

Per reported on the situation in Denmark. Christian Tscherning is retiring shortly as Professor at Copenhagen University and they need to start planning for a continuation. The number of students is not high enough at Copenhagen University. At Ålborg University approximately thirty students take their courses, but most of them decide to stay in Ålborg. Furthermore, DTU has developed a new education. After the separation from KMS and after having been at DTU for a



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while, they now realise that they need to have more education on the agenda. The name of the new programme is “Earth and Space Physics and Engineering” and is both Bachelor and Master. Main areas are; *Climate Change Detection, Exploration of Earth, Exploration of Space and Mapping and Navigation*. The start of the education is planned to September 2012.

In Denmark and Finland most Bachelor students continue with Master. Sweden has the experience that many students stop after three years. Norway seems to have the same experience that many students stop after three years.

The discussion about education noticed that NKG is both supplier and user of education. What can NKG do more in this field? Some proposals were the following:

- NKG Autumn School could be developed. Should they be arranged more frequently? Should the scope and theme be developed?
- Together develop PhD courses so that students can shift between the universities.
- Develop our webpage to interest potential students in geodesy, to present future job possibilities as well as to inform about various educations.
- Develop a “Geodesy for dummies”. A way of getting talented students from nearby areas to become interested in Geodesy.
- Telling good stories and publish them on the NKG web page to attract students.
- Using webinars more frequently.

Also, it is important to present what kind of job the students can expect when they have passed the Bachelor’s as well as the Master’s levels.

Action: Link to the new Swedish compendium on Geodesy to be put on the NKG web page. Mikael is responsible.

ITEM 8. REPORTS FROM THE WORKING GROUPS.

WG Geodetic Infrastructure (Per): The WG has not yet had its first meeting. Per suggested that important tasks for the WG could be to continue where NGOS stopped as well go in to the evaluation of the different data sources that contribute to the modelling of land uplift models.

WG Geodynamics (Dagny): The Working Group had its meeting in Hønøfoss in March 2011 prior to the last presidium meeting. One Important issue is the exchange of absolute gravity data. All institutions have not signed the corresponding agreement but several did so during the present Presidium meeting. Jaakko Mäkinen is working on a paper about the Nordic Absolute Gravity Project, but is not yet finished. One question from the presidium was if the working group is taking advantage of the work being made in the COST action ES0701 on GIA-modelling. Dagny is also encouraged to find a replacement during her maternity leave during 2012.

WG Geoid and Height Systems (Jonas): The working group had its meeting May 30-31 in Gävle. At the meeting the focus was on the discussion of projects. Jonas had proposed 8 projects and Jaakko Mäkinen had suggested one project to the WG. It was agreed to select five of them to the Presidium for decision. The working group also discussed the maintenance of the Nordic Levelling Data and its role when all countries are updating the UELN database. The working



group decided not to continue with the Nordic Levelling Database. The Baltic countries are now about to finish their new precise levellings and the question of making a new BLR-adjustment has been raised. The Baltic Levelling Ring was finalised in 2005. The final results were then delivered to the agencies participating with data in 2006 together with an official thank you letter written by Markku Poutanen. To make a new BLR adjustment would require new official permissions and would involve quite a lot of work. For the time being, the Baltic countries are recommended to send the levelling data to the UELN database to get their new national height systems coinciding with the next EVRS realisation EVRF 20XX.

WG Reference Frames, Positioning and Navigation (Pasi): The WG had its meeting just prior to the last Presidium meeting in Masala. Among a few other things, possible projects were discussed: The proposed projects are “Transformation ITRF → ETRS89 with velocity models” and “Nordic GNSS analysis centre”. Other topics discussed were geodetic infrastructure, GNSS modernization, antenna calibration, the Nordic Positioning Service and use of GNSS for ionosphere and troposphere studies.

ITEM 9. PROPOSALS FOR PROJECTS

WG Geoid and Height Systems (Jonas): Suggestions from the working group are;

- **Computation of the NKG2014 geoid model.** Proposed project leader is Jonas Ågren. Participation from all countries as well as Estonia and Latvia. The area covered by the proposed NKG2014 model has been discussed but not decided. For example, should Greenland be included or not. Lantmäteriet has been involved in discussions with the BSHC Chart Datum Working Group. Input from the Presidium was to coordinate the project with the BSHC Chart Datum Working Group as well as with the activities of the BLAST project.
- **Investigation of the requirements for a future 5 mm (quasi)geoid model.** This is a study project that aims at investigating what is required in theory and in practice (data) to reach the accuracy in question. Proposed project leader is Lars Sjöberg. The deliverable is a published paper in 2014.
- **Finalisation of the Baltic Levelling Ring (BLR).** Proposed project leader is Jonas Ågren. The proposal is to finalise the documentation before the Working Group meeting next year. The documentation is needed because at the moment different aspects of the BLR have been published in different places, making it difficult to get a good overview of the project.
- **Review of current and near-future levelling technology.** Proposed project leader is Olav Vestøl. This is supposed to be a literature and experience-based review report, partly motivated by the need to collect knowledge from various experts in the Nordic area that will soon retire (or has done so already). The final report should be 20-30 pages and is supposed to be presented at the Working Group meeting in 2012. Torbjørn and Dagny mentioned that Olav is currently not working at Statens Kartverk. Olav’s future plans are thus not clear and it is not known if Olav will participate in any of the NKG projects. Jonas will contact Olav about this.



- **Empirical land uplift modelling.** One aim is to compute an updated version of NKG2005LU. The deliverable in this part is an updated Nordic model in 2012 that includes the Baltic levelling data using the same method as before. In the long run (before 2014), the computation method should be improved and a more optimal model be computed using a new GNSS solution. The proposed project leader is Olav Vestøl. The discussion was how much more input data that should be used compared to what was used for NKG2005LU as well as if a new GIA-model should be included in this work. This project also touches on the proposed GIA project from the Geodynamics group. Jonas argued that it might be wise to keep empirical and GIA land uplift modelling separate, since otherwise we will end up in a too large project, which will be impossible to finish. The proposed empirical land uplift project is quite manageable, at least if Olav Vestøl is able to continue (cf. above). In the discussion it was clearly shown that all working groups are involved in one way or the other in land uplift related activities. The Presidium would like to see coordination among these efforts and therefore suggested a Joint Working Group Workshop on Postglacial Land Uplift Modelling in connection to the next presidium meeting; see item 11 for further details.

WG Geodynamics (Dagny): Three projects are proposed

- Co-ordinate absolute gravity measurements in Fennoscandia
- Facilitate cooperation between the operators of the superconducting gravimeters in Onsala, Metsähovi and Ny-Ålesund
- Development of a new NKG GIA model for the gravity change in Fennoscandia

WG Geodetic Infrastructure (Per):

No specific proposals for projects were presented at the meeting. However, the project proposal from Markku on the Nordic contribution to ECGN (see below) is very interesting for this working group.

WG Reference Frames, Positioning and Navigation (Pasi):

- **Transformation ITRF - ETRS 89 with velocity models.** Proposed project leader is Pasi Häkli. There is a need for an accurate connection between ITRS and the national ETRS89 realizations for maintenance of national reference frames (continuation of the work done in previous WG of Positioning and Reference Frames). The current transformation recommended by EUREF is not sufficient for cm-level accuracy in most Nordic countries due to the post-glacial rebound. The previous WG has produced transformation procedures for ITRF2000 and ITRF2005 with the intraplate model NKG_RF03vel, but ITRF2008, future ITRFs and models have not been considered so far.
- **Nordic GNSS Analysis Centre (NKG AC).** Proposed project leader is Lotti Jivall. The deliverable would be an official Nordic ITRFyy solution. The first step would be to do a pre-study of GNSS processing facilities and strategies in Nordic countries/institutes, including a study of how different existing solutions can be combined and of whether there is a need for harmonizing processing strategies. The presidium suggested that it could be a good idea to split the project into sub-projects.



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More information about the projects can be found in Appendix 2.

Project proposal from Markku: The Nordic contribution to the ECGN. Markku is responsible for ECGN on the EUREF level, where a pilot project is needed to motivate further development. The Nordic area has here been suggested as suitable. Markku proposed a NKG Pilot Project with the title "Observing the Glacial Isostatic Adjustment at the Baltic Sea Area" consisting for instance of activities like the following_

1. Establishing of the NKG Metadata base,
2. Collecting existing information, links to data archives, collaboration of all NKG WGs
3. Study on the sea level variation of the Baltic Sea, prediction of the future sea level rise at Fennoscandian coastlines
4. Other related studies such as gravity change, GIA modelling and so on

In summary, the NKG Presidium believes that the proposed projects are important for the progress of NKG and hopes that all involved institutions have the possibility to participate. However, the Presidium also realises that it cannot make decisions on behalf of the institutions regarding resources for the different projects. Next step would be to collect all project proposals from the working groups as soon as possible and then shared within the NKG Presidium. All working groups are encouraged to use the templates that we have agreed on. A good starting point would be to have all projects presented using the simple project template so that all proposals are presented in the same format.

Action: All working groups have indicated interest in working on land uplift issues. All working groups also indicated different views on when a next official model should be released as well as how rigorous research that should be done in short term and longer term. A Joint Working Group Workshop on Postglacial Land Uplift Modelling is needed. Per is responsible to organise.

Action: All working group chairs are asked to fill in the simplified project template as soon as possible, send them to Mikael who distributes them to all members of NKG Presidium.

ITEM 10. NKG LOGO

In previous Presidium meeting the use of NKG has been discussed when supporting International Conferences. It was decided at this meeting that a proposal should be sent to Niels or Mikael and that a quick decision is made through email discussion among the Presidium members.

ITEM 11. NEXT MEETING OF THE PRESIDIUM

Working group meetings are suggested to take place in the beginning of March. The next Presidium meeting will then be in April. We decided to try to use an Internet Doodle to find suitable dates. It was also decided that in connection to the Presidium meeting organise the Joint Working Group Workshop on Postglacial Land Uplift modelling mentioned under item 9. Per is



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responsible to organise the workshop. Since we decided to have the workshop as well as NKG Presidium meeting together, it was decided that Norway would be the first choice of hosting country. We decided to postpone the Presidium meeting in Iceland.

The second Presidium meeting in 2012 will be held in conjunction to the NKG Autumn School.

ITEM 12. CLOSING OF THE MEETING

Niels ended the meeting by thanking everyone for two hectic but interesting days and thanked the host Chalmers for excellent facility and support and wished everyone a safe journey back home.



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APPENDIX 1. OPEN ACTIONS

ACTION Item	Actions taken	Commission Action Officer	Action / Update.....UPDATED October 2011	Target Completion Date
2010.4	NKG Presidium meeting 47, Denmark, December 2010	Statens Kartverk	Norway and Statens Kartverk is asked to publish a paper book by latest September, 2011.	2011.09.30
2010.9	NKG Presidium meeting 47, Denmark, December 2010	Working group chairs	The presidium asked the working group chairs to come up with outreach topics for outreach activities to the next Presidium meeting.	2011.03.17
2010.12	NKG Presidium meeting 47, Denmark, December 2010	Markku	Marrku to report to the presidium in the future on activities in the EUREF TWG	Ongoing
2010.13	NKG Presidium meeting 47, Denmark, December 2010	All	Each institution to see what kind of facilities exists for the possibilities on video conference/telephone conference.	2011.03.17
2011.1	NKG Presidium meeting 48, Finland, March 2011	All	Anne will prepare with the help of the presidium members a proposal for NKG MS Word template, including the logo and name of NKG also in English in the heading	
2011.8	NKG Presidium Meeting, Sweden, October 2011	Mikael	Publish NKG Presidium meeting minutes on the NKG website	2011.11.01
2011.9	NKG Presidium Meeting, Sweden, October 2011	Niels	Niels to contact responsible agency for next years NMA Director General meeting to seek invitation for the NKG President.	2012.03.01
2011.10	NKG Presidium Meeting, Sweden, October 2011	Mikael	Baltic countries. Mikael to remind the Baltic countries that they are	2011.11.01
2011.11	NKG Presidium Meeting, Sweden, October 2011	All	All countries to confirm their member to the scientific committee	2011.10.15
2011.12	NKG Presidium Meeting, Sweden, October 2011	Mikael	Link to the new Swedish compendium on Geodesy to be put on the NKG web page. Mikael is responsible.	2011.12.01
2011.13	NKG Presidium Meeting, Sweden, October 2011	Per	A Joint Working Group Workshop on Postglacial Land Uplift Modelling	2012.05.01
2011.14	NKG Presidium Meeting, Sweden, October 2011	Working group chairs	All working group chairs are asked to fill in the simplified project template as soon as possible, send them to Mikael who distributes them to all members of NKG Presidium	2011.12.01



APPENDIX 2. PROJECT PROPOSALS

Project proposals from the WG of Geoid and Height Systems:

Project number:	1
Name:	Computation of the NKG2014 geoid model
Short description:	The project includes methodological issues, updating of data/databases as well as computation and documentation of the final NKG2014 model. The intention is to use two or more computation centres.
Deliverable, time	The NKG2014 geoid model in 2014
Project leader:	Jonas Ågren
Members:	René Forsberg, Gabriel Strykowski, Mirjam Bilker-Koivula, Dag Solheim, Ove Omang, Lars Sjöberg, Tõnis Oja, Artu Ellmann, Janis Kaminskis, Ivars Aleksejenko

Project number:	2
Name:	Investigation of the requirements for a future 5 mm (quasi)geoid model
Short description:	Study project to investigate what is required in theory and in practice (data) to reach the goal of a (quasi) geoid model with 5 mm standard uncertainty in the future.
Deliverable, time	Progress report in 2012, published paper in 2014
Project leader:	Lars Sjöberg
Members:	René Forsberg, Gabriel Strykowski, Mirjam Bilker-Koivula, Ove Omang, Jonas Ågren, (Martin Vermeer), (Christian Tscherning)



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Project number:	3
Name:	Finalisation of the Baltic Levelling Ring (BLR)
Short description:	This project contains remaining tasks from the Baltic Levelling Ring project. The covariance matrix is only computed if a reasonable amount of work is required.
Deliverable, time	Before the WGGHS meeting in 2012: <ul style="list-style-type: none">– BLR documentation published.– Covariance matrix computed (if possible with a limited amount of work)– Information folder about the Nordic height systems and BLR finished.
Project leader:	Jonas Ågren
Members:	Jaakko Mäkinen, Karsten Engsager, Olav Vestøl, Per-Ola Eriksson, Ivars Aleksejenko

Project number:	4
Name:	Review of current and near-future levelling technology
Short description:	Make a literature and experience-based review that sums the current levelling methods and capacities in the Nordic countries, identifies promising areas for further study and development.
Deliverable, time	Final report of 20-30 pages presented at the WGGHS meeting in 2012.
Project leader:	(Olav Vestøl)
Members:	Jaakko Mäkinen, Casper Jepsen, Per-Ola Eriksson, Guðmundur Valsson, Veikko Saaranen



Project number:	5
Name:	Empirical land uplift modelling
Short description:	Compute an updated version of NKG2005LU including levelling data from the Baltic countries, which can be used in the computation of the new Baltic height systems. In the long run the computation method shall be improved and a more optimal model will be derived using also a new, high quality GNSS solution.
Deliverable, time	An updated Nordic model computed including the Baltic levelling data in 2012. A model computed using an improved method and including a new GNSS solution in 2014.
Project leader:	(Olav Vestøl)
Members:	Jonas Ågren, Andres Rüdja, (Karsten Engsager), (Jaakko Mäkinen), Veikko Saaranen, Ivars Aleksejenko



Project proposals from the WG of Reference Frames, Positioning and Navigation:

ITRS-ETRS89 transformations

Project

MOTIVATION OF THE PROJECT

Need for an accurate connection between ITRS and national ETRS89 realizations for maintenance of national reference frames (continuation of the work done in previous WG of Positioning and Reference Frames). Current transformation recommended by EUREF is not sufficient for cm-level transformations in most Nordic countries due to post-glacial rebound. Previous WG has produced transformation procedures for ITRF2000 and ITRF2005 with intraplate model NKG_RF03vel but future ITRFs and models have not been considered so far.

OUTCOME /DELIVERABLE

1. Finalize the transformation part of NKG2008 campaign (from the previous WG) including constraining of the solution to ITRFyy and review of possible transformation procedures that take into account post-glacial rebound/plate tectonics in Nordic area to ensure accurate connection between global and national reference frames. Outcome: paper/report
2. Continuation:
 - a. new transformations for ITRF20yy with coordinates based on time series of GNSS stations (dependent on project NKG AC)
 - b. new intraplate model? (dependent on WGG)

WORKING GROUPS AND OFFICERS INVOLVED

Working group of Reference Frames, Positioning and Navigation (WGRFPN).

Leader: Pasi Häkli

Members:

- DK:
- EE: Karin Kollo, Priit Pihlak
- FI: Ulla Kallio
- IS: -
- LV: Janis Kaminskis
- LT: Eimuntas Paršeliūnas



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- NO:
- SE: Lotti Jivall, Martin Lidberg

MILESTONES, COMPLETION DATES

- 2011-09-30: nomination of the project group (sent to project leader)
- 2011-11-30: start of project; organization of the project group
- 2012-06-30: finalizing the results from previous WG and review of possible transformation procedures
- 2013-2014?: new transformation (dependent on new solutions and/or models)

PROPOSED MEETING SCHEDULE

TBD

PROJECT MONITORING AND REPORTING

Short status reports for the Presidium meetings.

SENT IN BY

Pasi Häkli



NKG GNSS analysis centre

Project

MOTIVATION OF THE PROJECT

Need for dense and consistent field of station velocities (time series) in global ITRFyy frames in order to maintain national ETRS89 realizations in the future and for other studies like GIA modelling.

OUTCOME/DELIVERABLE

NKG GNSS analysis centre (NKG AC) could provide a common and combined GNSS solution for Nordic countries.

1. The first step is to do a pre-study of GNSS processing facilities and strategies in Nordic countries/institutes including a study how different existing solutions can be combined and is there a need for harmonizing processing strategies. Outcome: a report of current processing strategies and plan for the future actions.
2. The next steps could include (more detailed plan according to the findings in phase #1):
 - a. a definition of data policy,
 - b. establishment of an NKG AC (continuous routine processing),
 - c. combination of different solutions and
 - d. production of a consistent field of station velocities that can be used in various studies like GIA modelling. The resulting GNSS solution is essential also for maintenance of national ETRS89 realizations in the future.
 - e. Later the deliverables could be official NKG densifications of ITRFyy in Nordic area and other related products like ionosphere and troposphere models.

WORKING GROUPS AND OFFICERS INVOLVED

Working group of Reference Frames, Positioning and Navigation (WGRFPN).

Leader: Lotti Jivall

Members:

- DK: Marianne Knudsen
- EE: Karin Kollo, Priit Pihlak
- FI: Pasi Häkli, Sonja Nyberg
- IS: Þórarinn Sigurðsson, Guðmundur Valsson
- LV: Inese Janpaule
- LT: Eimuntas Paršeliūnas



NORDISKA KOMMISSIONEN FÖR GEODESI

- NO:
- SE: Tina Kempe, Christina Lilje

MILESTONES, COMPLETION DATES

- 2011-09-30: nomination of project members (sent to project leader)
- 2011-11-30: start of project; organization of the project group
- 2012-06-30: pre-study completed and more detailed project plan ready
- 2013?: Routine processing working at NKG AC
- 2014 (next General Assembly)?: products

PROPOSED MEETING SCHEDULE

Not decided yet.

PROJECT MONITORING AND REPORTING

Short status report for Presidium meetings.

SENT IN BY

Lotti Jivall (and Pasi Häkli)