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For:
The International Information Sub
Committee, CGSIC

National Report from Denmark

1. National Activities

On a national level WGS84/ITRF has been introduced as the reference frame for geodesy, surveying and mapping purposes. Along with the new reference frame a new Transverse Mercator map projection has been introduced for large scale mapping, whereas UTM is still being used for the national small scale mapping.

A new geoid model has been developed in 2002, and has been fitted to the new Danish Vertical Reference, DVR90. It is thereby possible to use GPS, with high accuracy, for determination of heights relative to mean sea level.

Also in Greenland WGS84/ITRF has been introduced, and it is now being used for national small scale mapping.

2. Differential Services

Public: DGPS services are provided by the Royal Danish Administration of Navigation and Hydrography for marine GPS users, and by the National Survey and Cadastre for land use. Both services have been operational for several years with a stable number of users.

Private: A DGPS service is also provided by "Gpsnet.dk", a private company that is also distributing high accuracy RTK corrections from a dense nation wide network of reference stations. RTK corrections are furthermore distributed by "Andelsforeningen GPS-Referencen", a co-op with participation by several smaller Danish companies. The two nationwide RTK services are mainly used for land survey activities.

3. Research and Development Activities

Research activities are taking place at three different Danish universities. At the University of Aalborg the activities are mainly related to the use of GPS for land surveying. At the University of Copenhagen the use of GPS for geodesy, including GPS data processing aspects, are in focus along with various geophysical applications of GPS. At the Technical University of Denmark the focus is on the use of GPS for surveying, and navigation, and also on the combination of GPS with other sensors e.g. INS. At all three universities courses in GPS theory and practice are offered, and there are a number of graduate students working on GPS related theses.

Research activities related to geodesy, surveying, and mapping are also carried out at the National Survey and Cadastre, where the basic GPS infrastructure is developed and maintained with the geodetic reference network and permanent GPS reference stations. Three high quality permanent

GPS stations are operational in Denmark, and four stations are operational in Greenland, three of the latter being IGS stations.

Research and development related to the use of GPS for vehicle navigation and for road maintenance is carried out by the Danish Road Directorate.

Development activities related to GPS for marine navigation is carried out by the Royal Danish Administration of Navigation and Hydrography, and developments related to the use of GPS for aviation is carried out by the Danish Civil Aviation Administration.

Activities related to the use of GPS in space is mainly carried out by the Danish Space Research Institute.

The Danish Meteorological Institute is performing research on the use of GPS as a tool for probing the atmosphere with the purpose of improving weather predictions. This research is at a high level, and might be the GPS research area where Denmark is contributing the most on an international scale.

4. Industrial Aspects

Terma Industries, that among other things are developing military navigation systems, has head quarter in Denmark. Simrad, which is a division of Kongsberg Maritime, has a department in Denmark where GPS receivers for marine navigation systems are produced. Several smaller companies are developing navigation and guidance systems with off the shelf GPS receivers as integral parts.

5. National Policy Activities and Decisions

The introduction of WGS84/ITRF as national reference system is based on a national decision, and the change of reference systems was executed through the "System 2000" project, which has been completed this year with a new geoide model.

The Danish government decided on March 26. 2002 to participate in the European Galileo project.

6. National Responsible Authorities

The National Survey and Cadastre is responsible for coordination of GPS activities carried out by the various Danish government organizations. Also it is the responsibility of the National Survey and Cadastre to provide the basic infrastructure for geodesy and surveying. In these roles the National Survey and Cadastre participates in international cooperations as for instance the International GPS Service, the Nordic Geodetic Commission, and the Civil GPS Service Interface Committee.

The Royal Danish Administration of Navigation and Hydrography is responsible for providing navigational aids for marine users in concordance with the IALA specifications.

The Danish Civil Aviation Administration is responsible for navigational aids for aviation in according to ICAO specifications.

7. Conferences/Seminars/Exhibitions

The European Navigation Conference GNSS2002 with participants from all over the world was held in Copenhagen in May 2002. The conference was organized by the Nordic Navigation Forum and was as such a common Nordic activity.

Smaller seminars, with only Danish participation, are held almost every year organized by various organizations as for instance the Society for Danish Engineers, the Danish Association of Land Surveyors, or the Danish Hydrographic Society.

8. National Point of Contact

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