

Paper for Consideration by NIPWG

Navigational Services S-125

Submitted by:	S-125 Team within NIPWG
Executive Summary:	Status report of S-125 development
Related Documents:	
Related Projects:	S-101, S-201

Introduction / Background

SNPWG was tasked by HSSC4 to provide an estimate of the number of potential Product Specifications related to nautical publications. At HSSC5 SNPWG reported their plans to develop altogether seven such specifications, one of which was named Navigational Services. Navigational Services has been assigned the number S-125, and was initially to include additional information regarding Aids to Navigation, AIS Aids to Navigation (V-AIS) and GNSS-stations. Since then, the concept of S-125 has evolved and is today comprehended primarily as an extended substitute of the conventional List of Lights. S-125 would include, but not be limited to, the data normally included in a List of Lights.

During discussions at NIPWG 2, it was envisioned that S-125 could be visible on the ECDIS, and could be used to extend or substitute AtoN- data in ENC. Even the possibility of streaming data was discussed. At this time, the Interoperability Specification (S-98) was not yet available. The concepts of Maritime Resource Names (MRN) and Session Based services within S-100 were also not yet available for further reference.

During the discussions the main benefits of S-125 were identified as;

1. S-125 could provide additional information for (AtoN) features in the ENC
2. S-125 could provide more recent information than the ENC

The first point could include additional data and attributes needed for List of Light - data, schedules for buoys regularly withdrawn or replaced in winter, and possibly notes of future changes etc. Depending on the actual update-interval, separate channels used for communicating temporary changes and discrepancies could be substituted by S-125 product updates. One of the interests behind S-125 is the possibility to use frequent updates as a way to distribute up-to-date AtoN information to the end user.

Model data and an initial S-125 Data Model was created, based on the requirements. During the work, the need for interoperability rules and unique identifiers between Product Specifications became apparent. Further it was recognized, that IALA is working a very similar S-100 based specification S-201, as a part of the AtoN Information Service.

Work with S-125 was put on hold in order to clarify the similarities and possible overlaps with S-201, and also to receive further results from the interoperability discussion. Data models of both S-101 and S-201 are initially based on the AtoN data model of S-57, but are independently developed. NIPWG decided to raise awareness of the possible need for harmonization, by contacting S-100WG and IALA ENAV respectively. The discussions between these WG:s is now ongoing, and the benefits of harmonization is generally recognized.

Analysis/Discussion

IALA is working on the AtoN Information Service, which will use S-201 to transfer AtoN- data. The Service Specification version 0.7 (Q3/17) describes the operational context as;

"The initial operational context of the service is the exchange of information on AtoN between organizations, for example between a lighthouse authority and a hydrographic office. It could develop into a service direct to users, from AtoN providers, hydrographic offices, or other maritime service providers. Related operations supported by the service would include the issuing of navigational warnings and corrections to electronic charts associated with changes in AtoNs. Other related services would include exchange of information on radio AtoNs, for example DGNSS almanacs.

Based on the Service Description, the IALA- service seems very close to the anticipated use of S-125. The coordination of S-201, S-101 and S-125 was discussed during IALA ENAV21. During this meeting, a Task Group discussed future requirements and possible solutions. A report of the conclusions made by the Task Group was made, and added to IALA ENAV WG1 report. Below a few selected points from the TG1 report;

- The development of S-201, S-101 and S-125 should be harmonized. Proposals on the implementation strategy for datasets, both short and long-term could be considered in a future IALA/IHO joint meeting. Harmonization should be pursued through liaison with S-100WG/NIPWG.
- S-201 should be expanded to include serviceability status of AtoNs, including real-time information on faults, but this would be a later phase of development.
- Other useful additions at that stage would be occasional AtoNs and deployment schedules for buoys affected by ice.
- Adding data needed for creation of the list of lights to S-201, would ensure that S-125 (Navigational Services) is covered in full by S-201.
- Some organizations consider that S-125 and/or S-201 might be used for direct data exchange with the end-user, but this would have major quality assurance implications for AtoN authorities, particularly for M2M applications. Such a development could only be undertaken in full; cooperation with hydrographic offices.
- S-125 could carry limited data and be the public-facing specification, whereas S-201 would be used for comprehensive data exchange between AtoN authorities.

S-201 will be used as the primary format for transferring data from the Lighthouse authority (LA) to the Hydrographic office (HO). As such, it needs to contain all the data needed by the HO. The responsibilities between the offices might differ by country, but if the HO is issuing the Light List, also S-201 should include all the data needed by that product. Current version of S-201 is based on S-57. A tool for conversion between S-201 and S-57 is under development. It is assumed that initially S-57 will be used as an intermediate format for converting S-201 into S-101.

LA		HO		User
S-201	=>	S-57 => S-101	=>	ENC
S-201	=>	Other chart products	=>	Papercharts, Publications
S-201	=>	List of Lights	=>	List of Lights

Table 1 Anticipated workflow and use of S-201 as the main data delivery between organizations.

Even though the AtoN information service description contains the wording "could develop into a service direct to users" and said to support "corrections to electronic charts associated with changes in AtoNs", this should not necessarily be understood as a possibility to inject actual ENC- updates from an S-201 dataset. Even though the S-201 dataset would contain all the information needed for updating the actual ENC, it will still be an internal task for the HO to include these changes into the ENC- updates. In order to support frequent updates of AtoN- data within the S-100 ECDIS, we most likely need to resort to Interoperability between products. Interoperability includes the possibility that AtoN- features in an S-125 / S-201 dataset loaded (and frequently updated) could be given display priority over, or combined with, AtoN- features in S-57 / S-101. This mechanism would make it possible to display AtoN- changes on the ECDIS, which are not yet updated in the ENC- material.

The additional data identified as needed by the HO could be added to S-201. It is assumed those additions to the PS will not be actively developed in the near future. Distribution and data-content of S-201 is today mainly targeted toward data producers and not end-users. Interoperability and use within the S-100 ECDIS might need specific and additional metadata that is not relevant for other uses, and could restrict further development of the PS. In the TG1 report, it is recognized that direct distribution of data to end-users, using S-201, "would have major quality assurance implications for AtoN authorities, particularly for M2M applications". Further, it is recognized that such a development could only be undertaken in full cooperation with hydrographic offices.

S-201 is currently based on S-57. One of the reasons for this decision is compatibility with current systems based on S-57. According to previous discussions within TSMAD and S-100WG, a conversion of S-101 into S-57 is

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considered impossible, due to (for example) complex attributes, which have no equivalent in S-57. There are also differences within some of the features, like the Light- feature, which is one feature in S-57/S-201, but considered four different features in S-101. It is assumed a future version of S-201 might be aligned and harmonized more towards S-101, but considering the practical aspects this might not happen within years to come.

Conclusions

S-201 is a general-purpose product, created for transferring AtoN- data between offices. The ownership of this product would always lay with the Lighthouse Authority. Additional content could be included into S-201, but there are quality- and liability issues identified with the concept of using S-201 for direct data exchange with the end-user, particularly within M2M systems. ECDIS- interoperation could be considered such a system, and also Hydrographic Offices might have additional requirements for any product given priority over ENC.

The main need for harmonization with S-201 would be to ensure that all the data needed by the HO is available. It seems S-201 as a product might be too large and complex to implement for interoperability within the S-100 ECDIS. Even though S-125 and S-201 would contain similar data, or S-125 even was a subset of S-201, it seems that a PS without the overhead related to S-201 might better support S-100 Interoperability.

	LA		HO		User
	S-201	=>	S-57 => S-101	=>	ENC
	S-201	=>	Other chart products	=>	Papercharts, Publications
A.	S-201	=>	S-125	=>	S-125
B.	S-125	=>	S-125	=>	S-125

Table 2 Anticipated workflow including S-125. S-125 would be specially developed for Interoperability with S-101. Based on national agreements, S-125 could be derived and distributed as a subset of S-201 either by the HO (A) or the LA (B).

There are differences in data structure of AtoNs in S-57 and S-101. During the transition period, practical reasons dictate the use of S-57 as the base for S-201. It is assumed a future version of S-201 could be structured more as S-101 and include the data content envisioned for S-125, but this product might still not be suitable for ECDIS interoperability. The Interoperability Specification includes guidelines for developers of PS. (8.1.3) to maintain a data model that is as harmonized with related data models as possible. Due considerations should be taken before developing a concept that is different but functionally equal to similar concepts in other product specifications.

Recommendations

Harmonization work should be established and continued between NIPWG, IALA ENAV and S-100WG to support the development of S-101, S-201 (and S-125). IHO should make first priority to ensure, that all the data content needed by HO- products is recognized within the development of the IALA ATON SERVICE and S-201, which will be the future standard for data transfer between organizations. There is a recent initiative by IALA ENAV to establish such harmonization work.

In order to communicate AtoN- related updates and additional data to the end-user in a timely manner, the use of mechanisms described within the S-100 Interoperability Specification (S-98) are recommended.

Due to S-201 having multiple use-cases and backwards compatibility with S-57, a subset thereof (S-125) could function as an interface which closely follow the S-101 data structure, and thus might be better suited for Interoperability within the S-100 ECDIS. If ECDIS Interoperability is supported, it seem feasible that S-125 could carry limited data and be this public-facing specification, whereas S-201 would be used for comprehensive data exchange between AtoN authorities.

If data modeling of S-125 is continued, the following recommendations are given to guide the process;

- S-125 should follow S-101 data structure as far as possible for all data present in S-101. S-201 will have to support conversion of S-201 into ENC (S-57 / S-101) anyway, and a data model similar to S-101 will better support interoperability.

- For additional data not present in S-101, data structure should as far as possible be developed in cooperation such that the same data structures could be used as-is in both S-125 and S-201.

Action Required of NIPWG

The NIPWG is invited to:

- a. Note and discuss the paper
- b. Support the ongoing harmonization work and discussion
- c. Discuss whether the role of S-125 as described above seem feasible
- d. Decide on any future actions