1st IHO-HSSC Meeting
The Regent Hotel, Singapore, 22-24 October 2009

Paper for Consideration by HSSC

RTCA STATUS REPORT ON CORRESPONDENCE GROUP FOR DATA SUPPLY CHAIN CERTIFICATION (DSCC)

Submitted by:	RTCA Correspondence Group on Data Supply Chain Certification
Executive Summary:	This paper reports on the progress of the CG for DSCC and invites the HSSC to agree a new work item on the development of guidelines for a standard for the data supply chain.
Related Documents:	IHO Standards as listed in ANNEX A, RTCA DO-200A standard
Related Projects:	S-100 and S-101 development in IHO working groups (see ANNEX A)

Note by IHB:	This paper, which contains a definitive proposal for action, was submitted after the deadline for the submission of substantive papers (See *Instructions for the Submission of Reports and Proposals*). Some Member States will not have had the opportunity to fully consider and comment on the content of this report and its recommendations.

Introduction

1. During WEND 11, the RTCA observer to IHO presented the concept of "Data Supply Chain Certification" as a means of ensuring quality in a data supply chain, particularly in relation to the advent of new and emerging technologies and in light of the development of the e-Navigation concept.

2. The discussion during WEND 11 resulted in the following action items (from the minutes of WEND 11):

- The **RTCA** delegate to convene a Correspondence Group on *Data Chain Certification Concept*. (**Action 11/6 – RTCA**)
- The **RTCA** delegate to present the *Data Chain Certification Concept* to CHRIS-20. (**Action 11/7 – RTCA**)
- **IHB** to recommend that CHRIS members be invited to participate in the correspondence group on *Data Chain Certification Concept*. (**Action 11/8 – IHB**)
- The **RTCA** delegate to present a progress report from the Correspondence Group on *Data Chain Certification Concept* to IRCC-1. (**Action 11/9 – RTCA**)

3. The discussion on the same topic at CHRIS 20 (see action item above) resulted in the following action items from that conference (from minutes of CHRIS 20):

- **Action 20/7** – **IHB** to encourage MS to participate in the RTCA Correspondence Group on Data Chain Certification Concept.
- **Action 20/8** - **RTCA Correspondence Group** to liaise with DQWG and DPSWG.
- **Action 20/9** - **RTCA Correspondence Group Leader** to report on progress to HSSC-1.

4. In its Terms of Reference the Correspondence Group defined the following objectives:

   a. Review the current Maritime Data Supply Chain for electronic navigational charts (ENCs) and associated digital nautical publications (DNPs), identifying and documenting the different steps within this chain.

   b. Review the Data Supply Chain Certification concepts of related markets, mainly the DO-200A standard of aviation.

   c. Develop a proposal for IHO consideration on a standard for Data Supply Chain Certification relating to ENCs and DNPs.

Correspondence Group Discussion

5. Based on the action item agreed at WEND 11 (Action 11/6 – RTCA), the RTCA delegate established the Correspondence Group in December 2008. A secure Google Groups Forum was created and has 24 active members. The list of the members can be found in Annex B.

Limitations of S-63 applicability

6. One of the standards developed by RTCA is called DO-200A and is used in aviation circles for Data Supply Chain Certification (DSCC) for advanced, high precision navigational data streams. The group has commented on various sections of DO-200A as a reference source as well as referring to existing standards and, to some extent, best practice in this area. As the S-100 series of standards evolve, the issue of data distribution becomes more important, in particular the applicability of S-63 encryption and authentication will be under scrutiny in the future. While the participants agreed that data encryption supports the data quality concept, they highlighted several limitations when looking at the complete supply chain, in particular the ability of the existing standards to ensure multiple authentications throughout the chain. Under certain circumstances currently under discussion the role and best practice of the encryption algorithms may be in question. Whilst S-63 contains several powerful tools advances within the context of S-100 may call for a fresh approach. Advanced data integration as well as the IHO supported SENC distribution currently requires data to be made available unencrypted and in these circumstances alternative methods or adaptations of existing methods could be used to ensure quality within the supply chain. It is recognised that national policy often determines what is acceptable to hydrographic offices in this area and provision of a richer set of tools is only one step to a unified supply chain.

Data integration

7. The DSCC WG also considered the impact of discussions in SNPWG, migrating towards the S-100 series of standards. Figure 1, taken from an SNPWG submission to TSMAD , illustrates a proposed model of the integration of nautical publications and ENCs. Taking this as an example it is expected that further data integration is likely within the context of ECDIS, such as MIO, I-ENC or PortENC.

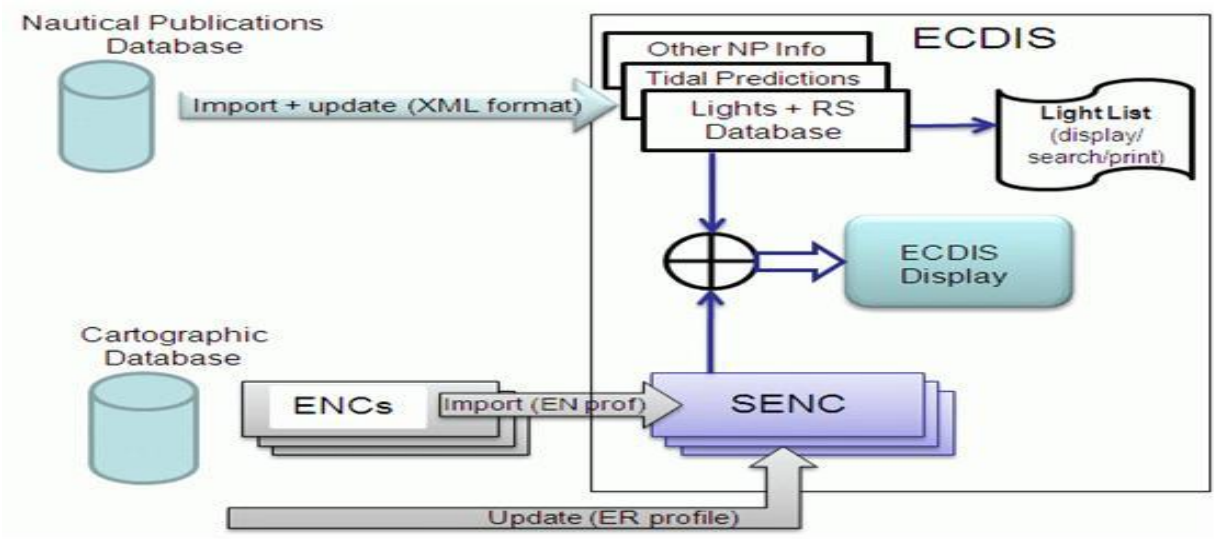


Figure 1 – Combining Nautical Publications and ENC data in an ECDIS

Source: Inclusion of Nautical Publications Information in the next ENC Product Specification (S-101) by *Tony Pharaoh - IHB*

8. Regardless of the different data types, as different data streams are combined in support of safe and efficient navigation, the data supply chain needs to ensure synchronization of different data streams. This synchronization is currently being executed without reference to any open specifications due to the non-carriage compliant nature of the auxiliary data streams. Should there be a future need to define standards to ensure consistent synchronization by all involved data service providers then data chain certification techniques could also be a useful tool. To support this goal, standards should be developed which are able to include data chain certification tools applied to multiple data sources and their integration.

Data update synchronization

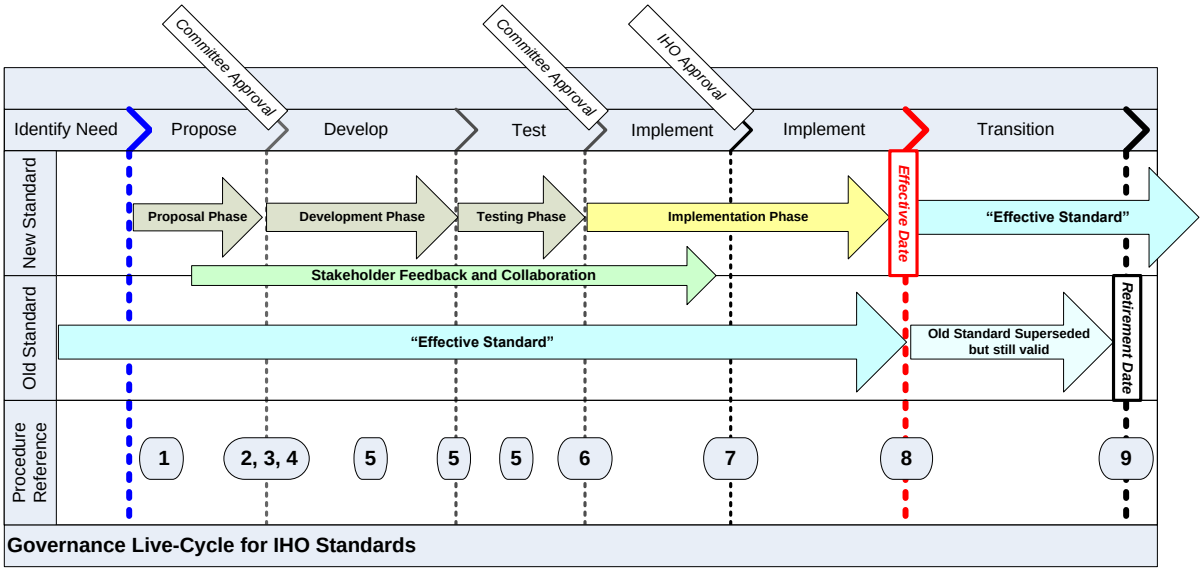
9. As described above different data streams are expected to be integrated into ECDIS and INS in the not too distant future. Once data contents are integrated, consistent timely updates across all of the supporting data streams will be essential to ensure situational awareness. If the update synchronization is not performed correctly, the update link will be broken and misleading or corrupted data may be displayed. This problem could be compounded within the context of multiple data sources on an ECDIS. Any development of data chain certification should also include updates as well. A new standard with a holistic view on all of the data supply chain could address this issue. Without such a standard, it will be difficult to ensure this specific aspect of data quality for the end users - the mariners on board of ships. In this context, once a standard for supply chain certification is defined a review of the IMO ECDIS performance standard may be required.

Recommendation

The currently existing standards are adequate for S-57 ENCs under today's distribution paradigm. The development of new standards like S-100 and S-101 in conjunction with the increasing need for data integration and synchronization of data updates across the data supply chain requires a control of all aspects of that chain. The CG-DSCC recommends that an IHO working group consider relevant areas of best practice to investigate and define the scope of appropriate standards for data distribution.

The working group should develop a proposal for a Data Supply Chain Certification Standard to be presented to HSSC for adaption once defined.

Within the IHO "Governance Live-Cycle for IHO Standards the recommendation requests the committee approval for the "Development Phase".



A proposal for ToR for the working group can be found at ANNEX C.

Justification and Impacts

The current standards defined by the different working groups of IHO are focused on certain aspects of data products like ENCs or Publications. They define aspects of data transfer, encryption and data quality. None of the current work items are reviewing the Data Supply chain in its entirety. They do not address the interrelations of different data sets nor do they address the synchronisation of the data streams. While a holistic review is not necessary in an environment where data products are used independently, the new systems and integrated standard upcoming with S-100 and e-NAVIGATION will need integrated data sets. Only with a clear standard for certifying integrated data delivery the necessary quality of the supply chain can be ensured. Given that no current work items are addressing this topic it is essential that IHO is adding a new work item as recommended.

The explanations above underline that the recommendation is in support of the IHO objectives, especially the "coordination of activities of national hydrographic offices" and the "greatest possible uniformity in nautical charts and documents".

It is recommended to use the proven method of a correspondence group for most of the work. A working conference once a year is recommended. It is also recommended to schedule the working conference in coordination with a TSMAD conference to ensure close collaboration and reduce financial impact.

The working group needs expertise on data transfer standards, data delivery methods, data handling and logistics and technical aspects of data integration and synchronisation. It is envisioned that industry and academic experts will be included in the working group to get access to knowledge on current best practice. Given the existing standards on this topic in aviation, expert contribution from this field will be beneficial.

The work item should be completed before or together with the S-101 implementation phase (Procedure Reference 8).

Action Required of HSSC

The HSSC is invited to:

establish a working group on Data Supply Chain Certification,

approve the Terms of Reference as set out in Annex C, and

appoint a temporary chair to establish the WG.

Existing standards related to Data Supply Chain Certification (DSCC)

	Title or Description	Relevant maintenance body
S-4	Regulations of The IHO for International (INT) Charts and Chart Specifications of the IHO (Plus INT 1, INT 2, INT 3)	CSPCWG
S-11 Part A	Guidance for the Preparation and Maintenance of INT Chart schemes	CSPCWG
S-52	Specifications for Chart Content and Display Aspects of ECDIS	DIPWG
S-57	IHO Transfer Standard for Digital Hydrographic Data	TSMAD
S-58	Recommended ENC Validation Checks	TSMAD
S-63	IHO Data Protection Scheme	DPSWG
S-64	Test Data Sets for ECDIS	TSMAD, DPSWG, DIPWG
S-65	ENC Production Guidance	TSMAD
S-100	IHO Hydrographic Geospatial Standard for Marine Data and Information	TSMAD
S-100 Hydro FCD & Portrayal Registers	individual entries in S-100 Hydro FCD and Portrayal registers	Hydro register control body
S-101	ENC Product Specification	TSMAD
S-101	Nautical Publications Information in the next ENC Product Specification	SNPWG

Members of RTCA Correspondence Group for Data Supply Chain Certification

Countries/Organization	Contact Name
RTCA	Michael Bergmann (Chair)
Belgium	Guido Dumon
Belgium	Natalie Balcaen
Germany	Mathias Jonas
Chair DPSWG	Jonathan PRITCHARD (UKHO)
Chair DQWG	LtCdr Shepard SMITH (USA-NOAA)
Chair TSMAD	Barrie Greenslade (UKHO)
Canada	Marc Journault
Canada	Savi Narayanan
Denmark	Peter Ladegaard Sørensen
Brazil	LtCdr Sebastiao Simoes de Oliveira
ECC (for Primar)	Peter Scott
Finland	Juha Tiihonen
IC-ENC	Graham Saundercock
Idontech	Doug Obrien
Ecuador	ING. MSIG PATRICIA VILLA
Ecuador	ING. MSIG PATRICIA VILLA
Ecuador	SGOS-HI KLEVER GONZALEZ
Netherlands	Erwin Wormgoor
USA	Chris Andreasen
USA	James (Jim) McGaughran
Norway	Gerry Larsson-Fedde
Rep. Korea	Yong BAEK
Poland	Capt Henryk Nitner
Primar	Kjell Olsen
Primar	Per-Arvid Jakobsen
RTCA	Daniela Winterbauer
Chile	Capt Patricio Carrasco Hellwig
Chile	Jesus Lopez
Chile	LtCdr Enrique Silva
France	Henri Dolou
UK	Paul Ensor

Working Group on Data Supply Chain Certification (DSCCWG)

Terms of Reference

2. Objectives

a. Review the current Maritime Data Supply Chain for electronic navigational charts (ENCs) and associated digital nautical publications (DNPs), identifying and documenting the different steps within this chain.

b. Review data supply chain certification standards and best practices in other areas, like RTCA-DO-200A in aviation for their applicability in the maritime sector.

c. Develop a proposal for IHO consideration on a standard for Data Supply Chain Certification relating to ENCs, DNPs and other data streams for safety of navigation at sea.

3. Authority

This WG is a subsidiary of the Hydrographic Services and Standards Committee (HSSC). Its work is subject to HSSC approval.

4. Procedures

a. The tasks of the DSCCWG are to:

   i. Identify the data streams within the data supply chain for safety of navigation at sea.

   ii. Review the current Data Supply Chain processes for ENCs, DNPs and other relevant data streams.

   iii. Document the different steps within the data supply chain.

   iv. Review the standards of related industries; for example, the RTCA DO-200A standard for aviation.

   v. Review and document best practices used in data supply chains in relevant areas.

   vi. Identify and document the concepts behind those standards as far as they are relevant for the data supply chain of ENCs, DNPs and identified data streams.

   vii. Develop a proposal for a standard that addresses hydrographic and charting data distribution for consideration by HSSC-2.

b. The WG should work by correspondence, group meetings, workshops or symposia. Permanent or temporary sub-working groups may be created by the WG to undertake detailed work on specific topics. The WG may meet at least once a year if required.

c. The WG should liaise with other HSSC WG's, and in particular TSMAD, and other IHO and international bodies as appropriate and as instructed by HSSC.

d. The WG should identify a work programme for each year, including expected time frames for completion of work items.

5. Composition and Chairmanship

a. The WG shall comprise representatives of IHO Member States (M/S), Expert Contributors and Accredited NGIO Observers.

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

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

d. The Chair and Vice-Chair shall be a representative of a Member State.

e. If the Chair is unable to carry out the duties of the office, the Vice-Chair shall act as the Chair with the same powers and duties.

f. Expert Contributors shall seek approval of membership from the Chairman.

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

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

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