**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.

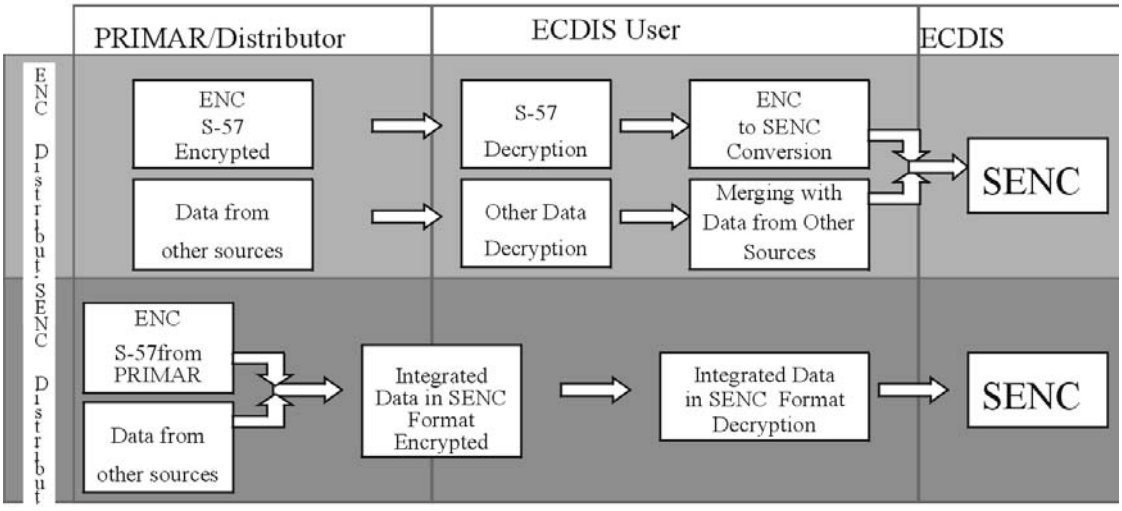


**Fig. 1 - Schema of Data Flow**

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/12/12.1B[1], 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 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

[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.

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/12/151A). 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 | | | |
| 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 |

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**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**

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[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 |

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|---|---|
| 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 *(to come)* |
| 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.<br>2. To submit a paper to TSMAD outlining problems experienced with temporary changes.<br>3. To contact the IHO LAC on the issue of unsynchronized NtM's and ER's.<br>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.<br>5. To contact the LAC seeking advice regarding the legal status of digital ENC updates. | IHB<br>BSH<br>IHB<br>SHOM<br>IHB | Refer to CHRIS/12/6A<br>"<br>"<br>"<br>" |
| 7 | 1. To convey to MS, CHRIS recommendation that SENC delivery be accepted as an option, in addition to direct ENC distribution.<br>2. To submit to MS the proposed new wording for § 3.3 of S-52, as in Annex F. | IHB<br>IHB | |
| 8.1 | 1. To produce a revised ENC Test Data Set for IEC.<br>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<br>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.<br>2. To assist with the establishment of an Open ECDIS Consortium (OEC).<br>3. To monitor the financial situation of the OEF and investigate alternative funding. | IHB<br>IHB<br>IHB | |
| 13.1 | 1. To inform MS and commercial users of S-57 of the release of S-57 Edition 3.1, which would not supersede Edition 3.0, but be used when available.<br>2. To investigate the impact on IEC 61174 of S-57 Editions 3.0 and 3.1 being both used for some time. | IHB<br>IEC TC80/MT1 | |

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|---|---|---|---|
| | 3. To advise the IHB about when type-approval authorities must move to new S-57 versions on type-approval. | 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.<br>2. To set up a discussion topic on Inland ECDIS, on the OEF. | TSMAD<br>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 | |