



11th 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



IHO

DCEG SUB-GROUP: MEETINGS

International
Hydrographic
Organization

- S-101 DCEG Sub-Group 4 meeting – 05-06 September 2023.
 - All outstanding GitHub issues discussed.
 - Draft changes applied in DCEG or papers submitted as Agenda Items for S-101PT11.

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



IHO

SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 1.2.0 SINCE S-101PT10

International
Hydrographic
Organization

- Corrections completed (DCEG and GI Registry) resulting from DQWG review of consistency between the DCEG and the S-101 Feature Catalogue.
- Additional corrections throughout for grammar and consistency as identified by S-101 DCEG Sub-Group members - consistency.
- Added new features Helipad and Mooring Buoy.
- Bridge Remodelling.
- Enhanced guidance for encoding of TextPlacement cartographic feature.
- Enhanced guidance for Update Information (S-101PT11-08.4).
- Rationalisation of QualityOfBathymetricData (S-101PT11-08.9).
- Enhanced guidance on encoding of meta features (S-101PT11-08.10).
- Enhanced guidance and modelling – encoding language independent text (complex attributes information and featureName).



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SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 1.2.0 SINCE S-101PT10 (2)

International
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- Enhanced guidance for S-101 “system” attributes.
- Amended units of measure for valueOfLocalMagneticAnomaly.
- Attribute categoryOfCargo added to Anchorage Area and AnchorBerth.
- Remodelling options for MooringWarpingFacility (S-101PT11-08.11).
- Revised modelling for mooring cables.
- Attribute stationNumber amended from integer to free text type.
- Example clarifications for associations (Structure/Equipment for radar reflectors).
- Addition of new techniqueOfVerticalMeasurement value mechanicallySwept.
- Addition of curve primitive to maritime jurisdiction areas.
- .Amended multiplicity of sub-attribute colour to [0..*] and added colourPattern as an allowable sub-attribute for topmark complex.



IHO

GENERAL STANDARDISATION

International Hydrographic Organization

- General standardization throughout, based on feedback from users and DQWG.

6.11 Overhead pipeline

IHO Definition: OVERHEAD PIPELINE. A string of interconnected pipes, supported by pylons and passing over or nearby navigable waters, used for the transport of matter, nowadays mainly oil or gas. (Adapted from IHO Dictionary – S-32 and S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.119, November 2000).

S-101 Geo Feature: Pipeline Overhead (PIPOHD)

Primitives: Curve

Real World	Paper Chart Symbol	ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of pipeline/pipe	(CATPIP)	2, outfall pipe 3, intake pipe 4, sewer 5, supply pipe	EN	0,1
condition	(CONDTN)	1, under construction	EN	0,1

29.6 horizontal clearance fixed

IHO Definition: HORIZONTAL CLEARANCE FIXED. The horizontal clearance measured between two points for a fixed span.

Indication: The complex attribute encodes the horizontal distance

Sub-attributes: horizontal clearance value see clause 27.105
horizontal distance uncertainty see clause 28.4

Remarks:
• No remarks.

29.7 horizontal clearance open

IHO Definition: HORIZONTAL CLEARANCE OPEN. The horizontal clearance measured between two points for an opening span.

Indication: The complex attribute encodes the horizontal distance

Sub-attributes: horizontal clearance value see clause 27.105
horizontal distance uncertainty see clause 28.4

Remarks:
• No remarks.

Teh Stand Deleted: Pipeline, o

8.21 Mooring trot

IHO Definition: MOORING TROT. A mooring is a place where a vessel may be secured. (IHO Dictionary – S-32).

A mooring trot is a mooring that is composed of ground tackle, mooring cables, buoys and mooring berths on junction cables.

S-101 Geo Feature: Mooring Trot (C_AGGR)

Primitives: Surface, None

Real World	Paper Chart Symbol	ECDIS Symbol

Teh Stand Deleted: s

27.8 call sign (CALSGN)

IHO Definition: CALL SIGN. The designated call-sign of a station (radio station, radar station, pilot, ...). (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.9, November 2000 (as amended)).

Attribute Type: Free Text

Remarks:
• No remarks.

27.9 category of airport/airfield (CATAIR)

IHO Definition: CATEGORY OF AIRPORT/AIRFIELD. Classification of airport/airfield based on the primary aircraft and user group.

Attribute Type: Enumeration

1) military aeroplane airport

IHO Definition: A large military airfield usually equipped with a control tower, hangars and accommodation for the receiving and dispatching of passengers or cargo. (Adapted from The Mariner's Dictionary, 1999)

24) abyssal hill

IHO Definition: An isolated small elevation on the deep seafloor. (IHO-IOC Publication B-6 Standardization of Undersea Feature Names, Edition 4.2.0).

25.15 Structure/equipment

IHO Definition: STRUCTURE/EQUIPMENT. A feature association for the binding between a navigation aid equipment feature and the structure that supports it.

Remarks:

- A Structure/Equipment composition binds a single "Supported by" feature to at least one "Supports" feature.

Role Type	Role	Associated With	Multiplicity
Composition	Supported by	Beacon Cardinal, Beacon Isolated Danger, Beacon Lateral, Beacon Safe Water, Beacon Special Purpose/General, Bridge, Building, Buoy Cardinal, Buoy Emergency Wreck Marking, Buoy Installation, Buoy Isolated Danger, Buoy Lateral, Buoy Safe Water, Buoy Special Purpose/General, Crane, Conveyor, Daymark, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Landmark, Light Float, Light Vessel, Mooring Buoy, Mooring/Warping Facility, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Wind Turbine, Wreck	0,1
	Supports	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	0,* {1,* [C]}

Role Type	Role	Associated With	Multiplicity
Composition	Supported by	Bridge, Building, Crane, Conveyor, Landmark, Offshore Platform, Pylon/Bridge Support, Span Fixed, Span Opening, Wind Turbine	0,1
	Supports	Light Air Obstruction	0,*
Role Type	Role	Associated With	Multiplicity
Composition	Supported by	Light All Around, Light Sectored ¹	0,1



IHO

ADDITION OF CURVE PRIMITIVE TO MARITIME JURISDICTION AREAS

International Hydrographic Organization

Action S-101PT10-10.

GEO FEATURES

Administration Area		C	S			Airport/Airfield	P	S		
Anchor Berth	P		S			Anchorage Area	P	S		
Archipelagic Sea Lane			S	N		Archipelagic Sea Lane Area			S	
Archipelagic Sea Lane Axis		C				Beacon Cardinal	P			
Beacon Isolated Danger	P					Beacon Lateral	P			
Beacon Safe Water	P					Beacon Special Purpose/General	P			
Berth	P	C	S			Bridge		C	S	N
Building	P		S			Built-up Area	P	S		
Buoy Cardinal	P					Buoy Emergency Wreck Marking	P			
Buoy Installation	P					Buoy Isolated Danger	P			
Buoy Lateral	P					Buoy Safe Water	P			
Buoy Special Purpose/General	P					Cable Area			S	
Cable Overhead		C				Cable Submarine		C		
Canal		C	S			Cargo Transshipment Area	P	S		
Causeway		C	S			Caution Area	P	S		
Checkpoint	P		S			Coast Guard Station	P	S		
Coastline		C				Collision Regulations Limit		C		
Contiguous Zone		C	S			Continental Shelf Area		C	S	
Conveyor		C	S			Crane	P	S		
Current – Non-Gravitational	P					Custom Zone			S	
Dam		C	S			Daymark	P			
Deep Water Route			S	N		Deep Water Route Centreline		C		
Deep Water Route Part			S			Depth Area			S	
Depth Contour		C				Depth – No Bottom Found	A			
Discoloured Water	P		S			Distance Mark	P			
Dock Area			S			Dredged Area			S	
Dry Dock			S			Dumping Ground	P	S		
Dyke		C	S			Exclusive Economic Zone		C	S	

16.8 Administration area

IHO Definition: ADMINISTRATION AREA. A defined area within which a jurisdiction applies. It may or may not be named.

S-101 Geo Feature: Administration Area (ADMARE)

Primitives: Curve, Surface

Real World

Paper Chart Symbol

ECDIS Symbol

Added Curve as an allowable geometric primitive for features Administration Area, Contiguous Zone, Continental Shelf Area, Exclusive Economic Zone and Territorial Sea Area.

2.3, 16.8, 16.12, 16.13, 16.15, 16.23

- International land boundaries should be encoded, at least in the vicinity of coasts.
- Administration Area must only be encoded using the geometric primitive curve where the real-world instance is actually linear, and it is therefore not possible to encode the feature using the geometric primitive surface. See clause 16.2.

The clauses in Section 16 below provide guidance for the encoding of maritime jurisdiction areas. Occasionally, these "areas" may actually be defined as linear due to international treaties, or the areas may not be fully defined and it may therefore be necessary to encode the boundary as a linear feature (see example at Figure 16-3 below). Clause 2.3 defining features permitted for use in ENC and their geometric primitives allows relevant feature classes relating to maritime jurisdiction areas to be encoded as type curve; however this must only be done in circumstances where it is not possible to encode the feature using geometric primitive surface.



Figure 16-3 – Maritime jurisdiction – areas cannot be defined

In Figure 16-3, Administration Areas A and B cannot be encoded using geometric primitive surface as the seaward edge of the areas is not defined. In this case, the section of the international boundary



• Action S-101PT9-05 and S-101 Documentation and GitHub [Issues #77](#).

default clearance depth (see clause 30.1) – this attribute is intended to provide a depth value **to the ECDIS** to aid in the display of underwater hazards (Obstruction, Underwater/Awash Rock, Wreck) where the actual depth of the underwater hazard is unknown (**attribute value of sounding populated with an empty (null) value**). This value is algorithmically calculated by the production system as required, based on the value populated for the ECDIS system attribute **surrounding depth** (see below). **For S-101 ENC’s, default clearance depth must be populated with a value, which must not be an empty (null) value, if the attribute surrounding depth is populated with a (non-null) value.**

flare bearing (see clause 30.2) – defines the orientation direction of a light flare where more than one all around light is collocated so as to avoid the light flares from being coincident in the ECDIS display. This attribute is automatically calculated and populated as required by the ENC production software. **However, for improved ENC display in ECDIS, encoders may manually populate flare bearing to cartographically align, for example, along a transit or leading line.**

in the water (see clause 30.3) – this Boolean attribute provides an indication to the ECDIS that features that are located in or over navigable water are to be included in the ECDIS Base Display. This attribute is **automatically** populated by the ENC production software where a structure is located over an area of bathymetry (Depth Area, Dredged Area, **Unsurveyed Area**).

sector arc extension (see clause 30.4) – this Boolean attribute provides an indication that a distance beyond the default distance at which a light sector arc will be displayed is required where more than one sector light having overlapping sectors has been encoded. This attribute is automatically calculated and populated as required by the ENC production software. Note that **sector arc extension** is not **utilised** where light sectors are displayed at the nominal range of the sectors.

surrounding depth (see clause 30.5) – this attribute defines a depth value for the area surrounding an underwater hazard of unknown depth, and is based on the **depth range minimum value** for the surrounding **Depth Area(s)**. This attribute is automatically calculated and populated as required by the ENC production software. **For an area feature covered by more than one Depth Area, the value of surrounding depth is determined as the depth range minimum value of the deeper of the Depth Area features covering the underwater hazard. For S-101 ENC’s, surrounding depth must be populated with a value, which must not be an empty (null) value, if the attribute value of sounding is populated with an empty (null) value.**

Added new guidance specifying that the ECDIS “system” attributes default clearance depth and surrounding depth must be populated with a value, which must not be an empty (null) value, if the attribute value of sounding is populated with an empty (null) value.	2.4.3, 2.4.5.1, 13.4, 13.5, 13.6, 13.10, 30.1, 30.5
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• **The minimum depth, if known, over any submerged wreck, must be encoded using the attribute value of sounding. Where value of sounding is populated with an empty (null) value, display of the wreck in ECDIS as an underwater hazard, in accordance with the Mariner’s selected safety depth, will be dependent on the value populated for the ECDIS “system” attribute default clearance depth (see clauses 2.4.5.1 and 30.1); however see exception in 8th bullet below.**

⋮

• If it is required to encode a **submerged Wreck** feature where the attribute **value of sounding** is populated with an empty (null) value, but the source information indicates the depth of the feature is within the range of the surrounding depth area, the value **exposition of sounding = 1** (within the range of the surrounding depth area) must be populated in order to avoid the unnecessary display of isolated danger symbols in ECDIS.

30 ECDIS System (Portrayal) Attributes

30.1 default clearance depth

IHO Definition: **DEFAULT CLEARANCE DEPTH.** The depth value determined for an underwater hazard of unknown depth, based on the depth of the surrounding area.

Attribute Type: Real

Unit: Defined as an attribute in the ENC dataset metadata: metre (m)

Resolution: 0.1m

Format: sxxxx.x
s: sign, negative values only

Examples: 12.5 for a default clearance depth of 12.5 metres
-2.4 for a drying default clearance height of 2.4 metres

Remarks:

- The depth of the surrounding area is determined from the surrounding encoded **Depth Area(s)** and is encoded **where required, based on the value calculated for the attribute surrounding depth** (see clause 30.5).
 - The default value populated for default clearance depth is the value calculated for surrounding depth – 66 metres.
 - default clearance depth must be populated with a value, which must not be an empty (null) value, only if the system attribute surrounding depth is populated with a (non-null) value.**
 - The auto populated value for default clearance depth may be amended by the Data Producer if the resulting isolated danger indication in the ECDIS is not considered appropriate.
- A drying height is indicated by a negative value.

More work is required



ENHANCED GUIDANCE AND MODELLING – ENCODING LANGUAGE INDEPENDENT TEXT (COMPLEX ATTRIBUTE INFORMATION)

• S-101 Documentation and GitHub [Issue #60](#).

2.4.6 Textual information

The complex attribute **information** (see clause 29.9) contains information as text using the sub-attribute **text**, or the name of an external file using the sub-attribute **file reference**, in English and, optionally, using multiple ordered instances of **information** to additionally encode the information in one or more national languages; and where bound to the geo feature classes may be used to encode additional textual information specific to a single feature instance. General conventions for the population of **information** for a feature instance are as follows:

- Where required, only a single mandatory instance of **information** in English (sub-attribute **language** = EN, empty (null) or not present) must be encoded. This instance must be the first instance in the ordered list of **information** instances, if more than one instance is encoded.
- Further optional instances of **information** may also be encoded (sub-attribute **language** populated with the two-letter country code in conformance with ISO 639-2/T). Only one instance of **information** may be encoded for any national language, with the second instance in the ordered list of **information** instances intended to be the default national language text displayed in the Pick Report when the ECDIS national language display option is selected by the Mariner. Other instances of **information** may be selectable by the Mariner on request.

The information type **Nautical Information** (see clause 24.4) should be used to encode additional textual information associated to a group of features; and if the **information** is specific to a single feature, the **information** should be encoded on the feature itself. The **Nautical Information** is associated to the relevant features using the association **Additional Information** (see clause 25.1).

The complex attribute **information** must not be used when it is possible to encode the information by means of any other attribute. Under certain ECDIS display settings the "information" symbol will display when this attribute is populated. Therefore **Producers** should carefully consider use of this attribute as the symbol may contribute significantly to ECDIS screen clutter.

Character strings contained in **information** sub-attribute **text** must be UTF-8 character encoding. **Information** should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give more detailed information about a feature. Text populated in **text** must not exceed 300 characters.

The exchange language for textual information should be English, therefore it is not required to populate the sub-attribute **language** for an English version of textual information. Languages other than English may be used as a supplementary option, for which **language** must be populated with an appropriate value to indicate the language. Generally this means, when a national language is used in the textual attributes, the English translation must also exist.

Enhanced guidance for the population of the complex attribute information.	2.4.6
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29.9 information

IHO Definition: **INFORMATION**. Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Pages 2.141 and 2.209, November 2000).

Indication: The complex attribute provides additional textual information that cannot be provided using other allowable attributes for the feature, and defines the language of the text string.

Sub-attributes:	file locator	see clause 27.95
	file reference	see clause 27.96
	headline	see clause 27.102
	language	see clause 27.114
	text	see clause 27.170

Remarks:

- At least one of the sub-attributes **file reference** or **text** must be populated.
- The files referenced by the sub-attribute **file reference** generally contain long text strings or those that require formatting; there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute **file reference**.
- The sub-attribute **file locator** cannot be populated unless the attribute **file reference** is populated.
- For further information on the population of **information**, see clause 2.4.6.
- This complex attribute should be used, for example, to hold the information that is shown on paper charts by cautionary and explanatory notes.

information		See clause 2.4.6	C	0..*(ordered)
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1..†
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	0,1
text	((INFORM) (NINFORM))		(S) TE	0,1..†

Key points:

- Multiplicity of **information** amended to [0..* (ordered)]
- First instance: Single allowed EN textual information
- Second instance: National language version to be displayed in national language setting
- Third instance ...: Additional languages that may be selectable within the Pick Report



• Complex colour combinations [Issue #6](#).

2.4.10 Colours and colour patterns

If it is required to encode multiple colours on a feature, they must be encoded using the attributes **colour pattern** and **colour** as follows:

- For horizontal stripes (**colour pattern** = 1), the values for **colour** must be ordered such that the first colour is the top-most, and subsequent colours follow sequentially from top to bottom. For example, **colour** = 3, 1 to encode a red stripe above a white stripe.
- For vertical stripes (**colour pattern** = 2), the values for **colour** must be ordered such that the first colour is the left-most, and subsequent colours follow sequentially from left to right. For example, **colour** = 3, 1, 3 to encode red, white, red vertical stripes
- For diagonal stripes (**colour pattern** = 3), the values for **colour** must be ordered such that the first colour is the top-left-most, and subsequent colours follow sequentially from top left to bottom right. For example, **colour** = 1, 3, 1, 3, 1 to encode white, red, white, red, white diagonal stripes.
- For squares (**colour pattern** = 4), the values for **colour** must be ordered such that the first colour is the top-left-most square. Subsequent colours follow sequentially from left to right along the top row then repeated for subsequent rows until the bottom right-most square is reached. For example, **colour** = 1, 3, 3, 1 to encode white, red squares on the top row and red, white squares on the bottom row.
- For border stripes (**colour pattern** = 6), the values for **colour** must be ordered such that the first colour is the border stripe, and the second colour that of the background. For example, **colour** = 3, 1 to encode a red border stripe on a white background. Where a border stripe is combined with other patterns, an assessment as to which pattern is most important to marine navigation must be made, and the appropriate value populated in **colour pattern**.

Note that the attribute **colour pattern** is mandatory for any feature (except lights) that has more than one colour.

If the encoded colours and colour pattern for feature is considered to be complex, it is strongly recommended that an image of the feature, if available, is also included using the attribute pictorial representation.

Added new guidance for features having encoded complex colour/colour pattern combinations to additionally include an image of the feature using the attribute **pictorial representation**.

2.4.10, 20.14.1

20.14.1 Daymarks (see S-4 – B-455.9)

If it is required to encode a daymark, it must be done using the feature **Daymark**.

The term "daymark" may also simply refer to any unlighted aid to navigation, particularly for leading marks. In North America, the term "daybeacon" is used for an unlit beacon.

In the following Table, a blank indicates that the encoder may choose a relevant value for the attribute. The Table contains the most common examples of coding; other coding combinations are possible.

Feature	INT1	Feature	category of special purpose mark	Other attributes
Coloured or white mark	Q101	Daymark		nature of construction = 9
Coloured topmark with function of beacon	Q102.1	Daymark		nature of construction = 9
Painted board with function of leading beacon	Q102.2	Daymark	16	topmark shape = 6

Table 20.3 – Daymarks – Examples

Remarks:

- For guidance on the encoding of the attributes **elevation**, **height** and **vertical length** see clause 2.5.7. **elevation** applies only to daymarks on land. Values populated for **height** and **vertical length** must include any equipment features.
- If it is required to encode a cairn that bears the colour(s) specified by a navigational system of marks, it must be done using a beacon feature.
- If it is required to encode an aid to navigation that may be considered to be a **topmark** but has multiple colours that are considered important for navigation, this must be done using **Daymark**.
- If it is required to encode a daymark that has more than one colour, the attributes **colour** and **colour pattern** must be encoded, according to the rules laid out in clause 2.4.10. If the colour pattern for the daymark is complex, it is strongly recommended that an image of the daymark is included, using the attribute pictorial representation.

Distinction: Beacon Cardinal; Beacon Isolated Danger; Beacon Lateral; Beacon Safe Water; Beacon Special Purpose/General; **Topmark**.



IHO

ENHANCED GUIDANCE AND MODELLING – ENCODING LANGUAGE INDEPENDENT TEXT (COMPLEX ATTRIBUTE FEATURE NAME)

International Hydrographic Organization

• S-101 Documentation and GitHub [Issue #60](#).

2.5.8 Geographic names

If it is required to encode an international or national geographic name, it must be done using complex attribute **feature name** (see clause 29.2). When possible, existing features (for example **Built-Up Area**, **River**, navigational marks) should be used to carry this information.

If it is required to encode a geographic name for which there is no existing feature, a specific **Administration Area**, **Sea Area/Named Water Area** or **Land Region** feature must be created (see clauses 16.8, 9.1 and 5.11). In order to minimise the data volume, these features should, where possible, use the geometry of existing features, for example a **Sea Area/Named Water Area** feature may use the geometry of a **Depth Area** feature.

National geographic names can be left in their original national language in a non-English iteration of the sub-attribute **feature name** (but only if the national language can be expressed using lexical level 0 or 1), or transliterated or transcribed and used in an English iteration of the sub-attribute **feature name**, in which case the national name should be populated in an additional iteration of the **feature name** with sub-attribute **language** populated with the relevant national language value in accordance with ISO 639-2/T. General conventions for the population of feature name for an encoded feature instance are as follows:

- Where required, at least one mandatory instance of **feature name** in English (sub-attribute **language** = *EN*, empty (null) or not present) must be encoded. These instances must be the first instances in the ordered list of **feature name** instances, if more than one instance is encoded. Where there is more than one instance of an English version of the name encoded, one of these instances must have the sub-attribute **display name** populated as *True* to identify the instance that is to be displayed in the ECDIS. Additional instances of **display name** will be available in the ECDIS Pick Report. Reasons for encoding more than one instance of **feature name** in English include (but are not limited to):
 - For cartographic reasons, for example to abbreviate a name using an international abbreviation.
 - To allow an identifier/designator to be displayed in preference to the name of the feature (for example on aids to navigation).
- Further optional national language instances of information may also be encoded (sub-attribute **language** populated with the two-letter country code in conformance with ISO 639-2/T). Multiple instances of **feature name** may be encoded for any national language, or for multiple languages, however where more than one national language instance is encoded only one of these (preferred) instances must have **display name** populated as *True* to identify the national language name to be displayed in the ECDIS when the ECDIS national language display option is selected by the Mariner. Other instances of information may be selectable by the Mariner on request.
- Where there is only a single instance of **feature name**, or there is only a single English instance and a single national language instance of **feature name** encoded for a feature instance, there is no requirement to populate the sub-attribute **display name**.

Geographic names should be encoded using **feature name** based on the following criteria and at the Producing Authority's discretion:

Enhanced guidance for the population of the complex attribute feature name.	2.5.8
29.2 feature name	
IHO Definition: FEATURE NAME . Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.	
Indication: The complex attribute provides the encoder with options as to the name to display in certain system display settings.	
Sub-attributes:	display name see clause 27.87
	language see clause 27.114
	name see clause 27.128
Remarks:	
<ul style="list-style-type: none"> • For further information regarding the population of the complex attribute feature name, in particular the encoding of multiple instances for a single feature instance, see clause 2.5.8. 	

Key points:

- Multiple English instances and multiple national language instances of **feature name** may be encoded
- Where multiple instances exist, one instance of each of English and national language must have **display name** = *True*
- If only one instance of English or a national language exist, **display name** does not need to be populated
- Should it be possible to force a name not to display (**display name** = *False*) – mandate **display name**?



IHO

ADDED NEW FEATURE HELIPAD

International Hydrographic Organization

• S-101 Documentation and GitHub [Issue #49](#).

6.5 Helipad

IHO Definition: HELIPAD. A site on which helicopters may land and take off. (IHO Dictionary – S-32).				
S-101 Geo Feature: Helipad (RUNWAY)				
Primitives: Point				
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 3. under reclamation 4. 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	(OB/INAM) (NOB/INIM)		(S) TE	1..1
nature of construction	(NATCON)	1. masonry 2. concreted 4. hard surfaced 5. unsurfaced 6. wooden 7. metal	EN	0..*
periodic date range		See clause 2.4.8	C	0..*
__date end	(PEREND)		(S) TD	1..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
reported date	(SORDAT)	See clause 2.4.8	ID	0..1
status	(STATUS)	1. permanent 2. occasional 4. not in use 5. periodic/intermittent 8. reserved 7. temporary 8. private 12. illuminated 14. public	EN	0..*
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
information		See clause 2.4.6	C	0..*(ordered)
__file locator			(S) TE	0..1
__file reference	(TXTDSC) (INXTDS)		(S) TE	0..1..†
__headline			(S) TE	0..1
__language		ISO 639-2/T	(S) TE	0..1
__text	(INFORM) (NINFORM)		(S) TE	0..1..†

Added new feature Helipad.

2.3, 2.5.9, 6.5

† For each instance of information, at least one of the sub-attributes file reference or text must be populated.
INT 1 Reference: D 17
6.5.1 Helipads (see S-4 – B-366.3)
If it is required to encode a helipad, it must be done using the feature Helipad.
Remarks:
• Helipads must be encoded, where required, using the feature Airport/Airfield (see clause 6.3). Where a helipad has been encoded, there is no requirement to indicate the individual helipads using Helipad.
• If it is required to encode an area where helicopters may sit down on water, it must be done using the feature Seaplane Landing Area (see clause 16.5).
• For navigational aids associated with air navigation, and air obstruction lights, see clauses related to navigational aids.
Distinction: Airport/Airfield; Runway; Seaplane Landing Area.

Feature/Feature associations: Updated Information; Text Association

Feature/Information associations: Additional Information

Spatial/Information association: Spatial Association

6.4 Runway

IHO Definition: RUNWAY. A defined area, on a land aerodrome, prepared for the landing and take-off run of aircraft. (Adapted from IHO Dictionary – S-32).				
S-101 Geo Feature: Runway (RUNWAY)				
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 3. under reclamation 4. planned construction	EN	0..1
feature name			C	0..*

Jeff Wootton
Refer to S-101 Documentation
20/07/2023 and discussions at
2023.

Jeff Wootton Deleted: , including helicopters

Jeff Wootton Deleted: Point,

Jeff Wootton Deleted: category of runway

Category of Runway
DCEG Clause: 6.4, 27.58
Points to Note:
- Paper for S-101PT11 still in development.
- No additional comments in the GitHub against this Issue since the Sub-Group 3 meeting.
Discussion/Decision:
- Sub-Group Members were given the opportunity to provide any further input on this Issue since the decisions/Actions from the Sub-Group 3 meeting. There were no comments from the floor.
Action:
- Full proposal to be developed to remodel the feature Runway and introduce new feature Heli Pad (IHO Sec). **[Complete]**

Issue #49



IHO

BRIDGE REMODELLING

International Hydrographic Organization

Action S-101PT10-14.

6.6 Bridge

IHO Definition: BRIDGE. A structure erected over a depression or an obstacle such as a body of water, railroad, etc., to provide a roadway for vehicles or pedestrians. (IHO Dictionary – S-32).

S-101 Geo Feature: Bridge (BRIDGE)

Primitives: Curve, Surface, None

Real World

Paper Chart Symbol

ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
bridge construction	(CATBRG)	1.. arch 2.. viaduct 3.. pontoon bridge 4.. suspension bridge 5.. transporter bridge	EN	0..1
bridge function	(CATBRG)	1.. vehicular 2.. rail 3.. pedestrian 4.. aqueduct	EN	0..*
category of opening bridge	(CATBRG)	3.. swing bridge 4.. lifting bridge 5.. bascule bridge 6.. pontoon bridge 7.. drawbridge	EN	0..1..†

opening bridge	(CATBRG)		BO	0..1..†
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The attribute category of opening bridge is mandatory if opening bridge = True
For bridges encoded over navigable water, the attribute opening bridge is mandatory.

- If it is required to encode a bridge for which part or the entire span is moved aside or backwards, it must be done using a Bridge feature, with attributes opening bridge = True and category of opening bridge = 7 (drawbridge).
- If it is required to encode a pontoon bridge where a pontoon section may be temporarily removed or rotated so as to allow passage of vessels, this must be done using a Bridge feature, with attributes bridge construction = 3 (pontoon bridge), opening bridge = True and category of opening bridge = 6 (pontoon bridge).

Amended conditional mandatory attributes for feature Bridge in Table 2-3 in accordance with re-modelling (see clause 6.5).	2.4.3
Amendments to attribution and guidance for feature Bridge based on re-modelled (former) attribute category of bridge.	6.6
Added new mandatory Boolean sub-attribute vertical clearance unlimited to complex attribute vertical clearance open for feature Span Opening. Amended sub-attribute vertical clearance value to conditional mandatory.	6.8, 27.188, 29.39
Added new enumerate type attributes bridge construction and bridge function (remodelling of feature Bridge – see clause 6.6).	27.3, 27.4
Removed attribute category of bridge (remodelling of feature Bridge – see clause 6.6).	27.9 (Edition 1.1.0)

27.3 bridge construction (CATBRG)

IHO Definition: BRIDGE CONSTRUCTION. The bridge's primary shape and/or construction material.

Attribute Type: Enumeration

1) arch

IHO Definition: A typically curved structural member spanning an opening and serving as a support (to the wall or other weight above the opening). (Merriam-Webster On-line Dictionary, July 2023).

2) viaduct

IHO Definition: A structure consisting of a series of arches or towers supporting a roadway, waterway, across a depression, etc. (IHO Dictionary – S-32).

3) pontoon bridge

IHO Definition: A fixed floating bridge supported by pontoons. (McGraw-Hill Dictionary of Scientific Technical Terms, 3rd Edition, 1984).

4) suspension bridge

IHO Definition: A fixed bridge consisting of either a roadway or a truss suspended from two or more towers which pass over towers and are anchored by backstays to a firm foundation. (McGraw-Hill Encyclopedia of Science and Technology, 7th Edition, 1992).

5) transporter bridge

IHO Definition: Consists of towers on each side of the watercourse connected by a system of girders which a carriage runs. (Defence Geospatial Information Working Group, Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

27.4 bridge function (CATBRG)

IHO Definition: BRIDGE FUNCTION. A specific role that describes the purpose of a bridge.

Attribute Type: Enumeration

1) vehicular

IHO Definition: Of, relating to, or designed for vehicles and especially motor vehicles. (Merriam-Webster On-line Dictionary, July 2023).

2) rail

IHO Definition: Of, relating to, or designed for vehicles that run on a guiding track(s), especially trains.

3) pedestrian

IHO Definition: Of, relating to, or designed for walking. (Merriam-Webster On-line Dictionary, July 2023).

4) aqueduct

IHO Definition: A bridge supporting an artificially elevated channel, for the conveyance of water. (Adapted from The New Shorter Oxford English Dictionary, 1993).

Remarks:

- No remarks.

27.188 vertical clearance unlimited

IHO Definition: VERTICAL CLEARANCE UNLIMITED. A statement that expresses if the vertical clearance for a feature in the open position, such as a bridge span, is unlimited.

Attribute Type: Boolean

Indication: A True value is an indication that the vertical clearance for a feature in the open position is unlimited.

Remarks:

- No remarks.

29.39 vertical clearance open

IHO Definition: VERTICAL CLEARANCE OPEN. The vertical clearance of a feature in 'opened' condition (for example an open lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.236, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of an opening overhead feature when it is in the open position.

Sub-attributes: vertical clearance unlimited see clause 29.189

vertical clearance value see clause 27.188

vertical uncertainty see clause 29.41

Remarks:

- No remarks.



IHO

BRIDGE REMODELLING (2)

International Hydrographic Organization

- GI Registry comment from Tom Bovey (DGIWG).
 - Should the attribute bridgeConstruction be changed to bridgeStructureType?

Tom Bovey

12:44:11 AM / 2023-09-14

Propose aligning concept with the DGIWG Defence Geospatial Feature Concept Dictionary by renaming to Bridge Structure Type (bridgeStructureType). Defined as 'The type of structural design of a bridge or bridge superstructure'

Hi Tom,

Thanks for your DCB adjudication and comment regarding the Bridge Construction concept.

Before I proceed further with this, I would like to discuss your proposal to change the name and definition to Bridge Structure Type in the context of how this concept is intended to be used in S-101. The modelling for Bridge Construction as it currently stands is as follows:

Primitives: Curve, Surface, None				
Real World	Paper Chart Symbol	ECCDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
bridge.construction	(CATBRG)	1. arch 2. viaduct 3. pontoon bridge 4. suspension bridge 5. transporter bridge	EN	0..1
bridge.function	(CATBRG)	1. vehicular 2. rail 3. pedestrian 4. aqueduct	EN	0..*
category of opening.bridge	(CATBRG)	3. swing bridge 4. lifting bridge 5. bascule bridge 6. pontoon bridge 7. drawbridge	EN	0..1

You can see the enumerated values above (arch, viaduct, ...). Can you confirm that the way that this is modelled is consistent with the DGIWG Bridge Structure Type term and definition? If so I will raise this for discussion at the S-101PT11 meeting the week after next and we can make the change.

Any further information regarding the definition (source, reference (for example a url) etc), would also be greatly appreciated.

Hi Jeff,

Yes it is consistent with the enumerate values listed for the entry in S-101, for example,

attributeValueConceptList	attributeValueConcept	Definition	Description
bridgeStructureType	arch	Supported by an arch underneath the bridge that directs pressure and weight of the bridge outward to the supports along the arch.	
bridgeStructureType	floating	Fixed, floating, and supported by pontoons.	Usually temporary in nature.
bridgeStructureType	suspension	The deck is suspended by hangars from cables attached to and extending between supports.	The supports may be in the form of towers located between the ends of the bridge.
bridgeStructureType	transporter	Consists of towers on each side of the watercourse connected by a system of girders on which a	



IHO

ADDED NEW FEATURE MOORING BUOY

Added new feature Mooring Buoy.

2.3, 2.4.3, 2.5.9, 20.8

Action S-101PT10-18 and S-101 Documentation and GitHub [Issue #81](#).

20.8 Mooring buoy

IHO Definition: **MOORING BUOY**. A buoy secured to the bottom by permanent moorings with means for mooring a vessel by use of its anchor chain or mooring lines. (IHO Dictionary – S-32).

S-101 Geo Feature: Mooring Buoy (MORFAC)

Primitives: Point

Real World	Paper Chart Symbol	ECDIS Symbol
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buoy shape	(BOYSHP)	1. conical 2. can 3. spherical 4. pillar 5. spar 6. barrel 7. superbuoy 8. ice buoy	EN	1.1
colour	(COLOUR)	1. white 2. black 3. red 4. green 5. blue 6. yellow 7. grey 8. brown 9. amber 10. violet 11. orange 12. magenta 13. pink	EN	0..* (ordered)
colour pattern	(COLPAT)	1. horizontal stripes 2. vertical stripes 3. diagonal stripes 4. squared 5. stripes (direction unknown) 6. border stripe	EN	0..1
feature name			C	0..*
display name			(S) BO	0..1
language		ISO 639-2/T	(S) TE	0..1
name	(OB/INAM) (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
nature of construction	(NATCON)	7. metal 11. latticed	EN	0..*
periodic date range		See clause 2.4.8	C	0..*
date end	(PEREND)		(S) TD	1..1

Added new Boolean type attribute visitors mooring (re-modelling of mooring buoys – see clause 20.8).

27.194

Removed value 29 (visitors mooring) as an allowable value for attribute category of small craft facility.

22.8, 27.65

date start	(PERSTA)		(S) TD	1..1
status	(STATUS)	1. permanent 2. occasional 4. not in use 5. periodic/intermittent 7. temporary 8. private 18. existence doubtful	EN	0..*
visitors mooring	(SMCFAC)		BO	0..1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
information		See clause 2.4.6	C	0..* (ordered)
file locator			(S) TE	0..1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0..1
headline			(S) TE	0..1
language		ISO 639-2/T	(S) TE	0..1
text	(INFORM) (NINFORM)		(S) TE	0..1
pictorial representation	(PICREP)	See clause 2.4.12.2	TE	0..1

! The attribute colour pattern is mandatory for buoys that have more than one value populated for the attribute colour.

! For each instance of fixed date range, at least one of the sub-attributes date end or date start must be populated.

! For each instance of information, at least one of the sub-attributes file reference or text must be populated.

INT 1 Reference: Q 40-45

20.8.1 Mooring buoys (see S-4 – B-431.5)

Mooring buoys must be shown on charts of appropriate scale to indicate buoys and moored vessels as possible hazards to navigation as well as, on the largest scales, to facilitate mooring operations.

If it is required to encode a mooring buoy, it must be done using the feature Mooring Buoy.

Remarks:

- If it is required to encode a buoy that has more than one colour, the attributes colour and colour pattern must be encoded, according to the rules laid out in clause 2.4.10.
- If it is required to encode a visitors mooring, it must be done by populating the attribute visitors mooring as True.

Distinction: Buoy Special Purpose/General; Mooring/Warping Facility; Small Craft Facility.

Action S-101PT18: New Feature MooringBuoy
DCEG Clause: 20.8

Points to Note:

- Based on the modelling for existing S-101 buoy features, in particular the BuoyInstallation feature.
- Note inclusion of new Boolean type attribute visitorsMooring (and corresponding removal of visitors mooring as an allowable value for attribute categoryOfSmallCraftFacility).
- Note GitHub comment from Klas Obergren (SE) for attribute natureOfConstruction, which has now been added to the proposed new feature.

Discussion/Decision:

- The modelling of the MooringBuoy feature was supported.
- The inclusion of the visitorsMooring Boolean was supported.

Issue # 81

- Jeff Wootton (IHO Sec) highlighted the naming for this feature MooringBuoy, which is consistent with the term already included in the IHO GI Registry and the IHO Hydrographic Dictionary, but is inconsistent with the Buoy... naming convention that has been used for all existing buoy and beacon features in S-101. He suggested that a proposal should be made to the S-101PT to amend the names of all the buoys and beacons in S-101 to harmonise them with other IHO publications, in particular the IHO Hydrographic Dictionary. There was concern raised that this will impact on other Product Specifications in S-100, and will significantly impact on Catalogues and portrayal rules.

Action:

- Report the endorsement of the draft DCEG Edition 1.2.0 amendments to the S-101PT (S-101PT11) for approval (IHO Sec).
- Raise the issue of re-naming of buoys and beacons with the NIPWG and S-101PT for input to further discussions/actions.

27.194 visitors mooring (CATSFCF)

IHO Definition: **VISITORS MOORING**. A mooring set aside for the use of visiting vessels. (S-57 Edition 3.1 Appendix A – Chapter 2, Page 2.92, November 2000).

Attribute Type: Boolean

Indication: A True value is an indication that a mooring is designated as a visitors mooring.

Remarks:

- No remarks.

Feature/Feature associations: Structure/Equipment, Mooring Trot Aggregation, Updated Information, Text Association

Feature/Information associations: Additional Information

Spatial/Information association: Spatial Association



Action S-101PT10-17 and S-101 Documentation and GitHub [Issue #84](#).

8.21.1 Mooring trots (see S-4 – B-431.6)

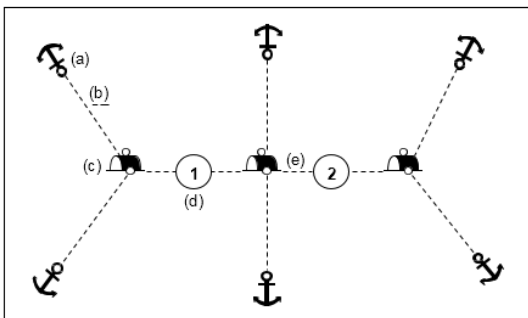


Figure 8-2 – Mooring trot

A complete mooring trot is composed of ground tackle, mooring cables and mooring berths on junction cables. The following remarks refer to the annotations in Figure 8-2 above:

- (a) Ground tackle should be encoded using **Obstruction** features (see clause 13.6), with attribute **category of obstruction = 9** (ground tackle).
- (b) Mooring cables should be encoded using **Cable Submarine** features (see clause 14.2), with attribute **category of cable = 6** (mooring cable).
- (c) Buoys should be encoded using **Mooring Buoy** features.
- (d) Mooring berths should be encoded using **Berth** features.
- (e) Junction cables should be encoded using **Mooring/Warping Facility** features, with attribute **category of mooring/warping facility = 6** (mooring cable).

All these features should be aggregated in a **Mooring Trot** feature, using the association **Mooring Trot Aggregation** (see clause 25.10), with the name of the mooring trot being populated using the complex attribute **feature name** for the **Mooring Trot**.

cables. The following remarks refer to the annotations in Figure 8-2 above:

- (a) Ground tackle should be encoded using **Obstruction** features (see clause 13.6), with attribute **category of obstruction = 9** (ground tackle).
- (b) Mooring cables should be encoded using **Cable Submarine** features (see clause 14.2), with attribute **category of cable = 6** (mooring cable).
- (c) Buoys should be encoded using **Mooring Buoy** features.
- (d) Mooring berths should be encoded using **Berth** features.
- (e) Junction cables should be encoded using **Cable Submarine** features, with attribute **category of cable = 9** (junction cable).

All these features should be aggregated in a **Mooring Trot** feature, using the association **Mooring Trot Aggregation** (see clause 25.10), with the name of the mooring trot being populated using the complex attribute **feature name** for the **Mooring Trot**.

Remarks:

- If it is required to encode the name of a mooring trot, the **Mooring Trot** should be encoded using geometry of type surface. The extent of the surface should cover the extent of all the components of the mooring trot.
- If it is required to encode the extent of an unnamed mooring trot, this may be done using a **Mooring Trot** feature having no geometry.
- Names or numbers of individual moorings within the mooring trot must be encoded using the attribute **feature name** on the relevant **Berth** feature.

Jeff Woodson Deleted:

Teh Stand Deleted: Warping facility

Teh Stand Deleted: with attribute category of mooring/warping facility = 7 (mooring buoy)

Teh Stand Deleted: See pages S-100/G10-07.2, Action S-101PT10-17 and S-101 Documentation and PC GitHub Issue 252.

Teh Stand Deleted: Mooring/Warping facility

Teh Stand Deleted: mooring/warping facility

Teh Stand Deleted: 5

Added new value 9 (junction cable) as an allowable value for attribute category of cable. 8.21, 14.2, 27.12

14.2 Submarine cable

IHO Definition: **SUBMARINE CABLE**. An assembly of wires or fibres, or a wire rope or chain, which has been laid underwater or buried beneath the seafloor. (IHO Dictionary – S-32).

S-101 Geo Feature: Cable Submarine (CBLSUB)

Primitives: Curve

Real World	Paper Chart Symbol	ECDIS Symbol
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buried depth	(BURDEP)		RE	0,1
category of cable	(CATCBL)	1.: power line 6.: mooring cable 7.: ferry 8.: fibre optic cable 9.: junction cable	EN	0,1

8.14 Mooring/warping facility

IHO Definition: **MOORING/WARPING FACILITY**. The equipment or structure used to secure a vessel. (Adapted from IHO Dictionary – S-32).

S-101 Geo Feature: Mooring/Warping Facility (MORFAC)

Primitives: Point, Curve, Surface

Real World	Paper Chart Symbol	ECDIS Symbol
------------	--------------------	--------------

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of mooring/warping facility	(CATMOR)	1 : dolphin 2 : deviation dolphin 3 : bollard 4 : tie-up wall 5 : post or pile	EN	1,1
colour	(COLOUR)	1 : white	EN	0,* (ordered)

Teh Stand Deleted: See pages S-100/G10-07.2, Action S-101PT10-16 and S-101 Documentation and PC GitHub Issue 252.

Teh Stand Deleted: Buoy shape

Teh Stand Deleted: 6 : mooring cable
7 : mooring buoy



IHO

CHANGING VALUE TYPE FOR ATTRIBUTE STATION NUMBER

International Hydrographic Organization

- S-101 Documentation and GitHub [Issue #86](#).

Amended attribute type for attribute station number from integer to free text.	10.5, 27.165
--	--------------

10.5 Tidal stream panel data

IHO Definition: TIDAL STREAM PANEL DATA. Approximate tidal stream characteristics given as discrete value sets at a specified interval before and/or after a high or low water. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.176, November 2000).

S-101 Geo Feature: Tidal Stream Panel Data (TS_PAD)

Primitives: Point, Surface

Real World	Paper Chart Symbol	ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
feature name			C	0..*
display name			(S) BO	0,1
language		ISO 639-2/T	(S) TE	0,1
name	(OBJ/NAM) (NOBJ/NM)		(S) TE	1,1
station name	(TS_TSP)		TE	1,1
station number	(TS_TSP)		TE	0,1

27.165 station number

IHO Definition: **STATION NUMBER**. The identification number of the reference tide station with reference water level for tidal stream panel observations.

Attribute Type: [Free text](#)

Indication: The value indicates the reference number of a tide station as listed in national Tide Tables.

Format c..

Example: 63230 for the reference number of Darwin tide station.

Remarks:

- No remarks.

SylviaSpohn-BSH commented 2 weeks ago

We support the issue as we have in Germany gauge station numbers with letters. See our paper presented at the DCEG Subgroup Meeting 5./6.9.23.
[Paper for Consideration T_SPAD.docx](#)

JeffWootton commented last week Collaborator

I would be interested in the background behind the "P" in the example included in the Paper from Germany. If this is the identification letter intended to be included in the magenta diamond as it appears on teh paper chart, this should be populated in featureName (name) and not as part of teh station number.



IHO

ISSUES WITH SURROUNDING DEPTH

International Hydrographic Organization

• S-101 Documentation and GitHub [Issue #10](#).

default clearance depth (see clause 30.1) – this attribute is intended to provide a depth value to the ECDIS to aid in the display of underwater hazards (Obstruction, Underwater/Awash Rock, Wreck) where the actual depth of the underwater hazard is unknown (attribute value of sounding populated with an empty (null) value). This value is algorithmically calculated by the production system as required, based on the value populated for the ECDIS system attribute **surrounding depth** (see below). For S-101 ENC's, default clearance depth must be populated with a value, which must not be an empty (null) value, if the attribute surrounding depth is populated with a (non-null) value.

surrounding depth (see clause 30.5) – this attribute defines a depth value for the area surrounding an underwater hazard of unknown depth, and is based on the **depth range minimum value** for the surrounding **Depth Area(s)**. This attribute is automatically calculated and populated as required by the ENC production software. For an area feature covered by more than one Depth Area, the value of surrounding depth is determined as the depth range minimum value of the deeper of the Depth Area features covering the underwater hazard. For S-101 ENC's, surrounding depth must be populated with a value, which must not be an empty (null) value, if the attribute value of sounding is populated with an empty (null) value.

Added new guidance specifying that the ECDIS "system" attributes default clearance depth and surrounding depth must be populated with a value, which must not be an empty (null) value, if the attribute value of sounding is populated with an empty (null) value.	2.4.3, 2.4.5.1, 13.4, 13.5, 13.6, 13.10, 30.1, 30.5
Added new guidance informing Data Producers of the impact of populating attribute value of sounding with an empty (null) value on ECDIS display for underwater hazards.	13.4.1, 13.5.1, 13.6.1, 13.10.1

- The minimum depth, if known, over any submerged wreck, must be encoded using the attribute value of sounding. Where value of sounding is populated with an empty (null) value, display of the wreck in ECDIS as an underwater hazard, in accordance with the Mariner's selected safety depth, will be dependent on the value populated for the ECDIS "system" attribute default clearance depth (see clauses 2.4.5.1 and 30.1); however see exception in 8th bullet below.

30 ECDIS System (Portrayal) Attributes

30.1 default clearance depth

IHO Definition: **DEFAULT CLEARANCE DEPTH**. The depth value determined for an underwater hazard of unknown depth, based on the depth of the surrounding area.

Attribute Type: Real

Unit: Defined as an attribute in the ENC dataset metadata: metre (m)

Resolution: 0-1m

Format: sxxxxx.x
s: sign, negative values only

Examples: 12.5 for a default clearance depth of 12.5 metres
-2.4 for a drying default clearance height of 2.4 metres

Remarks:

- The depth of the surrounding area is determined from the surrounding encoded **Depth Area(s)** and is encoded, where required, based on the value calculated for the attribute **surrounding depth** (see clause 30.5).
- The default value populated for **default clearance depth** is the value calculated for **surrounding depth** – 66 metres.
- default clearance depth must be populated with a value, which must not be an empty (null) value, only if the system attribute surrounding depth is populated with a (non-null) value.**
- The auto populated value for **default clearance depth** may be amended by the Data Producer if the resulting isolated danger indication in the ECDIS is not considered appropriate.
- A drying height is indicated by a negative value.

S-101 Issue with Surrounding Depth

DCEG Clause: 2.4.5.1, 30.1, 30.5

Points to Note:

- For the meeting, option (a) as suggested by Dave Grant (NIWC) in the GitHub has been implemented for discussion.
- Note that this Issue also relates to system attribute **defaultClearanceDepth**, which is intended to be populated based on the value populated for **surroundingDepth**.

Discussion/Decision:

- Dave Grant (NIWC) after summarising the Issue, suggested that, while the amended guidance was an improvement, it was incomplete and there was further guidance required regarding the relationship between **defaultClearanceDepth** and **surroundingDepth**. The logic for the population of the attribute needed to be included in the guidance, for awareness of both encoders and implementers.
- It was determined that the auto population of the attribute **surroundingDepth** should be kept consistent with the logic used in S-52, which is based on displaying the impacted feature as an underwater hazard only if (any part of) the feature is in navigable water based on the Mariners' selected safety depth, and as such would need to take the value of the deepest of the **depthRangeMinimum** values for the Skin of the Earth feature(s) covering the target feature.

Issue #10

- It was noted that this issue could also be covered as part of [Issue #77](#) (Action S-101PT9-05) to include further guidance on the application of the S-101 "System" attributes in the DCEG.
- It was questioned as to whether the attribute should be editable by the Encoder. It was agreed that this should be possible if the default value populated is not considered to be suitable.
- It was questioned as to whether guidance regarding the encoding of the "System" attributes would be more suitably included in the S-101 Main document. It was agreed that the guidance would remain in the DCEG as the guidance regarding other attributes in S-101 was included in the DCEG.

Action:

- Include additional guidance in the DCEG explaining the relationship between **defaultClearanceDepth** and **surroundingDepth**, including a description of the logic for the default population of the attribute (IHO Sec). **[In progress]**
- Include guidance that where possible a (non-null) value for attribute **valueOfSounding** must be populated (for Obstruction, Underwater/Awash Rock, Wreck and Marine Farm/Culture) and noting the impact of population of **valueOfSounding** = empty (null) on ECDIS display. **[Complete]**
- Include guidance that the attribute **defaultClearanceDepth** may optionally be amended, from the default value populated, by the Encoder (IHO Sec). **[Complete]**



IHO

REMODELLING EXPLOSIVES ANCHORAGES

International Hydrographic Organization

- S-101 Documentation and GitHub [Issue #66](#).

16.3 Anchorage area

IHO Definition: ANCHORAGE AREA. An area in which vessels or seaplanes anchor or may anchor. (Adapted from IHO Dictionary – S-32).				
S-101 Geo Feature: Anchorage Area (ACHARE)				
Primitives: Point, Surface				
Real World		Paper Chart Symbol	ECDIS Symbol	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of anchorage	(CATACH)	<ul style="list-style-type: none"> 1- unrestricted anchorage 2- deep water anchorage 3- tanker anchorage 4- quarantine anchorage 5- seaplane anchorage 6- small craft anchorage 7- small craft mooring area 8- anchorage for periods up to 24 Hours 9- anchorage for a limited period of time 10- waiting anchorage 11- reported anchorage 	EN	0..*
category of cargo		<ul style="list-style-type: none"> 1- bulk 2- container 3- general 4- liquid 5- passenger 6- livestock 7- dangerous or hazardous 8- heavy lift 9- ballast 10- dry bulk cargo 11- liquid bulk cargo 12- reefer container cargo 13- Ro-Ro cargo 14- project cargo 15- break bulk cargo 	EN	0..*

Teh Stand
 Refer S-101 [Documentation and EC GitHub Issue #66](#) agreed 10/02/23. Refer also to Discussions and Actions from DCEG SG4.

Teh Stand
 Deleted: 4 : explosives anchorage

Removed category of anchorage value 4 (explosives anchorage) as an allowable value; and added attribute category of cargo , for feature Anchorage Area .	16.3
Removed category of anchorage value 4 (explosives anchorage) as an allowable value; and added attribute category of cargo , for feature Anchor Berth .	16.4

16.4 Anchor berth

IHO Definition: ANCHOR BERTH. A designated area of water where a vessel, seaplane, etc... may anchor. (IHO Dictionary – S-32).				
S-101 Geo Feature: Anchor Berth (ACHBRT)				
Primitives: Point, Surface				
Real World		Paper Chart Symbol	ECDIS Symbol	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of anchorage	(CATACH)	<ul style="list-style-type: none"> 1- unrestricted anchorage 2- deep water anchorage 3- tanker anchorage 4- quarantine anchorage 5- seaplane anchorage 6- small craft anchorage 7- small craft mooring area 8- anchorage for periods up to 24 Hours 9- anchorage for a limited period of time 10- waiting anchorage 	EN	0..*
category of cargo		<ul style="list-style-type: none"> 1- bulk 2- container 3- general 4- liquid 5- passenger 6- livestock 7- dangerous or hazardous 8- heavy lift 9- ballast 10- dry bulk cargo 11- liquid bulk cargo 12- reefer container cargo 13- Ro-Ro cargo 14- project cargo 15- break bulk cargo 	EN	0..*

Teh Stand
 Still assessed that the same anchor berth can be encoded in more than one way. S-101PT needs to define primitive with values as an area. S-101PT needs to define function regarding area involved as an anchor. Still not resolved in DCEG Sub-10G4.
SG4: Both possibilities (area and point) should be available.

Teh Stand
 Refer S-101 [Documentation and EC GitHub Issue #66](#) agreed 10/02/23. Refer also to Discussions and Actions from DCEG SG4.

Teh Stand
 Deleted: 4 : explosives anchorage



IHO

VESSEL SPEED LIMITS

Added additional guidance for the encoding of more detailed information for vessel speed limits.

17.4, 17.8.1

• S-101 Documentation and GitHub [Issue #27](#).

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Vessel Speed Limit

DCEG Clause: 17.4, 17.8, 27.162, 29.42

Points to Note (from DCEG SG 3 meeting):

- Suggestion is that the complex attribute `vesselSpeedLimit` could have a sub-attribute to define the units of measure. Is currently standardized as Knots.
- Also, it has been suggested that the speed limit within an area could be displayed in the ECDIS marginalia. If this is the case the attribute `vesselClass` would be required to be more standardized, perhaps as an enumerate type attribute?
- Note that there is an enumerate type attribute `categoryOfVessel` already registered in the GI Registry (note however Klas comment).
- Note Raphael suggestion to leave as is – more complex information can be provided via another Product Specification.

Discussion:

- There was considerable discussion as to the level of encoding that is required for vessel speed limits for different classes of vessels in S-101. Some were of the opinion that the modelling should allow for a significant level of detail to be included in the ENC, which was supported by some of the comments in the GitHub. However, it was agreed that more detailed information regarding vessel speed limits is generally included in Sailing Directions publications, therefore this more detailed information should be included in the relevant NIPWG Product Specifications with the current level of modelling within S-101 considered to be sufficient for the navigational ENC, noting that the `vesselSpeedLimit` complex has [0..*] multiplicity. It was agreed, however, to include guidance in the DCEG for Data Producers that may wish to include more information about vessel speed limits for different classes of vessels (if, for example, they are not planning on producing NIPWG Product Specification datasets) using the complex attribute information; or the attribute `pictorialRepresentation` (for a graphic of a speed limit table, for example).
- It was agreed that, keeping the above in mind, there needs to be consistency between the modelling between different Product Specifications in order for operational interoperability and cross-product derivative sourcing of information to be achievable. With the NIPWG10 meeting being held at the IHO Secretariat in the week following the meeting, the results of this discussion should be communicated to the NIPWG.
- There was discussion on allowing different units of measure to be defined for the speed limit, with several attendees stating that speed limits within their national waters were quoted in units other than knots (which is defined in S-4 as the units of measure to be used for speed on charts and defined as such for the attribute `speedLimit` in S-101), such as kilometres per hour. It was agreed that, despite the mandating of knots as the units of measure for speed to be used on charts as specified in S-4, allowance should be provided in S-101 for different speed limit units of measure to be encoded.

Action:

- Include guidance in the DCEG for the optional use of the complex attribute information or the attribute `pictorialRepresentation` to provide more detailed information regarding vessel speed limits for various classes of vessels (IHO Sec). **[Complete]**
- Report the recommendation of the DCEG Sub-Group to allow units of measure other than knots to be defined for vessel speed limits to the S-101PT for consideration; and if approved further report this to the NCWG for discussion on possible amendments to S-4 (IHO Sec).
- Report the decision of the DCEG Sub-Group to retain the current S-101 level of modelling for the complex attribute `vesselSpeedLimit` to the NIPWG (IHO Sec).

[Issue # 27](#)

17.4 Speed limits (see S-4 – B-430.2)

Speed is often limited inside harbours in order to prevent wakes. If it is required to encode this restriction, it must be done using a **Restricted Area Navigational** feature (see clause 17.8), with the attribute **category of restricted area** = 24 (no wake area) or **restriction** = 13 (no wake). If it is required to encode cases where the speed limit is known in general or for a certain class(es) of vessel, it must be done using **restriction** = 27 (speed restricted), with the speed limit and, if appropriate, the class of vessel, encoded using an instance of the complex attribute vessel speed limit, sub-attributes **speed limit** and **vessel class**. Further detailed information regarding speed limits, for example varying speed limits based on vessel length, draught or cargo, may be encoded, if required, using the complex attribute information, or using the attribute pictorial representation (for example, to reproduce the graphic for a speed restriction table contained in a Nautical Publication).

If it is required to encode the buoys/beacons marking the **Restricted Area Navigational** feature with speed limits, it must be done using **Beacon Special Purpose/General** or **Buoy Special Purpose/General** features (see clauses 20.12 and 20.5 respectively), with the attribute **category of special purpose mark** = 24 (reduced wake mark) or 25 (speed limit mark). The speed limit and its unit of measurement should be encoded using the complex attribute **information** (see clause 2.4.6), sub-attribute **text** (for example *Speed limit is 6 knots*).

B-130 UNITS

- The standard units for **depths** and **heights** must be metres (m) and decimetres (dm).
- The standard units for **positional accuracy** must be metres (m).
- The standard units for **distance** 'on the ground' must be nautical miles (M) and cables, or metres (m).
- The standard units for **dimensions of charts** must be millimetres (mm).
- The standard units for **time** must be hours (h), minutes (min or m) and seconds (sec or s), referred to Universal Time Co-ordinated (UTC).
- The standard units for **speed** must be knots (kn).

Items of Note:

- DCEG Sub-Group agreement that the current level of modelling is sufficient.

For discussion: Should it be allowable to encode varying units of measure for speed limits?



IHO

EMERGENCY WRECK MARKING BUOY – BUOY SHAPES

International Hydrographic Organization

- S-101 Documentation and GitHub [Issue #68](#).

Removed attribute buoy shape values 7 (superbuoy) and 8 (ice buoy) as allowable values for feature Buoy Emergency Wreck Marking.	20.6
--	------

20.6 Emergency wreck marking buoy

IHO Definition: **EMERGENCY WRECK MARKING BUOY**. An emergency wreck marking buoy is a buoy moored on or above a new wreck, designed to provide a prominent (both visual and radio) and easily identifiable temporary first response. (Adapted from UKHO NP 735, 6th Edition).

S-101 Geo Feature: Buoy Emergency Wreck Marking

Primitives: Point

Real World	Paper Chart Symbol	ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buoy shape	(BOYSHP)	<ul style="list-style-type: none"> 1: conical 2: can 3: spherical 4: pillar 5: spar 6: barrel 	EN	1..1
colour	(COLOUR)	<ul style="list-style-type: none"> 1: white 2: black 	EN	1..2 (ordered)

Teh Stand Deleted: *

Teh Stand Deleted: BUOY,

Teh Stand Deleted: A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO Dictionary – S-32) ¶

Teh Stand Deleted: ¶
7: superbuoy ¶
8: ice buoy

Teh Stand Deleted: ¶
7: superbuoy ¶
8: ice buoy

JeffWootton commented on Aug 9 Collaborator

Agree with removal of values 7 (superbuoy) and 8 (ice buoy) as allowable vales for buoyShape.

The general convention for all buoys/beacons in both S-57 and S-101 is that attribution is not restricted (in general) to essentially only the values that conform to IALA conventions. I therefore recommend that, other than the removal of values 7 (superbuoy) and 8 (ice buoy), no further changes are made for BuoyEmergencyWreckMarking.

mikan66 commented on Aug 9

We should establish a procedure for handling "stale" attribute values that may exist within portrayal rules. This could involve top-level guidance from the IHO, i.e. look at DCEG and not within rules for official valid values. Furthermore, feeding these "removals" back into the portrayal catalog could also be done. Note, however, that modifying tested portrayal rules will require retesting of the rules. Generally, removal of attribute processing from existing rules has not been happening.

EmergencyWreckMarkingBuoy – Review List of Attribute Values

DCEG Clause: 20.6

Points to Note:

- Suggestion is that if the characteristics of a buoy installed as an emergency wreck marking buoy are not aligned with the IALA defined characteristics then the mark is actually a wreck buoy and should be encoded as such. Therefore allowable attribute encoding combinations that do not align with IALA should be removed for BuoyEmergencyWreckMarking.

Issue # 68

Discussion/Decision:

- The meeting agreed that encoders should be able to encode a BuoyEmergencyWreckMarking no matter what the characteristic of the buoy are if it is communicated that this is the intention of the buoy.
- It was, however, agreed to remove superbuoy and ice buoy as allowable buoy shapes for BuoyEmergencyWreckMarking.

Action:

- Include draft amendments to the DCEG in line with the discussions/conclusions of the Sub-Group, for approval at S-101PT11 (IHO Sec). **[Complete]**



IHO

BUOY AND BEACON - DEFINITIONS

International Hydrographic Organization

- Standardisation as part of DQWG consistency review.

18 Geo Features – Aids to Navigation – Overview

In the context of this Product Specification, the following generic term definitions apply:

Beacon: A fixed artificial navigation mark that can be recognised by its shape, colour, pattern, topmark or light character, or a combination of these. It may carry various additional aids to navigation. This term is not commonly used when the navigation mark can be classified as a lighthouse. (IHO Dictionary - S-32).

Buoy: A floating object moored to the bottom in a particular (charted) place, as an aid to navigation or for other specific purposes. Navigational buoys may be classified according to: (a) their shape, appearance, or construction, such as barrel, can, cask, conical, cylindrical, dan, keg, nun, pillar, spar, spherical, or topmark buoy; (b) their colour, such as black, chequered, green, red buoy; (c) their location, such as bifurcation, fairway, junction, mid-channel, middle-ground, or turning buoy; (d) the various kinds of hazards or dangers to navigation which they mark, such as bar, isolated danger, fish trap, obstruction, spoil ground, telegraph or wreck buoy; (e) their particular purpose or use, such as anchor, anchorage, compass adjustment, dredging, farewell (or landfall), marker, quarantine, station (or watch), or warping buoy. (IHO Dictionary - S-32).

Concept Details	
Name	Buoy Lateral
Alias	BOYLAT
CamelCase	buoyLateral
Definition	A lateral buoy is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well-defined channels and are used in conjunction with a conventional direction of buoyage.
Reference	5th Edition
Reference Source	IALA Maritime Buoyage System (NP 735) (Detail view)

426	beacon	A fixed artificial NAVIGATION MARK that can be recognised by its shape, colour, pattern, TOPMARK or light character, or a combination of the... more
427	beacon: aeronautical	An AERONAUTICAL GROUND LIGHT visible at all AZIMUTHS, either continuously or intermittently, to designate a particular point on the surface ... more
428	beacon: hazard	A BEACON marking an OBSTRUCTION or hazard.
429	beacon: identification	An AERONAUTICAL LIGHT used to identify a specific POINT can be identified.
430	beacon: light (or lighted)	A BEACON from which a LIGHT is emitted.
431	beacon: omnidirectional	See OMNIRANG.
432	beacon: radio	See RADIOBEACON.
433	beacon: responder	See TRANSPONDER.
434	beacon: transponder	See TRANSPONDER.
435	beaconage	A system of BEACONS.
583	buoy: radiobeacon	A BUOY equipped with a radio transmitter.
588	buoyage	A system of, or providing with, BUOYS, serving the purpose of indicating NAVIGABLE waters. See BEACONAGE.

Added generic IHO Hydrographic Dictionary definitions for the terms "Beacon" and "Buoy". [NOTE: These generic definitions have been removed from the feature class tables in Sections 19 and 20.] 18

20 Geo Features – Buoys, Beacons

20.1 Lateral buoy

IHO Definition: **LATERAL BUOY.** A lateral buoy is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well-defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP 735, 5th Edition).

S-101 Geo Feature: Buoy Lateral (BOYLAT)				
Primitives: Point				
Real World	Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buoy shape	(BOYSHP)	<ul style="list-style-type: none"> 1 conical 2 can 3 spherical 	EN	1,1

Teh Stand Deleted: x
Teh Stand Deleted: BUOY.
Teh Stand Deleted: A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO Dictionary - S-32)¶

20.9 Lateral beacon

IHO Definition: **LATERAL BEACON.** A lateral beacon is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well-defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP 735, 5th Edition).

S-101 Geo Feature: Beacon Lateral (BCNLAT)				
Primitives: Point				
Real World	Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
beacon shape	(BCNSHP)	<ul style="list-style-type: none"> 1 stake, pole, perch, post 2 withy 3 beacon tower 	EN	1,1

Teh Stand Deleted: x
Teh Stand Deleted: BEACON
Teh Stand Deleted: A beacon is a prominent specially constructed object forming a conspicuous mark as a fixed aid to navigation or for use in hydrographic survey. (IHO Dictionary - S-32)¶



IHO

MULTIPLE COLOURS OF TOPMARKS

International Hydrographic Organization

Action S-101PT10-23.

be encoded as a separate feature, and share the same spatial type as (for point structures), or cover the location of (for structures of type curve or area) the equipment feature.

- **Topmarks** are encoded as part of the navigational aid structure, using the complex attribute **topmark** (see clause 29.34).
- Radar reflectors must not be encoded as separate features when attached to navigational aids. If it is required to encode their existence, it must be done by populating the Boolean attribute **radar conspicuous** = True. Radar reflectors may only be encoded where their position is known and they are included as equipment features on an overhead cable structure feature (see clauses 6.9.1, 20.13 and 25.15).

Amended multiplicity of the sub-attribute **colour** on complex attribute **topmark** from (0,1) to (0,*). Added attribute **colour pattern** as an allowable sub-attribute for **topmark**. Removed guidance for encoding **topmarks** having multiple colours using feature **Daymark**.

18.1, 18.3.1.1, 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.9, 20.10, 20.11, 20.12, 20.13, 20.15,

Top Stand
Refer Paper S-101PT10-07.8 and Action S-101PT10-23.

Top Stand Deleted: If it is required to encode an aid to navigation that may be considered to be a topmark but has multiple colours that are considered important for navigation, this must be done using the feature **Daymark** (see clause 20.13).

topmark	(TOPMAR)		C	0,1
colour	(COLOUR)	<ol style="list-style-type: none"> 1.: white 2.: black 3.: red 4.: green 5.: blue 6.: yellow 7.: grey 8.: brown 9.: amber 10.: violet 11.: orange 12.: magenta 13.: pink 	(S) EN	0,* (ordered)
colour pattern	(COLPAT)	<ol style="list-style-type: none"> 1.: horizontal stripes 2.: vertical stripes 3.: diagonal stripes 4.: squared 5.: stripes (direction unknown) 6.: border stripe 	(S) EN	0,1
topmark/daymark shape	(TOPSHP)	<ol style="list-style-type: none"> 1.: cone (point up) 2.: cone (point down) 	(S) EN	1,1

Real World Feature	INI 1	Feature	topmark_A daymark shape	colour*	colour pattern*	marks navigational – system of
North cardinal topmark	Q130.3	Seacon Cardinal	13	2	/	1 and 2 (IALA A and B)
East cardinal topmark	Q130.3	Seacon Cardinal	11	2	/	1 and 2 (IALA A and B)
South cardinal topmark	Q130.3	Seacon Cardinal	14	2	/	1 and 2 (IALA A and B)
West cardinal topmark	Q130.3	Seacon Cardinal	10	2	/	1 and 2 (IALA A and B)
Isolated danger topmark	Q130.4	Seacon Isolated Danger	4	2	/	1 and 2 (IALA A and B)
Port lateral topmark	Q130.1	Seacon Lateral	5	2	/	1 (IALA A)
Starboard lateral topmark	Q130.1	Seacon Lateral	1	4	/	1 (IALA A)
Port lateral topmark	Q130.1	Seacon Lateral	5	4	/	2 (IALA B)
Starboard lateral topmark	Q130.1	Seacon Lateral	1	2	/	2 (IALA B)
Safe water topmark	Q130.1	Seacon Safe Water	2	2	/	1 and 2 (IALA A and B)
Special purpose topmark	Q130.1	Seacon Special Purpose/General	7	5	/	1 and 2 (IALA A and B)
Emergency wreck marking topmark		Supp Emergency Wreck Marking	5	5	/	1 or 2 (IALA A or B)

Table 18.3 – IALA topmarks – Attribute encoding

* If it is required to encode an aid to navigation that may be considered to be a topmark but has multiple colours that are considered important for navigation, this should be done using the feature **Daymark** (see clause 20.13).

Deleted: -

Top Stand Deleted: -

Top Stand Deleted: -

Top Stand Deleted: must

Top Stand Deleted: The attribute **colour pattern** only applies to topmarks that are encoded/encoded using **Daymark** having more than one value for the attribute **colour**...



IHO

TRAFFIC -> TRAFFIC SIGNAL STATION

International Hydrographic Organization

- Action S-101PT10-12; GI Registry and S-101 consistency.

Amended attribute category of signal station , traffic value 4 from "berthing" to "berthing signal station".	22.5, 27.61
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22.5 Traffic signal station

IHO Definition: **TRAFFIC SIGNAL STATION.** A traffic signal station is a place on shore from which signals are made to regulate the movement of traffic. (Adapted from IHO Dictionary – S-32 and S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.155, November 2000).

S-101 Geo Feature: Signal Station Traffic (SISTAT)

Primitives: Point, Surface

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of signal station, traffic	(CATSIT)	<ul style="list-style-type: none"> 1.: port control 2.: port entry and departure 3.: International Port Traffic 4.: berthing signal station 5.: dock 6.: lock 7.: flood barrage station 8.: bridge passage 9.: dredging 10.: traffic control light 	EN	1*

27.61 category of signal station, traffic (CATSIT)

IHO Definition: **CATEGORY OF SIGNAL STATION, TRAFFIC.** Classification of station based on the traffic service provided.

Attribute Type: Enumeration

- 1) port control

IHO Definition: A signal station for the control of vessels within a port. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

- 2) port entry and departure

IHO Definition: A signal station for the control of vessels entering or leaving a port. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

- 3) international port traffic

IHO Definition: A signal station displaying International Port Traffic signals. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

- 4) [berthing signal station](#)

IHO Definition: A signal station for the control of vessels when berthing. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).

- 5) dock

IHO Definition: A signal station for the control of vessels entering or leaving a dock. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.86, November 2000).



IHO

TEXT PLACEMENT MODELLING AND GUIDANCE

International Hydrographic Organization

• Action S-101PT10-04 and S-101 Documentation and GitHub [Issue #7](#).

23 Cartographic Features

23.1 Text Placement

IHO Definition: **TEXT PLACEMENT**. The Text Placement feature is used in association with the Feature Name attribute or a light description to [optimize](#) text positioning in ECDIS.

S-101 Cartographic Feature: Text Placement

Primitives: Point

Real World Paper Chart Symbol ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
text			TE	0..1 [†]
text offset bearing			IN	1..1
text offset distance			IN	1..1
text type		1. name 2. light characteristic	EN	0..1 [†]
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1

[†] Only one of the attributes text or text type must be populated for each instance of Text Placement.

INT 1 Reference:

If it is required to place text on an ENC to improve clarity of display, it must be done using the cartographic feature Text Placement. The Text Placement feature must be associated with the relevant geo feature using the composition Text Association (see clause 25.16).

NOTE: Where an associated instance of Text Placement has not been related to a feature having the attribute name and/or the attributes associated with the characteristics of a light populated, the text will be positioned in the ECDIS display in accordance with the default position for text strings defined in the Portrayal Catalogue.

Remarks:

- The Text Placement cartographic feature is used by the ECDIS to optionally position text in ECDIS, which has been populated using an attribute(s) for the associated feature. The attribute(s) is identified by populating the attribute text type. Alternatively, the text to be displayed may be encoded using the attribute text.
- The attributes text offset bearing and text offset distance define the bearing (related to true north) and distance of the anchor point of the text, in millimetres in the ECDIS display, to be displayed from the associated feature. The values populated for these attributes must be determined based on the desired position of the text at the maximum display scale of the ENC data. **Note that the attribute text offset bearing does not rotate the text itself. Displayed text will always appear horizontal regardless of the display mode set by the mariner (north-up or course-up).**
- Data Producers are advised to determine the best positioning for text at the maximum display scale for the data, and based on "north-up" ECDIS display. While text offset bearing and text offset distance will position the text at the same location relative to the associated feature at all Mariner's Selected Viewing Scales, Data Producers are advised that, as the Mariner zooms out to smaller viewing scales, text may unintentionally cover other charted detail. Therefore, as an alternative, Data Producers may experiment with positioning the text so that it clears the majority of other charted features at the smallest scale at which the text is intended to be displayed, and populating the attribute scale minimum accordingly (see bullet below). Data Producers are also advised that optimum results may not be achieved when the Mariner has set the display setting for the ECDIS to "course-up".

Amended attribute orientation value to new attribute text offset bearing for cartographic feature Text Placement.	23.1, 27.173
Renamed attribute text offset mm to text offset distance.	23.1, 27.174
Enhanced encoding guidance for the encoding of the cartographic feature Text Placement.	23.1.1

- The attribute scale minimum may be used to determine a scale at which the text string is no longer visible in the ECDIS when scale minimum functionality is enabled. Where populated, the value for scale minimum on Text Placement must not be set to a smaller scale value than the value populated for the associated feature.
- Text Placement should only be associated with features of type point, and used in areas where it is important that text clear navigationally relevant areas, for example shipping channels and dredged areas.

Distinction:

Feature/Feature associations: Text Association

27.174 text offset distance

IHO Definition: **TEXT OFFSET DISTANCE**. The distance that text associated with a feature is positioned from the feature in an end-user system.

Attribute Type: Integer

Unit: Defined in relation to the desired distance in the ECDIS display from the associated feature at the maximum display scale of the ENC data.

Resolution: 1mm

Format: xx

Example: 45 for a text offset of 45 mm

Remarks:

- None.

27.173 text offset bearing

IHO Definition: **TEXT OFFSET BEARING**. The angular distance measured from true north that text associated with a feature is positioned from the feature in an end-user system.

Attribute Type: Integer

Unit: Degree (°)

Resolution: 1°

Format: xxx

Minimum value: 0

Maximum value: 360

Example: 246 for a text offset bearing of 246 degrees

Remarks:

- The attribute text offset bearing only defines the bearing to the anchor point of the text in the end-user system. It does not impact on the rotation of the text itself (that is, text is always displayed horizontally on the screen).

For discussion: Should a Boolean type attribute be added to provide capability of rotating the text?



IHO

VALUE OF LOCAL MAGNETIC ANOMALY – UNITS OF MEASURE

- S-101 Documentation and GitHub [Issue #63](#).

Amended unit of measure for attribute magnetic anomaly value from minutes to decimal degrees.	27.120
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27.120 magnetic anomaly value (VALLMA)

IHO Definition: **MAGNETIC ANOMALY VALUE.** The value of the deviation from the normal magnetic variation. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.228, November 2000).

Attribute Type: Real

Unit: Degree (°)

Resolution: 0.1°

Format: ~~xx.x~~

Minimum value: 0.1

Maximum value: 180

Example: 5 for a deviation of 5 degrees

Remarks:

- The deviation is assumed to be positive and negative by default. The plus/minus character must not be encoded.

4.2.1 Local magnetic anomaly (see S-4 – B-274)

Local magnetic anomalies are local effects superimposed on the Earth's normal magnetic field which cause anomalous variation values. Permanent anomalies are caused by concentrations of ferromagnetic material in the Earth's crust or, to a more limited extent, by wrecks or man-made structures on the sea bed. They should not be charted unless they exceed 3° from the norm for the area (see clause 4.1), because diurnal and seasonal fluctuations in the Earth's magnetic field can change the stated variation by up to 1°, and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°.

B-274 ABNORMAL MAGNETIC VARIATION

Abnormal magnetic variation or local magnetic anomalies are local effects superimposed on the Earth's normal magnetic field which cause anomalous variation values. Reports of abnormal magnetic variation should be referred to one of the World Data Centres which exist under the auspices of the International Association of Geomagnetism and Aeronomy (IAGA), to establish whether it is a long-lasting feature, or relates to a temporary phenomenon, usually due to a magnetic storm.

B-274.1

Permanent anomalies are caused by concentrations of ferromagnetic material in the Earth's crust or, to a more limited extent, by wrecks or man made structures on the sea bed. They should not be charted unless they vary by at least 3° from the norm for the area, because diurnal and seasonal fluctuations in the Earth's magnetic field can change the stated variation by up to 1°, and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°.

Where the magnitude and extent of permanent local magnetic anomalies have been established to be 3° or greater, they should be shown by a limiting undulating magenta line with the value of the anomalous variation:



B82.1

Within the enclosed area the magnetic variation may deviate from the normal by the value shown. Where the magnetic compass is known to be deflected either to the west alone or to the east alone, 5°W or 5°E should be quoted, rather than +5° or -5°, to reduce the ambiguity resulting from either a W or E 'normal' variation in the general area. Where the deflection may be in either direction it is expressed as ±5°. In all cases, the value quoted for the anomaly must be the deviation from the normal magnetic variation expected for the area.



IHO

ADOPTING THE TERM “MECHANICALLY SWEEP”

International Hydrographic Organization

- Action S-101PT9-25 and S-101 Documentation and GitHub [Issue #80](#).

27.169 technique of vertical measurement (TECSOU)

IHO Definition: ~~TECHNIQUE OF VERTICAL MEASUREMENT~~. Survey method used to obtain depth information.

Attribute Type: Enumeration

1) found by echo sounder

IHO Definition: The depth was measured by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultrasonic signal and return of its echo from the [bottom](#). (Adapted from IHO Dictionary – S-32).

2) found by side scan sonar

IHO Definition: The depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the seabed and generate a record of the seabed configuration. (Adapted from IHO Dictionary – S-32).

3) found by multi beam

IHO Definition: The depth was measured by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship’s track. (Adapted from IHO Dictionary – S-32).

4) found by diver

IHO Definition: The depth was determined by a person skilled in the practice of diving. (Adapted from IHO Dictionary – S-32).

5) found by lead line

IHO Definition: The depth was measured by using a line, graduated with attached [marks](#), and fastened to a sounding lead. (Adapted from IHO Dictionary – S-32).

8) swept by vertical acoustic system

IHO Definition: The given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.207, November 2000).

9) found by electromagnetic sensor

IHO Definition: The depth was determined by using an instrument that compares electromagnetic signals.

(Adapted from IHO Dictionary – S-32).

10) photogrammetry

IHO Definition: The science or art of obtaining reliable measurements from photographs. (IHO Dictionary – S-32).

11) satellite imagery

IHO Definition: The depth was determined by using instruments placed aboard an artificial satellite. (Adapted from IHO Dictionary – S-32).

12) found by levelling

IHO Definition: The depth was determined by using levelling techniques to find the elevation of the point relative to a datum. (Adapted from IHO Dictionary – S-32).

Jeff Wootten
Deleted: technique of vertical measurement:

Tek Stand
Deleted: seabed

Tek Stand
Deleted: swept by wire-drag
IHO Definition: The given area was determined to be free from navigational dangers to a certain depth by towing a buoyed wire at the desired depth by two launches, or a least depth was identified using the same technique. (Adapted from IHO Dictionary – S-32).¶

Removed value 6 (swept by wire-drag) as an allowable value for attribute **technique of vertical measurement**. Added new value 18 (mechanically swept).

27.169
(corresponding changes made throughout)

13) swept by side scan sonar

IHO Definition: The given area was determined to be free from navigational dangers to a certain depth by towing a side scan sonar. (Adapted from IHO Dictionary – S-32).

15) found by LIDAR

IHO Definition: The depth was measured by using an instrument that measures distance by emitting timed pulses of laser light and measuring the time between emission and reception of the reflected pulses. (Adapted from IHO Dictionary – S-32).

16) synthetic Aperture Radar

IHO Definition: A radar with a synthetic aperture antenna which is composed of a [large number of elementary transducing elements](#). The signals are electronically combined into a resulting signal equivalent to that of a single antenna of a given aperture in a [given direction](#). (IHO Dictionary – S-32).

17) hyperspectral Imagery

IHO Definition: Term used to describe the imagery derived from subdividing the electromagnetic spectrum into very narrow bandwidths. These narrow bandwidths may be combined with or subtracted from each other in various ways to form images useful in precise terrain or target analysis.

18) mechanically swept

IHO Definition: [The given area was determined to be free from navigational dangers to a certain depth by towing a line or object below the surface at the desired depth; or least depth\(s\) and position\(s\) within an area was identified using the same technique.](#) (Adapted from IHO Dictionary – S-32).

Remarks:

- No remarks.



IHO

OTHER ISSUES: UPDATE INFORMATION

International Hydrographic Organization

- Action S-101PT9-21 and S-101 Documentation and GitHub [Issue #41](#).
- Paper S-101PT11-08.4.

3.11 Update information

IHO Definition: UPDATE INFORMATION. The Update Information metadata feature is used to represent a change to the information shown.				
3-101 Metadata Feature: Update Information				
Primitives: Point, Curve, Surface				
Real World	Paper Chart Symbol	ECDIS Symbol		
3-101 Attribute	3-67 Acronym	Allowable Encoding Value	Type	Multiplicity
update-description			C	1..1
—language		ISO 639-2/T	(S) TE	0..1
—text			(S) TE	0..1
fixed date range		See clause 2.4.8	C	0..1
date end	(DATEEND)		(S) TD	0..1
date start	(DATESTA)		(S) TD	0..1
update number			IN	1..1
update type		<ul style="list-style-type: none"> ↓ insert ↓ delete ↓ modify ↓ move 	EN	1..1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
source			TE	0..1
information		See clause 2.4.8	C	0..1
file locator			(S) TE	0..1
file reference	(TXTDSC) (TXTDSE)		(S) TE	0..1
headline			(S) TE	0..1
language		ISO 639-2/T	(S) TE	0..1
text	(NIPFCM) (NINFCM)		(S) TE	0..1
<p>↓ For each instance of fixed date range, at least one of the sub-attributes date end or date start must be populated.</p> <p>fixed date range and/or scale minimum are mandatory if fixed date range and/or scale minimum are populated for the associated Geo feature, and must be identical to the values populated for the associated Geo feature.</p> <p>For each instance of information, at least one of the sub-attributes file reference or text must be populated.</p>				
INT 1 Reference:				
3.11.1 Update information				
<p>If it is required to encode information about changes made to ENC data it must be done using Update Information. This feature must be encoded to cover the extent of changed data incorporated in the System</p>				

Database via ENC Updates (ER Application Profile), and may also be used to indicate changes introduced in ENC New Editions. It carries information about the changes. The meta feature Update Information is used by the ECDIS to provide, on request, a visual indication to the Mariner of information that has changed in the System Database when an ENC Update is applied. Therefore, an associated instance of Update Information corresponding to each feature instance included in an ENC Update dataset (ER Application Profile) is mandatory for all changes that impact on navigation*. Update Information **may** must be associated with features that have changed using the association Updated Information (see clause 25.19).

* Data producers may consider the non-inclusion of an instance of Update Information for minor changes to a feature that have no impact on navigation, such as correction of spelling/syntax errors in text strings or associated text files. For further guidance see Section 31.

Remarks:

- The mandatory attribute **update number** must be used to indicate the Update number of the Update dataset that the changed information is included in, as indicated in the file extension of the Update dataset.
- The mandatory attribute **update type** must be used to indicate the type of update applicable to the feature (insertion, deletion, modification, move).
- The mandatory complex attribute **update description information** (see clause 2.4.8) **must** may be used to provide a brief textual description of the changes to the dataset-associated feature as included in the Update. **If a more detailed description of the Update is required, this should be encoded using the complex attribute information (see clause 2.4.8).**
- Where the changed information is related to an information type, the Update Information should be associated with the features to which the information type is associated.
- The attribute source may be used to indicate the related paper chart Notice to Mariner's number.
- At each New Edition of an ENC cell, Update Information features which are no longer relevant must be deleted; and for the next Update to an ENC cell, Update Information features included in the previous Update dataset should be considered for deletion. Where a new Update impacts a feature that has previously been updated, any existing instance of Update Information associated to the feature must be deleted as part of the new Update; this **may** must be done by deleting the existing Update Information from the dataset, **or by removing the impacted feature(s) from the association Updated Information if there are features included in the association that are not impacted by the new Update.**
- The creation of Update Information meta feature instances and the corresponding Updated Information association instances may be substantially automated in ENC production systems and associated databases, with automated population of the mandatory attributes update number and update type based on the change made to the data; and the complex attribute fixed date range and attribute scale minimum based on the attribution of the associated geo feature. Any additional information populated for Update Information is at the discretion of the Data Producer.
- Where information has been deleted from an ENC the Update Information feature should cover the extent of the deleted information.**

Distinction: Information Area; Caution Area.

Feature/Feature associations: Updated Information

Update Information - Detailed Description

DCEG Clause: 3.11

Points to Note:

- Discussion resulting from submission of paper S-101PT10-07.10 by AU and resultant Action S-101PT10-21 required a Paper to be developed for the S-101PT11 meeting to redefine the scope of use of the S-101 meta feature Update Information so as to replace the current ECDIS update review by mariner request functionality.
- Paper S-101PT11-08.4 subsequently submitted to the DCEG Sub-Group for discussion.
- In general, GitHub comments were in support of the concept, with some suggested refinement/addition to the revised modelling included in comments.

Discussion/Decision:

- In general, there was approval of the concept as described in the Paper. There were no objections to submission to the S-101PT11 meeting for discussion/endorsement for implementation and testing.
- Jeff Wootton (IHO Sec) stepped through the intent of the revised modelling, stressing that this is only intended to replicate the display of the ENC Update highlight capability in S-100 ECDIS as is currently done in S-57/S-52 ECDIS, however allowing improved highlighting of only the changed features; and allowing scope for Data Producers to influence the information made available to the Mariner by providing the capability to not include non-navigationally significant changes as highlighted changes and to provide further information regarding the changes made if they wish to do so.
- It was agreed that the inclusion of an **expiryDate** attribute for Update Information was not required.
- The inclusion of an additional attribute **updateNumber** was discussed, and it was agreed that this should be included in the proposed modelling to be submitted to S-101PT11.
- The suggestion to add no geometry as allowable for Update Information was discussed, however it was agreed that the geometry of the Update Information, matching to the geometry for the feature being updated, was required to derive the required highlight symbology at least for the testing phase of this modelling.
- Further discussion regarding geometry suggested that the guidance could be enhanced by allowing, for example, an area Update Information to be defined as surface geometry covering a specific area of change in the dataset. This was supported, however it was agreed that this would be included as an enhancement in the DCEG once proof of concept of the proposed remodelling had been achieved through implementation and testing.
- Values for **updateType**: It was explained that the only purpose for the proposed values (insert, delete, modify) for **updateType** were to enable the appropriate symbology for the update action to be achieved – there was no intention of this attribute being used to provide information to the end user. However, discussion was in favour of utilising the attribute to provide information to the end user, and it was agreed that an additional value "move" should be included, noting that this will require additional symbology to be developed as there is currently no symbology in S-52/S-57 ECDIS to indicate a "move".

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- From the perspective of the impact of this proposal on the Data Producer, Mikko Hovi (FI) stated that, while FI had already planned its S-101 data production and management program based the current ECDIS process for highlighting of Updates, he can see the merit in the proposal and FI would reserve further judgement on the proposal until a better idea of the impact on Data Producers is known through implementation and testing.
- Concern was raised over the application of the **fixedDateRange** for the Update Information feature, noting that in terms of ECDIS display the presence of the highlight symbol, in particular for deletions, would differ from the presence of the updated feature. It was suggested that this may benefit from the inclusion of an additional date type attribute, and it was agreed that this should be included in the technical issues for consideration in the proposal.
- It was stated that this proposal, if adopted, had the potential to impact on other S-100 based Product Specifications as well, in particular the Nautical Publications product Specifications under development by the NIPWG. It was agreed that the proposal and the outcomes of the discussions of the Sub-Group meeting should be reported at the NIPWG10 meeting to be held at the IHO Secretariat the following week.

Action:

- Amendments to be made to the proposal submitted as S-101PT11-08.4 as discussed at the meeting (IHO Sec). **[Complete]**

- Options for portrayal of an Update resulting in the "move" of a feature to be discussed by the Portrayal Sub-Group (Portrayal Sub-Group Lead). **[In progress]**
- Proposal and outcomes of discussions by the DCEG Sub-Group to be reported to the NIPWG10 meeting (IHO Sec).



IHO

OTHER ISSUES: MERGING RESTRICTED AREA FEATURE TYPES

International Hydrographic Organization

- Action Portrayal SG-57 and S-101 Portrayal GitHub [Issue #31](#).
- Paper S-101PT11-08.5.

Paper for Consideration by S-101PT

Merging of features Restricted Area Navigational and Regulatory

Submitted by:	France
Executive Summary:	Proposal to merge the features Restricted Area Navigational and Restricted Area Regulatory in S-101 Edition 1.2.0.
Related Documents:	S-101FC, S-101DCEG.
Related Projects:	S-101.

Introduction / Background

- As compared to S-57, restricted areas are split into two categories in S-101 - 1.1.0: **Restricted Area Navigational** and **Restricted Area Regulatory**, mainly to avoid excessive alerts on the ECDIS. The unique criteria for encoding one feature or the other is the type of restriction(s) that apply in the area.
- The disadvantage of this data model is that it opens the door to a (frequent) double encoding when the regulation in a restricted area includes both a navigational and regulatory value for attribute **restriction**.

Analysis/Discussion

- In S-57, when no specific object exists, restricted areas are encoded with RESARE. Attribute RESTRN contains 27 values which all trigger an alert on the ECDIS.
- In order to reduce the number of alerts with S-101 ENCs, it was decided to create two separate features: **Restricted Area Navigational** and **Restricted Area Regulatory**. Only **Restricted Area Navigational** would trigger an alert on the ECDIS.
- S-101 edition 1.1.0 states that a **Restricted Area Navigational** will be encoded when attribute **restriction** contains at least one value from the following list: 1, 2, 7, 8, 13, 14, 25, 26, 27. A **Restricted Area Regulatory** will be encoded when attribute **restriction** contains at least one value from the following list: 3, 4, 5, 6, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 39. When attribute **restriction** contains values from both list, one instance of both features will be encoded, each one carrying the appropriate/allowable values for **restriction**.
- This data model has a couple of shortcomings:
 - For a unique official regulation that applies to a specific area, encoders will have, in many cases, to encode two areas sharing the same geometry. This double encoding is not optimum in terms of database management.
 - There is a risk that, when the regulation is no longer in force or when the restrictions are changed, that one of the areas is not suppressed or correctly amended.
- In order to avoid this double encoding, it is proposed to review the data model to come (nearly) back to what it is in S-57:
 - Replace **Restricted Area Navigational** and **Restricted Area Regulatory** by a unique **Restricted Area** feature;
 - In terms of ECDIS functionalities, an alert will only be triggered if restriction contains at least one value from the following list: 1, 2, 7, 8, 13, 14, 25, 26, 27;
 - Note: the portrayal catalogue also assigns an alert when **category of restricted area** = 28 (PSSA).
- The following S-101 DCEG guidance is proposed (based on guidance for **Restricted Area Navigational** as in edition 1.1.0):

17.8 Restricted area

Deleted: navigational

IHO Definition: RESTRICTED AREA. A specified area on land or water designated by an appropriate authority within which access or navigation is restricted in accordance with certain specified conditions. (Adapted from IHO Dictionary – S-32).

Deleted: A navigational restricted area is an area where the restrictions have a direct impact on the navigation of a vessel in the area.

S-101 Geo Feature: Restricted Area (RESARE)

Deleted: Navigational

Primitives: Surface

Real World	Paper Chart Symbol	ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of restricted area	(CATREA)	1 : offshore safety zone 4 : nature reserve 5 : bird sanctuary 6 : game reserve 7 : seal sanctuary 8 : degaussing range 9 : military area 10 : historic wreck area 12 : navigational aid safety zone 14 : minefield 18 : swimming area 19 : waiting area 20 : research area 21 : dredging area 22 : fish sanctuary 23 : ecological reserve 24 : no wake area 25 : swinging area 27 : environmentally sensitive sea area 28 : particularly sensitive sea area 29 : disengagement area 30 : port security area 31 : coral sanctuary 32 : recreation area	EN	0,*
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
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



IHO

OTHER ISSUES: MOORING AREAS

International
Hydrographic
Organization

- Action S-101PT9-26.
- Paper S-101PT11-08.8.

Paper for Consideration by S-101PT

Proposal for a new S-101 feature "Mooring Area"

Submitted by:	France, Australia, UKHO, IHO Secretariat
Executive Summary:	Proposal to add a new Feature "Mooring Area" in S-101 Edition 1.2.0.
Related Documents:	S-101FC, S-101DCEG.
Related Projects:	S-101.

Introduction / Background

1. At the S-101PT meeting 10, France presented paper S-101PT10-07.11 proposing to create a new S-101 feature **Small Craft Mooring Area**.
2. The S-101PT agreed in principle with the proposal but decided that rework was needed in consultation with the NIPWG (Action S-101PT10-26).

Analysis/Discussion

3. The origin of paper S-101PT10-07.11 suggesting a new S-101 feature **Small Craft Mooring Area** was that:
 - Among the 12 allowable values for **category of anchorage**, 11 relate to proper anchorage, whereas value 8 is the only one that relates to mooring;
 - Many mooring areas have been created to prevent vessels from anchoring;
 - **Restriction** value 1 (anchoring prohibited) is not allowed on feature **Anchorage area**, making it impossible to encode the main restriction for most of the mooring areas.
4. After discussion within the S-101PT and in consultation with the NIPWG, it is proposed to create a more generic feature **Mooring Area**. This will allow the population of suitable attributes to enable the provision of additional information relating to these areas, rather than being limited by the data model currently used for **Anchorage Area**.
5. During the discussion with NIPWG (S-127 and S-131 leads), a reserve was made on the impacts of such a change to existing S-1XX Feature Catalogues, Portrayal Catalogues, DCEG and S-57 to S-101 Conversion Guidance.
6. Conversion from S-57 to S-101 should not be an issue. ACHARE objects with CATACH = 8 would be converted into **Mooring Area** with **category of mooring area** = 1.
7. To align the documentation with this proposal, the DCEG 16.3.1 (Anchorage) should be reviewed to delete reference to value 8 for **category of anchorage** and a new item inserted as follows:

16.4 Mooring area

IHO Definition: MOORING AREA. An area in which vessels may be secured to mooring buoys (adapted from IHO dictionary – S-32).



IHO

OTHER ISSUES: UPDATE INFORMATION

International Hydrographic Organization

- Action S-101PT10-21.
- Paper S-101PT11-08.9.

Paper for Consideration by S-101PT

Options for Modelling of Quality of Bathymetric Data and Spatial Quality

Submitted by:	IHO Secretariat
Executive Summary:	There have been two alternate modellings included in the S-101 DCEG since Edition 1.0.1. Action S-101PT10-25 requires further investigation of the modelling of the metadata features in S-101; and as part of this Action modelling options for the features QualityOfBathymetricData and SpatialQuality have been developed for the S-101PT.
Related Documents:	S-101PT Action S-101PT10-25; S-101 DCEG; S-101 DCEG Sub-Group 4 meeting Notes; S-65 Annexes B and C.
Related Projects:	S-101; S-100 ECDIS portrayal and performance; ENC data conversion

Introduction / Background

- Since the two encoding options for the QualityOfBathymetricData and SpatialQuality features were included in S-101 Edition 1.0.1, there has been very little feedback on the preferred option to be included in the Edition 2.0.0 Operational Edition of S-101. Prompted by discussions at the S-101PT10 meeting (June 2023), consolidated modelling of these two options has been developed for discussion at S-101PT11, for inclusion of the preferred option in S-101 Edition 1.2.0 for testing.

Analysis/Discussion

- The modelling and accompanying encoding guidance for the two options is included in Annexes A (redline changes from S-101 Edition 1.1.0) and B (clean versions for inclusion of the preferred option in S-101 Edition 1.2.0), with each option included in Scenario's 1 and 2 of the Annexes. The key characteristics of each scenario are described in the following paragraphs.
- Scenario 1:** Splits out the horizontalPositionAccuracy and verticalAccuracy out from the QualityOfBathymetricData meta feature and requires an associated instance of the Information type SpatialQuality for all QualityOfBathymetricData features. Key points to note include:
 - Effectively separates the horizontal position and vertical uncertainties from the feature intended to provide the overall indication of the quality of bathymetric data. Requires a mandatory feature/Information association of instances of SpatialQuality with all instances of QualityOfBathymetricData using the association QualityOfBathymetricDataComposition.
 - For the requirement to provide horizontal position and vertical accuracy on all features of depth 30 metres or less, the same procedure is applied regardless of the quality of individual features. The same instance of SpatialQuality associated to the QualityOfBathymetricData can also be associated to all the features for which QualityOfBathymetricData applies; with additional instance(s) of SpatialQuality indicating different quality associated to the features having different horizontal position and vertical accuracies than the underlying QualityOfBathymetricData indicates. Lower quality depth information may be further indicated in the ECDIS by the population of the attribute qualityOfHorizontalPosition on SpatialQuality; however this must not be done for SpatialQuality associated to the QualityOfBathymetricData.
 - SpatialQuality can therefore play different roles, depending on the association used, with the spatial quality of the QualityOfBathymetricData feature itself being able to be encoded using the SpatialAssociation association, while the association to the features is done using QualityOfBathymetricDataComposition.
- Scenario 2:** Retains horizontalPositionAccuracy and verticalAccuracy on the QualityOfBathymetricData meta feature. Key points to note include:

date end	(DATEND)	(S) TD	0,1 †
date start	(DATSTA)	(S) TD	0,1 †
horizontal position uncertainty		(S) C	0,1
uncertainty fixed	(POSACC)	(S) RE	1,1
uncertainty variable factor		(S) RE	0,1
vertical uncertainty		C	0,1
uncertainty fixed	(SQUACC)	(S) RE	1,1
uncertainty variable factor		(S) RE	0,1
information	See clause 2.4.6	C	0,*
file locator		(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)	(S) TE	0,1 †
headline		(S) TE	0,1
language	ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFORM)	(S) TE	0,1 †

† For each instance of fixed date range, at least one of the sub-attributes **date end** or **date start** must be populated.

For each instance of **Information**, at least one of the sub-attributes **file reference** or **text** must be populated.

INT 1 Reference:

3.7.1 Quality, reliability and uncertainty of bathymetric data (see S-4 – B-297)

[NOTE: The modelling of the complex attribute zone of confidence and accompanying encoding guidance in this Edition of S-101 Annex A is intended to allow for 2 options for the encoding of degraded bathymetric data quality over time for testing purposes. One of the options described must be used when encoding the quality of bathymetric data for an area. This modelling will be consolidated when the preferred option has been determined. See also clause 24.5.]

Information about quality, reliability and uncertainty of bathymetric data is given using:

- the meta feature **Quality of Bathymetric Data** and the Information type **Spatial Quality** (see clause 24.5) for an overall assessment of the quality of bathymetric data;
- the meta feature **Quality of Survey** for additional information about individual surveys (see clause 3.10);
- the attributes **quality of vertical measurement** and **technique of vertical measurement** on groups of soundings or individual features;
- the attributes **horizontal position uncertainty**, **quality of horizontal measurement** and **vertical uncertainty** on the spatial types (see clauses 2.4.7 and 24.5).

Bathymetric data quality comprises the following:

- completeness of data (for example, seafloor coverage);
- currency of data (for example, temporal degradation);
- uncertainty of data;
- source of data.

All horizontal positional (2D), vertical (1D), horizontal distance (1D) and orientation (1D) uncertainty attributes concern the 95% confidence level of the variation associated with all sources of measurement, processing and visualization error. Uncertainty due to temporal variation should not be included in these attributes.

For the Mariner, **Quality of Bathymetric Data** provides the most useful information. Therefore, the use of **Quality of Bathymetric Data** is mandatory for areas containing depth data or bathymetry on ENC datasets at maximum display scale 1:700000 and larger.

uncertainty (uncertainty fixed) and vertical uncertainty (uncertainty fixed) = [empty (null)] must be populated.

- Wherever possible, meaningful and useful values for the attributes **category of temporal variation**, **full seafloor coverage achieved**, and the complex attribute **features detected** must be used for areas of bathymetry. For areas of unstable seafloors, the complex attribute **survey date range (date end)** must be used to indicate the date of the survey of the underlying bathymetric data.
- As a result of some disasters, for example earthquakes, tsunamis, hurricanes, it is possible that large areas of seafloor have moved and/or become cluttered with dangerous obstructions. Emergency surveys may subsequently be conducted over essential shipping routes and inside harbours. Outside these surveys, all existing detail is now suspect, whatever the quality of the previous surveys. In such cases, the attribute **category of temporal variation** should be reclassified to value 7 (extreme event), the Boolean attribute **full seafloor coverage achieved** set to *False*; complex attribute **features detected**, Boolean sub-attributes **least depth of detected features measured** and **significant features detected** set to *False*; the **zone of confidence** sub-attribute **category of zone of confidence in data** reclassified to 5 (zone of confidence D); and the **zone of confidence** sub-attributes **horizontal position accuracy (uncertainty fixed)** and **vertical uncertainty (uncertainty fixed)** on the associated **Spatial Quality** populated with an empty (null) value **(however see bullet for zone of confidence below)** in the affected areas outside the area covered by emergency surveys.
- To express completeness of bathymetric data, the complex attribute **features detected** must be encoded. **features detected** indicates that a systematic method of exploring the seafloor, or the water column to the depth indicated by population of the attribute **depth range maximum value**, was undertaken to detect significant features. The sub-attributes **size of features detected** and **least depth of detected features measured** must not be encoded unless the sub-attribute **significant features detected** is set to *True*.
- The mandatory complex attribute **zone of confidence** is used on a **Quality of Bathymetric Data** feature to **specify the vertical and horizontal position uncertainty of the depths covered by the surface**; and provide an overall indication of the accuracy of the bathymetric data in the area. Where **category of temporal variation** is set to values 2 (likely to change and significant shoaling expected) or 3 (likely to change but significant shoaling not expected), multiple instances of **zone of confidence** should be encoded to provide an indication of the degradation of the overall accuracy **as well as the vertical and horizontal position accuracy** of the charted bathymetric information over time.
 - Wherever possible, meaningful and useful values of the mandatory sub-attribute **category of zone of confidence in data** should be used (that is, values other than **category of zone of confidence in data = 6** (zone of confidence U)) for areas of bathymetry. These values must be determined from the **category of zone of confidence in data** definition table (see clause 27.71) in accordance with the values populated for the attribute **full seafloor coverage achieved**; the complex attribute **features detected**; and the **spatial accuracy** sub-complex attributes **horizontal position uncertainty** and **vertical uncertainty** on the associated **Spatial Quality**.
 - The sub-complex attribute **fixed date range** is used to define the date range(s) where the quality is degraded over time. Where multiple date ranges are specified, the **date start** of an instance must be equal to the **date end** of the previous instance. Within the sequence, the **date start** of the first instance and the **date end** of the last instance should not be populated.
- The sub-complex attribute **vertical uncertainty** on the associated **Spatial Quality** is used to specify the vertical uncertainty of the depths covered by the surface **within a specified date range (where encoded)**. When **depth range minimum value** is specified on **Quality of Bathymetric Data**, **vertical uncertainty** refers only to the uncertainty of the swept depth defined by **depth range minimum value**.
- The sub-complex attribute **horizontal position uncertainty** on the associated **Spatial Quality** is used to specify the positional uncertainty of the depths covered by the surface **within a specified date range (where encoded)**.
- The indication of the horizontal position and vertical uncertainties described in the above bullet and in Figure 3-2 may alternatively be encoded using an associated instance of the information type **Spatial Quality**—complex attribute **spatial accuracy** (see clause 24.5)—and using the association **Quality of Bathymetric Data Composition**. Where the horizontal position and vertical uncertainties are encoded using this method, the horizontal position uncertainty and vertical uncertainty sub-complex attributes for **zone of confidence** must not be populated on **Quality of Bathymetric Data**. However, where populated, the values for the sub-attributes of the sub-complex attribute **fixed date range** must be identical

S-101PT11, Lombok, Indonesia, 27-29 September 2023



IHO OTHER ISSUES: METADATA

International Hydrographic Organization

- Action S-101PT10-25 and S-101 Documentation and GitHub Issues [#59](#), [#72](#), [#73](#), [#74](#).
- Paper S-101PT11-08.10.



IHO RELATED DOCUMENTS/DISCUSSIONS

International Hydrographic Organization

- [S-101PT9 2022 INF1-01 EN Metadata Issues.](#)
- [S-101PT10 2023 07.9 EN Vertical Datum Information in S-101](#)
- [S-101PT10 2023 07.9A EN Metadata Issues.](#)
- S-101 Documentation and FC GitHub Issues
 - Default Value of Vertical Datum for Heights ([Issue #59](#))
 - Adopting a Single Vertical Datum for S-101 Datasets ([Issue #72](#))
 - 101FR00369660.000 no default vertical datum - DCEG issue? ([Issue #73](#))
 - DCEG 3.9 Vertical datum references non-existent Discovery Metadata field ()

Action S-101PT10-

3.9.1 Vertical datum

Vertical datum information is encoded in the dataset metadata, using the meta feature **Vertical Datum of Data**, or by populating the attribute **vertical datum** on individual geo features. The values encoded in the attributes **elevation**, **height** and **clearance vertical** (positive values up) are referenced to the specified datum(s); **vertical datum** must not be encoded on any feature unless at least one of the above attributes is also encoded on that feature.

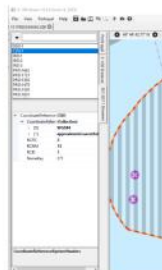
The default value for the vertical datum is stored in the Dataset Discovery Metadata in the Exchange Set.

Catalogue: S100_DatasetDiscoveryMetadata/verticalDatum

If the vertical datum for an area of an ENC dataset is different from the default value for the dataset, it must be



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IHO RECOMMENDATIONS (PAPER S-101PT10-08.9)

International Hydrographic Organization

- Remove default value from CRSH field in S-101 to remove confusion; datums applicable to geometry remain.
 - Needs further discussion? Prior feedback is that only a single (sounding) vertical CRS needs to be included in the ISO 8211 as the only feature that uses vertical CRS is soundings (all other vertical datum related information included via attribution).

Field	Subfield	Meta object class	Meta object attribute	Geo or spatial object attribute
DSD	ASGN		The use of M_PROJ is prohibited	
DSD	UACT		The use of M_PROJ is prohibited	
DSD	ISDT		The use of M_PROJ is prohibited	
DSPW	HDAT		The use of M_HDAT is prohibited	
DSPW	VDAT	M_VDAT	VERDAT	VERDAT
DSPW	SDAT	M_SDAT	VERDAT	VERDAT
DSPW	SDCL	M_SDCL	OSCALC	
DSPW	SDUN		The use of SDUN is prohibited	
DSPW	HJUN		The use of HJUN is prohibited	
DSPW	PUNJ		The use of PUNJ is prohibited	
M_ACEY		HORACC	HORACC	
M_ACEY		POSACC	POSACC	
M_ACEY		SQUACC	SQUACC	
M_ACEY		VERACC	VERACC	
M_NDYS		MARSYS	MARSYS	
M_NDYS		ORIENT	ATTRIB ORIENT of an individual object that the superclass the meta object attribute	
M_DUAL		GATZDC	POSACC,SQUACC and TRESSDU	
M_DUAL		SQUACC	POSACC	
M_DUAL		POSACC	POSACC	
M_SREL		SURATH	SORIND	
M_SREL		SUREND	SORIND	
M_SREL		SURETA	SORIND	
M_SREL		TRESSDU	TRESSDU	



Assumption is that only vertical CRS is required to be displayed in the ECDIS marginalia?

Table 5-4 - Compound CRS (WGS84 and Mean Sea Level)

Field	Subfield	Value	Description
CRSD			Coordinate Reference System Record Identifier
CRSH	CRSH	15	Record Name (15 = Coordinate Reference System Identifier)
CRSH	NRCD	1	Record Identification Number
CRSH	NRCC	2	Number of CRS Components
CRSH			Coordinate Reference System Header
CRSH	CRS1	1	CRS Name
CRSH	CRS2	1	CRS Type (1 = 2D Geographic)
CRSH	CRS3	1	Coordinate System Type (1 = Ellipsoid CRS)
CRSH	CRS4	WGS84	CRS Name
CRSH	CRS5	4326	CRS Identifier
CRSH	CRS6	2	CRS Source (2 = EPSG)
CRSH	CRS7		CRS Source Information (unfilled)
CRSH	CRS8		CRS Source Information (unfilled)
CRSH			Coordinate Reference System Header
CRSH	CRS9	2	CRS Name
CRSH	CRS10	0	CRS Type (0 = Vertical)
CRSH	CRS11	3	Coordinate System Type (3 = Vertical)
CRSH	CRS12		CRS Name
CRSH	CRS13		CRS Identifier (unfilled)
CRSH	CRS14	205	CRS Source (205 = Not Applicable)
CRSH	CRS15		CRS Source Information (unfilled)
CRSH	CRS16		CRS Source Information (unfilled)
CRSH	CRS17	12	Axis Type (12 = Gravity-Related Depth)
CRSH	CRS18	4	Axis Unit (4 = Vertical)
CRSH	CRS19		Vertical Datum
CRSH	CRS20		CRS Source Information (unfilled)
CRSH	CRS21	5	CRS Source (5 = Mean Sea Level)
CRSH	CRS22		Datum Source Information (unfilled)

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OTHER ISSUES: REMODELLING MOORING/WARPING FACILITY

International Hydrographic Organization

- Actions S-101PT9-18,19,20 and S-101 Documentation and GitHub [Issue #82](#).
- Paper S-101PT11-08.11.



IHO PROPOSALS

International Hydrographic Organization

- Summarised in GitHub Issue #82 (based on re-modelling attribute categoryOfMooringWarpingFacility):

Code	Label	Definition	Primitives	Comments	IHO Sec. Comments
1	Dolphin	A post or group of posts, used for mooring or warping a vessel, or as an aid to navigation. The dolphin may be in the water, on a wharf or on the beach.	Point/Surface	Create new feature Dolphin. Potential for OCMF definition to be used. "An independent platform incorporating mooring hooks or bollards for securing ship's mooring lines"	Agree with new feature, however note that the current definition is the Hydrographic Dictionary definition, therefore any proposed amendment will need to be approved by HDWG.
2	Deviation Dolphin	A post or group of posts, which a vessel may swing around for compass adjustment.	Point/Surface	Create new feature Dolphin and use a Boolean attribute to indicate deviation Dolphins.	Agree.
3	Bollard	Small shaped post, mounted on a wharf or dolphin used to secure ship's lines.	Point, Surface	Propose create a dedicated feature this would allow an attribute for Safe Working Load to be included Elevation as present on MORFAC should be retained. An attribute for identification should be included.	Agree.
4	Tie-Up Wall	A section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships.	Curve/Surface	Shore line construction includes categories of various walls, fender and landing steps. Propose making this a category of shoreline construction.	Would normally not agree, however I think a precedent has been set with already allowable categoryOfShorelineConstruction = 14 (fender). Therefore happy to accept.
5	Post or Pile	A long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility.	Point	Pile already exists as an S-101 feature, add additional value for Category of Pile.	Tend to agree. Add new value for "mooring post/pile"?
6	Mooring Cable	A chain or very strong fibre or wire rope used to anchor or moor vessels or buoys.	Curve	Submarine Cable also has a category of mooring cable (6). Propose map any instances to that feature in S-101.	Agree. Done in response to Action S-101PT10-17. See S-101 Documentation and FC GitHub Issue #83 .
7	Mooring Buoy	A buoy secured to the bottom by permanent moorings with means for mooring a vessel by use of its anchor chain or mooring lines.	Point	Propose making a specific Mooring Buoy feature with the relevant attributes.	See Action S-101PT10-15 and S-101 Documentation and FC GitHub Issue #81 . The decision to essentially deconstruct the MooringWarpingFacility feature as suggested above is based on this S-101PT10 decision.

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IHO RECOMMENDATION (POST OR PILE)

International Hydrographic Organization

- categoryOfMooringWarpingFacility = 5 (post or pile).
- Suggest new value 8 for attribute category of pile. Note however comment from Port of Rotterdam:
 - 5 Post or pile: I think it would be beneficial if a PILPNT remain as is and not as a mooring facility. We would commonly use a PILPNT for a post which is not used for mooring, as a lights support or purpose unknown.

If all recommendations summarized in the approved, the S-Mooring/Warping removed from S-

ENC conversion Annexes B and C amended accord

27.46 category of pile (CATPLE)

Attribute Type	Enumeration
1)	stake <i>IHO Definition:</i> An elongated wood or metal pole embedded in the seabed to serve as a marker or support. (Adapted from IHO Dictionary – S-32).
3)	post <i>IHO Definition:</i> A vertical piece of timber, metal or concrete forced into the earth or seabed. (Defence Geospatial Information Working Group, Feature Data Dictionary Register, 2010).
4)	tripodal <i>IHO Definition:</i> A single structure comprising 3 or more piles held together (sections of heavy timber, steel or concrete), and forced into the earth or seabed. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.61, November 2000).
5)	piling <i>IHO Definition:</i> A number of piles, usually in a straight line, and usually connected or bolted together. (Adapted from IHO Dictionary – S-32).
6)	area of piles <i>IHO Definition:</i> A number of piles, usually in a straight line, but not connected by structural members (Australian Hydrographic Office).
7)	pipe <i>IHO Definition:</i> A vertical hollow cylinder of metal, wood, or other material forced into the earth or seabed. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.61, November 2000).
8)	mooring post <i>IHO Definition:</i> A post where to which something (such as a craft) can be moored. (Adapted from Merriam-Webster Dictionary – 2023).
Remarks:	
• No remarks.	

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IHO

OTHER ISSUES: FEATURE NAMES – BUOYS AND BEACONS

International Hydrographic Organization

- Note naming of new feature Mooring Buoy (not Buoy Mooring). Done for consistency between IHO Hydrographic Dictionary, GI Registry and S-101.
 - Suggest that this convention is also applied for all existing buoy and beacon features, for example Buoy Lateral -> Lateral Buoy

20.1 Lateral buoy

IHO Definition: **LATERAL BUOY.** A lateral buoy is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well-defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP 735, 5th Edition).

S-101 Geo Feature: Buoy Lateral (BOYLAT)

Concept Details	
Name	Buoy Lateral
Alias	BOYLAT
CamelCase	buoyLateral
Definition	A lateral buoy is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well-defined channels and are used in conjunction with a conventional direction of buoyage.
Reference	5th Edition
Reference Source	IALA Maritime Bouyage System (NP 735) (Detail view)

The screenshot shows a software interface with a search bar containing the text "lateral mark". A pop-up window is displayed over the search results, containing the following text: "In the IALA Maritime Buoyage System a NAVIGATION MARK used to indicate the PORT or STARBOARD side of the ROUTE to be followed. They are generally used for well defined CHANNELS and are used in conjunction with a conventional direction of BUOYAGE. See also LATERAL SYSTEM." The pop-up window has an "OK" button in the bottom right corner. In the background, a table is visible with columns for "Eng ID" and "Term". One row is partially visible with "2686" in the "Eng ID" column and "lateral mark" in the "Term" column. The "Term" cell is highlighted in yellow.



IHO

OTHER ISSUES: MAXIMUM ALLOWABLE TVU (CATEGORY OF ZONE OF CONFIDENCE IN DATA)

International Hydrographic Organization

• Inconsistency between S-101 and S-44. Allowable?

Tom,

I am the technical advisor with NOAA's Hydrographic Surveys Division and the vice-chair of the HSWG along with David Parker. David forwarded your contact information and suggested I reach out to you as I have a few questions regarding standardization between S-44 and S-101 maximum allowable TVU equations.

- Do you know if there is a reason that the S-57/101 maximum allowable TVU equation is different from the S-44 maximum allowable TVU equation?
- Is it possible that we standardize between the two and have just one equation?

I'm assuming the reason they are different is because the S-57 TVU equation was developed prior to S-44 implementing the root mean square equation and we have not standardized between the two yet.

Remarks:

- The full categorisation of each category is as follows:

1	2	3	4	5	
ZOC ¹	Position Accuracy ²	Depth Accuracy ³	Seafloor Coverage	Typical Survey Characteristics ⁵	
A1	± 5 m + 5% depth	= 0.50 + 1% d		Full area search undertaken. Significant seafloor features detected ⁴ and depths measured.	Controlled, systematic survey ⁴ high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multi beam, chopped or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 0.6		
		30	± 0.8		
A2	± 20 m	= 1.00 + 2% d		Full area search undertaken. Significant seafloor features detected ⁴ and depths measured.	Controlled, systematic survey ⁴ achieving position and depth accuracy less than zone of confidence A1 and using a modern survey echo sounder ⁷ and a sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 1.2		
		30	± 1.6		
B	± 50 m	= 1.00 + 2% d		Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey achieving similar depth but lesser position accuracies than zone of confidence A2 , using a modern survey echo sounder ⁷ , but no sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 1.2		
		30	± 1.6		
C	± 500 m	= 2.00 + 5% d		Full area search not achieved; depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
		Depth (m)	Accuracy (m)		
		10	± 2.5		
		30	± 3.5		
D	Worse than zone of confidence C	Worse than zone of confidence C		Full area search not achieved; large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.
		Depth (m)	Accuracy (m)		
		100	± 7.0		
		1000	± 52.0		
U	Unassessed – The quality of the bathymetric data has yet to be assessed				

To decide on a ZOC Category, all conditions outlined in columns 2 to 4 of the Table must be met.

Explanatory notes quoted in the Table:

¹ The allocation of a Zone of Confidence (ZOC) indicates that particular data meets minimum criteria for position and depth accuracy and seafloor coverage defined in this Table. ZOC categories reflect a charting standard and not just a hydrographic survey standard. Depth and position accuracies specified for each ZOC category refer to the errors of the final depicted soundings and include not only survey errors but also other errors introduced in the chart production process. Data is further qualified in Feature Class **Quality of Bathymetric Data** (see clause 3.7) attributes as follows:

a) Positional Accuracy (**horizontal position uncertainty**) and Sounding Accuracy (**vertical uncertainty**) may be used to indicate that a higher position or depth accuracy has been achieved than defined in this Table (for example a survey where full seafloor coverage was not achieved could not be classified higher than ZOC B; however, if the position accuracy was, for instance, ± 15 metres, the attribute **horizontal position uncertainty** could be used to indicate this).

b) Swept areas where the clearance depth is accurately known but the actual seabed depth is not accurately known may be accorded a 'higher' ZOC (**that is, A1 or A2**) providing positional and depth accuracies of the swept depth meets the criteria in this Table. In this instance, the attribute **depth range minimum value** may be used to specify the swept depth. The position accuracy criteria apply to the boundaries of swept areas.

c) The complex attribute **survey date range** is used to indicate the start and end dates of the survey(s) covering the area.

² Position Accuracy of depicted soundings at 95% CI (2.45 sigma) with respect to the given datum. It is the cumulative error and includes survey, transformation and digitizing errors etc. Position accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

³ Depth accuracy of depicted soundings = $\sqrt{a^2 + (b \cdot d)^2}$ at 95% CI (2.00 sigma), where d = depth in metres at the critical depth. Depth accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

⁴ Significant seafloor features are defined as those rising above depicted depths by more than:

Depth	Significant Feature
a. <40 m	2 m
b. >40 m	10% depth

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IHO

ADDITIONAL WORK IN PROGRESS

International Hydrographic Organization

- Improving guidance for associations on S-101 (Action S-101PT10-22).
 - Sample additional guidance included for radar reflector associations (Structure/Equipment relationship).

25.15 Structure/equipment

IHO Definition: **STRUCTURE/EQUIPMENT**. A feature association for the binding between a navigation aid equipment feature and the structure that supports it.

Remarks:

- A Structure/Equipment composition binds a single "Supported by" feature to at least one "Supports" feature.

Role Type	Role	Associated With	Multiplicity
Composition	Supported by	Cable Overhead, Pipeline Overhead ⁶	0,1
	Supports	Radar Reflector	0..*

20.18 Radar reflector

IHO Definition: **RADAR REFLECTOR**. A device capable of, or intended for, reflecting radar signals. (IHO Dictionary – S-32).

S-101 Geo Feature: Radar Reflector (RADRFL)

Primitives: Point

Real World Paper Chart Symbol ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
fixed date range		See clause 2.4.8	C	0,1

text	(INFORM) (NINFOM)		(S) TE	0,1..†
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Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
Supported by	Structure/Equipment (see clause 25.15)	Cable Overhead, Pipeline Overhead	Composition	1,1

† For each instance of fixed date range, at least one of the sub-attributes date end or date start must be populated.

6.10 Overhead cable

IHO Definition: **OVERHEAD CABLE**. A single continuous rope-like bundle consisting of multiple strands of fiber, plastic, metal, and/or glass, which is supported by structures such as poles or pylons and passing over or nearby navigable waters. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2012).

S-101 Geo Feature: Cable Overhead (CBLOHD)

Primitives: Curve

Real World Paper Chart Symbol ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of cable	(CATCBL)	1.. power line 3.. transmission line 4.. telephone 5.. telegraph	EN	0,1

text	(INFORM) (NINFOM)		(S) TE	0,1..†
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Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
Supports	Structure/Equipment (see clause 25.15)	Radar Reflector	Association	0..*

† For overhead cables over navigable water, one of the attributes vertical clearance fixed or vertical clearance safe must be populated.



- Action S-101PT9-15 and S-101 Documentation and GitHub [Issue #41](#).
- Discussions and Action from NIPWG10.
 - New concept “Interoperability Identifier” proposed to the GI Registry as a “placeholder” for possible implementation of MRNs (attribute?).
 - To be discussed at S-100WG8.

The screenshot shows the IHO MRN web application interface. On the left is a sidebar menu with options: HOME, HELP&GUIDANCE, GI REGISTERS, MY TASKS, Concept (selected), Data Dictionary, Portrayal, Meta Data, PROPOSAL, and TEST BED. The main content area is divided into three sections:

Concept Details

Name	Interoperability Identifier
Alias	
CamelCase	interoperabilityIdentifier
Definition	A common unique identifier for entities which describe a single real-world feature, and which is used to identify instances of the feature in end-user systems where the feature may be included in multiple data product types.
Reference	
Reference Source	IHO Nautical Information Provision Working Group (Detail view)
Similarity to Source	Identical
Remarks	

Management Details

Proposal Type	Addition	Submitting Org	IHO Secretariat
Successor	--	Date Proposed	2023-09-15
Predecessor	--	Date Accepted	
Proposed Change	New Item.		
Justification	Mechanism for encoding Marine Resource Identifiers (MRNs) - intended to be an attribute.		

DDR Binding Contents

No data



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SUMMARY OF QUESTIONS FOR S-101PT

International
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- Encoding feature names: Should it be possible for encoders to encode a name of a feature but prohibit the name from displaying in the ECDIS?
- Should the attribute bridgeConstruction be changed to bridgeStructureType?
- Should the names of the existing buoy and beacon features in S-101 be changed to be consistent with other IHO publications and the GI Registry?
- Should it be allowable to encode varying units of measure for speed limits?
- Is it required to have consistency between the equations for the calculation of the maximum allowable TVU for S-101 and S-44 to be different?
- TextPlacement: Should a Boolean type attribute be added to provide capability of rotating the text?
- Apply the additional guidance on Associations throughout the DCEG?



IHO

ACTIONS REQUESTED OF S-101PT

International
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- **Note** the progress in the development of S-101 DCEG Edition 1.2.0.
- **Discuss** and **Approve** the changes made in S-101 Edition 1.2.0 DCEG.
- **Address** the questions included in this Paper (previous slide) and assign appropriate Actions.
- **Initiate** further action as required.



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THANK YOU

S-101PT11, Lombok, Indonesia, 27-29 September 2023