



NORDISKA KOMMISSIONEN FÖR GEODESI

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The NKG Steering Committee on the on-going sub-projects for "NORDIC POSITIONING SERVICE"

Minutes of the 9th meeting

Gävle, Sweden - November 22-23, 2001

PRESENT

Denmark: Sigvard Stampe Villadsen
Bo Madsen
Finland: No representative
Norway: Björn Engen
Rune Hanssen
Sweden: Bo Jonsson
Christin Lilje (Secretary)
Andreas Engfeldt

ITEM 1: OPENING OF THE MEETING

Björn Engen welcomed everybody to the 9th meeting of the NKG Steering Committee on the on-going sub-projects for "Nordic Positioning Service".

The Steering Committee agreed to the following agenda for the meeting

1. Opening
2. Minutes from the 8th Steering Committee meeting on August 13-14 in Copenhagen
3. Status of the application to "Nordisk Industrifond"
4. Information from the meeting of the Director Generals August 27-29
5. Status of a computer network between the Nordic control centres

6. Status of the sub projects
 - A0 - Standard for reference stations
 - A1 - Web-site
 - A2 - Automated Computation Service
 - B - Real time service with 0.5 m accuracy
 - C1A - Distribution channel for RTK
 - C1B - Evaluation of RTK algorithms
7. Draft of the Agreement on Exchange of data (both real time and post-processing)
between the Nordic countries - Pricing issues
8. Distribution of information from the meetings of the Steering committee
9. Other items
10. Future work, next meeting and closing

ITEM 2: MINUTES FROM PREVIOUS MEETING

Minutes from the 8th Steering Committee meeting on August 14-15 was approved, without any comments.

ITEM 3: STATUS OF THE APPLICATION TO "NORDISK INDUSTRIFOND"

In the beginning of June Björn prepared an application and sent it to "Nordisk Industrifond". After a few weeks he was asked to describe the financing of each sub-project separately. An updated version of the application was sent to "Nordisk Industrifond" the 9th of July.

The responsible person at "Nordisk Industrifond" has not been able to deal with the application yet, among other things due to travelling and illness. It will take another couple of months before the next formal meeting at "Nordisk Industrifond", where a decision on the application can be made.

ITEM 4: INFORMATION FROM THE MEETING OF THE DIRECTOR GENERALS AUGUST 27-29, 2001

The Director Generals had a meeting in Strömstad on August 27-29. Björn participated in the meeting as representative for NKG and had two items on the agenda, "Nordic Positioning Service" and "Nordiska Kommissionen för Geodesi". The General Directors considers the "Nordic Positioning Service" project as an interesting one and important for a deeper Nordic collaboration. See appendix 1 for minutes of the meeting.

ITEM 5: STATUS OF A COMPUTER NETWORK BETWEEN THE NORDIC CONTROL CENTRES

The specification for the network of the control centres in Denmark, Norway and Sweden can be found in the document "NKG Network - Architectural Design", which was updated on 20th of November, see appendix 2. The Steering Committee approved the document.

The VPN (Virtual Private Network) connections between the control centres will be installed on December 8-10 in Norway and in the middle of December (no date determined) in Sweden and Denmark. Software for the communication, using UNIX, has been developed in Norway. The same software will also be installed in Denmark. The test of the software will start in the near future. Similar software to be used on Windows NT platform is under development in Sweden. The expectation is to have a version for testing in the beginning of January.

Sweden would like to see more co-ordination between the countries during the development phase.

ITEM 6: STATUS OF THE SUB PROJECTS

A0 - A Nordic standard for reference stations

A detailed document of the classification of the reference stations has been developed. Gunnar Hedling, the chair of the sub project, will send the document to the members of the sub project, to the Steering Committee and to other involved persons for approval in January 2002. The document will be approved at the next meeting of the Steering Committee, on 6-7 March 2002.

The next step is to make an inventory of the existing Nordic reference stations. Based on this inventory and the existing standards for IGS and EUREF stations the sub-project shall propose a long-term standard for the design of Nordic reference stations.

A standard form, based on e.g. an Access database, should be used for the description of the reference stations.

A1 - A Nordic Web-site for download of reference station data for post-processing purposes

Anders Frisk informed about the status of the sub project. The aim has been to establish a common Nordic Web-site where it is possible to download post-processing data from all the Nordic permanent stations.

The last meeting of the sub project took place on 18th of August in Copenhagen. Then following was decided:

- To compress the data files using Hatanaka and some kind of zip software (compatible with PKZIP)
- The session name should follow the IGS standard
- It should be possible to download the newest precise ephemeris from the web-site

Advantages and disadvantages establishing a common web-site was discussed and the group came up with following:

Advantages with a common web-site:

- Easier to implement
- Easier to maintain
- Only one login system necessary
- A common Nordic activity

Advantages with a national web-site:

- Easier to supply national support
- No need for a common pricing policy
- Faster to implement when a common pricing policy is not needed

It should be observed that a disadvantage with a common web-site is that money has to be transferred between the Nordic countries, which requires an administrative organisation.

The first goal is to implement a common Web portal at each control centre of the Nordic networks of permanent reference stations, taking in consideration the existing pricing policy in each country. The final goal is to specify and establish a common Web site with a common pricing policy.

A prototype of the Web-site is available at KMS and SK but the users have no access to it yet. Since LMV is using Windows NT, instead of UNIX, it is a need for further development of the software to be able to use it.

The co-ordinates to be used in the RINEX header were discussed. As discussed at the meeting 19th of January 2001, there is a need to do some investigations regarding the national reference systems. The Steering committee proposes that a common Nordic campaign, containing the stations in the Nordic networks of permanent stations and the certified EUREF stations, is carried out in order to develop a common set of ETRS co-ordinates for the Nordic networks of permanent reference stations.

The issue has also been discussed at the meeting of the NKG presidium on February 2001 and at the NKG working group meeting of Satellite Geodesy on October 2001 in Hönefoss. No decision was made at the meeting. Björn Engen and Bo Jonsson will contact the working group of Satellite Geodesy and ask them to organise and perform the campaign as soon as the snow is gone, in spring 2002.

From the 1st of January 2002 the co-ordinates in the RINEX header should be the official EUREF 89 co-ordinates. The RINEX header should also include a comment that the co-ordinates are in EUREF 89.

A2 - An Automated Computation Service

LMV has a computation service in operation on the SWEPOS web-site. Since 16th of October 2001 the user have to pay 20 % extra on the subscription on GPS data for post-processing purposes to achieve access to the computation service.

The performance of the service is satisfied but the user interface can still be improved. In order to increase the number of users LMV will organise regional information meetings during spring 2002.

To extend the computation service to be a Nordic service some investigations regarding the national reference systems needs to be done, see comments under sub project A1.

B - A Nordic Real-time Service with half-meter horizontal accuracy (95 %)

SK has installed Trimble WADGPS software. Communications between the control centres are necessary for a Nordic co-operation on a WADGPS service. The communication between the control centres was discussed in more detail under item 5.

The expected accuracy is 10 centimetres (1σ , horizontally) and 30 centimetres (3σ , horizontally). Tests have been performed using dual frequency Ashtech, Javad and Trimble receivers, not Leica so far. The Javad receiver did not perform as well as the others. During the last periods of high activity in the ionosphere the accuracy was decreased to 1 metre.

The Norwegian private company Navsys is developing a pocket VRS (Virtual Reference Station computation unit), which include a Windows CE computer, GSM modem, FM radio receiver, RS232 serial port and optional a GPS receiver. Unfortunately the development is postponed four months. 1st of February 2002 SK will receive 10 prototype pocket VRS receivers. The first release is planned two months later.

When the communication links between the control centres are established a pilot project with a "decimetre" service (WADGPS) will be carried out in southern Norway, southern Sweden and Denmark using the software installed at the SATREF control centre. The SATREF control centre will collect data from the control centres for SWEPOS and the Danish reference stations. SATREF will provide a computed network model to the control centres for SWEPOS and the Danish reference stations for test and evaluation.

Before the pocket VRS receiver is available a laptop with the VRS software installed and a GSM modem or a radio receiver, connected to a GPS receiver, can be used in order to test the WADGPS service.

C1A - Test of distribution channels for RTK

GSM is used as distribution channel in the network RTK projects in Sweden. An ISDN router is installed at LMV. The user fee is 1300 SKr/year plus connection time. The ordinary price for GSM data is 1.10 SKr/min. In regional areas the fee can come down to 0,60 SKr/min.

A national network of transmitters for DAB (Digital Audio Broadcasting) is under establishment in Denmark. The whole country will be covered within the next year. GSM is used as distribution channel in the Trimble network RTK service and the fee is 1.15 DKr/min.

C1B - Evaluation of available RTK algorithms

KMS has performed several tests using Trimbles network RTK service in three different areas in Denmark. Additional tests with single station RTK has also been performed. Four documents describing the tests and results are available at KMS homepage, <http://www.kms.dk/referencenet>, under RTK.

One of the conclusions from the tests is that single station RTK performs better than network RTK when the rover is closer than 4-5 km to the nearest reference station. KMS has asked Trimble to modify their software in order to broadcast single station RTK data if the rover is closer than a certain limit.

Bo Jonsson informed about the experiences from the network RTK projects in Sweden. There is an agreement for extension of the Stockholm area network and further tests during one year, starting 1st of February 2002. For further information see <http://www.swepos.com>. During this year one rover of each brand (Ashtech, Javad, Leica and Trimble) will be available for the members of the project to share. The manufacturers supply the equipment for free.

A questionnaire regarding RTK positioning performance has been sent to the manufacturers of rovers used in the network RTK projects (Ashtech, Javad, Leica and Trimble). Christina will put together a list of the questions and answers and send it to the members of the steering committee.

A new version of GPS network, from Trimble Terrasat, has previously been installed. Before the installation a comparison of the old (1.50 build 1511) and

the new (1.56 build 1594) version was performed. Among other things the initialisation time seems to be improved with the new version. The new version solves ambiguities for satellites down to 5 degrees.

November 27-28 Mark Richter from Trimble Terrasat will give a two-day course/training in how to handle GPS-network. The training is mainly for the operators of SWEPOS but Mark will start with an overview of the software and network RTK with VRS (Virtual Reference Stations) in general. The operators need more guidelines for analysing and verifying the system.

LMV will do more tests with the Calgary network RTK software. There are still some problems with the software. LMV will inform and invite SK and KMS when the software performs better.

SK has come to an agreement with Bravida about taking over the network for Network-RTK of 6-8 stations in the southern part of Norway. SK will be responsible for the operation of the network and the private company Bravida will be responsible for the marketing and sale.

ITEM 7: DRAFT OF THE AGREEMENT ON EXCHANGE OF DATA (BOTH REAL TIME AND POST-PROCESSING) BETWEEN THE NORDIC COUNTRIES

- PRICING ISSUES

The Steering committee proposes that data (both post-processing and real time) will be exchanged free of charge between the Nordic countries. To avoid competition each National Mapping Authority will only distribute data for use within the nation and this condition shall clearly be stated in the agreement with the users. On the other hand each NMA are free to charge the national use of Nordic data according to the national price list.

Reidun Khalayli, SK, presented a proposal for an agreement for exchange of data between the Nordic countries without any costs. Reidun visited LMV some weeks ago get information about the present pricing policy in Sweden. In the near future she will also visit KMS and discuss the Danish conditions.

The proposal of the agreement is written in Norwegian but the final version should be in English. The agreement should be about exchange of data, not about specific common services. The agreement should not include e.g. the

version of RINEX, which is used. This kind of information should be included in an appendix.

Regarding rights and obligations, each country should define the minimum number of reference stations they promise to deliver data from. When a failure to deliver data occurs, the other NMA's should be notified within a normal working day.

KMS will pay the bill for the communication between the countries and then SK and LMV will pay a third each to KMS every quarter of a year.

The agreement should be valid one year and extended one year at a time. The period of notice should be six months.

ITEM 8: DISTRIBUTION OF INFORMATION FROM THE MEETINGS OF THE STEERING COMMITTEE

Christina has published a summary of the minutes from the last meeting of the steering committee at the NGK's home page. The minutes from the coming meetings will also be available there. A notification and a link to the web site will be sent to the members of the steering committee, who can inform the employees at the geodetic divisions at each Mapping Authorities. A document describing the project in general and the sub project specifically is also available at the NGK's home page.

ITEM 9. OTHER ITEMS

The next meeting of the Director Generals will take place on January 28-30, 2002, on Iceland. Björn and Bo Jonsson will make a status report of the Nordic Positioning Service project.

ITEM 10. FUTURE WORK, NEXT MEETING AND CLOSING

The next meeting of the Steering Committee will take place at SK in Hönefoss on March 6-7, 2002. Björn E. thanked all the participants for their contribution to a fruitful meeting.