IHB File No. S3/8151/CHRIS

Circular Letter No. 15/2001/Rev.1
15 March 2001

MINUTES OF THE 12th CHRIS MEETING
Valparaiso, Chile, 23–25 October 2000

Dear Sir,

A copy of the Draft Minutes of the 12th CHRIS Meeting is attached for your information. Annexed to the Minutes are a List of Acronyms (Annex A), the Agenda (Annex B), the List of Participants (Annex C), the List of Documents (Annex D), a list of basic premises and safeguards for SENC distribution (Annex E), the proposed changes to S-52 in relation to SENC delivery (Annex F), CHRIS Decision to fostering industry participation (Annex G) and Actions Arising (Annex H). Member States' attention is particularly drawn to the following two points:

- SENC Delivery Option (refer to paragraph 7 of the Minutes). According to the IHO Specifications for ECDIS, as contained in § 3.3 of S-52, the conversion from ENC to SENC (System ENC: the database actually used by the ECDIS) must take place in the onboard ECDIS. A number of HOs, led by Germany, advocated that it should be possible to carry out this conversion outside the ECDIS, ie by a suitable qualified organisation ashore, hence the "SENC delivery" concept. The arguments made in favour of this option were that time would be saved and that this would allow for the distribution of ENC data with non-HO data by the distributors. It was stated that the second advantage would simplify the process of providing data to the mariner, while also being an incentive to private companies to distribute official HO data (ENCs, in an SENC format). Concern was expressed by Finland, Denmark and a number of other States that SENC delivery did not conform to the IMO Performance Standards for ECDIS. They further felt that HOs would lose control over their ENC data through the SENC delivery mechanism. After lengthy discussions, the Meeting unanimously **agreed that SENC distribution would be acceptable** as an option, in addition to direct ENC distribution, providing that basic premises and safeguards for SENC delivery were adhered to. These safeguards were developed and agreed to at the Meeting (see Annex E). Paragraph 3.3 of S-52 was redrafted accordingly (see Annex F where changes from the existing edition, associated with the SENC delivery option, have been emphasized).

  Papers on the subject, prepared by SHOM (French HO) and BSH (German HO) and received by

the IHB subsequent to the 12th CHRIS Meeting, are provided for your information as Attachments III and III bis, respectively. Member State comments on these papers and the 12th CHRIS Meeting Documents, as they appear on the IHO Website, should reach the IHB **before 1 May 2001**. This will enable these comments to be available should the next WEND Committee Meeting wish to consider the principle of SENC Delivery. Member States will be advised of the outcome of this Meeting as soon as possible.

- ENC Security Scheme (refer to paragraph 9.1 of the Minutes). PRIMAR had offered to make available to IHO Member States, the security scheme they use in support of their ENC service. This includes data encryption, data authentication and selective access to data. As a result, the IHB polled MS on this issue (CL 38/2000 refers). Summaries of the 31 replies received along with Member States' comments are provided at Attachment IV. Responses showed that, although all MS wished to have their ENC data encrypted and that a large majority (26) were in favour of having a single IHO recommended security scheme, only 17 respondents agreed that the PRIMAR security scheme should be adopted as the IHO standard. It was also noted that the majority in favour of the PRIMAR system were already supplying their data to PRIMAR. Several HOs expressed concern on the amount of time, and money that would be required by those who would become involved in implementing the PRIMAR scheme. It was also reported that the development and maintenance of standards for encryption were being conducted in other forums and that an international standard on data encryption may soon emerge. The Meeting agreed that it was premature to make any decisions or proposals on this issue and that **it should be deferred for a year** to allow clarity to be obtained on a number of key issues.

As can be seen in Annex H to the Minutes, a number of actions arose from the Meeting, most of them for the attention of the IHB. The Bureau will endeavour that all actions be progressed as actively as possible. The following can already be reported:

- To properly address the issue of Industry reaction to the IHO Presentation for ECDIS (Action 13.2 refers), the IHB has decided, in cooperation with the Chairman of C&SMWG, the holding of an IHO / Industry / Users Workshop on 25-26 June 2001 at the IHB (CL 13/2001 refers). In fact, the scope of this meeting, which may become a regular workshop, will be extended to cover other subjects such as ENC delivery mechanisms or type-approval issues. It is hoped that this will facilitate the exchange of information on issues of mutual concern to all involved in provision of charts and charting information.

- The University of New Hampshire, USA, has kindly offered to host the Open ECDIS Forum (Action 12.1 (3) refers). The IHB welcome this initiative and is monitoring the transfer to the new site in liaison with the OEF Board of Patrons and the current host (SevenCs, Germany).

- A revised ENC Test Data Set for IEC (Action 8.1 (1) refers) has been produced by the UKHO and is near completion. It will be made available on the IHO website as soon as it is ready.

- The IHB has obtained verbal confirmation that IEC endorses the formation of an IHO-IEC Harmonizing Group on Marine Information Objects (Action 17.1 refers) and supports the nomination of the prospective Chairman. Written approval by IEC is however still awaited.

- Changes to the Terms of Reference for all CHRIS Working Groups, related to their Composition and Chairmanship, were agreed by the Meeting (see Annex G) and these WGs have been advised accordingly (Action 12.1 (1) refers).

Member States' attention is also drawn to the standard development efforts on Electronic Chart Systems (ECS), which are currently taking place within ISO and RTCM (Action 5 refers):

- ISO/TC8/SC6/WG7 (ECS database) is developing an ECS Data Standard, which is due for publication in April 2002 (see Document CHRIS/12/5A). This standard will address the issues of content, quality, colors and symbols, updating, and tests for ECS data. Any information on the matter can be obtained from Mr. Mortimer Rogoff <mortrogoff@worldnet.att.net>, Convenor for the above WG.
- RTCM (Special Committee 109 on Electronic Charts) is developing Recommended Minimum Performance Standards for ECS (see Document CHRIS/12/5B). They should provide performance and related testing requirements for three "classes" of ECS based on anticipated types of vessel application. The latest draft was released in January 2001. Any further information can be obtained from Mr Frederik Ganjon <fganjon@erols.com>, Chairman of RTCM SC-109.

It was agreed that CHRIS would continue to monitor these standard developments but that the IHO would not underwrite them.

All CHRIS/12 documents are currently available on the IHO website (www.iho.shom.fr/msonly/ecdis/chris2000.htm). According to CHRIS/12 decision at Annex G, they will be moved to the public section as soon as feasible.

The 13th CHRIS Meeting is scheduled to be held in Athens, Greece, on 17-19 September 2001.

On behalf of the Directing Committee
Yours sincerely,

Rear Admiral Neil GUY
Director

Encls: Minutes of CHRIS/12 *(Attachment I* – English only*)*
SENC delivery option – Voting paper *(Attachment II)*
SHOM's paper on SENC distribution *(Attachment III* – English only*)*
BSH's paper on SENC distribution *(Attachment III bis - English only)*
ENC security scheme – Replies to CL 38/2000 *(Attachment IV* – English only*)*

12th CHRIS MEETING
Valparaiso, Chile, 23-25 October 2000

MINUTES

Notes : 1) The paragraph numbering is the same as in the agenda (Annex B).
2) A list of acronyms used in these minutes is at Annex A.

1. OPENING AND ADMINISTRATIVE ARRANGEMENTS

The Chairman (Rear Admiral Neil GUY, IHB Director) opened the meeting. Captain Rafael MAC-KAY, Chief Hydrographer of Chile (SHOA), welcomed the CHRIS participants to Chile (Annex C). He briefly described the importance of hydrography in the region, and the scope of activities that were performed by SHOA. Michel HUET (IHB), Secretary of CHRIS, explained the availability of CHRIS/12 meeting documents (Annex D). Dr. Lee ALEXANDER (MIO) was appointed as Rapporteur. Commander Jorge PEREIRA (Chile), Vice-Chairman of CHRIS, explained about the meeting arrangements including the visit to the SHOA office.

2. APPROVAL OF AGENDA

The Chairman reviewed the Abridged Agenda (Annex B) and indicated those items which he considered to be the most important. In particular he mentioned ENC/SENC delivery, ENC/RNC Encryption, Industry relationships, and IHO S-57 Edition 3.1. Australia (Robert WARD) suggested that the ranking of the most important agenda items should be #7 (ENC/SENC Delivery), 9 (ENC/RNC Encryption), 12 (Open ECDIS Forum – Liaison with Industry), 13 (Reports by CHRIS Working Groups), and 8 (Status of IEC 61174). This was approved.

3. MATTERS ARISING FROM MINUTES OF 11TH CHRIS MEETING

The Chairman briefly reviewed the documents CHRIS/12/3A and CHRIS/12/3B. In particular, he noted that most of the action items resulting from the 11th CHRIS Meeting, listed in the latter document, had been completed. Two actions were still under consideration, dealing with OEF funding (see para. 12) and the establishment of an IHO-IEC harmonizing group on Marine Information Objects (see para. 17).

4. LIAISON WITH IMO

4.1 SOLAS Chapter V – MSC 72 and NAV 46

The Chairman, referring to CHRIS/12/4.1A, briefly explained the issues related to use of the indefinite article "a" or the more definite article "the" when used with the term "government", in the definition for Nautical Chart (Regulation 2). He stated that this hopefully would be resolved at MSC 73 in December 2000, in time for the revision of SOLAS in 2002.

Chile (Jorge PEREIRA) pointed out that in the 5th paragraph of CHRIS/12/4.1A where it says "… submitted new wording to MSC 73 as follows:" the sentence submitted was not put in, which should read: "In Regulation 2.2, the term 'Government' refers to the Coastal State Government, and the term 'Hydrographic Office or other relevant government institution' refers to the Coastal

State Government's Hydrographic Office or other relevant government institution, where exists." The document was corrected accordingly.

4.2 Reactivation of HGE

USA-USCG (Dan MADES) introduced a paper related to the need to re-activate the IHO-IMO Harmonizing Group on ECDIS (HGE) to deal with back-up arrangements, MIO, encryption, and SENC distribution (CHRIS/12/4.2A). He recommended that this group begin working via e-mail correspondence as he felt there was not an urgent need for the HGE to formally meet at this time.

The Chairman commented that HGE is a matter that IMO-MSC oversees, and that it would be difficult to schedule a meeting of this group in the next year. He further felt that the HGE was not intended to resolve IHO matters. Also, he mentioned that IMO has strict rules in terms of deciding what needs to be accomplished.

Australia (RW) did not support the convening of the HGE, commenting that:

- IHO needed to resolve its own matters first;
- The proposed work items were premature, and there was no clear resolution;
- Despite the IMO PS and amendments, no administration currently recognized the use of ECDIS;
- SOLAS Chapter 5 did not list ECDIS as a required system;
- The HGE would not likely be able to determine backup arrangements; this is a responsibility of national administrations;
- For MIOs, it was not likely that they would be in place for some years;
- For SENC and ENC encryption, there needed to be more experience gained.

Germany (Horst HECHT) and UK (Christopher DRINKWATER) generally supported the views of Australia. However, Germany (HH) pointed out that there are Administrations recognising ECDIS used in conjunction with ENCs. He felt that IHO needed to gain more experience related to ECDIS data, display and services before making proposals to IMO to amend the ECDIS PS.

The Chairman concluded that there was not enough support for reactivating the HGE.

5. ECS DEVELOPMENT

IHB (Michel HUET) briefly explained the work of ISO and RTCM on ECS data and performance standards. Information papers had been submitted by Mort ROGOFF of NECSA (CHRIS/12/5A) and Fred GANJON of RTCM (CHRIS/12/5B). The Chairman mentioned that PRIMAR intended to release data to be used for ECS. UK (CRD) noted that the original version of RTCM SC 109 made specific mention that this ECS was not intended to meet SOLAS requirements. However, the most recent version (2.1) did not include this caveat, and the distinction has become blurred. UK (CRD), Germany (HH), and Australia (RW) suggested that the IHO should continue to monitor as to whether the distinction between ECDIS and ECS is not distorted but not be involved in details of standardisation. Italy (Rosario LA PIRA) mentioned that they were involved in ECS for pleasure boats but not for SOLAS vessels.

The Chairman summarised that IHO would not underwrite the development of these standards. However, the IHB would draw the attention of Member States on these two efforts.

Action: IHB

6. REPORT ON THE MAY 2000 ENC UPDATING SESSION

IHB (MH) briefly described the results of an IHO Session on ENC Updating that was held in May 2000 at the IHB (CHRIS/12/6A). This session reviewed the actions resulting from the Mobile, Alabama (USA) Workshop in May 1999. At the May 2000 session, there were an additional five action items to be addressed. However, no significant problems were identified in terms of producing, implementing or disseminating ENC updates. MIO (Lee ALEXANDER) pointed out that this assessment might be somewhat premature as relatively few mariners were actually using ENC updating service.

Action: IHB

7. ENC/SENC DELIVERY

The Chairman reminded that this issue was raised one year ago by Germany, at the 11th CHRIS Meeting (see CHRIS/12/3A). It was then discussed at the 5th WEND Meeting in March 2000, where it was decided that this was a technical matter which, therefore, should be re-considered by CHRIS. He recalled that, according to the IHO Specifications for ECDIS, as contained in S-52, § 3.3, the conversion from ENC to SENC (i.e. the database that the ECDIS actually accesses for the display of chart information) must take place on the onboard ECDIS. The issue was to agree on whether an SENC delivery option was acceptable and, if yes, to re-draft § 3.3 of S-52 accordingly. He commented that it is the responsibility of the IHO to resolve this type of matter which, he felt, the IMO has delegated to IHO. He added that reference documents were CHRIS/12/7A rev.1 (by Germany), CHRIS/12/7B (by Finland) and CHRIS/12/7C (by Denmark).

Germany (HH) introduced CHRIS/12/7A, supported by Australia, Canada and USA-NOAA, promoting the SENC delivery option. In his presentation he showed the diagram in Figure 1, illustrating the data flow in both ENC & SENC distribution modes.

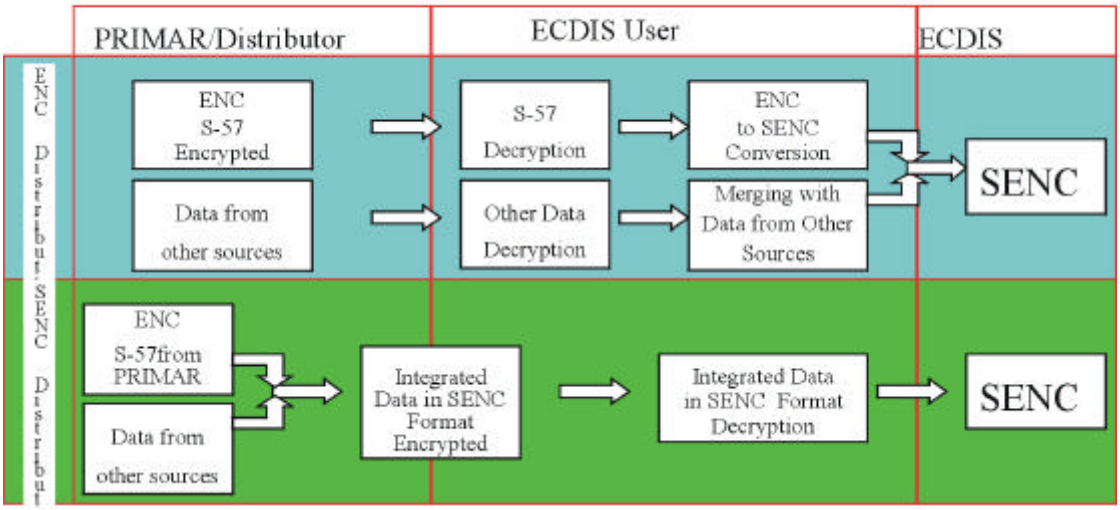

Fig. 1 - Schema of Data Flow

He also addressed a number of questions related to direct SENC distribution:

- Why has this not been thought of from the beginning? The world has turned out less perfect than it was thought to be in the minds of those developing ECDIS standards. Thus ENC coverage is too scarce and supplementary data will be required for many routes in the world for a long time. Also, private service providers rule the data market, serving thousands of ECS users worldwide.

- What is the problem with the current distribution system? The need for supplementary data for route coverage makes multi-fuel supply, i.e. ENCs and proprietary data, difficult for both manufacturers and end-users, due to the multiplicity of security systems used. As a result, official ENC data are left out of consideration on the market, as long as they do not fit into the proprietary data flows.

- Which options exist for IHO? Do nothing and the vast majority of end-users, the ECS users, are likely to continue using the data service they are accustomed to, ignoring any existing ENCs, OR attract service providers by allowing them to incorporate ENCs, wherever they exist, in an integrated service.

- Why would SENC delivery be a solution to the problem? As an additional option to direct ENC distribution, this would help HOs to gain a firm footing on the marketplace, through incorporation of their ENCs with providers' data services, at the same time resulting in considerable increase of revenues.

Finally he pointed out that, in his view, SENC distribution would still be covered by type-approval, under the existing IEC standard.

USA-NIMA (Christian ANDREASEN) supported the proposal by Germany and the use of SENC as the one data source, questioning the need to keep onboard the official copy of the HO supplied ENC, as stated in § 3.3 of S-52, in case of SENC delivery. He felt that users would not accept the double cost of handling two chart folios onboard and the associated updating. He offered new wording for that paragraph which would be considered later (see below "*Changes to S-52 related to SENC Distribution*").

Italy (RLP) and Norway (Ole B. KVAMME) also supported Germany's proposal and USA-NIMA's comments. Italy (RLP) suggested that SENC distribution be an option by each HO. Australia (RW) felt that this matter was really inevitable and that this could be a watershed decision in terms of involving industry. He wondered how would either mariners or HOs be disadvantaged? In his view, the real issue was on the quality of the data. Canada (Mike CASEY) felt that there was a need to have more creativity from the private sector. The proposal should be considered to be an additional option with additional possibilities, and it would not replace the need for ECDIS to be able to use ENCs.

UK (CRD) felt that things have changed, and believed that SENC could be safe and sensible for mariners. However, in order to ensure it is safe, he felt that IHO should seek the views of maritime safety administrations, OEMs, and type-approval organisations on the implications of direct SENC distribution. For instance, he wondered how would the mariner know what sort of information currently being displayed is official or non-official?

In order to clarify the latter point, Canada (Julian GOODYEAR) explained that the C&S Presentation Library already has the ability to distinguish between official and non-official data. Germany (HH) felt that there would really be no change in terms of how the ECDIS would deal with the SENC. USA-NOAA (Dave ENABNIT) pointed out that the ability to use ENC remains, but the issue of lack of ENC coverage also remains.

PRIMAR (Robert SANDVIK), supporting UK's opinion, felt that it was necessary to get the views

of type-approval authorities (e.g., on the use of a "compiler" for SENC). Germany (HH) responded that BSH deals with this matter in regard to additional functionality that must not affect the core capability.

Finland (Juha KORHONEN) introduced CHRIS/12/7B, against the proposed SENC distribution. He mentioned that Sweden and Denmark were also opposed and felt that the IHO might proceed on path that one could not return from. He believed that the IMO Performance Standards for ECDIS are the authority on this matter (e.g., ENC must be issued by an HO and transformed by ECDIS into an SENC) and he felt that there were also legal and commercial issues. In his presentation, he further raised the following points:

- Standardisation. The main goal for standardisation should be that one standard format be used for ENCs and their distribution, controlled by the IHO.

- Legal opinion. The IHO cannot change S-52 to be inconsistent with the IMO PS.

- Should SENC delivery be allowed, then he felt that IHO might loose control of ENC distribution, pure delivery of which would disappear, that managing updates of SENC versions would be complex and, as a result, that safety of navigation might be threatened. He also felt that mariners would be tightly dependent of their selected ECDIS manufacturers and that only some of the latters would survive, limiting free competition and leading to increases in prices.

China (Xu BINSHENG), Japan (Kunikazu NISHIZAWA) and Singapore (Lim Wee KIAT) supported the views expressed by Finland. China (XB) added that it was necessary that production, distribution and correction of ENCs, as well as paper charts, remain under control by HOs. He said that ENC distribution should not depend upon particular ECDIS equipment and that the ECDIS market should not be monopolized by a few manufacturers.

There followed a discussion on some key issues:

- Should IMO become involved in this decision? Germany (HH) felt that if this does not occur in the ECDIS, that it is an additional option then it is not a matter for IMO. It would preserve the principles of the original IMO PS. More to the point, this is a distribution matter that is the responsibility of IHO to decide. HECHT also explained the role of type-approval authorities in regard to SENC certification (e.g., by BSH and DnV).

  Finland (JK) disagreed, and had the opinion that the IMO PS purposely specifies that an ENC be transformed into an SENC inside the ECDIS.

  Australia (RW) believed, supported by USA-NOAA (DE), Italy (RLP) and Chile (JP), that first and foremost, IHO must determine what is the IHO's position on the best way forward.

- What would be the benefit to Mariners of direct SENC distribution? USA-NOAA (DE) felt that this would just be an option for the mariner to choose. Canada (MC) felt that this would simplify the process of providing data to the mariner. Finland (JK) did not feel that this would make things any simpler. MIO (LA) pointed out that mariners would view any possible benefits from three perspectives: cost to implement, improvements in coverage/availability of data, and impact on shipboard operations/training.

- What would be the impact on HOs or private companies? Germany (HH) felt that there would be an incentive to private companies to distribute official HO data in an SENC format.

Germany (HH) concluded that IHO could open the road to SENC distribution, but it would be the responsibility of individual HOs to decide whether this is something they wish to pursue. The responsibility and control over distribution would remain that of the HO until either the ENC or the SENC enter the ECDIS.

Following a suggestion by Canada (MC), it was agreed that a small WG be formed to address the Pros and Cons identified by Finland, Denmark and Germany. Findings of this WG, chaired by Germany (HH), are summarized below.

- SENC Distribution - Pros. HOs could avoid encryption and data communications; Differing interpretations of the Product Standard would be resolved ashore vice being a ship problem; Better IHO interface with industry would result and this would foster the replacement of commercial ECS data with ENC; and one standard would be used as a nautical data source.

- SENC Distribution - Cons. Loss of direct link between users and HOs; and commercial firms involvement with liability.

Finland (JK) reported on the results of a small WG meeting to accommodate the concerns of Finland, Sweden, Denmark, Japan and other States. A paper listing the basic premises and safeguards for SENC Distribution had been developed (see Annex E). In the opinion of Finland and these other States, if these premises and safeguards were followed, then SENC distribution would be acceptable. China reiterated that SENC distribution should be controlled by HOs.

Canada (MC) and Italy (RLP) supported this recommendation. After discussion, the Meeting agreed that SENC distribution would be acceptable as an option, in addition to direct ENC distribution, providing that basic premises and safeguards for SENC delivery, as listed at Annex E, be adhered to. CHRIS' views would be conveyed to IHO Member States for consideration and decision on the matter.

Action: IHB

The Chairman summarized: The issue of whether SENC is an appropriate distribution mechanism involves four different groups and actions:

- IHO (CHRIS) – Amend § 3.3 in IHO S-52.
- IEC – Revisit IEC 61174 to see whether it should be amended.
- Type-approval authorities, regulatory authorities, OEMs and mariners – Seek advice.
- IHB – Issue Circular Letter.
- HOs – Make final decision.

In addition he stated that, where SENC distribution was allowed by an HO, the fact that the HO exercised control over what type of SENC distribution was used, was extremely important. UK (CRD) stated that matters would become very complicated for RENCs such as PRIMAR if some of its contributing HOs wished their data distributed in SENC format but others demanded that it should only be distributed in S-57 format. He also observed that permitting SENC format may result in the two or three most common formats becoming *de facto* standards and as a consequence OEMs which used other SENC formats going out of business.

When asked by the Chairman, MIO (LA) stated that this SENC distribution mechanism should not affect the minimum requirements contained in the IMO PS, as this would be an additional capability beyond the minimum requirements (i.e., in addition to, not a replacement for).

Changes to S-52 related to SENC Distribution

The Chairman recalled that amendments to § 3.3 of S-52 would be needed to accommodate the SENC delivery option. An issue was whether keeping onboard an HO-provided ENC, as stated in the current § 3.3 (d), should be a mandatory requirement or an option. Norway (OK) and Finland (JK) were of the opinion that this should be a requirement. Australia (RW) felt that the fundamental issue was whether an SENC could be considered fulfilling the official data requirements for ECDIS, and believed that Section 4.1 of IMO PS accommodates either an HO-supplied ENC or officially-distributed SENC. Germany (HH) supported these views.

The Chairman clarified that there would not be a need for an ENC to be kept onboard if there is an officially-distributed SENC. After Italy (RLP), USA-NIMA (CA) and Australia (RW) had offered alternative wording for § 3.3 (d), the Chairman proposed, and it was agreed, that the relevant sentence in § 3.3 (d) would read as follows:

"An official copy of the HO data, distributed as an ENC or contained within an externally generated SENC, is to be kept onboard."

He also proposed that paragraph (b) and (c) be consolidated. On the suggestion of USA-NIMA (CA), a small WG reviewed all of § 3.3, (a) through (d), for clarity. The results are reflected in Annex F. The Meeting approved the proposed new wording for § 3.3 and recommended that the draft be submitted to Member States.

Action IHB

The possibility of reconvening the IHO S-52 WG was envisaged, with a view to also addressing issues such as security schemes and RCDS mode of operation.

8. STATUS OF IEC 61174

8.1 IHO ENC Test Dataset

UK (CRD) referred to CHRIS/12/8.1A and reported that the existing ENC Test Data Set for IEC, as on the IHO website (www.iho.shom.fr/general/files/ecdisnew.htm#ENC), contains a small number of errors. In addition, some additional objects and attributes are required to accommodate future tests. Finally, there is a requirement for a Test Data Set based on data conforming to S-57 Edition 3.1. He informed that it had been agreed, at a recent meeting of TSMAD, that the UKHO would undertake the necessary work on behalf of the IHB, to hopefully be completed by late December 2000.

The revised Test Data Set would then be validated using software based on the soon-to-be-published IHB List of Recommended Checks, as Annex C to S-57 Appendix B.1, prior to it being circulated to a number of OEMs, software producers and HOs for comment.

Action: UKHO

It was agreed that, once the ENC Test Data Set is finalised, the IHB would inform Member States accordingly and make it available on the IHO Website and on CD-ROM (S-52 Appendix 4). An RNC Test Data Set, including samples of ARCS and BSB raster data, would complete the IHO Test Data Set for IEC.

Action: IHB

8.2 IEC TC80/MT1

MIO (LA) gave a brief report on the work of this group (CHRIS/12/8.2A). Maintenance Team No 1, chaired by USA-USCG (Daniel MADES), has been tasked to prepare the next edition of IEC 61174, taking into consideration the standard developments occurred at the IMO and the IHO, which may impact on the IEC standard. They met in May 2000 in Alexandria, Va., USA, and reviewed the various items in their work program, including RCDS; Back-up Arrangements; Navigation-related Symbols; Colours and Symbols; ENC Test Dataset; and Encryption Issues. As a result, a draft CDV version of IEC 61174 Edition 2 has been developed, which should be finalised at the next meeting of MT1 planned at the IHB, Monaco, on 30 April - 1 May 2001.

9. REPORT ON THE 5TH WEND COMMITTEE MEETING

The Chairman made mention about the 5th WEND Committee (CHRIS/12/9A). Various methods of distribution were discussed as well as the appropriate bodies and forums to promote ECDIS, and ENC production. It was felt that the existing INT Chart Committees, sometimes operating within Regional Hydrographic Commissions, might constitute appropriate means to fostering ENC production and establishing RENCs. A WEND Resolution that would promote the implementation of the WEND System, an amendment to the WEND Principles dealing with data encryption and amendments to the WEND Terms of Reference that would ensure harmonization between RENCs, were agreed for submission to IHO Member States. It was noted that the 6th WEND Meeting would be held in Norfolk, Va., USA, on 18-19 May 2001, in conjunction with the next US Hydrographic Conference (21-24 May).

9.1 ENC/RNC Encryption

Canada (MC) introduced the report on ENC Security and Protection Issues (CHRIS/12/9.1A.).

The Chairman reported that PRIMAR had offered to make available to IHO Member States, the security scheme they use in support of their ENC service. This includes data encryption, data authentication and selective access to data. As a result, the IHB polled MS on this issue (CL 38/2000 refers). Responses were somewhat mixed and showed that, although all MS wished to have their ENC data encrypted and that a large majority agreed that IHO should adopt one "IHO-Recommended Security Scheme", hardly half of the responders agreed that the PRIMAR scheme should be adopted as the IHO standard (see CHRIS/12/9.1C).

PRIMAR (RS) briefly discussed what was contained in the PRIMAR Security Scheme Outline (CHRIS/12/9.1B). He reported that most type-approved ECDIS manufacturers were implementing the PRIMAR scheme. He further stated that there were currently 31 PRIMAR distributors.

Canada (MC) explained the approach taken by Canada towards the over-riding issue of ENC security schemes. For instance, in regard to possibly implementing an encryption scheme (e.g. PRIMAR scheme), he noted that there were significant concerns about how much effort (i.e., money and time) would be involved. In Canada (and other countries), it was felt that PKI was perhaps a better option. In summary, he stated that it was premature to rush into this matter at this time, that it would divert resources that could be better spent on increasing ENC coverage. China (XB) confirmed they were not in favour of adopting the PRIMAR scheme at this time.

The Chairman suggested, and this was agreed, that the matter be deferred for a year. IHO Member States would be informed accordingly.

Action: IHB

10. PROJECTS OF INTEREST TO CHRIS

SHARED Project – Singapore (LWK) briefly described the status of this project (CHRIS/12/10A). In view of promoting the SHARED concept, the Singapore Navy vessel 'RSS Endurance' departed Singapore in May 2000 to circumnavigate the world and returned in September. She used official ENCs and RNCs with an ECDIS that had the capability to accept incremental ENC updates at sea. Contributing HOs for chart data included Singapore, UK, USA, Canada, France, Malaysia and Indonesia. He (LWK) reported that feedback from the navigation officer aboard RSS Endurance had been positive and encouraging.

He also mentioned that ECDIS sea trials were being conducted between Japan and Korea. He added that, beginning in late 2000, it was planned that integrated ECDIS-AIS trials would be included as well.

USA-NOAA (DE) informed that, under the Caribbean Sea and Gulf of Mexico Hydrographic Commission (CGMHC), the SHARED Project concept would be extended into the Caribbean area (CHRIS/12/10B).

11. CONFERENCES OF INTEREST TO CHRIS

IHB (MH) provided a brief overview of the GEOMATICA 2000 Conference in Havana, Cuba on 22-27 May 2000 (CHRIS/12/11A). This Conference was organised by GEOCUBA, which includes the Cuban HO. The theme of the Conference: *"For a Global Integration of Data and Geospatial Services"* reflected the current trend towards integration, interoperability and standardisation of geospatial data, as a basis for a more globalised market. The IHB co-sponsored the Conference, and RAdm Neil GUY and Michel HUET presented papers and acted as Chairmen of Sessions in the GEOMATICA 2000 programme. The standard of the papers was very high and showed advance thinking on many of the aspects relevant to Hydrography. The next Conference will again take place in Havana, on 18-23 February 2002.

12. OPEN ECDIS FORUM - LIAISON WITH INDUSTRY

12.1 Reports on the March and September 2000 IHO-Industry Meetings

The Chairman referred to CHRIS/12/12.1A, reporting on the IHO-Industry Interface held in Monaco in March 2000. He also mentioned the IHO-Industry workshop that took place at the IHB in September 2000 and, as a following-up of this workshop, the Meeting discussed how best to involve industry and other ECDIS interest groups, in the standard development process taking place in ECDIS-related IHO WGs and Committees.

Australia (RW) introduced CHRIS/12/12.1B1, including a proposal that the results of technical meetings be widely circulated, that appropriate representative bodies be invited to attend CHRIS meetings as observers, and that the Terms of Reference for CHRIS WGs be amended to allow for greater participation by external expert contributors, with a view to fostering greater "industry" involvement in CHRIS activities (Cf §10 in CHRIS/12/12.1B). The Chairman felt that industry participation was not a problem for the various WGs. However, for WEND and CHRIS this could create some problem in terms of what are official/non-official positions. UK (CRD) expresses some concern about the size of some of the WGs becoming too large. He further noted that use of the OEF could provide an additional mechanism for greater participation. Chile (JP) pointed out that some countries have limited capability to participate in all the WGs. He also felt that

1 In the diagram contained in this paper, CIRM is shown with a "?" to reflect that manufacturers are not forced to express their views through CIRM.

composition of WG's meetings should be rationalised, because of the cost implications for the country that should organise those meetings, with many people. Finally, he felt that the inclusion in the proposed new wording for "Composition and Chairmanship" of an expression like "… an Expert Contributor's continued participation is irrelevant or unconstructive to the work of the WG" (Cf §10, item 6 in CHRIS/12/12.1B) might close instead of opening door for industry.

After discussion, Australia's proposal was adopted with some amendments (see Annex G). This decision would be implemented by the IHB, in particular regarding CHRIS WGs' membership.

Action: IHB

The Chairman explained his paper (CHRIS/12/12.1C) and stated that there was a need for an Open ECDIS Consortium (OEC) or an Open Industry Consortium, to be available for all interested parties to participate. He also explained the purpose of the various diagrams showing relationships between the IHO and other relevant organisations or proposed organisations. After discussion, the Meeting supported that the IHB would assist with the establishment of an Open ECDIS Consortium (OEC). This body would encompass all non-official ECDIS-related interest groups, eg ECDIS manufacturers or mariners. The OEC could then propose representatives and/or experts to attend IHO Committees and WGs. The existing Open ECDIS Forum (www.openecdis.org) could be a main communication vehicle for the OEC, HOs and any other role players on ECDIS matters. It was suggested that the lists of "Interested Parties" and "Interested Organisations", as in CHRIS/12/12.1B, might be considered as the basis for such initiative.

Action IHB

In regard to OEF funding (Action item 11 in CHRIS/12/3B), the Chairman informed that the IHB had planned to financially participate in the operating costs for the OEF in 2001. In addition, monitoring the financial situation of the OEF and investigating alternative funding would be pursued by the IHB.

Action: IHB

13. REPORTS BY CHRIS WORKING GROUPS

13.1 Transfer Standard and Applications Development (TSMAD)

UK (CRD) introduced CHRIS/12/13.1A. He briefly discussed the implications of the planned adoption of IHO S-57 Edition 3.1 in November 2000. This minor new edition, which includes only a limited number of additional attribute values, was made available in November 1999, that is one year in advance, to allow for familiarisation by users. It was reported by PRIMAR (RS), however, that many ECDIS manufacturers had not made the necessary changes to ECDIS software and that distribution of "3.1" ENC data would not be possible at this stage. PRIMAR did not envisage issuing "3.1" data until at least June 2001. After much discussion, the Meeting agreed that S-57 Edition 3.1 would be made officially available by the IHB from November 2000. Edition 3.1 would not supersede Edition 3.0, but be used when available. Some HOs would continue to produce ENCs based just on S-57 Edition 3.0. New ECDIS equipment must therefore be able to read both Editions 3.0 and 3.1 for the time being. IHO Member States and commercial S-57 users would be informed accordingly.

Action: IHB

UK (CRD) noted that there would be some changes made to the IHO ENC Test Data Set that are required by IEC 61174. The amended Test Data Set would probably be available from January

2001. He also mentioned that there might be some implications in terms of type approval certification of current or future ECDIS systems. Germany (HH) confirmed that the main issue was the ability of ECDIS to recognize and use "3.1" rather than "3.0" data. It was agreed that both "3.0" and "3.1" ENCs would remain in use for some time. IEC would investigate this at the next meeting of IEC TC80/MT1.

Action: IEC TC80/MT1

Germany (HH) raised the point that type-approval authorities must know when to move to new S-57 versions on type-approval. The TSMAD Chairman (CRD) agreed to advise the IHB accordingly.

Action: TSMAD Chairman

The Chairman remarked that the lessons learnt by the upgrading of S-57 must be considered and taken into account when any future update is made. He also felt that there was a need for consistency in terminology in terms of referring to an ENC as a “database comprised of cells, sets and tiles”.

13.2 Colours and Symbols Maintenance (C&SMWG)

Canada (JG) introduced CHRIS/12/13.2A. In particular, he discussed the status of C&SMWG efforts to deal with Deferred Amendments, single colour palette, labeling the Safety Contour, and changes in symbolizing different surveyed areas. He also discussed how minor deviations were being addressed.

Germany (HH) asked about the potential impact of S-57 Ed. 3.1 on Ed. 3.2 of the C&S Presentation Library. It was clarified that the impact on the PL of S-57 Ed. 3.1 was reviewed by staff of the C&SMWG early in 1999 and changes to account for it were covered in the first two items of deferred amendment 5 issued in Maintenance Document No 3 of March 2000 (see www.iho.shom.fr/general/files/ecdisnew.htm#colour).

IHB (MH) introduced CHRIS/12/13.2B, which reported on an IHB letter to 63 institutions and/or commercial companies having activities related to ECDIS/ENC, as an action resulting from the 11th CHRIS Meeting (Cf item 12.3 in CHRIS/12/3B). Recipients included all ECDIS Manufacturers having purchased the IHO PL for ECDIS. They were asked to suggest improvements to the PL through the following question: "Would you kindly advise the IHB of your comments and in the event of a possible improvement being suggested would you be as precise as possible giving the advantages of such a change?". However, the responses were very limited, possibly reflecting a lack of interest by the companies on this issue, or that they were not using the IHO PL, or that they were content with the PL as it was, or that the IHB letter was not specific enough and should have included suggestions in regard to the expected changes/improvements.

As a result, it was agreed that another attempt should be made to involve the industry in PL enhancement and that IHB, in liaison with the C&SMWG Chairman, would again try to obtain industry reaction to the PL.

Action: IHB

Canada (JG), noting that current editions of S-57 and the PL were 3.1 and 3.2 respectively, observed that there might be some merit in aligning the various versions of S-52 and S-57.

13.3 Technology Assessment (TAWG)

Canada (MC) reported on the work of TAWG (CHRIS/12/13.3A). This group works entirely by e-mail correspondence and using the Open ECDIS Forum (OEF). Since the last report (1999), there has been a rise in e-Commerce, wireless, and open standards (e.g., EDI and XML). In terms of emerging technologies for year 2000, the five most important were:

- Print-on-demand
- Electronic docking aids
- Data encryption/authentication
- Pilot carry-on ECDIS
- E-Commerce

The TAWG Chairman (MC) asked that CHRIS approve these projects. This was done.

On request from MIO (LA), it was agreed that TAWG would investigate the use of high-resolution flat panel displays for ECDIS.

Action: TAWG

The Chairman supported the continued work of TAWG and commented that many (outside of CHRIS) would benefit from being informed about the work and results of TAWG.

13.4 Standardisation of Nautical Publications (SNPWG)

Australia (RW) briefly reported on the work of this group (CHRIS/12/13.4A). He informed that office bearers (Chairman and Vice Chairman) were appointed in April 2000. He stated that the general idea was to progress from existing paper based nautical publications (NP's) towards electronic databases that are fully complementary to the ENC in ECDIS. Progress would be through the following sequence: 1) existing paper documents; 2) relatively simple electronic versions based on existing paper NP's; and finally 3) non-duplicating, non-conflicting, databases fully complementary to ENC's. In regard to the latter point, he noted that close consultation would be necessary with TSMAD to ensure full compatibility with both S-57 and the S-57 ENC product specification.

14. LIAISON WITH OTHER GROUPS

14.1 IHO Chart Standardization Committee (CSC)

France (Jean-Louis BOUET-LEBOEUF, CSC Vice-Chairman) reported on CSC activities in relation to CHRIS (CHRIS/12/14.1A). The Chairman commented on the possibility of merging CSC with CHRIS. Germany (HH) felt that integrating CHRIS and CSC sometime in the near future would be beneficial. This was supported by the Meeting and the IHB would follow-up the matter in liaison with the CSC.

Action: IHB

On a question from the Chairman asking who from IHO attended IMO Marine Environmental Protection Committee (MEPC) meetings, it was clarified that the CSC Secretariat at the UKHO follows closely MEPC's work on charting issues and has representation to MEPC's meetings from time to time. Australia (RW) inquired about the harmonization (cross-referencing) between INT1, S-52 and S-57. It was reported that the INT1 to S-57 cross referencing had been completed and will form Annex D to Appendix B.1 of S-57 Edition 3.1, to be released in November 2000. References to M-4 and S-52 Appendix 2 (ECDIS symbology) will be added to this document in

2001.

14.2 ISO/TC211 (Geographic Information/Geomatics)

IHB (MH) gave a brief report on ISO/TC211 activities in relation to CHRIS (CHRIS/12/14.2A). More than 20 base standards covering all aspects of geographic information are being developed by the ISO/TC211 committee. The publication of several of these standards is planned for 2001. It is expected that these ISO standards will eventually be widely used by the institutions concerned with the management of geographic data and for a wide variety of marine GIS applications beyond hydrography.

UK (CRD), as Chairman of TSMAD, reported on the proposal regarding the future evolution of S-57 and the relationship to the ISO/TC211 Geographic Information Standards (CHRIS/12/14.2B). Possible alignment of S-57 with ISO standards was the subject of a study conducted in early 2000 by a Canadian company under contract to the IHB. This resulted in recommendations being made to CHRIS by the TSMAD WG, which had considered the study report. IHO S-57 is a transfer standard that can be used for more than meeting just ENC requirements. He proposed that CHRIS authorize the formation of a small sub-group within TSMAD to work on the following issues as a matter of priority: Registering the hydrographic components of the S-57 object catalogue with ISO; Reorganizing the ENC product specification, based on S-57 Edition 3.1, as a stand alone document; Adding to S-57 a raster/matrix component and, for vector data, a time dimension and 3-D; and Drafting of an IHO-ISO/TC211 co-operating agreement. USA-NOAA (DE) supported this effort. After discussion, the proposal by the Chairman of TSMAD was approved.

Action: TSMAD

Germany (HH) asked who would be responsible for the maintenance of the S-57 Object Catalogue, if registered with ISO? IHB (MH) responded that this would have to be decided between IHO and ISO. If IHO wished to keep responsibility for the maintenance of the O.C., which seemed desirable, this would have to be specified in the co-operating agreement.

Germany (HH) mentioned about the applications of S-57 for inland ECDIS on the River Rhine and Danube. To a question raised as to whether IHO should be involved in these more national matters, the Chairman felt that IHO should be involved. However, as it was not clear what should be the extent of a coordination role, UK (CRD) suggested that this might be an appropriate topic for discussion on the Open ECDIS Forum (OEF). This was agreed.

Action: IHB

The Chairman discussed the possible IHO role on a wider spectrum of data exchange standards (CHRIS/12/14.2C). MIO (LA) wondered how IHO would deal with the broader applications of IHO S-57 that go beyond hydrographic matters. These would include marine environmental protection, coastal zone management, fisheries habitat inventory/management, and broader aspects of Marine GIS. Australia (RW), USA-NIMA (CA), and Germany (HH) felt that IHO should focus on the core areas of hydrography (e.g. surveys, cartography and safety of navigation). The Chairman stated that while liaison with ISO/TC211 might be the best way to deal with this issue for now, ultimately, national Hos would need to decide on this matter. Further, that IHB should be re-active, rather than pro-active, to the needs of Hos as they relate to new S-57 objects or application profiles.

IHB (MH) clarified that the OEF is a means whereby new S-57 objects intended for applications outside the IHO can be registered by non-HO bodies, e.g. commercial data producers. He felt that

IHO should not put additional resources into developing standards for marine GIS applications that are not the responsibility of IHO (e.g. coastal zone management).

14.3 ICA Commission on Spatial Data Standards

IHB (MH) reported on the activities of the ICA Spatial Data Standards Commission in relation to CHRIS (CHRIS/12/14.3A). In recent years, this ICA Commission has conducted scientific assessments of existing international geospatial standards, e.g. transfer standards or metadata standards. Its work on metadata standards is nearing completion and results will be contained in an ICA Metadata Book to be published in 2001. The Commission hold its 2000 Meeting at the IHB in June and started a new task on the subject of Spatial Data Infrastructure (SDI), covering the areas of science, technology and standards, at the Global, Regional and National levels. The Commission has decided to not duplicate the work of the already established GSDI (Global Spatial Data Infrastructure) and to do something distinctive and scientific. It will develop principles for defining the characteristics of appropriate data sets for SDI applications and will publish descriptions and assessments of SDIs around the world. The next meeting of this ICA Commission will be held in Beijing, China, in August 2001, in conjunction with the 2001 ICA Conference.

In this regard, China (XB) informed that the 2001 ICA Conference in Beijing is being organised by the Chinese State Bureau of Surveying and Mapping (SBSM). General information on this event is available from the SBSM website (www.sbsm.gov.cn/icc2001/). He further noted that the IHB would organise an IHO Chart and GIS exhibition, in the frame of the ICA Conference, with the assistance of the Chinese HO (Maritime Safety Agency - MSA). It was agreed that this initiative should be supported.

Action: All

14.4 IHO WG on Standards for Hydrographic Surveys (S-44)

IHB (MH) reported on S-44 WG activities in relation to CHRIS (CHRIS/12/14.4A). He reminded that the issue was to extend the scope of S-57 to hydrographic features, e.g. bathymetry, tides, bottom structure, gravity, or side-scan sonar images, as opposed to cartographic features, which only have been considered so far. IHB Circular Letter 16/1999 asked Member States to indicate which features should be qualified as “hydrographic”. The numerous proposals received were sent to S-44 WG members, with a view to agreeing on an exhaustive list of hydrographic features. This work still needs completion. Steps to follow will include expressing these hydrographic features in terms of S-57 objects and attributes, for incorporation in the S-57 Object Catalogue, and possibly developing product specification(s) particular to hydrography. It was suggested, and agreed, that the IHB would pursue the matter in liaison with the S-44 WG.

Action: IHB

14.5 IHO Tidal Committee

14.5.1 Use of Real-Time Tidal Data on ECDIS

IHB (MH) introduced CHRIS/12/14.5A “*Report on Tidal Matters in Relation to CHRIS*”. This paper had been prepared by Cdr. A. Cabezas (Chile), Chairman of the IHO Tidal Committee, who could not present it to the Meeting. The paper addressed issues such as dynamic tides on ECDIS (use of real time data), display of tidal information, vertical datum for ENCs, treatment of storm surges, tidal overlays in ECDIS and three dimensional representation of currents and tidal streams. It also contained a number of recommendations, mainly intended for TSMAD and C&SM WGs. It was agreed that these recommendations would be considered by both WGs, which then will advise CHRIS accordingly.

Action: TSMAD and C&SMWG

15. VECTOR DATA DEVELOPMENT

15.1 European RENC (PRIMAR)

PRIMAR (RS) gave a brief presentation on the status of PRIMAR (CHRIS/12/15.1A). Work is underway to replace the existing MoU between UK and Norway by forming a new government-owned company that will be called PRIMAR AS, hopefully before 1 July 2001. UK and Norway will be the major shareholders but other HOs will be able to buy shares. As of October 2000, 671 ENC cells are available from PRIMAR, with about 3/4 of them produced by Denmark and Norway, for a total of 443 Mbytes. The ENC service is provided to users through 31 authorised distributors in 16 countries, more than half of them being charts and publications agents / ship supply providers. PRIMAR has currently 17 end-users, with more ECS than ECDIS users and an average of 25 cells on subscription per end-user.

It is expected that 223 systems will have the PRIMAR security scheme installed by end 2000 and 745 by the end of 2001. A special toolkit has been developed to make it easier for OEMs to implement the PRIMAR scheme. Also, several security enhancements have been implemented in data communications, e.g. encrypted delivery of ENCs from HOs.

PRIMAR is currently in the process of developing a Virtual Private Network (VPN), which will allow different access rights to different sets of users of the PRIMAR Geo-Data Server (GDS). For example, HOs will be able to upload their ENCs to the GDS, or download them. This should give HOs greater involvement and access to their data.

15.2 Other RENCs

Italy (RLP) gave a presentation on the status of a Virtual RENC in the MBSHC Area (CHRIS/12/15.2A). When asked by Germany (HH), he responded that there was no specific time schedule for formal establishment of this Virtual RENC.

15.3 ENC Development in HOs represented at the Meeting

In the interest of time saving, the Chairman asked the meeting to accept the reports as submitted and that delegates update their reports if necessary. National reports on ENC developments are contained in documents CHRIS/12/15A and CHRIS/12/15B. A summary of ENC production by the HOs represented at the Meeting, as of October 2000, is shown in Table 1.

IHO Member State	ENC Data		Updating service provided	Commercially available
	No Paper Charts (1)	No ENC Cells		
Australia	48		N	N
Canada	300	450	Y	Y
Chile	38	38	Y	Y
China		81	N	N
Ecuador	Project to start 2000			

IHO Member State	ENC Data		Updating service provided	Commercially available
	No Paper Charts (1)	No ENC Cells		
Finland		9	Y(2)	Y(2)
France		58	Y(2)	Y(2)
Germany	16	16	Y(2)	Y(2)
Greece	Project to start 2000			
Italy		56	N	N
Japan	295	345	Y	Y
Korea (Rep.)	210		N	N
New Zealand		12	N	N
Norway (NHS)	40	100	Y(2)	Y(2)
Singapore	14		Y	Y
South Africa	10		N	N
Spain	14		Y(2)	Y(2)
Sweden		36	Y(2)	Y(2)
UK	43	56	Y(2)	Y(2)
USA (NOAA)		65	N	N
Venezuela	Project to start 2000			

(1) Geographical coverage of ENC data, in terms of paper charts
(2) Through PRIMAR (European RENC)

Table 1 - Status of ENC Data Production (Estimates – October 2000)

Australia (RW) stated that, in the absence of definitive guidance from the WEND Committee regarding responsibility and jurisdiction for ENC production in non-national waters, Australia intends to produce ENCs of all paper chart coverage. South Africa (Derek LAW) informed that, due to limited in-house capability, they have entered into a contract with C-Map Norway to produce ENCs.

15.4 ENC Development in HOs not represented at the Meeting

IHB (MH) informed that during the course of the year 2000, reports on ENC developments were received from Cuba, Denmark, India, Malaysia, Portugal and Russia. They are contained in documents CHRIS/12/15A and CHRIS/12/15B.

15.5 DNC Development in USA – National Imaging and Mapping Agency

USA-NIMA (CA) reported that over 75% of the 4,818 NIMA charts have already been made available to the US Navy on 29 CD-ROMs, as Digital Nautical Charts (DNC®) in DIGEST C – Vector Product Format. They plan to have 100% completed by end 2000. Currently the DNC is restricted from public distribution. Current NIMA work is *inter alia* concentrated on development of methods for DNC updating. NIMA has implemented the IHO symbology for nautical products

in their GeoSym (Geospatial Symbols for Digital Displays) Presentation Library. More details are in CHRIS/12/15A.

16. RASTER DATA DEVELOPMENT

16.1 RNC Development in IHO Member States

National reports on Raster Navigational Chart development and production were recently received from Australia, UK and USA-NOAA. They are contained in CHRIS/12/16A.

16.2 RNC Services (updating, printable patches)

USA-NOAA (DE) reported on this issue (CHRIS/12/16.2A). The entire suite of 1,016 official NOAA nautical charts has been available in digital raster form since 1995. They are produced jointly by NOAA and a commercial company (Maptech). All charts are continually updated on a weekly basis. In order to limit the size of updates files to be distributed, they have developed a special "patch" technology, where a pixel-by-pixel comparison is made between the old raster chart file and the updated one. A difference file is made that contains exactly those pixels, which, if overlaid on the old raster chart, turn it into the new one. This difference file is then compressed using a special algorithm developed to create a small (1 to 100 KB with 99% smaller than 10 KB) patch for each raster chart. The commercial updating service which distributes these patches began in January 2000. The update service costs about $5.50 (USD) per chart per year for weekly updates.

17. MARINE INFORMATION OBJECTS (MIO)

17.1 Relationship of MIO to CHRIS and IEC

The Chairman reported on the status of establishing an IHO-IEC Harmonisation Group on Marine Information Objects (HG-MIO). Draft Terms of Reference (CHRIS/12/17.1A) had been forwarded to IEC and a formal response was still awaited. The Chairman stated that the IHB would follow-up the matter.

Action: IHB

MIO (LA) reported that, meanwhile, some informal HG-MIO-related activities had occurred including the display of AIS symbols, an "Ice in ECDIS" Workshop, and an International Workshop for AIS/ECDIS/VTS Interface (CHRIS/12/17.1B).

18. STATUS OF IHO PUBLICATIONS ON ECDIS

IHB (MH) described the status of the various publications (CHRIS/12/18A). He noted, in particular, that Edition 3.2 of the IHO Presentation Library for ECDIS (Annex A to S-52 Appendix 2) was published in March 2000 and that Edition 3.1 of the IHO Transfer Standard S-57 would be released in November 2000.

19. ANY OTHER BUSINESS

19.1 Print-on-Demand

USA-NOAA (DE) gave a presentation on the status of efforts in the USA related to Print-on

Demand (PoD) Nautical Charts (CHRIS/12/19.1A). Examples of PoD were distributed. He asked the question as to how to implement the recommendations of TAWG related to PoD. For instance, is there a need for a new WG? Canada (MC) suggested that under the aegis of the TAWG, a PoD discussion group be formed, utilizing the OEF. This was agreed.

Action TAWG

19.2 Electronic Commerce

USA-NOAA (DE) gave a presentation on the status of efforts in the USA related to electronic commerce for nautical charts (CHRIS/12/19.2A). By logging into the following web-site http://chartmaker.ncd.noaa.gov/ocs/ecommerce/contents.htm (with login & password), an example of how this e-Commerce site operates can be obtained. He noted that, potentially, this could be applied to RNCs and ENCs and operated under the aegis of TAWG. He said that he would be willing to chair an e-Commerce discussion group on the OEF. This was agreed.

Action: TAWG

19.3 Review of IHO Work Programme 2001

The Chairman presented document CHRIS/12/19.3A, which includes Elements 3.1 and 3.4 of the IHO Work Programme for 2001, as approved by the 2nd Extraordinary IHC in March 2000. These elements identify the work being carried out by the WEND and CHRIS committees and their working groups. This work responds principally to the strategic issue of transition to the digital environment. However, due to time constraints, the Chairman felt that it would not be possible for the Meeting to review the paper in detail. He requested that participants seriously review the Programme and advise the IHB as soon as possible.

Action: All

19.4 Norwegian Maritime Geodata Demonstror (NMGD) Project

NMGD (Tor SVANES) gave a brief description of the project. It was initiated by the NHS in order to establish an operational maritime geodata service for Norwegian waters. NMGD includes representation from companies and organisations with interests in the development and production of electronic chart systems and related activities. It also aims at harmonising and integrating other relevant research projects, which are directed towards maritime activities. The project has now been running for about 2.5 years and its current main objectives are to:

- Establish and demonstrate an operational real-time service on MIO objects such as tides, currents, wind and waves; and
- Develop and demonstrate the integration of AIS/VTS functionality in an ECDIS.

19.5 Submission of Papers to CHRIS

Australia (RW) expressed his concerns about the late submission of papers to CHRIS. He felt that a 6-week target date was necessary for "papers of substance". Greece (Alexis HADJIANTONIOU) reminded that a decision was made three years ago to ensure that all papers were to be submitted at least one month prior to the meeting date. The Chairman and the IHB would try to apply pressure to ensure that that target of one month be met.

Action: IHB

20. DATES AND LOCATION OF NEXT MEETING

The Chairman explained that is was intended that CHRIS would meet in Monaco every other year. However, as Greece had offered to host the next meeting sometime during late September – early October 2001, and it was relatively close to Monaco, it was agreed to have the 13th CHRIS Meeting in Athens. IHB would finalize the dates with the Greek Hydrographer.

Action: IHB

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Annex A

LIST OF ACRONYMS

AIS	Automated Identification System
ARCS	Admiralty Raster Chart Service (UK)
BSH	Bundesamt für Seeschiffahrt und Hydrographie (Germany)
CDV	Committee Draft for Voting (IEC)
CHRIS	Committee on Hydrographic Requirements for Information Systems (IHO)
CSC	Chart Standardisation Committee (IHO)
C&S	Colours & Symbols
C&SMWG	Colour and Symbol Maintenance Working Group (IHO)
CD-ROM	Compact Disk - Read Only Memory
DIGEST	Digital Geographic Information Exchange Standard
DNC	Digital Nautical Chart (USA-NIMA)
DnV	Del Norske Veritas (Norway)
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
EDI	Electronic Data Interchange
ENC	Electronic Navigational Chart
GDS	Geo-Data Server (PRIMAR)
GeoSym	Geospatial Symbols for Digital Displays (USA-NIMA)
GSDI	Global Spatial Data Infrastrusture
GIS	Geographic Information System
HGE	Harmonizing Group on ECDIS (IHO-IMO)
HG-MIO	Harmonizing Group on MIO's for ECDIS
HO	Hydrographic Office

ICA	International Cartographic Association
IEC	International Electrotechnical Commission
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
INT	International (Charts) (IHO)
ISO	International Organization for Standardization
MEPC	Marine Environmental Protection Committee (IMO)
MIO	Marine Information Object
MoU	Memorandum of Understanding
MSA	Maritime Safety Agency (China)
MSC	Maritime safety Committee (IMO)
MT1	Maintenance Team 1 (IEC)
NAV	Sub-committee on Navigation (IMO)
NECSA	Navigational Electronic Chart System Association
NHS	Norwegian Hydrogaphic Service
NIMA	National Imagery and Mapping Agency (USA)
NMGD	Norwegian Maritime Geodata Demonstror
NOAA	National Oceanic and Atmospheric Administration (USA)
NP	Nautical Publication
OEC	Open ECDIS Consortium
OEF	Open ECDIS Forum
OEM	Original Equipment Manufacturer
PKI	Public Key Infrastructure
PL	Presentation Library (IHO)

PoD	Print-on-Demand
PRIMAR	European ENC Coordinating Centre
PS	Performance Standards for ECDIS (IMO)
RCDS	Raster Chart Display System
RENC	Regional Electronic Navigational Chart Coordinating Centre (IHO)
RNC	Raster Navigational Chart
RSS	Republic of Singapore Ship
RTCM	Radio Technical Committee on Maritime Services (USA)
SBSM	State Bureau of Surveying and Mapping (China)
SDI	Spatial Data Infrastructure
SENC	System Electronic Navigational Chart
SHARED	Singapore Hong Kong Admiralty Raster and ENC Demonstration
SHOA	Servicio Hidrográfico y Oceanográfico de la Armada (Chile)
SNPWG	Standardization of Nautical Publications Working Group (IHO)
SOLAS	Safety of Life at Sea Convention (IMO)
TAWG	Technology Assessment Working Group (IHO)
TC211	Technical Committee 211 (ISO)
TOR	Terms of Reference
TSMAD	Transfer Standard Maintenance and Application Development Working Group (IHO)
UKHO	United Kingdom Hydrographic Office
USCG	United States Coast Guard
VTS	Vessel Traffic System
WEND	Worldwide Electronic Navigational Chart Data Base (IHO)
WG	Working Group
XML	Extensible Markup Language

Annex B

AGENDA

1. Opening and Administrative Arrangements

2. Approval of Agenda

3. Matters arising from Minutes of 11th CHRIS Meeting

4. Liaison with IMO
   - 4.1 SOLAS Chapter V – MSC 72 and NAV 46
   - 4.2 Reactivation of HGE

5. ECS Developments

6. Report on the May 2000 ENC Updating Session

7. ENC/SENC Delivery

8. Status of IEC 61174
   - 8.1 IHO ENC Test Data Set
   - 8.2 IEC TC80 Maintenance Group

9. Report on the 5th WEND Committee Meeting
   - 9.1 ENC/RNC Encryption

10. Projects of interest to CHRIS (e.g. SHARED)

11. Conferences of interest to CHRIS (e.g. GEOMATICA 2000)

12. Open ECDIS Forum – Liaison with Industry
    - 12.1 Reports on the March and September 2000 IHO – Industry meetings

13. Reports by CHRIS Working Groups
    - 13.1 Transfer Standard Maintenance and Applications Development (TSMAD)
    - 13.2 Colour and Symbol Maintenance (C&SMWG)
    - 13.3 Technology Assessment (TAWG)
    - 13.4 Standardisation of Nautical Publications (SNPWG)

14. Liaison with other Groups
    - 14.1 IHO Chart Standardization Committee (CSC)
    - 14.2 ISO/TC211 (Geographic Information/Geomatics)
    - 14.3 ICA Commission on Spatial Data Standards
    - 14.4 IHO WG on Standards for Hydrographic Surveys (S-44)
    - 14.5 IHO Tidal Committee
      - 14.5.1 Use of Real-Time Tidal Data on ECDIS

15. Vector Data Development
    - 15.1 European RENC (PRIMAR)
    - 15.2 Other RENC(s)
    - 15.3 ENC Development in HOs represented at the Meeting
    - 15.4 ENC Development in HOs not represented at the Meeting
    - 15.5 DNC Development in USA – National Imagery and Mapping Agency

16. Raster Data Development
    - 16.1 RNC Development in IHO Member States
    - 16.2 RNC Services (Updating, Printable Patches)

17. Marine Information Objects (MIO)
    - 17.1 Relationship of MIO to CHRIS and IEC

18. Status of IHO Publications on ECDIS

19. Any Other Business

    - 19.1 Print-on-demand
    - 19.2 Electronic commerce
    - 19.3 Review of IHO Work Programme 2001
    - 19.4 Norwegian Maritime Geodata Demonstror (NMGD) Project
    - 19.5 Submission of Papers to CHRIS

20. Date and Location of Next Meeting

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Annex C

LIST OF PARTICIPANTS

Country	Name of Member	Email
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PRIMAR	Mr. Robert SANDVIK	Robert.Sandvik@primar.org

[1] Korea Reasearch Institute of Ships and Ocean Engineering (KRISO), representing NORI
[2] Chart Standization Committee
[3] Norwegian Marine Geo-Demonstrator
[4] Marine Information Objects

Annex D

LIST OF DOCUMENTS

CHRIS/12/1A rev.7	List of Documents
CHRIS/12/1B rev.4	List of Participants
CHRIS/12/1C rev.3	Membership List for CHRIS and Related Working Groups
CHRIS/12/1D rev.3	CHRIS Membership List
CHRIS/12/2A rev.3	Abridged Agenda
CHRIS/12/3A	Minutes of the 11th CHRIS Meeting
CHRIS/12/3B rev.2	Actions arising from the Minutes of the 11th CHRIS Meeting
CHRIS/12/3C rev.1	Terms of Reference for CHRIS Committee and Related Working Groups
CHRIS/12/4.1A rev.1	Report on SOLAS Chapter V, in relation to CHRIS
CHRIS/12/4.2A rev.1	New Work Proposals for the IHO-IMO Harmonization Group on ECDIS (HGE)
CHRIS/12/5A	Report on ECS Data Standard Development
CHRIS/12/5B	Report on ECS Equipment Standard Development
CHRIS/12/6A rev.2	Report on the May 2000 ENC Updating Session
CHRIS/12/7A rev.1	Distribution of ENCs by means of SENC Distribution, by Germany
CHRIS/12/7B	Comments to Doc. CHRIS/12/7A rev.1, by Finland
CHRIS/12/7C	Comments to Doc. CHRIS/12/7A rev.1, by Denmark
CHRIS/12/8.1A	Status Report on IHO Test Data Set for IEC
CHRIS/12/8.2A	Report on activities of IEC TC 80 Maintenance Group on IEC 61174, in relation to CHRIS
CHRIS/12/9A	Report on the 5th WEND Committee Meeting
CHRIS/12/9.1A	ENC Security and Protection Issues
CHRIS/12/9.1B	PRIMAR Security Scheme Outline
CHRIS/12/9.1C rev.2	Polling Member states on ENC Security Schemes – responses to CL 38/2000
CHRIS/12/10A	Status Report on SHARED
CHRIS/12/10B	Implementation of the SHARED Concept in the CGMHC Area
CHRIS/12/11A	Report on GEOMATICA 2000, Cuba
CHRIS/12/12.1A	Report on the March 2000 IHO – Industry Interface Meeting
CHRIS/12/12.1B rev.1	Fostering Industry Involvement in CHRIS Activities
CHRIS/12/12.1C	IHO-Industry Co-operation
CHRIS/12/13.1A	Report on activities of TSMAD
CHRIS/12/13.2A	Report on activities of C&SMWG
CHRIS/12/13.2B	IHB Consultation of Industry on Future Developments of the IHO Presentation Library for ECDIS
CHRIS/12/13.3A	Report on activities of TAWG
CHRIS/12/13.4A	Report on activities of SNPWG
CHRIS/12/14.1A	Report on CSC activities, in relation to CHRIS
CHRIS/12/14.2A	Report on ISO/TC 211 activities, in relation to CHRIS
CHRIS/12/14.2B	Proposal on the future evolution of S-57 and the Relationship to the ISO TC211 Geographic Information Standards
CHRIS/12/14.2C	A Wider Spectrum of Data Exchange Standards – The IHO Role
CHRIS/12/14.3A	Report on ICA Spatial Data Standards Commission, in relation to CHRIS
CHRIS/12/14.4A	Report on S-44 WG activities, in relation to CHRIS
CHRIS/12/14.5A	Report on Tidal Committee activities, in relation to CHRIS

CHRIS/12/15A rev.6	Worldwide Production of Electronic Chart Data – Vector Development
CHRIS/12/15B rev.2	Status of ENC Production Worldwide (October 2000)
CHRIS/12/15.1A	Report on PRIMAR Activities
CHRIS/12/15.2A	Status Report on Virtual RENC Development in the MBSHC Area
CHRIS/12/16A rev.2	Worldwide Production of Electronic Chart Data – Raster Development
CHRIS/12/16.2A	Raster Chart Updating Service in the USA
CHRIS/12/17.1A	Draft ToR for the proposed IHO-IEC Harmonizing Group on Marine Information Objects (MIO)
CHRIS/12/17.1B	Status Report on Marine Information Objects (MIO) Development
CHRIS/12/18A	Status of IHO Publications on ECDIS
CHRIS/12/19.1A	Print-On-Demand Nautical Charts
CHRIS/12/19.2A	Electronic Commerce for Nautical Charts
CHRIS/12/19.3A	Review of IHO Work Programme 2001

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Annex E

SENC DISTRIBUTION

Premises:

- If the IHO allows the SENC distribution, this will be a major change in the IHO policy.
- The SENC distribution is a voluntary option in addition to the current ENC distribution.
- Before a final decision all outstanding technical concerns (e.g. regarding updating) should be solved.
- The National Hydrographic Offices decide if they allow the SENC distribution of their data.
- The opinions of mariners, maritime safety authorities, OEMs, etc. should be asked on national level.

SENC distribution should include the following safeguards:

Service Providers who are to supply the SENC service must operate under the regulations of the issuing authority (HO or RENC).

- Version control should not be inferior to ENC service.
- Update mechanism should not be inferior to ECDIS update mechanism.
- The distributor should maintain a registry of its users.
- Within the SENC distribution the copyright of ENC should be maintained.

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Annex F

SENC DELIVERY OPTION: PROPOSED CHANGES TO S-52

[Changes are shown by means of striked-through (deletions) or shaded (additions) characters]

3.3 System ENC (SENC)

(a) The Transfer Standard, is designed for the distribution of digital chart data. It is recognized that it is not the most efficient means of storing, manipulating or preparing data for display. Each manufacturer of ECDIS systems may design his own storage formats or data structure to allow its system to meet the performance requirements stated in this specification. The resulting database is called the System ENC (SENC).

(b) Any ECDIS should be capable of accepting and converting official HO data (ENC) to the internal storage structure of the individual ECDIS (System ENC or SENC). Such data includes both that in the ENC and that delivered in digital format to update the ENC. ~~(c) —~~ This conversion process ~~should be accomplished in the ECDIS but~~ does not imply real-time processing of HO supplied data. ~~It allows for the one-time conversion of the HO data upon receipt.~~

(c) ~~The~~ An official copy of the HO ~~supplied ENC~~ data, distributed as an ENC or contained within an externally generated SENC, is to be kept onboard. ~~From this, the ECDIS generates the "System ENC", which~~ The SENC generated on board, by ENC to SENC conversion, or ashore is used for actually operating the ECDIS. Through the same conversion process, official updates are added to the System ENC.

The information content of the SENC should include all that of the ENC corrected by official updates (see Appendix 1).

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Annex G

FOSTERING INDUSTRY PARTICIPATION IN ACTIVITIES OF THE IHO CHRIS AND ITS WGS

Decision of the 12th CHRIS Meeting

Following Australia's proposal in CHRIS/12/12.1B, it was agreed that:

1. The results of all CHRIS and CHRIS WG meetings would be widely circulated, including being posted on the IHO website. In particular, those bodies likely to represent interested parties would be provided with information copies of minutes and other relevant documentation and encouraged to seek comment and feedback from their constituencies. The list of organizations below should be used as an initial distribution list.
2. Appropriate representative bodies would be invited to attend CHRIS meetings as observers. The list of organizations below may be considered as the basis for such invitations.
3. ToR's for CHRIS WG's would be amended to incorporate the following membership guidelines:

   Composition and Chairmanship

   (1) The WG shall comprise representatives of IHO Member States (M/S) and Expert Contributors.

   (2) Decisions should generally be made by consensus. If votes are required on issues or to endorse proposals presented to the WG, only M/S may cast a vote. Votes shall be on the basis of one vote per M/S represented.

   (3) Expert Contributor membership is open to entities and organisations that can provide a relevant and constructive contribution to the work of the WG.

   (4) The WG shall be chaired by a representative of a M/S. The Chairman and the Vice-Chairman shall be chosen by the M/S represented in the WG, for a period of three years.

   (5) Expert Contributors shall seek approval of membership from the Chairman.

   (6) Expert Contributor membership may be withdrawn in the event that a majority of the M/S represented in the WG agree that an Expert Contributor's continued participation is irrelevant or unconstructive to the work of the WG.

   (7) All members shall inform the Chairman in advance of their intention to attend meetings of the WG.

   (8) In the event that a large number of Expert Contributor members seek to attend a meeting, the Chairman may restrict attendance by inviting Expert Contributors to act through one or more collective representatives.

The IHB was requested to implement amending procedures as appropriate.

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Interested Organizations

Comité International Radio Maritime (CIRM)

Engineering Committee on Ocean Resources (ECOR)

European Harbour Masters Association (EHMA)

IHO/IOC Guiding Committee for GEBCO

Intergovernmental Oceanographic Commission (IOC)

International Association of Geodesy (IAG)

International Association of Institutes of Navigation (IAIN)

International Association of Lighthouse Authorities (IALA)

International Association of Ports and Harbours (IAPH)

International Cartographic Association (ICA)

International Chamber of Shipping (ICS)

International Council for Exploration of the Seas (ICES)

International Council of Scientific Unions (ICSU)

International Electrotechnical Commission (IEC)

International Federation of Surveyors (FIG)

International Institute for Aerospace Survey and Earth Sciences (ITC)

International Maritime Organization (IMO)

International Society for Photogrammetry and Remote Sensing (ISPRS)

International Union of Geodesy and Geophysics (IUGG)

International Union of Geological Sciences (IUGS)

International Union of Surveying and Mapping (IUSM)

Oil Companies International Marine Forum (OCIMF)

Permanent Committee on Mean Sea Level (PCMSL)

Scientific Committee on Antarctic Research (SCAR)

Scientific Committee on Oceanic Research (SCOR)

The Hydrographic Society (THS)

UN Division for Ocean Affairs and the Law of the Sea

UN Environment Programme (UNEP)

World Meteorological Organization (WMO)

Annex H

ACTIONS ARISING FROM THE MINUTES OF THE 12th CHRIS MEETING

Para.	Subject	Action	Comments
5	To draw Member States' attention on ECS standard developments (NECSA and RTCM)	IHB	
6	1. To solicit comments from ENC and ECDIS producers to ascertain what additional checks/tests should be included as mandatory in IEC 61174. 2. To submit a paper to TSMAD outlining problems experienced with temporary changes. 3. To contact the IHO LAC on the issue of unsynchronized NtM's and ER's. 4. To elaborate a proposal, to be submitted to TSMAD, to resolve the conflict between Paragraph 3.2 (m) of S-52 Appendix 1 and Table 5.1 of the ENC Product Specification. 5. To contact the LAC seeking advice regarding the legal status of digital ENC updates.	IHB BSH IHB SHOM IHB	Refer to CHRIS/12/6A " " " "
7	1. To convey to MS, CHRIS recommendation that SENC delivery be accepted as an option, in addition to direct ENC distribution. 2. To submit to MS the proposed new wording for § 3.3 of S-52, as in Annex F.	IHB IHB	
8.1	1. To produce a revised ENC Test Data Set for IEC. 2. Once the ENC Test Data Set is finalised, to inform MS and make it available on the IHO Website and on CD-ROM.	UKHO IHB	
9	To inform MS of CHRIS suggestion to defer the encryption issue for a year.	IHB	
12.1	1. To implement CHRIS Decision, as in Annex G, in particular regarding CHRIS WGs' membership. 2. To assist with the establishment of an Open ECDIS Consortium (OEC). 3. To monitor the financial situation of the OEF and investigate alternative funding.	IHB IHB IHB	
13.1	1. To inform MS and commercial users of	IHB	

	S-57 of the release of S-57 Edition 3.1, which would not supersede Edition 3.0, but be used when available. 2. To investigate the impact on IEC 61174 of S-57 Editions 3.0 and 3.1 being both used for some time. 3. To advise the IHB about when type-approval authorities must move to new S-57 versions on type-approval.	IEC TC80/MT1 TSMAD Chairman	
13.2	To obtain industry reaction to the PL, i.e. which changes are required to enhance it?	IHB	
13.3	To investigate the use of high-resolution flat panel displays for ECDIS.	TAWG	
14.1	To investigate the possibility of merging CSC with CHRIS.	IHB	
14.2	1. To establish a sub-group within TSMAD to work on issues related to S-57 alignment with ISO/TC211 standards. 2. To set up a discussion topic on Inland ECDIS, on the OEF.	TSMAD IHB	Refer to CHRIS/12/14.2B
14.3	To support IHB initiative to organise an IHO Chart & GIS Exhibition at ICC'2001.	All	
14.4	To extend S-57 scope to "Hydrography", as opposed to "Cartography".	IHB	
14.5	To consider recommendations from IHO Tidal Committee and act as necessary.	TSMAD and C&SMWG	Refer to CHRIS/12/14.5A
17.1	To follow-up, in liaison with IEC, the establishment of an IHO-IEC Harmonisation Group on Marine Information Objects (HG-MIO).	IHB	
19.1	To form a discussion group on Print-On-Demand (POD), utilizing the OEF.	TAWG	
19.2	To form a discussion group on e-Commerce, utilizing the OEF.	TAWG	
19.3	To review the IHO Work Programme for 2001 and advise the IHB asap.	All	
19.5	To ensure that documents are submitted at least one month prior to the meeting date.	IHB	
20	To finalize the dates for the 13th CHRIS Meeting in Athens, Greece.	IHB	

Member State: ……

SENC DELIVERY OPTION

QUESTIONNAIRE / VOTING PAPER

(*to be returned to the IHB - Deadline will be given later*
E-mail: info@ihb.mc - Fax: +377 93 10 81 40)

1) Do you agree with the recommendation of the CHRIS Committee that SENC distribution be accepted as an option, in addition to direct ENC distribution, providing that basic premises and safeguards for SENC delivery, as listed at Annex E to the Minutes of the 12th CHRIS Meeting, be adhered to?

☐ YES ☐ NO

2) If the answer is "YES" to Question 1), do you agree that paragraph 3.3 of IHO Publication S-52 be amended as emphasized in Annex F to the Minutes of the 12th CHRIS Meeting[1]?

☐ YES ☐ NO

Comments: ……

……

……

Name / Signature …… Date: ……

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1 If adopted, the revised paragraph 3.3 of S-52 would read as follows:

3.3 *System ENC (SENC)*

(a) *The Transfer Standard, is designed for the distribution of digital chart data. It is recognized that it is not the most efficient means of storing, manipulating or preparing data for display. Each manufacturer of ECDIS systems may design his own storage formats or data structure to allow its system to meet the performance requirements stated in this specification. The resulting database is called the System ENC (SENC).*

(b) *Any ECDIS should be capable of accepting and converting official HO data (ENC) to the internal storage structure of the individual ECDIS (System ENC or SENC). Such data includes both that in the ENC and that delivered in digital format to update the ENC. This conversion process does not imply real-time processing of HO supplied data.*

(c) *An official copy of the HO data, distributed as an ENC or contained within an externally generated SENC, is to be kept onboard. The SENC generated on board, by ENC to SENC conversion, or ashore is used for actually operating the ECDIS. Through the same conversion process, official updates are added to the System ENC.*

The information content of the SENC should include all that of the ENC corrected by official updates (see Appendix 1).

DISTRIBUTION OF ENCS BY MEANS OF SENC DISTRIBUTION
(Ing en chef Michel LE GOUIC, SHOM, France)

Below is the text of SHOM's letter 111 SHOM/EG/NP of 16 January 2001, signed by Ingénieur en chef Michel LE GOUIC, Head of Bureau for General Affairs, and addressed to CHRIS Members. It is reproduced, with SHOM's permission, for the information of Member States. Any comments / requests for clarification should be addressed to Ing en chef LE GOUIC, mlegouic@shom.fr.

SUBJECT : Distribution of ENCs by means of SENC distribution

REFERENCE (S) : CHRIS/12/7A rev.1

The issue is to decide whether SENCs may be considered as official charts under certain conditions. Deciding whether they may be used as unofficial charts is outside the purview of IHO.

Official chart is considered hereafter with the definition of the new SOLAS V "a special purpose map or book, or a specially compiled database […] that is issued officially by or on the authority of a government, authorized Hydrographic Office, or other relevant government institutions, and is designed to meet the requirements of marine navigation".

1 The present status of official ENC and ECDIS

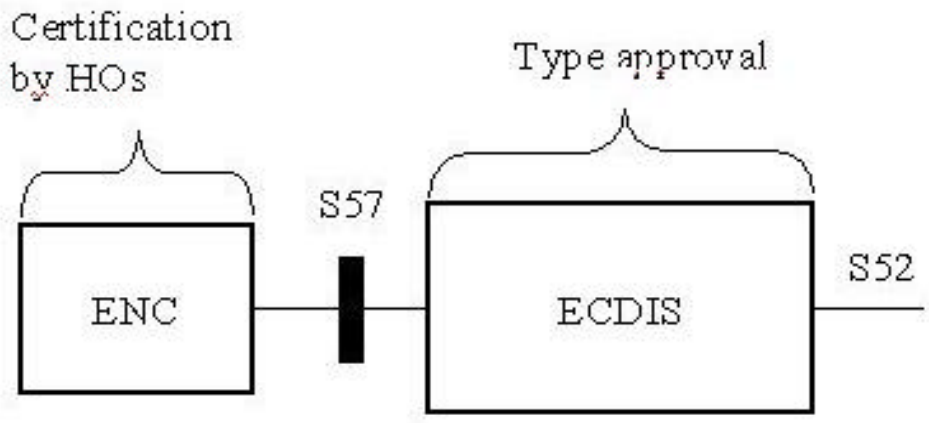
The global "electronic chart system" is made of two sub-systems which have to be certified :

- the subsystem(s) producing the ENCs and updates ;
- the subsytem using the ENC, ie the ECDIS equipment.

The certification of the ECDIS equipment is made by applying several standards, among which S-52, IEC 61174, resolution A.817(19) of the IMO...

The certification of the subsystem(s) producing ENCs is given by the official authority of HOs and is based on IHO standards and specifications, and on the quality organisations of the different HOs.

The certifying authorities are not the same: the ECDIS equipment is certified by classification bodies, the specially compiled databases constituting the ENCs are "certified" by HOs. The interface between the two sub-systems has to be clearly defined: that is the function of S-57 (format, content, structure, product specification).

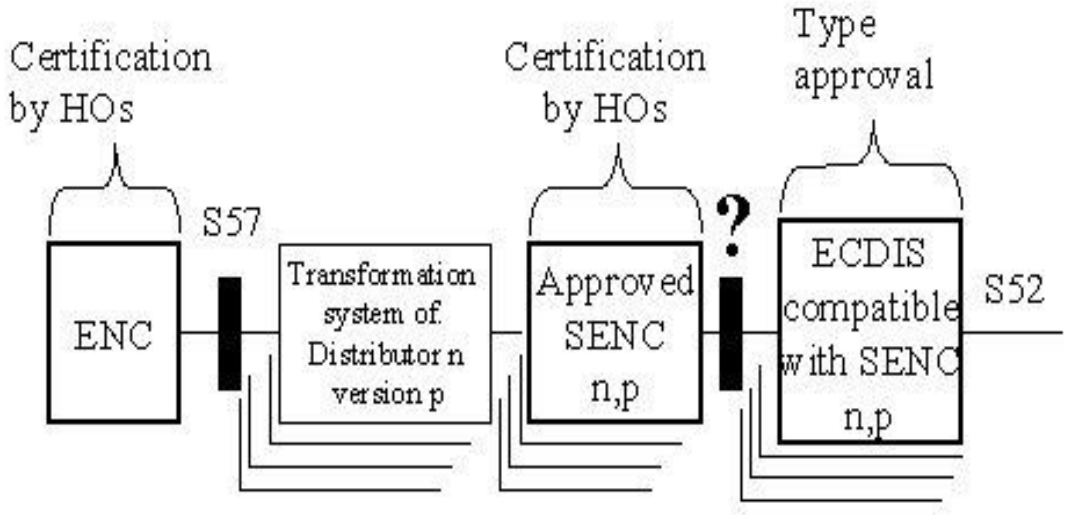


2. Possible processes for an "official" use of SENCs

If other kinds of interfaces are authorized, it will be necessary to clearly define by whom they have been certified.

2.1 *Control of the SENC quality by HOs*

When an ECDIS is type-approved, what is called SENC is not certified as a specially compiled database, but through the whole process from S57 ENC to S52 display. If a SENC database is considered as an input, then it has to be certified as an "official chart". The expertise should rely on the HOs acting as authorized government institutions (cf SOLAS V), but they have not the resources and it would be very cost-ineffective to approve as many SENCs as there are manufacturers, and for a manufacturer as many SENCs as there are system versions of their equipment.



2.2 *Certification of the SENC generator system*

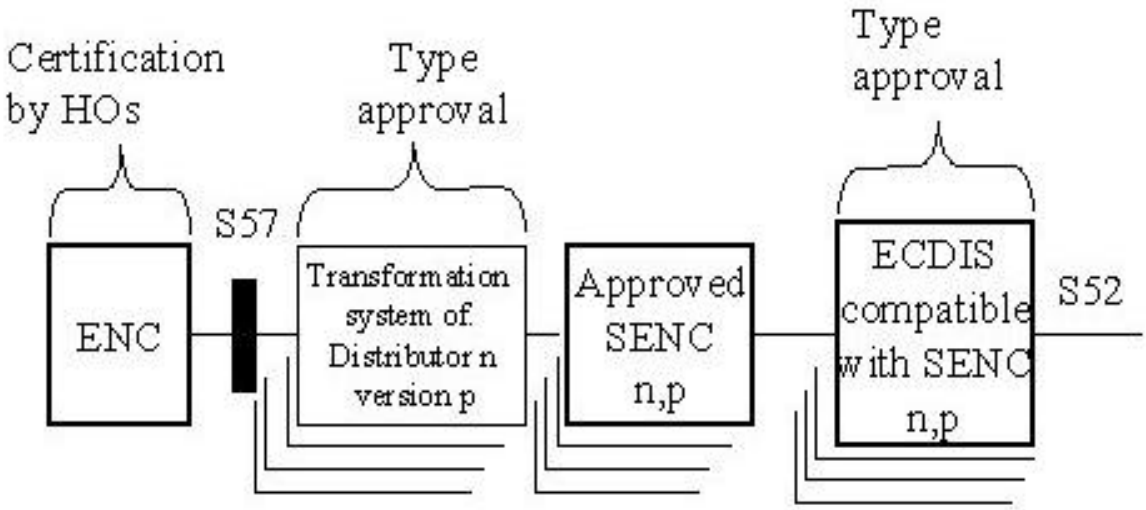
We could therefore try to consider that the certification of SENC is obtained through the certification of the equipment (hardware and software) permitting the transformation of S57ENC into SENC.

It has been rightly stated in last CHRIS that "version controls (for SENC) should not be inferior to ENC services". The only way to apply this statement is to apply more stringent control procedures to land-based SENC generators than the ones applied to ECDIS global type approval.

The ways control procedures could be more stringent and reliability could be improved, have also to be formally specified (standardised): it is also probable that the security schemes for ENCs and SENCs would be different, still increasing the problem.

The only reasonable solution would therefore be to have a standardised SENC[1], but such a standard efficient for manufacturer A would not be efficient for manufacturer B, and for this manufacturer B it would be necessary to define its own System SENC. Another aspect is that SENC formats, having to be tailored to the ECDIS architectures, will certainly evolve with their architectures. If official SENCs are allowed, there will surely be many versions of official SENCs formats and the coherency between all those versions will have to be managed. …

[1] It is probable that recognising official SENCs would generate de facto standards which would be used by several distributors and several manufacturers, with the high risk that some of those unofficial standards would give rise to hidden discrepancies that would be dangerous for the mariner; and HOs do not have the resource to standardise several standards and guarantee their safe usage.

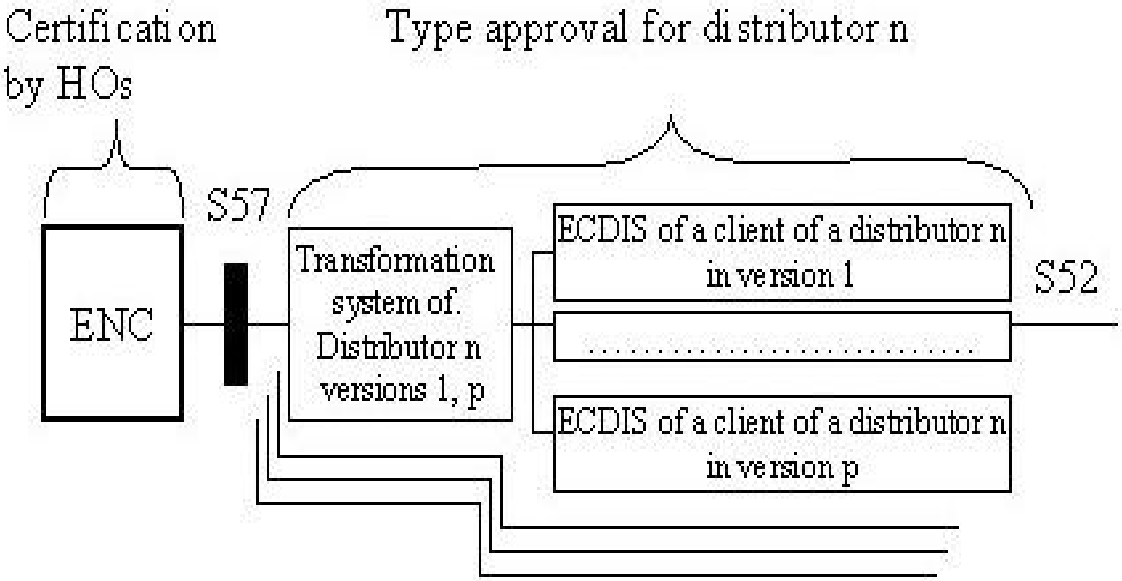


With such a burgeoning of complexity, we may be almost sure that we have overlooked other problems and that, as usual in complex environments, the "reality" is much more complex that what is perceived at first sight.

2.3 *Global distribution system certification*

A third possibility to be considered for "SENC distribution" would be to globally type-approve the transformation by a distributor of the ENC in a SENC in a land-based system, and the use at sea of this SENC, with appropriate up-dates. The interest would be for the distributor to have the possibility to add non ENC data in its SENCs, therefore providing specific services to its clients.

We can observe that this SENC route includes software for handling SENCs at the distributor's, increasing the volume of software to be certified, and thus requiring a greater reliability (whatever that means).



2.4 Comparison between the different "official" SENC routes

We have now 3 main types of routes permitting the use of SENCs in the ECDIS:

In § 2.1 the certification of as many SENCs as there are distributors and types of versions of equipment is done by HOs: that is simply unrealistic

In § 2.2 the certification of as many SENCs as there are distributors and types of versions of equipment is done through type approval of the land based SENC generators of the distributors. This implies that the certification body implicitly approves the quality of the cartographic data of the SENCs and their up-dates. Therefore in the waters of a given country, there would be many official digital cartographic data sets but only one of these sets authorised by the relevant national authority, except if we consider the certification bodies are relevant cartographic authorities: they would probably consider this as too risky.

In § 2.3 the certification is done in a process from the S57 ENC to the S52 compliance, but includes handling softwares at the distributor's. This scheme, from the point of view of the HOs is not different than the present scheme presented in §1. But for the type-approving body, the complexity is greater because each distributor and the ECDIS equipments using its services are to be type-approved. The benefit for the distributor is to be able to offer various services to its clients, using the support of the ECDIS.

3 <u>What is a SENC ?</u>

In fact, do we clearly know what a SENC is? According to the IHO and IMO standards, "SENC means <u>a</u> database resulting from the transformation of the ENC by ECDIS for appropriate use, updates to the ENC by appropriate means, and other data added by the mariner".

It may be deduced from the texts that it is the database stored on hard-disk or equivalent memory, but this database is not directly displayed ; it is transferred to central memory, generally in a different format, then probably used to create a "display base" which is then displayed via specialised processors and specialised memory. All this depends on the ECDIS architecture, which is intentionally not standardised on those matters. As for the "other data added by the mariner[1]", it is not specified how they are stored.

We deduce from those few remarks that a SENC is only an intermediate concept[2], useful for specifying certification standards for ECDIS. We may then wonder whether a non standardised exchange format of an ill-defined object is suitable for an official delivery.

Furthermore, it seems that the only interest of "official" SENC would be to make it easier to reload the ECDIS after a failure. But there exist many hardware and software for saving images of memory on lasting media, and most software vendors authorise such back-up copies. This mechanism is very easy to apply to ECDIS and ENCs[3].

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[1] Where an ENC exists, the added data cannot of course concern the nautical cartography.

[2] Another example of the difficulty to formalise an approved SENC concept. The SENC updates would be broadcast by the distributor. As a consequence, there arise questions which have to be formally answered in official standards :

- Is the ECDIS allowed to be able to receive ENC updates and SENC updates ? If it is, how should these be synchronised ? If not, which one ? Are ENC updates allowed in SENC-provided ECDIS ? Are SENC updates allowed in ENC-provided ECDIS ?
- Is an ECDIS allowed to shift from ENC updates to SENC updates ? Under which conditions ? How to validate the shift? And what if an ENC update arrives before the corresponding SENC update in a SENC-provided ECDIS? And what if a SENC update arrives before the corresponding ENC update ?
- Is an ECDIS allowed to receive different SENC formats ? If yes, we have to answer the same kind of questions as above, for each possible sequence or combination.

[3] It should be stressed that such a back-up is needed for updates anyway.

So what is a SENC, and what is the real problem do not appear clearly.

It must be stressed that the rigour of the definition of basic terms is mandatory for the success of the development of information systems. As it appears that the concept of SENC is somewhat ambiguous (and it needs not to be rigorous for its present use), we can be sure that the ambiguities will propagate and develop in the process of applying the standards to information systems. It follows that, for using the concept of SENC for clear-cut interface, much arduous and thorough work would be necessary.

Of course, a SENC format would be proprietary, at least at the beginning, and would give its owner a better control of its market, but that should not be a concern for most HOs , at least not when dealing with official charts.

CONCLUSION

Allowing the distribution of "official" SENC is probably not practically feasible and has a lot of drawbacks with only a very slim advantage, if any.

HOs should stick to a simple global design, which is that they interface with ECDIS through S-57 ENCs and that the contents and display are standardised in S-52 only from the man-machine perspective. The concept of SENC is only a help for understanding the ECDIS, but the ECDIS should be treated as a black-box by the HOs which should not, at any cost, be involved in how this information is handled inside. It seems, at first sight, that it would be easy to replace the concept of SENC in IHO papers by much simpler concepts like the information to be stored in the ECDIS. It is probably useful to simplify S-52 now that we know that it works.

One could argue that this position unduly restricts the capacities of distributors and manufacturers to put new and innovative architectures on the market. In fact, it just defines that the interface between the HOs and the outside world is S-57 ENCs. Nothing prevents IMO from standardising distributed architectures like in § 4, where a broadcasting system based on ENC inputs and subscribing ECDIS linked via a "SENC line" would be considered as official navigation systems and the RENCs could devise a licensing agreement for such a scheme. But it would not be an IHO standard and would not involve HOs.

Distribution of ENCs by means of SENC Distribution

Comments on Attachment III
to IHB Circular Letter 15/2001

Submitted by Germany
Supported by Australia, Canada, Italy, USA (NIMA), USA (NOAA)

Attachment III submitted by France raises a number of questions and comments regarding . SENC distribution. Most were thoroughly discussed at the CHRIS meeting in Valparaiso, Chile, 23 – 25 October 2000. As a result of the discussions in Valparaiso, at which France was represented, the meeting agreed unanimously that "SENC distribution would be acceptable as an option, in addition to direct ENC distribution providing that basic premises and safeguards for SENC delivery, as listed at Annex E, be adhered to" (agenda item 7, page 6 of the Minutes). It is our view that the subsequent paper submitted by France contains a number of incorrect interpretations which in turn have led to an overly pessimistic and complicated outlook. The following clarifications are offered.

Control of SENC Quality by HO's

Certification of the SENC generator system

In our view it is incorrect and misleading to characterize S57 as an interface between the ENC and ECDIS. S57 is the data format in which the official chart database is compiled and published by the HO. This data set is subsequently used in ECDIS by converting it into a SENC. At present the conversion of an ENC into a SENC takes place inside the ECDIS and is tested as part of the type approval process. This testing, conducted under the requirements of IEC61174, ensures that the ENC data is not degraded or compromised.

France is correct to point out that if a SENC is to be created outside the ECDIS, then HO's must have an assurance that the conversion process is as effective as if the ENC had been converted internally in a type approved ECDIS. However, this does not require any additional work by the HO. Nor does it mean that more stringent control procedures or additional formats or standards are required. This is because the conversion process (described by France as the *SENC generator system*) will be the same as the one inside an ECDIS. It can therefore be tested easily by the same test authorities that are already testing all the internal functions of ECDIS. In fact at least two commercial organisations have already achieved satisfactory testing of their converters with BSH and DNV.

It is also our view that incorporating official and unofficial data in the SENC is not a threat to the integrity of the official data. The inclusion of unofficial data is addressed in the ECDIS standards already. Official ENC data must be uniquely identifiable and sequenced for version control. In fact, there are several type-approved ECDIS that have a "multi-fuel" capability that supports various non-official input formats already. If this can already be achieved satisfactorily by a type approved ECDIS at sea, then simply relocating the SENC generator function ashore means that the same thing can be achieved there too. It is the same situation whether the unofficial data is introduced onboard a ship or during SENC creation ashore.

Finally, we would point out that SENC delivery of an official ENC will always require the authority of the HO or government responsible for the parent ENC. It follows that any HO that is unwilling or uncertain will withhold approval for their ENC's to be distributed in this way and thereby prevent SENC distribution. This is their right and responsibility. Meanwhile, the proposals agreed at the CHRIS meeting are intended for those HO's that wish to enhance and further promote the widespread use of ENC data.

It remains our view that this is a forward looking initiative that will not adversely affect existing arrangements and therefore deserves support.

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ENC SECURITY SCHEME
Responses to IHB CL 38/2000 of 5 September 2000

1. Summary of Replies

Country	*Is it your intention to have your ENC data supplied in an encrypted format, e.g. directly or through a RENC?*	*If the answer is "YES" to Question 1), do you agree that there should be one IHO Recommended Security Scheme?*	*If the answer is "YES" to Questions 1) & 2), do you agree that the Security Scheme presently employed by PRIMAR, as described in Annex A, should become the IHO Recommended Security Scheme?*
Argentina	Yes	Yes	Yes
Australia	Yes	Yes	No (comments)
Bahrain	Yes	Yes	Yes
Brazil	Yes	Yes	Yes (comments)
Canada	Yes	No	N.A. (comments)
Chile	Yes	Yes	No (comments)
China	Yes	Yes	Yes
Colombia	Yes	No	No vote
Denmark	Yes	Yes	Yes (comments)
Finland	Yes	Yes	Yes (comments)
France	Yes	Yes	No vote (comments)
Germany	Yes	Yes	Yes (comments)
Greece	Yes	Yes	Yes
Iceland	Yes	Yes	Yes
India	Yes	Yes	No (comments)
Japan	Yes	No	N.A. (comments)
Malaysia	Yes	Yes	Yes (comments)
Netherlands	Yes	Yes	Yes
New Zealand	Yes	Yes	No (comments)
Norway	Yes	No	N.A. (comments)
Pakistan	Yes	Yes	No vote (comments)
Peru	Yes	Yes	Yes (comments)
Portugal	Yes	Yes	No (comments)
Russia	Yes	Yes	Yes
Spain	Yes	Yes	Yes
Sweden	Yes	Yes	Yes (comments)
Tunisia	Yes	Yes	No vote (comments)
Turkey	Yes	Yes	No vote (comments)
United Kingdom	Yes	Yes	Yes (comments)
Uruguay	Yes	Yes	Yes
USA (NOAA & NIMA)	Yes	No	No (comments)
31 responses	**31 Yes**	**26 Yes** **5 No**	**17 Yes** **6 No** **3 N.A.** **5 No vote**

2. Members States' Comments

ARGENTINA

No comments

AUSTRALIA

The PRIMAR security scheme may well exhibit all the desirable components of an IHO model, however it does not necessarily enjoy the level of industry support claimed in the supporting paper.

To impose the PRIMAR solution after only the limited involvement of those most affected is inappropriate. In keeping with recent discussions at the 2nd EIHC and subsequently at the TSMAD/C&SMWG Industry meeting, the IHO should try and confine itself to defining the requirements of a security regime, rather than proposing the solution.

Accordingly, ECDIS stakeholders, particularly ECDIS manufacturers, should now be invited to comment on a preferred method of achieving standardized security arrangements. This should be organized against a strict timetable. A decision must be reached well in advance of the introduction of the revised SOLAS V on 1 July 2002. Obviously, if industry is unable to come forward with suitable arrangements, then the PRIMAR model remains a fall back position.

BAHRAIN

No comments

BRAZIL

We see no reason for the development of another standard as this have been field tested and is under way to become an Industry Standard.

CANADA

1. Canada does not intend to implement an ENC Security System for at least two years.

2. We base this decision on the fact that we do not consider the security threat to be severe enough to warrant such a substantial investment in a protection system. In Canada we are confident that the commercial shipping industry will not be pirating ENC data nor knowingly use pirated data.

3. Furthermore we consider that as security technology rapidly evolves to meet the requirements of e-commerce and e-government, it is premature to settle on a standard which, over time, may prove to be non-standard vis-à-vis the rest of the world.

4. The government of Canada has declared that it will use the Public Key Infrastructure (PKI) approach to on-line access security with its citizens. PKI is an open standard being promoted by a number of nations for both e-Commerce and e-Government.

5. The use of ECDIS as the "heart and hub" of a marine electronic highway is a concept promoted by the Shipping Industry and rapidly gaining acceptance in Canada. In this vision the ECDIS will receive information from a wide variety of sources, only one of which is CHS. Other agencies supplying data also have security concerns but will be seeking a more global security system and not a piecemeal approach wherein each supplier provides its own security standard.

6. The candidate security system suggested in the CL has yet to be implemented at another RENC or HO. Canada has a project underway to determine the level of difficulty in implementing this approach. It

is premature to judge the full cost of implementation but our initial investigation shows the task to be non-trivial and require extensive use of software engineers skilled in implementing security systems. This may be onerous for some HOs.

7. Having more that one approach to security will indeed make it more difficult for the systems manufacturers to implement. However this problem pales in comparison to the one they face daily - the paucity of official vector data. Systems suppliers currently base their marketing strategy on the flexibility of their system to adopt a variety of data standards and use terms such as dual-fuel, triple-fuel etc. to demonstrate the systems ability to adapt to whatever data is available. Having more that one security standard is a solvable problem.

CHILE

1. Of course, if we expect data pirating or a wicked intervention of a third party, our intention is to supply encoded ENC data. On another hand, if this is extremely bothersome and onerous, we are not going to encode the data, minimizing the interest of pirating, through the supply of data at a low cost, providing periodical publications which make obsolete the previous ENCs editions.

2. In the case of an encoding, our wish is to standardize it and that it be an IHO recommendation, as the only way of ensuring such a standardization.

3. The PRIMAR Security Scheme seems to us very complicate and it would be most convenient to know the experiences of the involved actors. We believe that the establishment of a unique administrator of the scheme is extremely convenient.

CHINA

No comments.

COLOMBIA

We do not recommend to establish security schemes through the IHO; these protection procedures are part of the autonomy of the HOs. If some of them wish to make it with PRIMAR, that's fine; if they desire to create schemes, that's also fine. The technology ends by prevailing itself, without needing any IHO recommendations. If the PRIMAR scheme is of worldwide scope, with general adherence to, it will end by prevailing without any IHO support. First impression is that PRIMAR scheme appears "bureaucratic", that is why a much deeper analysis will be required in Colombia.

DENMARK

For the time being the change to a new one should be controlled and coordinated allowing industry sufficient time to prepare.

FINLAND

The Security Scheme of PRIMAR has been implemented for the ten co-operating Hydrographic Offices. The Security Scheme is now operational and proven to be feasible.

In the documentation enclosed with the CL 38/2000, there were no estimation of the actual workload of the Scheme Administrator. Thus it is difficult to estimate the resources needed at the IHB if the IHO takes the role of the Scheme Administrator. For the time being it may be feasible that the IHO contracts out the practical work of the Scheme Administrator to PRIMAR, ECC AS, or other publicly known and reliable organization. There may even be different organizations for different parts of the world.

FRANCE

As regards question 3, our reply is, a priori, positive, as the scheme currently used by PRIMAR appears to be satisfactory. However, it would be useful to have an independent technical opinion (from a CHRIS Working Group, for example) and above all to have more details as regards the practical arrangements for the transfer of the scheme administration which is briefly outlined in para. 5.3 of IHB CL 38/2000.

GERMANY

It is unfortunate that the issue of a standard IHO Security Scheme is put to a decision by IHO only a posteriori, after PRIMAR has adopted its system. Adopting now a potentially superior security scheme different from PRIMAR 's would, however, send a confusing and probably upsetting message to the industry which has partly already implemented the PRIMAR schema.

It should be noted that the "IHO Standard Security System" will be limited to ENCs only. Dual-fuel users (e.g. ENC supplemented with ARCS) data will continue having to employ two different security systems. This problem can only be overcome by promulgating ENCs through a SENC distribution system when data from multiple sources are integrated by a service provider for the particular ECDIS under a single (proprietary) security schema.

GREECE

No comments.

ICELAND

No comments.

INDIA

Whilst the security system employed by PRIMAR is appreciated, the IHO recommended security system should have inbuilt safety to protect the copyrights of producer nations/charting agencies to avoid any hijacking of the issue by a particular country/group of countries.

JAPAN

The Hydrographic Department of Japan (JHD) considers that an encryption system which is suitable for application to ENC for small craft and GIS should be examined. As techniques of encryption are not established and are developing rapidly, JHD is opposed to standardize the encryption methods.

MALAYSIA

PRIMAR security scheme to be adopted as an initial start, but can be reviewed later if necessary.

NETHERLANDS

No comments.

NEW ZEALAND

1. An ENC review is currently being undertaken to determine the needs of New Zealand's mariners, and to plan a strategic approach to production and distribution. We expect to commence

distribution of ENC data in two years time.

2. New Zealand endorses the use of encryption in the production of ENC data for the following reasons:
   - As proof of authoritative data to the mariner, especially if in an IHO format;
   - To protect the integrity of the data; and
   - To provide a secure tracking system of users for updating purposes.

3. New Zealand believes that if encryption is a requirement then the approach should be standardized and produced by the IHO.

4. It is noted that the IHO has limited knowledge in this area and should obtain advice and guidance from Member States (producing ENC's) and industry partners (ECS manufacturers).
5. New Zealand does not believe that the PRIMAR scheme should be used. Other systems are available and a rigorous comparison needs to be made to find the best solution.

NORWAY

Comment No. 1

Every approach within this field should primarily be driven by objectives seeking increased safety for the user, better cost efficiency and improved overall characteristics/capability throughout the complete producer-distributor-user chain. Commercial constraints should be taken into consideration by IHO/HOs only if such constraints have no significant impact on these major objectives.

The NHS answer to Q1 is Yes, but the encryption scheme for Norwegian waters is limited to imposing a digital signature, i.e. highest priority is given to the first four objectives above. If the situation with respect to unauthorized copying, data piracy, commercial consequences, etc. is more difficult than now envisaged, this decision should be evaluated. Finally, we would like to emphasize the importance of confidence between all serious players operating within this field.

Comment No. 2

The NHS answer to Q2 is a this time No, the actual choice should be based on developments and trends in the market. Various alternative are available of which PRIMAR's solution is probably the most mature. For instance, the US alternative AES as described in the last document referred to above seems interesting and promising and it is premature to make a firm decision in this direction now. We recommend hover the IHB to closely follow the US development efforts.

PAKISTAN

The Security Scheme employed by PRIMAR seems suitable to adopt as standard. However, it is suggested that it may be compared with other such schemes and most suitable may be adopted as IHO Standard Security Scheme for ENC Data.

PERU

The involvement of having the IHO adopt the Security Scheme, which is presently being applied by PRIMAR, specially related to management, roles and responsibilities, should be taken into consideration more deeply, as the possible operation of such system is not very clear yet.

PORTUGAL

We believe that IHO should allow a testing period of PRIMAR and other security systems that may be

developed in the near future before it becames an IHO recommended Security Scheme. If needed, an Industry – HOs – PRIMAR meeting should be planned and a common solution to be provided.

RUSSIA

No comments.

SPAIN

No comments.

SWEDEN

As has been mentioned earlier in other contexts, it should be noted that the Security Scheme is not only a guard against piracy or illegal copying. It is furthermore, and not the least, a guarantee that a delivery contains original data.

TUNISIA

With regard to paragraph 3, the Tunisian Hydrographic and Oceanographic Service suggests the creation of a technical working group to study into details all the aspects affecting the ENC, such as encryption problems, distribution process and updating models.

Later on, the recommendations of the WG will be submitted to the HO's Member States by Circular Letter for voting and eventual comments.

TURKEY

Despite the fact that the e-commerce and the related technologies are evolving too fast, TN-DNHO supports that there must be a universal standard for encryption of ENC Data, which will provide maximum security, taking into account the cost and the operational concerns. Therefore PRIMAR's Security Scheme can be adopted as the IHO Recommended Security Scheme but the financial aspects and/or burden of this to the HOs, especially for those who are not one of the Cooperative HOs with PRIMAR shall also be defined in clear terms, before it's final approval. We are not in a position to answer Yes or No to this question, without knowing these details.

UNITED KINGDOM

For the UKHO, the primary requirement for the security scheme is as a tool to facilitate the assurance of data and service integrity.

The UKHO believes most strongly that a single IHO Standard Security Scheme would be beneficial to HOs, ECDIS/ECS manufacturers and, most importantly, to ECDIS/ECS users. It is a logical extension to the IHO agreed concept of a single standard for the format and content of HO-produced vector navigational charts.

As mentioned in Annex A to CL 38/2000, the UKHO has been heavily involved in the development of the Security Scheme used by PRIMAR. Recent studies by independent consultants have confirmed both the suitability and currency of the technical solution for the intended purposes. Furthermore, a significant number of ECDIS/ECS manufacturers have implemented the PRIMAR Scheme, are working on implementation or have stated their intention to do so. Early adoption of the Scheme by the IHO would be extremely welcome by these companies and it would greatly assist the take up of ECDIS by the shipping industry by removing one of the related uncertainties. Further delay is likely to be detrimental to the whole concept of ECDIS and ENCs.

URUGUAY

A virtual RENC should be established in South America.

USA

The area of encryption and security is rapidly changing, both technologically and legally. We firmly believe that it is premature to settle on a system in these evolving times. Instead we suggest the IHO assume the role of developing and drafting “performance requirements”, noting just what is expected of these encryption systems, keeping in mind both the safety of navigation as well as security. Once such performance requirements are completed, industry should be allowed and encouraged to determine the most effective means of implementing the requirements utilizing current technology.

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