

**3<sup>rd</sup> IHO-HSSC Meeting  
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**Paper for Consideration by HSSC**

**Review of S-58 Recommended ENC Validation Checks**

<b>Submitted by:</b>	UK
<b>Executive Summary:</b>	This paper considers the different usages currently being made of IHO S-58 and proposes restructuring and re-categorising the existing standard.
<b>Related Documents:</b>	1. S-58 Recommended ENC Validation Checks
<b>Related Projects:</b>	S-101

### Introduction / Background

1. Currently ENC production by member states must conform to the ENC product specification. Member States' validation practices vary between countries and there is no mandated standard for content validation applied to all ENCs. Additionally ECDIS manufacturers must build extensive parsing and checking into their ECDIS so that data may be imported into the SENC. The aim of ENC related standards should be to ensure a minimum standard of both format and content validation is applied to all ENC data to best prepare it for SENC import within and ECDIS and this paper proposes a restructure of S-58 in order to achieve this.

2. S-58 provides the Recommended ENC Validation Checks. These ensure that ENC data conforms to the S-57 ENC Product Specification, that it is encoded correctly and the data is logical. S-58 is a reasonably clear and detailed list of tests which can be conducted on ENC data in order to "validate" it. These tests, built up by experience of many hydrographic offices over a number of years examine many parts of ENC data and perform both format validation and object/attribute structure and content validation. Many vendors of ENC production software have also embedded S-58 testing suites in their tools.

### Analysis/Discussion

3. As is well known with S-58, the results of its many tests are generally categorized as errors or warnings, some of which require cartographic context of objects to be taken into account to resolve the severity of "failure". Some errors, in contrast, are straightforward and clearly represent issues which could render ENC unusable for import or safe navigation. Due to S-58s optional nature and the lack of a consistent baseline of syntactic quality within global ENCs a review is proposed within TSMAD. The goals of the review are to produce a version of S-58 specific to hydrographic offices' needs for data validation and to assist the manufacturer community by documenting a baseline for ENC data. In addition a clearer statement of all tests should be documented within the standard.

### Proposed review of S-58.

4. The contents of the proposed review of S-58 is described below :

4.1 The S-58 checks are currently categorized in sections aligned to the different parts of S-57, e.g the ENC product specification, Use of the Object Catalogue etc. One particular section contains checks to ensure data loads correctly in ECDIS. The conditions for failure and the test itself are unambiguous in nature and stated in very precise terms. Generally these tests are at a level where a consistent ENC "structure" is being set out. These tests are ECDIS specific and should be moved out of S-58 into a separate IHO "S" standard for reference by manufacturers.

4.2 It is proposed that the remaining content of S-58 is re-categorized as follows:

(a) Major Producer Data Errors – Test failures which affect the safe use of data but which require cartographic input from the originating producer in order to correct.

(b) Minor Producer Data Errors - Test failures which are caused by encoding ambiguities or a need for producer choice in the current standard. These would not affect the safe use of the data and are acceptable in distributed ENCs for ECDIS.

4.3 Rewording of test conditions into a more precise programmatic language. This follows the move proposed for rewording the complex conditional symbology procedures embedded within the S-52 presentation library into structured, machine readable XML code.

4.4 A clarification of the intended user for each test and purpose of the standard which is to assist ENC producers in constructing valid ENC data which may be loaded on to an ECDIS.

5. The current standard, whilst comprehensive in its content is still entitled "Recommended ENC Validation Checks" and is not clear as to its intended underlying purpose. As a "standard" it should not be regarded as "recommended", particularly for something as important as ENC.

6. Currently there is no mandatory requirement for any Member States' data to conform to any subset of S-58 tests although RENC countries and many non-RENC Member States generally have a minimum set of quality standards which have to be met in order to release data. However experience has shown that some data containing errors either may not be loaded or, worse, may load but cause anomalous behaviour on some models of ECDIS. It is therefore proposed that all ENCs should pass at least the tests contained in category 4.2 (a) above.

7. The corollary to this requirement for ENC would be the expectation that ALL type approved ECDIS systems should load data conforming to 4.2 above but the ECDIS manufacturer is only required to run the tests described in 4.1 to determine basic data consistency with no cartographic input or user feedback required for loading. The benefit for the ECDIS manufacturers is that they can assume a deeper level of consistency and harmonization at an object level than currently exists, without having to explicitly check data for it prior to import.

### **Conclusion**

8. Currently the position is unclear for ECDIS manufacturers in that data encoding practices vary between producer nations. This has forced some manufacturers to carry out more consistency checking than should be required with the attendant longer loading times and, in many cases, reporting of errors (which in many cases are warnings) to the unsuspecting end user. There is the remaining issue of old systems with outdated versions of S-58 tests embedded within them which may not load current, valid ENC data.

The endorsement of this "minimum quality standard" for all ENCs and its implementation will contribute to better and more consistent ECDIS implementation by manufacturers and actively promotes the concept of ENC quality.

### **Recommendations**

9. The recommendations of this paper are as follows:
- a. Carry out a review of S-58 according to the principles and goals outlined in this paper.
  - b. Work towards future versions of S-58 which harmonise its application by ECDIS manufacturers and IHO Member States.
  - c. Ensure that S-58 is clear and well structured for all users.
  - d. Ensure that IHO S-64 contains sufficient test data to allow exhaustive testing of ECDIS for loading.

### **Action Required of HSSC**

10. The HSSC is invited to:
- a. Endorse the launch, through TSMAD, of a review of S-58 with the goals defined within this paper.
  - b. Ensure any required changes are made to S-64 to ensure adequate test regimes are in place for new systems.
  - c. Determine the impact on Member States of the requirement of all ENCs to conform to a minimum quality standard to be adopted from the current S-58 standard.