



NORDISKA KOMMISSIONEN FÖR GEODESI

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NORDIC POSITIONING SERVICE

BACKGROUND

The Directors General of the Nordic Mapping Authorities decided at their meeting in Gävle on 24 February 1999 to give the Nordic Geodetic Commission (NKG) the task to prepare a project for the development and establishment of a Nordic Real-time Positioning and Navigation service.

The Presidium of NKG decided at an ad hoc meeting in Gävle on March 17th, 1999 to establish a group of specialists from the NKG to work together — assembling knowledge of scientific progress, existing Nordic plans etc. The aim of the group was to prepare a plan for development and establishment of a common Nordic Real-time Positioning Service.

The final proposal was completed in January 2000 and was accepted by the Directors General, but very little funds were allocated. In January 2000 the working group decided to run a reduced project.

PURPOSE OF A NORDIC CO-OPERATION

Activities related to networks of permanent reference stations are on-going at all the Nordic Mapping Authorities and each agency has a plan for operation and further developments of their national positioning services. The core activity for the Mapping authorities is to provide quality checked data from the networks for distribution to end-users. Data for post-processing is at present available via FTP/WWW-servers and real-time data is distributed via different

distribution channels e. g. the FM-radio channels RDS and DARC, cellular phones and satellite services.

If these activities were to continue on the National level each country would probably have to provide full development costs. On the other hand the development work can to a large extent be adjusted to the national conditions and the existing national network of permanent stations. Further, uncoordinated technical solutions could lead to problems at the borderlines between the countries. A Nordic co-operation will to some extent result in shared development costs, faster and more qualified solutions where e. g. borderline problems are considered already in the development phase. A common service will also facilitate the wider distribution of the physical network that provides the basic information.

Another important task for the Nordic co-operation is the transfer of "know-how" between the partners, which is important for the maintenance and further development of the competency at the Mapping Authorities in the field of GPS/GNSS.

On the other hand the accomplishment of the proposed project during the period February 2000 to December 2001 will in most cases in the short-term require extra funds on the national level because of additional administration, travel expenses and additional work for agreements of common standards.

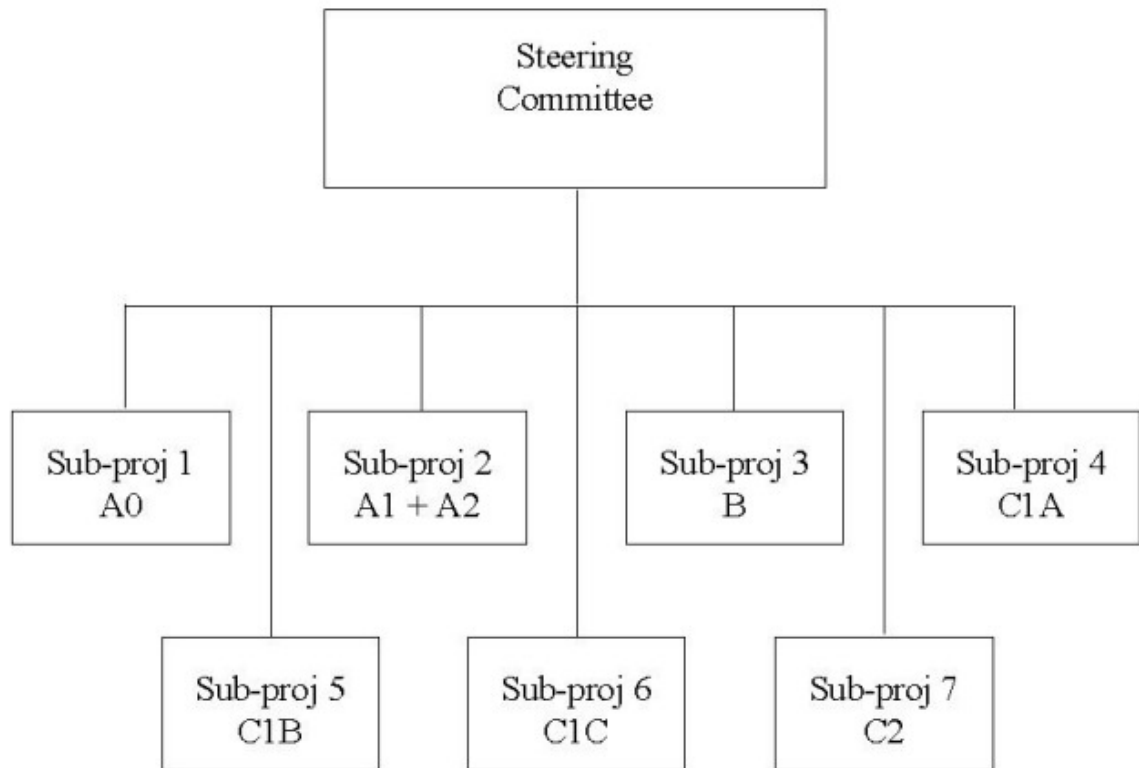
The establishment of a Nordic Post-processing service will increase the use of data from the networks of permanent stations and this means on the long-term an increased contribution from the users to the operation costs of the networks of permanent reference stations

Co-ordination on the Nordic level of the development work for the use of real-time data from networks of permanent reference stations will result in a common Nordic contribution to the on-going standardisation of formats for network-RTK, run by the RTCM Committee. The co-ordination will also improve the possibilities for standardisation of user equipment for the distribution channels, e. g. the FM-radio network and cellular phones. The standardisation will facilitate the use of the real-time services and result in a faster implementation of the

network-RTK concept in production environments and this means an increased contribution from the users to the operation costs of the networks.

The Nordic Mapping Authorities have built up a space-geodetic infrastructure for positioning purposes and possess the professional background to maintain it. This provides a valuable basis for the implementation of a real-time positioning and navigation service adjusted to meet the future demands of large user groups. The envisaged regional service would make use of geodetic infrastructure, which has to be maintained in any case for national geodetic reference purposes.

PROJECT DESIGN OF THE REDUCED PROJECT



MEMBERS OF THE STEERING COMMITTEE

Denmark:	Sigvard Stampe Villadsen Bo Madsen
Finland:	No representative
Norway:	Bjørn Engen Rune Hanssen
Sweden:	Bo Jonsson Christina Lilje (Secretary)

AIM OF THE SUB-PROJECTS

A0 - A Nordic standard for reference stations

The aim of this sub-project is to make an inventory of the design of the existing Nordic reference stations and the data formats for the communication between the reference stations and the control centres. 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.

Members: Gunnar Hedling (project leader) (S), Bo Madsen (DK) and Svein Rekkedal (N)

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

The aim of this sub-project is to establish a common Nordic Web-site where it is possible to download post-processing data from all the Nordic permanent stations.

Members: Søren West-Nielsen (project leader) (DK), Anders Frisk (S) and Anne Guro Nokleby (N)

A2 - An Automated Computation Service

The aim of this sub-project is an automated computation service for post processing applications. The users transmit their observation files in a RINEX format to a Web-site and obtain computed co-ordinates in a suitable reference system, using a suitable number of permanent stations.

Members: Lotti Jivall (temporary project leader) (S), Bo Madsen (DK) and vacant (N)

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

The aim of this sub-project is to establish a Nordic Real-time Positioning Service with an accuracy of a half metre (95 % confidence interval). Wide Area DGPS based on a subset of the Nordic permanent reference stations and computed for the whole Nordic region should be used. The WADGPS corrections should be available for the Nordic Mapping Authorities both for development of a high-accuracy DGPS-service and for transmission direct to real-time distributors.

Members: Rune Hansen (project leader) (N), Ole Bjerregaard (DK), Bo Hansen (DK), Gunnar Hedling (S), Jan Zachrisson (S) and Anders Frisk (S)

C1A - Test of distribution channels for RTK

The aim of this sub-project is to test distribution channels. The Nordic Mapping Authorities distribute single station RTK data on a national basis in selected areas in order to establish infrastructure and demonstrate the distribution channel for the users. Experiences from these services will be exchanged within the Nordic project.

Members:

C1B - Evaluation of available RTK algorithms

The aim of this sub-project is to establish a test-bed for test and evaluation of network-RTK software. A contribution to a proposal of a standard format for network-RTK is developed. On the market available prototype network-RTK software are continuously evaluated.

Members:

C1C - Market analysis

Co-ordinated national market analyses have been carried in Sweden and Norway.

Members: Bo Jonsson (S), Stampe Villadsen (DK) and Bjørn Engen (N)

C2A - Design of a Nordic real-time Positioning Service

The aim of this sub-project is to design a Nordic real-time Positioning Service. A proposal for a Nordic real-time Positioning and Navigation Service will be developed based on the results from the Nordic real-time Positioning service with the positioning accuracy half a metre, distribution of single station RTK data, the evaluation of the network-RTK concepts and a market analysis.

Members:

C2B - Procurement of an operational network-RTK software

The aim of this sub-project is to procure an operational network-RTK software. When the evaluation of the network-RTK concept is completed a concept is selected for development to an operational software.

Members: