



10th Meeting of the IHO Nautical Information Provision Working Group

Changes to S-101 DCEG Since Edition 1.0.2

Agenda Item 05.4



IHO

DCEG SUB-GROUP: MEETINGS

International Hydrographic Organization

DCEG Sub-Group Meeting 05-06 October 2022

Meeting Notes

- Point out at start that lower GitHub issues to be discussed are related to issues with ECDIS portrayal as derived as actions from the Portrayal Sub-Group. Later issues are related to issues identified in the Changes spreadsheet.

[Issue # 47](#)

Flare Angle

DCEG Clause: 2.4.5.1, 30.2

Points to Note:

- Suggestion (from SE) is to allow manual cartographic encoding (for example along a transit or leading line).
- Current draft 1.1.0.20220929 only reflects the option to encode manually for cartographic purposes.
- Corresponding changes to that shown in the GitHub made at clause 30.2.
- Rename to flareBearing? If so bearing towards or away from (Note Christian comments).
- Possible alternative: Additional optional feature attribute that overrides all?

Discussion/Decision:

- General approval of the proposed change from flareAngle to flareBearing.
- After some discussion, general consensus was that the bearing to be encoded should be the bearing "away" from the light (i.e. the bearing as populated for any associated navigation line (towards the light) +/- 180).
- There was no discussion on the possible alternatives provided (additional optional feature attribute; and Christian's RCDIS portrayal rule).

Action:

- Amend DCEG to reflect change of name for flareAngle to flareBearing (IHO Sec). **[Complete]**.
- Supersession proposal to be submitted to Concept Register (IHO Sec). **[Complete]**
- Close issue and open new issue to capture possible modelling/portrayal alternatives (IHO Sec).

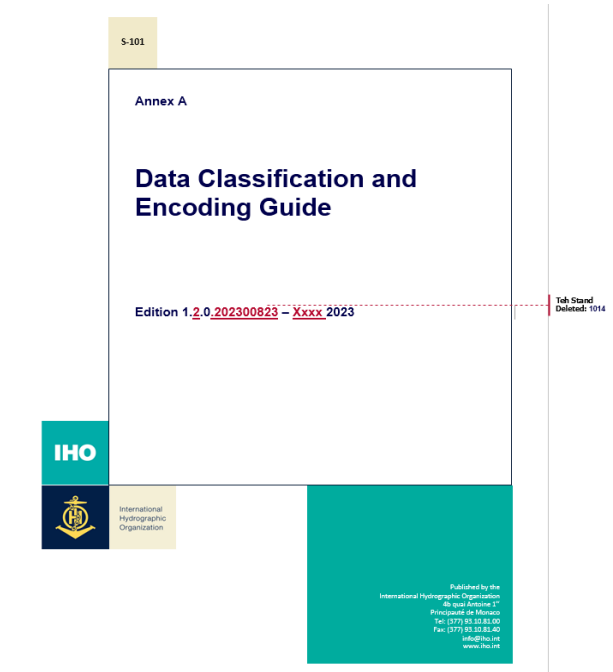
Encoding of Dates

DCEG Clause: 2.4.8, 2.4.8.1, 27.76, 27.77, 27.79

Points to Note:

- Observation from NIWC that in S-100 Edition 5.0.0 encoded date ranges are inclusive.
- Solves the problem for dateEnd but, for "last day in February", not for dateStart.

Github



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

NIPWG10, IHO Secretariat, Monaco, 12-15 September 2023



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DCEG SUB-GROUP: MEETINGS (2)

S-101

Annex A

Data Classification and Encoding Guide

Edition 1.2_0.202300908 - Xxxx 2023

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International Hydrographic Organization

DCEG Sub-Group Meeting 05-06 September 2023

Meeting Notes

- S-101 Documentation and GitHub Issues discussed in order from lowest Issue number to highest, unless requested by participating PT Members. This record is ordered from lowest to highest Issue number (DCEG then Feature Catalogue), and does not necessarily reflect the actual order of discussions.
- Where an Action from the meeting requires an Issue to be closed, the Issue will remain open until the DCEG report to the S-101PT11 meeting has been endorsed.

S-101 Text Placement Cartographic Feature

DCEG Clause: 23.1

Points to Note:

- Action S-101PT10-04: Discussion on this Issue assigned to Klas Östergren, in consultation with Hugh Astle (T-Caris). Discussion held 05/09/23 to be summarised at Day 2 session.
- There is a requirement for some Figures in support of guidance included in the DCEG. S-100 Testbeds to supply.
- Note Dave simulations and outcomes (GitHub comment submitted 17/08/23).
- Note Alvaro proposals for modelling changes in the GitHub.

Discussion/Decision:

- Hugh Astle (T-Caris) summarised the discussions held with Klas Östergren (SE) on the implementation and testing of the current model for the TextPlacement feature. He explained that the main problem was the justification of the text, with using the centroid of the text as the justification point proving to be the biggest problem. In general, the results were satisfactory in "North-Up" ECDIS display, however there was no suitable solution when the display was switched to "Course-Up". Hugh further reported that while in all cases the position of the text in regard to the related feature was OK in "North-Up" mode, there was still potential fouling of other encoded features as the Mariner zooms out, for which there was currently no current solution. It was considered that a solution to the justification issue could be found with a change to S-100, but there was no possibility of such a change being made until at least S-100 Edition 6.0.0.
- Dave Grant (NIWC) reported on the simulation of the current modelling conducted by NIWC and their outcomes, which supported the discussions between Hugh and Klas.
- The recommendation from the discussions was that consideration be given to only implementing the TextPlacement cartographic feature when the Mariner is navigating in "North-Up" display mode; and the default text placement is applied in the ECDIS when in "Course-Up" display mode. It was commented that experience/feedback from users indicates that most route monitoring is conducted with the ECDIS in "North-Up" mode, although Julie Larrivière (CA) commented that in Canadian waters most recreational/small craft mariners used "Course-Up". It was agreed that this guidance is to be included in the DCEG for Edition 1.2.0, with additional guidance relating to the impact of zooming out on surrounding features as reported by Hugh to also be incorporated in the guidance.

[Issue # 7](#)

GitHub Issues

Filters | Q: is:issue is:open | Labels: 17 | Milestones: 0 | [New issue](#)

Issue	Author	Label	Projects	Milestones	Assignee	Sort
<input type="checkbox"/> 36 Open ✓ 52 Closed						
<input type="checkbox"/> Iso8211 Encoding : CompositeCurveRecord in a base structure dataset	#90					
<input type="checkbox"/> Iso8211 Encoding : CurveRecord in an Update DataSet	#89					
<input type="checkbox"/> Figure 4-6 in the Main document Scales	#88					2
<input type="checkbox"/> Compilation scale (CS) and maximum display scale (MaxDS) Scales	#87					4
<input type="checkbox"/> Recommend changing ValueType of stationNumber: from integer to string.	#86					1
<input type="checkbox"/> Recommend that tidal stream panel data include a more complex example	#85					5
<input type="checkbox"/> Action S-101PT10-17 - Encoding of mooring cables DCEG Feature Catalogue For S-101 Ed 1.2.0	#84					1
<input type="checkbox"/> Scale minimum and multiple Data coverage features scale minimum Scales	#83					12
<input type="checkbox"/> Action S-101PT10-19 - Options for re-modelling of Feature MooringWarpingFacility DCEG Feature Catalogue For S-101 Ed 1.2.0	#82					1
<input type="checkbox"/> Action S-101PT9-18 - New Feature Mooring Buoy DCEG Feature Catalogue For S-101 Ed 1.2.0						1

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

NIPWG10, IHO Secretariat, Monaco, 12-15 September 2023



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EDITION 1.1.0 APPROVED: ADD GEOMETRIC PRIMITIVES TO FEATURES HAVING ONLY (None)

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

Teh Stand Deleted: having no allowable

Archipelagic Sea Lane			S	N
Deep Water Route			S	N
Fairway System			S	N
Island Group			S	N
Mooring Trot			S	N
Range System		C	S	N
Traffic Separation Scheme			S	N
Two-Way Route			S	N

- Required to provide positional information in the ECDIS for the position of textual information (names).

Remarks:

- The name of the TSS must be populated using the complex attribute **feature name**. Where it is required for the name to be displayed in the ECDIS, the **Traffic Separation Scheme** must be encoded using surface geometry. The extent of the geometry of the **Traffic Separation Scheme** should utilise the geometry of the components of the scheme so as to cover its full extent.



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EDITION 1.1.0 APPROVED: BUOY NEW DANGER MARKING -> BUOY EMERGENCY WRECK MARKING

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GEO FEATURES

Administration Area			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			

- Structure Features: Includes Beacon Cardinal, Beacon Isolated Danger, Beacon Lateral, Beacon Safe Water, Beacon Special Purpose/General, Buoy Cardinal, [Buoy Emergency Wreck Marking](#), Buoy Installation, Buoy Isolated Danger, Buoy Lateral, Buoy Safe Water, Buoy Special Purpose/General, Daymark, Light Float, Light Vessel, Landmark, Pile.
- Equipment Features: Includes Daymark, Fog Signal, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Reflector, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning.
- Navigational Aid Features: Includes Beacon Cardinal, Beacon Isolated Danger, Beacon Lateral, Beacon Safe Water, Beacon Special Purpose/General, Buoy Cardinal, [Buoy Emergency Wreck Marking](#), Buoy Installation, Buoy Isolated Danger, Buoy Lateral, Buoy Safe Water, Buoy Special Purpose/General, Daymark, Light Float, Light Vessel, Pile.

Feature	Mandatory Attributes
---------	----------------------

GEO FEATURES

Administration Area	jurisdiction
Archipelagic Sea Lane Area	nationality *
Archipelagic Sea Lane Axis	nationality *
Beacon Cardinal	beacon shape; category of cardinal mark; colour
Beacon Isolated Danger	beacon shape; colour
Beacon Lateral	beacon shape; category of lateral mark; colour
Beacon Safe Water	beacon shape; colour
Beacon Special Purpose/General	beacon shape; category of special purpose mark; colour
Berth	feature name
Bridge	over navigable water: category of bridge other cases: none
Buoy Cardinal	buoy shape; category of cardinal mark; colour
Buoy Emergency Wreck Marking	buoy shape; colour
Buoy Installation	buoy shape; colour

20.6 [Emergency wreck marking buoys](#)

IHO Definition: **BUOY, EMERGENCY WRECK MARKING**. 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).

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

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buoy shape	(BOYSHP)	1 : conical 2 : can 3 : spherical 4 : pillar	EN	1,1

is apparent from reference to a chart, Sailing Directions or Notice to Mariners.

12) [emergency wreck](#) marking

IHO Definition: A mark used to indicate the existence of a recent wreck.

Teh Stand Deleted: new danger

Teh Stand Deleted: ly identified new danger, such as a



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EDITION 1.1.0 APPROVED: REMOVAL OF ALLOWABLE FEATURE/GEOMETRY ENCODING COMBINATIONS

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Crane | P | S | Deleted: C

- Curve primitive removed as allowable geometric primitive for feature **Crane**.
 - Not an allowable geometric primitive for S-57 Object Class **CRANES**.
 - No use case identified.
 - Track along which a crane may run is encoded using **Railway**.

Foul Ground | P | S | Free Port Area | S | Deleted: C

- Curve primitive removed as allowable geometric primitive for feature **Foul Ground**.
 - Foul ground encoded in S-57 as **OBSTRN**. However no use case has been identified for curve primitive to be allowable for **Foul Ground** in S-101.

Information Area | P | S | Deleted: C

- Curve primitive removed as allowable geometric primitive for feature **Information Area**.
 - No use case identified.

Remarks:

- The feature **Information Area** encodes information which the Producing Authority determines is relevant to the mariner, but does not warrant the triggering of ECDIS alarms through the encoding of **Caution Area** features.
- If the information applies to a specific area the **Information Area** feature should cover only that area.

Distinction: Caution Area; Collision Regulations Limit; Obstruction; Underwater/Awash Rock; Unsurveyed Area; Wreck.

Feature/Feature associations: Updated Information: Text Association

Tch Stand Deleted: -#-If the information to be encoded is spatially linear, this should be encoded using a "very narrow" **Information Area** feature of type surface (approximately 0.3mm wide at the maximum display scale of the ENC data) similar to the method for encoding linear maritime jurisdiction areas (see clause 16.2).†



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EDITION 1.1.0 APPROVED: SEPARATION ZONE OR LINE

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Separation Zone or Line

C

S

15.19 Separation zone or line

IHO Definition: **SEPARATION ZONE OR LINE** "A zone or line separating the lanes in which ships are proceeding in opposite, or nearly opposite directions; or separating a traffic lane from an adjacent sea area, or separating traffic lanes designated for particular classes of ships proceeding in the same direction. (IHO Dictionary – S-32).

S-101 Geo Feature: Separation Zone or Line (TSELNE, TSEZNE)

Primitives: Curve, Surface

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
date end	(DATEND)		(S) TD	0,1 1
date start	(DATSTA)		(S) TD	0,1 1
status	(STATUS)	1 : permanent 3 : recommended 9 : mandatory 28 : buoyed	EN	0,*
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 1
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (WINFORM)		(S) TE	0,1 1

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: M 12, M 13, 20.1, 20.3, 21

15.19.1 Separation zones and lines (see S-4 – B-435.1 and B-435.3)

The feature **Separation Zone or Line** must be used to encode the **common boundary** of separation areas between two traffic lanes, or of one traffic lane and one inshore traffic zone, or to encode the centre part of a roundabout.

Remarks:

- No remarks.

Distinction: Traffic Separation Scheme Boundary; Traffic Separation Scheme Crossing; Traffic Separation Scheme Lane Part; Traffic Separation Scheme Roundabout.

Tah Stand Deleted: Traffic separation
20/09/22

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Tah Stand Deleted: Traffic Separation Line;

- S-57 features **TSEZNE** and **TSELNE** are identical except for geometry.
- S-32 defines single term “Separation Zone (or Line)”
 - Approved to amend to “Separation Zone or Line”.



IHO

EDITION 1.1.0 APPROVED: FLARE ANGLE -> FLARE BEARING

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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 align, for example, along a transit or leading line.

30.2 **flare bearing**

Flare **bearing**: IHO Definition: The **bearing** about which the light flare symbol is rotated to be displayed in ECDIS.

Attribute Type: Integer

Indication: Indicates the **bearing** of the light flare to be included in the data for ECDIS display purposes where different from the default. Required where there is more than one light encoded on an instance of point spatial geometry. The value encoded corresponds to a bearing away from the position of the light.

Unit: Degree (°)

Resolution: 1°

Format: xxx

Minimum value: 0

Maximum value: 359

Example: 270 for an flare **bearing** of 270 degrees away from the light

Remarks:

- The initial flare bearing is calculated by ENC production software systems.
- The attribute flare bearing may also be populated manually to cartographically align the light flare along, for example, a transit or leading line (noting that the in such cases the bearing to be encoded will be the reciprocal (+/- 180° of the bearing encoded for the navigational line).

Teh Stand
See [S-101 Documentation and FC GitHub issue #47](#) opened 29/09/22.

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Teh Stand
See [S-101 Documentation and FC GitHub issue #47](#) opened 29/09/22.

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Notes: YYYY = calendar year; MM = month; DD = day.
The dashes (-) indicating that the year, month or day is not needed must be included.

Encoded date ranges are inclusive, see S-100 Part 3, clause 3-8.3. For example:

fixed date range/date start = 20220922 Commences at 000000 hours on 22 September 2022
fixed date range/date end = 20221022 Ends at 240000 hours on 22 October 2022.
periodic date range/period start = ---09-- Commences annually at 000000 hours on 01 September.
fixed date range/date end = ---09-- Ends annually at 240000 hours on 30 September.

Where the temporal attributes have been encoded for any feature that is the structure component of a **Structure/Equipment** feature association (see clause 25.15), all other component features within the relationship must not extend beyond the temporal attribute values encoded for the structure feature.

2.4.8.1 Seasonal features

If it is required to show seasonality of features, it must be done using the attribute **status** = 5 (periodic/intermittent). If it is required to encode the start and/or end dates of the season, this must be done using the complex attribute **periodic date range** (see clauses 2.4.8 and 29.15).

Where there is a requirement to indicate the beginning or end date of a seasonal occurrence as the "last day in February", consideration must be given to allowing for the extra day (29th February) added on leap years. Encoding **periodic date range**, sub-attribute **date end** with the value `---0228` may result in erroneous indication of seasonality in the ECDIS on the 29th February for leap years, while encoding the value `---0229` may similarly result in ECDIS performance issues for non-leap years. Encoders are advised, therefore, that where it is required to encode the end of seasonality as the last day in February, this must be done, similar to any other month of the year, by encoding the value of periodic date range, sub-attribute date end as ---02--. Where the beginning of seasonality is the last day in February, this must be done by encoding the value of **periodic date range**, sub-attribute **date start** in accordance with the next occurrence of the date (`---0228` if the next occurrence is a non-leap year or `---0229` if the next occurrence is a leap year). The ENC dataset must be amended by ENC Update (see Section 31) where the date is required to be changed. For instance, if the value is `---0228` and the next occurrence is a leap year, an ENC Update must be created to amend the date to `--0229`.

Alternatively, if encoders consider that there is no regulatory requirement to update the **start date of a period** for leap years, the value of **date start** may be populated as `---03--`, indicating a beginning date of 01 March each year.



Teh Stand
See [S-101 Documentation and FC GitHub issue #40](#) opened 19/09/22.

27.77 date end (DATEND, PEREND, SUREND)

Date end: [IHO Definition](#): The latest date on which an object (for example a buoy) will be present.
Attribute Type: Truncated date
Indication: Dates should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific year, month and/or day is required/known, indication of the year, month and/or day is omitted, and replaced with dashes (-). See also clause 2.4.8.
Format: YYYYMMDD (full date, mandatory)
 YYYYMM-- (no specific day required – mandatory)
 YYYY---- (no specific month required – mandatory)
 ---MMDD (same day each year, mandatory)
 ---MM-- (same month each year, mandatory)
Example: 20101203 for 03 December 2010 at 240000 hours as ending date.
 ---02-- for 28 February at 240000 hours as ending date for non-leap years, and 29 February at 240000 hours as ending date for leap years.
Remarks:
 • The attribute date end indicates the latest date of an event or the end of a date range. This attribute is used to indicate the end of a fixed date range, the end of a periodic date range, or the removal or cancellation of a feature at a specific date in the future.



Teh Stand Deleted: Status



Teh Stand
See [S-101 Documentation and FC GitHub issue #40](#) opened 19/09/22.



Teh Stand Deleted: Encoders are advised, therefore, that where it is required to encode



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Teh Stand



IHO

DCEG SUB-GROUP APPROVED: SKIN OF THE EARTH – REMOVAL OF DOCK AREA AND LOCK BASIN

International Hydrographic Organization

8.18 Dock area

IHO Definition: DOCK AREA. An artificially enclosed area within which ships may moor and which may have gates to regulate water level. (S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.56, November 2000).				
S-101 Geo Feature: Dock Area (DOCARE)				
Primitives: Surface				
Real World	Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of dock	(CATDOC)	1: tidal 2: wet dock	EN	0..1
condition	(CONDTN)	1: under construction 2: ruined 3: under reclamation 5: planned construction	EN	0..1
feature name			C	0..*
display name			(S) BO	0..1
language		ISO 639-2/T	(S) TE	0..1
name	(OBJNAM) (NOBJNM)		(S) TE	1..1
fixed date range		See clause 2.4.6	C	0..1
__date end	(DATEND)		(S) ID	0..1..†
__date start	(DATSTA)		(S) ID	0..1..†
periodic date range		See clause 2.4.6	C	0..*
__date end	(PEREND)		(S) ID	1..1
__date start	(PERSTA)		(S) ID	1..1
horizontal clearance fixed			C	0..1
horizontal clearance value	(HORCLR)		(S) RE	1..1
horizontal distance uncertainty	(HORACC)		(S) RE	0..1
horizontal clearance length			RE	0..1
horizontal clearance width			RE	0..1
maximum permitted draught			RE	0..1
status	(STATUS)	1: permanent 4: not in use 6: reserved 8: private 14: public	EN	0..*
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
information		See clause 2.4.6	C	0..*

2.5.1.1 Skin of the Earth

Each area covered by a meta-feature **Data Coverage** must be totally covered by a set of geo features of geometric primitive type surface that do not overlap each other (the Skin of the Earth). Feature types that comprise the Skin of the Earth are listed below:

- Depth Area
- Dredged Area
- Land Area
- Unsurveyed Area

The geometry of coincident boundaries between Skin of the Earth features in a dataset must not be duplicated.

8.20 Locks

IHO Definition: LOCK BASIN. A wet dock in a waterway, permitting a ship to pass from one level to another. (IHO Dictionary – S-32).				
S-101 Geo Feature: Lock Basin (LOKBSN)				
Primitives: 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	(OBJNAM) (NOBJNM)		(S) TE	1..1
fixed date range		See clause 2.4.6	C	0..1
__date end	(DATEND)		(S) ID	0..1..†
__date start	(DATSTA)		(S) ID	0..1..†
periodic date range		See clause 2.4.6	C	0..*
__date end	(PEREND)		(S) ID	1..1
__date start	(PERSTA)		(S) ID	1..1
horizontal clearance fixed			C	0..1
horizontal clearance value	(HORCLR)		(S) RE	1..1
horizontal distance uncertainty	(HORACC)		(S) RE	0..1
horizontal length	(HORLEN)		RE	0..1
horizontal width	(HORWID)		RE	0..1
status	(STATUS)	1: permanent 4: not in use 6: reserved 8: private 13: historic 14: public 16: watched 17: unwatched	EN	0..*
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
information		See clause 2.4.6	C	0..*

† 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: F 27, 28

8.18.1 Tidal and non-tidal basins (see S-4 – B-326.3-4)

If it is required to encode a non-navigable dock area, it must be done using the feature Dock Area.

Remarks:

- If the dock is navigable at the maximum display scale of the ENC data, it must be encoded using the features Depth Area, Dredged Area or Unsurveyed Area (see clause 11.7.4), and the geo features making up the dock limits must be encoded using appropriate features such as Coastline, Shoreline Construction or Gate. The dock must not be encoded as Dock Area. If it is required to encode the name of the dock, it must be done using the feature Sea Area/Named Water Area.
- If it is required to encode a dock which is not navigable at the maximum display scale of the ENC data, it must be done using the feature Dock Area, covered by a Land Area or Unsurveyed Area feature. The name of the dock should be encoded using the complex attribute feature name on the Dock Area. The boundary of a dock must not be encoded as a separate feature (for example Coastline, Shoreline Construction), except for the gate feature (Gate) for a wet dock, which may be encoded.
- The complex attribute horizontal clearance fixed is used to encode the size of the entrance to the dock area, where required.
- The attributes horizontal clearance length and horizontal clearance width are used to encode the regulatory length and width of the navigable part of the dock area as declared by a competent authority, where known.

Teh Stand Deleted: Refer to S-101 Documentation and FC issue #38

Teh Stand Deleted: Dock Area features are part of the Skin of the Earth. If an encoded Dock Area has a date dependency, this should be indicated using the complex attribute information (see clause 2.4.6). For example: sub-attribute text = Start date: 01 April; End date: 15 October.



IHO

EDITION 1.1.0 APPROVED: UPDATE INFORMATION

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3.11 Update information

IHO Definition: UPDATE INFORMATION. The Update Information metadata feature is used to represent a change to the information shown.

S-101 Metadata Feature: Update Information

Primitives: Point, Curve, Surface

Real World	Paper Chart Symbol	ECDIS Symbol
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
update description			C	1..*
language		ISO 639-2/T	(S) TE	0..1
text			(S) TE	1..1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0..1
source			TE	0..1
information		See clause 2.4.6	C	0..*
file locator			(S) TE	0..1
file reference	(DXTRSC) (DYXTRD)		(S) TE	0..1..1
headline			(S) TE	0..1
language		ISO 639-2/T	(S) TE	0..1
text	(INFORM) (INFORM)		(S) TE	0..1..1

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

INT 1 Reference:

3.11.1 Update Information

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 SENC 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. **Update information** may be associated with features **(inf)** have changed using the association **Updated Information** (see clause 25.19).

Remarks:

- The mandatory attribute **update description** must be used to provide a brief textual description of the changes to the dataset 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 2.4.6).
- 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

Teh Stand
26/05/22: T-Calls: DCEG section 3.11 Update Information remark was stated that Additional Information about the update can be associated to Nautical Information however the DCEG and PC does not include the association between UpdateInformation and Nautical Information.
Session 25.1 Additional Information does not use Update Information or being associated to Nautical Information. Include optional association between Update Information and Nautical Information.
26/05/22: DCEG 3.11 Update Information does not describe whether/how Update Information can be used to describe changes to Information type content. Include optional association between Update Information and Nautical Information.
26/05/22: Update Information feature has no means of indicating the update number it was made for as a data start for when it was issued. Consider adding 'Metadata' to Update Information feature.
Refer to 2.101 Recommendation and PC issue #11 - closed 27/05/22.

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Deleted: which

Teh Stand
Deleted: an associated instance of

Teh Stand
Deleted: information type Nautical Information (see clause 24.4).

Update Information - detailed description

DCEG Clause: 3.11

Points to Note:

- Proposal is to add the information complex attribute to UpdateInformation to enable encoding of additional information relevant to an ENC Update(s) (consistent with changes made for geo features in Edition 1.2.0).
- Additionally, new guidance has been included to require an instance of UpdateInformation related to a change to an information type to be associated with the geo features to which the information type is referenced.
- Note Christian approval of the changes, with suggestion that the "should" is changed to "must" in the new bullet. Also suggestion that examples/use cases are included.

Discussion/Decision:

- The proposal to add the information complex attribute to the UpdateInformation meta feature was approved for S-101 Edition 1.1.0.
- The proposal to include guidance that updates related only to an information type should require the UpdateInformation to be associated only to the geo feature that the information type is associated with was approved for S-101 Edition 1.1.0.
- Concerns were raised as to how the modelling is intended to work in regard to optimizing portrayal and indications in ECDIS. It was agreed that in moving forward it should be assumed that the implementation of the UpdateInformation feature in S-101 would replace the current S-57/S-52 system implementation (it was noted that the IMO ECDIS Performance Standards only state that the indication of changes applied in an ENC Update are to be made visible (highlighted) to the mariner on request – how this is done is not specified).
- The suggestion was made that a mechanism could be provided for the data producer to indicate those updates that are minor in nature and do not impact on safety of navigation (and therefore are not highlighted on request). There was concern that this could be erroneously applied.

Action:

- Keep Issue open for contributors to include additional comments/observations and as a mechanism for posting/discussing further development of UpdateInformation (All). **[Ongoing]**
- Report to the S-101PT that the intention for further development of the UpdateInformation meta feature is that it is to replace the current S-57/S-52 system implementation for highlighting ENC Updates (IHO Sec).



IHO

EDITION 1.1.0 APPROVED: VALUE OF LOCAL MAGNETIC ANOMALY

International Hydrographic Organization

value of local magnetic anomaly			C	1,2
magnetic anomaly value	(VALLMA)		(S) RE	1,1
reference direction		5 : east 13 : west	(S) EN	0,1

Teh Stand Deleted: anomaly value maximum < anomaly value minimum† (+/- minutes)

Teh Stand Deleted: magnetic anomaly value minimum

† Where there are two instances of the complex attribute value of local magnetic anomaly, the sub-attribute reference direction is mandatory for each instance.

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

INT 1 Reference: B 82.1-2

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

If it is required to encode an abnormality in magnetic variation for a localised area, it must be done using the feature Local Magnetic Anomaly.

If the area cannot be defined, the feature should be represented as a point.

Remarks:

- If it is required to indicate a local magnetic anomaly that is the same magnitude for both east and west, a single instance of the mandatory ~~Where the mandatory~~ complex attribute value of local magnetic anomaly contains a value in the sub-attribute magnetic anomaly value maximum only, the deviation is assumed to be positive and negative by that amount. ~~Where the positive and negative values for the local magnetic anomaly differ, the positive value must be populated in anomaly value maximum, and the negative value in the sub-attribute magnetic anomaly value minimum. The plus/minus character must not~~ must be encoded, with the value of the anomaly populated in the mandatory sub-attribute magnetic anomaly value. ~~The sub-attribute reference direction must not be encoded in this case.~~
- If it is required to indicate a local magnetic anomaly that is in a single direction, a single instance of value of local magnetic anomaly must be encoded, with the value of the anomaly populated in magnetic anomaly value and the direction encoded using the sub-attribute reference direction.
- If it is required to indicate a local magnetic anomaly that is of a different magnitude for east and west, two instances of value of local magnetic anomaly must be encoded, with the values of the anomaly and the direction populated for each instance in magnetic anomaly value and reference direction respectively.
- If the value of the local magnetic anomaly is unknown, a single instance of value of local magnetic anomaly must be encoded, with magnetic anomaly value populated with an empty (null) value and the complex attribute information containing textual information relevant to the local magnetic variation.
- Abnormal magnetic variation should not be encoded unless it varies by more than about 3° from the normal magnetic variation (see clause 4.1) for the area.

Distinction: Magnetic Variation.

Note amendments of resolution from minutes to degrees (DCEG SG 4 meeting).

27.121 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: 3

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.

27.141 reference direction

Reference direction: IHO Definition: A direction used as a basis for comparison of other directions. (IHO Hydrographic Dictionary – S-32).

Attribute Type: Enumeration

5) east

13) west

Remarks:

- No remarks.

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Teh Stand Deleted: minute

Teh Stand Deleted: minute

Teh Stand Deleted: minute

Teh Stand Deleted: x

Teh Stand Deleted: 30.3

Teh Stand Deleted: 30.3

Teh Stand Deleted: minutes

Teh Stand NOTE: I have chosen not to include the definitions, which are bearing sectors related to the compass being broken up into 16 segments.



6.11 Pylon/bridge support

IHO Definition: **PYLON/BRIDGE SUPPORT.** A vertical construction consisting, for example, of a steel framework or pre-stressed concrete to carry cables, a bridge, etc. (S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.125, November 2000).

S-101 Geo Feature: Pylon/Bridge Support (PYLONS)

Primitives: Point, Surface

Real World

Paper Chart Symbol

ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of pylon	(CATPYL)	1 : power transmission pylon/pole 2 : telephone/telegraph pylon/pole 3 : aerial cableway pylon 4 : bridge pylon/tower 5 : bridge pier 6 : pipeline pylon	EN	1,1

the attributes **category of pipe** and **product** must not be encoded.

- Where a pipeline has radar reflectors at known positions, they must be encoded as separate **Radar Reflector** features (see clause 20.17). If the whole pipeline is radar conspicuous, the maximum display scale for the ENC data is too small to show individual reflectors, or the positions of the radar reflectors are not known, the **Pipeline Overhead** should be encoded with attribute **radar conspicuous**.
- [In navigable water, overhead pipeline supports must be encoded, where possible, using a Pylon/Bridge Support feature \(see clause 6.11\), with attribute category of pylon = 6 \(pipeline pylon\).](#)
- If available and considered important for route planning and/or monitoring, the vertical uncertainty associated with encoded vertical clearance values should also be encoded.



IHO

EDITION 1.1.0 APPROVED: BERTHS

International Hydrographic Organization

Proposal to re-define the term "Berth" (Jonathan – refer to Paper submitted to the meeting):

DCEG Clause: 8.13

Discussion/Action:

- Proposal is to redefine the term "Berth" in the IHO GI Registry and IHO Hydrographic Dictionary (and consequently in S-101) so as to harmonize with common usage by IMO, other organizations, and industry groups.
- The proposal was generally supported, however the Sub-Group agreed to "endorse" the proposal rather than "approve", as approval is at the discretion of the Register Domain Control Body.
- It was suggested that, due to the change in definition, the modelling for berths and berth-type features in general in S-101 may need a future review.

Action:

- Clarification proposal to be submitted to the Concept Register proposing to amend the definition of the term "Berth" in accordance with the recommendation in the Paper (Raphael). **[Complete]**
- Register Manager to acknowledge the endorsement of the proposal by the DCEG Sub-Group when processing the Registry proposal and submitting to the Register Domain Control Body (IHO Sec). **[Complete]**
- Amend DCEG clause 8.13 to reflect the revised definition [NOTE: This amendment is made in anticipation of approval of the revised definition by the Register Domain Control Body and implementation in the Data Dictionary Register] (IHO Sec). **[Complete]**

27.123. minimum berth depth (DRVAL1)

Minimum berth depth: IHO Definition: The least depth of the body of water at the berth or in a berth pocket adjacent to the berth. (IHO Nautical Information Provision Working Group, 2022).

Attribute Type: Real

Unit: Metre (m)

Resolution: 0.1m

Format: xx.x

Example: 14.6 for a minimum berth depth of 14.6 metres

Remarks:

- No remarks.

Teh Stand
Note proposal to the Concept Register (for 5-131) for new concept Minimum Berth Depth. Consider that, if approved, this should replace depth range minimum value. Refer to 5-101 Documentation and FC issue #39.

8.13 Berth

IHO Definition: BERTH. A place, generally named or numbered, where a vessel may moor or anchor. (IHO Dictionary – S-32).

S-101 Geo Feature: Berth (BERTHS)

Primitives: Point, Curve, Surface

Real World	Paper Chart Symbol	ECDIS Symbol

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
feature name			C	1,*
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 †
horizontal clearance length			RE	0,1
horizontal clearance width			RE	0,1
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1
<u>minimum berth depth</u>	<u>(DRVAL1)</u>		<u>RE</u>	<u>0,1</u>
periodic date range		See clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1

Teh Stand Deleted: Place

Teh Stand Deleted: in which a ship is moored at wharf

Teh Stand Deleted: depth range minimum value

Teh Stand
Note proposal to the Concept Register (for 5-131) for new concept Minimum Berth Depth. Consider that, if approved, this should replace depth range minimum value. Refer to 5-101 Documentation and FC issue #39.



11.3.1 Soundings (see S-4 – B-412 and B-413.1)

A sounding associated with a rock or coral pinnacle which is an obstruction to navigation must be encoded using the feature **Underwater/Awash Rock** (INT1 – K14, see clause 13.4) with attribute **value of sounding** populated with the value of the sounding.

The geometry of soundings and no bottom found depths (see clause 11.8) is held in a 3 dimensional array (latitude, longitude, depth). In the interests of efficiency, multiple soundings should be encoded in one spatial type (known as “grouping” of soundings), provided that all the spatial and geo feature attributes are common to the group.

As the sounding multiplication factor (CMFZ) for ENC is 10, soundings may be encoded to one decimal place of a metre. Drying soundings must be indicated by a negative value.

For soundings surrounded by a danger line, see clauses 13.1 and 13.2.

Population of the attributes **quality of vertical measurement**, **source date** and the spatial attribute **quality of horizontal measurement** are described in the Table below:

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Teh Stand Deleted: two

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11.8.1 No bottom found depths (see S-4 – B-412.3)

If it is required to encode a depth at a point at which it is indicated as having no bottom found at the value shown, it must be done using the feature **Depth – No Bottom Found**.

The geometry of soundings (see clause 11.3.1) and no bottom found depths is held in a 3 dimensional array (latitude, longitude, depth). In the interests of efficiency, multiple no bottom found depths should be encoded in one spatial type, provided that all the spatial and geo feature attributes are common to the group.

Even though the sounding multiplication factor (CMFZ) for ENC is ~~10~~, no bottom found depths must be encoded to a whole metre value.

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

INT 1 Reference: [C 32](#), K 1, 31, 40-43, 46; L 21, 23; Q 42

13.6.1 Obstructions and foul areas (see S-4 – [B-312.4](#), B-327.5, B-420.1, B-422.8-9, B-431.6, B-445.1, B-447.5 and B-447.7)

If it is required to encode [features considered to be an obstruction or hazard to surface navigation that cannot be encoded using any other S-101 specific feature \(for example Underwater Rock, Wreck\)](#), it must be done using the feature **Obstruction**.

Population of the attributes **quality of vertical measurement**, **technique of vertical measurement** and **water level effect** are described in Table 13.4 below.

In the following Table, the symbol 'f' indicates that this attribute is not relevant for the obstruction instance and therefore must not be encoded. A blank indicates that the encoder may choose a relevant value for the attribute.

28/09/22.

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Deleted: snags, stumps, wellheads, diffusers, cribs, fish havens, foul areas, booms, ice booms, sites of cleared platforms, ground tackle, wave energy devices, underwater turbines, subsurface ocean data acquisition systems, artificial reefs, or active submarine volcanos...

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Deleted: (except rocks, wrecks, fishing facilities and marine farms (see clauses 13.4, 13.5, 13.9 and 13.10)...

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Deleted:)

- Active submarine volcanos can be a significant navigational hazard; and harmful concentrations of volcanic gases emanating from active submarine volcanos can cover an extensive area (see S-4 – clause B-428.4). If it is required to encode an active submarine volcano, it must be done using an **Obstruction**

feature [of type point](#), with attributes **category of obstruction** = 21 (active submarine volcano), **exposition of sounding** = 2 (shoaler than the range of depth of the surrounding depth area) and **quality of vertical measurement** = 2 (depth or least depth unknown). To indicate the unpredictable nature of the volcano (it may be periodically submerged or extend above the surface), the mandatory attributes **value of sounding** and **water level effect** must be populated with an empty (null) value. In order to raise the level of indication of the hazard in the ECDIS to the mariner so as to generate an alarm, a small **Depth Area** feature having attribute **depth range minimum value** = 0 may also be encoded. The area that can be potentially covered by harmful volcanic gases, which may cover an area of up to 10 NM from the volcano, should be encoded using a **Caution Area** feature (see clause 16.10), having the complex attribute **information** (see clause 2.4.6), sub-attributes **text** = *Volcanic activity* and **file reference** carrying a reference to an appropriate cautionary note similar to:



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Refer to [S-101 Postscriptal GitHub issue #71](#), New [S-101 Documentation and FC issue #32](#) opened 21/09/22.

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IHO

EDITION 1.1.0 APPROVED: OFFSHORE PRODUCTION AREA – ADDITION OF WATER LEVEL EFFECT

International Hydrographic Organization

14.6 Offshore production area

IHO Definition: **OFFSHORE PRODUCTION AREA.** An area at sea within which there are production facilities. (S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.113, November 2000).

S-101 Geo Feature: Offshore Production Area (OSPARE)

Primitives: Surface

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of offshore production area		1 : wind farm 2 : wave farm 3 : current farm 4 : tank farm 5 : seabed material extraction area 6 : solar farm	EN	0,1
condition	(CONDTN)	1 : under construction 2 : ruined 4 : wingless 5 : planned construction	EN	0,1

visual prominence	(CONVIS)	1 : visually conspicuous 2 : not visually conspicuous 3 : prominent	EN	0,1
<u>water level effect</u>	<u>(WATLEV)</u>	<u>2 : always dry</u> <u>3 : always under water/ submerged</u> <u>4 : covers and uncovers</u> <u>7 : floating</u>	<u>EN</u>	<u>0,1</u>
scale minimum	(SCAMIN)	See clause 2.5.9	IN	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 †



Teh Stand

Note that offshore wind turbines may be fixed or floating. Wave and current turbines may be always submerged(?). Consider adding attribute water level effect to feature Offshore Production Area.
IHO Sec: Consider that this may be relevant information at smaller scales where the individual structures within the production area may not be encoded.

Refer to [S-101 Documentation and FC issue #44](#) opened 28/09/22.

NOTE: Values listed need to be discussed/confirmed.



IHO

EDITION 1.1.0 APPROVED: SPOIL GROUNDS

International
Hydrographic
Organization

- Disused dumping grounds for harmful materials are considered dangerous for an indefinite period and must therefore be encoded on the largest maximum display scale ENC datasets, with attribute **status** = 4 (not in use). The date when the area ceased to be used may be populated using the attribute **date disused**, if known.

16.6.2 Spoil grounds, dredging areas (see S-4 – B-446)

Spoil grounds are areas set aside, clear of shipping channels and in deep water where possible, for the disposal of material (spoil) generally obtained by dredging. Their significance to the mariner is that very large quantities of material may be dumped, decreasing the depth of water available. Where possible, charts should be updated in a timely manner so as to include the latest survey information covering the spoil ground.

Extraction (or dredging) areas are those areas where a concentration of dredging vessels may be encountered, taking up sand or shingle to be brought ashore (for example for construction purposes). Their significance is primarily as a collision hazard, although they also indicate the likelihood of finding a greater depth of water than charted. Channels dredged to provide an adequate depth of water for navigation are "dredged areas", not to be confused with "dredging areas".

If it is required to encode a spoil ground, it must be done using a **Dumping Ground** feature, with attribute **category of dumping ground** = 5 (spoil ground).

If it is required to encode a dredging area, it must be done using a **Restricted Area Navigational** feature (see clause 17.8) or **Restricted Area Regulatory** feature (see clause 17.9), with attribute **category of restricted area** = 21 (dredging area). An area in which seabed material (for example sand, shingle) is being extracted for

purposes such as construction must be encoded, where required, using the feature **Offshore Production Area** (see clause 14.6), with attribute **category of production area** = 13 (seabed material extraction area).

Remarks:

- Within a spoil ground, if the depths within the area are liable to be very much less than charted after the discharge of spoil and post-dumping surveys are not available, they may be treated as unsurveyed areas (see clause 11.10), in which case soundings and depth contours may be omitted from the area. Alternatively, an indication of the discrepancy between charted depth information and the actual depths within the spoil ground may be provided by downgrading the information included in the underlying Quality of Bathymetric Data feature (see clause 3.7).

Distinction: Dredged Area.



Teh Stand

Refer to [S-101 Portrayal GitHub issue #44](#), New [S-101 Documentation and FC issue #33](#) opened 21/09/22.

Teh Stand September 21, 2022

Deleted: <#>Within a spoil ground; if the depths within the area are liable to be very much less than charted after the discharge of spoil, they may be treated as unsurveyed areas (see clause 11.10), in which case soundings and depth contours may be omitted from the area.¶



IHO

EDITION 1.1.0 APPROVED: TOPMARKS/DAYMARKS

International
Hydrographic
Organization

18 Geo Features – Aids to Navigation – Overview

18.1 Geo features forming parts of navigational aids

Aids to navigation are composed of fixed or floating structure features established specifically as an aid to navigation, which may carry equipment features.

When identifying relationships (associations) between aids to navigation and associated geo features within this document, three "base classes" are used to define the aids to navigation geo features included in the relevant association. These "base classes" are:

Remarks:

- Structures that have not been established specifically as an aid to navigation may also carry aids to navigation as equipment features. These include **Bridge, Building, Cable Overhead, Conveyor, Crane, Floating Dock, Fortified Structure, Fishing Facility, Hulk, Landmark, Mooring/Warping Facility, Offshore Platform, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Obstruction, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Wind Turbine, Wreck**. If it is required to encode such supporting structures at the same location as an equipment feature, it must 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). 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).



Teh Stand October 12, 2022

Refer to [S-101 Documentation and FC issue #48](#) opened 30/09/22.

Reply Rescue

- However, additional changes applied for Edition 1.2.0 (included in a future slide).



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 optimise text positioning in ECDIS.

S-101 Cartographic Feature: Text Placement

Primitives: Point

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
orientation value			RE	1,1
text			TE	0,1 †
text offset mm			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:

23.1.1 Text placement

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



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See [S-101 Documentation and FC GitHub issue #7](#).

Markup A

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Deleted: [NOTE: This modelling for the **Text Placement** cartographic feature is intended for implementation and testing purposes only. Complete implementation of this modelling is dependant on pending amendments to S-100 Part 9 to be included in S-100 Edition 5.0.0.]

- The data modelling for the TextPlacement cartographic feature remains a complex ongoing issue ([S-101 Documentation and FC #7](#)).



IHO

EDITION 1.2.0 APPROVED: TERMS AND DEFINITIONS (CORRECTION)

International Hydrographic Organization

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

1.3 Terms, definitions and abbreviations

1.3.1 Terms and definitions

[See S-101 Product Specification Main document clause 1.3.2.](#)

1.3.2 Abbreviations

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

S-101 Annex A

Xxxx 202X

Edition 1.2.0

Teh Stand

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

NOTE: → A test result can be from an observation or measurement

aggregation
special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component part (see [composition](#))

alarm
a high-priority alert. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship

association
semantic relationship between two or more classifiers that specifies connections among their instances

1.3.2 Terms and definitions

Accuracy

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

Aggregation

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

Alarm

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

Alert

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

Application Schema

Conceptual schema for data required by one or more applications.

Association

Semantic relationship between two or more classifiers that specifies connections among their **instances**.

NOTE: A binary association is an association among exactly two classifiers (including the possibility of an association from a classifier to itself)

Attribute

(1) Named property of an entity.

NOTE: Describes a geometrical, topological, thematic, or other characteristic of an entity.

(2) Feature within a classifier that describes a range of values that **instances** of the classifier may hold.

NOTE: An attribute is semantically equivalent to a composition association; however, the intent and usage is normally different.

NOTE: "Feature" used in this definition is the UML meaning of the term.

2 Data Classification and Encoding Guide

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



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

8.3 Hulks

IHO Definition: HULK. The hull of a wrecked or condemned ship, from which the fittings and superstructure have usually been removed, which is moored in a permanent position or grounded. It may be abandoned or put to some other use. (Adapted from IHO Dictionary – S-32).				
S-101 Geo Feature: Hulk (HULKES)				
Primitives: Point, Surface				
<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 hulk	(CATHLK)	1 : floating restaurant 2 : historic ship 3 : floating museum 4 : floating accommodation 5 : floating breakwater 6 : casino 7 : training vessel	EN	0,*

⋮

name	(OBJNAM) (NOBJNM)		(S) TE	1,1
fixed date range		See clause 2.4.8	C	0,1
date end	(DATEND)		(S) ID	0,1 †
date start	(DATSTA)		(S) ID	0,1 †
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
periodic date range		See clause 2.4.8	C	0,*
date end	(PEREND)		(S) ID	1,1
date start	(PERSTA)		(S) ID	1,1
radar conspicuous	(CONRAD)		BO	0,1



IHO

EDITION 1.2.0 APPROVED: TYPES OF LIGHTS (ENHANCEMENT)

International
Hydrographic
Organization

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

Table 19.2 - Special types of lights

Jeff Wootton
Formatted Table



Teh Stand
See [S-101 Documentation](#) and [FC GitHub issue #58](#).



IHO

EDITION 1.2.0 APPROVED: VIRTUAL AIS AID TO NAVIGATION TYPE (CORRECTION)

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

27.190 virtual AIS aid to navigation type

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

Attribute Type: Enumeration

- 1) north cardinal
IHO Definition: Indicates that it should be passed to the north side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).
- 2) east cardinal
IHO Definition: Indicates that it should be passed to the east side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).
- 3) south cardinal
IHO Definition: Indicates that it should be passed to the south side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).
- 4) west cardinal
IHO Definition: Indicates that it should be passed to the west side of the aid. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.18, November 2000).
- 5) port lateral (IALA A)
IHO Definition: Indicates the port boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA A system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).
- 6) starboard lateral (IALA A)
IHO Definition: Indicates the starboard boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA A system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).
- 7) port lateral (IALA B)
IHO Definition: Indicates the port boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA B system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).
- 8) starboard lateral (IALA B)
IHO Definition: Indicates the starboard boundary of a navigational channel or suggested route when proceeding in the "conventional direction of buoyage" in the IALA B system. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.47, November 2000).

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

Jeff Wootton Deleted: preferred channel to starboard

Jeff Wootton Deleted: . (

Jeff Wootton Deleted: . (

Jeff Wootton Deleted: preferred channel to port

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

Jeff Wootton Deleted: preferred channel to starboard

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



IHO

EDITION 1.2.0 APPROVED: DQWG REVIEW – CONSISTENCY BETWEEN DCEG AND FEATURE CATALOGUE EDITION 1.1.0 (CORRECTIONS)

International Hydrographic Organization

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

• Category of Radio Station

The part underlined in yellow is missing in the FC.

27.52 category of radio station (CATROS)

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

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

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

Category of Radio Station	Differential GNSS	a radiobeacon transmitting dgps correction signals.	a radio station intended to determine only the direction of other stations by means of transmission from the latter.	Have applied changes in both the DCEG and GI Registry to have definition consistent with IHO Hydrographic Dictionary definition.
Concept Details				
Name	Differential GNSS			
Alias				
CamelCase	differentialGNSS			
Definition	Differential GNSS is implemented by placing a GNSS monitor receiver at a precisely known location. Instead of computing a navigation fix, the monitor determines the range error to every GNSS satellite it can track. These ranging errors are then transmitted to local users where they are applied as corrections before computing the navigation result.			
Reference	http://iho-ohi.net/S32/eng/view.php?quick_filter=differential+GPS&quick_filter_operator=Contains			
Reference Source	Hydrographic Dictionary, Part I Volume I, English (Detail view)			
Similarity to Source	Generalization			
Remarks				

27.52 category of radio station (CATROS)

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

Attribute Type: Enumeration

5) radio direction-finding station

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

10) differential GNSS

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

11) Toran

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

14) Chaika

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

19) radio telephone station

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

20) AIS base station

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

Remarks:

- A radiobeacon is a radio transmitter which emits a distinctive or characteristic signal on which a bearing

may be taken.

are proposed to also register. IHO Sec: Support removing value 5 and adding new value 27; however requires a proposal that includes a definition for the new value. Note also that if this change is approved, clause 21.4.2 will also need to be amended.

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

Teh Stand DQWG Cross-Checks of 5-101 Ed 1.1.0 FC with DCEG (Attributes) - email from Hugo 08/03/23. Have proposed an amendment to the IHO Hydrographic Dictionary name and definition for “Differential GPS” to provide consistency.

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

Teh Stand DQWG Cross-Checks of 5-101 Ed 1.1.0 FC with DCEG (Attributes) - email from Hugo 08/03/23.

Teh Stand Deleted: No remarks.

EDITION 1.2.0 APPROVED: „LINEAR“ MARITIME JURISDICTION AREAS (ENHANCEMENT)

Summary of Substantive Changes in Edition 1.2.0

Bold references in the Clauses Affected column indicate the principle sections/clauses that are impacted by the described change.

Change Summary	Clauses Affected
Feature and Attribute clause headings standardized throughout for consistency with the FC/GI Registry.	Entire
Terms and definitions replaced with reference to corresponding Clause (1.3.2) in the S-101 Main document.	1.3.1
Moved former clause 2.3 "Information Types" to clause 2.2 (former clause 2.2 "Geometric primitives" renumbered to clause 2.3).	2.2, 2.3
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, 10.8, 16.12, 16.13, 16.15, 16.23

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**

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
in dispute			BO	0,1
jurisdiction	(JRSDTN)	1 : international 2 : national 3 : national sub-division	EN	1,1
feature name			C	0,*
display name			(S) BO	0,1
language		ISO 639-2/T	(S) TE	0,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
nationality	(NATION)		TE	0,*

16.8.1 International and national territories (see S-4 – B-440.1 and B-440.3)

International maritime boundaries are those which have been established by agreement between adjacent or opposite States. Boundaries are sometimes negotiated on the basis of the equidistance or "median" line principle. For various reasons, however, agreed boundaries even when negotiated on this principle are seldom true median lines.

Navigationally, international boundaries may vary in their significance over different parts of their lengths. Inshore, they may represent the delimitation of Territorial Seas of two states or "internal waters", (for example within bay closing lines or straight baseline systems). Offshore, they may represent Exclusive Economic Zone and/or Continental Shelf boundaries.

If it is required to encode a named international or national territory, it must be done using the feature **Administration Area.**

Remarks:

- 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.**

Distinction: Contiguous Zone; Continental Shelf Area; Exclusive Economic Zone; Fishery Zone; Land Region; Territorial Sea Area; Vessel Traffic Service Area.

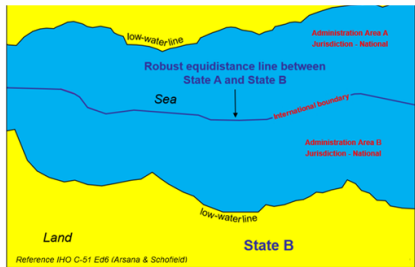


Figure 16-2 – Maritime jurisdiction areas in constrained waters

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 2.2 "defining features permitted for use in EN" 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 extending seaward from the low water line should be encoded as an Administration Area feature of type curve (see clause 16.8).

In the Table, abbreviations are as follows: point (P), pointset (A), curve (C) and surface (S). A feature that may have no geometric primitive is annotated as none (N).

GEO FEATURES

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

Tab Stand Deleted: 1
Tab Stand Deleted: 2
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Tab Stand Deleted: many of the

Tab Stand



IHO

EDITION 1.2.0 APPROVED: NEW FEATURE MOORING BUOY

International Hydrographic Organization

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	(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 †
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

Teh Stand
Re-modelling of mooring buoys. See paper S-100/WG10-07.5, Actions S-101PT10-19 and S-101 Documentation and FC QdHub Issue #61.

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..*
file locator			(S) TE	0..1
file reference	(TXTDSC) (INTXDS)		(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 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 p** 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 moor True**.

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

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

Feature/Information associations: Additional Information

Spatial/Information association: Spatial Association

category of small craft facility	(CATSCF)	1 : visitors berth 2 : nautical club 3 : boat hoist 4 : sailmaker 5 : boatyard 6 : public inn 7 : restaurant 8 : chandler 9 : provisions 10 : doctor 11 : pharmacy 12 : water tap 13 : fuel station 14 : electricity outlet 15 : bottle gas 16 : showers 17 : launderette 18 : public toilets 19 : post box 20 : public telephone 21 : refuse bin 22 : car park 23 : parking for boats and trailers 24 : caravan site 25 : camping site 26 : sewage pump-out station 27 : emergency telephone 28 : landing/launching place for boats 29 : scrubbing berth 30 : picnic area 31 : mechanics workshop 32 : guard and/or security	EN	1..*
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Teh Stand Deleted: 29 : visitors mooring†

To be discussed at S-101PT11

27.39 category of mooring/warping facility (CATMOR)

IHO Definition: **CATEGORY OF MOORING/WARPING FACILITY**. A place or structure to which a vessel can be secured.

Attribute Type: Enumeration

- dolphin**
IHO Definition: 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. (Adapted from IHO Dictionary – S-32).
- deviation dolphin**
IHO Definition: A post or group of posts, which a vessel may swing around for compass adjustment. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- bollard**
IHO Definition: Small shaped post, mounted on a wharf or dolphin used to secure ship's lines. (IHO Dictionary – S-32).
- tie-up wall**
IHO Definition: A section of wall designated for tying-up vessels awaiting transit. Bollards and mooring devices are available for both large and small ships. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- post or pile**
IHO Definition: A long heavy timber or section of steel, wood, concrete, etc., forced into the seabed to serve as a mooring facility. (Adapted from IHO Dictionary – S-32.)

Remarks:
• No remarks.

Teh Stand Deleted: Category of mooring/warping facility.

Teh Stand
See paper S-100/WG10-07.5, Actions S-101PT10-17 and S-101PT10-17, and S-101 Documentation and FC QdHub Issue #61 and #64.

Teh Stand Deleted: ~~mooring cable~~
IHO Definition: A chain or very strong fibre or wire rope used to anchor or moor vessels or buoys. (IHO Dictionary – S-32)†
~~mooring buoy~~
IHO Definition: 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)†



IHO

EDITION 1.2.0 APPROVED: REMODELLING OF BRIDGE FEATURE

International Hydrographic Organization

6.5 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

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>
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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 : sailing bridge 4 : lifting bridge 5 : bascule bridge 6 : pontoon bridge 7 : drawbridge	EN	0,1 †
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 †
condition	(CONDTN)	1 : under construction 2 : ruined 5 : planned construction	EN	0,1
feature name			C	0,*
display name			(S) BO	0,1
language		ISO 639-2/T	(S) TE	0,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1

Teh Stand
Modelling for feature Bridge revised. See Paper S-101PT10-07.6 and Annex S-101PT10-14.

Teh Stand Deleted: 1 : fixed bridge†
2 : opening bridge†

Teh Stand Deleted: 8 : transporter bridge†
9 : footbridge†
10 : viaduct†
11 : aqueduct†
12 : suspension bridge

Attribute categoryOfBridge removed

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 †
height	(HEIGHT)		RE	0,1
nature of construction	(NATCON)	1 : masonry 2 : concreted 6 : wooden 7 : metal 11 : latticed	EN	0,*
opening bridge	(CATBRG)		BO	0,1 †
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See clause 2.4.8	TD	0,1
status	(STATUS)	1 : permanent 2 : occasional 4 : not in use 5 : periodic/intermittent 7 : temporary 12 : illuminated	EN	0,*
visual prominence	(CONVIS)	1 : visually conspicuous 2 : not visually conspicuous 3 : prominent	EN	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (TXTDTS)		(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

† For bridges encoded over navigable water, the attribute opening bridge is mandatory.

— The attribute category of opening bridge is mandatory if opening bridge = True.

The sub-attribute colour pattern is mandatory for bridges that have more than one value populated for the sub-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: D 20-24

6.5.1 Bridges (see S4 – B-381)

If it is required to encode a bridge, it should be done using the feature Bridge. Bridges may be encoded over water that is navigable or non-navigable at the maximum display scale of the ENC data. Where the bridge is encoded over navigable water, the spans and pylons of the bridge must be associated with the feature Bridge using the association Bridge Aggregation (see clause 25.4) (that is, the Bridge feature has geometry of type curve or surface, or has no geometry). Where the bridge is encoded over non-navigable water, then it must be encoded, where required, using a Bridge feature having no component features (that is, the Bridge feature has geometry of type curve or surface), or as a Landmark feature (see clause 7.2) if the bridge has geometry of type point.

Teh Stand Deleted: category of

The value of the vertical clearance between (high) water level and any fixed overhead obstruction must always be given, where known, on the largest maximum display scale ENC data intended for navigation under the bridge, and for detailed passage planning. The datum above which clearances are given must be a high water level, preferably Highest Astronomical Tide (HAT), where the tide is appreciable. For bridges over navigable water, the value for the vertical clearance(s) must be encoded using the features Span Fixed or Span Opening (see clauses 6.6 and 6.7), with the clearance(s) populated using the complex attributes vertical clearance fixed, vertical clearance closed and/or vertical clearance open, and sub-attributes populated relevant to the span. In areas where the tidal range is not appreciable the datum above which clearances are given should be Mean Sea Level (MSL).

Remarks:

- If it is required to encode the name of a bridge over navigable water, the Bridge should be encoded using geometry of type curve or surface, associated with all relevant components of the bridge using the association Bridge Aggregation. The extent of the geometry of the Bridge should utilise the geometry of all the components of the bridge so as to cover its full extent.
- If it is required to encode the extent of an unnamed bridge over navigable water, this may be done using a Bridge feature having no geometry, associated with all relevant components of the bridge using the association Bridge Aggregation.
- Water under a bridge must be encoded using the features Depth Area, Dredged Area or Unsurveyed Area (and appropriate Depth Contour and Sounding features) if the waterway is navigable at the maximum display scale for the ENC data, or using the features Land Area if the waterway is not navigable at the maximum display scale for the ENC data.
- When there is a fixed vertical clearance, closed vertical clearance, or open vertical clearance given for a bridge, it should be applied only to the portion of the bridge to which the clearance refers, using the features Span Fixed or Span Opening (see clauses 6.6 and 6.7). All encoded bridge spans must be associated with the Bridge feature using the association Bridge Aggregation (see clause 25.4). See examples in the Figures below. If there are no vertical clearances given for a bridge and it is over water that is navigable at the maximum display scale of the ENC data, a single Span Fixed or Span Opening feature must be encoded covering the area of the bridge, having mandatory vertical clearance attributes populated with an empty (null) value.
- The attribute height is used, where required, to encode the height of the highest point on the bridge structure (see clause 2.5.7).
- 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 populated with an empty (null) value.
- If it is required to encode a distance mark that is included on or associated with a bridge, this must be done using the feature Distance Mark (see clause 8.9).
- In navigable water, bridge supports must be encoded, where possible, using a Pylon/Bridge Support feature (see clause 6.11), with attribute category of pylon = 4 (bridge/pylon tower) or 5 (bridge pier).
- It is not mandatory to encode roads or railways on bridges.

Teh Stand Deleted: construction

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IHO

EDITION 1.2.0 APPROVED: NEW MODELLING FOR UNLIMITED BRIDGE CLEARANCES (OPEN SPAN)

International Hydrographic Organization

6.7 Span opening

IHO Definition: **SPAN OPENING**. An opening component of the deck of a bridge spanning successive bridge piers. (Adapted from Defence Geospatial Information Working Group, Feature Data Dictionary Register, 2013).

S-101 Geo Feature: Span Opening (BRIDGE)

Primitives: Curve, Surface

Real World	Paper Chart Symbol	ECDIS Symbol
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
fixed date range		See clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 †
date start	(DATSTA)		(S) TD	0,1 †
horizontal clearance fixed			C	0,1
horizontal clearance value	(HORCLR)		(S) RE	1,1
horizontal distance uncertainty	(HORACC)		(S) RE	0,1
vertical clearance closed			C	1,1
vertical clearance value	(VERCCL)		(S) RE	1,1
vertical uncertainty			(S) C	0,1
uncertainty fixed	(VERACC)		(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical clearance open			C	1,1
vertical clearance unlimited			(S) BO	1,1
vertical clearance value	(VERCOP)		(S) RE	0,1 †
vertical uncertainty			(S) C	0,1
uncertainty fixed	(VERACC)		(S) RE	1,1
uncertainty variable factor			(S) RE	0,1

Teh Stand Deleted: .
Suggest that complex attribute fixed date range is removed as an allowable attribute for Span Opening. Not sure how this is intended to work for individual bridge spans and is already included for the Bridge feature.

Teh Stand Deleted: .
Refer to S-65 Annex B (clause 4.8.10) draft Edition 1.1.0 review comment from NL

Teh Stand Deleted: 1

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

The sub-attribute vertical clearance value for the complex attribute vertical clearance open is mandatory if the sub-attribute vertical clearance unlimited is set to True.

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

INT 1 Reference:

6.7.1 Span opening

If it is required to encode the clearance characteristics (vertical or horizontal) for an opening part of a bridge between piers or supports, it must be done using the feature Span Opening, which must be associated with the feature Bridge (see clause 6.5) using the association Bridge Aggregation (see clause 25.4). See clause 6.5 for examples of Span Opening features used in conjunction with Bridge features.

The value of the vertical clearance between (high) water level and any opening overhead obstruction must always be given, where known, on the largest optimum display scale ENC data intended for navigation under the overhead obstruction, and for detailed passage planning. The datum above which clearances are given must be a high water level, preferably Highest Astronomical Tide (HAT), where the tide is appreciable. Clearances must be populated using the complex attributes vertical clearance closed and vertical clearance open for the span and sub-attributes populated relevant to the feature, rounded down to the nearest whole metre (unless under 10m, when metres and decimetres may be quoted). In areas where the tidal range is not appreciable the datum above which clearances are given should be Mean Sea Level (MSL).

Remarks:

- Span Opening features should only be encoded if the span is entirely or partly over navigable water at the maximum display scale for the ENC data.
- Where the maximum display scale of the ENC data is such that individual spans over navigable water cannot be indicated, the entire bridge should be covered by a single Span Opening feature, having attributes populated according to the opening span.
- The complex attributes vertical clearance closed and vertical clearance open must be encoded for both the opening (vertical open) and closed (vertical closed) clearance values. Where the open vertical clearance is unlimited, the Boolean sub-attribute vertical clearance unlimited must be set to True.
- Where it is required to encode time schedule information relating to the opening and closing times for the span, including any scheduled closure times or amended schedules for festivals or national holidays, this should be done using an associated instance of the information types Service Hours (see clause 24.2) and/or Non-Standard Working Day (see clause 24.3).
- If available and considered important for route planning and/or monitoring, the vertical uncertainty associated with encoded vertical clearance values should also be encoded.

Distinction: Bridge; Cable Overhead; Conveyor; Pipeline Overhead; Span Fixed.

Teh Stand Deleted: open

Teh Stand Deleted: populated with an empty (null) value



IHO

EDITION 1.2.0 APPROVED: NEW GUIDANCE FOR COMPLEX COLOUR PATTERNS

International
Hydrographic
Organization

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.



Teh Stand

Refer to [IHO Documentation and FC Github Issue #6](#) opened 26/07/21.



IHO

EDITION 1.2.0 APPROVED: RESTRUCTURING OF DEFINITIONS

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).

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

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
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
category of lateral mark	(CATLAM)	1 : port-hand lateral mark 2 : starboard-hand lateral mark	EN	1,1

Teh Stand Deleted: s

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).¶



IHO

EDITION 1.2.0 APPROVED: TOPMARKS WITH MULTIPLE COLOURS

International Hydrographic Organization

topmark	(TOPMAR)	C	0,1
colour	(COLOUR)	(S) EN	0..*(ordered)
colour_pattern	(COLPAT)	(S) EN	0..1

Teh Stand Deleted: 1

18.1 Geo features forming parts of navigational aids

Aids to navigation are composed of fixed or floating structure features established specifically as an aid to navigation, which may carry equipment features.

When identifying relationships (associations) between aids to navigation and associated geo features within this document, three "base classes" are used to define the aids to navigation geo features included in the relevant association. These "base classes" are:

- Structure Features: Includes Beacon Cardinal, Beacon Isolated Danger, Beacon Lateral, Beacon Safe Water, Beacon Special Purpose/General, Buoy Cardinal, Buoy Emergency Wreck Marking, Buoy Installation, Buoy Isolated Danger, Buoy Lateral, Buoy Safe Water, Buoy Special Purpose/General, Daymark, Light Float, Light Vessel, Landmark, Pile.
- Equipment Features: Includes Daymark, Fog Signal, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Reflector, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning.
- Navigational Aid Features: Includes Beacon Cardinal, Beacon Isolated Danger, Beacon Lateral, Beacon Safe Water, Beacon Special Purpose/General, Buoy Cardinal, Buoy Emergency Wreck Marking, Buoy Installation, Buoy Isolated Danger, Buoy Lateral, Buoy Safe Water, Buoy Special Purpose/General, Daymark, Light Float, Light Vessel, Pile.

The encoding of relationships between structure and equipment features is described in clause 18.2.

Remarks:

- Structures that have not been established specifically as an aid to navigation may also carry aids to navigation as equipment features. These include Bridge, Building, Cable Overhead, Conveyor, Crane, Floating Dock, Fortified Structure, Fishing Facility, Hulk, Landmark, Mooring/Warping Facility, Offshore Platform, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Obstruction, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Wind Turbine, Wreck. If it is required to encode such supporting structures at the same location as an equipment feature, it must 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, 20.17.1 and 25.15).

Teh Stand Refer Paper 5-101PT10-07.8 and Action 5-101PT10-23.

Teh 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).

Real World Feature	INT 1	Feature	topmark / daymark shape	colour*	colour pattern*	marks navigational – system of
North cardinal topmark	Q130.3	Beacon Cardinal	13	2	/	1 and 2 (IALA A and B)
East cardinal topmark	Q130.3	Beacon Cardinal	11	2	/	1 and 2 (IALA A and B)
South cardinal topmark	Q130.3	Beacon Cardinal	14	2	/	1 and 2 (IALA A and B)
West cardinal topmark	Q130.3	Beacon Cardinal	10	2	/	1 and 2 (IALA A and B)
Isolated danger topmark	Q130.4	Beacon Isolated Danger	4	2	/	1 and 2 (IALA A and B)
Port lateral topmark	Q130.1	Beacon Lateral	5	3	/	1 (IALA A)
Starboard lateral topmark	Q130.1	Beacon Lateral	1	4	/	1 (IALA A)
Port lateral topmark	Q130.1	Beacon Lateral	5	4	/	2 (IALA B)
Starboard lateral topmark	Q130.1	Beacon Lateral	1	3	/	2 (IALA B)
Safe water topmark	Q130.1	Beacon Safe Water	3	3	/	1 and 2 (IALA A and B)
Special purpose topmark	Q130.1	Beacon Special Purpose/General	7	6	/	1 and 2 (IALA A and B)
Emergency wreck marking topmark		Buoy Emergency Wreck Marking	8	6	/	1 or 2 (IALA A or B)

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Teh Stand Deleted: must

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

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).



EDITION 1.2.0 APPROVED: FLOODLIGHT COLOURS AND MULTI-LIGHT SHAPES

19.1.7 Various special types of lights

Type	S-4	category of light	Remarks
Subsidiary light	B-471.8	10	Encoded as a separate light from the main light feature
Aero light	B-478.1	5	
Air obstruction light	B-478.2		Encode using feature Light Air Obstruction
Fog detector light	B-477		Encode using feature Light Fog Detector
Bearing light		18	
Flood light	B-478.2	8	Only to encode flood lights that are visible from seaward. The illuminated structure should be encoded using appropriate feature classes, with attribute status = 12 (illuminated) <u>and, if the flood lit colour of the structure is considered important for navigation, complex attribute information, sub-attribute text indicating the colour, for example, <i>Purple when flood lit</i>.</u>
Synchronized lights	B-478.3		status = 15 . A series of synchronized lights may be defined by associating the lights features with a Range System feature using the feature association Range System Aggregation (see clause 25.13)
Strip light	B-478.5	9	
Spot light		11	Only to encode spot lights that are visible from seaward. The illuminated feature should be encoded using appropriate feature classes, with attribute status = 12 (illuminated)
Emergency light		17	Must be encoded as a separate feature to the main light feature
Horizontally disposed lights	B-471.8	19	The number of lights must be encoded using complex attribute multiplicity of features
Vertically disposed lights	B-471.8	20	The number of lights must be encoded using complex attribute multiplicity of features
Specific pattern of lights	B-471.8		<u>The pattern must be encoded using complex attribute information, sub-attribute text; for example <i>lights disposed in the shape of a triangle</i>. The number of lights must be encoded using complex attribute multiplicity of features</u>

Table 19-2 - Special types of lights

Teh Stand
Action S-101PT4-06. For consideration of DCEG Sub-Group. See [S-101 Documentation and EC GitHub Issue #78](#)

Teh Stand
DCEG Sub-WG meeting 3: UK to work up proposal for specific Association for synchronized lights.

Teh Stand
DCEG Sub-WG meeting 4: Strip lights that are an aid to navigation need to be addressed in portrayal... not sure how if there is no attribution to indicate the difference between a strip light that is an aid to navigation and one which is not.

Teh Stand
See [S-101 Documentation and EC GitHub issue #58](#)

Teh Stand
Example: Cross, Arrow, etc.



IHO

EDITION 1.2.0 APPROVED: VIRTUAL AIS AID TO NAVIGATION TYPE VALUES - CORRECTION

27.193 virtual AIS aid to navigation type

IHO Definition: **VIRTUAL AIS AID TO NAVIGATION TYPE**. A purpose of a virtual AIS Aid to Navigation.

Attribute Type: Enumeration

1) **north cardinal**

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

2) **east cardinal**

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

3) **south cardinal**

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

4) **west cardinal**

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

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

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

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

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

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

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

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

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

Jeff Wootton
Deleted: Virtual AIS aid to navigation type:

Jeff Wootton
Deleted: . (

Jeff Wootton
Deleted: . (

Jeff Wootton
Deleted: preferred channel to port

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

Jeff Wootton
Deleted: preferred channel to starboard

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



IHO

EDITION 1.2.0 APPROVED: CATEGORY OF SIGNAL STATION TRAFFIC = BERTHING - AMENDMENT

International Hydrographic Organization

27.62 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).

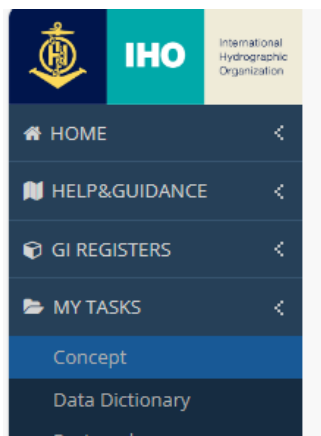
Jeff Wootton

Deleted: Category of signal station, traffic:



Teh Stand

Action S-101PT10-12.



Concept Details	
Name	Berthing
Alias	
CamelCase	berthing
Definition	Attaching a vessel to a wharf or jetty.
Reference	
Reference Source	IHO Nautical Information Provision Working Group (Detail view)
Similarity to Source	Identical
Remarks	



IHO

FOR APPROVAL AT S-101PT11: CATEGORY OF CABLE = JUNCTION CABLE

International Hydrographic Organization



Action S-101PT9-17 - Encoding of mooring cables #84

JeffWootton opened this issue 3 weeks ago · 1 comment

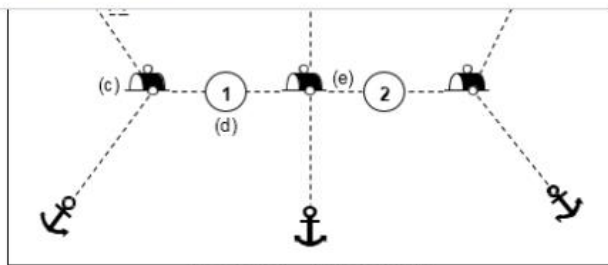


Figure 8-2 – Mooring trot

A complete mooring trot is composed of ground tackle, mooring cables, buoys 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**.

Given that this is the only distinction in the DCEG, suggest that categoryOfMooringWarpingFacility = 6 is removed as an allowable value in S-101. On the assumption that the junction cables should be identified as their own cable type, suggest that a new value categoryOfCable = 7 (junction cable) is introduced for CableSubmarine:

27.12 category of cable (CATCBL)

IHO Definition: **CATEGORY OF CABLE** Classification of the cable based on the services provided.

Attribute Type: Enumeration

1) power line

IHO Definition: A cable that transmits or distributes electrical power. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) transmission line

IHO Definition: Multiple un-insulated cables usually supported by steel lattice towers. Such features are generally more prominent than normal power lines. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.16, November 2000).

4) telephone

IHO Definition: A cable that transmits telephone signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) telegraph

IHO Definition: An apparatus, system or process for communication at a distance by electric transmission over wire. (IHO Nautical Information Provision Working Group, 2017).

6) mooring cable

IHO Definition: A chain or very strong fibre or wire rope used to anchor or moor vessels or buoys. (IHO Dictionary – S-32).

7) ferry

IHO Definition: A vessel for transporting passengers, vehicles, and/or goods across a stretch of water, especially as a regular service. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

A ferry cable is a cable or chain used to facilitate the movement of a ferry.

8) fibre optic cable

IHO Definition: A cable made of glass or plastic fibre designed to guide light along its length. Fibre optic cables are widely used in fibre-optic communication, which permits transmission over longer distances and at higher data rates than other forms of communication.

9) junction cable

IHO Definition: A cable used for joining components of complex marine structures, for example mooring trots.

Remarks:

- No remarks.

Teh Stand Deleted: Category of cable:

Teh Stand See DCEG Cross-Checks of S-101 Ed 1.1.0 PC with DCEG (Annexure) - email from Hugo 05/03/23. Issue with the different definitions in the DCEG and the PC (GI Registry). Perhaps there should be a **feature** item "Ferry Cable"?

Teh Stand August 11, 2023 See paper S-100WG10-07.1, Action S-101PT10-17 and S-101 Documentation and PC GIHub Issue #54.

Reply Resolve



IHO

FOR APPROVAL AT S-101PT11: REMODELLING OF MOORING/WARPING FACILITY FEATURE

Open Action S-101PT9-19 - Options for re-modelling of Feature MooringWarpingFacility #82
JeffWootton opened this issue 3 weeks ago · 1 comment

My thoughts for consideration of the S-101 DCEG Sub-Group:

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 OCIMF 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 category of ShorelineConstruction = 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-101PT10-18 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.

Labels

DCEG Feature Catalogue For S-101 Ed 1.2.0

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

1 participant



JeffWootton added DCEG Feature Catalogue For S-101 Ed 1.2.0 labels 3 weeks ago



JeffWootton commented 2 weeks ago

Collaborator Author ...

Further email feedback from Netherlands (requirements for Port of Rotterdam):

In reaction on [the] Paper for Consideration, I do have some remarks.

- 1 & 2 Dolphin: Creating a new feature Dolphin is a good approach. Consider adding an attribute Category of Dolphin: 1) Mooring Dolphin 2) Fender/breasting Dolphin 3) Deviation Dolphin etc.

The distinction between a Dolphin used for the Lines and those used for breasting is the main issue for POR. The terminology and definitions is also something to look at because there's quite some confusion in place.

- 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.



IHO

FOR APPROVAL AT S-101PT11: MECHANICAL SWEEP

International Hydrographic Organization



Action S-101PT9-25 - Adopting the term "Mechanical Sweep" #80

JeffWootton opened this issue 3 weeks ago · 0 comments

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.

Points to Note:

- Rather than "mechanical sweep" have chosen to name "mechanically swept" to be consistent with the naming for other techniques of vertical measurement (for example "swept by side scan sonar").
- As mentioned at the S-101PT9 meeting, this new term cannot have a definition that is identical to a term that is already registered in the IHO GI Registry. In this case the definition proposed in Paper S-101PT9-08.9 is identical to the already registered IHO Hydrographic Dictionary term "Sweeping". I have therefore taken some aspects of the proposed definition and re-drafted so as to be similar to other values for techniqueOfVerticalMeasurement (for example definition for "swept by side scan sonar").
- Former value 6 (swept by wire drag) has been removed and additional changes recommended in the Paper have been applied to the draft DCEG.

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-87 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).

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).

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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).

Teh 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) ¶

Teh Stand

Refer paper S-101PT9-08.9 and Action S-101PT9-25. See also S-101 Documentation and PC GitHub issue #80 opened 11/09/23.



IHO

FOR APPROVAL AT S-101PT11: REMODELLING OF UPDATE INFORMATION

International Hydrographic Organization

3.11 Update information

IHO Definition: UPDATE INFORMATION. The Update Information metadata feature is used to represent a change to the information shown.

S-101 Metadata Feature: Update Information

Primitives: Point, Curve, Surface

<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>
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S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
update-description			C	1,*
—language		ISO 639-2/T	(S) TE	0,1
—text			(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
update type		1 : insert 2 : delete 3 : modify	EN	1,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1 †
source			TE	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) (NINFOM)		(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.

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.

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

INT 1 Reference:

3.11.1 Update information

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 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 Electronic Navigation Data Service (ENDS) 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 type must be used to indicate the type of update applicable to the feature (insertion, deletion, modification).
- The mandatory-complex attribute update-description information (see clause 2.4.6) 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 2.4.6).
- 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 substantively automated in ENC production systems and associated databases, with automated population of the mandatory attribute 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 of the deleted information.

Distinction: Information Area; Caution Area.

Feature/Feature associations: Updated Information

Update Information - Detailed Description #41
JeffWootton opened this issue on Sep 27, 2022 · 8 comments



JeffWootton commented 2 days ago

Collaborator Author ...

An initial draft paper S-101PT11-08.4 has been prepared for discussion at the DCEG Sub-Group meeting 05-06 September 2023.

[S-101PT11_2023_08.4_EN_Modelling_and_Use_of_the_UpdateInformation_Feature_V1.pdf](#)

Comments in advance of the DCEG Sub-Group meeting are welcome.



alvarosanuy commented 2 days ago

Support the paper. Some points I would like to discuss:

- Should S-98 Annex C be updated to better communicate OEMs expected performance (S-52 vs S-101) when mariners select the 'ENC Update review' function in a DF ECDIS?
- Should we create a new S-164 test to verify ECDIS performance (as per above).
- Should we create a new Alert - When UpdateInformation impacts and Active or Planned route (including safety corridor). Not sure if this is currently an ECDIS requirement when an ENC update adds, deletes or moves a feature into that space. If this is the case this entry can be ignored.
- Not sure about the use case for a new attribute updateExpiryDate. Visually and for Alerts, this should be handle by dateEnd. Also, although I can't say it is an ECDIS performance requirement, I've seen ECDIS present/group changes by ENC Update number. Wouldn't removing the feature from the ENDS interfere with that functionality? Furthermore, would a new system attribute (i.e. updateNumber) be required to support this functionality in S-101 (I imagine that currently in S-57 is managed by binary differencing methodology?).



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FOR DISCUSSION AT S-101PT11 (IN PROGRESS):

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- Remodelling of QualityOfBathymetricData and SpatialQuality to provide a more directly relationship between meta data information and the features that the meta data relates to.
 - Paper in development.
- New feature for covering structures over the water (in cooperation with IEHG).
 - Paper in development.
- Revised guidance for associations and review of association roles.
 - For discussion by Associations Sub-Group.
- Text Placement.
 - Initial implementation only for ECDIS “North-Up” display setting.
 - Renaming of attributes: orientationValue -> textOffsetBearing; textOffsetMm -> textOffsetDistance.



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FOR DISCUSSION AT S-101PT11 (IN PROGRESS) (2):

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- Anchorage Areas and Anchor Berths.
 - Addition of category of Cargo.
- Vessel Speed Limit.
 - Current level of modelling (sub-attributes) to be retained.
 - Allowing varying units of measure for speed limits tbd.
- New feature Runway
 - Paper in development.
- Language independent text
 - Discussion ongoing.
- Beacons and Buoys – naming convention
 - Refer to new feature Mooring Buoy – consistency??



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FOR DISCUSSION AT S-101PT11 (IN PROGRESS) (3):

- Data load/unload and display
 - Display algorithm in development.
 - Possible re-introduction of optimumDisplayScale?
- Implementation of MRNs.
 - S-100WG/NIPWG/S-101PT discussion – more concise guidance required in S-100.



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ACTIONS REQUESTED OF NIPWG

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- **Note** the progress in the development of S-101 DCEG since Edition 1.0.2.
- **Discuss** any of the developments in S-101 data modelling as related to Nautical Publication information as required.



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THANK YOU

NIPWG10, IHO Secretariat, Monaco, 12-15 September 2023