Paper for Consideration by WENDWG14

Think beyond the border, what comes next

Submitted by:	WENDWG Chair
Executive Summary:	This paper described potential future developments, which may have impacts on HOs missions.
Related Documents:	C-17 Ed. 3.0.0, S-100 based products, IMO SOLAS Chapter V
Related Projects:	

Introduction/Background

The advent of putting S-100 into service will engage HOs for many years. Starting in 2026, HOs will have to fulfil the obligation to produce S-57 and S-101 ENCs. In addition, the elaboration of the full S-100 potential requires the provision of other S-100 based products. These challenges, in combination with permanent budget constraints, will put a significant workload on HOs.

Other organisations identified the potential of the S-100 concept. They will start the production of S-100 compliant products in the future. These products may contain information provided by S-101 ENC, such as ice, restricted areas, and cables.

The publication C-17 (Spatial Data Infrastructures "The Marine Dimension") describes data provision options. Especially, the "Linked Data" option in section 2.4 (Third party data incorporation methods) could have significant impacts on the data processing, the product generation and delivery processes.

Interoperability levels 3 and 4 as described by the IHO publication S-98 enables feature hybridization and spatial operations. Although being conceptual at the current stage, these levels offer the linked data implementation possibility in the future.

Online availability and bandwidth are also no longer preventing arguments. Satellites offer worldwide internet availability and shore-based 6G and 7G data provisions are possible.

This paper attempts to address these challenges. It invites HOs to consider their future conception of themselves. The paper does not intend to provide the ultimate solution, but it seeks to develop a concept worth discussing.

Analyses/Discussion

The described scenarios below are selective and hypothetical.

In the near future a worldwide availability of high-speed data streaming service is no longer a vision. Every discussion point is dependent on this service. The IHO publication C-17 describes various data sharing level. Linked Data is the most advances step and the existing technologies support this technique. Linked Data utilizing Internet based technologies.

The S-101 data model

Having split the S-101 data model in semantic parts, it could be assumed that an S-101 data product is a collection of data provided by third parties. This could slightly differ from HO to HO, but it is a fact from a generic point of view. The best examples are AtoNs, cables, and ice. It is possible to extract these features from S-101 and to provide these data separately. These data are currently provided or could be provided by separate data products

(AtoN by S-125, Cable information by a ProdSpec under development by the ICPC, ice information by S-411). Especially, S-125 is one of the product specifications under the IHO responsibility.

S-125 data set provision

S-201 data, generated by national lighthouse administrations are the basis of S-125 data. Theoretically, the buoy tender could amend an on-board chart presentation when the tender manipulates one AtoN. The data streaming is as follows: BuoyTender → national lighthouse administration → national HO (optional) → RENC → (optional) → VAR / Service Provider → onboard ECDIS. The optional steps reflecting the current data provision set up. However, not all of them are necessary. The buoy tender data could be streamed directly via the national lighthouse administration and the VAR / Service provider to the onboard ECDIS. That would make the provision of AtoN information by the HOs and RENCs unnecessary.

Cable information provision

The cable information provision is similar to the AtoN. The cable layer could provide the as-laid and other cable information directly to the cable authority. This information could be forwarded to the VAR / Service Provide and afterwards directly to the on board ECDIS. The only difference here is that a cable authority is not recognised as a charting authority by the IMO SOLAS chapter V.

Ice information provision (real-time data)

Long-time observations are the basis of the current ice information in ENC. Ice authorities could easily replace this information by real-time ice information. This real-time data provision requires a more complex logistic than the provision of AtoN and cable information. However, the approach is similar. HOs and RECNs are not needed to provide real-time ice information.

S-101 data set

Seeing S-101 as a product of merged data from various sources, we see three different approaches. An ENC data set could be produced ashore under the responsibility of an HO or of a RENC/VAR/Service Provider. The third option is that the onboard systems manages the data merging.

Possible IHO position (static information provision)

The IHO must emphasize the necessity to provide high quality data to the onboard systems. Only a human based final product check containing all chart information ensures that the onboard systems receive correct data. This is in particular important when autonomous or semi-autonomous ships are in service. Having experience and capability to identify third party data errors, HOs are the only bodies, which could guarantee this service.

Possible IHO position (real-time data provision)

The responsibility of real-time data provision varies from country to country. It seems clear that it is impossible to provide a human based final check for real-time data. Both the real-time data and the real-time data provision chain must be 100% reliable. That underlines the importance that HOs set up minimum standards for real-time data provision in their quality assurance policies. Ideally, the IHO defines guidance on how to set up these minimum standards.

Recommendations

WENDWG chair recommends brainstorming the various options. The developed ideas should become part of future discussions at the various IHO levels. Ideally, the ideas would be useful to support the development of a future IHO strategic position.

Justifications and impacts

Taking into account the persistent budget constraints and the future workload, discussing the future IHO position affecting each HO prevents investing money and human resources in the wrong direction.

Conclusion

Considering future developments affecting HOs and discussing how to manage them in the future supports HOs in future orientation.

Action required of WENDWG14:

The WENDWG14 is invited to:

a. Take note of the paper,

b. Consider the described challenges,

c. Brainstorm possibilities and options.