

Paper for Consideration by S-100WG**Operational service implications of S-128 and possible impacts on its design**

Submitted by:	Eivind Mong (CCG & NIPWG Chair) & Izzy Kim (KHOA, S-100WG co-vice chair & S-128 Task group lead)
Executive Summary:	NIPWG is developing S-128 as a catalogue of products for utilization in communicating the status of product offerings compatible with S-100 based product services. The utilization of S-128 for this purpose require a well-defined process and framework and this paper is a continuation of discussions aimed at establishing these.
Related Documents:	S-100
Related Projects:	Any S-100 Product Specifications

Introduction / Background

NIPWG has been developing S-128 as a means of exchanging catalogues of products. The scope of S-128 has been extended to also provide end user systems, like ECDIS, with data to verify local content against latest available information. At the 14th meeting of the Hydrographic Services and Standards Committee (HSSC), S-128 was approved as Edition 1.0.0 in accordance with IHO Resolution 2/2007.

In the submission to HSSC14 (05.3B) NIPWG reported that discussions during development and WENDWG13 has highlighted the need to clarify the vision for how S-128 will be utilized by stakeholders (data producers, RENC, VAR, users, PSC, etc). Therefore, HSSC advised NIPWG to liaise with S-100WG on issues identified regarding responsibility of stakeholders in producing and distributing S-128 and for NIPWG to provide an input paper to WENDWG13.

Analysis/Discussion

At HSSC14, NIPWG reported on the status of S-128 development and recommended that it was in a state where it was ready to go to edition 1.0.0 and asked HSSC to approve this. This approval was given. Jointly with the development update, NIPWG reported on discussions that originated within the WENDWG and how these had been raised at NIPWG meetings as well. These questions revolve mainly around what implications follow the scope change of S-128 for the purpose of facilitating a machine generatable means of providing SENC/SENS up-to-datedness statements. Things such as who must provide the S-128 service realizing that some S-100 based services are real time or near real time services, multiple government agencies may be involved in the S-100 service provisions, while in the S-57 service provision it was usually only the hydrographic office/RENC that was involved.

These questions lead to the need of clearly identifying stakeholders, their roles and responsibilities, as well as processes involved in S-128 services to inform stakeholders of any responsibilities in ensuring a well-functioning S-128. Moreover, these efforts should aim to assist end user system OEMs and their industry organizations, such as ECDIS manufacturers, CIRM and IEC, by clearly defining any functionalities they may need to include in their equipment to meet expectations associated with S-100-based data services as well as what checks should be included in test standards for such systems to ensure compliance with the overall expectations. It must be noted that in the S-100 eco system, there is an expectation that a significant number of stakeholders will be non-hydrographic office government organizations. The traditional means of data product distribution may not be a natural fit for these organizations and this must be accounted for in the processes for S-128 utilization for supporting the up-to-datedness function in user systems.

HSSC has advised NIPWG to liaise with S-100WG on these topics and provide an input paper to the next meeting of the WENDWG. Included with this paper is Annex A which contain the questions that NIPWG has

identified building from the WENDWG12 discussions. This annex will form the basis for an input paper to WENDWG13, and NIPWG invites S-100WG to comment on the content, especially to its completeness and invites S-100WG to jointly submit the input to WENDWG13.

Conclusions

S-128 technical development is progressing well, but the discussions on the operational use is still in an early phase. Efforts are needed to accelerate these discussions and they should probably be led by WENDWG with input from NIPWG and S-100WG.

Action Required of S-100 WG

The S-100 WG is invited to:

- a. Note this paper
- b. Discuss the content of Annex A and it's completeness
- c. Consider the appropriateness of a joint NIPWG/S-100WG paper on the operational use of S-128.

Annex A - S-128 service provision implications

Background

Acknowledging that S-128 is an essential part of S-100 ECDIS, WENDWG12 discussed possible ways on how to provide the S-128 files to the end users (on board systems and port state control officers). It was realized that the IHB (INToGIS in particular) may not be able to act as a reliable and always up to date S-128 repository, although IHB will be processing S-128 data as well. S-128 may also be a product catalogue for S-100-based services by organizations that are not under IHO membership; such as WMO and IALA.

Questions identified by NIPWG that need investigation.

- S-100 ECDIS needs a machine-readable way to determine up-to-dateness of system electronic navigational data. S-128 is intended to provide this function. Does this mean that all S-100-based data services need to be combined with an S-128 service for the paradigm to work? There were suggestions that real-time data need a separate mechanism, does this hold true in all scenarios?
- Is it necessary to draft example S-128 distribution scenarios which describe the role and responsibilities of each participant?
 - This would need to consider scenarios where a data producer is not a member of a RENC.
 - The role of S-128 in the Maritime Services in the context of e-Navigation must be described.
 - A start of such scenarios has been drafted in Figure 1A below.
- Is it necessary to create mechanisms that make it so that S-100-based navigational data services cannot operate without a S-128 service?
- Do we need one aggregator for up-to-dateness S-128?
 - If yes, Where and How? How will the ECDIS find the S-128 service?
 - Is there a need for a national catalogue in each country? Or should it be each producer responsible for creating S-128 catalogues? or is a super catalogue for whole world the best goal?

Note 1: A significant number of data producers will be non-hydrographic office government organizations. The RENC and VAR distribution structure may not be a natural fit for these organizations and this must be accounted for in the processes for S-128 utilization for supporting the up-to-dateness function in user systems.

Note 2: It has been suggested that the aggregation of catalogue files by RENCs and VARs will give the flexibility to deliver services that meet user needs. VARs are seeing significant growth in the number of users obtaining their data over the Internet, with the benefit that they can access much more up-to-date data than was possible in the past. S-100 is expected to further enable this. However, bandwidth at sea remains limited. The growth in data volumes being exchanged for a wide range of purposes, including the spectrum of S-1XX products that will be available, means that bandwidth will continue to be under pressure for the

foreseeable future. Users will want to access just the data that they need and not be restricted to downloading entire national datasets or, in this case, catalogues.

Note 3: RENCs (and VARs for non-RENC members data) carry out quality assurance process which sometimes requires issues with datasets to be resolved before they can be issued. If the RENCs and VARs are not able to put their own catalogue files together, end users will be expecting updated data that isn't yet ready for release. They'll also be at risk of being expected to carry the updated data by Port State Control, when that data hasn't yet been released in service. This issue doesn't exist under the process shown in Figure 1A because the RENC or VAR will only include the updated catalogue record when the S-1XX data is released into service. Synchronising nationally-produced catalogue files with the release of data from RENCs and VARs will be very difficult to achieve.

Such an option is not expected to prevent Port State Control having access to full catalogue files for the purposes of understanding how up-to-date a vessel should be. This may be a separate use case which may mean a different service.

- Do we need to think two main categories of S-128 service?
 - The two categories could be a catalogue for navigational purpose and a catalogue for others usages. Considerations in such a scenario would be;
 - What are the implications of such a service in light of S-100's intended universal use?
 - What are the added workload implications on service providers?
- S-128 service will be an essential part of Port State Control. PSC officers have to check that the vessel conforms to carriage requirement: SOLAS V/27 : Nautical charts and nautical publications, such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date. Therefore, S-128 service is not only of up-to-dateness verification of products on board.
 - Is there a need for a definition/description of a S-128 service that Port State Control officers will access to evaluate the update status of the onboard products?
 - Should each VAR provide this information to them individually? How? PSC owned and operated repository? Is this service description a IHO responsibility?
 - We could also say that IHO/HOs provide the data/content. The packing of the container, the transport, the unpacking and the last mile is not IHO/HO remit. Will this position be accepted by the maritime community? Some are of the opinion that SOLAS V, regulation 9, prescribe that contracting Governments must provide data management arrangements to support service and therefore HOs are responsible.

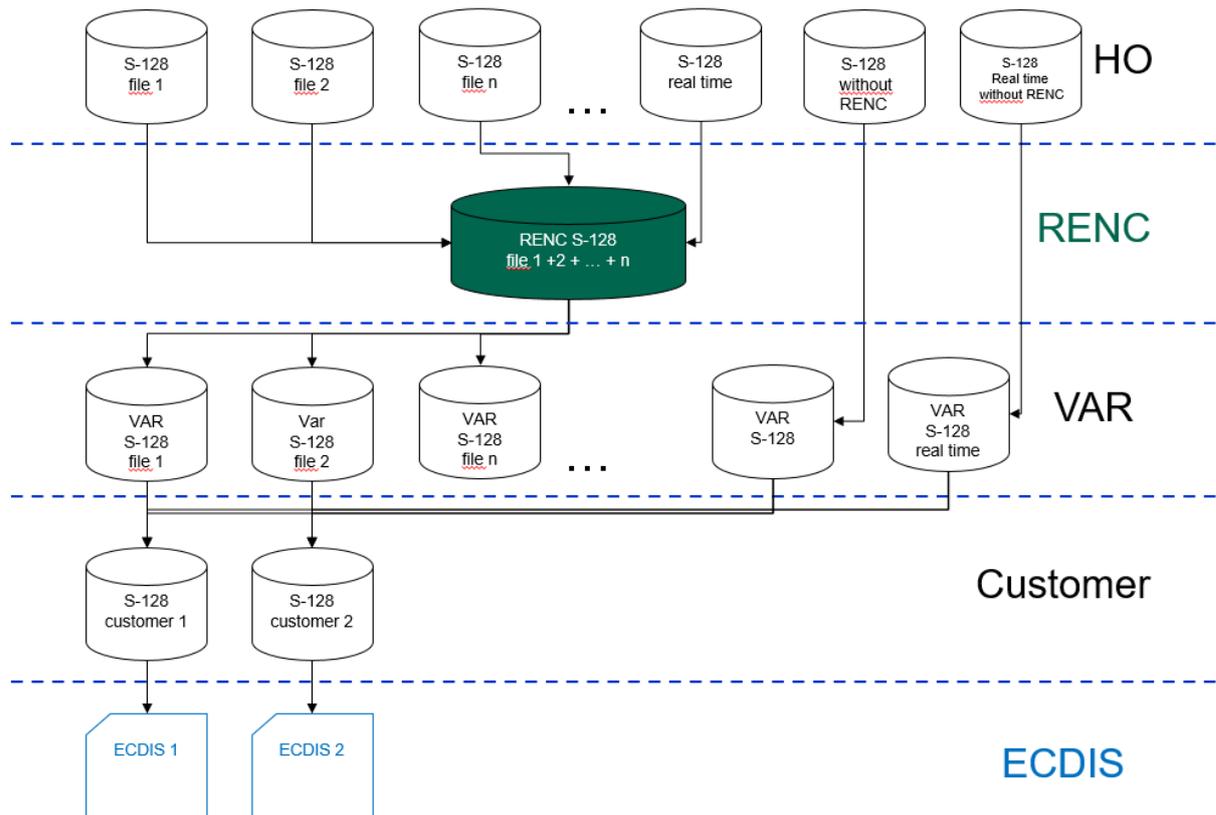


Figure 1A - Potential WEND view of S-128 service for navigational data.

Diagram notes to consider;

- The exchange of S-128 data between the different stakeholders will most likely be at a machine to machine level, and humans may not be involved beyond setting up the rules.
- Non-Member States are missing.
- Non-HO data producers are missing.
- The RENC concept had many challenges in the beginning.
- HO's or any other data provider may produce 1..n S-128 files.
- The provision of real-time data must be considered.
- Direct end user distribution of S-128 should be considered as an option.
- S-128 products may be provided to the responsible RENCs or forwarded directly to the VARs. The latter case happens if a data provider is not part of the RENC distribution system.
- The RENCs compile the individual S-128 into one big data package noting that real time data might be provided differently.
- The VARs grab the full producer S-128 product package and the S-128 provided directly, merge them to one integrated S-128 product and split its dataset afterwards into individual products, which will be forwarded to individual users and their ECDIS systems. Real time data might need to be provided differently.