



NORDISKA KOMMISSIONEN FÖR GEODESI

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

Minutes of the 11th meeting

København, Denmark - June 13-14, 2002

PRESENT

Denmark: Sigvard Stampe Villadsen
Bo Madsen

Finland: No representative

Norway: Björn Engen
Rune Hanssen

Sweden: Bo Jonsson
Andreas Engfeldt (secretary)

ITEM 1: OPENING OF THE MEETING

Björn Engen welcomed everybody to the 11th 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 10th Steering Committee meeting on March 6-7 in Hønefoss
3. Status of the application to "Nordisk Industrifond"

4. Status of a computer network between the Nordic control centres
5. Draft of the Agreement on Exchange of data between the Nordic countries
6. Status of the sub projects
 - A0 – Standard for reference stations
 - A1 – Web-site
 - A2 – Automated Computation Service
 - B – Real time service with dm accuracy
 - C1A – Distribution channel for RTK
 - C1B – Evaluation of RTK algorithms
7. Preparation for the next meeting of the Director Generals
8. Distribution of information from the meetings of the Steering committee
9. Ongoing activities
10. Future work
11. Other items – Situation report, KMS, LMV and SK
12. Next meeting and closing

ACTION LIST:

- The Agreement on exchange of data from the Danish, Norwegian and Swedish networks of permanent reference stations is now ready to be signed. It will first be signed in Norway, and will then be sent to Sweden and then to Denmark (ITEM 5).
- LMV will distribute two diploma work reports to the rest of the Steering committee (ITEM 6, C1B).
- Rune Hanssen will arrange a telephone conference with Bo H and Örjan Z (ITEM 4).
- Dan Norin will write a detailed document of the classification of the reference stations that has been developed (ITEM 6, A0).
- Rune Hanssen checks if SK has received the portal for the Nordic web-site for distribution of data from the Danish, Norwegian and Swedish networks of permanent reference stations for post-processing (ITEM 6, A1).

ITEM 2: MINUTES FROM PREVIOUS MEETING

Minutes from the 10th Steering Committee meeting on March 6-7 was approved, with a comment from Rune H to ITEM 5, which then was "STATUS OF A COMPUTER NETWORK BETWEEN THE NORDIC CONTROL CENTRES". One sentence was changed to: There have been some problems with the transfer of GPS-data **via Internet** from SWEPOS to SATREF. When there's too much strain on the network time-delays occurs. The usual delay is on the level 5-10 seconds, but sometimes it can increase up to 90 seconds. The problem is now smaller when Internet has been upgraded.

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

At a meeting of the board of "Nordisk Industrifond" two weeks before the 10th meeting of the steering Committee (6-7 March) it was decided that no funds would be allocated to the project "A Nordic Positioning Service". No reason for rejection of the application of funds was given in the letter to Björn E. A letter was sent from the Steering Committee to Nordisk Industrifond, where an explanation for the rejection was demanded. A proper answer has been received from Nordisk Industrifond, see enclosure 1 and Björn has distributed that explanation to the members of the project. We are now not going to take any more actions about that. On the next General Director Meeting in Ålborg the application to Nordisk Industrifond will be mentioned.

ITEM 4: STATUS OF A COMPUTER NETWORK BETWEEN THE NORDIC CONTROL CENTRES

The specification for the computer network between 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 Minutes from the Meeting of the steering committee in Gävle in November 2001. The Steering Committee approved the document.

Rune H. reported that the network connection to Denmark was up on April 13th, but still it is not working. This is an issue for Tele Danmark. Örjan Z (LMV) and Hanna M (SK) have tried to "ping" between Gävle and Hönefoss, but it doesn't work properly right now. It seems to be the wrong IP-addresses, which means that the configuration is wrong. A telephone conference about the status of the network will very soon be arranged between Bo H, Rune and Örjan by Rune. Then they will decide about further contacts with Tele Danmark.

ITEM 5: DRAFT OF THE AGREEMENT ON EXCHANGE OF DATA (BOTH REAL TIME AND POST-PROCESSING) BETWEEN THE NORDIC COUNTRIES

- PRICING ISSUES

Geodeettinen Laitos have read the agreement on exchange of data from the Nordic networks of permanent reference stations and discussed it, but at present it is not of current interest for them. None of their stations can meet the demands and they can't commit themselves to the things that the agreement is saying. For scientific applications they still mean that no costs shall be included for exchange of data.

The Agreement is now ready to be signed (see Appendix A). It will first be signed in Norway, and will then be sent to Sweden and then to Denmark.

ITEM 6: STATUS OF THE SUB PROJECTS

A0 - A Nordic standard for reference stations

The intention is that Dan Norin (LMV) will replace Gunnar Hedling as the chair of the sub-project A Nordic standard for reference stations. He will update the document of the classification of the reference stations that has been developed. Then he will send the document to the members of the sub project, to the Steering Committee and to other involved persons for comments before the 10th of August. The document will then be approved at the next meeting of the Steering Committee, on August 15-16, 2002.

The next step is to make an inventory of the existing Nordic reference stations. A standard form, based on e.g. an Access database, should be used. 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.

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

In the sub-project A Nordic Web-site for download of reference station data for post-processing purposes only the last phase is remaining. All the countries should have received the Web-portal. LMV has not put out the portal on the Web-server, but has acquired a new Web-server, transfer of the portal from UNIX to NT environment is necessary. SK puts out data every day, but Rune is insecure if they really have received the portal. He will check it as soon as possible.

The co-ordinates to be used in the RINEX header of the files with data from the Nordic networks of permanent reference stations were discussed. As discussed at the meeting on the 19th of January 2001, there is a need to do some investigations regarding the national implementations of ETRS 89. 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.

Because of this, SK is performing some 3D campaigns. One is performed right now (during the meeting) and one will be performed 19/8 - 13/9. A proposal was that KMS also should perform a 3D campaign at that time, but the distance to northern Norway (of where that campaign will be performed) is too long, so there should be no gain for KMS in performing it at the same time. LMV and GL will use their permanent reference stations for the campaign. The responsible person for SK is Torbjörn Nörbeck.

On the Norwegian Web-site the Norwegian responsible person of the Web-site is named and on the Swedish Web-site the whole SWEPOS group is presented. The same it should be in Denmark.

From the 1st of January 2002 the co-ordinates in the RINEX header should have been the official EUREF 89 co-ordinates. The RINEX header should also have included a comment that the co-ordinates are in EUREF 89. This has not happened yet in Denmark, but will soon happen. In Norway and Sweden the right co-ordinates are included.

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 fee for GPS data for post-processing purposes to achieve access to the computation service.

The performance of the service is very satisfactory, but the user interface can still be improved. A green/yellow/red lamp will soon be included in the mail of the result to the user.

To extend the computation service to be a Nordic service some investigations regarding the national reference systems needs to be done, a 3D-campaign must be performed (see sub project A1 above). When this is done the service can be introduced e. g. in Denmark.

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

SK has installed Trimble WADGPS software and the system is now operational There have been some delays with the Pocket VRS, and some problems in getting Windows CE working together with the hardware platform. Now the software is running on a small hand held Compaq, but that means that a cellular phone also is needed.

The expected position accuracy of the WADGPS-service (DPOS) is 10 centimetres (1σ , horizontally) and 30 centimetres (3σ , horizontally). Tests have been performed using dual frequency Ashtech, Javad and Trimble receivers as rovers, but not Leica receivers so far. The Javad receiver did not perform as well as the others, but this was because of the used Javad-receiver was not working properly. Now a new Javad-receiver has been tested and it performs as well as the other receiver brands. During the last periods of high

activity in the ionosphere the accuracy was decreased to 1 metre in the worst cases.

Now SK will test DPOS against RTK and find out the advantages and the disadvantages. So far the DPOS solution has proved to be stable, although this is a code solution. But there have been problems with the radio from Sectra. The frequency list of the transmitter can't get into the radio, and if one gets contact with a transmitter far away then big problems occurs. This means that using DPOS in a car is not a very good solution, because with a car one can fast travel long distances so that the used transmitter soon will be very far away. There is also a small problem in using PVRS and GSM, but there are no problems in using PVRS and radio.

The cost for a DPOS subscription is 12000 NOK/year. It covers southern Norway on FM DARC and northern Norway on GSM. The tests this far shows a 2 sigma value of 50-60 cm and a vertical RMS of 40 cm.

At LMV an ionosphere monitoring is working, but is not published on the Web, because of that an explanation of the graphs are needed.

When the communication links between the control centres are established a pilot project with a (WADGPS) "decimetre" service 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.

C1A - Test of distribution channels for RTK

LMV has discussed with the private company Cartesia about sending data via radio when a good distribution format exists for Network-RTK. But that is in the long run. The GPS Network software is not user friendly for the operators. In this autumn there might be time to test the software Geo++. In that case Bo J will travel to Germany this autumn to meet the manufacturer of Geo++. Björn E is in that case also interested to accompany on that trip and a meeting. There might also be an interest of KMS.

SK has now CPOS and DPOS on the market, which means that there have not been any available resources for further tests of distribution channels.

KMS has done some tests of the Network-RTK software from Trimble on long distances (up to 38 km) from the reference station and the results are a little bit better than the ones from LMV. But the results are not at all so good as Trimble's own results. The results are also more distance depending than the Swedish ones.

KMS has also investigated on which distance from a reference station Network-RTK is better than Standard-RTK, the distance is between 4 and 5 km from the reference station.

A national network of transmitters for DAB (Digital Audio Broadcasting) is established under establishment in Denmark. The whole country will be covered within the next year. KMS will probably soon arrange a meeting with Tele Danmark about DAB (e.g. about prices, coverage and availability). No commercial DAB-radio-receivers exist on the market, they are big and expensive. In Sweden the DAB-net no longer exist.

C1B - Evaluation of available RTK algorithms

An extension of the Stockholm area RTK-network has been achieved and a test project including further tests during one year started on the 7th of February 2002. For further information see <http://www.swepos.com>. During this year one rover of each brand (Ashtech, Javad/Topcon, Leica and Trimble) is available for the partners members of the project who don't own any GPS-receivers. The manufacturers supply the equipment for free. Bo J. also informed of another two RTK test projects, which will start later this year, one in next week (in the most southern parts of Sweden, Malmö area) and one in the autumn (in the Gothenburg area).

In these projects the participants have to measure two days each month on some "known" points. These results will be compiled by LMV. That is one of the purposes with the projects, the other purpose is that the participants use Network-RTK for production work.

A MSc diploma work has been performed at LMV, which includes test measurements with Network-RTK. The results from the diploma work are

almost the same as those from the pilot project Stockholm-Mälaren part 1, with the exception that no gross errors are included. The report from this diploma work will be distributed to the Steering committee before the next meeting.

Also a BSc diploma work has been performed at LMV, which includes test measurements with Network-RTK. One big difference with this diploma work compared with the one mentioned above is that Network-RTK with and without RTCM message 59 was investigated. This report isn't printed yet, but when it is, it will be distributed to the Steering committee.

LMV has not done any more tests with the Calgary network RTK software since the last Meeting, because of that the software still is not working.

Anna Jensen (KMS) accounts for her doctor thesis in some of the next weeks.

Rune H will have a meeting with the Norwegian Civil Aviation Administration in a few weeks. They are interested in Network-RTK applications

ITEM 7: PREPARATION FOR THE NEXT MEETING OF THE DIRECTOR GENERALS

The next meeting of the Director Generals will be in Ålborg in the beginning of September. A document for the future activities of the project A Nordic Positioning Service will be prepared for this meeting on the next meeting of the Steering Committee in August.

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

The minutes from this meeting and from all the coming meetings will be available at the NKG home page. This Item will not be included in next agenda.

ITEM 9: ONGOING ACTIVITIES

Nothing more to write here.

ITEM 10: FUTURE WORK

The Steering committee discussed the main goals for the project during the next year and the Committee agreed to work out more detailed plans at the next meeting in August for the activities listed below:

1. Tests of a Nordic dm-service
2. Examine and test cm-solutions.

The test of a Nordic dm-service will be based on the computer network between the control centres of the Nordic networks of permanent reference stations and the WADGPS software installed at the control centre of SATREF.

The cm tests will be performed in the Gävle test network. Another issue that shall be treated is a proposal of a Nordic test-bed for a geodetic Galileo, at higher latitudes. From now and on the sub-projects will be divided into co-operation projects and exchange of information projects. The co-operation projects will be: B (A Nordic Real-time Service with half-meter horizontal accuracy (95 %)) and C1B (Evaluation of available RTK algorithms) the Computer network and the Agreement on exchange of data. The exchange of information projects will be: A0, A1, A2 and C1A

For the dm-service Pocket VRS:s are needed. The Danish net will include the three Danish stations and one Swedish station, probably the Onsala station. The Swedish net will include four Swedish stations in the Gävle area.

ITEM 11: OTHER ITEMS - SITUATION REPORT KMS, LMV AND SK

KMS

Economical problem, the turn over has decreased 37 million DKK, which means that about 100 employees will have to get fired during this year.

LMV

Good economical result last year, which gave the employees a few thousand SEK in bonus. The Director General inaugurated the first Network-RTK project in February.

SK

This year the funds were cut with 38 million NOK, which was really surprising. This means that the activities will be reduced this year. The Land Division are now almost not permitted to take part in external projects and activities. By this action almost the whole part of the losses will be reduced.

ITEM 12. NEXT MEETING AND CLOSING

The next meeting of the Steering Committee will take place at LMV in Gävle on August 15, 13.00 – August 16, 13.00, 2002. Björn thanked all the participants for their contribution to a fruitful meeting.