

**11th CHRIS MEETING
IHB, Monaco, 16-18 November 1999**

**MINUTES OF THE 10th CHRIS MEETING
(Singapore, 30-31 October 1998)**

- Notes: 1) The paragraph numbering is the same as in the abridged agenda (Annex C) unless otherwise specified.*
- 2) A list of acronyms is provided at Annex A.*

1. OPENING AND ADMINISTRATIVE ARRANGEMENTS

- 1.1 The 10th meeting of the IHO Committee on Hydrographic Requirements for Information Systems (CHRIS) was held in a conference room of the Pan Pacific Hotel, Singapore made available by the Maritime and Port Authority, Hydrographic Department of Singapore, on 30 and 31 October 1998. The meeting was Chaired by Rear Admiral Neil GUY, I.H. Bureau Director. There were 36 participants from 17 Member States, the IHB, IEC and the Chairman of the IHO Marine Information Workshop (See List of Participants at Annex D).
- 1.2 The Chairman welcomed all participants, including the People's Republic of China participating for the first time since the transition from COE to CHRIS. He expressed appreciation to Captain Wilson CHUA, Hydrographer of Singapore, for the outstanding support provided throughout the International ECDIS Conference and the several meetings held in association with the Conference. The Hydrographic Office did an outstanding job of supporting all seven meetings.
- 1.3 The Chairman opened the meeting and explained the administrative arrangements.
- He referred participants to the List of Documents (Annex E), List of Participants (Annex D) and had each of the delegates introduce themselves. He confirmed that only official national delegates and invited observers were present.
 - He drew attention to the fact that many delegates had arrived at the meeting without having obtained the necessary documents, which had been made available from the IHO Web site (<http://www.iho.shom.fr>). He noted with regret the significant burden this caused for the MPA, Singapore. It was further noted that several CHRIS and national reports had been presented for consideration within 24-hours of the meeting which is unsatisfactory. The Chairman then proposed that in the future, for documents to be considered, they must arrive at IHB one-month prior to the start of the meeting. This was agreed.
 - Since many delegates did not have the documents, the Chairman was obliged to conduct a document by document review to ensure that delegates had all the

relevant documents (Annex E) prior to proceeding with the meeting. As this took an hour of the meeting, it was clear that a better handling procedure for documentation was necessary and that an early submission deadline as agreed above was justified.

- He stated that decisions should be made by consensus.
- He noted with appreciation that a reception offered by MPA for the CHRIS attendees would be held on this first evening.

1.4 Rear Admiral Chris ANDREASEN (US-NIMA) and Mr. Adam KERR (UK) were appointed as Rapporteurs for the Meeting.

2. APPROVAL OF AGENDA

2.1 The Annotated Agenda (CHRIS/10/2B rev.2) was adopted. Following a suggestion from the Chairman, it was agreed that items 7. to 10. would be dealt with in the following order: item 8. first, then 9., then 10. and its subparagraphs, then finally 7. It was also agreed that items 11.1, 11.2 and 12.4 would be handled together.

3. MATTERS ARISING FROM MINUTES OF THE 9TH CHRIS MEETING

The Minutes of the 9th Meeting (CHRIS/10/3A) had been previously approved by correspondence (IHB Circular Letter 8/1998 and CHRIS Letter 2/1998). The Chairman proposed review of the Action items from the 9th CHRIS meeting (CHRIS/10/3B). The reference () below refers to the minutes of the 9th meeting.

- (2.3) *Vice-Chairman for CHRIS.* CHRIS Letter 2/1998 completed action in that nominations have been received and an election was being held during the 10th CHRIS Meeting.
- (3) *Clarification of "time-zero".* The IHO Legal Advisory Committee Chairperson, Ms. Danièle DION (Canada), was consulted on the matter and her response is quoted in Document CHRIS/10/3B.
- (4) *HGE Meeting before NAV 44.* An IHO Meeting on HGE matters took place at the IHB on 23-24 February 1998.
- (4) *IHB CL on NAV 44 issues.* CLs 7, 15, 21, 29, 33 and 34/1998 dealt with that topic.
- (4.1) *Revision to IMO Performance Standard for ECDIS.* No comment has been received at the IHB on that matter. No action required.
- (5.1) *Advance information to mariners of future events.* IHB wrote to IEC concerning how to inform mariners of future events and is awaiting IEC response.
- (5.1) *IHO ENC Test Data Set for IEC.* There was discussion as to whether one or two ENC Test Data Sets exist. The TDS developed by UK is considered the

official IHO ENC Test Data Set and is available from the IHO Web site. This development has been principally a joint effort of UK and Canada with several others having been involved. The TDS developed by Canada is available from the Canadian Hydrographic Service Web site (http://www.chs-shc.dfo-mpo.gc.ca/chs_hq/maricart/ecdis/sample.html) but is not the official IHO TDS. This set was developed as a part of the validation procedure. (See also Agenda Item 10.2).

- (5.1) *Colour representations required in IEC 61174.* Graphic presentations have been produced by NDI, under contract to the IHB. They will form, together with the digital TDS on CD-Rom, Appendix 4 of S-52.
- (8.1) *Final ZOC Table.* The final ZOC Table was issued with S-57 Maintenance Document 1, dated November 1997.
- (8.1) *Application of ZOC concept to paper charts & Information of mariners and cartographers on CATZOC.* HOs are to liaise directly with the Chairman, IHO Data Quality Working Group (DQWG) on this matter.
- (8.1) *Chairmanship of DQWG.* As the Chairman of DQWG, Mr. Ken BURROWS (Australia) has retired, the Chairman asked Australia to confirm if Cdr. Robert WARD (Australia), prospective new DQWG Chairman, could be confirmed. Australia confirmed its willingness for Cdr. WARD to serve as Chairman DQWG.
- (8.2) *S-57 data dictionary.* An IHO Object Catalogue Data Dictionary was submitted by Japan to the 2nd TSMAD Meeting, IHB, May 1998.
- (8.2) *HTML version of S-57.* Two companies, BLOM of Norway and USL of Canada, have such versions. A note will be put on the IHO Web site which refers to their Web sites. BLOM has agreed to place their version on the BLOM Web site and IHB has written to USL and is awaiting a response to its enquiry. It was stressed that it is very important to recognize that the official version is the one available from the I.H. Bureau. In the case of BLOM or USL versions, document maintenance is outside the IHO responsibility and there is no guarantee of the HTML versions remaining current.

Action: IHB

- (8.3) *Membership of C&SMWG.* It was noted that Netherlands has advised that it will not have membership on C&SMWG.
- (8.4) *ECDIS Glossary.* The 3rd Edition of S-52 Appendix 3, dated December 1997, is available from the IHO Web site. It has also been sent to Member States with CL 12/1998.
- (8.4) *Maintenance of the ECDIS Glossary.* IHB confirmed that the IHO Dictionary Working Group, chaired by IHB Professional Assistant (Hydrography) Hans-

Peter ROHDE, will maintain the ECDIS Glossary now that the ECDIS Glossary Working Group has been disbanded.

- (8.5) *Membership of TAWG.* TAWG Membership has been established.
- (9.1) *Future of Harmonizing S-57 and DIGEST.* This is to be addressed during the 10th CHRIS meeting, Agenda Item 11.1.
- (9.2) *Monitoring of ISO/TC211 developments.* ISO/TC211 documents are received and reviewed at the IHB on a regular basis.
- (9.3) *Monitoring of CEN/TC287 developments.* This is to be reported during the 10th CHRIS meeting, Agenda Item 11.3. Dr. Christopher DRINKWATER (UK) made a statement that concerns for the CEN standards work relate to their becoming mandatory in Europe with the possibility of conflict with the IHO S-57 standard. He noted that UK had written to advise CEN that an international standard exists and also wrote to other European national HOs encouraging them to similarly write to CEN. He also noted that CEN is to “adopt a practical attitude” for standards development but that it is unclear what this means in relation to S-57. Ing. en chef Michel HUET (IHB) noted that IHB had written to CEN about the implications of adoption of a CEN standard with respect to the internationally adopted S-57 standard. The response has been that CEN develops the theoretical framework into which standards like S-57 would fit. He expressed the opinion that there should be no problem as it would be difficult for S-57 not to fit into such a loose framework. It was agreed that the IHB should continue to follow-up for a response.

Action: IHB

- (9.4) *Quality elements used in HO's databases.* Information still waited from the ICA Commission on Spatial Data Quality.
- (10.4.1) *Additional transfer standard to S-57.* Radm. ANDREASEN (USA) noted that NIMA has placed this action on hold.
- (11.1) *Product specification for RNC.* Dr. DRINKWATER (UK) reported that Action relating to the Raster Nautical Chart (RNC) Product Specification is “in hand”. It was noted that under “Status” the IHO Member States had not specifically been asked to comment on the revised Draft RNC Product Specification. The Chairman responded that this was implied in the issued Circular Letter and no further action was needed. (See also Agenda item 13.1).
- (12) *IALA proposal for displaying of VTS information on ECDIS.* C&SMWG and TSMAD have commented on the IALA proposal. (See Agenda Item 10.2).
- (13) *French versions of S-52 and S-57.* The 5th edition of S-52 in French was distributed with CL 47/1998. Ing. en chef HUET (IHB) gave a brief update on the status of S-52 and S-57 translation into French, noting that to translate

S-57 would be a tremendous burden on IHB. This matter is to be addressed during 10th CHRIS meeting, Agenda Item 15. With regard to Caretaking of S-52 and its Appendix 1, the Chairman noted that, based on issues raised at the SHARED meeting and elsewhere during the Singapore meetings, it has become evident that a Workshop on Updating needs to be held. IHB will consider the matter and call for such a workshop. (See also Agenda Item 10.2).

- (15(c)) *Open ECDIS Forum*. The Chairman outlined the situation noting that the German commercial firm SevenCs has undertaken provision of a service under the aegis of the IHO. Terms of Reference for the OEF (see Annex F) were developed alongside the 2nd TSMAD meeting at the IHB in May 1998. They appear on the OEF Web site <http://www.openecdis.org>. The OEF is to be guided by a Board of Patrons consisting of senior representatives from academia, shipping industry, mariners and the IHO. He (RAdm GUY) is the IHB representative. He noted that there are no regulatory aspects to the OEF and that, as it is constituted, it has NO authority.

Mr. Gert BÜTTGENBACH (SevenCs, Germany) further noted that the OEF has been established to be supportive of the IHO. It provides a mechanism and modern technology which is useful in addressing problems of coordination. Discussions through the OEF are closed discussions and not everyone is allowed to participate. He added that IHO's S-57 is one of a very few worldwide successes. There is a need to offer it to the wider audience and at the same time there is a need for control. He described the OEF as somewhat of a self organizing chaos!

Mr. Mike CASEY (Canada), Chairman of TAWG, stated that the TAWG was using the OEF as a mechanism for discussion and that it was a good operation.

Mr. David ENABNIT (USA) stated that the workload on SevenCs likely will increase in the future, placing a burden on this company that may be difficult to meet. He further expressed concern for 1) assignment of producer codes for non-Member States, and 2) setting of standards related to non-navigation through extensions to the S-57 Object Catalogue. He feared that some organizations (external to IHO) may capture areas through OEF not yet handled by IHO, e.g. a symbol developed which later IHO requires in a different way. He advocated greater participation by IHO Member States beyond participation on the OEF Board of Patrons.

Mr. BÜTTGENBACH (Germany) explained that the OEF is constituted as a non-commercial service under the control of a seven (7) person Board of Patrons. SevenCs is ONLY sponsoring the OEF. They run the Web site with part-time of an employee (about one day per week). Although, at present, there is not a lot of traffic, it is noted that the workload is increasing. In any case, there is a need for control of "nonsense". Users do not put things directly on the site, but rather propose topics, etc. and somebody must assess each submission. A SevenCs' cartographer will do this review. This assignment will occur in about one (1) month. The budget impact to SevenCs is about 80,000 DM per year, plus communications and hardware costs for a total of about 100,000 DM per year. He noted that he should be able to run for about a year without resource concerns. He also noted,

while the Web site is currently in Hamburg, Germany, the site could physically be elsewhere.

With regard to extension of object codes, he stated that if someone desires to code an object, it would be coded in Lower Case to distinguish the code from an IHO adopted code. The OEF has been established to avoid the possibility of two companies in, for example, Germany and the USA, putting codes into practice which conflict. The OEF provides a central place for adoption of coding. If a company wants to use an existing code, they would contact the originator of the Lower Case code. For a code to become an extension of the IHO codes, TSMAD would have to adopt the code. It would then be given an Upper Case code to identify it as an IHO approved code.

Following a remark from Mr. Horst HECHT (Germany) that only HO bodies should be involved with approval of new object codes, Mr. BÜTTGENBACH noted that there are some unusual cases and cited that for Saudi Arabia where there is no Hydrographic Office but ARAMCO acts in some ways as the HO there and has dealt with the OEF.

Answering a question from Cdr. WARD (Australia) on the role of the Board of Patrons, Mr. BÜTTGENBACH outlined the tasks. The Board of Patrons is not to handle routine OEF matters. When a proposal is submitted to the OEF, a SevenCs' cartographer must evaluate the submission, comment on how the design might be better, etc. A proposal is not automatically adopted within the OEF. The Board of Patrons would have two functions: 1) assess proposals for new discussion (title and topics); if acceptable the Webmaster would allow starting the discussion, and 2) if tension arises relating to some topic, any participant may appeal to the Board, e.g., if a participant feels insulted, etc. in which case the Board would decide if discussion is to be terminated and the associated Web text deleted.

The Chairman asked about possible financial impact and Mr. BÜTTGENBACH stated that there has been discussion about the possibility of levying nominal fees to fund the OEF but that the associated administrative costs are likely to be onerous.

Mr. ENABNIT (USA) stated that the USA-NOAA is particularly interested in actions relating to marine GIS, i.e. more than navigation. He expressed the opinion that there is a need to go further, e.g. to resolve in advance topics such as vegetation. He stated that there is a need for a non-HO group, similar to TSMAD, for extensions beyond marine chart codes. He further suggested that there be regular review of the OEF with annual reporting at the CHRIS meetings and this was agreed.

Action: IHB

To a question from Dr. Shinichi KIKUCHI (Japan) on how Producer Codes would be handled with regard to a RENC and whether there would be joint HO codes, Dr. DRINKWATER (UK) replied that this would be for the IHB and TSMAD to work out and then allocate the necessary code.

In conclusion, the Chairman expressed appreciation to SevenCs for the work done on the OEF, noting that if problems arise the Board will do something to resolve them.

Following a suggestion from Mr. Ole BERG (Denmark), it was agreed that the Board of Patrons will be informed of the CHRIS discussions.

Action: IHB

4. ELECTION OF A VICE-CHAIRMAN FOR CHRIS

Mr. ENABNIT (USA) nominated LCdr. Jorge PEREIRA (Chile) and Mr. Göran NORDSTROM (Sweden) nominated Cdr. Robert WARD (Australia). It was noted that both Chile and Australia have always participated in these meetings and have been excellent participants. A vote was taken and LCdr. PEREIRA was elected as the new Vice-Chairman of CHRIS.

5. REPORT OF IHO-IMO HARMONIZATION GROUP ON ECDIS (HGE)

The Chairman reported on the actions that occurred concerning RCDS (Raster Chart Display System) approval at NAV 44, noting that RCDS has now been submitted for discussion during the Maritime Safety Committee (MSC 70) to be held in December 1998. In general, there has been widespread support for RCDS adoption, although some States have expressed their opposition. Also, in accordance with NAV 44, HGE work has stopped on development of performance standards for Electronic Chart Systems (ECS). Finally, as there are no issues for HGE to address at present, only actions within MSC 70 may result in topics for HGE to address. This could occur if matters are referred to NAV 45, which means that an HGE meeting is not expected before July-August 1999 at the earliest.

Mr. BERG (Denmark) drew the Meeting's attention to a Norwegian Demonstrator brochure which he found confusing in that wording indicated data would go from S-57 to CM93 (C-Map format) into ECDIS. The Meeting emphasized that a device without an S-57 processing capability would not be considered an ECDIS. Mr. Robert SANDVIK (Norway) explained that the Norwegian type-approval authority (DNV) would verify that the system meets the IEC Standard 61174, and this would imply that data provided to ECDIS would comply with S-57, where it is to be converted for display (SENC). All other methods of data provision would make the system an ECS. Mr. HECHT (Germany) added that BSH, being the German type-approval authority, like DNV, would not approve any ECDIS with no direct S-57 processing capability.

6. REPORT OF MSC 69 AND NAV 44

The Chairman reported that IHO Member States were advised of the proposal by the delegate of Italy to MSC 69, on the issue of "official" versus "approved" data, which was referred to NAV 44 (CL 29/1998 refers). In addition, IHB requested CHRIS Members' comments for consideration prior to NAV 44 (CHRIS Letter 1/1998 refers). As the Italian proposal was not addressed during NAV 44 due to lack of time, the issue was deferred to NAV 45. IHB subsequently informed Member States on the matter (CL 34/1998 refers) and intends to submit a paper for NAV 45. He noted that SOLAS V impact must be in for NAV 45 consideration.

Action: IHB

Cdr. Rosario LA PIRA (Italy) commented on the reference to the 'Italian Proposal', stating that the Italian Hydrographic Institute would produce ENCs and the addition of other information by private companies would still be compliant to the ECDIS PS. In fact the ECDIS PS requires that it should be possible for the system to distinguish between sources (for example between Official HO-ENC information and manufacturer's additional information).

In response to a question, Mr. Robert SANDVIK (Norway) explained the details of the Norwegian Marine Geodata Project, noting in particular the functions of the Norwegian Hydrographic Service, the Electronic Chart Centre and C-Map in this project.

7. ACTIVITIES OF IEC TC80/WG7 AND STATUS OF IEC 61174

Dr. Lee ALEXANDER (P and H Marine Associates, USA), Chairman of IEC TC80/WG7 and representing IEC, presented his report (reference CHRIS/10/7A). He advised that the international standard IEC 61174 had been adopted and officially published in August 1998. A copy of the final document was provided as CHRIS/10/7B *"Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required tests results"*.

He noted that the first ECDIS type-approval, based on IEC 61174, has been conducted in Russia for the TRANSAS Marine system. With regard to type-approval, he noted the concern for validation of the IHO ENC Test Data Set for IEC and expressed the hope that it would be further validated.

Regarding the IHO colour and symbol specifications, he noted concerns that have resulted from the first tests conducted and the recent announcement that a number of proposed amendments to S-52, Appendix 2 were pending. He cited concerns relating to ECDIS Chart 1, colour calibration tables, night display colours, introduction of complex line styles for curved lines, and arbitrary measures relating to SCAMIN. He felt the Colours and Symbols specifications are too extensive and complex and there is a need for them to be clarified and simplified. He stated his intention to cooperate with the Colour & Symbol Maintenance WG on these issues.

He noted that, currently, IEC TC80/WG7 is "inactive." However, it will likely be reconvened early 1999 to begin work on a 2nd Edition of IEC 61174 which could be completed within two years. The future work programme should address: backup arrangements, IHO colours and symbols (e.g. colour calibration) and navigation symbols (e.g. harmonization of radar/ARPA, AIS and VTS symbols). RCDS would also be considered if approved by IMO in December 1998. Cdr. Dan RONAN (U.S. Coast Guard) has agreed to serve as the next Convenor (i.e. Secretariat) for TC80/WG7, replacing Mr. Mark WHITE (Raytheon, UK) who is retiring. Dr. ALEXANDER expects to continue as Chairman.

8. REPORT ON 3rd WEND COMMITTEE MEETING

The Chairman presented a report on this meeting. He noted that the Bureau plans to work on RENC development and that a letter had been sent to the NE/RENC to seek assistance in extending the WEND principle. To a question from Mr. ENABNIT (USA) asking for justification of the IHB's involvement, as RENCs are not universally accepted as a distribution mechanism, the Chairman stated the aim was to seek means of ENC distribution and not necessarily to support the RENC model. There followed some discussions on the association of RENCs with Regional Hydrographic Commissions.

9. PROJECT OF INTEREST TO CHRIS (e.g. COST 326 and SHARED)

- COST 326. Mr. Jean-Luc DÉNIEL (France) recalled that the European Union's COST 326 project (Cooperation in the field of Scientific and Technical Research) was officially ended since august 1997.
- TEN-T. After the end of COST 326, thirteen European hydrographic offices decided to submit a project for a "community financial aid in the field of the trans-european transport network (TEN-T)" (reference CHRIS/10/9B), whereby funds are expected from the EU to further ENC development. The support requested is 1.75 M€ (approx. \$ 2M). The French and UK HOs coordinate the TEN-T project.
- SHARED. Mr. KERR (UK) outlined programs on the SHARED project (Singapore Hong Kong Admiralty Raster and ENC Demonstration), noting the success of the original Singapore to Hong Kong demonstration and referred to the recent meeting on this issue. He stated it is planned to extend the demonstration to include other HOs and other routes. There followed some discussion on the goals of the SHARED project (references CHRIS/10/9A and CHRIS/10/9A add.1).

10. REPORT OF CHRIS WORKING GROUPS

10.1 Data Quality (DQWG)

Cdr. WARD (Australia), new DQWG Chairman (see item 3, (8.1)), stated his WG had no activity during the reporting period but that he intended to proceed (reference CHRIS/10/10.1A). There was some discussion on the substance of the DQWG work and in particular to the use of the CATZOC attribute. Cdr. WARD noted that Australia was one of the few countries employing CATZOC, when compiling ENCs and paper charts, and that Australian Annual Notices to Mariners No 1 contains information for mariners on the use of CATZOC.

With regard to data quality, Mr. BERG (Denmark) referred to a publication of SHOM (France) "Navigation Publications: Imperfections and Improper Use". He noted that Denmark had produced a similar publication "Behind the Nautical Chart, 1998" and offered to make copies available.

10.2 Transfer Standard Maintenance and Application Development (TSMAD)

The report (reference CHRIS/10/10.2A rev.1) was presented by Dr. DRINKWATER (UK), Chairman of TSMAD, who outlined the actions and concerns. In particular, he noted that the freezing of S-57 Edition 3 will be extended till at least November 2002 since there is, as yet, very little ENC data being used for navigation. He further noted that a limited new edition, Edition 3.1, would come into force in November 2000 to incorporate a small number of additional attribute values only. It will be made available a year in advance, i.e. in November 1999 for the benefit of users of the standard. There was then a discussion on the factors affecting a complete new edition, the need for coordination of C&SMWG and TSMAD (in case any of these changes require amendments to be made to the Presentation Library), and that raster was another application of the general model of S-57.

There was then a discussion on ENC updating and the Meeting agreed there was a need for a workshop on this issue. The Chairman stated that he would coordinate, in liaison with TSMAD, the organization of a workshop on the subject, to be held during the first half of 1999. The problem of regionalization of the workshop was raised and it was stated that it might be necessary to hold two workshops, one in Europe and one elsewhere. It was suggested that the subject be discussed beforehand on the Internet. Following a proposal from Mr. BÜTTGENBACH (Germany), it was also agreed that commercial firms with related experience would be involved in this workshop.

Action: IHB

A proposal from IALA on VTS Symbols for ECDIS was raised. It was noted that C&SMWG had produced a report commenting on the IALA proposal in January 1998. It was further noted that TSMAD had prepared a draft response to IALA on their proposal (reference CHRIS/10/3C rev.1). The Meeting agreed that technical specialists should get together to decide what information should be considered. The Chairman asked TSMAD to send a letter to IALA requesting specific requirements and also asked Mr. Keith MILLEN (IALA) to report back to his organization. A general discussion followed concerning matters such as impact of AIS introduction and the relationship of this matter to C&SMWG and TSMAD activities.

Action: TSMAD

Mr. ENABNIT (USA) raised the matter of Digital Sailing Directions, noting that he and others present had recently attended a symposium on the topic that was held in St. John's, Newfoundland, Canada. He felt that its scope reached beyond Sailing Directions and was generally very positive and progressive. Ing. en chef HUET (IHB) stated that, following this symposium, the Bureau had released a Circular Letter (CL 49/1998) on the formation of a WG on the subject and that a proposed option was that this WG would be under the umbrella of CHRIS. Copies of this CL were made available.

Discussion then moved to the IHO ENC Test Data Set for IEC, following a question from Mr. ENABNIT (USA) on whether the Data Set include corrupt data as required

by the IEC. The response to this was affirmative but led to a lengthy discussion on the validity of this data set. Dr. ALEXANDER (IEC) strongly advocated the use of a χ^2 approach in which two or more different national data sets were evaluated against two or more QA software. Dr. DRINKWATER noted that the TDS validation exercise had been very similar to that proposed by Dr. ALEXANDER, with the UKHO and the CHS respectively validating each others product using different software tools. Following that exercise, the UKHO data set (which contains more information than the CHS one) was evaluated by several equipment manufacturers and QA software producers. Any proposed changes resulting from this exercise were circulated to all parties for comment and were only incorporated if there was agreement to such action. This procedure was repeated on several occasions.

Commander WARD further requested that it be recorded that no-one has challenged the quality or validity of the IHO Test Data Set.

Dr. DRINKWATER stated that this IHO Test Data Set was developed by the UKHO in collaboration with several national HOs, OEM and QA Software developers, on behalf of the IHO. He emphasized that the resulting data set was reached through the consensus of many parties.

Finally, the Meeting agreed that there was always a possibility that errors or apparent errors could be found in the TDS as more HOs produced ENC's and more manufacturers developed an ENC

reading capability. It was very important that such instances be brought to the attention of the TSMAD so that they could be evaluated and appropriate action taken.

Action: TSMAD

10.3 Color and Symbol Maintenance (C&SMWG)

Mr. Julian GOODYEAR (Canada), Chairman of C&SMWG, discussed the status of his group's work (reference CHRIS/10/3A). Sea tests were conducted in 1998 following release of the IHO Colour & Symbol Specifications and the ECDIS Presentation Library in 1997. The main lesson from these trials was that the mariner needs a systematic method of adjusting the CRT brightness and contrast control in order to ensure that no chart information is lost in reducing the screen luminance. Graphic presentations associated with the IHO ENC Test Data Set were produced under the control of the C&SMWG. The C&SMWG consulting engineer visited type-approval agencies in Europe (BSH-Germany and DNV-Norway) and he was able to help with mistaken manufacturers' attitudes over calibration. A number of amendments to S-52 Appendix 2, classified as immediate or deferred depending on their impact on safety of navigation, have been agreed by the C&SMWG and should soon be promulgated by the IHB.

Action: C&SMWG and IHB

Mr. GOODYEAR stated that the Presentation Library provided some problems, in particular that ECDIS manufacturers complained that symbolising the ECDIS Chart 1 was inconveniently different from symbolising the ENC. He informed that Mr. Brent BEALE (Canada) had been assigned as Technical Co-ordinator for the C&SMWG. He welcomed all comments and solicited support through the Open ECDIS Forum. He advocated mutual representation of C&SMWG and TSMAD personnel at their respective meetings, in view of harmonising any future developments of S-57 and S-52 Appendix 2.

Then followed a lively debate on the Presentation Library and Colours & Symbols in general. Due to its use in type-approval operations, inconsistency of the ECDIS chart 1 was noted as an immediate problem. The impact on C&S Specifications and the PL, of making changes to S-57 was noted. The Chairman stated the need to call a meeting as soon as possible to look at proposals for amendments. It was agreed that a meeting should be held at the BSH, Germany, in December or January at which type-approval representatives from BSH would participate (the meeting actually took place on 14-15 December 1998). It was further agreed that the C&SMWG should be represented at the next TSMAD Meeting to be held in June 1999.

Action: C&SMWG

10.4 Technology Assessment (TAWG)

Mr. CASEY (Canada), Chairman of TAWG, presented the report (reference CHRIS/10/10.4A). He described the purpose of the WG as to consider the impact of emerging technology on IHO applications. He noted that the TAWG has been looking into emerging IHO needs, e.g encryption standards, electronic docking aids and pilot carry-on ECDIS, and into emerging technologies, e.g. data communications, displays and informatics. The TAWG is using the Open ECDIS Forum (see item 3, (15(c))) which provides the group with two (2) services: 1) an e-mail list server whereby messages are sent to all participants on the list, including the replies that are made, and 2) a web site for the posting of results, findings, etc. A literature review has been conducted and he noted that this involved a great volume of information. The TAWG came up with a "top 10" list of emerging issues with **encryption** of electronic chart data as number 1. Thus, an Encryption Project Group has been formed. He noted that TAWG is to present an interim report at the time of the next WEND meeting in January 1999.

There followed a general discussion on the encryption issue. Ing. en chef HUET (IHB) noted that a study was being conducted on the matter at the Northern Europe RENC for possible implementation about mid-1999. Participants in this study are also in the TAWG Encryption Project Group. Dr. DRINKWATER (UK) advised that UK is about to award a contract to evaluate ECHO project encryption and that, when complete, this report will be freely available to the TAWG. Mr. KERR (UK) noted that the RENC is a prime driver for encryption and related issues.

Dr. DRINKWATER (UK) also expressed concern about the length of time it took to develop and agree technical solutions using the IHB working group and committee

mechanism, a mechanism which was not always compatible with the current speed of technological change. Dr. ALEXANDER (IEC) concurred and expressed the opinion that the encryption development should go to private companies through contracts funded by interested IHO Member States, as it had been done with the IHO Presentation Library. Cdr. WARD (Australia) stated that TAWG should make recommendations and that IHO should decide the direction to take, which he felt would be to go to a private company.

The Chairman explained that the task of the TAWG is indeed to provide advice concerning possible encryption and not to develop an encryption standard, in accordance with a conclusion of the last IHO WEND meeting. He noted that the NE-RENC has been formed as a commercial agreement, even though under the IHO WEND concept. He further questioned if it is really up to the IHO to mandate encryption?

Mr. CASEY (Canada) noted his concerns about how encryption might be implemented. He cited the possibility of a master being denied access to data aboard his own vessel. In considering encryption, there is a need to consider the possible implications and if IHO should implement it. He stated, with support from Mr. HECHT (Germany), that the IHO should play a role in considering the ethical aspects of encryption. Mr. HECHT added that the NE-RENC has decided to encrypt its data, even though the encryption method to use has not yet been agreed.

Mr. ENABNIT (USA) stated that for the TAWG to evaluate and recommend possible IHO encryption methods, was beyond the scope of how the USA sees the task of the TAWG. He noted that use of a dongle for encryption would not be acceptable to the USA and that it is really the implications of technology that need to be addressed by TAWG. He expressed a willingness to await the TAWG report and then address the issue. Mr. HECHT (Germany) stated that he would not want to see RENCs adopting encryption methods that differ.

Citing IEC rules, Dr. ALEXANDER (IEC) noted that encryption can also be IEC business.

The Chairman concluded that the TAWG should report to the WEND on the advisability of encryption. This was agreed.

Action: TAWG

11. LIAISON WITH OTHER GROUPS

11.1 DGIWG (Harmonising S-57/ENC and DIGEST/DNC)

The Chairman observed that the IHO-DGIWG Harmonising Working Party had discharged its responsibilities to WG5 of ISO/TC211. A Sub-Group of WG5, SG5.1, had been established to address harmonisation issues. He stated that TSMAD must consider future requirements of SG5.1. It requires an identification of membership and IHO membership must come from TSMAD.

Mr. CASEY (Canada) discussed the work done on harmonising ENC and DNC within the DGIWG umbrella. In Canada two contracts had been let to study the matter, one with an individual and the other with a company that produced both DNCs and ENCs. He noted that a paper on this subject has been published in the September 1998 issue of the I.H. Review (reference CHRIS/10/11.1A).

With respect to ongoing work, he offered Mr. Don VACHON (Canada) as co-chairman of SG5.1 (IHO side) and for the CHS to take a lead role. The Meeting agreed that the IHB would issue a circular letter inviting all countries concerned to identify membership. A meeting of SG5.1 may be arranged at the occasion of the ISO/TC211 meetings in Vienna (Austria), in March 1999.

Action: IHB

11.2 ISO/TC211 (Geographic Information/ Geomatics)

Ing. en chef HUET (IHB) addressed this item, noting the huge amount of documentation issued from ISO, received at the IHB. For presentation he selected a document which provides an overview of the approximately 20 standards under development (reference CHRIS/10/11.2B). He reviewed the relevant sections of the document, e.g. Geospatial Services which included standards on Positioning Services, Portrayal (Presentation Library in IHO), Services (Updating in IHO) and Encoding (Data Structure in S-57). He noted that all basic standards of ISO provide a framework within which others may develop their own standards. As an example, he noted that IHO development of the Object Catalog of S-57 could follow or conform to ISO guidelines within the ISO standard on Cataloguing, which is not necessarily the case at present. He noted important items such as ISO's development of a Reference Model which IHO has influenced during its development and with which the S-57 theoretical model is in line. He noted that IHO does not have a Metadata standard, nor does S-57 contain a Metadata section. ISO/TC211's Metadata standard was considered at a recent TSMAD meeting and it could possibly be used to develop a Metadata section in a next edition of S-57.

He noted that Working Group 5 of TC211 which deals with "Profiles and Functional standards" is of particular interest to IHO (see also item 11.1 above). It presently addresses three (3) international *de facto* standards: DIGEST, S-57 and GDF (a transportation standard). He noted that S-57, for example, could be a candidate for an ISO profile if it was made in line with the ISO/TC211 base standards in a future edition. He emphasized that the originator of a profile (the IHO for S-57) remains the custodian of the standard under ISO rules. He concluded stating that the monitoring of the voluminous number of ISO/TC211 documents is a significant task within the IHB.

The Chairman noted that while the IHB cannot always attend relevant ISO meetings, as this would require added staff and travel funding, others related to IHO do attend. Ing. en chef HUET added that TC211 meets every 6 months in various locations throughout the world and that IHB has typically requested IHO Member State representatives to attend on behalf of IHB/IHO. Thus, Mr. Per

JAKOBSEN (Norway) was at the last TC211 meetings in Beijing (China) and his report is at CHRIS/10/11.2A.

Dr. KIKUCHI (Japan) advised that ISO/TC211 meetings are to be held in Japan in September 1999 and the Japan Hydrographic Department would be happy to be provided related documentation such that JHD might attend on behalf of the IHO. IHB agreed and expressed appreciation for the offer.

Action: IHB

The Chairman advised that the IHB will continue to monitor the ISO/TC211 activities and pick out the relevant parts for reporting at future CHRIS meetings. This was agreed.

11.3 European Union CEN/TC 287 (Geographic Information)

Ing. en chef HUET (IHB) gave the report using copies of an overhead presentation obtained from Mr. François SALGÉ, Chairman of CEN/TC287 (reference CHRIS/10/11.3A). CEN is developing a series of 12 standards on geographic information. Aims of this TC are similar in nature to those of the ISO/TC211 standardization work. Most of the CEN standards are expected to be completed within the next two (2) years. IHO related standards concern Data Transfer, Quality, Position and Metadata. Once adopted, these standards will have a mandatory character within Europe. Therefore, IHO needs to maintain an awareness of this activity and to follow-up in its clarification that there will be no impact on S-57 (Action Item, see Agenda Item 3, (9.3)). It was noted that CEN had now completed their Transfer Standard which should be up for voting.

Ing. en chef HUET noted the existence of a cooperation agreement between CEN/TC287 and ISO/TC211 (known as Vienna Agreement) which contains a set of rules adopted by both TCs for adoption of common standards, with a view to avoiding duplication in their work. Consequently, there is close coordination between the two TCs.

He advised that the IHB has no direct representation in CEN which is a regional body. Considering that IHO representation in ISO/TC211 is sufficient, further noting that relevant CEN activities are coming to a close, the Meeting agreed that reporting on CEN/TC287 activities would no longer be a standing item of CHRIS.

11.4 ICA Commission on Standards for the Transfer of Spatial Data

Ing. en chef HUET (IHB) presented the report (CHRIS/10/11.4A), emphasizing that the objective of ICA is not to develop standards but rather to study and assess existing standards, preferably international ones. The aim is to help users select appropriate standards to suit their needs. Their first study, which has been completed and published as a book, was on transfer standards. In doing so, ICA reviewed 25 transfer standards.

Since that time, ICA has been studying metadata standards. They have established a list of characteristics for assessment, taking into consideration the work already done by ISO/TC211 in this domain. ICA is presently reviewing 15 metadata standards and again plans to publish a book about these. There will be a report on this work at the 1999 ICA Congress in Canada. It was felt that the ICA work on metadata might be of benefit to the IHO, which has not yet addressed the matter. The ICA Commission on Standards for the Transfer of Spatial Data meets annually and IHO is represented at these meetings, sometimes by a Member State representative acting on behalf of IHO.

Radm. ANDREASEN (USA) noted that the ICA book on Transfer Standards included an assessment of S-57 Version 2 rather than Edition 3, which was not yet complete at the time of publication. He suggested that IHO might encourage ICA to put Web site addresses in their future publications such that individuals interested in such standards would have access to updates. This was agreed.

Action: IHB

12. VECTOR DATA DEVELOPMENT

12.1 Northern European RENC (UKHO-ECC)

Mr. SANDVIK (Norway) made an oral presentation, noting that the NE-RENC was a joint UKHO-ECC venture located in Stavanger, Norway. The UK has now begun locating personnel in Stavanger. The NE-RENC organizational structure has been identified, with ECC holding the position of Director and UKHO holding the position of Deputy Director. He noted that Mr. Rune JOHNSEN (Norway), NE-RENC Marketing Director, was present and had made a report to the International ECDIS Conference that was held earlier on same week.

He confirmed that the NE-RENC will begin a provisional ENC service in January 1999. Initially, this service will be free and will not include data encryption. He stated that pricing was still under discussion within the NE-RENC but that, by the end of 1999, both pricing and encryption will be in place. He noted that the NE-RENC has been approached by the Mediterranean and Black Seas Hydrographic Commission, concerning the possibility of the NE-RENC being extended to cover those regions. To assist in monitoring the NE-RENC, an Advisory Committee and a Technical Experts Group have been formed. Currently 200 ENC cells are available which is equivalent to approximately 100 paper charts. The NE-RENC plans to have ENC updating available from January 1999.

Mr. SANDVIK noted that the NE-RENC service will be called PRIMAR (trademarked by the NE-RENC) and a PRIMAR Web site will soon become available. The NE-RENC is currently building an uniform approach on how to deal with distributors and this involves all participating HOs. Dr. ALEXANDER (IEC) emphasised that information about the NE-RENC service should be made available to the mariners as early as possible, for planning and budgeting purposes.

12.2 ENC Development in HOs represented at the Meeting

Reports were presented by representatives of relevant HOs. The following comments were noted:

- **Australia** (reference CHRIS/10/12.2A). Cdr. WARD presented this report. He noted that about 2/3 of Australia's HO production staff are working on electronic chart production and 1/3 on paper chart production. The strategy is to first develop small scale coverage of Australian waters, to be followed by coverage of the areas of high usage by mariners. Detailed coverage of the Great Barrier Reef compulsory pilotage route, its approaches and linking passages are being compiled, with inclusion of source data better than that available from the paper chart. The first Australian ENC (AUS-ENC1), covering NE Australia, will be trialed at sea as a "beta" version about January 1999, together with ENCs covering some Australian ports. Commercial release is anticipated during the 3rd quarter of 1999. Discussions are currently being held with the Australian Maritime Authority on how to handle the situation of paper charts and ENCs that differ in content.
- **Canada** (reference CHRIS/10/12.2D). Mr. CASEY presented this report. He noted that CHS, after one year of S-57 production, has 115 charts converted to S-57 format. This is equivalent to about one chart converted every two days. It was noted that controlling the error rate is the key to maintaining production. He emphasized that a HO cannot overinvest in training of its personnel, although this is essential for quality production. He advised that CHS has adopted a pricing of \$50 USA per chart per ship per year and that this includes the updating. This price also includes the agents' discount and CHS expects them to be competitive with one another and use their discount to lower the price below the above figure. He noted that at present CHS' data are not encrypted but there are concerns in Canada about the need for encryption since digital data is so easily reproduced.
- **Chile** (reference CHRIS/10/12.2M). LCdr. PEREIRA presented this report. Initial emphasis has been of the Straits of Magellan where a CD-Rom containing 12 charts in S-57 Edition 3 has been produced. Due to availability of DGPS, sea trials are to be conducted in Valparaiso starting in December 1999. In total 33 charts have been produced and Quality Controlled, and it is now necessary to sort out distribution.
- **China** (reference CHRIS/10/12.2R). Mr. LI Shubing presented this report. He noted the need for ENCs in Chinese language. Answering a question, he stated that the Chinese Navy was also involved in ENC production. The Chairman noted China's interest in participating in the SHARED project.
- **Denmark** (reference CHRIS/10/12.2N). Mr. BERG presented this report. He noted that at present Quality Control is done by hand and is therefore a rather slow process. There will be, however, 55% coverage of Danish waters by the end of 1998, 80% in April 1999 and 100% in July 1999. He stated that ENCs of Greenland's waters have not yet been produced, further noting that C-Map has vector data for those waters.

- **Estonia.** No paper was available but Mr. Tõnis SIILANARUSK gave a verbal report. There are 78 ENC cells available in S-57 Version 2. Five cells have been re-compiled, using added digital data, and will be available in S-57 Edition 3 by the end of 1998. It is planned to produce 35 cells (Edition 3) in 1999. A digital exchange of Notices to Mariners with Russia and other countries bordering the Baltic Sea, using the Internet, will also be implemented.
 - **France** (reference CHRIS/10/12.2J). Mr. Jean-Luc DÉNIEL presented this report. He commented that there was a lack of specific requirements for content of ENCs, in the ENC Product Specification, resulting in differences in level of detail between HOs. He noted this was similar to the paper chart regime. Answering a question, he stated that it was software difficulties which presently prevented SHOM from producing ENC updates (ERs).
 - **Germany** (reference CHRIS/10/12.2P). Mr. HECHT presented this report, noting that it was only a production plan. Five cells conforming to paper chart coverage have been issued in 1998 as official data. Data are kept continuously updated, and production of ER updates has been resumed after correction of a software bug. German waters in the Baltic Sea will be complete in 1999 by digitizing paper charts. Then, they will move to the North Sea, where owing to the large number of corrections needed, ENCs will be produced from source data.
- He also described the Inland Waters Chart Project (CHRIS/10/12.2G), noting various different approaches such as the use of radar for positioning the vessel from the coastline, developed by the University of Stuttgart.
- **Italy** (reference CHRIS J10/12.2K). Cdr. LA PIRA presented this report. He stated Italy's intentions to make use of the CATZOC attribute and to inform mariners clearly of its meaning. Automatic ENC Updating has not yet been implemented and manual methods are used in the testing phase. Verification methods are under development. At present, 56 ENCs in S-57 Edition 3 have been produced, which are not yet verified but will be used for trials.
 - **Japan** (reference CHRIS/10/12.2I). Dr. KIKUCHI presented this report. He noted that JHD started to issue an ENC updating service in September 1998. The "Electronic Notices to Mariners" includes updating data according to the ER profile of S-57 Edition 3 on CD-Rom, and is issued on every last Friday of each month. He provided details of the JHD publishing schedule : March 1998 for Tokyo Wan at large scales and September 1998 for Tokyo Wan to Asizuri Misaki at small scales, all ENC cells being in S-57 Edition 3. This has resulted in 2 sets of CD-Rom. Further large and small scale ENCs are planned during 1999.
 - **Korea, Rep. of** (reference CHRIS/10/12.2S). Dr. S.H. SUH presented this report. Notice to Mariners' requirements are currently being analysed. By the end of 1999 all charts in Korean waters will have been digitized. Procedures for distribution are being established and domestic workshops on pricing issues are planned.

- **New Zealand** (reference CHRIS/10/12.2B). Mr. Bruce WALLEN made a brief report, noting that New Zealand has not yet commenced a formal program of ENC data production and is working to determine the most appropriate methodology for proceeding forward.
- **Norway** (reference CHRIS/10/12.2H). Mr. Odd BREVIK presented this report, making some reference to the Norwegian Maritime Geodata Demonstrator.
- **Sweden** (reference CHRIS/10/12.2F). Mr. NORDSTROM presented this report. The HO has 10 charts digitized. He noted that there is a significant effort required for verification after digitization is completed, citing that several HOs have quoted 6-weeks per chart as a typical level of effort. It was noted that Sweden is depending on Danish surveying of an INT Chart area relating to Sweden. It is first planned to create 1:200,000 scale general coverage followed by focus on the port areas. Current problems are: 1) verification workload; 2) corrections which presently must be effected by publishing new editions and; 3) the need for resources to be applied to get the required ENC coverage.

Ing. en chef HUET (IHB) noted that Sweden was using a regular grid cell schema, i.e. squares like in S-57 Version 2. He pointed out that some HOs are using a grid cell schema whilst others use the bounds of the paper charts. As a result, this might cause any catalogue issued by the NE-RENC to have a non-uniform appearance to the users. Mr. SANDVIK (Norway) commented that the NE-RENC recognized this and tried to get a common approach amongst participants but this proved not possible.

Mr. BÜTTGENBACH (Germany) noted that there is a reluctance on the part of HOs to issue data after they have been produced. He cited that data needs to be made available to providers, even not perfect, and that training of the mariner needs to occur in parallel with data distribution to educate him of the limitations inherent with the use of the data. He further noted the very significant responsibility of the ship owners who have to train their mariners, purchase systems, etc.

Mr. KERR (UK) opined that availability within the NE-RENC could only include ENCs actually approved and not those in testing. This is an issue underlying the RENC difficulties in not yet coming up with the needed pricing scheme. Mr. JOHNSEN (Norway) added that the NE-RENC will inform on pricing once it has been developed through a thorough analysis.

- **Singapore** (reference CHRIS/10/12.2Q). Mr. Parry OEI presented this report, stating that 14 harbours ENC cells have been produced, equivalent to approximately 10 charts. Selection of distributors and agents is currently being considered. At present, an amount of \$80 (Singapore) is charged for a license. The Singapore HO is working with the tripartite group (Japan, Malaysia and Indonesia) on the Straits of Malacca.

- **United Kingdom** (reference CHRIS/10/12.2O). Dr. DRINKWATER presented this report. He noted that ENC cells are based on paper chart limits.
- **USA – NOAA** (references CHRIS/10/12.2C and CHRIS/10/12.2E). Mr. Doug BROWN presented these reports. NOAA is compiling vector data using original source data to provide a scale independent and product neutral database. Only features that are navigationally significant (13 themes) are being collected. NOAA does not presently comply with depth units in that its collection is in feet and fathoms. Data have been collected for 40 major port areas of the USA which corresponds to approximately 198 nautical charts. The data are currently in Intergraph format but will be converted to S-57. Data are now being loaded into the Laser-Scan Automated Map Production System 2 (LAMPS2) for routine maintenance and production. The first areas to be released will be in the Gulf of Mexico, e.g. New Orleans, Houston and Tampa. The data include the large scale channel “blue prints” of the U.S. Corps of Engineers and are being maintained weekly. Future enhancements will consist in adding a 2-foot high resolution contour interval and nearshore hydrography.

During the interim while there is not complete S-57 coverage, raster data will be available for the remainder of U.S. waters. Nine (9) cells (vector data) have been completed of the lower Mississippi River and one (1) cell in Tampa, Florida in support of Automated Information System (AIS) development in the USA. Inland river systems of the USA are also being done in vector format using the LAMPS2 system. Initially, data is to be free of charge but when updating is in place the system will become commercial and then be encrypted.

There followed a general discussion of differing units. Dr. DRINKWATER (UK) asked if the USA still intends to use depth units other than meters, as called for in the ENC Product Specification? Dr. ALEXANDER (IEC) pointed out that this would have an influence on the mariner such as with regard to the entering of values for ship safety contours and the systems computations relating to various units. Mr. CASEY (Canada) further inquired on how the mariner would know the units?

Mr. BROWN responded that this would be part of the display. He added that NOAA is working on the matter with Laser-Scan on the possibility of having the option of both English and Metric units for U.S. waters, further noting that NOAA has found significant user demand for English units and is looking to support its customer base.

12.3 ENC Development in HOs not represented at the Meeting

- **Finland** (reference CHRIS/10/12.3A). The Chairman presented a report received from Finland.

- **India** (reference CHRIS 10/12.2L). The Chairman read out a letter providing information on the above subject.
- **Russia** (reference CHRIS/10/7C). The Chairman presented a communication from Russia. A number of questions were asked about information in this paper to which Mr. Andreiy SABAJDASH (Morintech, Estonia) attempted to provide some answers. Regarding the planned production of a large number of ENC's in S-57 Edition 3, world wide, for charts at scale 1:500,000, the meeting was informed that these were for military use. There was considerable concern for the apparent failure of Russia to recognize copyright. Mr. SABAJDASH re-iterated that the data is at present available for navy fleet only, further noting that, should commercial release of this data be considered, the HDNO would follow IHO procedures concerning bilateral agreements and copyright.

Mr. NEILSEN (Denmark) endorsed the remarks on copyright and said his country was looking forward to negotiate with Russia concerning data under Danish jurisdiction. He then referred to an incident in Danish waters in which a near accident occurred to a ship reported to be using Russian charts. Copies of this report were made available.

12.4 DNC Development in USA (NIMA)

RAdm. ANDREASEN presented this subject. He stated that 2700 charts in the Vector Product Format (VPF) had been produced and all were Quality Assured. Approximately 100 charts are being produced per month. Production is still ahead of schedule and it is expected to have 5300 charts produced by end 1999. NIMA plans to implement IHO symbology, as in S-52 Appendix 2. DNC updating will be made by "file" replacement. An issue is how to show deleted information.

He noted that action to begin public availability of DNCs is planned at the end of 1998. This will initially concern distribution for U.S. waters only. Distribution of DNC outside U.S. waters is planned to be offered through commercial firms. The commercial firms would be required to come to agreement with the concerned nation in regard to copyright, payment of royalties and third party release conditions. In response to a question, it was noted that when a country does not agree to public release, where it has copyright data in a DNC, then that DNC would simply not be publicly available. Concern was expressed on whether commercial firms would negotiate use of DNC/VPF data of other country's waters. He noted that NIMA acquires data for compilation, e.g., through cooperative surveys and remote sensing, and claims copyright for foreign area charts. Firms desiring access to DNC for distribution only would be granted access through confirmation of having concluded such negotiations.

RAdm. ANDREASEN mentioned that NIMA is also committed to further S-57/VPF harmonization.

13. RASTER DATA DEVELOPMENT (CHRIS/10/13A)

Mr. ENABNIT (USA) referred to NAV 44 and the requirements for sea trials of RCDS. He noted the many trials and considerable experience that now existed. The RCDS Performance Standards will go to MSC 70 in December 1998 for approval of the NAV 44 recommendations.

13.1 Product Specifications for Raster Navigational Charts

Dr. DRINKWATER (UK) discussed this matter. He stated that the Product Specification for RNC had been reviewed by TSMAD and, as a result of comments by France, the document was modified and is provided at Annex A to CHRIS/10/10.2A. He noted the plan for the IHB to publish it as a new IHO Publication.

Action: IHB

Dr. ALEXANDER (IEC) further noted the need for RCDS Test Data Sets to be developed, one in HCRF format and another in BSB format.

13.2 RNC development in IHO Member States

- **Australia** (reference CHRIS/10/13.2A). Cdr. WARD summarized the Australian paper, noting the accessibility of portability of the Australian raster system. He further noted the interest of mariners for vector data, arising from the availability of raster data.
- **USA-NOAA** (reference CHRIS/10/13.2B). Mr. ENABNIT presented NOAA's paper. He observed that nearly two (2) million raster charts have been sold. He further noted that raster charts were sold in the ratio of 8:5 against paper charts but there was no apparent impact on sales of the latter. NOAA is doing maintenance on all 1,000 raster charts. Trials of update patch systems are in progress and it is expected to include an update service and night colours from January 1999.
- **UK** Dr. DRINKWATER noted that there was no UK report but he supported the Australian comments. There are 2700 charts available that are updated weekly in conjunction with paper charts.

Mr. ENABNIT (USA) further commented that he had received information that **Argentina** intends to produce raster charts.

14. MARINE INFORMATION OBJECTS (MIOs)

Mr. Bohdan (Dan) PILLICH (SevenCs, Germany) presented this topic (reference CHRIS/10/14A), noting that the work on MIOs is directed towards the next edition of S-57 and the need for thematic layers of additional information for ECDIS. He reported on a workshop on MIOs, which was held on 29-30 October, also in Singapore. He stated that MIOs, previously called Time Varying Objects (TVOs), have been categorized as follows: tides, tidal streams & currents; magnetic variations; ice; weather; VTS & AIS (Automatic Identification Systems); underkeel clearance; IFO & UFO (Identified/Unidentified Floating Objects); and water & air

temperature. He referred to workshops previously held on tidal, ice, meteorological and other information.

He noted that the Singapore workshop focused on detailing all parameters in each category and on identifying which of them should be shown on the ECDIS display during route monitoring and which ones would be for route planning purpose only. The workshop suggested that the design of symbols to show temporary MIOs on ECDIS display should be the responsibility of the IEC. It further recommended that all MIOs considered so far be compiled into a single document, with details on the corresponding objects and attributes based on S-57 Edition 3.0.

He anticipated that the next meeting would be held by end 1999 and that the development of objects, attributes and symbols would be referred to TSMAD within the year.

15. STATUS OF IHO PUBLICATIONS ON ECDIS

Ing. en chef HUET (IHB) discussed this matter (reference CHRIS/10/15A). He drew attention to two points. One, he needed instructions on whether to continue distributing the IHO Test Data Set (S-52 Appendix 4) or wait until it had been further tested. The Meeting agreed on the 2nd option (see also Agenda Item 10.2).

The second point concerned the French versions of S-52 and S-57. He recalled that French versions of S-52 and its Appendices had been published or were under preparation (see Agenda Item 3, (13)). He felt there was little interest in translating the Presentation Library documentation (Annex A to S-52 Appendix 2) into French, as it was mainly intended for ECDIS manufacturers and software developers. The Meeting supported this opinion.

Regarding S-57 Edition 3, he noted that translating into French the associated documentation (more than 800 pages) would be a very major task, even though a significant part is formed of the Object Catalogue. In addition, S-57 Maintenance Documents would have to be also produced in French. He felt this was beyond the present capabilities of the IHB and suggested to NOT publishing a French version of S-57.

Ing. en chef DÉNIEL (France) observed the importance of S-57 and that French is an official language of the IHO. He stated that priority would be for translation of parts of S-57 not including the Object Catalogue. The Chairman said that the IHB would undertake that work, further noting this might be at the detriment of other tasks of the Bureau. He added that any help from SHOM or other HO on the matter, would be appreciated.

Action: IHB

Mr. HECHT (Germany) noted the need to keep the document "Status of IHO Publications on ECDIS" updated on the IHO Web site.

16. ANY OTHER BUSINESS

The following additional points were discussed:

- *Posting on the IHO Web site of meetings' documents.* It was agreed that, for the time being, only approved Minutes of Meetings should appear on the Web, due to the need for confidentiality on some topics. The Chairman noted that it is IHB's intention to develop a password protection for non-public documents.

Action: IHB

- *NATO WECDIS.* Dr. ALEXANDER (IEC) outlined this subject, as described in a paper presented at the ECDIS Conference held earlier on same week.
- *Marine Electronic Highway.* Dr. ALEXANDER (IEC) outlined proposals that were presented at recent workshops.
- *Australian Project 1430 Phase 1.* Cdr. WARD (Australia) summarized this major project for which it is expected to go to contract in early 1999.
- *ENC Verification tests.* Ing. en Chef HUET (IHB) presented a preliminary list of generic tests for ENC production that was developed by the Technical Experts Group of the NE RENC (reference CHRIS/10/16A). It was agreed that this document would be made publicly available on the Open ECDIS Forum.

Action: IHB

17. DATE AND LOCATION OF NEXT MEETING

It was agreed that the 11th CHRIS Meeting would be held in Monaco in October or November 1999. The intention is to hold it back-to-back with other meetings. The exact date will be announced later.

In closing, the Chairman recognized the excellent work and hospitality of the MPA' staff, noting that six (6) meetings had been organized without hitch. A vote of thanks was given.

LIST OF ACRONYMS

AIS	Automated Identification System
ARCS	Admiralty Raster Chart Service (UK)
CATZOC	Category of Zones of Confidence
CHS	Canadian Hydrographic Service
CEN	Comité Européen de Normalisation (European Union)
CHRIS	Committee on Hydrographic Requirements for Information Systems (IHO)
C&SMWG	Colour and Symbol Maintenance Working Group (IHO)
COST	Cooperation in the field of Scientific and Technical Research (European Union)
DIGEST	Digital Geographic Information Exchange Standard
DGIWG	Digital Geographic Information Working Group
DGPS	Differential GPS
DNC	Digital Nautical Chart (USA/NIMA)
DQWG	Data Quality Working Group (IHO)
ECC	Electronic Chart Centre (Norway)
ECDIS	Electronic Chart Display and Information System
ECHO	European Chart Hub Organization (European Commission)
ECS	Electronic Chart System
ENC	Electronic Navigational Chart
FRV	Farvandsvaesenet (Denmark)
GPS	Global Positioning System
GWG	Glossary Working Group (IHO)
HDNO	Head Department of Navigation and Oceanography (Russian Federation)

HGE	Harmonizing Group on ECDIS (IHO-IMO)
HTML	Hyper Text Markup Language
IALA	International Association of Lighthouse Authorities
ICA	International Cartographic Association
IEC	International Electrotechnical Commission
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
ISO	International Organization for Standardization
KMS	Kort & Matrikelstyrelsen (Denmark)
MS	Member State (IHO)
MSC	Maritime safety Committee (IMO)
NATO	North Atlantic Treaty Organization
NAV	Sub-committee on Navigation (IMO)
NDI	Nautical Data International
NHS	Norwegian Hydrographic Service
NIMA	National Imagery and Mapping Agency (USA)
NOAA	National Oceanic and Atmospheric Administration (USA)
OEF	Open ECDIS Forum
OEM	Original Equipment Manufacturer
PS	Performance Standards for ECDIS (IMO)
QA	Quality Assurance
RCDS	Raster Chart Display System
RENC	Regional Electronic Navigational Chart Coordinating Centre
RNC	Raster Navigational Chart

SD	Sailing Directions
SHARED	Singapore Hong Kong Admiralty Raster and ENC Demonstration
SHOM	Service Hydrographique et Océanographique de la Marine (France)
TAWG	Technology Assessment Working Group (IHO)
TDS	Test Data Set
TEN-T	Trans-European Network - Transport (European Union)
TSMAD	Transfer Standard Maintenance and Application Development Working Group (IHO)
UKHO	United Kingdom Hydrographic Office
USCG	United States Coast Guard
VPF	Vector Product Format
VTS	Vessel Traffic System
WECDIS	Warship ECDIS
WEND	Worldwide Electronic Navigational Chart Data Base (IHO)
ZOC	Zone of Confidence

**ACTIONS ARISING FROM THE MINUTES OF THE
10th CHRIS MEETING**

Para.	Subject	Action
3. (8.2)	HTML version of S-57.	IHB
3. (9.3)	Impact on S-57 of CEN/TC287 developments.	IHB
3. (15(c))	Report on OEF to CHRIS Meetings.	IHB
3. (15(c))	To inform the OEF's Board of Patrons of CHRIS discussions.	IHB
6.	IHO paper to be submitted to NAV 45.	IHB
10.2	Workshop on ENC updating.	IHB
10.2	IALA Proposal on VTS Symbols for ECDIS	TSMAD
10.2	IHO ENC Test Data Set validation.	TSMAD
10.3	Amendments to S-52 Appendix 2.	C&SMWG and IHB
10.3	C&SMWG Meeting in end 98/beginning 99.	C&SMWG
10.4	TAWG's report to WEND/4 on encryption.	TAWG
11.1	S-57/DIGEST Harmonization, meeting of SG 5.1 (ISO/TC211).	IHB
11.2	Japan H.D. representing IHO at the ISO/TC211 September 1999 meeting.	IHB
11.4	Web site addresses in ICA publications.	IHB
13.1	IHO Publication on RNC Product Specification.	IHB
15.	French version of S-57 Edition 3.	IHB
16.	Meetings' documents on the IHO Web site.	IHB
16.	ENC verification tests on the OEF	IHB

ABRIDGED AGENDA

1. Opening and Administrative arrangements
2. Approval of agenda
3. Matters arising from Minutes of 9th CHRIS Meeting
4. Election of a Vice-Chairman for CHRIS
5. Report of IHO-IMO Harmonization Group on ECDIS (HGE)
6. Report on MSC 69 and NAV 44
7. Activities of IEC TC80/WG7 and Status of IEC 61174
8. Report on the 3rd WEND Committee Meeting
9. Projects of interest to CHRIS (e.g. COST 326 or SHARED)
10. Reports by CHRIS Working Groups
 - 10.1 Data Quality (DQWG)
 - 10.2 Transfer Standard Maintenance and Application Development (TSMAD)
 - 10.3 Colour and Symbol Maintenance (C&SMWG)
 - 10.4 Technology Assessment (TAWG)
11. Liaison with other Groups
 - 11.1 DGIWG (Harmonizing S-57/ENC and Digest/DNC)
 - 11.2 ISO/TC211 (Geographic Information/Geomatics) and its WG5 (Harmonizing S-57/ENC and Digest/DNC).
 - 11.3 European Commission CEN/TC287 (Geographic Information)
 - 11.4 ICA Commission on Standards for the Transfer of Spatial Data
12. Vector Data Development
 - 12.1 Northern Europe RENC (UKHO-ECC)
 - 12.2 ENC Development in HOs represented at the Meeting
 - 12.3 ENC Development in HOs not represented at the Meeting
 - 12.4 DNC Development in USA – National Imagery and Mapping Agency

13. Raster Data Development
 - 13.1 Product Specification for Raster Navigational Charts (RNC)
 - 13.2 RNC Development in IHO Member States
 14. Marine Information Objects (MIO)
 15. Status of IHO Publications on ECDIS
 16. Any other business
 17. Date and location of next meeting
-

Annex D

LIST OF PARTICIPANTS

Country	Name	E-mail
Australia	Cdr. Robert Ward	jrward@mail.usyd.edu.au
Canada	Mr. Mike Casey Mr. Julian Goodyear	caseym@dfo-mpo.gc.ca goodyearj@dfo-mpo.gc.ca
Chile	Capt. Rafael Mac – Kay LCdr. Jorge Pereira	rmackay@shoa.cl jpereira@shoa.cl
China	Mr. Li Shubing Mr. Wang Liang Yu	- hsash@public.sta.net.cn
Denmark (KMS)	Mr. Ole Berg	olb@kms.dk
Denmark (FRV)	Mr. Arne Nielsen	arn@fomfrv.dk
Estonia	Mr. Tõnis Siilantarusk Mr. Andrey Sabajdash	tonis@enmb.ee Sab@morintech.spb.su
France	Ing. en chef Jean-Luc Déniel	deniel@shom.fr
Germany	Mr. Horst Hecht Mr. Gert Büttgenbach	horst.hecht@bsh.d400.de bue@sevencs.com
Italy	Cdr. Rosario La Pira	iim@assicomitalia.it
Japan	Mr. Shinichi Kikuchi	skikuchi@cue.jhd.go.jp
New Zealand	Mr. Bruce Wallen Mr. Nathan Heazlewood	bwallen@linz.govt.nz nheazlewood@linz.govt.nz
Norway (NHS)	Mr. Odd Breivik	breiviko@sjo.statkart.no
Norway (ECC)	Mr. Robert Sandvik Mr. Rune Holst Johnsen	Robert.Sandvik@ecc.statkart.no Rune.Holst.Johnsen@ecc.statkart.no
Republic of Korea	Dr. S.H. Suh	shsuh@mailgw.kimm.re.kr
Singapore	Capt. Wilson Chua Mrs. Peggy Koh	wilson@mpa.gov.sg peggy@mpa.gov.sg
Sweden	Mr. Göran Nordström	Goran.Nordstrom@sjofartsverket.se
United Kingdom	Dr. Chris Drinkwater Mr. Adam J. Kerr	drinkwater@hydro.gov.uk kerr@mc.mail
USA (NIMA)	Radm. Chris Andreasen Mr. Edwin Danford	Andreasenc@nima.mil Danforde@nima.mil
USA (NOAA)	Mr. Doug Brown Mr. Dave Enabnit	Douglas.Brown@noaa.gov Dave.Enabnit@noaa.gov
USA (USCG)	Mr. Dan Ronan	Dronan@c2cen.uscg.mil
IHB	Radm. Neil Guy Ing. en chef Michel Huet	dir1@ihb.mc pac@ihb.mc
Observers		
IEC	Dr. Lee Alexander	lalex@nh.ultranet.com
MIO Workshop	Mr. Dan Pillich	pi@sevencs.com

LIST OF DOCUMENTS

CHRIS/10/1A/rev.5	List of Documents
CHRIS/10/1B/rev.3	List of Participants
CHRIS/10/1C/rev.3	Membership of CHRIS and related WGs
CHRIS/10/2A/rev.1	Abridged Agenda
CHRIS/10/2B/rev.2	Annotated Agenda
CHRIS/10/3A	Minutes of the 9 th CHRIS Meeting
CHRIS/10/3B	Actions arising from the Minutes of the 9 th CHRIS Meeting
CHRIS/10/3C/rev.1	Draft TSMAD response to IALA on their proposal on VTS information and ECDIS (by C. Drinkwater & G. Spoelstra).
CHRIS/10/5A	IHO Meeting on HE Matters, Monaco
CHRIS/10/6A	69 th Meeting of the Maritime Safety Committee of the IMO, London and 44 th Session of the IMO Sub-Committee on Safety of Navigation (NAV 44), London
CHRIS/10/6B	MSC 70/11/8 – Note by the Russian Federation
CHRIS/10/7A	Report on IEC 61174 developments and on the future of IEC/TC80/WG7
CHRIS/10/7B	Standard IEC 61174
CHRIS/10/7C	Letter to the IHB from Adm Komaritsyn, Russian Federation
CHRIS/10/8A	3 rd WEND Meeting, Goa, India
CHRIS/10/9A	Informal meeting to promote the “SHARED” Project, Singapore
CHRIS/10/9A add	Report – Second Informal meeting on “SHARED” Project
CHRIS/10/9B	ENC TENT-T Project
CHRIS/10/10.1A	DQWG Report
CHRIS/10/10.2A/rev.2	TSMAD Report
CHRIS/10/10.3A	C & SMWG Report
CHRIS/10/10.4A	TAWG Report
CHRIS/10/11.1A	A Review of the relationship of the ENC and DNC Hydrographic Vector Data Products (by C.Doug O'Brien, Don Vachon and Mike Casey)

CHRIS/10/11.2A	Work on ISO TC211 Working Group 5 (by Per A. Jakobsen)
CHRIS/10/11.2B	ISO/TC 211 Geographic information – Part 2 : Overview
CHRIS/10/11.3A	Report on CEN/TC 287 activities (by F. Salgé)
CHRIS/10/11.4A	Report on ICA Commission for the Transfer of Spatial Data (by Michel Huet)
CHRIS/10/12.2A	Vector Data Development – Australia
CHRIS/10/12.2B	ENC Development in New Zealand
CHRIS/10/12.2C	Update on the Status of the US (NOAA) ENC Program
CHRIS/10/12.2D	ECDIS Implementation and ENC Production – Canada
CHRIS/10/12.2E	Inland Waterway Electronic Chart Project - USA (NOAA)
CHRIS/10/12.2F	Swedish Status Report on Chart Digitizing for ENC Data
CHRIS/10/12.2G	Inland Waterways Electronic Chart project for river Rhine (by Germany)
CHRIS/10/12.2H	ENC Development in Norway
CHRIS/10/12.2I	ENC Development in Japan
CHRIS/10/12.2J	French ENC Production
CHRIS/10/12.2K	ENC Development in Italy
CHRIS/10/12.2M	Report of the Chilean ENC Project
CHRIS/10/12.2N	Status for the Danish ENC Production
CHRIS/10/12.2O	UK Report on progress in ENC Production
CHRIS/10.12.2P	Germany ENC Data Production
CHRIS/10.12.2Q	ENC Singapore Country Report
CHRIS/10/12.2R	Report on ENC Development in Maritime Safety Administration of China
CHRIS/10/12.2S	Plan and views on development of ENC in Rep. of Korea
CHRIS/10/12.3A	ENC Development in Finland
CHRIS/10/12.3B	Report on ENC Development in National Hydrographic Office, India
CHRIS/10/12.4A	Digital Nautical Chart (DNC) Development – USA (NIMA)
CHRIS/10/13A	IMO Approves Standards for Raster Chart Display

	System (RCDS) – USA (NOAA)
CHRIS/10/13.2A	Report on Raster Development – Australia
CHRIS/10/13.2B	Raster Nautical Chart Development – USA
CHRIS/10/14A	Marine Information Objects (MIO) Present Status and Expected Developments (by Dan Pillich)
CHRIS/10/15A rev.1	Status of IHO Publications on ECDIS (by Michel Huet)
CHRIS/10/16A	Preliminary list of generic tests for ENC production

OPEN ECDIS FORUM (OEF)

(<http://www.openecdis.org>)

TERMS OF REFERENCE

The Open ECDIS Forum (OEF) is dedicated to the development of Electronic Chart Display and Information Systems (ECDIS). By means of its consensus building activities, OEF promotes the vision of a maritime Geographic Information System (GIS) that supports navigation, environmental control and vessel traffic services. Through its discussion forums, meetings, promotional activities, and publications the OEF shall inform producers of digital charts, manufacturers of marine electronics and R&D organisations on issues related to ECDIS. The OEF supports the International Hydrographic Organization (IHO) in its efforts to make its S-57 standard a world wide accepted exchange format for Electronic Navigational Charts (ENC). The objectives of the Open ECDIS Forum are as follows :

- Encourage and support the development of ECDIS and its extensions
- Provide lines of communication between IMO/IHO/IEC standards users and developers
- Promote the S-57 data model in the marine environment and monitor the usage of S-57
- Examine the development proposals and advise on their validity
- Promote ENC production

To achieve these goals the Open ECDIS Forum will:

- Consider and register the user defined S-57 objects.
- Consider and register private producer agency codes
- Levy nominal fees, if necessary, to avoid abuse of registration and to finance the activities of the OEF
- Distribute forum related freeware/shareware software and sample S-57 datasets
- Organise workshops on related matters and distribute associated documentation
- Provide a link with the IHO web-site and with other organisations relevant to ECDIS

Any person or organisation interested in ECDIS is entitled to become a member of the OEF and to participate in OEF activities. Membership is simply achieved by joining a discussion forum. Currently no membership fees are raised. For certain activities such as workshops, fees may be raised from those who attend to cover costs. A **Board of Patrons** (BOP) has been formed and neutrally monitors the activities of the OEF in :

- Conducting the affairs of the forum
- Considering and approving topics for discussion, and monitoring the discussions
- Monitoring any financial matters

The Hamburg/Germany based company SevenCs sponsors and operates the OEF. The Sydney/Australia based company Hydrographic Sciences Australia (HSA) will provide a backup site if necessary.