NORDISKA KOMMISSIONEN FÖR GEODES

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2003-09-23

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

Minutes of the 15th meeting

Kobenhavn, Denmark - June 3, 2003

PRESENT

Denmark:	Sigvard Stampe Villadsen
	Casper Jepsen
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 15th meeting of the NKG Steering Committee on the on-going sub projects for "Nordic Positioning Service". Casper Jepsen took part in the Meeting instead of Bo Madsen, who was on Greenland.

The Steering Committee agreed to the following agenda for the meeting

1. Opening
2. Minutes from the 14th Steering Committee meeting on March 6-7 in Norway and review of the action list

3. Status of the real time data exchange between the Nordic control centres, Rune H´
4. Project A0- A Nordic standard for reference stations
5. Project A1 - Nordic Web-site, Stampe
6. Project C1A – Distribution channel for RTK
7. Preparation for the next Directors General Meeting, All
8. Results of the different tests, which are running - the Danish height test and other tests.
9. GPRS as distribution channel, Rune H
10. Status for the CPOS-service in Norway, the commercial services in Denmark and the regional Positioning services in Sweden
11. Status of the co-operation sub projects
    B – Real time service with dm accuracy
    C1B – Evaluation of RTK algorithms
12. Project A2 – Automated Computation Service
13. Ongoing activities and Future work
14. Other items
15. Next meeting and closing

ACTION LIST:

- Resources will be allocated to solve the computer network problems between Norway and Sweden. This will be done before the summer holidays (ITEM 3).
- A new project group will be formed for sub-project A0. They will have their first Meeting on the 2-3 of September, probably in Hønefoss (ITEM 4).
- Before the meeting of the new A0 project group, every country have to classify two different types of reference stations (ITEM4).
- A new web-project group will be formed. They will have their first Meeting on the 4th of September at Gardermoen (ITEM 5).
- In August and September a two months test with SAPOS and DARC will be performed in one of the Network RTK areas in Sweden (ITEM 6).

- Bosse will check how Network RTK works in Switzerland and Andreas will check how the SAPOS network is working. This will be checked before the next meeting (ITEM 7).
- The Danish height test is planned to be performed in June (two weeks after this meeting) (ITEM 8 and ITEM 11, C1B).
- When all data problems with the computer network and data formats for real-time raw data have been solved, KMS will perform a DPOS-test (ITEM 11, B).
- LMV will present statistics for the SWEPOS Automated Computation Service on the next meeting of the Steering Committee (ITEM 12).

ITEM 2: MINUTES FROM PREVIOUS MEETING

Minutes from the 14th Steering Committee meeting on March 6-7 was approved after the following remarks were given:

ACTION LIST FROM THE MEETING OF THE STEERING COMMITTEE ON MARCH 6 –7 AND WHAT HAS HAPPENED:

- Andreas E will collect the co-ordinates of the Nordic permanent reference stations. (ITEM2) and distribute to the members of the Steering Committee. Action carried out: Permanent reference stations from Denmark, Finland, Norway and Sweden have been put together on a map which was distributed (not included here). Three Norwegian stations were though missing on the map. A mail with a request for the co-ordinates has been sent to Iceland but has got no response this far. The future work lies on the new sub-project group for A0 (see ITEM 4).
- Rune H will arrange a telephone conference to discuss the status for the software development for exchange of data between SWEPOS and SATREF/the Danish network. Action carried out: Rune and Bo has clarified the status of the software development, (see ITEM 3).
- KMS will make a comparison of height measurements with different brands of GPS-equipment at one site (ITEM 7 C1B). Action carried out: It is planned to be performed two weeks

after this meeting together with the Danish Road Administration (see ITEM 8).

- Andreas E will update the paper (report) from the comparisons of GPSNet and GNSMART in November 2002 (ITEM 4). Action carried out: . The paper is ready and will be sent to print within a week from now and will then be distributed to the members of the Steering Committee.
- KMS takes the initiative to develop a login procedure for the Nordic the Web-site for post-processing data (ITEM 8 A1). Action carried out: (see ITEM 5) See item 5 in these minutes.
- The document of the classification of the reference stations that has been developed will be updated as soon as possible (ITEM 7 A0), LMV is responsible. Action carried out: The document is completed and distributed to the members of the Steering Committee (see ITEM 4).
- Mails about how the Swedish tests of SAPOS RTCM message 59 proceed (ITEM 8 C1A) and how the Danish height tests proceed (ITEM 7 C1B) will be sent out to the Steering Committee. Action carried out: (see ITEM 6) See item 6 in these minutes.

ITEM 3: STATUS OF THE REAL TIME DATA EXCHANGE BETWEEN THE NORDIC CONTROL CENTRES

The computer network between SATREF, SWEPOS and the Danish network is working. Exchange of data between SATREF and the Danish network of permanent reference stations is in operation. The software development for exchange of data between SWEPOS and SATREF/the Danish network is still not finalised. LMV and SK have to allocate resources to finalise this development. Since SWEPOS and SATREF use different real-time formats a conversion from the SWEPOS format to the SATREF format and vice versa are necessary. It should though be mentioned that the SWEPOS format is no special format, it is actually the receiver standard format. The SATREF format is though a special format created just for the SATREF system.

In week 26 (July 23 -27) a telephone meeting will be arranged by Rune possibly participantans are Mohammed (SK) and Örjan (LMV), and it is desirable that resources are allocated in week 27 and 28 and in order to clarify the status and future requirements of resources for the task to transfer real-

time raw data between SWEPOS and SATREF. Then the problems hopefully will be solved.

ITEM 4: PROJECT A0 - A Nordic standard for reference stations

The document of the classification of the reference stations that has been developed is at last written, see Appendix A. This document will have to be revised every second year. Bo Madsen accepted to be responsible for that.

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. A project group, who will make all arrangements for the database, will be formed. A working group meeting is planned to will be held on the 2-3 of September, probably in Hønefoss. Rune will call the participants. Every country will classify at least two types of reference stations in their own country before the meeting.

ITEM 5: PROJECT A1 - A Nordic Web-site for download of reference station data for post-processing purposes

KMS will co-ordinate and start the development of a login page for the Nordic Web-site portal for post-processing data. In this matter a lot of different ideas (not mentioned here) how the Web-site should work were discussed. It was decide d that we will have only one start page for the don-load of post processing data and from that page the users should be directed to the national page after they have marked which system they are registered users of (SATREF/SWEPOS/the Danish network).

Since the last meeting nothing has happened except for on the thinking side. After the summer KMS will start this work.
SATREF has got a new web address, **www.satref.no** and a new webpage has been created for CPOS.
Right after the summer, the Internet server for SWEPOS will be changed. This means that there will be a new flow for the data, which will be outside the LMV firewall, which means that everything will go faster.
A one day meeting for the web-project group will be hold at Gardermoen probably on the 4th of September.

ITEM 6: PROJECT C1A - Test of distribution channels for RTK

In Sweden an initial test of SAPOS RTCM-message 59 for network-RTK has been performed. First it was tested with GSM as distribution channel, and

second it was tested with the DARC channel on the FM-radio network as distribution channel (locally). Both of the tests worked in a satisfactory way, so the next step is a two months test s in one of the Network RTK areas in August and September.

ITEM 7: PREPARATIONS FOR THE NEXT DIRECTOR GENERALS MEETING

The next full meeting of the Directors General of the Nordic Mapping Authorities will be on 25-26 August on Iceland. Since the latest meeting of the Directors General we have performed the GNSMART/GPSNet test campaign, but we have not tested DPOS in Denmark because of the different standard data formats for real-time raw-data.

It is important to inform the Directors General that we are continuing with the work, and which issues we are working on. It is also important for us to make them understand that the services should be financed both by governmental money and by user fees, because they are a part of the national infrastructure. We should bring up the solution of northern Belgium. Bosse will check with how things are proceeding with the Swiss network and Andreas will check how the SAPOS-network is working. Those two things should be checked before the next meeting.

ITEM 8: RESULTS OF THE DIFFERENT TESTS WHICH ARE RUNNING

The height test in Denmark will be performed by KMS on June 17, i. e. in two weeks after the meeting of the Steering Committee, in collaboration together with the Danish Road Administration. In the test it will be investigated if the different height algorithms in the different GPS equipment from different GPS manufacturer make different heights. The test will go on for 24 hours and NMEA positions will be logged every second in a PC. For more information, see Appendix B, which is the description of the test.

ITEM 9: GPRS AS A DISTRIBUTION CHANNEL FOR NETWORK-GPS DATA

GPRS is a further development of GSM. For GSM the user pays for the connection time, but for GPRS the user pays for the transferred data quantity. At present there is probably no maximum delay time in the GPRS-channel, since data is transferred in "package mode". For more information about this, see the notes from the 14th Steering Committee meeting in Nordic Positioning Service, ITEM 5.

Bosse reported about Ntrip, which stands for Networked transport of RTCM via Internet protocol. The use of Ntrip is a proposal from Georg Weber/EUREF for data distribution of reference station data for post processing. For more information, see http://igs.ifag.de/index_ntrip.htm

ITEM 10: STATUS FOR THE CPOS-SERVICE IN NORWAY, THE COMMERCIAL SERVICES IN DENMARK AND THE REGIONAL POSITIONING SERVICES IN SWEDEN

Two new CPOS-stations (Ulefoss and Porter) in the Østland area have been established this year. Now there are totally 8 CPOS-stations. There will be an establishment of new stations in Rogaland (6 stations), in Stavanger and in Augder quite soon. Later also stations in the Molde area and the Trondheim area will be established.

In Denmark nothing in particular has happened with the commercial RTK-services since our last meeting.

In Sweden there are now three projects running. In Stockholm there are 14 + 7 stations (14 project station and 7 "SWEPOS-stations", in the Western area there are 8+5 stations and in the South area there are 7+3 stations. Invitations for two new areas, Värmland/Dalarna and the south eastern Sweden were distributed during April this year. The deadline for submissions of answers is in the middle of June. The new project areas are all included in the proposal of a nationwide RTK-service in Sweden, which includes 114 stations. The coverage of the service should be the southern part of Sweden up to Gävle and the coastal area of the northern part of Sweden. The investment cost for an extension of the present SWEPOS to the proposed RTK-service is estimated to 42 million SEK and the operation cost is estimated to 21 million SEK/year including the investment costs for replacement equipment.

ITEM 11: STATUS OF THE CO-OPERATION SUB-PROJECTS

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

At present the DPOS-service can't use data from the SWEPOS network since the software development for exchange of real-time date between SWEPOS and SATREF/the Danish network is not finalised yet, see ITEM 3.
When this finally works, a quality test with the cellular phone system as distribution channel will be performed in Denmark. Casper has since long

time finished the plans for such a test, which will be performed in three different cities.

C1B - Evaluation of available RTK algorithms

In Sweden the version of the Network RTK software (GPSNet) was changed in February. After the change it worked as good as before in the Stockholm area (where it had been tested before the installation), but much worse in the other project areas. Some upgraded routines for the software (a "bugfix", which was provided from Trimble) were then installed on the 15th of March and after that the version has worked as it should. This means that it works better than the old version, because now 6 stations are used in the solution instead of 3 in a trianle before. So if one station should go down, then it still works to get a fix solution for the users, but the quality of the position can be worse.

KMS will carry out a comparison of the algorithms for height measurements in different brands of GPS-equipment, see ITEM 8.

ITEM 12: PROJECT A2 - An Automated Computation Service

LMV has a computation service in operation on the SWEPOS web-site, which performance is very satisfactory. Until the next meeting LMV will make some statistics over the use of the service.

Since the last Meeting nothing new has happened here. Statistics about users of the computation service will be presented on next meeting.

In next week (10-12 of June) the NKG Working Group for Reference Frame and Positioning will have a meeting in Gävle when the plan for the 3-D campaign will be developed. The campaign is meant to investigate the relations between the national reference systems in the Nordic countries. When this is done the computation service can be extended to be a Nordic service and introduced e.g. in Denmark.

ITEM 13: ONGOING ACTIVITIES AND FUTURE WORK

EGNOS will be a new point on the agenda for next meeting.

This year there will be a new permanent reference station in Denmark, Gedser, on the most southern part of Falster. Hirtshals and Esbjerg are other places where permanent reference stations are planned.

ITEM 14: OTHER ITEMS

Bosse informed about the Galileo Application Network, which is run by a French company and German company. The purpose of GAN is to find out how the industry can develop services and products out of Galileo.

ITEM 15: NEXT MEETING AND CLOSING

The next meeting of the Steering Committee will take place in Gävle on October 2, 2003, 12.00 – October 3, 2003, 12.00. Björn thanked all the participants for their contribution to a fruit