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## S-100 Implementation Roadmap - Concerns and Recommendations

Risks of S-100 implementation and their mitigation

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SevenCs/ChartWorld are working on a variety of products and solutions dealing with different aspects of S-100 implementation. These include development on our S-100 ECDIS kernel, to support S-101, S-102 and S-104 for use in ECDIS (read, display, alerts, interaction, decryption, etc.). This development also deals with the dual-fuel concept. Moreover, functionality is being developed to provide S-100 services, helping data producers with new S-100 data management processes, validation, metadata handling, authentication, exchange set creation, etc.

IHO has already communicated that it may be the case that not all operational specifications of S-100 Phase 1 (Route Monitoring), including their critical framework specifications (S-98, S-128 and S-164), will meet the envisaged publication date in 2024 (e.g. S-98 Ed. 2.0.0 will be published in 2025). It should be noted that, at the time of writing, some fundamental functions of an S-100 ECDIS have not even been fully specified yet (e.g. loading algorithm, interoperability, consideration of accuracy information).

This will have an impact on the time frame for development of validation standards and for completion of IEC test standards for ECDIS.
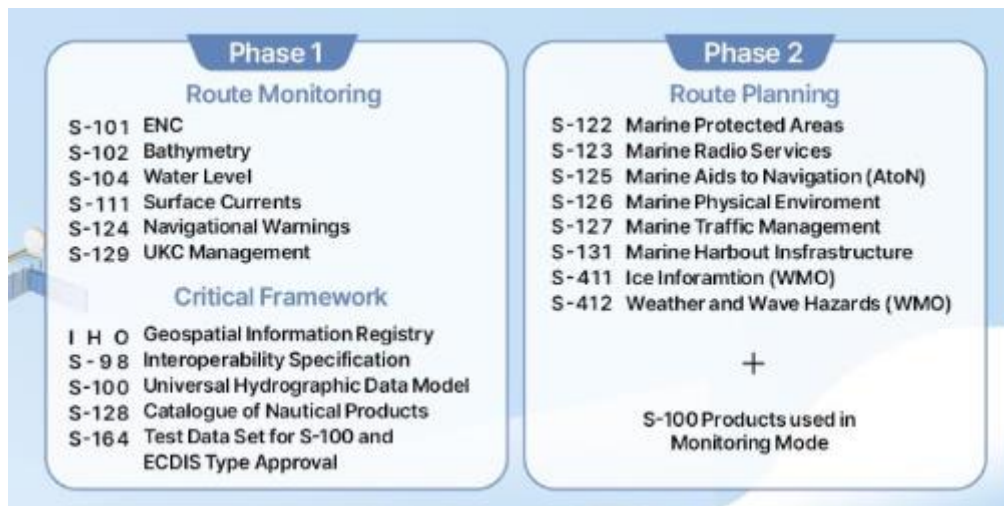
These circumstances will have several impacts and consequences that we would like to highlight:

1. A delay in completing the relevant specifications will result in less implementation time for ECDIS manufacturers. Also, this makes it difficult for industry to plan its implementation.
2. Completion of standards under time pressure may result in operational S-100 product editions that are not sufficiently mature. It is always difficult if inconsistencies in

relevant ECDIS standards are detected only during the implementation phase, due to lack of testing time at an earlier stage.

3. Representatives and contributors active in the industry have an insight into the progress and delays in the standardization work. However, for external stakeholders it is difficult to assess what the latest status is.

We acknowledge that all the relevant IHO working groups and project teams are putting a lot of effort and pressure into a timely completion of the relevant standards. Software manufacturers do their best to update data production systems accordingly. What is missing, as we see it, is comprehensive testbeds and sufficient testing time. A few testbeds have been set up, but so far, they can investigate particular use cases only and the test data does not always comply to the latest Product Specification updates.

It is obvious that the entire S-100 development process is facing a conflict between a challenging scope and the envisaged deadlines that have been set for the new S-100 ECDIS Performance Standard's entry into force. It may be the case that exact and precise standardisation (especially regarding ECDIS functionality) is not feasible on time, or it is risky. Industry's motivation to contribute to S-100 development based on "unstable" normative documents might be limited.

Recommendations:

We propose that, for an ECDIS to comply with the new S-100 Performance standard, it should be possible to focus on a defined sub-set of the Phase 1 products, rather than having to support all of them, right from the outset. Reducing the scope within a specific product should be considered as well. For S-104 Edition 2.0.0 for example this has been done already – it has been agreed that only gridded coverages are used.

IHO should use the following scope reduction criteria:

- readiness level of the relevant product specifications
- readiness level of the related interoperability specifications
- confirmed practical experience, at least in prototype implementation and testbeds
- expected availability of data

More freedom should be given to industry to produce the best possible implementation, based on what is available from IHO products (services) and on the demands of maritime market customers. Requirements should be 'softened' if it is not possible to produce 'firm/proven' technical requirements in time. This will help to minimize business risks and enable more practical experience to be gained within a transition period (say, before S-57 is withdrawn from legal use).