10th Meeting of the IHO (S-100WG) S-101 Project Team

Changes to S-101 DCEG Edition 1.1.0

Summary Report

Agenda Item 06.1

S-101PT10, Brest, France, 13-15 June 2023

DCEG SUB-GROUP: MEETINGS

- None held since S-101PT9.
- Work has continued via correspondence (identification of errors/inconsistencies, new proposals).

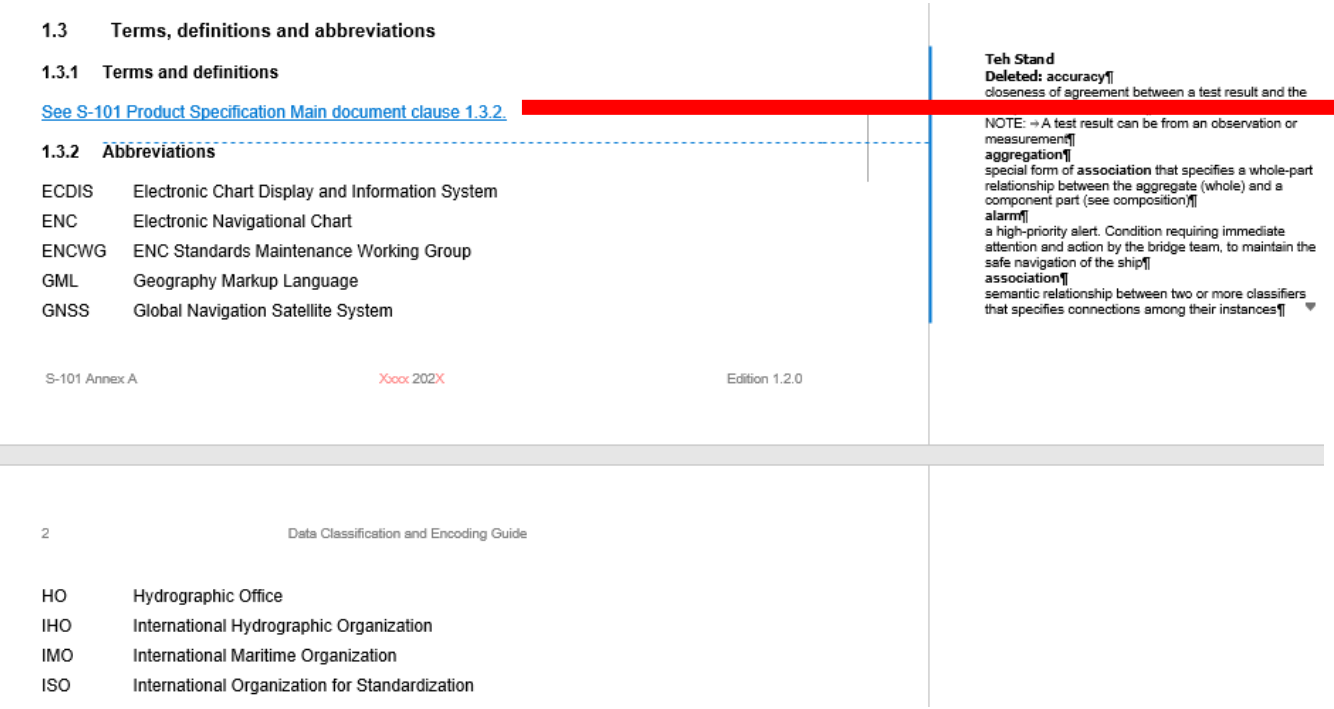
https://github.com/iho-ohi/S-101-Documentation-and-FC

CHANGES APPLIED SO FAR IN DRAFT DCEG ED 1.2.0

- Terms and definitions replaced with reference to S-101 Main document.
- Minor re-arrangement of sub-clauses (Section 2) – logical consistency.
- Corrections throughout for grammar and consistency as identified by S-101 DCEG Sub-Group members - consistency.
- Re-arrangement of clause 2.5 (Datasets) for consistency/referencing to S-101 Main document – for changes introduced in Main document Edition 1.1.0.
- New guidance for lights disposed in a pattern.
- Corrections made (DCEG and GI Registry) resulting from first phase of DQWG review of consistency between the DCEG and the S-101 Feature Catalogue (attributes). See Paper S-101PT10-06.1E.

TERMS AND DEFINITIONS (CORRECTION)

- Terms and definitions replaced with reference to S-101 Main document.
  - Information included in DCEG Edition 1.1.0 not previously included in the S-101 Main document included in draft Edition 1.2.0 Main document.



1.3 Terms, definitions and abbreviations

1.3.1 Terms and definitions

See S-101 Product Specification Main document clause 1.3.2.

1.3.2 Abbreviations

ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigational Chart
ENCWG	ENC Standards Maintenance Working Group
GML	Geography Markup Language
GNSS	Global Navigation Satellite System

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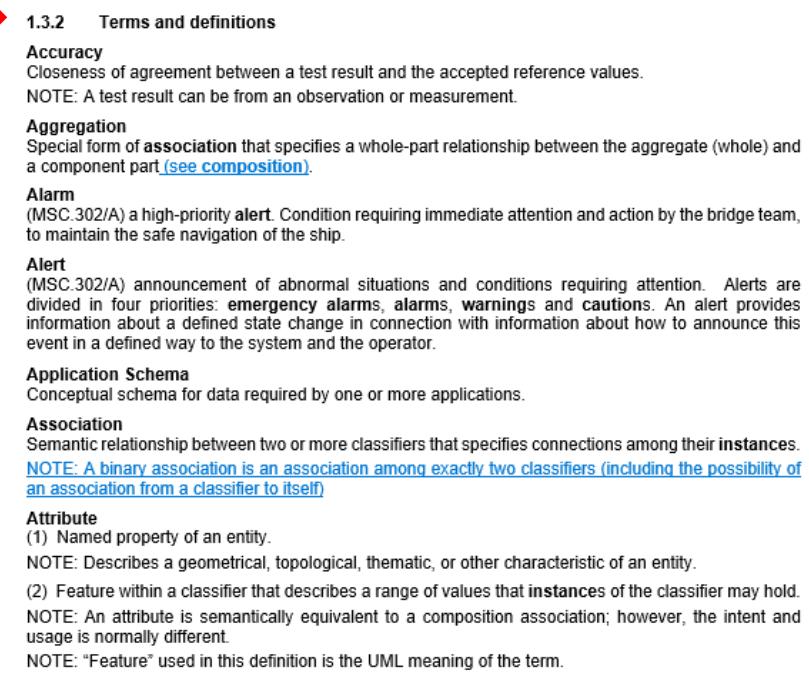
2 Data Classification and Encoding Guide

HO	Hydrographic Office
IHO	International Hydrographic Organization
IMO	International Maritime Organization
ISO	International Organization for Standardization

Teh Stand

Deleted: accuracy¶
closeness of agreement between a test result and the

NOTE: ⇒A test result can be from an observation or measurement¶
aggregation¶
special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component part (see composition)¶
alarm¶
a high-priority alert. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship¶
association¶
semantic relationship between two or more classifiers that specifies connections among their instances¶



1.3.2 Terms and definitions

Accuracy
Closeness of agreement between a test result and the accepted reference values.
NOTE: A test result can be from an observation or measurement.

Aggregation
Special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component part (see composition).

Alarm
(MSC.302/A) a high-priority **alert**. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship.

Alert
(MSC.302/A) announcement of abnormal situations and conditions requiring attention. Alerts are divided in four priorities: **emergency alarms**, **alarms**, **warnings** and **cautions**. An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.

Application Schema
Conceptual schema for data required by one or more applications.

Association
Semantic relationship between two or more classifiers that specifies connections among their **instances**.
NOTE: A binary association is an association among exactly two classifiers (including the possibility of an association from a classifier to itself)

Attribute
(1) Named property of an entity.
NOTE: Describes a geometrical, topological, thematic, or other characteristic of an entity.
(2) Feature within a classifier that describes a range of values that **instances** of the classifier may hold.
NOTE: An attribute is semantically equivalent to a composition association; however, the intent and usage is normally different.
NOTE: "Feature" used in this definition is the UML meaning of the term.

CLAUSE RE-ORDERING – SECTION 2 (CORRECTION)

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- Former clause 2.3 (Information Types) re-numbered to clause 2.2 to provide more logical clause ordering.
  - Former clause 2.2 (Geometric primitives) re-numbered to clause 2.3.

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2.2 Information types

An information type is an identifiable object that can be associated with features in order to carry information particular to the associated features. An example of the use of an information type may be the requirement to include a note about overhead cables. Information types can also be associated with other information types. This may be done where there is further supplementary information that is relevant to the information type.

Information types carry attributes but not geometry.

2.3 Geometric primitives

The allowable geometric primitive for each feature type is defined in the Feature Catalogue. Within this document, allowable primitives are included in the tables containing a description of each feature type. Allowable geometric primitives are point, pointset, curve and surface.

Each spatial value must be referenced by at least one feature instance.

Within this document, allowable primitives are included in the description of each feature type. For easy reference, Table 2.1 below summarises the allowable geometric primitives for each feature type. In the Table, abbreviations are as follows: point (P), pointset (A), curve (C) and surface (S). A feature that may have no geometric primitive is annotated as none (N).

GEO FEATURES

DATASETS (ENHANCEMENT)

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- Reference included in DCEG to main document clause 4.5.
  - Additional changes made in sub-clauses to remove potentially repeated information from the DCEG and ensure consistency with the S-101 Main document.

2.5 Datasets

A Dataset is a grouping of features, attributes, geometry and metadata which comprises a specific coverage.

Four types of ENC dataset may be produced and contained within an exchange set:

- Update: Changing some information in an existing dataset.
- Re-issue of a dataset: Including all the Updates applied to the original dataset up to the date of the reissue. A Re-issue does not contain any new information additional to that previously issued by Updates.
- New dataset and New Edition of a dataset: Including new information which has not been previously distributed by Updates. Each New Edition of a dataset must have the same name as the dataset that it replaces.

See also S-101 Main document, Section 4.5 in addition to the sub-clauses below for further information regarding ENC datasets.

1:90,000
1:45,000
1:22,000
1:12,000
1:8,000
1:4,000
1:3,000
1:2,000
1:1,000

Table 2.5 - Maximum and minimum display scale values

The **Data Coverage** features within a dataset must not overlap, however **Data Coverage** features from different datasets may overlap as long as the scale ranges do not overlap. All Data Coverage features within a dataset must have the same minimum display scale, but portions of a dataset can have a different maximum display scale, depending on the best scale required for navigation in an area for the purpose of the ENC data.

To ensure a seamless ECDIS display of ENC data within the same scale range, it is important that the data on the border of the dataset is aligned and matched with the corresponding data in any adjoining datasets within the scale range, where possible. Where there is a mismatch in depth data between adjoining datasets, editing of the depth data should be done such that depth contours and depth areas are adjusted on the side of safety. Edge matching of data across different scale ranges, particularly depth data, is often not possible due to generalisation issues resulting from differing scales, although features such as maritime boundaries, navigation lines, recommended tracks, roads

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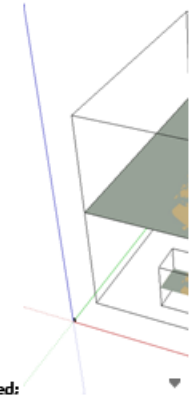
Teh Stand Consistency with Main document

Teh Stand **Deleted:** if they have differing

Teh Stand **Deleted:** data

Teh Stand See S-101 Documentation and FC

Teh Stand



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HULKS (CORRECTION)

- Date attributes missing from feature **Hulk**.
  - **Hulk** removed from the Skin of the Earth in S-101.

8.3 Hulks

IHO Definition: **HULK**. The hull of a wrecked or condemned ship, from which the fittings and superstructure have usually been removed, which is moored in a permanent position or grounded. It may be abandoned or put to some other use. (Adapted from IHO Dictionary – S-32).

S-101 Geo Feature: Hulk (HULKES)

Primitives: Point, Surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of hulk	(CATHLK)	1 : floating restaurant 2 : historic ship 3 : floating museum 4 : floating accommodation 5 : floating breakwater 6 : casino 7 : training vessel	EN	0,*
⋮				
name	*(OBJNAM)* *(NOBJNM)*		(S) TE	1,1
fixed date range		See clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 †
date start	(DATSTA)		(S) TD	0,1 †
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
periodic date range		See clause 2.4.8	C	0,*
date end	*(PEREND)*		(S) TD	1,1
date start	*(PERSTA)*		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1

TYPES OF LIGHTS (ENHANCEMENT)

Type	S-4	category of light	Remarks
Vertically disposed lights	B-471.8	*20*	The number of lights must be encoded using complex attribute **multiplicity of features**
Specific pattern of lights	B-471.8		The pattern must be encoded using complex attribute **information**, sub-attribute **text**; for example *lights disposed in the shape of a triangle*. The number of lights must be encoded using complex attribute **multiplicity of features**

Table 19.2 - Special types of lights

Jeff Wootton
Formatted Table

Teh Stand
See S-101 Documentation and FC GitHub issue #58.

VIRTUAL AIS AID TO NAVIGATION TYPE (CORRECTION)

International Hydrographic Organization

- Attribute **virtual AIS aid to navigation type** values 5-8 incorrect (IHO GI Registry and S-101 DCEG). Values corrected to be consistent with S-57.

27.190 virtual AIS aid to navigation type

Virtual AIS aid to navigation type: IHO Definition: A purpose of a virtual AIS Aid to Navigation.

Attribute Type: Enumeration

1) **north cardinal**

   IHO Definition: Indicates that it should be passed to the north side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).

2) **east cardinal**

   IHO Definition: Indicates that it should be passed to the east side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).

3) **south cardinal**

   IHO Definition: Indicates that it should be passed to the south side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).

4) **west cardinal**

   IHO Definition: Indicates that it should be passed to the west side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).

5) **port lateral (IALA A)**

   IHO Definition: Indicates the port boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA A system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

6) **starboard lateral (IALA A)**

   IHO Definition: Indicates the starboard boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA A system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

7) **port lateral (IALA B)**

   IHO Definition: Indicates the port boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA B system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

8) **starboard lateral (IALA B)**

   IHO Definition: Indicates the starboard boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA B system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

virtual AIS aid to navigation type		1 : north cardinal 2 : east cardinal 3 : south cardinal 4 : west cardinal 5 : port lateral (IALA A) 6 : starboard lateral (IALA A) 7 : port lateral (IALA B) 8 : starboard lateral (IALA B) 9 : isolated danger 10 : safe water 11 : special purpose 12 : emergency wreck marking	EN	1,1

Jeff Wootton
Deleted: . (

Jeff Wootton
Deleted: . (

Jeff Wootton
Deleted: preferred channel to port

Jeff Wootton
Deleted: At a point where a channel divides, when proceeding in the "conventional direction of buoyage", the preferred channel (or primary route) is indicated by a modified port-hand lateral mark. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

Jeff Wootton
Deleted: preferred channel to starboard

Jeff Wootton
Deleted: At a point where a channel divides, when proceeding

Jeff Wootton
Deleted: preferred channel to port

Jeff Wootton
Deleted: preferred channel to starboard

CONDITIONAL DISPLAY – BURIED TUNNELS (ENHANCEMENT)

International Hydrographic Organization

- Conditional display exists in S-52 for **TUNNEL** objects that have a populated value for attribute BURDEP other than 0.
- New Boolean type attribute added in S-101 for allow for this conditional display in S-100 ECDIS.
  - Alternative is to not include an option for this conditional display – will need to be included in S-65 Annex B guidance.

27.112 is buried

Is MRCC: IHO Definition: A statement that expresses whether or not a feature is buried underneath a body of water.

Attribute Type: Boolean

Indication: A True value is an indication that the encoded feature is buried.

Remarks:
- No remarks.

Teh Stand
Suggest add attribute buriedDepth as allowable attribute for Tunnel (BURDEP included for TUNNEL in S-57). ECDIS portrayal issue – refer to email from Hugh 28/04/23 and 03/05/22. Suggestion is to add a new Boolean type attribute (isBuried?). See S-101 Documentation and FC Issue #65.

6.15 Tunnel

IHO Definition: **TUNNEL**. A passage that is open to the atmosphere at both ends, buried under the seabed or laid over the seafloor or bored under the ground or through mountains. (S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.191, November 2000).

S-101 Geo Feature: Tunnel (TUNNEL)

Primitives: Curve, Surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
condition	(CONDTN)	1 : under construction 2 : ruined 5 : planned construction	EN	0,1
feature name			C	0,*
display name			(S) BO	0,1
language		ISO 639-2/T	(S) TE	0,1
name	*(OBJNAM)* *(NOBJNM)*		(S) TE	1,1
horizontal clearance fixed			C	0,1
horizontal clearance value	(HORCLR)		(S) RE	1,1
horizontal distance uncertainty	(HORACC)		(S) RE	0,1
is buried	*(BURDEP)*		BO	0,1
reported date	*(SORDAT)*	See clause 2.4.8	TD	0,1

Teh Stand
Suggest add attribute buriedDepth as allowable attribute for Tunnel (BURDEP included for TUNNEL in S-57). ECDIS portrayal issue – refer to email from Hugh 28/04/23 and 03/05/22. Suggestion is to add a new Boolean type attribute (isBuried?). See S-101 Documentation and FC Issue #65.

Teh Stand
Deleted:

DQWG REVIEW – CONSISTENCY BETWEEN DCEG AND FEATURE CATALOGUE EDITION 1.1.0 (CORRECTIONS)

International Hydrographic Organization

- First stage of review conducted by DQWG (attributes) assessed and draft changes made (refer to Paper S-101PT10-06.1E).
  - Assessment made of each issue raised and changes proposed for either the DCEG or in the GI Registry (for the Feature Catalogue).
  - NOTE: In some cases, significant consistent changes have been made to definitions (removal of “also known as” terms; base class definitions moved to Remarks, etc).

- **Category of Radio Station**

The part underlined in yellow is missing in the FC.

27.52 category of radio station (CATROS)

Category of radio station: IHO Definition: Classification of radio services offered by a radio station.

A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken. (Adapted from IHO Dictionary, S-32).

For DCEG Edition 1.2.0: Have applied the change to the DCEG. The yellow highlighted text has been moved to the Remarks section (is now consistent with the GI Registry entry).

Category of Radio Station	Differential GNSS	a radiobeacon transmitting dgps correction signals.	a radio station intended to determine only the direction of other stations by means of transmission from the latter.	Have applied changes in both the DCEG and GI Registry to have definition consistent with IHO Hydrographic Dictionary definition.

Concept Details

Name	Differential GNSS
Alias	
CamelCase	differentialGNSS
Definition	Differential GNSS is implemented by placing a GNSS monitor receiver at a precisely known location. Instead of computing a navigation fix, the monitor determines the range error to every GNSS satellite it can track. These ranging errors are then transmitted to local users where they are applied as corrections before computing the navigation result.
Reference	http://iho-ohi.net/S32/engView.php?quick_filter=differential+GPS&quick_filter_operator=Contains
Reference Source	Hydrographic Dictionary, Part I Volume I, English (Detail view)
Similarity to Source	Generalization
Remarks	

27.52 category of radio station (CATROS)

Category of radio station: IHO Definition: Classification of radio services offered by a radio station.

Attribute Type: Enumeration

5) **radio direction-finding station**

IHO Definition: A radio station intended to determine only the direction of other stations by means of transmission from the latter. (IHO Dictionary – S-32).

10) **differential GNSS**

IHO Definition: Differential GNSS is implemented by placing a GNSS monitor receiver at a precisely known location. Instead of computing a navigation fix, the monitor determines the range error to every GNSS satellite it can track. These ranging errors are then transmitted to local users where they are applied as corrections before computing the navigation result. (Adapted from IHO Dictionary – S-32).

11) **Toran**

IHO Definition: An electronic position fixing system used mainly by aircraft. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.71, November 2000).

14) **Chaika**

IHO Definition: A low frequency electronic position fixing system using pulsed transmissions at 100 KHz. (Admiralty List of Radio Signals, UK Hydrographic Office, Volume 2, 1995).

19) **radio telephone station**

IHO Definition: The equipment needed at one station to carry on two way voice communication by radio waves only. (Websters New World Dictionary Third College Edition).

20) **AIS base station**

IHO Definition: An onshore AIS unit that monitors traffic in the waterways. (http://www.allaboutais.com/index.php/en/aisbasics1/glossary-of-ais-terms).

Remarks:

- A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken.

IHO Sec: Support removing value *5* and adding new value *21*; however requires a proposal that includes a definition for the new value. Note also that if this change is approved, clause 21.4.2 will also need to be amended.

Teh Stand
Deleted: A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing may be taken. (Adapted from IHO Dictionary, S-32).¶

Teh Stand
DQWG Cross-Checks of S-101 Ed 1.1.0 FC with DCEG (Attributes) - email from Hugo 08/03/23. Have proposed an amendment to the IHO Hydrographic Dictionary name and definition for “Differential GPS” to provide consistency.

Teh Stand
Deleted: A radio station intended to determine only the direction of other stations by means of transmission from the latter

Teh Stand
DQWG Cross-Checks of S-101 Ed 1.1.0 FC with DCEG (Attributes) - email from Hugo 08/03/23.

Teh Stand
Deleted: No remarks.

ONGOING ACTIVITIES

- Resolution of outstanding identified discussion items (GitHub).
- Migration of other outstanding DCEG comments to the GitHub for further discussion as required.
- Resolution of alternate encoding options based on testing (**Quality of Bathymetric Data**).
- Further development of cartographic feature **Text Placement** based on implementation and testing outcomes.
- Review of guidance related to associations based on change made in S-100 Edition 5.0.0.
- Address actions from S-101PT10 Papers as required (Agenda Item 7).

PROPOSED WAY FORWARD

- Completion of DQWG review assessment (July 2023).
- Migration of other outstanding DCEG comments to the GitHub for further discussion as required; including further items for discussion from S-101PT10 (July 2023).
- Resolution of alternate encoding options based on testing (**Quality of Bathymetric Data**) (??).
- Further development of cartographic feature **Text Placement** based on implementation and testing outcomes (??).
- Review of guidance related to associations based on change made in S-100 Edition 5.0.0 (July 2023).
- S-101 DCEG Sub-Group review of draft DCEG Edition 1.2.0 and DCEG Sub-Group meeting (July/August 2023).
- Preparation of final draft Edition 1.2.0 for submission to S-101PT11 for endorsement (September 2023).

ACTIONS REQUESTED OF S-101PT

- **Note** the progress in the development of S-101 DCEG Edition 1.2.0.
- **Approve** the proposed way forward for finalization of S-101 DCEG Edition 1.2.0, noting items that are dependent on testing.
- **Initiate** further action as required.

IHO

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THANK YOU