



# NORDISKA KOMMISSIONEN FÖR GEODESI

**Chairman**  
MARKKU POUTANEN  
FGI -- Finnish Geospatial Research Institute  
Department of Geodesy and Geodynamics  
Geodeetinrinne 2,  
FIN-02430 Masala  
Finland

**Secretary**  
HOLGER STEFFEN  
Lantmäteriet  
Geodesienheten  
SE-801 82 GÄVLE  
Sweden

## MINUTES

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

**Time:** 2-3 October 2019, noon to noon.  
**Place:** Park Inn Hotel, Keflavik (ca. 10 min drive from the airport).  
Park Inn By Radisson  
Hafnargata 57  
230 Keflavik  
Tel : +354 421-5222, ([www.radissonhotels.com/en-us/hotels/park-inn-reykjavik-keflavik-airport?cid=a:se+b:gmb+c:emea+i:local+e:pii+d:nob+h:REKPO](http://www.radissonhotels.com/en-us/hotels/park-inn-reykjavik-keflavik-airport?cid=a:se+b:gmb+c:emea+i:local+e:pii+d:nob+h:REKPO))

#### **Presidium**

Markku Poutanen (chair)  
Holger Steffen (secretary)  
Niels Andersen  
Søren Fauersholm Christensen  
Bengt Eurenus  
Pasi Häkli  
Anna B.O. Jensen  
*Jan Johansson (Skype)*  
Jarkko Koskinen  
*Ove Omang (not present)*  
Per Erik Opseth  
Ola Øvstedal  
Þórarinn Sigurðsson  
Guðmundur Valsson

#### **Guests**

Artu Ellmann  
Janis Kaminskis  
*Ivars Liepins (not present)*  
Michael Schultz Rasmussen

#### **Item 1) Opening of the meeting (Markku)**

Markku opened the meeting and welcomed us all.

We welcomed our guest Michael Schultz Rasmussen, the new head of the Geodesy and Geodynamics Division of DTU Space. He is a physical geographer specialized in remote sensing. He came from University of Copenhagen to DTU.

We also welcomed Bengt Eurenus, the Acting Head of Geodetic Infrastructure after Mikael Lilje until the position is filled again (*Note from after the meeting: Martin Lidberg will be the new Head effective 1 November 2019 and thus represent Lantmäteriet in future Presidium Meetings*).

Ove Omang is the new chair of Future Height Systems and Geoid. Ove could unfortunately not attend. Hence his introduction will be done next time.

As Mikael Lilje served as secretary for many years, a new secretary should be selected. Holger will serve as secretary for this meeting but will not continue.

Markku has created a GoogleDrive for all documents and presentations of this meeting:

<https://drive.google.com/drive/folders/1hWqVhRb0M81b7Mf8TFrostKnOPnRRkWR>



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

We agreed on the agenda.

## Item 3) Approval of the Minutes from the 75<sup>th</sup> NKG Presidium Meeting (April, 2019) (All)

We approved the minutes except a small change of the title.

**Action:** Holger is asked to make the change (*Note from after the meeting: Done*).

## Item 4) Action Items from the 75<sup>th</sup> NKG Presidium Meeting

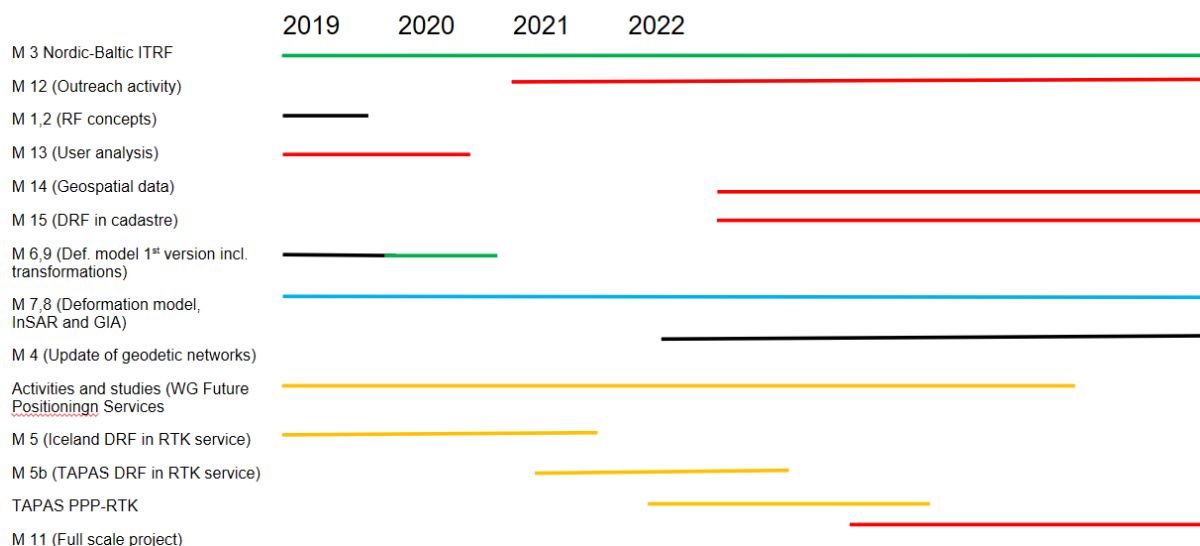
- Report from coordinating board (= Item 5), Per-Erik
- by-laws (= Item 8); representatives from each country, all
- co-operation with Russia, Markku
- Science week in Iceland (=item 16) Holger/Markku/ Þórarinn
- NKG Summer school in Denmark (= item 17)

Four of the five items above were discussed during the meeting, see respective item for information. Regarding c), Markku had no further information on this topic now. There has been no contact, but it will be tried again.

## Item 5) Report from Coordinating Board (Per-Erik)

### Project view on the DRF Focus Area mile stones 2018-2022

DRF- Iceland ———  
DRF- User perspective ———  
WG - Geodynamic ———  
WG - Ref. Frame ———  
WG - Positioning ———



Per Erik reported on the progress of the coordinating board. There is currently only one project running, namely the DRF project for Iceland. Per-Erik presented the current situation (DRF-NKG-2019\_PM-iceland.pptx in Google Drive). There are four milestones of this project, see PPT. M1, the Deformation Model for Fennoscandia, was picked up by Pasi during his report from the WGRF. M2, the Deformation Model of Iceland, is running. M3, the Evaluation of DRF-concepts, is finished. The documentation has been sent by the secretary on behalf of Martin Lidberg (Reference\_frames\_static\_dynamic\_semidynamik\_two\_frame\_approach\_20190930-1 in Google



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Drive). M4, the Evaluation of the test of RTK-DRF on Iceland, is running. A first draft of a time schedule (so-called Gantt chart) has been developed, see above (3<sup>rd</sup> slide of the PPT). Currently three different WGs (Geodynamics, Reference Frames, Positioning) are involved.

The presidium concluded that the DRF project is progressing well and working fine. However, it should be ensured that the geospatial domain and decision makers are involved. While the geodetic part is very well covered, the geospatial community seems to be underrepresented and should be better and perhaps earlier involved. Moreover, we must understand that decision makers do not understand our problems, e.g. what a reference frame is or what the quality of geographic data is. The presidium discussed the reasons for this bias and possible solutions. It was also noted that the presented timeline is for discussion and not fixed.

As the DRF project is based on the decision of the General Assembly a lot of geodetic work must be done first. Regarding the user analysis (e.g., what is the economic benefit? What are the costs?) and involvement of the geospatial community, the problem remains that we are all geodesists. Per Erik mentioned that a meeting was planned in September to, among others, address this issue but was unfortunately skipped. Bengt added that LM is eager to have the geospatial community on track. LM will have an internal workshop in the fall to make colleagues at LM aware of this.

**Action: Lantmäteriet** is asked to give a short summary of the Fall Workshop with the Geodata department during the **next Presidium Meeting** as part of the National Report.

It was proposed to keep the schedule as is to show that we take care of the (technical) geodetic background and user needs. The geospatial community should be informed but then work on this outside of us. This could be enabled via the new NMCA group (see Item 10). When the geospatial community is ready, we take “inreach” and work with their requests as we are aware that we cannot map all those problems – we are not experts in this field. In this regard, it is important to follow possible demands from EU. For example, the Finnish Ministry of Traffic and Telecommunication may have demands but so far, there is no access to any documents. At the same time, it has been mentioned that an absolute accuracy of 2.5 cm is needed for autonomous driving but not clarified how, just that this may be a boundary agreement between European states. Jarkko added that the Ministry was anxious in reading the draft of the white paper from the WG on Future positioning services (NKG WG Positioning - white paper - draft 2019-09-16).

**Action: Anna** and the WG is asked to finalize the white paper by **1 December 2019**. **Presidium members** are asked to forward it to decision makers/members of the transportation ministries and ask how these things are proceeding in each country. If no contact exists yet, each country is asked to try establishing such contact. Each country shall report on the progress during the **next Presidium Meeting**.

## **Item 6) Report from Working Groups (Pasi, Ove, Holger, Anna)**

### a) Reference Frames

Pasi gave an overview of recent activities since April 2019. Several papers were published in the NKG GA special issue of Geophysica as well as Sonja Lahtinen’s NKG GNSS AC paper in GPS Solutions. The GNSS AC has included RINEX3 data and multi-GNSS signals as requested by EPN. A benchmark test has been performed and results will be presented soon. EUREF has asked to contribute to two projects, namely the EPN Densification project with operational solutions by



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each LAC and the EUREF Dense velocities project with the intraplate velocity model. Pasi also presented the NKG transformation project status. The model is now almost ready. The zero-velocity location seems too much North as expected (actually in the area of the uplift centre), however, this is a reference frame issue because Altamimi et al. did not use stations in northern Europe for generation of ITRF2014 plate motion model that is used to produce intraplate (or residual) velocities. If the velocity field is used in ITRF2014 it works very fine. An area of abnormally high velocities in central western Norway might relate to another geodynamic process and is left to scientists. The NKG transformation is ready and will work once the final model is delivered. This model shall also be implemented in PROJ. Lastly, we concluded again that a contact to Russia would be beneficial in future as only a few Russian EPN stations can be used to date.

## b) Future Height Systems and Geoid

Dagny has left Kartverket. Ove is the new chairman but could not attend the meeting, thus there is no report this time.

## c) Geodynamics and Earth Observation

Holger summarized the development since the WG meeting in March. The WG has two milestones until the next GA, the development of a GIA model of northern Europe and publications on the relative gravity lines. Both activities are ongoing. Regarding the GIA model, the missing publication on the latest BIFROST velocity field processing is under preparation now. Valentina Barletta from DTU Space has provided new results. Target journal is Journal of Geophysical Research. Regarding the relative gravity lines, Jaakko Mäkinen and Andreas Engfeldt have started working on the subject. Jaakko is currently checking so far unpublished data. Also, parts of the data were already sent to Andreas. Lastly, Holger informed that the planned Nordic comparison of absolute gravimeters in Onsala cannot be performed in 2020 due to other commitments of potential participants. Target year is now 2021. Planning will involve colleagues at Onsala, Lantmäteriet and FGI.

## d) Future positioning services and applications

Anna reported on the socio-economic analysis and on the white paper, available on the Google Drive (NKG WG Positioning - white paper - draft 2019-09-16.docx). The WG had two meetings and has 14 members. The socio-economic value of GPS is 1.4 trillion \$ when calculated back in time. The NKG socio-economic analysis shall give insight into questions such as what the benefit in the future is, and what the benefit of geodesy for society is. The Presidium acknowledged the excellent work of the WG and the great white paper. Several suggestions were made by Presidium members that should be considered in the future work. Among others, it was suggested that the area of the socio-economic analysis should be broadened to geodetic infrastructure instead of positioning service only. For the white paper, it is important to add a strong executive summary which is of major importance for decision makers as they likely will not read the whole document. Lastly, the recommendations were examined, and slight adjustments made. The WG will meet again during the Science Week 2020 and will discuss future steps.

## Item 7) National Reports (All)

Denmark-DTU Space



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The two departments were merged to the Geodesy and Geodynamics Division of DTU Space. Michael introduced the new model with visions. There are 5 research teams (RTs): Gravity Field (Rene Forsberg), Cryosphere (Louise Sandberg Sørensen), Hydrosphere (Ole Baltazar Andersen), Geodynamics (S. Abbas Khan) and GNSS (Per Knudsen). Ole and Abbas were appointed as new professors in the last two years. The RTs are for science and are project owners. Then there is a project management team for project organization, best resource utilization, satisfied partners and customers. This is led by the Head of the Department (Michael). Projects are e.g. a 5 mm geoid (SDFE) or gravity in Uganda. Education coordination for development and quality is done by Per Knudsen. Teaching commitment is 50% for permanent positions. Niels informed that Knud Poder passed at the age of 94.

## Denmark-SDFE (NKG october 2019.pdf)

SDFE has currently three hot topics: Green transition, TAPAS, and the Future Height Infrastructure. Regarding Green transition, the Danish government has decided to make legislation to secure 70% reduction of CO<sub>2</sub> in 2030, whereas 65% should come from wind and sun energy. SDFE is requested to deliver proposals on how to cover the 5%. There are three suggestions: Dynamic positioning, authoritative geodetic height information, GNET's (Greenland GNSS network) importance for international climate action (use GNET results to show if Green transition goes into the right direction). TAPAS (Testbed in Aarhus for Precision positioning and Autonomous Systems), the geodetic research platform for accurate and dynamic positioning, has 11 stations with ca. 10 km distance in between. It is an open research and development test facility for non-commercial use to allow tests in a living city. It has already been used in public and private projects. Currently, the CityShark project collects waste in the harbor with drones, while the City of Aarhus used grass cutting with an autonomous vehicle. For the Future Height Infrastructure, SDFE works towards designing a maintenance plan such that strong deforming areas are visited more frequently and stable areas less frequently. Here, tide gauge, leveling, InSAR and GNSS shall be combined and integrated to arrive at a new vertical datum and maintenance. This shall suggest surveying areas and surveying frequency.

## Finland

The new government has finally granted 5 million Euros to continue the geospatial clarification project. The project shall answer: What is the accuracy needed in our RF? What is the future for our positioning service and interference service? What is the strategy of our national SDI? However, priorities will be set by a committee on Ministry level. There are some rather drastic changes of NLS' organization but interferences with FGI are minimal, hopefully. In Metsähovi, a new VLBI receiver is coming and final SLR installation is ongoing. Both should be available for testing next year. The FinnRef extension is ready now with 49 stations. FinnRef + a few stations in Sweden and Estonia form the positioning service FinnPOS. 20 stations are part of EPN. Absolute gravity measurements were performed in Latvia. The AG will go to Antarctica again in near future. As part of the ESA-funded Geodetic SAR project for Height System Unification, three transponders and two corner reflectors were bought. Within the EU-funded ISTLAB project for marine navigation, sea height shall be determined in Rauma harbor to get the amount of free water under the keel to the sea bottom in real time. The project shall answer the question: What density of reference station is needed around the harbor? Markku will step down as the Head of Geodesy



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and Geodynamics department at the FGI and will continue as a research professor. There are 4 applicants for head of department and results are expected mid of November. The new head will start 1 January 2020 (*Note from after the meeting: Dr. Hannu Koivula will be the new Head effective 1 January 2020*). Maaria Nordman has started as new associate professor at Aalto University 1 October. Her position is partly funded by NLS.

## Iceland

Eydís Líndal Finnbogadóttir is the new Director General since 1 July 2019. There are some problems with finances and people retiring or working less hours which affects the work flow. In addition, office problems occurred after no activity in July and in the first week of August. ICECORS deployment is progressing. The goal is 34-36 stations and 23-24 stations will be available end of this year. This is in cooperation with the met office and the university. It is hoped to get more users like farmers once the benefit for them has been explained. The service is free of charge. Trigonometric levelling was performed along the highland line, 80 km in three weeks, with good results. GNSS work is done in the Reykjavik area as the old flat-Earth system does not fit the benchmark any more. About 60 points were measured, but a few more must be measured to generate a new model. Gudmundur analyses the needs for publicly available images and heights in Iceland. In the Arctic DEM project in cooperation with MetOffice, DEMs are combined. The final report on the Island 2016 campaign will be published soon.

## Norway-NMBU (Geodesy\_Geomatic\_education\_in\_Norway\_2018.pptx)

Ola showed an overview of students in geodesy and geomatics in Norway. Norway is concerned regarding number of students in these fields as 2018 (only) 165 students completed. Most are actually hi-jacked already 1-2 years before they finish. Some disappear as they have a bachelor which is sufficient as pre-requisite to work in industry.

## Norway-Kartverket (NKG Oct 2019 National report Norge.pdf)

The Geodetic Institute has integrated a new international service with 8 persons. There are 13 ongoing projects, mainly SE Europe, Africa and Asia. The PGS network is densified, mainly to achieve partly 10 km density near railroads. More companies are interested in access to raw-data streaming, currently there are ca. 5000 users. With additional more than 5000 CPOS users, there are more than 10,000 users of RTK services. A contract with Bane NOR has been signed. 27 new stations along none-electrified railroads were built, with 20 more to come next year. This is for efficiency in positioning of the rails. The latest user survey shows that more than 91% of the users happy with Kartverket. However, accuracy and system-up time should be improved. Another ongoing user analysis deals with socio-economic effects of the positioning service, e.g. for scenarios with CPOS or raw data free of charge. Important questions that shall be answered are:

- Is there a need for an improved height system in Norway?
- How will ongoing development in GNSS industry affect what we consider as the reference frame in Norway?
- What is the first natural step on the way to implementation of a semi-dynamic reference frame?

Work is ongoing towards a unified height reference at land and sea as there are several areas with more than 10 cm difference in the height systems. The old 20 m antenna at Ny Ålesund will be





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demolished in 2022. Until then, two years of parallel observation with the new one is planned. The VLBI antenna has some problems in the three-band feed. The VGOS feed is in place in the other antenna. Pre-operational mode is hoped for in 2019. Regarding SLR, there are 1.5 years delay of NASA deliverables, ORR shall take place in 2024. A new SLR expert was employed. Ongoing research deals with ocean topography from Sentinel 3A, and GNSS and InSAR combination.

Sweden-LM (National report October Sweden.pdf)

Mikael Lilje is now Head of LM's International Department. A new Head for the Geodetic Infrastructure is searched (*Martin Lidberg as of 1 November*). Jonas Ågren left to Högskolan i Gävle (still 20% at LM to finish some projects) and Gunnar Hedling retired. The recruitment process for both positions has been initiated. Marine gravimetry campaigns have covered Sweden's water now to a density of 1/3 that we need. The 2019 GIA Training School was held in Gävle with 41 international students and 16 lecturers from 28 countries and 6 continents. A report on GNSS positioning services of the future is in preparation which shall outline the expected users of future GNSS positioning services and their requirements, the national geodetic infrastructure as expected and needed by future users of GNSS positioning services and provide recommendations to the required national geodetic infrastructure including geodetic reference frames and height systems in support of such services. It is based on the global and European development but has specific focus on Sweden and on the SWEPOS services of Lantmäteriet. There are several ongoing projects (NPAD, Stomnät i luften 2.0, Prepare Ships, Geodetic SAR). SWEPOS has increased availability and redundancy, i.e. with a new backup station. There are ca. 5700 users.

Sweden-RI.SE

The staff increased on the VLBI side. Hans-Georg Scherneck did not fully retire, he got a contract on hour basis. The VLBI telescope improvements are ongoing.

Estonia

The EUREF2019 was held in Tallinn with 115 participants from 30 countries. A PROJ tutorial was also held in advance with 60 participants. Karin Kollo is the new EUREF secretary. ESTPOS was recognized by the EUREF GB as Class A (resolution #1). ESTPOS provides service for infrastructure projects, perhaps for the anticipated railway from Berlin to Helsinki with a tunnel between Tallinn and Helsinki (under discussion). Estonia also contributes to the Geodetic SAR project. Mapping of the Estonian shoreline is planned in 2020. This is done once in 8 years. The new LiDAR data from 2017 are in place, which show more details. The corresponding paper for the 5 mm geoid model for Estonia, ESTGEOID-2017, has been published in Survey Review. Estonia is now a member of EuroSDR.

Latvia-URiga (RTU\_NKG\_Iceland\_.pdf)

Janis presented the university view. New laser-scanning systems and total stations were purchased. There is an agreement of cooperation on supporting the adoption of Building Environment Modelling (BIM) by establishing the Centre of Excellence for BIM Advancement in the Baltic Region. The EIT Raw Materials Baltic Hub was launched in September. An International LOFAR telescope (ILT) was installed north of Ventspils in Irbene and is launched in October. There is a plan to develop Geodetic VLBI, so that it can be integrated in the IVS and to contribute to ITRF/ICRF. Planning of 2<sup>nd</sup> Int. Symp. On Applied Geoinformatics is ongoing. The 1<sup>st</sup> Symposium



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will be held in November in Istanbul and is co-organized by the University of Riga. Old triangulation towers are revisited as outreach activity. They shall be improved to serve as tourist attractions with a connection to the Struve Arc. Latvia is now Associate Member of IUGG.

## **Item 8) By-laws (Corresponding members of this group)**

We shortly discussed how to proceed as this group has not been formed yet. We need a balance between universities and NMCAs, perhaps a representative of the WGs. Markku suggests Per-Erik for N, Sören and Niels for DK, the new head of the department of LM (*Martin Lidberg*) for S, himself for FIN and Holger as WG representative for the moment. Iceland is happy to be just informed via e-mail. One person from the Baltic countries should participate as well.

**Action:** The **Baltic countries** decide on their representative in the group and forward the name to Markku.

**Action:** **Markku** will call for a meeting when all participants are determined.

## **Item 9) Copyright and Licensing of NKG Products (Holger)**

Holger summarized the success and distribution of NKG products. However, nowadays data products are connected with corresponding metadata, copyrights and if possible, even DOI-numbers. So far, NKG products miss metadata and copyright, which has been turned out to be an issue for scientists using NKG2016LU in open software. Holger thus suggests that metadata and copyright information will be added to NKG2016LU and NKG2016LU\_gdot as well as future NKG products. An adequate copyright license would be CC-BY, as data provider "Nordic Geodetic Commission (NKG)" could be listed. The Presidium briefly discussed this topic and agrees that adding adequate metadata and licensing information is the right step forward.

**Action:** **Holger** is asked to forward missing metadata and licensing information to those individuals that requested this information (*Note from after the meeting: Done*) and to work on adding this information for NKG2016LU and NKG2016LU\_gdot until the **next Presidium Meeting**.

## **Item 10) Report from Storschefsmötet Mariehamn (Markku and Per Erik)**

Markku and Per Erik were invited and gave a presentation in the meeting. Markku showed the slides that he presented during the meeting (NKG\_Mariehamn\_MP.pdf in Google Drive). He mentioned that NKG has been a big success. NKG has always be ahead of time, like 5-10 years ahead of practical solutions. Per-Erik talked about another group we should pay attention to, the governing boards of the NMCAs. Geodesy is usually not on their agenda, thus he suggested that a group is needed from the NMCAs to work on geodesy. The Director Generals of the Storschefsmötet decided to ask the heads of NMCAs geodesy sections to establish a cooperation to work on how to move in direction of a global reference frame as the geodetic foundation. This new group will report to the NKG in the future. According to Per-Erik, it will not take any science out of NKG. Instead, this group is using information coming out of NKG. A good example is the NKG2015 geoid model.

## **Item 11) UNGGIM Subcommittee on Geodesy, UNGGIM:Europe GRF (Markku)**





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Since a meeting in Brussels in June, Markku is not chairing the group anymore. Hence, we may not have direct information in the future. Message is out in search for a new chair, so far there are no news.

## **Item 12) UNGGIM Centre of Excellence (Per Erik)**

Per-Erik presented the history and tasks of this centre (NKG\_Island\_2019\_GGRF\_v1.pdf in Google Drive). It acts as an operational hub of the UN-GGIM. Currently the Russian Federation and Germany work on minister level to get funding. This means that geodesy is now on the high political agenda and thus highly visible. Laila Løvholden informed during the Presidium Meeting that a meeting of the Centre is planned, so work is ongoing.

## **Item 13) Report from EUREF and IAG (Markku)**

Markku is not any more the president of EUREF, hence the Presidium briefly discussed how to organize the exchange of information. Markku as the Secretary General of IAG can provide general information on IAG. However, as Karin Kollo is now the Secretary of EUREF and Martin Lidberg the new president, we concluded that we have good contacts there (*Note from after the meeting: Martin Lidberg as new head of geodesy at LM will be member of the Presidium*).

Markku showed and briefly commented on the resolutions of the EUREF and IAG meetings. EUREF Resolution #4 regarding usage of RINEX3 is the reason that the NKG GNSS AC has switched to RINEX3. Next EUREF GB meeting will be in two weeks in Warsaw. Markku will attend. It is wished that the new EUREF structure should be presented at the next Presidium Meeting (*Note from after the meeting: Martin will do that*).

## **Item 14) GGOS Affiliate (Markku)**

Richard Gross asked last year if NKG could become an Affiliated Member of GGOS. NKG would have a chair in the Coordinating Board. So far, GGOS Japan is the only Affiliated Member. There are no obligations from GGOS, but it would increase NKG's visibility and we could get more information on a global level.

The presidium discusses this offer. It is questioned why NKG should become a member of another organisation, i.e. as we are already members in some way of GGOS. In view of the current work within UN-GGIM, the expectations and benefits of being a GGOS Affiliated Member must be outlined clearer.

**Action: Markku** is asked to discuss with the new GGOS chair (Basara Miyahara) the expectations and benefits of NKG being a GGOS affiliate member and present those during the **next Presidium Meeting**.

## **Item 15) NKG Web page (Þórarinn & Gudmundur)**

Much information is missing on the webpage and usage of it is low. Þórarinn and Gudmundur note that there has been no action from the WG chairs, except WG Reference Frames. This seems because login and instructions were sent before the last GA to the previous WG chairs. Pasi notes that not all tools are working. An update is available which should be installed. It is acknowledged that the instructions are straightforward and thus the WG chairs should be able to maintain the website as appropriate.



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**Action:** The web page host (**Iceland**) is asked to resend the login and instructions to the (new) WG chairs as well as to update the software. **WG chairs** are asked to update their websites then accordingly until the **next Presidium Meeting**.

## **Item 16) Science Week 2020 (Iceland)**

The Presidium discussed the meaning, costs and carbon footprint of having the Science Week in Iceland. Also, it was wondered if a Science Week and Summer School should happen the same year. It was explained that at least two WGs will have their meeting anyway in Iceland and that Iceland did not host a WG meeting since 2013. For organisational purposes, especially for our Icelandic colleagues, it is beneficial to have it that way. Further, Summer School and WG meetings always happened the same year and the target audience is different. The Presidium thus suggested that Iceland continues with the local organisation of a Science Week in week 11, 2020. The Scientific Committee will consist of Gudmundur, the four WG chairs and Markku.

**Action:** The **Scientific Committee** is asked to provide a theme and tentative schedule to the Local Organizers (*Note from after the meeting: tentative theme is "Geodesy – from science to society" and planned from Monday, 9 March noon, to Wednesday, 11 March, late afternoon*).

## **Item 17) Summer School 2020 (Denmark)**

Planning has not progressed since the last Presidium Meeting, where it was proposed that the Summer School 2020 could be held in Billund, Denmark. During this Presidium meeting it was found out that actually Norway is in charge of the Summer School 2020. Per-Erik will initiate the planning in Norway.

**Action: Norway** is asked to present the plan for the Summer School at the **next Presidium Meeting**.

## **Item 18) Other Business (All)**

- Seeking external funding for NKG projects (e.g. EU-Horizon 2020, Nordforsk, ...) - now only opening the discussion  
This item was postponed to the next meeting as time was running.
- Anna mentioned that she has been appointed president of the Nordic Institute of Navigation (NNF) and that she sees some joint interests between the NKG and the NNF especially around positioning, sea level and reference frames. She also mentioned two upcoming Nordic navigation activities; INTO 2019 – Indoor and Challenging Navigation Seminar in Helsinki in November 2019 and a seminar on timing, time synchronisation and 5G to be held in Linköping in May 2020.

## **Item 19) Next meeting of the Presidium (All)**

The 77<sup>th</sup> Presidium Meeting is offered to be held in Riga by the Technical University in early spring 2020.

Last six meetings including this; Iceland – Sweden – Finland – Norway – Denmark – Finland