CHRIS/13/7A

13th CHRIS MEETING
17-19 September 2001, Athens, Greece

ENC/SENC DELIVERY

IHB File No. S3/8151/CHRIS

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

Excerpts

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

Dear Sir,

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

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

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

ENC Security Scheme .....

On behalf of the Directing Committee
Yours sincerely,

Rear Admiral Neil GUY
Director

Encls: Minutes of CHRIS/12 *(Attachment I* – English only*)*
SENC delivery option – Voting paper *(Attachment II)*
SHOM's paper on SENC distribution *(Attachment III* – English only*)*
BSH's paper on SENC distribution *(Attachment III bis - English only)*

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

MINUTES
(Excerpts)

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.

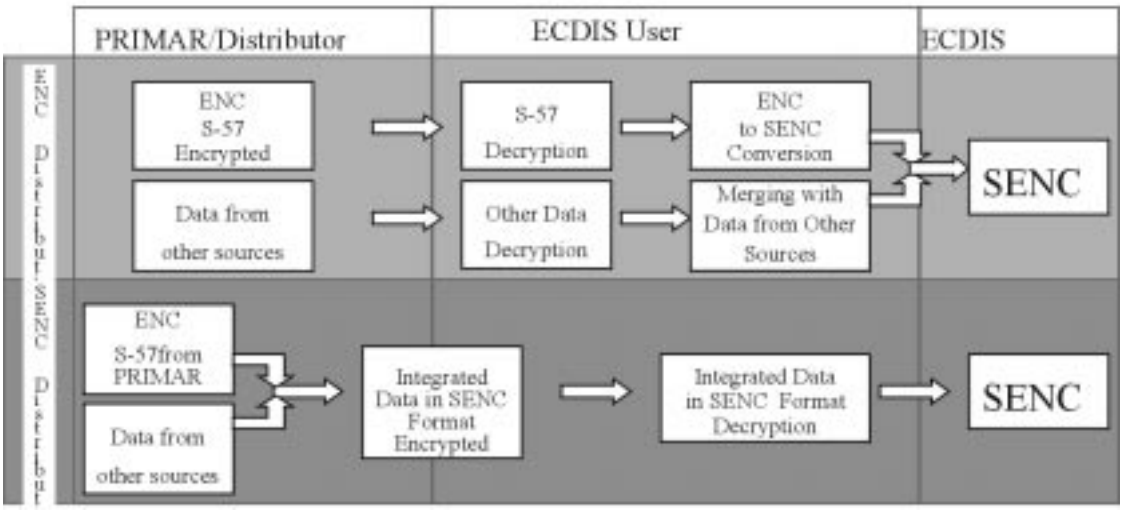

Fig. 1 - Schema of Data Flow

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.

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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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Member State: ……

SENC DELIVERY OPTION

QUESTIONNAIRE / VOTING PAPER

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

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

☐ YES ☐ NO

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

☐ YES ☐ NO

Comments: ……

……

……

Name / Signature …… Date: ……

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

3.3 System ENC (SENC)

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

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

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

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

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

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

SUBJECT : Distribution of ENCs by means of SENC distribution

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

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

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

1 The present status of official ENC and ECDIS

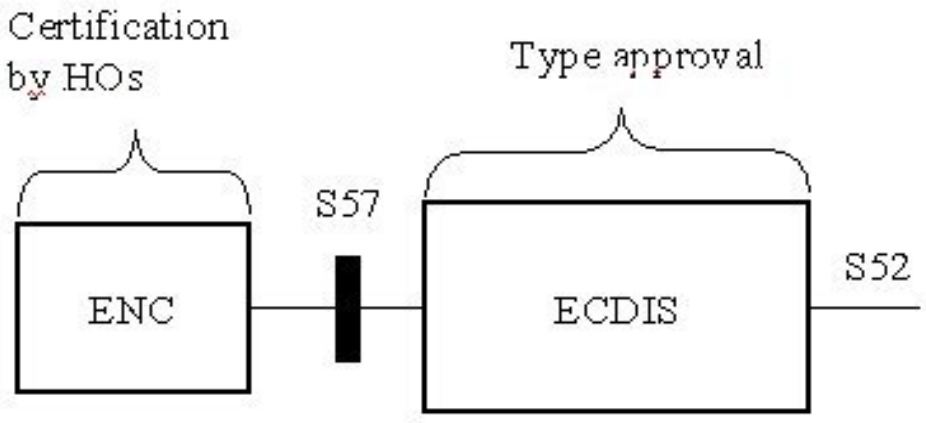
The global "electronic chart system" is made of two sub-systems which have to be certified :

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

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

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

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

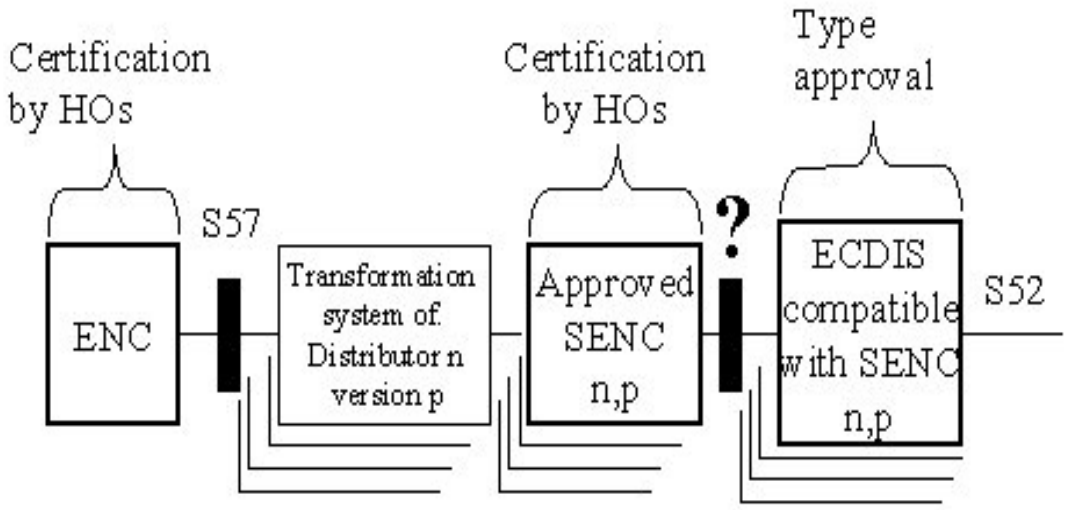


2. Possible processes for an "official" use of SENCs

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

2.1 *Control of the SENC quality by HOs*

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



2.2 *Certification of the SENC generator system*

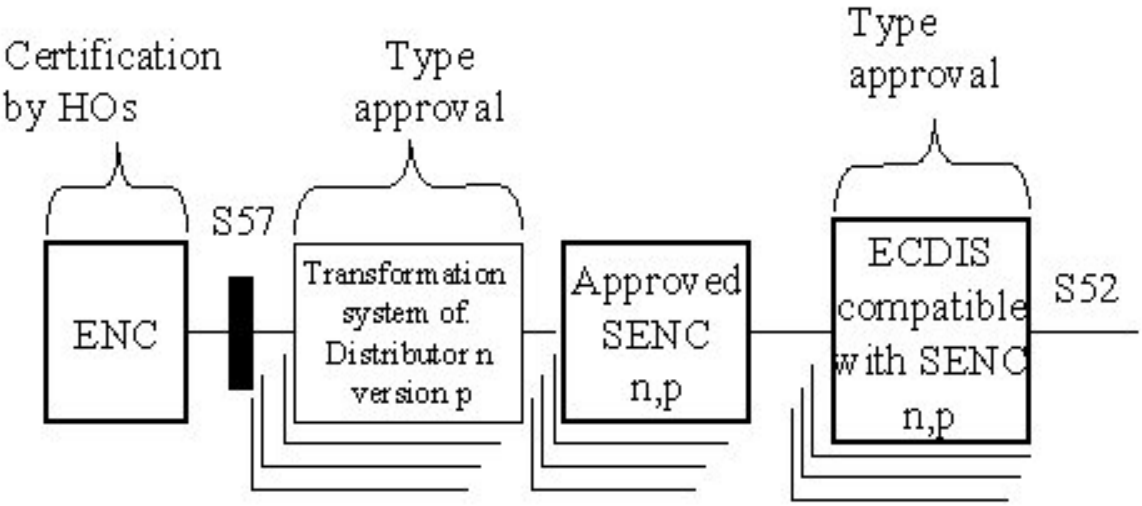
We could therefore try to consider that the certification of SENC is obtained through the certification of the equipment (hardware and software) permitting the transformation of S57ENC into SENC.

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

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

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

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

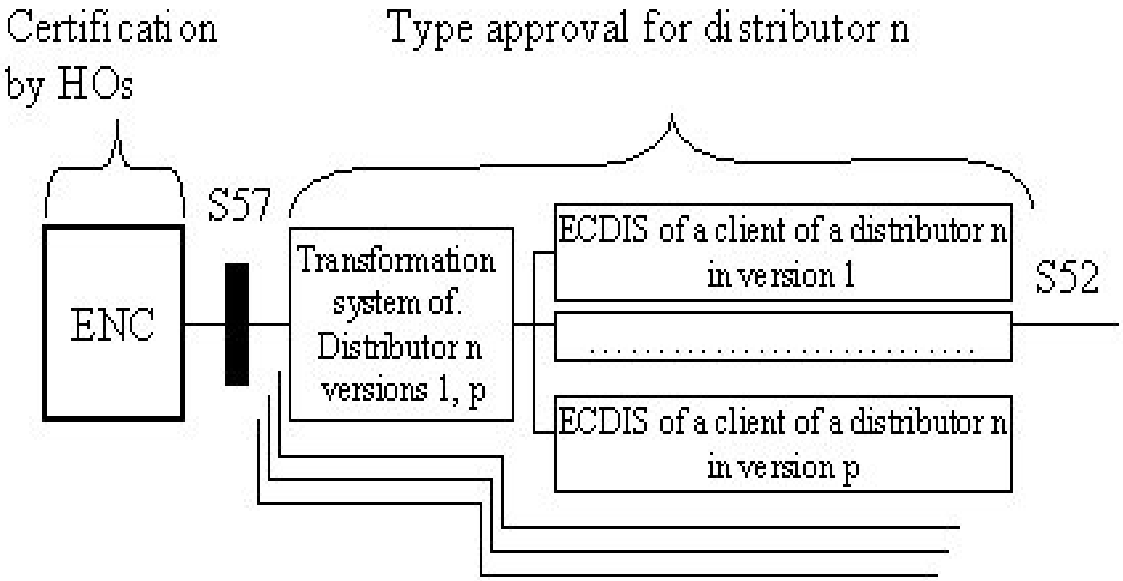


With such a burgeoning of complexity, we may be almost sure that we have overlooked other problems and that, as usual in complex environments, the "reality" is much more complex that what is perceived at first sight.

2.3 *Global distribution system certification*

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

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



2.4 Comparison between the different "official" SENC routes

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CONCLUSION

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

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

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

Distribution of ENCs by means of SENC Distribution

Comments on Attachment III
to IHB Circular Letter 15/2001

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

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

Control of SENC Quality by HO's

Certification of the SENC generator system

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

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

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

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

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

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