

S-101 DATA CLASSIFICATION AND ENCODING GUIDE

FRAMEWORK AND DEVELOPMENT DOCUMENT

INTRODUCTION

The S-101 Data Classification and Encoding Guide is the reference document to be used for the consistent encoding of IHO compliant ENC's in the S-101 ENC Product Specification, which is a Product Specification developed in S-100 – IHO Universal Hydrographic Data Model.

FRAMEWORK

The S-101 Data Classification and Encoding Guide is based on the Nautical Chart Manual (Volume 3) – Digital Specifications – Data Capture and Classification Guide (as amended at August 2009); produced by the US National Oceanographic and Atmospheric Administration (NOAA) in MS Word format. The NOAA document is a guide for the compilation of US ENC's based on the existing IHO Transfer Standard for Digital Hydrographic Data (S-57 Edition 3.1.2). The Inland Electronic Navigational Chart Encoding Guide, produced and maintained by Inland ENC Harmonization Group, has also been used as a guide in the production of the S-101 Data Classification and Encoding Guide.

Reference Documents: A number of documents have been used in order to determine the best format, structure and presentation for the S-101 Data Classification and Encoding Guide. These include:

- S-57 Use of the Object Catalogue for ENC;
- The Inland ENC Encoding Guide (Edition 1, Version 3.1);

Procedure:

1. Copy of the Nautical Chart Manual (Volume 3) – Digital Specifications – Data Capture and Classification Guide in MS Word format obtained from NOAA August 2009.
2. Cover page, contents and overview section have been derived from and formatted in accordance to the Draft S-101 ENC Product Specification as submitted to TSMAD18. The Document Control page has been derived from and formatted in accordance to S-100 Edition 0.0.3.
3. The following documents were referenced in the development of the S-101 Data Classification and Encoding Guide and the Working Draft amended to comply with these documents as required:
 - S-32; Hydrographic Dictionary Edition 5 (1994)
 - S-57 Appendix A Chapter 1; Object Classes, Edition 3.1 (November 2000)
 - S-57 Appendix A Chapter 2; Attributes, Edition 3.1 (November 2000)
 - S-57 Appendix B.1; ENC Product Specification, Edition 2.0 (November 2000)
 - S-57 Appendix B.1 – Annex A; Use of the Object Catalogue for ENC, Edition 2.1 (April 2002)
 - S-57 Supplement No. 2 (June 2009)
 - S-57 Maintenance Document (Cumulative) – Number 8 (March 2002)
 - S-58 Recommended ENC Validation Checks Edition 4 (June 2009)
 - DGIWG FACC (Current as at March 2010)
 - Australian Use of the Object Catalogue for ENC (AUOC2.1) Version 11 (August 2009).
4. Within the Working Document, the relevant references to the above documents have been included in the Working Draft as comments for easy cross-referencing.
5. The first principle used is that anything from the existing S-57 ENC Product Specification and the Use of the Object Catalogue that has not been incorporated in the Draft S-101 has been incorporated in the Data Classification and Encoding Guide.

Additionally, as much of the S-57 Object and Attribute Catalogues as possible have also been included in the document. TSMAD will need to decide which information is not relevant or can be transferred to the main S-101 document. **Consideration must be given to the compiler, who may not be aware that they have to refer to other documents e.g. the Feature Catalogue or the S-101 main document, to find information relevant to their requirements** (e.g. the list of objects permitted for use in ENC and their geometric primitives, and the mandatory attributes table). Balanced against this is the consideration of not repeating information contained in other documents where possible.

6. The format of the Guide has been retained as for the NOAA S-57 Data Capture and Classification Guide for ENC, i.e. in INT1 order.
7. Terms and definitions (in the Overview Section of the document): Where possible, these have been taken from S-100, Annex A, V0.1 – Terminology (AA405404).
8. Clauses/paragraphs/sentences that are considered to require more work, or further discussion by TSMAD, have been retained in the document in pink text.
9. Clauses/paragraphs/sentences/words that have not been derived from the S-57 ENC Product Specification, UOC, Object and Attribute Catalogues; have been derived from the AU UOC and other nation's encoding guides; or additional nautical cartographic guidelines derived from IHO S-4, have been inserted in the document in magenta text. TSMAD will need to determine the relevance/appropriateness of such text.
10. Within the individual feature clauses, defining attributes for that feature have been listed, and the definitions of enumerates for these defining attributes (if applicable) have been included. In addition, any enumerated attribute with an allowable enumerate list that is a subset of the full list as defined in the Register (or presently the existing S-57 Attribute Catalogue) is included. TSMAD will be required to review these enumerate lists as they relate to each feature for which the attribute is applicable, and confirm the bindings that have been suggested. [NOTE: This activity should be performed as part of S-101 Feature Catalogue development.]

Strength of Wording:

The terms “must”, “should” and “may” have been retained in the draft document as used in S-57 Appendix B.1 – Annex A.

Maintenance:

A maintenance section (Clause 1.5) has been included on the assumption that Appendix A will be maintained as a separate document.

PROGRESS MADE AS AT TSMAD20/DIPWG2 (MAY 2010):

1. Copy of the Nautical Chart Manual (Volume 3) – Digital Specifications – Data Capture and Classification Guide (as amended at August 2009); produced by the US National Oceanographic and Atmospheric Administration (NOAA) in MS Word format supplied on CD. Copy of the IEHG Inland ENC Encoding Guide (in pdf and database formats) obtained at TSMAD19.
2. Development of standard formatting guidelines – based on the draft S-101 Product Specification document (as at TSMAD19). This included criteria for clause Headings, paragraphs etc.
3. Drafting of Overview and General sections of the document. Evaluation of the information contained in the introductory clauses of the NOAA Data Capture and Classification Guide for relevance to the IHO document. Text retained (in magenta) if considered relevant. Note that within this draft document, the “Objects permitted for ENC and their geometric primitives” and “Mandatory attributes” tables from the S-57 ENC Product Specification have been included at clauses 2.2 and 2.4.2. Feedback from ENC compilers at the AHO has indicated that these tables are an invaluable quick reference when compiling, therefore they have been included.
4. Determination of standard format for tables used for Feature classification and encoding guidance.

5. Evaluation of S-57 UOC, Object and Attribute Catalogues for information to be included in the tables.
6. Progression through the document to populate and standardise the individual S-101 Feature tables. Steps/decisions taken during table population included:
 - Determination of attributes to be included in the table. This is based on those attributes that best define the characteristics of feature in the real world (predominantly from the Attributes_A list on the S-57 Object Catalogue), and those attributes that are applicable to only that feature. It was also determined that the full list of (E) and (L) attributes would be included, as in most cases only a subset of the full list of enumerates that apply to an attribute would be relevant to an attribute as it is applied to a feature. For instance, while black may be considered a valid value for the attribute COLOUR for many features, it is not logical to allow black to be a value that can be populated for COLOUR for a LIGHTS feature. The determination of this binding should be done in the development of the S-101 Feature Catalogue, but a quick evaluation on a feature by feature basis has been done in the development of the document.
 - Evaluation of the enumerate list for (E) and (L) attributes to determine the subset (where applicable) in relation to the binding of the attribute to the feature. As stated above, this has only been a rough first pass and an interpretation from one individual. The actual list to be included in the tables will be based on the development of the S-101 Feature Catalogue. Within the draft, the full list of allowable enumerates (from S-57) has been included, with those considered not applicable to the feature indicated in ~~pink-strike-through~~ text. Prohibited enumerate values have not been included in the list.
 - Insertion of additional rows in the table to provide additional information on a selection of the attributes listed in the "S-101 Attribute" column. This information has been taken from the S-57 Attribute Catalogue. For (E) and (L) attributes, only those enumerates considered applicable to that feature have been defined.
 - Definitions: Throughout the document, instances of definitions of features, attributes and enumerates that have no authority listed have been included in pink text. TSMAD will need to determine whether other, authorised definitions should be substituted, suggestions made to the HDWG for new definitions to be included in S-32, or the current unauthorised definition be retained. **NOTE:** This will have implications on the contents of the IHO Registry.
 - Compilation of the additional ENC encoding guidance in the final row of the table. This information is predominantly from the S-57 UOC. The full attribute list for the feature is included in the attribute list, in the order (from S-57) Attributes_A, Attributes_B and Attributes_C (note that prohibited attributes have not been included in this list). Additional text and changed wording from that in the UOC is in magenta text (e.g. substituting "feature" for "object"). Additional information included from other ENC- related documentation (e.g. derived from S-58 or taken from the S-57 Maintenance Document) is indicated in green text (note that, where possible, a reference has been included with magenta and green text as a comment in the document). Where possible on the first pass, this guidance has been updated to include additional/amended guidance and specification from:
 - S-58 Recommended ENC Validation Checks;
 - S-57 Maintenance Document (MD8);
 - S-57 Internal Extensions list;
 - S-57 Supplement No. 2;
 - ENC Encoding Bulletins
 - On completion of the geo feature tables, evaluation was done on the Object and Attribute Catalogues to determine what was missing. This included the meat features, and spatial, meta and attributes common to all features. These were then included in Sections 2 and 3 of the document.

- A second pass of the document has been commenced. As at TSMAD20, this has progressed as far as clause 7.2. This second pass has been focussed on the following:
 - Checking of format of the table;
 - Evaluation of definitions – where a non-authorised definition has been included (from S-57), an alternate, authorised definition has been investigated. The first source of investigation has been S-32. Existing definitions sourced authorised as sourced from S-32 have been checked for correctness (definition and S-32 reference) against S-32. An alternate source of investigation has been the DGIWG FDD. This has been done in the interests of harmonisation between the IHO and DGIWG Registries. TSMAD will need to determine whether this is an appropriate way to go (note that in some cases this may result in proposals for changes to hydrographic-relevant definitions in the DFDD). Note that not all definitions have been authorised. Alternate definitions are indicated in the document in **green text**;
 - Check that all information from the S-57 UOC has been included;
 - Check that INT1 and S-4 references are correct. Where a reference(s) has been amended, this is indicated in **green text**;
 - Check that guidance is included in the document in relation to equivalent S-58 Checks. Such guidance, where incorporated, has been included in **green text**;
 - Check S-57 MD8 that clarifications and corrections relevant to features, attributes and enumerates have been included. Where additional/changed text is required, this has been indicated in **green text**;
 - Check the S-57 Internal Extensions List that all extensions relevant to features, attributes and enumerates have been included. Where additional/changed text is required, this has been indicated in **green text**;
 - Check IHO S-65 for any information that may be included in the document (e.g. SCAMIN consistency guidelines?);
 - Check IHO S-4 for fundamental cartographic guidance to the compiler relevant to the feature (AU Action from TSMAD18). Where considered necessary, such guidance has been included in the document in **magenta text**.
- In line with the above, the document “Issues to Raise with TSMAD and Other Fora” has been developed incrementally as a “work in progress” to (hopefully) capture the issues that need to be discussed.

TASKS TO BE COMPLETED POST-TSMAD20/DIPWG2:

1. Incorporate any suggested changes to the document from TSMAD/DIPWG feedback.
2. Align the tables with the S-101 Feature Catalogue.
3. Complete second pass of document, noting points 1 and 2 above.
4. Reconcile any **pink text** in the document, and confirm/reject incorporation of **green** and **magenta** text in the document.
5. Complete the population of the first column of the table (images) – missing real-world examples (where possible); INT1 example(s) and ECDIS symbol example(s).
6. Incorporate new rules/processes introduced in S-100/S-101 e.g. complex attributes; scale dependant/independent ENC cells; information and collection features; inclusion of cartographic features, attributes and enumerates; addition of SCAMAX(?), etc.
7. Determine how the IHO would like the document to be published i.e. existing format; web-based (html?); both?
8. On completion of the document, go for a couple of quiet beers to celebrate.

Due to the late submission of the document, and other documents associated with the development of the document, it is not anticipated that significant discussions will take place

at TSMAD20/DIPWG2. It is hoped, however, that TSMAD delegates will take some time post-meeting to have a look at the document and provide feedback to:

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DOCUMENT STANDARD PROPERTIES

TEXT STYLES:

All text is in the Ariel font

Major Headings:	Heading 1 (12 pt)	Spacing: 12 pt before / 12 pt after (at 12 pt)
Major sub-headings:	Heading 2 (11 pt)	Spacing: 3 pt before / 12 pt after (at 12 pt)
Minor sub-headings 1:	Heading 3 (10 pt)	Spacing: 3 pt before / 12 pt after (at 12 pt)
Minor sub-headings 2:	Heading 4 (10 pt)	Spacing: 3 pt before / 12 pt after (at 12 pt)
Body text:	10 pt block justified (Single)	Spacing: 0 pt before / 6 or 12 pt after

STANDARDISATION OF TERMS/SYNTAX:

- Units of measure: Full term has been used i.e. “metre” instead of “m”.