NHC/53/1A

53rd NHC Meeting
Helsinki, 21-23 April, 2009

LIST OF DOCUMENTS
(7 April 2009)

Note: IHO Circular Letters or other commonly available documents are not included in this list (even if listed in the Annotated Agenda)

Document code	Title	By	Remarks
NHC/53/1A	**List of Documents**	**FIN**	
NHC/53/1B	**List of Participants**	**FIN**	
NHC/53/1C	**Program**	**FIN**	
NHC/53/2A Rev.1	**Agenda**	**FIN**	
NHC/53/2B	**Annotated Agenda**	**FIN**	
NHC/52/ Minutes	**Minutes of the 52nd NHC Meeting.**	**SWE**	*Distributed by SWE on May 2008.*
NHC/52/ Actions	**Actions arising from the minutes of the 52nd NHC Meeting**	**FIN**	*Status of actions updated by 1 April 2009.*
NHC/53/4.1A	**National Report of Denmark**	**DEN**	
NHC/53/4.2A	**National Report of Finland**	**FIN**	
NHC/53/4.3A	**National Report of Iceland**	**ICE**	
NHC/53/4.4A	**National Report of Norway**	**NOR**	
NHC/53/4.5A	**National Report of Sweden**	**SWE**	

Document code	Title	By	Remarks
NHC/53/6.1A	Report of the Nordic Paper Chart Production Group	FIN	
NHC/53/6.1B	Draft proposed TORs for NCPEWG	FIN	
NHC/53/6.1C	Status Report on Implementation of Harmonisation Rules from Sweden	SWE	
NHC/53/6.2A	Improved Data Exchange Working Group-IDEWG	SWE	
NHC/53/6.2B	Report of the Improved Data Exchange Working Group	SWE	
NHC/53/6.3A	Report of the Nordic Data Quality SubWG	FIN	
NHC/53/6.3B	Draft proposed TORs for Nordic Data Quality SubWG	FIN	
NHC/53/8.1A	Primar Report 2009	NOR	
NHC/53/8.1B	Proposal on establishment of additional RENCs	NOR	
NHC/53/8.1C	UKHO's production of Dual-badge BA charts fro Norwegian waters	NOR	
NHC/53/8.2A	The establishment of AIS as an Aid to Navigation	SWE	
NHC/53/8.2B	IALA Guide No 1062 On The Establishment of AIS as an Aid to Navigation	IALA	

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List of Participants

(by 7 April 2009)

Country	Organi-sation	Participants	E-mail address	Phone / Mobile phone	Arrive	Depart	Hotel res. Remarks
Denmark	**DAMSA**	**Mrs Charlotte Wiin Havsteen**	CWC@frv.dk		**21.4.**	**23.4.**	Hotel OK.
	DAMSA	**Cmdr Lars Hansen**	LHA@frv.dk	+45 3268 9622 +45 4089 4899	**21.4.**	**23.4.**	Hotel OK.
	KMS	**Mr. Jens Peter Hartmann**	JEPHA@kms.dk	+45 22446 867	**21.4.**	**23.4.**	Hotel OK.
	KMS	**Mr. Peter Ladegaard Sørensen**	pls@kms.dk	+45 7254 5102 +45 2089 5351	**21.4.**	**23.4.**	Hotel OK.
Finland	**FMA**	**Ms. Tiina Tuurnala**	tiina.tuurnala@fma.fi	+358 204 484 426 +358 40 547 762			-
	FMA	**Mr. Juha Korhonen**	juha.korhonen@fma.fi	+358 204 484 480 +358 400 815 180			-
	FMA	**Mr. Jukka Varonen**	jukka.varonen@fma.fi	+358 204 484 30 +358 400 206 692			-
	FMA	**Mr. Jarmo Mäkinen**	jarmo.makinen@fma.fi	+358 204 484 563 +358 400 795 714			-
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	FMA	**Mr. Mikko Hovi**	mikko.hovi@fma.fi	+358 204 484 494 +358 40 7664 494			Partial participation
Iceland	**LHG**	**Mr. Hilmar Helgason**	Hilmar@lhg.is	+354 545 2120 +354 893 2809	**21.4.**	**23.4.**	Hotel OK.
	LHG	**Mr. Georg Kr. Lárusson**	Georg@lhg.is		**21.4.**	**23.4.**	Hotel OK.

Norway	**NHS**	**Mr. Gerry Larsson-Fedde**	gerry.larsson.fedde@statkart.no		**21.4.**	**23.4.**	Own hotel reservation
	NHS	**Mr. Noralf Slotsvik**	Noralf.Slotsvik@statkart.no	+ 47 51 85 88 13 + 47 416 65 504	**21.4.**	**23.4.**	Own hotel reservation
Sweden	**SMA**	**Mr. Åke Magnusson**	ake.magnusson@sjofartsverket.se		**21.4.**	**23.4.**	Own hotel reservation
	SMA	**Mr. Ralf Lindgren**	Ralf.Lindgren@Sjofartsverket.se	+46 1119 1371	**21.4.**	**23.4.**	Own hotel reservation
IHO	**IHB**	**Director Robert Ward**	robert.ward@ihb.mc	+33 6 23 46 30 88	**21.4.**	**24.4.**	Hotel OK.

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Helsinki, 21-23 April, 2009

Program of the Meeting

(7 April 2009)

	Tuesday 21 April 2009	Wednesday 22 April 2009	Thursday 23 April 2009
Morning ***9.00 - 12.30***		**Meeting commence**	**Meeting continue**
12.30 - ***13.30***		***Lunch***	***Lunch***
Afternoon ***13.30 -***		**Technical Excursion** *[Vuosaari harbour. Arrangements to be informed]*	**Meeting continue.** **Closing of the Meeting** *About 15.00.*
Evening ***19.00 -***	***Ice Breaking Reception*** *[At FMA premises]*	***Dinner*** *[Suomenlinna fortress. Arrangements to be informed]*	

Notes:

NHC/53/2A Rev.1

53rd NHC Meeting
Helsinki, 21-23 April, 2009

Draft Agenda
(7 April 2009)

1. Opening of the Meeting

2. Adoption of Agenda

3. Minutes of the 52th NHC Meeting

- Approval of the minutes
- Status of Actions

4. Reports on activities within nautical charting and hydrographic surveying in each of the Nordic countries

4.1 Report of Denmark
4.2 Report of Finland
4.3 Report of Iceland
4.4 Report of Norway
4.5 Report of Sweden

5. Reporting of joint projects

6. Reporting of Working Groups etc.

6.1 Report of Paper Chart Production Group (PCPG)
6.2 Report of Improved Data Exchange Working Group (IDEWG)
6.3 Report of Nordic Data Quality Sub Working Group (NDQSubWG) and HSSC DQWG

7. The IHO Work

7.1 IHO Issues

- Report by IHB
- Discussion on the progress of the approval process of the amendments to the IHO Convention
- Nomination of NHC representative on IHR Editorial Board
- Report of the first meeting of Tidal and Water Level WG
- Discussion on NHC participation to S-23 WG (if established)

7.2 4EIHC Issues

- Discussion on 4EIHC Conference proposals
- Discussion on ENC Seminar on 5 June 2009 Monaco and status of mandatory ECDIS carriage requirement issues

7.3 IRCC issues

- Discussion on NHC Capacity building issues

- NHC report, representative and participation to IRCC-1 meeting on 5 June 2009
- Discussion on feasibility of establishing a Nordic Panel for evaluation of competence of hydrographic surveyors
- Status of updating S-55

8. Other international activities regarding nautical charting and hydrographic surveying

8.1 PRIMAR Issues

- Primar Report 2009
- Proposal on establishment of additional RENCs
- Relation to UKHO with regard to AVCS/BA charts

8.2 IMO and IALA issues

- AIS as an Aid to Navigation

8.3 Other issues

9. Relations to other (private) nautical charting interests in the Nordic countries

- Discussion on experiences in outsourcing and/or cooperation in production with private companies

10. Discussion of general trends and policy questions within the area of nautical charting and hydrographic surveying

11. Status Reports and Technical Issues

- Change of production nation of INT 1025 from Finland to Sweden

12. Next Chairman for NHC

13. Date and Place of the Next Meeting

- Review of Actions and specific Items for the next meeting

14. Any other business

15. Closing of the Meeting

53rd NHC Meeting
Helsinki, 21-23 April, 2009

Draft Annotated Agenda

(7 April 2009)

1. Opening of the Meeting

2. Adoption of Agenda

3. Minutes of the 52th NHC Meeting

- Approval of the Minutes
  [NHC52 Minutes]

- Status of Actions
  [NHC52 List of Actions]

4. Reports on activities within nautical charting and hydrographic surveying in each of the Nordic countries

[Note: Especially all are invited to present their current organisational status and plans]

4.1 Report of Denmark *[Denmark]*
[Doc. NHC/53/4.1A]

4.2 Report of Finland *[Finland]*
[Doc. NHC/53/4.2A]

4.3 Report of Iceland *[Iceland]*
[Doc. NHC/53/4.3A]

4.4 Report of Norway *[Norway]*
[Doc. NHC/53/4.4A]

4.5 Report of Sweden *[Sweden]*
[Doc. NHC/53/4.5A]

5. Reporting of joint projects

6. Reporting of Working Groups etc.

6.1 Report of Paper Chart Production Group (PCPG) *[Finland]*
[Doc. NHC/53/6.1A, NHC/53/6.1B, NHC/53/6.1C]

6.2 Report of Improved Data Exchange Working Group (IDEWG) *[Sweden]*
[Doc. NHC/53/6.2A, NHC/53/6.2B]

6.3 Report of Nordic Data Quality Sub Working Group (NordicDQSubWG) and HSSC Data Quality Working Group *[Finland]*
[Doc. NHC/53/6.3A, NHC/53/.3B]

7. The IHO Work

7.1 IHO Issues

- Report by IHB *[IHB]*
- Discussion on the progress of the approval process of the amendments to the IHO Convention *[IHB]*
  [Doc. IHO CL 01/2009]
- Nomination of NHC representative on IHR Editorial Board *[All]*
  [Doc. IHO CL 15/2009]
- Report of the first meeting of the HSSC Tidal and Water Level Working Group (TWLWG-1) *[Finland]*
- Discussion on NHC participation to S-23 WG (if established) *[All]*
  [Doc. IHO CL 3/2009bis]

7.2 4EIHC Issues

- Discussion on 4EIHC Conference proposals *[All]*
  [Doc. CCL 6]
- Discussion on the ENC Seminar on 4 June 2009 in Monaco and status of mandatory ECDIS carriage requirement issues *[All]*
  [Doc. CCL6]

7.3 IRCC issues

- Discussion on NHC Capacity building issues *[All]*
  [Doc. IHO CBC Letter on 2 Dec 2008]
- NHC report, representative and participation to IRCC-1 meeting on 5 June 2009 *[All]*
  [Doc. IHO Web Pages → IRCC → IRCC-1]
- Discussion on feasibility of establishing a Nordic Panel for evaluation of competence of hydrographic surveyors *[Finland]*
- Status of updating S-55 *[All]*
  [Doc. IHO CL 102/2008]

8. Other international activities regarding nautical charting and hydrographic surveying

8.1 PRIMAR Issues

- Primar Report 2009 *[Norway]*
  [Doc. NHC/53/8.1A]

  Proposal on establishment of additional RENCs *[Norway]*
  [Doc. NHC/53/8.1B]

– Relation to UKHO with regard to AVCS/BA charts *[Norway]*
[Doc. NHC/53/8.1C]

8.2 IMO and IALA issues

– AIS as an Aid to Navigation *[Sweden]*
[Doc. NHC/53/8.2A]

8.3 Other issues

9. Relations to other (private) nautical charting interests in the Nordic countries

- Discussion on experiences in outsourcing and/or cooperation in production with private companies

10. Discussion of general trends and policy questions within the area of nautical charting and hydrographic surveying

– Status of implementation of EU ISPIRE Directive *[All]*

11. Status Reports and Technical Issues

- Change of production nation of INT 1025 from Finland to Sweden *[Finland]*

12. Next Chairman for NHC

[Note: According to the NHC Statutes Iceland should be next]

13. Date and Place of the Next Meeting

- Review of Actions and specific Items for the next meeting

14. Any other business

15. Closing of the Meeting

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NHC/52/Final minutes

Final Minutes from the 52nd Nordic Hydrographic Commission Conference

Norrköping, Sweden 6-8 May, 2008

Opening of the Meeting

The NHC chairman Åke Magnusson welcomed all participants to Norrköping and the 52nd meeting of the Nordic Hydrographic Commission. Admiral Alexandros Maratos, president of the IHB, and the new Norwegian Hydrographer Gerry Larsson-Fedde were especially welcomed.

Ref *NHC52_1B_Participants.doc*

1.Approval of the Agenda

The agenda was approved with a discussion on AVCS added under the agenda item 10 AOB.

Minutes of the NHC 51 meeting

The minutes of last meeting were reviewed without any additional comments.

Actions of the NHC 51 meeting

The action list of the last meeting was reviewed and at the end of the meeting updated with actions decided in the 52nd meeting.

Ref *NHC 52 Action items.doc*

2.Reports on activities within nautical charting and hydrographic surveying in each of the Nordic countries (National reports)

2 A Hydrographic National Report of Denmark

Ref *NHC52_2A_DK Hydrographic national report 2008.doc*

Denmark has special efforts ongoing to make new charts in the Greenland area. The intention is to produce six charts during 2008. The new charts have created interest within the local mariner community and a lot of comments are handled. The hydrographic surveys in Greenland are focused

for safe entrances to main cities and for routes between the most important cities. The area is also interesting for cruise vessels.

Denmark is investigating how to proceed in cases where private producers are using Danish chart information without proper agreements.

2 B National Report of Finland

Ref *NHC52_2B_National Report of Finland.pdf*

Finland reported on possible new organisation of the production. A probable solution could be a government owned company. A new TSS is planned south of Åland which requires surveys to be performed and new charts produced. The plan is to obtain a good national ENC coverage by 2010. Leisure craft charts will still be produced by FMA in the foreseeable future.

In connection with this report the responsibilities to produce charts for smaller vessels were discussed. Alexandros Maratos pointed out that the regulations in SOLAS chapter 5 applies to all types of vessels unless otherwise decided by national authorities.

2 C National Report of Iceland

Ref *NHC52_2C_Icelandic Nat Report.pdf*

Iceland presented the national report on performed surveys, chart and ENC production. The establishment of a TSS has caused some problems. Iceland is planning to have full ENC coverage in 2010. In cooperation with the UKHO a new version of the Arctic Pilot Vol II is being produced. IHB commented with a reminder to notify the bureau when new or changed INT charts are produced.

2 D National Report of Norway

Ref *NHC52_2D_National Report Norway 2008.doc*

Norway reported on the organisation and some important changes in roles and positions. Hydrographic surveys in Svalbard have been efficient and are important also to support the increasing activity of cruise vessels in the area. A multibeam course will be held in Stavanger in march 2009. A project is ongoing to improve the flow of information from the Coastal Administration to the Hydrographic Office. The difficulty to recruit staff with the proper skills and experiences was mentioned.

2 E National Report of Sweden

Ref *NHC52_2E_Sweden National Report.doc*

A couple of government investigations is ongoing which will have effects on the organisation of the Swedish Maritime Administration. The possibility to make parts of the production in private companies is taken into consideration within the investigations. The outcome and effects for the Swedish HO is not clear at the moment.

There is a project to improve and renew the necessary nautical publications. They have not been updated properly during the last years.

2 F Analog depth information to be included in the Swedish National Depth Information database - Sweden.

Ref *NHC52_2F_ScanDis.doc*
NHC52_ 2F_Presentation_Analogue depth.ppt

2 G Hydrographic surveying using high resolution satellite images - Sweden.

Ref *NHC52_2G_Quickbird.doc*
NHC52_2G_Presentation_Quickbird.ppt

3. Reporting of joint projects

3.A Proceedings for the Validation Workshop – Denmark

Denmark shortly reported from a workshop on validation of multibeam data that was decided at the previous NHC meeting. One question is whether this type of workshops should continue in some way. The meeting was of the opinion that this workshop will be arranged also in the future with rotation of hosts.

Action: Sweden will invite to the next workshop concerning this item.

3.B Nordic Working Group on Paper Chart Harmonisation – Chairman

The working group has concluded their task and delivered a report. It is decided that the working group has fulfilled its task and is disbanded.

Denmark suggested that a status report on implementation of the harmonising rules is delivered to the next NHC meeting by all countries concerned.

It is decided to establish a Nordic Working Group on Exchange of S57 Data.

Denmark briefly reported on the ongoing work of the Baltic Sea ENC Harmonisation Working Group (BSEHWG). A number of recommendations will be reported and the aim is that these recommendations are approved by BSHC members before finalising the report.

Sweden brought up the question on the use of red colour symbols, text and line types in charts. Iceland have noted this also and have the same concerns. Norway commented that also the S52 ECDIS display causes problems.

Action: Before the next NHC meeting all countries concerned will produce a report on the implementation status of the recommendations in the report of the WG on Paper Chart Harmonisation.

Action: Sweden will invite to the next meeting, possibly held during the autumn 2008, of the Nordic WG on Paper Chart Production.

Action: Sweden will invite to a first meeting of the Working Group on Exchange of S57 Data to be held during autumn 2008. Sweden will distribute draft Terms of Reference for this WG.

4. Report from Working Groups etc.

There were no papers listed for this agenda item. Several NHC working group reports were handled in other agenda items.

5.The IHO Work

5.A IHB Activities – IHB

Alexandros Maratos reported on the status of the work at the IHB and important issues for the IHO. The new convention and organisation of the IHO as described in the protocol of amendments is approved by 19 countries. The process of approval is slow and with the current rate it will take another 10 years before the protocol is ratified. The Bureau is concerned about this fact and is willing to assist in whatever possible way to speed up the process.

There are three new member applications (Cameroon, Sierra Leone and Montenegro) in the process of ratification, Haiti is in the early stage of applying for membership and Surinam has been reinstated as a full member.

It was reported that all decisions of the last International Hydrographic Conference are in implementation faces. The planning of the next Extra IHC in June 2009 has started. .Important topics for the EIHC will be reports from working groups ISPWG, HCIWWG and MSDIWG. The status of ENC availability will be on the agenda and member states may propose other important items for the next EIHC agenda.

The IHB is active in communicating with IMO Nav 54 and has delivered a report saying that a good global ENC coverage will be in place by 2010. A presentation will also be given at this summers Nav 54 meeting. Five new Navareas are being established in the north with Canada, Norway and Russia as coordinators. The Online Chart Catalogue, with sections for ENC, raster and paper charts, will be operational late 2008.

Finland asked, concerning the ratification of the protocol of amendments, if there are indications that member states are against the changes. IHB answered that they have no such indications but expresses concern once again about the slow process of approval.

Action: All NHC members to use available channels and assist in the process of approval of the protocol of amendments and for the approval of new IHO member states.

5.B Report of the Nordic S-44WG on renewal of the IHO S-44 – Finland

Ref *NHC52_5B_Report of the Nordic S-44WG.pdf*

Jukka Varonen reported that the finalization of the revised S-44 went quite well. The Nordic contribution by the work of the Nordic S-44 subWG has been recognized as important. More details in the report. The chairman expresses his gratitude for the work in the Nordic subWG. It is decided that the Nordic subWG is disbandoned. Alexandros Maratos comments that S-44 is a very important standard for the safety of navigation.

5.C Report of the IHO ISPWG work – Finland

Ref *NHC52_5C_Report of the ISPWG work.pdf*
NHC52_5C_Presentation_ISPWG.pdf

Juha Korhonen, representative from NHC (and BSHC) to the IHO Strategic Planning Working Group (ISPWG), gave an introduction to the ongoing work in the WG. Juha welcomed all to contribute with comments and opinions to improve the documents.

Alexandros Maratos emphasized that the strategic plan is very important and the document needs to be reviewed and revised at regular intervals.

5.D Procedure for selection of NHC Members to council – Chairman

This item was also discussed at the NSHC conference in april. Due to the delay in procedures for approval of the convention this is not an vital issue yet. It is the opinion of NHC to get as much influence as possible in future assemblies of the IHO. A discussion between NSHC and NHC is suggested to form a common approach.

5.E Status of Ratification of amended convention and Pending Member States – IHB

See notes under 5A above.

5.F IHO Work Programme RHCs to report – Chairman

The chairman raised the question whether these reports, according to the IHO Work Programme, should be delivered from the NHC. The bureau expresses the opinion that a short report could be helpful. The NHC will examine the situation and deliver a report.

Action: The NHC will produce a brief report on the tasks 17,18 and 19 of the IHO Work Programme. Sweden, Finland.

6. Other international activities regarding nautical charting and hydrographic surveying

6.A Primar, Report 2008 – Norway

Ref *NHC52_6A_Status PRIMAR 2008.doc*

The latest country to join Primar is Ukraine and an agreement with Brazil is under way. A new service is being development to deliver chart data as WMS.

6.B Technical Report (ECDIS and ENC Coverage) – Norway

Ref *NHC52_6B_ECDIS_ENC follow up 08 report.pdf*

7. Relations to other (private) nautical charting interests in the Nordic countries

Denmark commented on the fact that customers at times not are aware of that they buy unofficial products. Resellers prefer to sell those products where they have better margins. Finland mentioned that CMap publish printed charts for the pleasure market.

8.Discussion of general trends and policy questions within the area of nautical charting and hydrographic surveying.

8.A Development of SDI in Sweden - Sweden

Ref *NHC52_8A_Development_SDI_in_Sweden.doc*
NHC52_8A_Presentation_SDI in Sweden.ppt

The initiative, under the eContent+ framework, that is started by the UKHO was discussed. Note also the IHO circular letter CL41.

9. Next Chairman for NHC/ Date and place for next meeting.

According to the NHC rotation order the next chair country for the NHC is Finland. Jukka Varonen was elected as the NHC chairman for the period up to and including the next meeting in 2009.

The place and time of next meeting was preliminary decided to be Helsinki Tuesday April 21st until Thursday 23rd 2009.

10.Any other business

Discussion on the UKHO AVCS initiative

The recently announced initiative Admirality Vector Chart Services (AVCS) from the UKHO was discussed. Especially the fact that UKHO will claim exclusive rights to distribute new ENC's produced as a result of AVCS was noted. This raises concern and questions among the NHC member states and will certainly be discussed further.

Closing of the Meeting

The resigning chairman Åke Magnusson thanked the meeting participants for their attendance and the fruitful discussions and closed the meeting. The newly elected chairman Jukka Varonen expressed his gratitude for the organisation and hospitality during the meeting in Norrköping and welcomed the participants to Helsinki in 2009.

52nd NHC Meeting
Norrköping, 6-8 May 2008

Action items decided at the 52nd NHC Meeting

(Including actions carried on from previous meetings and status of actions)

Agenda	Action	Action by	Remarks Status by 1 April 2009
3	Report on the lessons learned on *Rocknes* incident, to be distributed when feasible.	**NO**	**Pending.** **Carried on from 50th meeting**
3	Countries concerned should before the next NHC meeting produce a report on status of implementation of the harmonising rules resulting from the work of the WG on Paper Chart Harmonisation.	**All concerned**	
3	Invite to the next meeting, in autumn 2008, of the Nordic WG on Paper Chart Production.	**SE**	**Done**
3	Invite to a first meeting, in autumn 2008, of the new Nordic WG on Exchange of S57 Data. Distribute Draft Terms of Reference for the WG.	**SE**	**Done**
3	Invite to the next meeting, in autumn 2008, of the Nordic Workshop on Validation of Multi Beam data.	**SE**	**Done**
3	All HOs to work towards expanding cooperation with scientific organizations involved in survey operations and prepare better guidelines for crews in order to improve data.	**All**	**Carried on from 51st meeting**
5	Use available channels and networks to assist in the process of approval of the protocol of amendments and new member states.	**All**	
5	Make a proposal, before the next NHC meeting, on NHC monitoring of implementing the new S-44.	**SE, FI**	**Nordic DQSubWG established**
5	Report the status in the NHC area on tasks 17,18 and 19 of the IHO work programme.	**SE, FI**	**Done (June 2008)**
10	Distribute report of tanker grounding in The Gulf of Finland to NHC members	**FI**	**Carried on from 51st meeting** **Report not yet available.**
10	Include in the national reports considerations of Guidelines for collection of bathymetry by Research vessels.	**all**	**Carried on from 51st meeting**

Finnish Maritime Administration

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Report of the Nordic Paper Chart Production Group (PCPG)

(7 April 2009)

1. INTRODUCTION

The Paper Chart Production Group was established under the Nordic Hydrographic Commission (NHC) in 2000 in order to exchange information among those who are in practice responsible for the production of printed charts and publications. However, no official Terms of Reference were created.

An extract from the minutes of NHC/44 (2000):

> *There were discussions about re-establishing workshops for the actual producers of Charts and Publications. These were conferences where people that are not on the administrative level, that is, cartographic staff etc. met and discussed current issues. These workshops were being held until few years ago and proved to be very useful. Delegates supported it strongly that these would be reactivated. Some discussions were about adding more countries into these workshops but the general feeling was that smaller groups are more efficient. FI promised to organise this kind of workshop in Helsinki in September 2000.*

2. MEETINGS

The Group has held so far 5 meetings and all Nordic HOs have participated into them.

- 4 – 5 October 2000, Helsinki, Finland
- 6 – 7 September 2002, Reykjavik, Iceland
- 8 – 9 September 2004, Copenhagen, Denmark
- 1 - 2 November 2006, Stavanger, Norway
  - *The group discussed the name of the PCP group and decided to alter the name to Chart Data Group (CDGroup).*
  - *Norway was to send a proposal of the new name to the secretary of the Nordic Hydrographic Commission, Mr. Svend Eskildsen (Denmark).*
- 15 – 16 November 2008, Norrköping, Sweden
  - *The group met under the name Paper Chart Production Group despite the name change in the previous meeting*

Preliminary date for the next meeting is October 2010, hosted by Finland.

3. DISCUSSED ISSUES

The group has mainly focused on the following issues

- information related to (paper) chart production systems (current status and future plans)
- chart data management
- chart production workflows in each HO
- the connection between ENCs and paper charts in each HO
- other current issues in participating HOs at the time of the meeting

The discussions have been informative by nature, no actual agreements or decisions have been made.

In their last meeting in Norrköping (2008), Paper Chart Production Group participants found out that the group does not have any Terms of Reference as guidance for the groups work. The group also noted that many of the issues previously handled in this group were now discussed in other working groups under the NHC or BSHC.

4. CONCLUSIONS

The Group believes that it should continue, as the exchange of information on all levels of chart production is necessary for improving practises and extending knowledge in chart production.

This group has also made it possible to meet colleagues from other Nordic HOs for those who are not involved in other IHO / NHC working groups.

The group suggests that it should continue exchanging information about current practises in chart production in the Nordic HOs. The group also suggests that it should function as a discussion forum for experts from the Nordic HOs.

The Group proposes it to be renamed as **Nordic Chart Production Expert Group (NCPEG)** which more precisely describes its tasks.

The group suggests that the Terms of Reference for this should be written in a way which would allow the group to discuss issues that are relevant at the time of the meeting. The proposed TORs are written in a general IHO style and have more guidance to avoid duplication of the work. The participants from each HO would also be selected based on the issues that are to be discussed.

It was agreed that Finland as the host for the next NHC meeting would draft the Terms of Reference for this group and present them in the next NHC meeting in April 2009.

The draft proposed TORs are in a document ***NHC/53/6B***. These terms of reference are revised based on the group's views at their meeting in Norrköping 2008

5. ACTIONS REQUIRED BY THE NHC/53 MEETING

The NHC/53 meeting is asked to:

1. take a note of this report
2. approve the Terms of Reference for NCPEG
3. endorse the work of NCPEG

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53rd NHC Meeting
Helsinki, 21-23 April, 2009

Draft Proposed TORs for the Nordic Chart Production Expert Group (NCPEG)

(7 April 2009)

1. Objective

The Paper Chart Production Group was originally established by the Nordic Hydrographic Commission (NHC) in 2000 in order to exchange information among those experts who are in practice responsible for the production of printed charts and publications.

2. Authority

This NCPEG is a subsidiary of the Nordic Hydrographic Commission (NHC). Its work is subject to NHC approval/monitoring.

3. Procedures

A. The NCPEG should:

A.1 Evaluate current practices of producing charts and publications in Nordic HOs where feasible, i.e.
- status on Nordic chart harmonization according to IHO M-4
- source data management
- chart data management
- education / training of staff
- quality control methods of chart production & chart products
- print on demand
- chart printing and marketing
- discuss other current issues suggested by participating HO(s)

A.2 Where feasible, harmonise the Nordic practices in chart publishing, chart distribution and chart adoption

A.3 Arrange workshops, training or courses on nautical chart production

A.4 Liaise with other relevant bodies when feasible

A.5 Forward joint Nordic opinions and proposals to relevant other bodies when found feasible

B. All Nordic HOs are encouraged to participate to the work of NCPEG

C. The NCPEG should work by correspondence as far as possible. Especially between the meetings the members are encouraged to exchange relevant information.

D. Meetings will be organised normally every second year, or when deemed appropriate. The organizing responsibility is to be circulated among the Nordic HOs. The organising country and possible date for the next meeting should be decided at a NCPEG meeting.

E. The PCPEG should report to NHC at least at the NHC annual meetings.

4. Composition and Chairmanship

A. The NCPEG shall comprise representative of NHC members who are involved in the practical issues of the production of paper charts and publications.

B. The NCPEG Expert may invite contributors to join its work.

B. Decisions should be made generally by consensus. If votes are required all members have one vote.

D. The NCPEG shall elect its Chair among its members. Normally the Chair should be on the HO who is responsible for the next meeting.

_____

Status Report on Implementation of Harmonisation Rules from SWEDEN

Background

During 2007 the Nordic Working Group on Paper Chart Harmonisation was established and presented its final report in Norrköping in the end of the same year. The overall recommendation from the Working Group was to improve the method of updating the chart information of neighbouring countries areas and to harmonise the charts according to IHO's publication M-4 *Chart Specifications of the IHO and Regulations of the IHO for International (INT) Charts*.

Even if Sweden had claimed that the Swedish charts adhered to M-4 no general harmonisation against the specification had been done previously. Parallel with the work being done in the Nordic Working Group on Paper Chart Harmonisation an internal investigation started at SMA in order to find out how the Swedish chart could be improved and changed according to M-4. The result of the investigation was that a change could be done with relatively limited resources and that most of the changes could be done automatically by changing the setup in the internal production system. Therefore the decision was taken in the end of 2007 that all Swedish charts where to be published in a new edition during 2008 with the symbolisation changed according to M-4 as close as possible.

Updating routines for chart information in neighbouring countries

Since most the of chart information in neighbouring countries areas in Swedish charts is based on older data than now available ENC:s it is a time consuming task to exchange all old information against new information based on neighbouring countries ENC:s. However in order to improve the safety for the users it is an important task to fulfil especially for larger scale charts. Therefore a new chart (SE 937) in 1:50 000 covering the border area to Norway will be published in 2009. This chart will be based on Norwegian ENC data on the Norwegian side of the border.

The updating routines and the data exchange needed for improving the situation are currently under discussion in the Improved Data Exchange Working Group which will present their final report at NHC53.

Harmonisation according to M-4

The actions mentioned below have been taken at SMA in order to harmonise the Swedish charts against M-4. All Swedish charts were published in a new edition during 2008 and are now available with this new symbolisation.

- The terms New Chart, New Edition and Reprint have been implemented. The numbering system follows the same principals as ENC:s. A New Chart has the edition 1.0 a New Edition always gets the number x.0, for example 2.0 and the following Reprint will be numbered 2.1 and then 2.2 etc.

- Soundings out of position have been changed from upright figures without brackets to sloping figures with brackets. This was an important change since upright figures without brackets have the meaning Unreliable sounding in M-4. In order to make this change SMA took the decision to change all depth contours from black to blue. Since the chart would somehow be more cluttered with black brackets on every sounding out of position the impression was that it was less problematic when using blue depth contours than black.

- Swept and dredged areas were changed from black continuous line to red dashed line for swept areas and black dashed line for dredged areas.

- Recommended tracks have been change from continuous black line to dashed black line when not based on fixed marks and continuous black line when based on fixed marks. Small craft tracks are symbolised in the same way as ordinary tracks since the status of them has been changed. The least depth which was previously given on small craft tracks has been removed and to some extent been replace with soundings out of position given in narrow passages.

- All Swedish abbreviations used on beacons (Bk, Kl, Stg, Tvl, Sm) have been removed. The symbol Beacon in general is used for all beacons since the difference in shape and size is of less importance for the users.

- All text in the charts is now in English and most of the Swedish text has been removed. The notes in the charts are still in both Swedish and English language.

- Besides all above mentioned actions symbolisation of approximately 30 other items have been changed but these changes are less obvious for the users and was implemented in order to adhere more strictly to M-4.

Concerning the symbolisation of unsurveyed areas in Swedish charts (the blue bands) a joint proposal from Denmark, Finland, Norway and Sweden were presented at the IHO Chart Standardisation Paper Chart Working Group meeting in Sydney in November 2008. The proposal will be forwarded to all working group members and will hopefully be a part of M-4 in the future.

NHC/53/6.2A

SWEDEN

Improved Data Exchange Working Group - IDEWG

The IDEWG which was suggested at the 52nd Nordic Hydrographic Commission (NHC) conference has finalized its work and hereby present the Final Report for the NHC.

The working group considers having completed the tasks given in the Terms of Reference and proposes that the working group be dissolved. The NHC is invited to decide if the recommendations given in the report should be followed.

Hans Engberg
Hans Engberg
Chairman IDEWG

Magnus Wallhagen
Magnus Wallhagen
Secretary IDEWG

NHC/53/6.2B

THE NORDIC HYDROGRAPHIC COMMISSION

THE NORDIC WORKING GROUP FOR DEVELOPING IMPROVED DATA EXCHANGE THROUGH S-100

FINAL REPORT
2009

20TH MARCH 2009

THE NORDIC HYDROGRAPHIC COMMISSION

THE NORDIC WORKING GROUP FOR DEVELOPING IMPROVED DATA EXCHANGE THROUGH S-100

FINAL REPORT
2009

SWEDISH MARITIME ADMINISTRATION

SE-601 78 Norrköping
Tel: +46 11 19 10 00
Fax: +46 11 10 19 49

20TH MARCH 2009

Content

SUMMARY

There are two main aspects of improved data exchange between neighbouring countries. The first aspect is that of improved data quality as a result of timely and descriptive exchange of information regarding updates. The second aspect is that of improvement to the efficiency of the chart production process as a result of adding cartographic information to the exchange set.

A proposal has been put to The IHO Transfer Standard Maintenance and Application Development Working Group (TSMAD) regarding the inclusion of ten cartographic attributes in S-101. This proposal will be debated at the 18th TSMAD Meeting in May 2009.

We would like to make the following recommendations to the Nordic Hydrographic Commission:

1. National paper charts at a scale of 1:750 000 and larger that cover another nation's waters should be produced from the other nations ENCs.

2. Generalisation of the neighbouring countries ENC data should be kept to a minimum to ensure data quality and for more efficient updating.

3. Once the paper chart is based on ENCs the update should be done via ENC updates.

4. A Paper Chart Source Information List should be kept up to date by each Nordic Hydrographic Office.

5. NHC to decide which country would be responsible to administrate the Paper Chart Source Information Lists for all Nordic countries.

6. An ENC Update Query Web Service or an equivalent query function should be provided by each Nordic Hydrographic Office.

7. If no ENC Update Query Web Service is available then it should be possible to produce an ENC Update Report on request by another country.

8. To present the recommendations and the suggested methods in this report to the IHO Chart Standardization and Paper Chart Working Group.

9. Implementation plan:

    a. If not already available start then to collect administrative information for the ENC Update Report 1st Jun 2009.

    b. Each country should on request be able to produce an ENC Update Report from the 1st Dec 2009.

    c. Paper Charts should be based on the neighbouring countries ENCs according to the following time schedule.

        i. Chart with scale larger than 1:150 000 completed 1st Jan 2011.

        ii. Scale 1:150 000 – 1:400 000 completed 1st Jan 2013.

        iii. Scale 1:400 000 – 1:750 000 completed 1st Jan 2015.

    d. Each country to present the status of implementation at every NHC-meeting.

BACKGROUND

In the report from the Nordic Working Group on Harmonizing Paper Chart Regimes it was stated:

"The benefit of using chart data from a neighbouring country is to avoid duplication of work and hence create data in an area that has already been charted. In common geographical charting responsibility areas the need to store and update data in both countries could then be reduced."

The Nordic working group on Paper Chart Harmonisation concluded that there was a need to improve the data exchange between the Nordic countries. The working group suggested in its final report to the Steering Committee that a Nordic working group be established to develop and present an improved solution for handling cartography within S-100. At the 52nd Meeting the Nordic Hydrographic Commission decided that the Improved Data Exchange Working Group should be established.

TERMS of REFERENCE

The terms of Reference for the Nordic WG for developing Improved Data Exchange through S-100 (IDEWG):

Evaluate the present cartographic attributes and object classes within S-100 and identify the need for improvements.

Identify and analyze how 'cartography' (for paper chart production) is stored at respective Nordic HOs.

Identify what has been done elsewhere when handling cartography within S-57/S-100 in order to learn and gain experience from other HOs.

Identify existing data exchange within the Nordic countries using S-57 from PRIMAR with regard to using the data for paper chart production (new charts and updates).

Propose solutions and measures for enhancing data exchange within the Nordic countries using S-57 from PRIMAR for paper chart production (new charts and updates).

Report to the next NHC Meeting in April 2009 on the progress made.

Rules of procedure:

The Nordic members are strongly encouraged to participate and contribute to the work of the IDEWG

The work of the IDEWG should be carried out as far as possible by correspondence

The IDEWG should consult relevant CHRIS committees and its working groups as deemed necessary

The IDEWG should present a Progress Report to the next NHC Meeting in April 2009.

PARTICIPANTS and MEETINGS

Participants

Hans Engberg, Chairman	Swedish Maritime Administration
Magnus Wallhagen, Secretary	Swedish Maritime Administration
Mikko Hovi	Finnish Maritime Administration
Carsten Riise-Jensen	Danish Hydrographic Office
Lis Gram	Danish Hydrographic Office
Kjetil Wirak	Norwegian Hydrographic Service
Níels Bjarki Finsen	Icelandic Coast Guard

Meetings

1st IDEWG Meeting in Norrköping	2008-09-18
2nd IDEWG Meeting in Kastrup	2008-12-02
3rd IDEWG Meeting in Kastrup	2009-03-17

ANALYSIS

The focus of the analysis has been on geographical areas of common charting responsibility, i.e. the areas of the national paper chart that are covering another nation's waters.

The working group has concluded that there are sea areas of different interest and that the need for effective data exchange between countries differs. The Sound is a congested area of great importance which consequently means that the data exchange in general is of more importance between Denmark and Sweden than for example in the area of the North Sea were the data exchange between Norway and Denmark is not likely to be as critical.

Even though the work has been carried out on the direction of the Nordic Hydrographic Commission it has been important to find solutions and make recommendation that could be implemented by the wider IHO community.

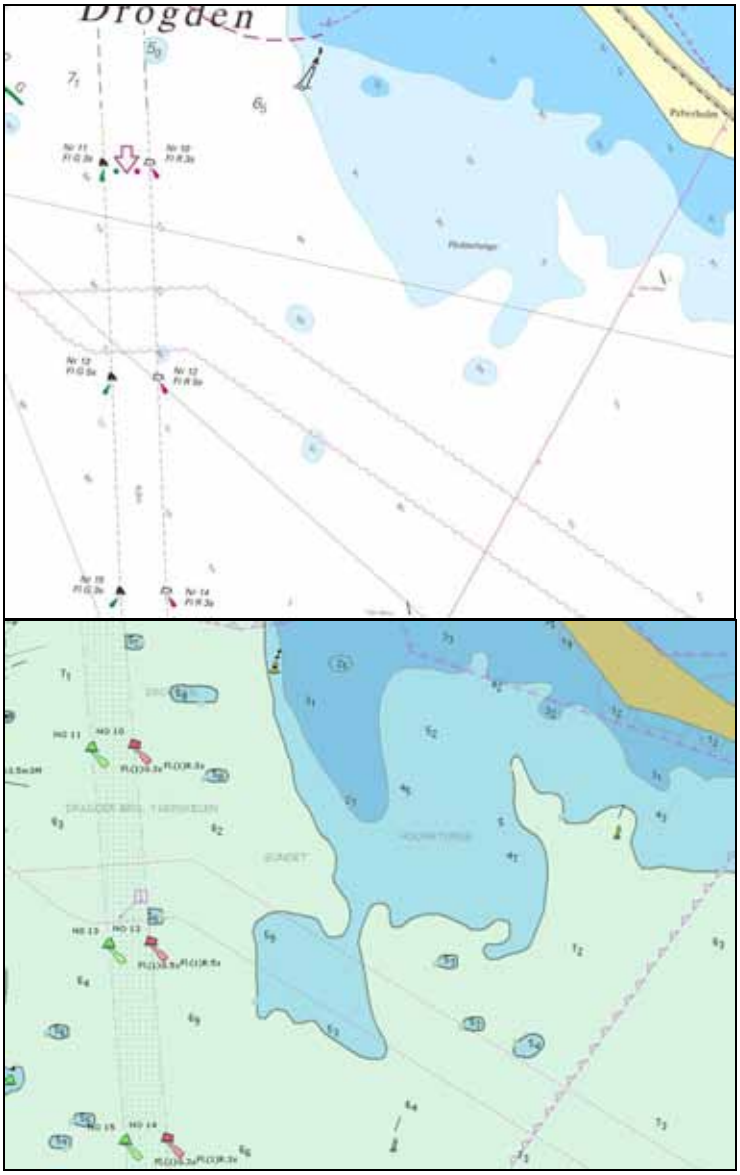
Data exchange within the Nordic countries

Paper chart production at present

When producing the first edition of a paper chart covering neighbouring countries waters the other nations ENCs are generally used. The printing nation makes a request for the ENC data or simply downloads the necessary ENC cells from the RENC database. The ENC data is then converted to the printing nations chart production data format. However, since the ENC data does not contain cartographic objects and attributes all cartography has to be created by the printing nation. This process is time consuming.

Paper chart updating

Updates are generally made from information published in the neighbouring country's NtM. It is impossible, however, to give a complete description of all updates in a notice. A new survey is one example of an update that could only be described in general terms. Hence, the method of keeping a neighbouring country's chart information updated solely through the NtM inevitably leads to the information becoming inaccurate.



Picture 1.
The Swedish chart SE8141 compared to the Danish ENC cell shows that the depth information differs as a result of the insufficient updating method.

Paper charts and ENCs

ENCs are continuously kept up to date by the producer nation and are always available at the RENC. This is a very good starting point for improved data exchange for paper chart production. However, today it is difficult to know exactly what information has been updated in an ER or EN without having to apply the ENC update. You must also keep in mind that only the latest edition and its updates are available at the RENC database. Furthermore, the occurrence of preliminary and temporary ENC

updates complicates matter since these updates should not be included in the printed chart.

There should be a process established within the HO making sure that once a paper chart is produced from ENCs of the neighbouring country, it is kept up to date through ENC updates and not simply through NtM.

Paper Chart Portfolios

Only a few paper charts covering neighbouring countries waters are currently produced from the neighbouring countries ENCs. It would be optimal that all subjected charts were produced from the neighbouring country's ENCs. This could be a long term goal, but in practice priority would have to be given to the production of the larger scale charts.

Generalisation levels

Consideration must be taken of the fact that the available ENCs of the neighbouring country may not always be at a corresponding compilation scale. This will lead to different generalisation levels in different areas of the paper chart. Here generalisation level is defined as selection of themes and objects, depiction and simplification of objects, e.g. coastline, depth contours and soundings.

In Norway the ENC and the paper chart have quite different generalisation levels. The consequences of this are difficult to overcome. The working group has chosen to disregard this particular problem for the purpose of finding a general improved solution for data exchange. The consequence of this difference between paper chart and ENC would be that a Swedish paper chart over Norwegian waters would be generalised according to the Norwegian ENC and not to a Norwegian paper chart. As the common chart area between these countries is relatively small the working group consider the problem as being of the same proportion.

It is important to recognize that ENCs in the border area will be used by the neighbouring country for paper chart production. If possible this should be considered in the compilation of the ENCs.

Vertical datums

The vertical datum differs from one country to another. Normally the vertical datum is tied to the tidal level in the area. In the Baltic Sea – Mean Sea Level (MSL).

As long as a note in the chart states to which vertical datum the depth information is given the WG finds it not substituting a hazard to safe navigation.

The handling of cartography at the Nordic HO:s

The Nordic HOs have different chart production systems. Denmark and Iceland have Caris, Norway has dKart from Jeppesen, Finland has an ESRI-system from T-Kartor and Sweden uses software from 1Spatial and Star-Apic. The result of this is that cartography is stored and handled in quite different ways. While Sweden has a database where almost all cartography is stored within the data, Finland has the application nSector which creates the cartography from settings and attributes when a chart is going to be printed. At present Denmark does not use a database for paper chart production. The data is stored as separate files. For Iceland and Norway the situation is basically the same.

The working group discussed possible exchange formats other than S-57, e.g. ESRI shape, AutoCAD dwg etc. A possible method could be to introduce a separate cartographic information layer. Such a file would demand thorough definition. It would also mean that a separate production line must be created at the HO for mapping the internal objects and attributes to that common definition. The cartographic exchange file could hardly be continuously available and would have to be requested. This was considered to be a great disadvantage compared to the ENC infrastructure already in place.

Cartographic attributes and object classes within S-100

The status of the cartographic feature classes and attributes within S-100 is currently the same as in S-57. Cartographic objects and attributes within S-57 were included in the standard at an early stage. The reason was to facilitate exchange of hydrographic data between HOs for paper chart production. However, the practical use of S-57 has only been the production of ENCs.

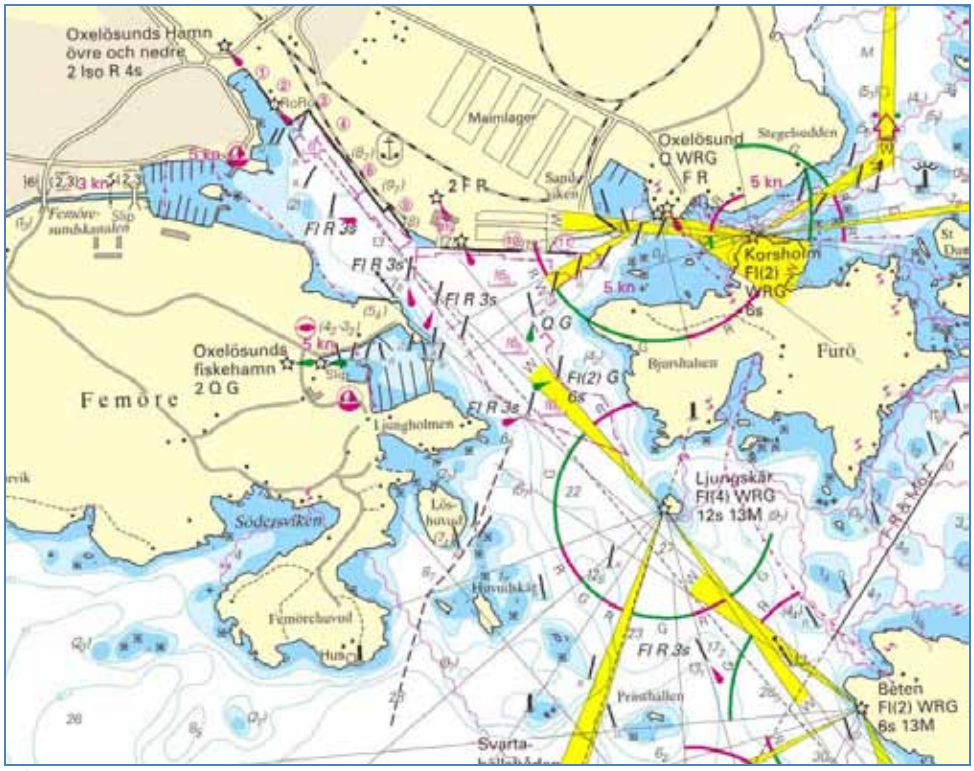
The present cartographic object classes and attributes within S-57 (See Annex 1) were analysed by the working group.

As the working group studied the cartographic object classes and attributes the conclusion was that this combination is not enough to fully reproduce a paper chart. ENC data being currently the most used exchange format the working group analysed the conversion process from ENC to paper chart and agreed that the cartography for texts was a major obstacle. The working group realized that an improved solution for text would give most benefit.

Since the presentation of text in ECDIS is less than optimal (Picture 2) the working group believed it would be suitable to introduce cartographic text attributes in the ENC Product Specification. This would improve the presentation in ECDIS and at the same time greatly improve the efficiency of data exchange for paper chart production.

The possible introduction of cartographic attributes in ENC:s would have the advantage that there would not be a need for a separate product specification for hydrographic data exchange and that the HO:s could utilize the ENC production system and the RENC-concept.

A proposal was put to The IHO Transfer Standard Maintenance and Application Development Working Group (TSMAD) regarding inclusion of ten cartographic attributes in S-101.



Picture 2.
Because no cartographic information is encoded in the ENC data the presentation is more cluttered in the ECDIS Display compared to the paper chart.

The handling of cartography within S-57/S-100 at other HOs

Some of the hydrographic production systems base their data model on S-57. To be able to produce paper charts from the model there are added features and functionality. Norway provided the working group with a description from Jeppesen to give us an example of how it has been implemented in dKart.

Since the Nordic Hydrographic Offices do not have the same hydrographic production system and are in different phases with regard to the existing production systems life cycles it would be difficult to agree on a common data model and a defined data format.

CONCLUSIONS

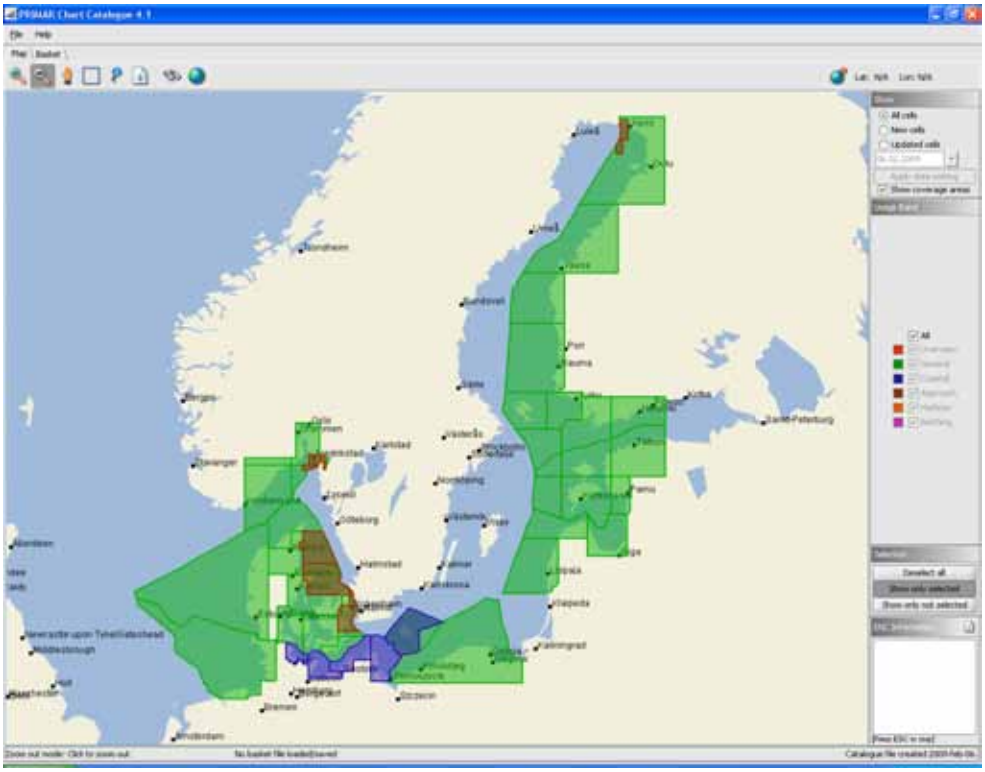
General

There are two main aspects of improved data exchange. The first aspect is that of improved data quality as a result of timely and descriptive exchange of information regarding updates. The second aspect is that of improvement to the efficiency of the chart production process as a result of adding cartographic information to the exchange set.

At present only a few paper charts in the national portfolios uses ENC as their source. It is assumed that this situation will change in the future, leading to an increasing number of paper charts produced from ENCs. The value and importance of the proposed improved data exchange will increase accordingly.

Paper Chart Source Information List

In order to use ENCs and the existing data infrastructure as a basis for data exchange, one needs to know which ENCs are of interest for each nation's paper chart production. Each nation has compiled a Paper Chart Source Information List (PCSIL) from which it is possible to see which foreign ENCs are sources for their national paper chart (See Annex 2 - 6).



Picture 3.
Primar Chart Catalogue view of the Swedish Paper Chart Source Information List.

Improved Data Exchange for new editions of paper charts

To improve the efficiency of the production of new editions of paper charts it is critical that the content of the paper chart is kept as close as possible to the content of the correspondent ENC source. Since any generalisation of the ENC data from a neighbouring country will have to be redone for each new edition the generalisation should be kept to a minimum. The correlation between the content of the paper chart and the ENC is also important with respect to data maintenance and quality.

The current situation in the Nordic Hydrographic Offices is that only a few paper charts are produced directly from the neighbouring countries ENC data. Although it is a more or less common practice to use the ENC data as a source for some of the information in the paper chart.

Improved Data Exchange for updates

The working group suggest that ENC data should be used for keeping national paper charts up to date. To make this process more effective it is suggested that each nation should be able to produce an ENC Update

Report (See Annex 7, ENC Update Report). The format of the ENC Update Report is secondary as long as the information content is according to the specification. Ideally this ENC Update Report should be available at any time through a Web Service. The Report should give information about all ENC updates between a selectable start date and end date, i.e. even if the updates were included in superseded editions of the ENC.

Process of ENC Update Report

The Update Report should be requested regularly from the neighbouring country, so that the data could be updated continuously. The frequency could differ from one country to another. Norway will start a print on demand service from 1st of January 2010. This will require that Sweden produces an ENC Update Report every second week for the ENC-cells affected. If more countries were to start with print on demand services the frequency of requesting this ENC Update Reports will increase.

If no automatically method of producing the ENC Update Report is available a temporary solution would be to ask for the Report according to a contact list.

Country	Contact Persons	E-mail
Denmark	Pia Marianne Rasmussen Gitte Iversen	pmr@kms.dk gi@kms.dk
Finland	Mikko Hovi Teppo Kuusijärvi	mikko.hovi@fma.fi teppo.kuusijarvi@fma.fi
Iceland	Níels Bjarki Finsen Árni Þór Vésteinsson	niels@lhg.is arni@lhg.is
Norway	Mette Karlsen Gro Johnsen	mette.karlsen@statkart.no gro.johnsen@statkart.no
Sweden	Magnus Wallhagen Bo Kullander	magnus.wallhagen@sjofartsverket.se bo.kullander@sjofartsverket.se

Cartographic objects and attributes

The working group made a proposal to TSMAD regarding 10 new cartographic attributes for inclusion in S-101. If the TSMAD agrees that these attributes could improve the display of ENC data in ECDIS the attributes would be registered in the S-100 Hydrographic Register. The attributes are suggested to be non-mandatory.

CFOFFB – Cartographic Feature Offset Bearing
CFOFFD – Cartographic Feature Offset Distance
CRLINE – Cartographic Reference Line
CJUSTH – Cartographic Horizontal Justification
CJUSTV – Cartographic Vertical Justification
CTSMIN – Cartographic Minimum Text Scale
CTSMAX – Cartographic Maximum Text Scale
CANGLE – Cartographic Angle
CFSCAF – Cartographic Feature Scaling Factor
CTSPRD – Cartographic Text Spread

CFOFFB, the bearing from the true position of the feature object to the cartographic feature measured in degrees.

CFOFFD, the distance from the true position of the feature object to the cartographic feature measured in mm on screen.

CRLINE, the line type of the cartographic reference line that is generated between the cartographic feature and the true position of feature object.

CJUSTH, the horizontal justification of text.

CJUSTV, the vertical justification of text.

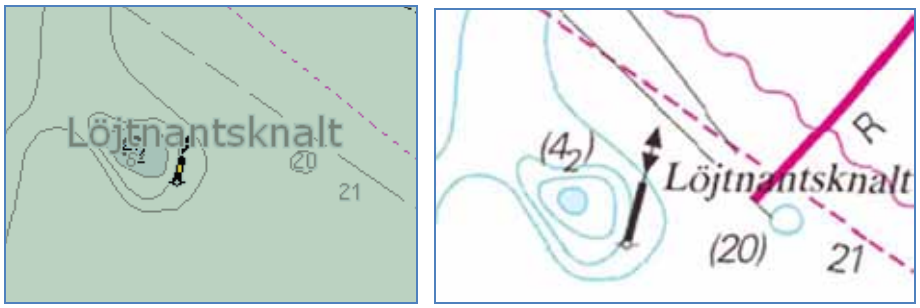
CTSMIN, the minimum scale for which the text should be displayed.

CTSMAX, the maximum scale for which the text should be displayed.

CANGLE, the angular distance in degrees measured clockwise from the default orientation of the cartographic point feature, i.e. the symbol or the text.

CFSCAF, the scaling factor of symbols and texts measured in percent of standard size.

CTSPRD, the value of the spread of text measured in percent of standard spread.



Picture 4.

The suggested cartographic attributes would give the producer of the ENC the ability to encode suitable text placements. This is an example where the automatic text placement in ECDIS makes the navigation more dangerous than in the paper chart since the text “Löjnantsknalt” covers both a critical depth and the top mark of the cardinal buoy.

RECOMMENDATIONS

1. National paper charts at a scale of 1:750 000 and larger that cover another nation's waters should be produced from the other nations ENCs.

2. Generalisation of the neighbouring countries ENC data should be kept to a minimum to ensure the quality and for more efficient updating.

3. Once the paper chart is based on ENCs the update should be done via ENC updates.

4. A Paper Chart Source Information List should be kept up to date by each Nordic Hydrographic Office.

5. NHC to decide which country would be responsible to administrate the Paper Chart Source Information Lists for all Nordic countries.

6. An ENC Update Query Web Service or an equivalent query function should be provided by each Nordic Hydrographic Office.

7. If no ENC Update Query Web Service is available then it should be possible to produce an ENC Update Report on request by another country.

8. To present the recommendations and the suggested methods in this report to the IHO Chart Standardization and Paper Chart Working Group.

9. Implementation plan:

    a. If not already available then start to collect administrative information for the ENC Update Report 1st Jun 2009.

    b. Each country should on request be able to produce an ENC Update Report from the 1st Dec 2009.

    c. Paper Charts should be based on the neighbouring countries ENCs according to the following time schedule.

i. Chart with scale larger than 1:150 000 completed 1st Jan 2011.

ii. Scale 1:150 000 – 1:400 000 completed 1st Jan 2013.

iii. Scale 1:400 000 – 1:750 000 completed 1st Jan 2015.

d. Each country to present the status of implementation at every NHC-meeting.

53rd NHC Meeting
Helsinki, 21-23 April, 2009

Report of the Nordic Data Quality SubWG

(31 March 2009)

Introduction

The IHO HSSC data Quality Working Group (DQWG) was activated by the CHRIS-19 meeting in 2007. The CHRIS-20 meeting in November 2008 approved the Work Programme for DQWG.

Based on good experiences of the Nordic S-44 SubWG, the NHC Chair polled the opinions on establishing similar co-operation for data quality issues and harmonised participating to the HSSC DQWG. All NHC members supported this kind of co-operation. An option to establish a formal Nordic DQSubWG with a nominated Chair was preferred.

Membership

The NHC members nominated the following persons to the Nordic DQSubWG:

Denmark:	Mr. ***Jesper Vedel*****,** DAMSA
	Ms. ***Berit Holse***, KMS
Finland:	Mr. ***Mikko Hovi*** **,** Chair of the Nordic DQSubWG
Iceland:	No member, ***Hilmar Helgason*** on distribution list.
Norway:	Ms. ***Lynn Kolbeinson***, head of Chart Production Section
Sweden:	Mr. ***Kenneth Gustanfsson***, system developer/coordinator

The Nordic DQSubWG elected Mr. *Mikko Hovi* as its Chair.

Actions so far

The NHC Chair organised the first meeting on 4 March 2009, where all members were participating. In addition also Mr. *Jukka Varonen* and Mr. *Juha Korhonen* participated the meeting. The HSSC DQWG Chair and Vice-Chair were also invited to the meeting, but were not able to attend. The DQWG work so far was briefly reviewed. It was noted that quite few HOs are participating to the work of the DQWG.

During the meeting the following issues were discussed and agreed:

The Nordic SubWG should contribute with comments and proposals to the work of the HSSC DQWG and ensure that the Nordic opinions and proposals will be duly recognised by the DQWG. It was agreed that this SubWG will concentrate on the quality issues of bathymetric (depth areas and contours, soundings, rocks,) data. The main focus should be on the how to clearly transfer the quality information on navigational products to mariners.

The SubWG developed the draft TORs for the Nordic DQSubWG. These are included in document ***NHC/53/6.3B***. The meeting also elected Mr. *Mikko Hovi* as its Chair.

During the meeting the Nordic **current practices and opinions** on data quality issues were reviewed and discussed widely. Based on these discussions the following **quality issues** or **developing items** were noted:

- The problems with current specifications should be studied and analysed
- Further studies to enhance current quality specifications and presentations are needed
- Further studies for more simple presentations of quality information are needed
- Further studies and brainstorming for new approaches for presentation of quality are needed.
- Further studies and brainstorming for new approaches for alarms are needed.
- Further efforts for educating and informing of mariners on quality related issues are needed

Proposed way ahead

The SubWG drafted future actions as follows:

All SubWG members are invited to study the identified quality issues in more details and forward their further comments and opinions. Consolidated opinions will be presented at the NHC/53 meeting.

After the NHC/53, if the meeting endorses the work and proposals, these will be forwarded to the DQWG Chair to be discussed at the DQWG meeting in Norfolk in week 11-15 May 2009. *Mikko* will present these at the meeting.

The Nordic SubWG will elaborate these issues further on by correspondence and during its next meeting, preliminary scheduled in early June 2009.

Regarding to the relation to the BSHC it was agreed that after the DQWG meeting it maybe feasible to forward Nordic opinions, findings and proposals to BSHC members for information. These may be discussed at BSHC/14 Conference in September 2009 and the Conference may decide on further actions. It was noted that the Baltic Sea is a uniform closed sea area and it may be feasible to have common approaches within it.

Actions required by the NHC/53

The meeting is asked to

- take note of this report
- approve the TORs for the Nordic Data Quality SubWG
- confirm the Chair of the Nordic Data Quality SubWG
- endorse the proposed work of the SubWG
- give guidance, if any, to the future work for this SubWG.

———————————————

Draft TORs for the Nordic Data Quality SubWG

(Proposed by NordicDQSubWG on 31 March 2009)

1. Objective

To contribute to the work of the HSSC DQWG and to ensure that the Nordic opinions and proposals will be duly recognised by the DQWG.

2. Authority

This SubWG is a subsidiary of the Nordic Hydrographic Commission (NHC). Its work is subject to NHC approval.

3. Procedures

A. The SubWG should:

A.1 Evaluate current Data Quality practices in Nordic HOs

A.2 Harmonise the Nordic Data Quality practices as far as feasible

A.3 Forward joint Nordic Data Quality opinions and proposals to DQWG

A.4 Especially, the Nordic SubWG should concentrate on

- to study the user (mariners) requirements for quality indicators
- to study on the quality indicators related to information necessary for safety of navigation, especially depth related information
- to develop and evaluate quality indicators adopted for M-4, S-100, S-101 and future replacement of S-52
- to study the possibility to use new simple approaches for quality indicators considering existing solutions and proposed alternatives
- to promote the education of mariners on quality related issues
- to study the use of alarms for ECDIS route planning phase
- to study the use of transparent colour area presentation on charts

B. The SubWG should work by correspondence as far as possible. Meetings will be organised when deemed appropriate.

C. The SubWG Chair will normally present it to the DQWG

D. The SubWG should report to NHC at least at the NHC annual meetings.

4. Composition and Chairmanship

A. The SubWG shall comprise representative of NHC members. Expert contributors may me invited to join the SubWG.

B. Decisions should be made generally by consensus. If votes are required all member state has one vote.

D. The SubWG shall elect its Chair among its members. The election of the Chair shall be approved be the NHC.

———————————————

NHC 53rd Conference
Helsinki

NHC/53/8.1A

April 21-23 2009

PRIMAR Report 2009

1 Introduction

The PRIMAR international co-ordinating centre for electronic navigational charts (ENCs) has been operated by the Norwegian Hydrographic Service (NHS) since April 1, 2002.

PRIMARs Vision.
In order to enhance safety at sea and protect the maritime environment, PRIMARs vision is to be the most efficient model for the provision of ENC services and maritime geospatial data worldwide

Since the last NSHC meeting PRIMAR has signed an agreement to distribute Ukraine data through the service, and data from Brazil and New Zealand has been received through the agreement with for IC-ENC. Including the agreement with IC-ENC, the PRIMAR ENC service now distributes ENCs from almost 40 nations.
The following countries are members of the Regional ENC Coordination Centre regime (RENC): Croatia, Denmark, Estonia, Finland, France, Greece, Latvia, Mozambique, Norway, Poland, Russia and Sweden.

PRIMAR makes its database of ENCs available through 54 distributors located in 22 countries, and serving all the major markets. This also includes data from the other RENC and HOs, and is distributed within their own tailored, integrated service as described in the WEND Principles.

PRIMAR today provides the world's widest official ENC coverage with 5648 ENCs from PRIMAR cooperating nations (RENC members and non-members) and 2858 ENCs from IC-ENC, a total of 8506 ENCs. A total of 16700 ER- updates have been provided to mariner's world wide

Quality Assurance

All ENCs delivered to PRIMAR undergo a set of checks before they are released into the market. The data is uploaded to the Virtual PRIMAR Network (VPN). The VPN technology is a set of tools and functionality to give Hydrographic Offices or other data producers a possibility to get a closer participation in the operations in a database of ENCs. It also enables a HO to have a much better control and management of its own information stored in an ENC database. When data is uploaded, the system performs a set of checks on the data, e.g. S-57 data structure, filenames, issue dates, external files, order of updates, geo limits etc.

In the VPN the data is validated using Validation Report Checker (VRC). The VRC is an internet based software tool linked to the Errors Database and allows upload of validation reports into a data management production database. The uploaded reports are “verified” against the Errors Database using an interactive process to accept or reject errors and warnings that are reported. The input validation reports that are loaded into the VRC are three different validation logs.

ENCs in the same navigational band should not have data overlap and all data that is uploaded to the PRIMAR database is therefore checked for overlap against the whole PRIMAR database containing 8500 ENCs.

The final check that is done is to upload all data into two different ECDIS systems to see that it is no problem to import the data.

When all checks above are done, the ENCs can be released.

3. Distribution:
During 2008 five new distributors were added to the distribution network.
A business to business (B2B) interface was successfully launched in 2007 allowing distributors to integrate their own business-systems with PRIMAR.

The NHS and its cooperating HOs are continuously working to include new nations to the PRIMAR quality service. Discussions have taken place with India, Brazil and China, but so far no agreements have been signed.

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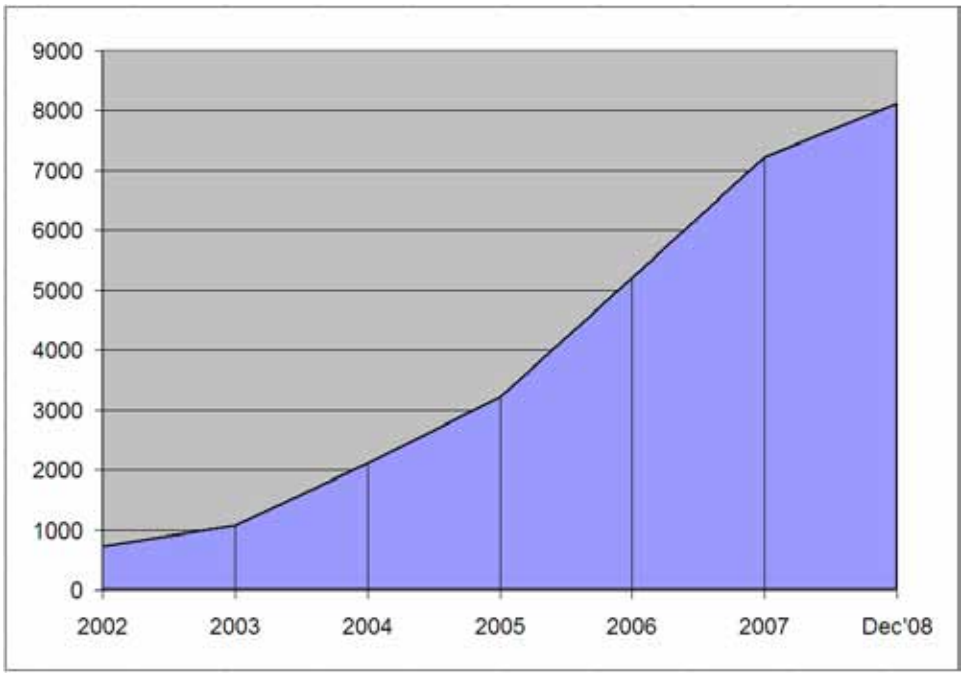


Figure 1 Development of PRIMAR database

PRIMAR is unique in offering a virtual solution (Virtual PRIMAR Network) which gives all member countries full access to and control over own data within a secure network. Automatic integrated operations check data quality, particularly in overlap zones. This provides additional security, allowing charts from different nations to work together without problems. Maintaining good control of data is also important in ensuring than none of the available navigation systems have problems reading the formats.

Customer folio planning and ordering is automatic via the PRIMAR Chart Catalogue enabling distributors to perform ordering and sales 24/7. Version 4.2 of the catalogue with some new functionality will be launched in May 2009.

PRIMAR Coverage March 2009

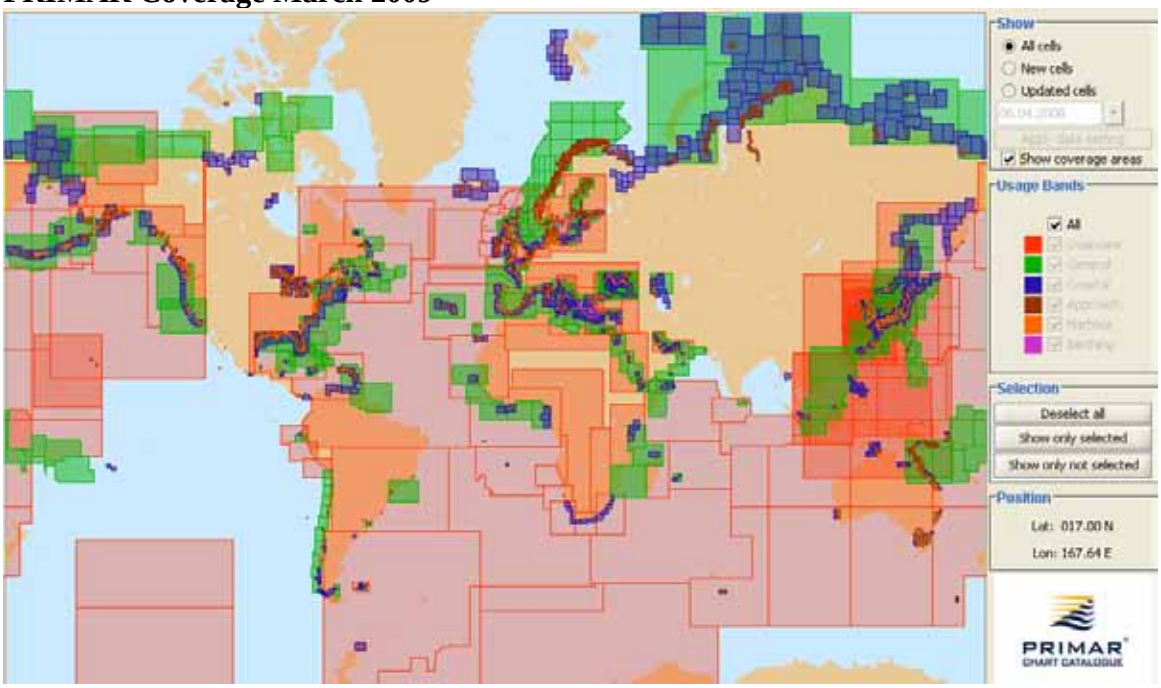


Figure 2 Coverage in PRIMAR database March 2009

Increasing demand for ENCs

The PRIMAR service has so far been a success with an increasing number of ENCs in use by vessels. There was an increase of 48 % in the number of vessel from the end of 2007 to the end of 2008.

Last year PRIMAR also focused on developing standardised efficient services for use within navies and governmental organisations (pilots, VTS, maritime authorities). This also includes a Web Map Service (WMS) project based on ENC-data currently being developed as well as a project together with the Norwegian Maritime Directorate where PRIMAR infrastructure will be used to provide port state control inspectors with information regarding use of ENCs on vessels.

For more information visit www.primar.org

Introduction

NHC53/8.1B

NHC april 2009

Objectives for this presentation

- Status Norwegian Hydrographic Service (NHS)
- Common understanding of WEND
- Current status of WEND
  - Only two RENCs - ”Eurocentric” “Static”
  - Fragmented and spotted coverage at the IHO level
  - Limited exchange of expertise and knowledge worldwide
- Vision of PRIMAR towards 2012 and beyond
  - Networks of RENCs – (WENC)
  - PRIMAR as a RENC : tools and services for 2 main functions: ENC validation and database integration (for HOs), ENC management and distribution through non-exclusive distributors only
  - Free flow of data, knowledge and technology
- Discussion on the roadmap – Way forward towards true realisation of WEND principles by 2012

PRIMAR

Status Norwegian Hydrographic Service

- Government fully supports maritime strategy and WEND and WENC
- Currently 120 full time staff
- Full ENC coverage achieved – over 980 national ENCs available through PRIMAR RENC
- Operator of the PRIMAR RENC, developed S63 standards
- Fully supportive of mandatory requirements
- Co-sponsored DNV Formal Safety Assessment related to ECDIS

PRIMAR

WEND principles

WEND PRINCIPLES

IC 2.10 PRINCIPLES OF THE WORLDWIDE ELECTRONIC NAVIGATIONAL CHART DATABASE (WEND)

Set out within the WEND principles are a set of clear goals – defined and agreed by the whole international Hydrographic community

PRIMAR

WEND principles

WEND 1.2 - Member States will strive to ensure that their ENC data are available to users through integrated services

PRIMAR

WEND principles

WEND 1.3 - Member States are encouraged to distribute their ENCs through a RENC in order to share in common experience and reduce expenditure, and to ensure the greatest possible standardization, consistency, reliability and availability of ENCs.

PRIMAR

WEND principles

WEND 1.4 - Member States should strive for harmonization between RENCs in respect of data standards and service practices in order to ensure the provision of integrated ENC services to users.

PRIMAR

WEND principles

WEND clearly defines a world in which expertise, assistance and data flow freely through intra-regional and inter-regional cooperation. The guidelines to WEND reinforce this view.

PRIMAR

WEND principles

PRIMAR members believe regional centres are needed to deal with the regional issues which only they can comprehend and resolve effectively.

PRIMAR

WEND principles under threat?

Not all hydrographic offices appear to fully support WEND and RENCs as long as their ENCs are distributed - this leads to confusion between core HO tasks and competitive services - which leads to a Eurocentric situation.

PRIMAR

WEND principles under threat?

Leading to exclusive data and integrated services, lack of choice for distributors and end-users and lack of innovative solutions for mariners

PRIMAR

The ENC world emerging today

PRIMAR

PRIMAR RENC

- Established in 1998 as the world's first RENC
- Is a **not for profit**, governmental organization
- Close cooperation with member nations
- Focus on ENC quality and the exchange of knowledge
- Fully compliant with IHO guidelines and principles
- Efficiency of entire ENC value chain and easy access to ENC data for the distributors then mariners

PRIMAR

PRIMAR RENC

The core aim of PRIMAR is enhancing safety at sea and protection of the maritime environment

PRIMAR has built a solid reputation for HOs and distributors of expertise, technology, quality, innovation, operational sustainability and fairness

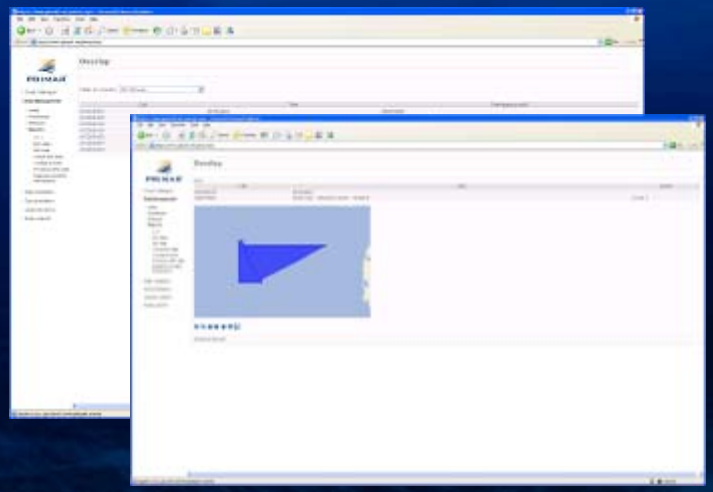
PRIMAR

PRIMAR RENC

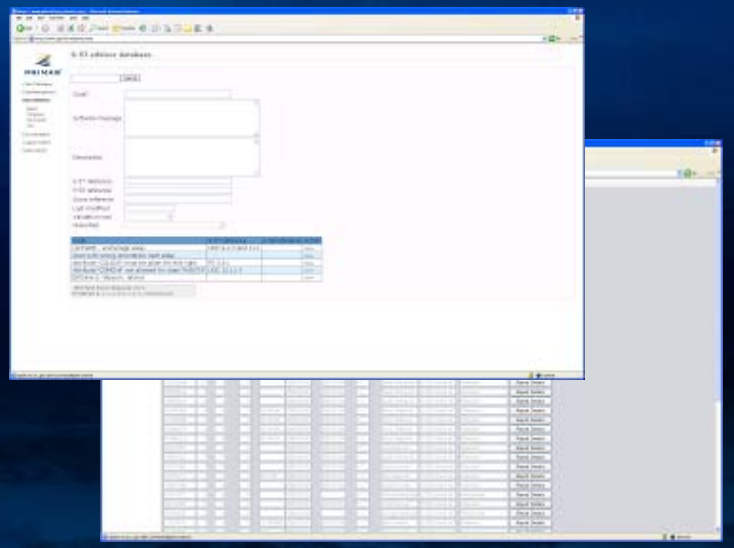
Through its open – non-exclusive distributor network, promoting integrated services - PRIMAR supports over 4000 users all over the world with over 1 million ENC subscriptions annually – and increasing exponentially

PRIMAR

PRIMAR RENC



Overlap Checker – automatically identifying issues with ENC overlaps

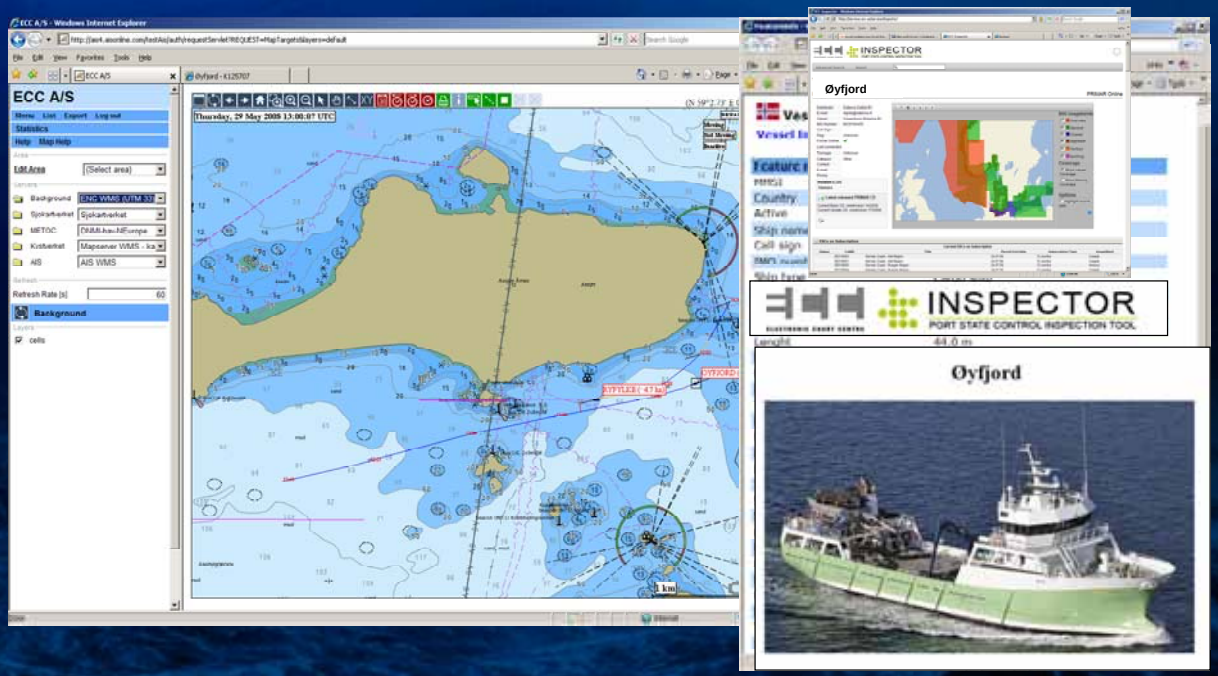


Validation report Checker/S-57 Advisor – assisting with ENC validation – supporting dKart Inspector and ENC Analyser

PRIMAR supports a wide range of RENC support tools and services – assisting Hydrographic offices in their validating processes and harmonisation of ENC data within the RENC.

PRIMAR

PRIMAR RENC



In addition, PRIMAR supports a wide range of **optional** services to assist hydrographic offices in meeting their national requirements

PRIMAR

PRIMAR RENC

Towards governmental marine pilots – directly linked into national ENC databases, receiving the latest ENC data at all times

Regional Electronic Navigation Centre

PRIMAR

PRIMAR RENC

Towards Police, Coast Guard, Search & Rescue – ensuring common chart reference for all actors concerned with maritime safety

Regional Electronic Navigation Centre

PRIMAR

PRIMAR RENC

Towards the general public – enabling the hydrographic offices meet the obligations of the European INSPIRE directive

Regional Electronic Navigation Centre

PRIMAR

Regional Models

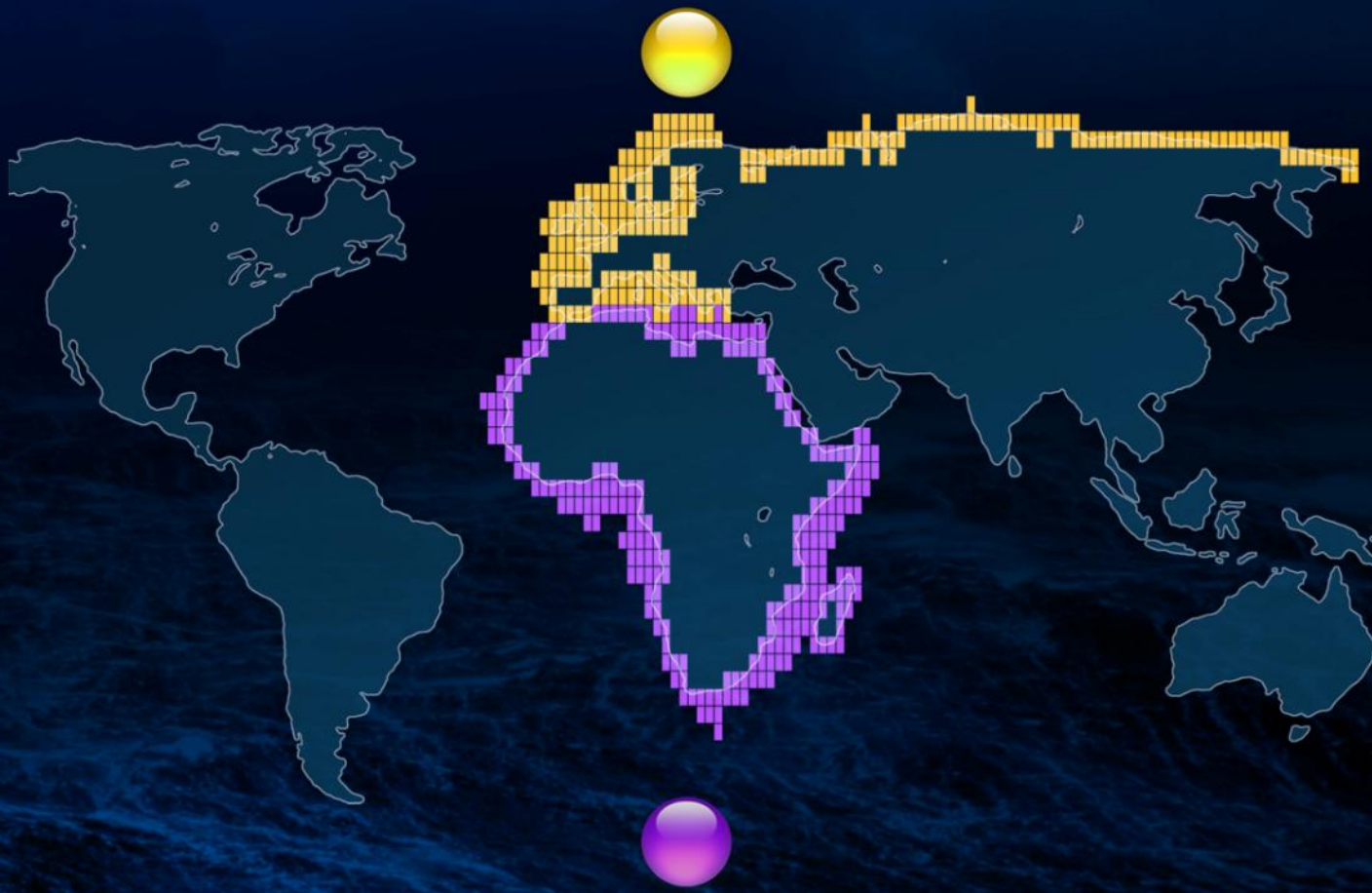
PRIMAR members believe it is now time to share our collective experience and develop RENCs in other regions of the world before the mandatory carriage requirements come into effect ?

PRIMAR

The Goal – RENCs based on RHC?

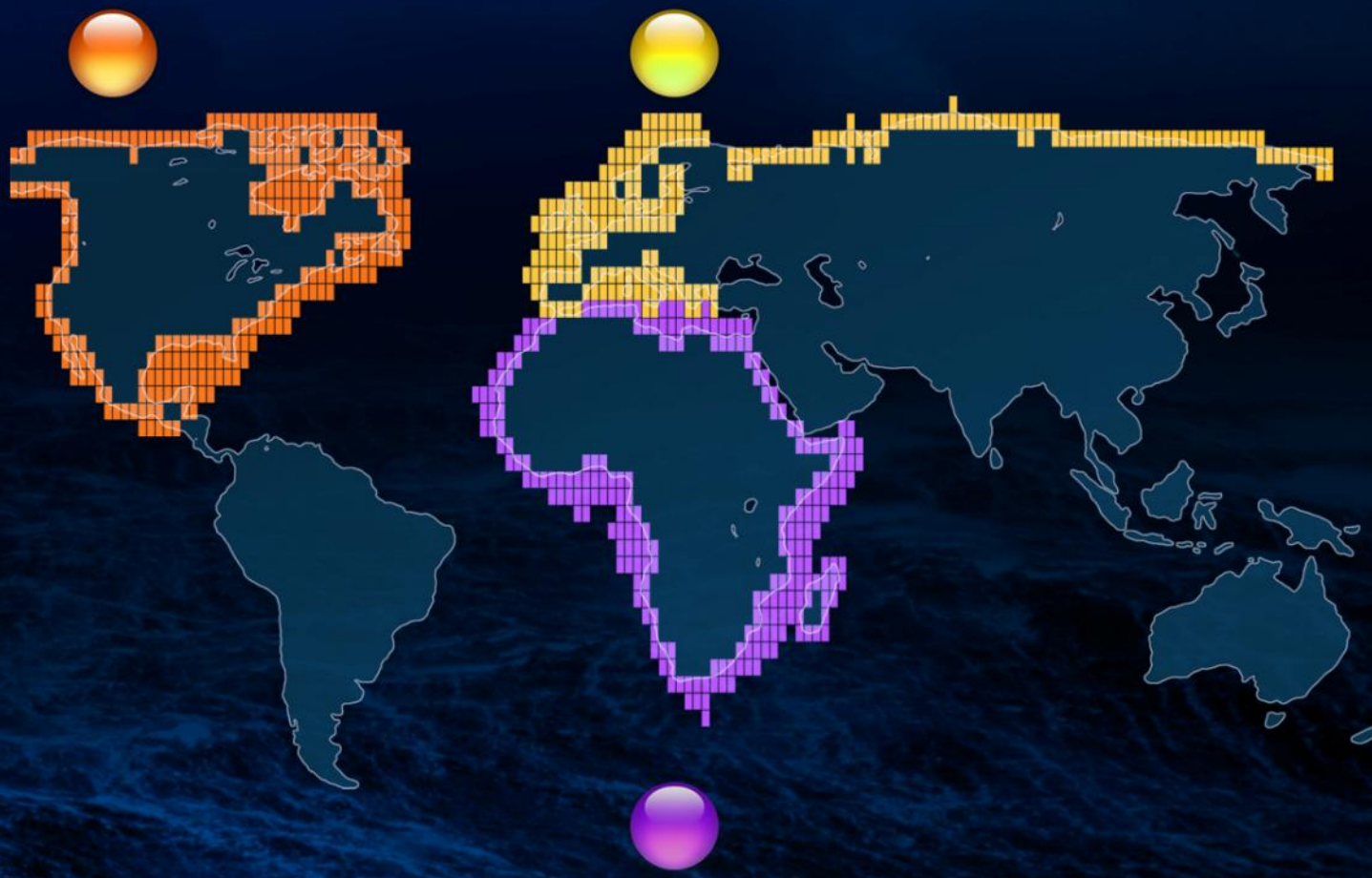
PRIMAR

The Goal – RENCs based on RHC?



PRIMAR

The Goal – RENCs based on RHC?



PRIMAR

The Goal – RENCs based on RHC?

PRIMAR

The Goal – RENCs based on RHC?

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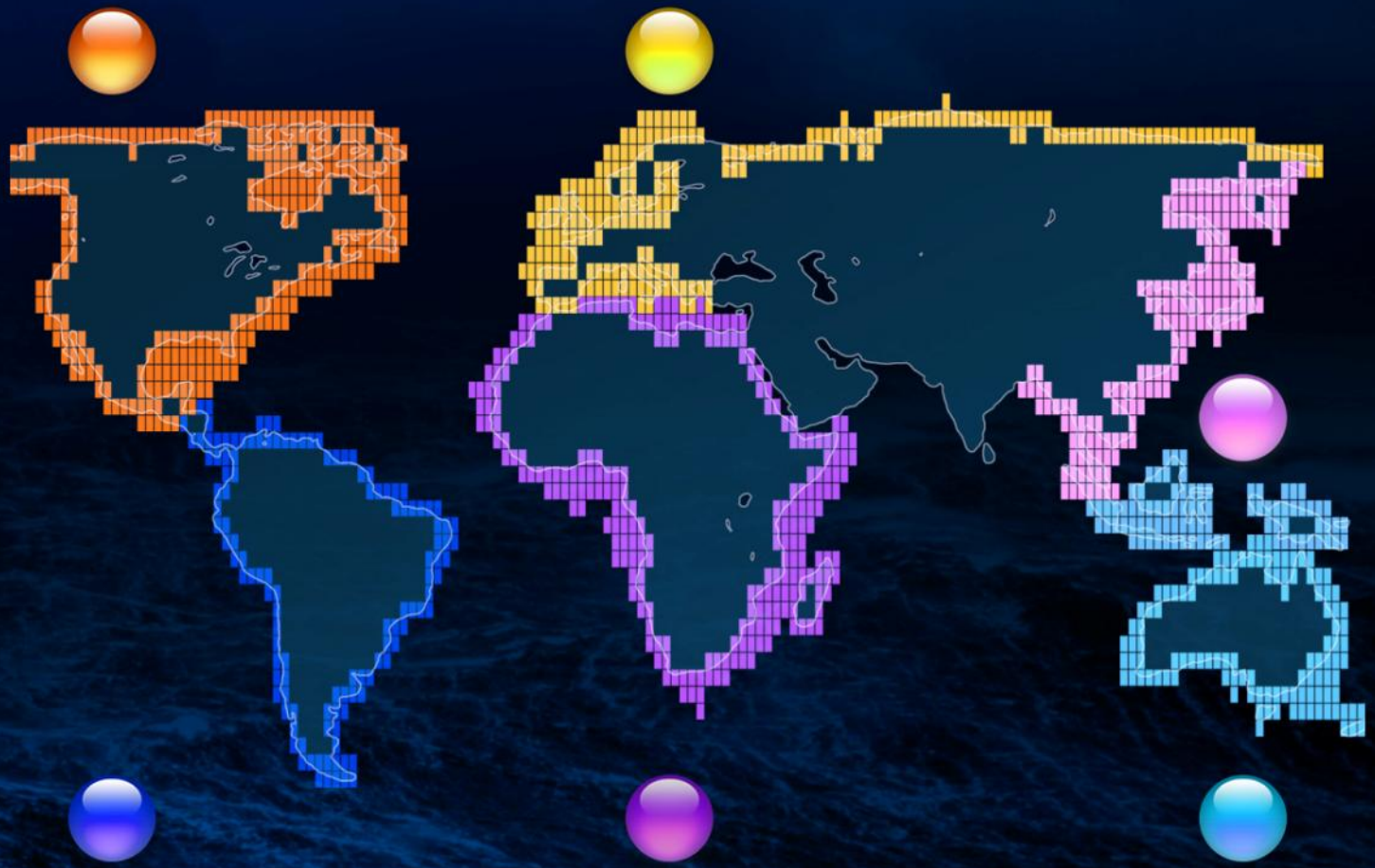
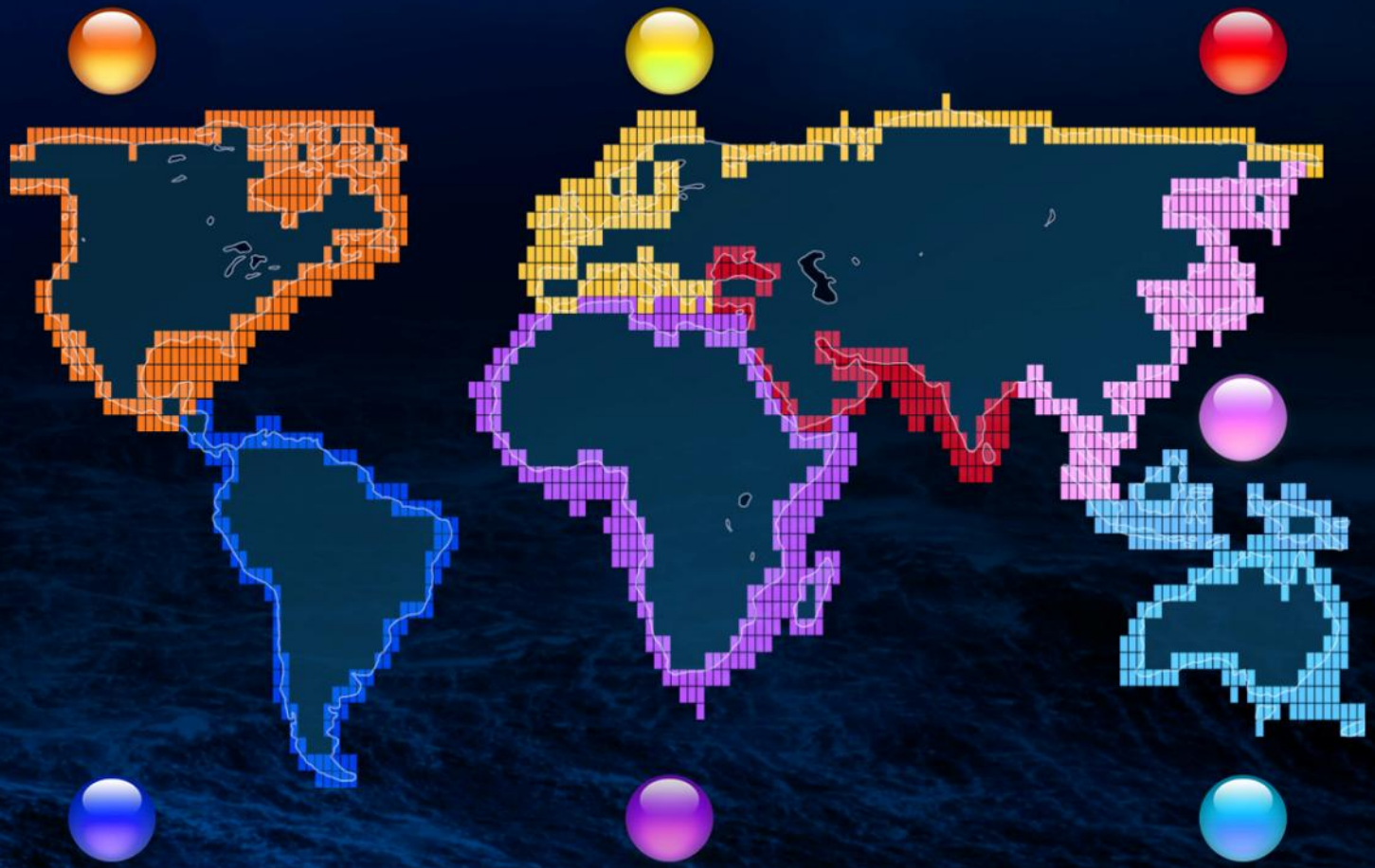


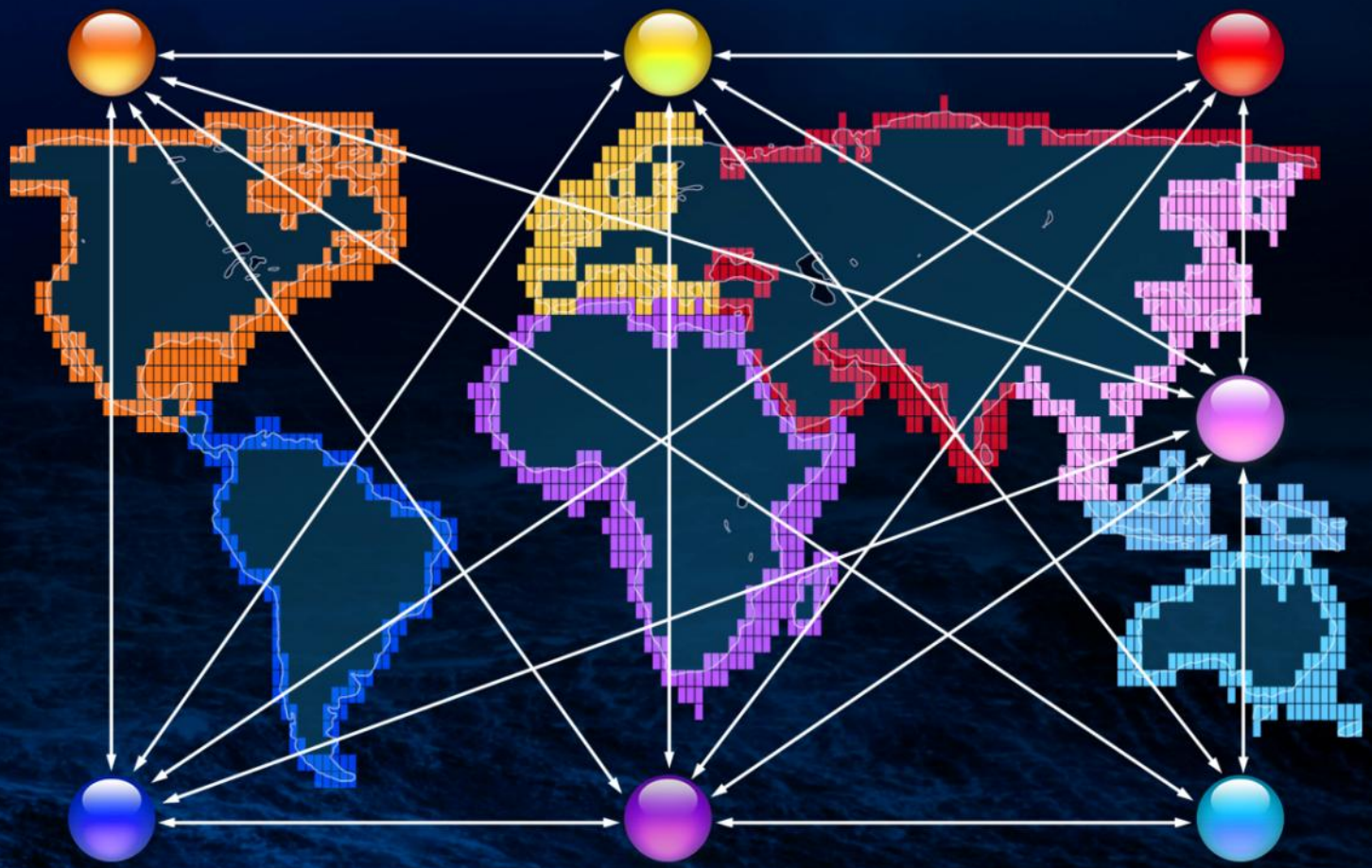
PRIMAR

The Goal – RENCs based on RHC?



PRIMAR

WEND-PRIMAR Vision (based on RHCs)



PRIMAR

Ultimate Goal

Each RENC becomes part of the IHO-WENC

PRIMAR

Thank you for your attention

Questions? Discussion?

PRIMAR

53rd NHC Meeting
Helsinki 22-23 April 2009

NHC/53/8.1C

UKHO's production of Dual-badge BA charts for Norwegian waters

Executive Summary

NHS is concerned with the fact that BA charts covering Norwegian waters is not containing the same information as the Norwegian charts, but they are still considered sufficient by the Norwegian Maritime Directorate as official charts to be used for navigation in Norwegian waters. NHS would like to have the view of the other NHC MS on this issue. Below you will find the UKHO's response to our letter dated 17.02.09

1. UKHO response

1. Clarification of the status from UKHO with respect to the receiving of Norwegian Notice to Mariners (EfS). Do all corrections from the Norwegian EfS go directly in to the UKHO NtM?

No, not all NO EfS corrections have been reproduced as GB NtMs. This is largely because, for the majority of the NO coast, our coverage is at a much smaller scale than the NO coverage (1:200k compared to 1:50k). Corrections are, therefore, not appropriate for reasons of scale. Where we have already adopted your charts we sometimes do not reproduce EfS if we consider that the update is not likely to affect SOLAS vessels. A typical example would be the insertion of an overhead cable at the head of a narrow fjord, or a submarine cable crossing a small, shallow bay. We also have inserted notes warning of the existence of marine farms on many of our charts so that we do not have to reproduce every EfS updating these.

2. Clarification from UKHO if information to the NtM is gathered from sources other than NHS?

We do not include information in our NtMs from sources other than the NHS, except sometimes light ranges or other details obtained from the NO Coastal Administration. If we were to receive a report of a navigationally significant feature from a vessel, we would always pass that report to the NHS and wait for a response before taking any action.

3. Clarification from UKHO on the average period between the issue of a new chart or reprint by the NHS and subsequent issue of a new Dual Badge chart by the UKHO?

In the past, we have usually taken months to publish a dual-badge chart following the issue of a NO New Edition (NE) or New Chart (NC). This has been mainly because of competing priorities in our Operations Division and the technical problems of reproducing NO charts and making modifications. In spite of some hard work by both NO and UKHO technical experts, the change in NO production processes which took place some time ago has meant that the Postscript files which are made available to us require significant manipulation before we can use them to create our version. However, in response to the commitments made in the revised bilateral arrangement (effective from 1 January 2009), we will be introducing changes which should reduce the time taken from months to weeks. We are just completing a review of UKHO charting

priorities worldwide, which should result in a more efficient allocation of staff resources across our many commitments. We will also be reducing the number of modifications that we make when producing our versions of your charts. One of the most time-consuming modifications has been in the depiction of light sectors because we have not, in the past, reproduced your coloured light sectors. However, the technical problems involved in doing this have received much attention by our technical experts and should be resolved soon.

It might be useful, while I am writing, to give you an outline of our plans for adopting more of your charts and withdrawing our re-compiled charts. With regard to our existing large scale re-compiled charts of your waters, we will withdraw these with as little delay as possible following your publication of modern NEs or NCs. As an example, we will shortly download the repromat of NO474 which you offered us recently, and would also like to take NO473, in order to be able to withdraw GB1327. We will issue our versions of these charts as soon as possible – definitely within weeks not months. It would be very useful if you could send us a copy of your production plans, so that we can see which other large scale charts you will be updating in future and when. A regular update, every six months, would be ideal. We were also pleased to see your recent announcement of a new series of 1:350k NO charts. Again, a copy of your proposed timetable for the production of these charts would be much appreciated. We would also be very interested to see an early copy of the first in the series. Will you be minimising the detail shown on these charts in the areas covered by your 1:50k series in order to encourage users to use the appropriate larger scale charts? Our aim is to withdraw our 1:200k re-compiled charts for your waters as these 1:350k NO charts become available for adoption.

Possible actions to be taken by NHS:

1. UKHO would have to agree on making their dual-badge BA chart contain all information from the Norwegian NTM's, all information needs to be gathered from NHS and the time for issuing NO New Edition (NE) or New Chart (NC) needs to be reduced to a minimum.

2. Only charts produced by NHS will be considered as compliant with the carriage requirements in SOLAS for Norwegian waters.

The establishment of AIS as an Aid to Navigation

We would like to draw your attention to a recently approved IALA guideline (IALA guideline No. 1062) on "The establishment of AIS as an Aid to Navigation. The whole IALA paper is attached as 'IALA_guidelines_no_1062_AIS_AtoN.pdf'.

Background

The IALA guideline points out how AIS could be used as an Aid to Navigation (AtoN) and to briefly summarise the guideline it mentions different types of AIS as an AtoN. These are:

- **Real (Physical) AIS AtoN –** A 'real AIS AtoN' is one that is physically located on the AtoN.
- **Synthetic AIS AtoN** – There are two different types of 'synthetic AIS AtoN' – monitored and predicted. Basically both transmit the AIS message from a Base station and the position of the message is shown at the intended position of a physical AtoN.
- **Virtual AIS AtoN** – A 'virtual AIS AtoN' is transmitted as a message for an AtoN that does not physically exist and could be used to temporarily mark new dangers or obstructions or replacing existing buoys. Virtual AIS AtoNs are divided into different types and follows the ordinary IALA system. There are Lateral Marks, Isolated Danger Marks, Safe Water Marks, Cardinal Marks and Special Marks (see also ANNEX I).

Analysis

The Swedish Maritime Administration and the Swedish Transport Agency have discussed this specific IALA guideline and many questions arise especially regarding 'Virtual AIS AtoN'. If the use of such systems is widely spread, it will probably have great impact on methods of navigation. There are reasons to believe that this will be the case since the guideline points out that virtual AIS AtoN could be used 'where installation of physical AtoN is technically or economically difficult' (Chapter 4 – Function of AIS ATON).

As virtual AIS AtoN come into use the different types of virtual AIS AtoN need to be portrayed in both paper charts and ENCs. Even if the AIS target will be displayed (a blue diamond with a plus sign in the centre) in the vessels ECDIS/ECS or Radar within VHF-range there will be a need to see the virtual AIS AtoN when planning the voyage. The standard for paper

charts (M-4), the future version of the ENC product specification (S-101) and the adherent presentation library needs to be changed regarding this issue. In the IALA guideline No 1062, chapter 11 points out that 'Particular issues arise in relation to virtual AIS. Effective utilization of virtual AIS needs an internationally accepted standard on symbols defined by type so that the user can clearly identify the AtoN area of interest'. The same chapter also mentions that 'AIS symbology on navigational charts is governed by IHO standards'.

There could be different options to solve the issue of portrayal. One option could be to use the top marks of the different IALA-types and the AIS diamond symbol. The colour should be magenta to indicate that there is no physical structure. Normally a red circle would be used to symbolise transmitting objects, but in order to reduce unnecessary clutter in the ECDIS display and in the paper chart this has been removed. A starboard lateral mark would then be portrayed as in figure 1.

Figure 1 - Portrayal of a virtual AIS AtoN - starboard lateral mark.

When the vessel approaches within VHF-range the blue diamond symbol is displayed on top of the existing symbol in the ECDIS. Since the ordinary positioning symbol for buoys and beacons is used in the ENC the blue diamond symbol does not interfere with the 'ENC symbol'. See figure 2.

Figure 2 - Blue AIS diamond symbol on top of the 'ENC symbol'

The same portrayal could also be used in the paper chart.

Questions

There are some questions that ought to be clarified before any further actions are taken regarding ENCs and paper charts:

- Have there been any investigations within the IMO about how replacement of existing buoys with virtual AIS AtoN influence navigation?

- Will there be a separate work item in the development of the IMO e-Navigation strategy regarding this issue?

- Have there been any discussions regarding Virtual AIS AtoN between IALA and IHO? Has the IHO – Hydrographic Services and Standards Committee (HSSC) taken any actions to handle this issue?

- If the virtual AIS AtoN is permanent would it not be possible to use ‘virtual symbols’ in the ENCs instead of transmitting AIS message

NHC is invited to note this information and if found suitable, identify appropriate actions.

NHC/53/8.2B

International Association of Marine Aids to Navigation and Lighthouse Authorities

IALA Association of Internationale de Signalisation Maritime **AISM**

IALA Guideline No. 1062

On

The establishment of AIS as an Aid to Navigation

Edition 1

December 2008

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Document Revisions

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

Date	Page / Section Revised	Requirement for Revision

Table of Contents

1 GENERAL

IALA Recommendation A-126 on the Use of the Automatic Identification System (AIS) in Marine Aids to Navigation provides detailed information on the type of AIS AtoN services that may be provided. The Recommendation states that an AIS transponder could provide information and data that could:

- Be used as an aid to navigation;
- Complement existing aids to navigation;
- Monitor the performance of aids to navigation;
- Monitor the 'on station' position of floating aids to navigation;
- Provide identity, state of 'health' and other navigational information such as meteorological and hydrological data, if available, to ships and shore authorities; and
- Be used to assess traffic type and patterns to assist in providing the appropriate level of service and mix of aids to navigation.

Further, IALA A-126 recommends that 'National Members and other appropriate authorities providing marine aids to navigation services, use appropriate AIS units as part of their marine aid to navigation services for the provision of information data to shipping and monitoring purposes.

In this manner, IALA has recognised that AIS can be applied to AtoN to further improve and enhance services to mariners as well as assisting AtoN authorities in ensuring that the provision of such aids to navigation as the volume of traffic justifies and the degree of risk requires, as stated in SOLAS, Chapter V, Reg13 'Establishment and operation of aids to navigation'.

The Contracting Government is to 'undertake to arrange for information relating to aids to navigation to be made available to all concerned, and AIS provides a means of promulgating near-real time information on aids to navigation' (SOLAS, Chapter V, Reg13, clause 3).

It needs to be noted that as of the date of issue of this Guideline, the International Maritime Organization (IMO) is continuing development work on the application of AIS binary messages. The outcomes of this continuing development may require this Guideline to be reviewed and updated in the future.

2 OBJECTIVE

When deploying AIS AtoN it is important to bear in mind that not all vessels are equipped with AIS. In addition, for those vessels that are AIS equipped, the display of AIS data can range from no display, or limited display on some AIS Class B units, to the use of minimum keyboard display (MKD) on some AIS Class A units to full ECDIS and Radar overlay. In the absence of ECDIS or Radar overlay users will not be able to fully use AIS AtoN functionality. The potential to display AIS AtoN data will increase in the future, as all Radars for SOLAS vessels fitted from 1 July 2008 must be able to display AIS data.

It is also very important when considering deploying AIS AtoN to bear in mind the mariner's need of for appropriate, relevant, accurate and unambiguous information. Particular care must be exercised with the activation and promulgation of virtual AIS AtoN so as to avoid errors, particularly errors in position, and to avoid the unintentional creation of situations where mariners could be faced with too much information, irrelevant information, or information that results in confusion or distraction.

The criteria for the use of AIS as an AtoN should be based on the navigational requirement derived from the assessment of risk.

There is a distinction between the application of AIS as an AtoN to assist in safe navigation and other applications of interest to the AtoN authority, such as AtoN performance monitoring.

3 SCOPE

This guideline identifies general criteria to assist AtoN authorities in determining whether AIS AtoN functionality should be provided and, if so, what approach should be taken to establish the AIS AtoN. This guideline should be read in conjunction with IALA Recommendation A-126, ITU Recommendation M.1371 and the relevant references as provided in Section 12.

This document does not provide advice to the mariner on the use of AIS nor should it be considered a comprehensive source of information on AIS regulations and specifications.

4 FUNCTION OF AIS ATON

The use of AIS as an AtoN can provide the following services to AIS equipped vessels: (this is not priority list)

- Provide identification of the AtoN in all weather conditions;
- Complement existing signals from AtoN (e.g. Racon);
- Transmit accurate positions of floating AtoN;
- Indicate if a floating AtoN is off position;
- Mark or delineate tracks, routes, areas, and limits (for example, areas to be avoided and Traffic Separation Schemes (TSS));
- Mark offshore structures (for example, wind turbines, wave and tidal energy devices, oil and gas platforms);
- Provide weather, tidal, and sea state data.
- Provide additional AtoN capability through use of virtual AIS AtoN where installation of physical AtoN is technically or economically difficult;
- Indicate AtoN status; and
- Provide an accurate position for fixed AtoN which act as reference targets for verifying radar.

In addition, the use of AIS as an AtoN can provide a number of benefits to the AtoN authority:

- Monitor the status of an AtoN;
- Track AtoNs that are off position;
- Assist in the identification of ships involved in collisions with AtoN through provision of exact AtoN position data;
- Gather real-time (or near real-time) information on the ‘state of health’ of an AtoN;
- Remotely control changes in AtoN parameters (if so equipped);
- Provide statistics on reliability of AtoN;
- Extend the coverage (range) of AIS monitoring;
- Enable timely marking of new wrecks and dangers and identify temporary recommended routes through the use of virtual AIS AtoN;
- Monitor the status of other support equipment at the site.

5 VDL CONSIDERATIONS

As noted in A-126, an authority planning the application of AIS for AtoN should bear in mind the message capacity of the VHF data link (VDL).

In areas of high VDL activity, for example crowded shipping areas, transmission of AIS information from non-shipborne units should be kept to a level that will avoid overloading the VDL. The Competent Authority should consider increasing the reporting interval of AtoN AIS messages to reduce congestion while ensuring that the effectiveness of the transmission is not decreased.

6 DEFINITIONS OF AIS ATON AND EXAMPLES OF USE

The use of AIS AtoN can vary from the provision of an actual unit on a physical AtoN to the transmission of a 'synthetic' or 'virtual' AtoN by an AIS base station, where they fall within the footprint of the base station.

As with all AIS AtoN, these units should be established taking into account the needs of all waterway users – SOLAS and non-SOLAS.

Whenever considering the use of virtual AIS AtoN extreme care must be taken to avoid errors, particularly errors in position, and to avoid the creation of situations where mariners may be faced with too much information, irrelevant information, or information that results in confusion or distraction. Exercising such care will require the development and use of strict procedures and protocols that include verification of the appropriateness of the selected AIS AtoN and its accuracy.

6.1 Real (Physical) AIS AtoN

A 'real' AIS AtoN is one that is physically located on the AtoN. This unit transmits:

- Message 21 – identification of AtoN and current geographical position status;
- Message 8 – meteorological and hydrological-data or other IMO message;
- Message 21 and 14 – hazards to navigation;
- Message 6 – AtoN monitoring message;

There are three types of real AIS AtoN:

- Type 1 – transmit only station
- Type 2 – similar to type 1, includes a receiver for remote configuration
- Type 3 – full transmit and receive station.

All three station types are capable of switching off and 'sleeping' between transmissions to conserve power use.

It may be appropriate to use real AIS AtoN on existing aids to navigation to realize benefits as identified in Section 3. The power requirements for AIS AtoN need to be taken into account when looking to install on floating AtoN or on fixed AtoN in remote areas.

IEC 62320-2 provides the various capabilities of real AIS AtoN.

6.2 Synthetic AIS AtoN

There may be times when, for practical and/or economic reasons it is not appropriate to fit a real AIS to an AtoN. In these instances, consideration should be given to the use of 'Synthetic' AIS AtoN. There are 2 types of Synthetic AIS AtoN – 'Monitored Synthetic AIS AtoN' and 'Predicted Synthetic AIS AtoN'.

6.2.1 Monitored

A 'monitored' synthetic AIS AtoN is transmitted as a Message 21 from an AIS Base Station located in the vicinity of the AIS AtoN. In this instance, the AtoN physically exists, however there does not have to be a real AIS AtoN unit. The communication between the AtoN and the AIS shall confirm the location and status of the AtoN.

Possible areas where it may be appropriate to use 'Monitored Synthetic AIS AtoN' may include:

- on an existing monitoring system to transmit the AtoNs status via a base station;
- to feed meteorological / hydrological data via a base station.

6.2.2 Predicted

A 'predicted' synthetic AIS AtoN is transmitted as a Message 21 from an AIS Station located remotely from the AtoN. The AtoN exists, but there is no monitoring to confirm either location or status. Only a monitored synthetic AIS AtoN can ensure the integrity of the floating AtoN, therefore **the use of predicted synthetic AIS AtoN is not recommended for use on floating AtoN.**

Possible areas where it may be appropriate to use 'Predicted Synthetic AIS AtoN' may include:

- On fixed AtoN (e.g. lighthouses, beacons);
- On fixed hazards to navigation (e.g. fish farms, wind turbines, platforms)

6.3 Virtual

A 'virtual AIS AtoN' is transmitted as a message 21 for an AtoN that does not physically exist.

Virtual AIS AtoN are used where it is not physically possible or feasible to put the real AtoN on station, examples include ice conditions, new wrecks and dangers, etc. Possible areas where it may be appropriate to use 'Virtual AIS AtoN' are provided in more detail in Annex 1 and may include:

- Replace existing buoys or augment existing buoyage to increase safety of navigation;
- provide an AtoN when a physical AtoN is temporarily removed;
- Mark new danger or obstruction;
- Indicate deep water channels;
- Indicate a temporary recommended fairway;
- Indicate landfall or some other key point of interest;
- Identify hydrographic survey areas;
- Delineate exclusion zones / SAR or pollution zones.

6.4 Chained AIS AtoN

A chain of AIS AtoN Stations allows for communication from an AIS Base Station to AIS AtoN Stations that are remotely located and unable to communicate directly with the base station. Messages are passed from station to station until the intended recipient is reached.

The concept requires an AIS AtoN Station to have knowledge of other AIS AtoN Stations in the chain, namely its parent and all children below it in the chain.

A "parent station" is a station that is in the direction of the base station. A "child station" is a station that is directed away from a base station. In order to prevent unnecessary retransmission of the messages, each AIS AtoN Station in a chain may have only one parent, but may have multiple children (this includes all synthetic and virtual AIS AtoN).

7 ACCESSING THE VDL

As with all AIS units, AIS AtoN require MMSI numbers to access the VDL.

The numbering format for AIS AtoN is as per ITU-R M585-4, Annex 4. This number is a nine-digit unique number using the format $9_1 9_2 M_3 I_4 D_5 X_6 X_7 X_8 X_9$ where the digits 3, 4 and 5 represent the MID and X is any figure from 0 to 9. In this format, the MID represents the territory or geographical area of the administration assigning the call identity for the navigational aid.

The administration may use the sixth digit to differentiate between certain specific uses of the MMSI, as shown in the example applications below:

a 99MID1XXX Physical AIS AtoN

b 99MID6XXX Virtual AIS AtoN

Synthetic AIS AtoN are identified through a flagged element of the MMSI configuration command.

8 CRITERIA FOR PROVIDING AIS ATON TO ASSIST NAVIGATION

The criteria for fitting AIS to any AtoN should be based on the navigational requirement derived from the assessment of risk. AIS messages for an AtoN may be generated from information derived from the AtoN itself and broadcast directly from the AtoN, or broadcast from an AIS unit not located on the AtoN – i.e. a transmitting AIS base station.

8.1 Real AIS AtoN

8.1.1 Lighthouses and Beacons

The primary purpose of providing AIS AtoN functionality to lighthouses and beacons is to provide the mariner with a fixed point of reference on the shore, and to confirm the functionality of other AtoN provided on the station. Such a point of reference is the e-Navigation equivalent of the physical station and is of assistance to the mariner in identifying a particular point of land, for spatial awareness, in taking bearings or distances for position confirmation, or in laying off parallel index lines. The provision of AtoN functionality information gives advance information to the mariner on whether key AtoN are performing correctly and allows for revision of the passage plan if required.

8.1.1.1 Criteria

AIS AtoN functionality should be provided on Lighthouses and Beacons where a navigational assessment identifies the requirement set out above. Typical locations for consideration would include offshore stations, headland stations, landfall stations, stations that are commonly used as waypoints, stations that mark points on featureless coastlines, or isolated dangers.

8.1.2 Buoys and Major Floating Aids

In addition to the point of reference and AtoN information purposes described above for fixed AtoN the provision of AIS AtoN functionality on floating AtoN such as buoys and Major Floating Aids (MFA) provides confirmation of the floating AtoN position. Confirmation of position provides the mariner with an assurance that the AtoN can be used, improves spatial awareness, enables bearings and distances for position confirmation, or in laying off parallel index lines. Advance confirmation of the position of floating AtoN is a significant improvement in the service available to the mariner.

8.1.2.1 Criteria

An important consideration is to identify high risk areas where, in poor conditions, AIS can improve the conspicuity of AtoNs. The importance of the floating AtoN in the navigational solution is the key to assessing need for provision of AIS AtoN functionality. Therefore, it is likely that all Major Floating Aids (MFA) and Buoys of Primary Navigation Significance (BPNS)

will be AIS equipped. Of the remaining floating AtoN, typical locations for consideration would include gateway buoys at the approach to narrow channels, buoys that are commonly used as waypoints, buoys marking isolated dangers, buoys marking the extremities of shoal areas and buoys that are critical to the mariner's spatial awareness.

8.2 Virtual AIS AtoN

Virtual AIS AtoN are used where it is not physically possible to put the real AtoN on station, examples include ice conditions, new wrecks and dangers, etc. or where additional AtoN can be provided to enhance safety of navigation. Virtual AtoN may also have a future role in replacing some MFA or buoys and in providing AtoN to meet the needs of special craft such as Wing-In-Ground (WIG) vessels.

8.2.1.1 Criteria

The criteria for use of virtual AIS will be influenced by the practicality of providing a physical AtoN and Real or Synthetic AIS. Where physical AtoN cannot be provided, for example in ice conditions, virtual AIS AtoN can contribute to reducing the risk and provide additional information for the user. The need to rapidly mark wrecks and other new dangers with virtual AIS AtoN, often in advance of laying physical AtoN, will be based on an assessment of the danger posed to shipping in the area. The criteria for replacement of existing AtoN with virtual AtoN will involve an assessment of the navigational value of the physical characteristics. Typical locations would include deepwater AtoN intended primarily for SOLAS Convention vessels.

9 ADDITIONAL APPLICATIONS OF AIS ATON

An AtoN Authority can gain benefit from the provision of AIS AtoN with regards to monitoring of aids to navigation, data collection and networking.

In establishing an AIS station, consideration should be given to future as well as present requirements

When deciding to implement AIS AtoN there are a series of steps / elements to be considered, as outlined in Figure 1. Each stage has a number of options and some key points to keep in mind in the process are also indicated.

9.1 Monitoring

There is a wide range of possible means of monitoring AtoNs. These range from physical observation, radar coverage, and electronic reporting through to full telemetry control systems. Whether an AIS AtoN Station is required for navigational purposes or not, AIS may still be used as an AtoN monitoring and networking tool.

Where AIS equipment at the AtoN is used for monitoring, consideration must be given to the possibility of the failure or the AIS itself while the AtoN continues to function. If a secondary monitoring system is available, any AIS messages being transmitted to the mariner may still be transmitted from an adjacent station as synthesised messages.

Where there is no AtoN requirement, the criteria for using AIS as an alternative means of monitoring will centre on cost, reliability and the value attached to the additional functionality available from the various systems.

9.2 Data Collection

AIS AtoN can collect and store data regarding the activity on the VDL. AIS AtoN can also be chained in a parent / child system to extend coverage range and enable data collection throughout a navigational area.

9.3 Networking

Networks of AIS Base Stations can provide a useful means of monitoring the integrity of transmitted AIS messages and for local storage of data.

The availability of detailed AIS vessel track information will contribute significantly to the navigational review process.

Where an AIS Base Station is being provided as part of the AtoN requirement, consideration should be given to utilisation of the station for monitoring of other AtoN in the area and for network, data storage and forwarding purposes as outlined in IALA Guideline 1050 on the Management and Monitoring of AIS Information. The criteria in this case are likely to centre on communications costs and reliability. While AIS data can be secured using time or event generated polling on dial-up lines, live streaming over broadband or similar high speed lines is preferred.

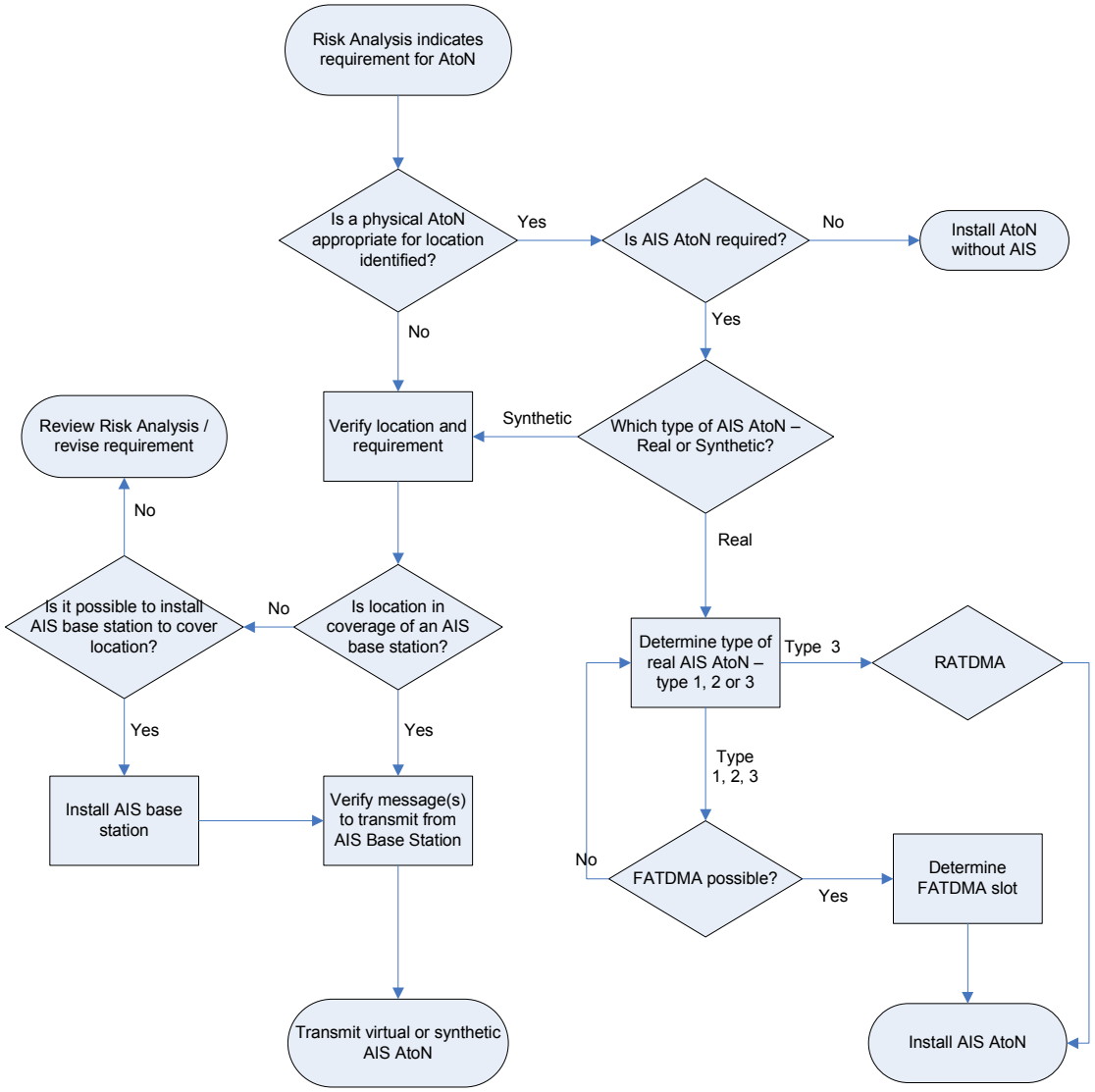

Figure 1 Flow Chart for decision process, AIS AtoN

9.4 General considerations

A number of elements to consider when determining if an AIS AtoN is required include:

- Present use of the VHF data link (VDL) and possible impact on the VDL by the use of an AIS AtoN;
- Category of AtoN / criticality for navigation;
- Use of AIS AtoN for way points, identifying isolated danger or delineating TSS;
- User requirements (e.g. High Speed Craft);
- Additional functionality (e.g. Met / Hydro; DGNSS).

There are different options for the use of AIS AtoN.

Overview of elements to consider for AIS AtoN – provides an overview of possible uses for real, synthetic or virtual AIS AtoN.

Table 1 Overview of elements to consider for AIS AtoN

Element to be addressed	Real	Synthetic	Virtual	Chained
Low power availability at site		X	X	
Difficult to access site		X	X	X
Space limitations on site		X	X	
Requirement for remote monitoring	X			X
Additional functionality – met/hydro data; DGNSS; etc.	X			X
Location – difficult Environmental conditions (including tide / current; cyclone /hurricane; extreme temperature)		X	X	
Need for spatial awareness	X	X	X	X
Waterway use for SOLAS vessels only			X	
Waterway use mixed vessels	X	X		
Temporary marking of new danger / wreck			X	
Extend range of AIS system				X

10 AIS ATON MESSAGE USE

AIS Message 21 is the primary AIS AtoN information message. This message provides details of the identity, position and status of the AtoN and will warn the mariner if any of the AtoN functions are not performing correctly. In addition, there are a number of other messages that can be used with AIS AtoN, enabling additional information to be transmitted to the mariner and also providing the AtoN authority with status and monitoring capabilities.

ITU-R M.1371 defines the AIS messages used, and IEC 62320 provides a summary of the AIS AtoN station messages. A summary of Message Types (current at date of publication) is available at Annex 3.

11 DISPLAY OF AIS ATON AND SYMBOLOGY

Guidelines for display of AIS AtoN are provided by IMO in IMO SN/Circ.243 Guideline on AIS Symbology. This symbology relates to display on Radar, ECDIS or other similar systems and is based on the use of a diamond symbol.

IEC 62288 also sets out similar AIS Display System symbology and provides for the use of a 'V' symbol for virtual AIS in addition to the basic diamond symbol.

AIS symbology on navigational charts is governed by IHO standards.

Particular issues arise in relation to virtual AIS. Effective utilization of virtual AIS needs an internationally accepted standard on symbols defined by type so that the user can clearly identify the AtoN area of interest.

12 REFERENCES

1 IALA Aids to Navigation Guide (NAVGUIDE) 5th Edition

2 IALA Recommendation A-126.

3 IALA Guideline 1050

4 ITU-R M.1371

5 ITU-R M.585-4

6 IMO SOLAS Chapter V, Reg. 13

7 IEC 62320-2 AIS AtoN

8 IEC 62288-ECDIS

9 IEC 62388-New Radar

ANNEX I Function of Virtual AtoN AIS

Application Mode	Function	Description	Type of Virtual AtoN AIS
Permanent Marking of Obstacles	Marking of Shoals and Reefs	Virtual AtoN can be effectively utilized where it is difficult to place a physical AtoN due to sea state, winds, or other environmental or ecological conditions. A clear marking of the shoals and/or reefs will improve safety of navigation.	Isolated Danger Marks
Permanent Marking (navigation support)	Marking of Fairway Limits	Virtual AtoN can be effectively utilized where lighted buoys cannot be installed for some reason (i.e. sharing of waterway). A clear marking of the fairway limits will serve for orderly flow of marine traffic and improved safety of navigation.	Lateral Marks
	Marking of Fairways	Virtual AtoN can be effectively utilized where a physical AtoN placement is difficult due to the water depth, seabed, etc. A clear marking of the fairway will improve safety of navigation.	Lateral Marks, & Safe Water Marks
		Virtual AtoN can be effectively utilized in approaches to a harbour entrance where a ship changes its course and where it is difficult to install a physical AtoN. A clear marking of the point of approach will serve for an orderly flow of ships at a entrance and improve safety and efficiency of shipping.	Safe Water Marks
	Marking of Fairways & Marking of the Limits of Safe Water	Virtual AtoN can be effectively utilized where navigation becomes difficult due to a thick fog, heavy rain, etc. (This application can also be adapted as a temporary marking during a limited visibility.) Marking of a recommendable fairway during times of limited visibility will serve to improve safety of navigation and efficiency of shipping.	Lateral Marks & Safe Water Marks
Temporary Marking	Marking of a Navigation Restricted Areas	Virtual AtoN can be effectively utilized when navigation restriction is required due to e.g., marine accidents or when marking of a wreck. A temporary navigation restriction can prevent subsequent incidents from developing.	Cardinal Marks, & Special Marks
	Designation of Temporarily Recommendable Fairways	Virtual AtoN AIS can be effectively utilized for indication of fairways when a large scale disaster hits the area. A clear marking of temporarily recommendable fairways will be expected to serve for the relief ships dispatched to the site and to support safe and effective relief activities.	Lateral Marks & Safe Water Marks
	Marking of Aids to Navigation that are malfunctioning or off position	Virtual AtoN AIS can be effectively utilized when a physical AtoN has lost ability to perform regular functions due to a natural disaster. When a physical AtoN lost ability to perform regular functions due to natural disasters, recovery actions are required at the earliest opportunity. Virtual AtoN can respond to the circumstance even if the actions by personnel cannot be achieved due to meteorological and/or hydrological conditions, and keep the influence of the trouble reach to ships in navigation at a minimum level.	Cardinal Marks, Lateral Marks, Isolated Danger Marks, Safe Water Marks, Special Marks, & Other Position Marks

ANNEX II Description of AIS AtoN Stations

Reference IEC 62320-2

Requirements	Type 1 AIS AtoN Station	Type 2 AIS AtoN Station	Type 3 AIS AtoN Station	Alternatives
VDL Receiver	No Receiver	Receiver for control functions only	2 Receiving processes for autonomous mode	
Transmitted Messages	21			21 plus one or more of 6, 8, 12, 14, 25 and other appropriate messages (Types 1, 2 and 3) Plus 7, 13 (Type 3 only)
Access Mode for Message 21	FATDMA			FATDMA and RATDMA (Type 3 only)
Access Mode for Messages other than 21, if implemented				FATDMA (Type 1 and 2) One or more of FATDMA, RATDMA or CSTDMA (Type 3)
Configuration / Communication method	Defined by manufacturer			Defined by manufacturer with Standard Sentences (Type 1, 2 and 3)
Physical Communication Interface	None			The electrical and physical characteristics shall be defined by manufacturer. (Type 1, 2 and 3)
Transmit Power	12,5 W			As defined by manufacturer (Type 1, 2 and 3)
Transmitter capability	Dual channel			Single channel (Type 1 and 2)
Synthetic and Virtual AtoN	No			Yes (Type 1, 2 and 3)
Positioning Device	EPFS and Surveyed Position			Surveyed Position Only (no EPFS) (Type 1, 2 and 3)
UTC synchronisation	Direct Only			Direct, Indirect or semaphore (Types 3)
Assignment	Shall not respond to assignment Messages 16 and 23			
Interrogation	Shall not respond to interrogation Message 15			

ANNEX III Summary of Current Message Types

Reference ITU-R M.1371

Message ID	Name	Description
1	Position report	Scheduled position report; (Class A shipborne mobile equipment)
2	Position report	Assigned scheduled position report; (Class A shipborne mobile equipment)
3	Position report	Special position report, response to interrogation; (Class A shipborne mobile equipment)
4	Base station report	Position, UTC, date and current slot number of Base station
5	Static and voyage related data	Scheduled static and voyage related vessel data report; (Class A shipborne mobile equipment)
6	Binary addressed message	Binary data for addressed communication
7	Binary acknowledgement	Acknowledgement of received addressed binary data
8	Binary broadcast message	Binary data for broadcast communication
9	Standard SAR aircraft position report	Position report for airborne stations involved in SAR operations, only
10	UTC/date inquiry	Request UTC and date
11	UTC/date response	Current UTC and date if available
12	Addressed safety related message	Safety related data for addressed communication
13	Safety related acknowledgement	Acknowledgement of received addressed safety related message
14	Safety related broadcast message	Safety related data for broadcast communication
15	Interrogation	Request for a specific message type (can result in multiple responses from one or several stations)
16	Assignment mode command	Assignment of a specific report behaviour by competent authority using a Base station
17	DGNSS broadcast binary message	DGNSS corrections provided by a Base station
18	Standard Class B equipment position report	Standard position report for Class B shipborne mobile equipment to be used instead of Messages 1, 2, 3
19	Extended Class B equipment position report	Extended position report for class B shipborne mobile equipment; contains additional static information
20	Data link management message	Reserve slots for Base station(s)
21	Aids-to-navigation report	Position and status report for aids-to-navigation
22	Channel management	Management of channels and transceiver modes by a Base station
23	Group assignment command	Assignment of a specific report behaviour by competent authority using a Base station to a specific group of mobiles
24	Static data report	Additional data assigned to an MMSI Part A: Name Part B: Static Data
25	Single slot binary message	short unscheduled binary data transmission (Broadcast or addressed)
26	Multiple slot binary message with Communications State	scheduled binary data transmission (Broadcast or addressed)

ANNEX IV LIST OF ACRONYMS

AIS	Automatic Identification System
AtoN	Aids to Navigation
BPNS	Buoys of Primary Navigation Significance
CSTDMA	Carrier Sense Time Division Management
DGNSS	Differential Global Navigation Satellite System
ECDIS	Electronic Chart Display Information System
EPFS	Electronic Position Fixing System
FATDMA	Fixed Access Time Division Multiple Access
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IEC	International Electrotechnical Commission
IMO	International Maritime Organisation
ITU	International Telecommunications Union
MFA	Major Floating Aids
MID	Maritime Identification Digit (first three digits of the MMSI)
MKD	Minimum Keyboard Display
MMSI	Maritime Mobile Service Identity
RATDMA	Random Access Time Division Management
SOLAS	IMO Safety of Life at Sea Convention, 1974 as amended,
TSS	Traffic Separation Scheme
UTC	Universal time co-ordinated/ Universal Co-ordinated Time
VDL	VHF Data Link
VHF	Very High Frequency
WIG	Wing-in-Ground