



**11th IHO CHRIS Meeting
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1 INTRODUCTION

In 1995 several Hydrographic Offices in northern Europe agreed to the establishment of the Northern Europe RENC as a collaborative arrangement, operated on their behalf, jointly by the Electronic Chart Centre (ECC) of the Norwegian Mapping Authority (NMA) and the United Kingdom Hydrographic Office (UKHO). This led to the cooperation agreement known as the Arrangement on Co-operation within the Northern Europe RENC (COA), which was signed by the original Cooperating Hydrographic Offices (CHO) on 30 September 1996.

To date the following countries are signatories: Denmark, France, Finland, Germany, Netherlands, Norway, Poland, Portugal, Sweden and UK. Several other Hydrographic Offices have expressed interest in PRIMAR and have provided valuable contributions to the development of the existing position. Canada, Estonia, Greece, Italy, Russian Federation, Slovenia and Spain attended the last PRIMAR Advisory Committee meeting as observers. PRIMAR hopes to enter into bilateral discussions with other Hydrographic Offices to include their ENC's as part of the service.

The constitution, organisation and management structure of PRIMAR derives from the application of the International Hydrographic Organisation's WEND principles. The commitment of the Cooperating Hydrographic Offices to PRIMAR is enshrined in the Helsinki Accord, signed by the Hydrographers of the ten countries on 18 March 1998. This identifies PRIMAR as the CHO's common instrument for the integration of their data and the provision of their official ENC service.

The first trial phase of the ENC service began on 1 February 1999 and the full Official Service commenced on 1 October 1999.

From 1 February 1999 the European ENC Coordinating Centre adopted the name PRIMAR™ to denote both the organisation and the Service.

2 PRIMAR MISSION STATEMENT

- To act on behalf of contributing national Hydrographic Offices, as their common instrument, to assemble their national official hydrographic vector data into a consistent, uniform ENC service and to make it widely available to contribute to the safety of navigation, the protection of the environment and the effective operation of maritime activities.
- To co-operate with RENCs established in other geographical areas to establish a world-wide ENC service.

3 THE PRIMAR CORPORATE MANAGEMENT STRUCTURE

The organisation and management structure is as follows:

- The Directing Board (DB). Consisting of the Director General of the NMA and the Hydrographer of the UKHO (representing the Joint Venture Participants), together with members from Denmark, France and Germany (elected by and representing the Cooperating HOs).
This body meets four times per year.
- The Advisory Committee (AC). The cooperating HOs contribute to the management of PRIMAR through the mechanism of an Advisory Committee comprising all cooperating Hydrographers or their representatives. It provides assistance, advice and guidance to the Directing Board on the development and operation of PRIMAR.
This body meets twice per year and is chaired by Denmark.

Although not part of the management structure, there are two other groups that bring together PRIMAR and representatives of the CHOs, these are:

The Technical Group: aimed at resolving the technical problems linked to the data flow between the CHOs and PRIMAR and at facilitating the exchange of technical expertise and knowledge.

The Marketing Group: that provides a forum in which all aspects of PRIMAR's marketing activities can be discussed and harmonised with those in the CHOs.

4 PRIMAR - THE EUROPEAN ENC COORDINATING CENTRE

General

PRIMAR operates from a single office in Stavanger, Norway and is manned by staff of 18 provided by the UKHO and the ECC. It is managed by a four-member corporate team led by the General Manager who is responsible to the Directing Board for the leadership and overall management of the PRIMAR Office, including the formulation of policies, plans and budgets, the determination of medium and long-term operational strategy, and the approval of all plans and initiatives underway within the organisation.

Note that PRIMAR does not have its own IT section; the IS\IT infrastructure and support is provided by the ECC based on detailed requirements and Service Level Agreements.

Costs and Budgets

The operating cost for 1999 is approximately US\$3.8 Million. The UKHO and the NMA are providing this funding on a 50/50 basis.

It should also be noted that the Joint Venture Partners made very large investments in development work prior to the formal establishment of PRIMAR on 1 January 1999.

Accommodation

PRIMAR is located within the existing ECC office in Stavanger. This office space is rented from the NMA, together with all domestic services such as security, cleaning, canteen facilities and office supplies.

ENC Production and Management Systems

The ENC production and management system is based upon the *SevenCs ENC Tool Suite*. Independent quality control software is provided by *dKart Inspector* and *Dxaminer* together with *ENC Analyzer*.

Service Support Systems

The Service Support System will provide Distributors with a global on-line access to the PRIMAR products and services. It will support:

- Immediate access and download of new ENC's and update messages released by national HO's and made available via PRIMAR as soon as new products are released.
- Access to textual and graphical information about all ENC products and services available from PRIMAR with regard to ENC coverage, status and availability.

Business Support Systems

PRIMAR is using an international business system called Navision Financials that provides a fully integrated business environment, able to support any currency, adaptable to different accounting standards and containing its own web ordering module.

Liability and Copyright

PRIMAR is working closely with the North Sea Hydrographic Commission Working Group on Copyright to ensure that the rights of CHO's are secured when their data are marketed.

PRIMAR will constantly review the question of liability in relation to its services, production processes and other activities.

Relationship with the IHO

PRIMAR will develop its own relationship with the IHO (as distinct from the UKHO and ECC). PRIMAR staff participates in working groups and committee activities as required ensuring that it remains in the forefront of relevant developments and debate.

5 PRIMAR ENC INFORMATION

ENC Information

- The ENC will be fully compliant with IHO publication S57 Edition 3 and its associated ENC Product Specification.
- The ENC will fulfil all the requirements of the IMO performance standard for legal acceptance as adequate for navigation under the SOLAS requirements for the carriage of charts.
- The ENC will be based on the data of the appropriate national hydrographic authority, which will select the source material to be used to populate each navigational purpose category and is responsible for the production and verification of the ENC data.
- New Editions or re-issues of the ENC data will be made available whenever initiated by the appropriate HO. (The data will be produced by national Hydrographic Offices or by the RENC and distributed by PRIMAR in accordance with the requirements of S57 Edition 3)
- Updates to ENCs will be added to the PRIMAR database for all changes issued by the authoritative national Hydrographic Office. These will also be fully compliant with the internationally approved data transfer standard as detailed in the IHO publication S57 Edition 3.0 and its associated Product Specification.
- The ENC updates will fulfil all the requirements of the IMO performance standard for legal acceptance as adequate for navigation under the SOLAS requirements for the maintenance of navigational products fully up to date.



In view of their legal liability, HOs are responsible for all aspects of the quality of their ENCs and of the updates provided to PRIMAR. The HOs therefore verify and validate their own data.

PRIMAR also validates all data it receives, using a variety of software validation tools, and ensures the consistency of adjoining data sets. PRIMAR, on detecting errors or anomalies in the incoming data, does not amend the data itself but sends all queries back to the HO, requesting that the HO should examine the problem and, if agreed, supply a new data set.

The validation of data remains a major task for the PRIMAR Data management Team. It must be remembered that this is the first time that so much S57ed. 3.0 data, from so many sources, has been brought under a single quality control system. Errors have been found in both the data and the validation software. As part of this work there is continual

dialogue between PRIMAR and the QC software manufacturers to improve the validation tools.

Initially, not all HOs have a capability to produce EN and /or ER profiles themselves. In such cases, in accordance with the COA, and in agreement with a HO, PRIMAR may produce ENC's or ER's of that HO's waters. PRIMAR therefore has the ability to process data from three different streams:

- EN and ER produced by a HO.
- EN produced by a HO, ER produced by PRIMAR.
- EN and ER produced by PRIMAR on behalf of the HO. (if requested by the HO and only if resources are available)

Availability

PRIMAR liaises closely with all cooperating Hydrographic Offices (CHO) to determine national areas of responsibility, ensure that there are no gaps or overlaps between national areas, and to define a schedule for the supply of ENC data (EN and ER). In addition, it has been necessary to define the method of data exchange and to put in place the administrative system necessary to control and monitor communications between PRIMAR and each CHO. This includes secure transmission and authentication of data.

Once the geographical areas of responsibility have been established and agreed, PRIMAR discusses with the CHOs a schedule of priorities for the delivery of ENC's. This schedule must consider critical geographic areas and other marketing factors but it must also focus on the capacity of each HO and the need to arrive at a practical and achievable plan. The amount of ENC data available is increasing gradually.

6 REQUIREMENTS FOR ENC SERVICES

PRIMAR has experience from previous international projects, existing chart services and considerable market feedback identified that an ENC service must have the following characteristics:

- Services must be global and provide 24 hours on-line access. It must support both a CD-ROM and on-line service.
- Services must provide end-user decision support and interoperate with existing and other information used by the mariners
- Services must be perceived as providing «One-stop» shopping and be prepared to support electronic commerce in the future
- Services must be a combination of «push-technology» to make important or user selected information automatically available, and «pull-technology» where information is made available for access. Focus is to avoid information jamming where end-users are overwhelmed with new information which is not immediately required for their voyage or specific operations.
- Services and data must be secured with authentication of the end-users and the service provider on all supported carriers, and protected to prevent misuse of the ENC products
- Services must be reliable, cost effective and with high quality

- Technology must be based on well proven international standards and cost effective operation

PRIMAR provides an operational ENC service which meets these requirements. They will in the future be amended to support more telecommunication carriers and distribution services.

7 PRIMAR ENC SERVICES

PRIMAR commenced 1 October 1999 its official ENC service as defined in the PRIMAR Service Definitions. The service meets all requirements to provide ENC information required for ECDIS operation. All the ENC information is also provided in accordance with the PRIMAR Security Interface. Information about the Service Definitions are available from PRIMAR on request.

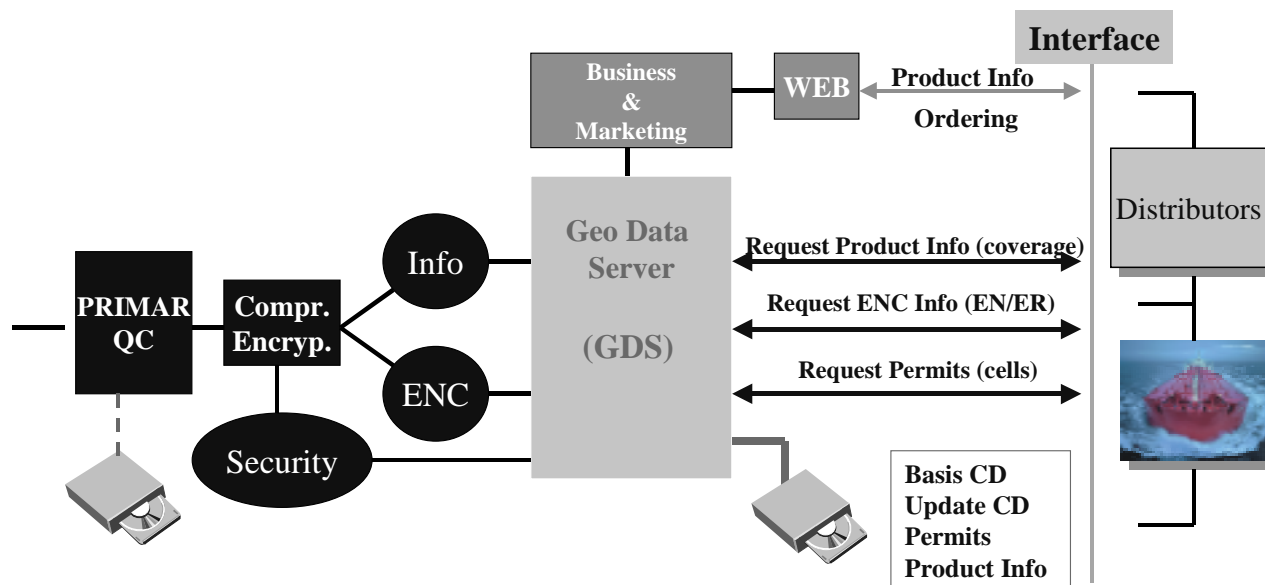
The ENC service is provided on both a CD-ROM and on-line telecommunication. PRIMAR has also developed a separate *Product List* containing the navigational status and coverage for all ENCs available from PRIMAR. The *Product List* is available for both the CD-ROM and on-line services.

The CD-ROM service consists of:

- ENC base data will be supplied on a base CD, together with all updates which are issued weekly on an accumulative update CD will bring it up-to-date to the most recent corrections at the time of supply.
- New editions or re-issues of cells will be distributed on the weekly update CD until they have been incorporated into the next base data CD.
- New versions of the base data CD will be produced occasionally or as required to incorporate all updates and new cells produced.

The following service will be provided when ENC base data is made available by telecommunications:

- ENC base data will be available globally and 24 hours a day for immediate on-line download, together with all updates to bring it up-to-date to the most recent corrections at the time of supply.
- New editions or re-issues of ENC base data will be made available for on-line access as soon as they are officially released by PRIMAR.
- Only the latest edition of a base ENC will be made available for on-line access. This includes also any re-issues applied to that edition of the base cell.
- A copy of the PRIMAR Product List is always available for download and contains the navigational status and coverage for all ENCs available from PRIMAR at the time of the request.
- The on-line service contains several qualifiers to request specific items (e.g. individual updates) or all of the items (e.g. all updates). The message protocol is defined in the Primar Service Documents.



The figure above provides an overview of the systems developed for the operation and provision of the PRIMAR ENC services. All ENC information is stored safely when it passes validation. Upon import into the Geodata Distribution Server (GDS), security information is applied to all the ENC data. This includes issuing a digital certificate with the PRIMAR public key, digital signatures of all the ENC information in accordance with the international Digital Signature Standard. All ENC information is finally also encrypted. The Security Interface is available from PRIMAR upon request.

The GDS has functionality to automatically handle on-line requests using the HTTP and TCP/IP protocols for:

- Download of the PRIMAR Product List for e.g. individual ENC cells, geographic areas or for all ENCs available
- Download of individual ENC base cells or user specified range of cells.
- Download of individual ENC update messages or user specified range of update messages.
- Download of Cell Permits (decryption keys) as for registered users as specified in the Primar Security Interface.

These services are now available operationally from PRIMAR, but are being amended to also support other types of communication protocols and to make more user tailored services available. Free sample software demonstrating the security and on-line aspects is available from the PRIMAR web-site.

The GDS is also used to automatically produce the weekly and accumulative update CD issued by PRIMAR.

The GDS software is also interconnected with a business system which provides a web-interface to distributors to automatically and simplify the registration of new customers

and new orders. The GDS will automatically enable access to new customers and also distribute new User Permits (decryption keys) as a response to new orders from distributors.

OEM Manufacturers will demonstrate all aspects of the PRIMAR CD-ROM and on-line telecommunication services at the Europort Exhibition in Rotterdam November 1999.

Customer Interface

The service to the end user will be made available in two ways:

- **Authorised Distributors.**
Defined as organisations providing an end-user ENC service that is either the PRIMAR service or a value-added service that includes, as a component, the PRIMAR service. The ENC data received by the end-users' ECDIS will be as supplied from the PRIMAR database, i.e. a fully IMO-compliant ENC service.
Authorised Distributors selling the PRIMAR database service may, if they wish, contract to PRIMAR to deliver the service directly to the end-users.
To date PRIMAR has 12 distributors, with many other applications being processed.
- **Copyright Licencees.**
Defined as organisations providing an end-user service which is not an ENC service (i.e. not IMO-compliant), but which is derived from the ENC data held by PRIMAR.
- **Suppliers.**
This is a new category created at the request of the CHOs to enable them to supply data to their government vessels without the need for them to become a full Distributor.

8 STRATEGY AND DIRECTION

- **Co-operation with Hydrographic Offices**
PRIMAR is adopting a pro-active policy aimed at increasing the number of CHOs and thus improving the service and the ENC coverage that it can provide.
PRIMAR will respond to requests to attend Regional Hydrographic Commission meetings to provide advice and guidance to HOs wishing to produce national ENCs and become CHOs.
- **Co-operation with other RENCs**
PRIMAR has had two meetings with the Canadian Hydrographic Service and Nautical Data International – the Canadian RENC. It is hoped that these discussions will lead to an inter-RENC bi-lateral agreement in the very near future.
- **Develop the PRIMAR Service**
The support systems used to provide the ENC service will be amended to provide more mechanisms for providing on-line services to access the ENC information, and meet specific requirements from the market.

9 CONCLUSION

This paper has described the creation, objectives and future plans of PRIMAR, but it is ENC data that lies at the heart of the whole organisation. We in Stavanger are confident that the basic infrastructure and systems necessary to operate PRIMAR are now in place. We also realise that we have a unique opportunity to develop an Official ENC Service that will meet the user's requirements and protect the rights and interests of all Cooperating Hydrographic Offices, existing and new.

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