



12th Meeting of the IHO (S-100WG) S-101 Project Team

Changes to S-101 DCEG Edition 1.1.0

Summary Report

Agenda Item 05.1



IHO

DCEG SUB-GROUP: MEETINGS

International
Hydrographic
Organization

- None since finalization of DCEG Edition 1.2.0.
- Discussions on clarifications and corrections continued by correspondence as raised.
- Intended to hold a Sub-Group meeting during April 2024 to resolve open GitHub Issues.

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

The screenshot displays the GitHub interface for the repository `iho-ohi/S-101-Documentation-and-FC`. At the top, there are navigation links for Product, Solutions, Open Source, and Pricing, along with a search bar and Sign in/Sign up buttons. Below the repository name, there are icons for Notifications, Fork (5), and Star (18). The main navigation bar includes Code, Issues (29), Pull requests (1), Actions, Projects, Security, and Insights. The file browser shows a `main` branch with 4 branches and 0 tags. A search bar for files is present. The file list includes:

File/Folder	Last Action	Time Ago
Documents (Main and DCEG)	Add files via upload	3 months ago
Load_Unload_Strategy Sub Group	Add files via upload	8 months ago
S-101FC	Add files via upload	last year
Scales Sub Group	Update S-101_PS_Scale_guidance.md	2 years ago
README.md	Update README.md	2 years ago

The right sidebar provides repository statistics: 18 stars, 29 watching, and 5 forks. It also includes links for Readme, Activity, and Report repository.

S-101PT12 Remote (VTC) Meeting, 13-15 February 2024



IHO

SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 2.0.0 SINCE FINALIZATION OF EDITION 1.2.0

International
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- Minor editorial corrections made throughout for clarity and consistency (thanks to those that identified these issues).
- Added statement regarding the restriction of geometric primitives based on attribution of individual feature instance attribution.
- Added nameUsage and deleted displayName from portrayal feature attributes summary.
- Added the UpdatedInformation association to the meta features.
- Clarified that the vertical uncertainty associated with survey reliability is to be encoded using an instance of SpatialQuality associated to the geometry of individual geo features or an instance of QualityOfBathymetricData.
- Corrected the Type for the Component of Role for the AidsToNavigationAssociation to Aggregation for the relevant target features.
- Added new encoding examples (Figures) for the Bridge feature.



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SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 2.0.0 SINCE FINALIZATION OF EDITION 1.2.0 (2)

International
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- Added value 21 (cement) as an allowable enumerate value for attribute product on feature Conveyor.
- Added Pontoon as an allowable feature for inclusion in the association BridgeAggregation.
- Amended Clause 13.6.1, Remarks 16th bullet to distinguish between FAD and a wreck deliberately sunk to perform the function of a fish haven.
- Added complex attribute fixedDateRange as an allowable value for features DeepWaterRoute, MooringTrot, RangeSystem, TrafficSeparationScheme and TwoWayRoute.
- Corrected complex attribute verticalClearanceOpen for feature Gate to be consistent with feature SpanOpening (addition of mandatory sub-attribute verticalClearanceUnlimited and amendment of multiplicity of sub-attribute verticalClearanceValue).



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SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 2.0.0 SINCE FINALIZATION OF EDITION 1.2.0 (3)

International
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- Added new Remark prohibiting Obstruction of geometric primitive curve where attribute categoryOfObstruction is populated s 23 (mangrove).
- Added attribute communicationChannel and amended encoding guidance to specify single communication channel instances should be encoded on the relevant feature but multiple instances of the same communication channel should be encoded using an associated ContactDetails feature
- Corrected Table 19-1 to remove columns for IQ and IVQ (no longer valid light characteristics in S-4).
- Added attribute exhibitionConditionOfLight value 3 (fog signal) as an allowable value for feature LightSector.
- Added new guidance for encoding virtual AIS aids to navigation intended to serve a purpose other than those defined in attribute virtualAIS AidToNavigationType.



IHO

SUMMARY OF CHANGES APPLIED IN DRAFT DCEG ED 2.0.0 SINCE FINALIZATION OF EDITION 1.2.0 (4)

- Corrected association TextAssociation to add missing feature SweptArea to the identifies Role.
- Corrected Note 1 for attribute categoryOfZoneOfConfidenceInData to include the Information type SpatialQuality in providing additional quality information.
- Corrected the definition of attribute maximumPermittedVesselLength to refer to length rather than draught.
- Removed redundant complex attribute updateDescription.



- Added statement regarding the restriction of geometric primitives based on attribution of individual feature instance attribution.

2.3 Geometric primitives

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

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

Within this document, allowable primitives are included in the description of each feature type. For easy reference, Table 2-1 below summarises the allowable geometric primitives for each feature type. For some features, the allowable geometric primitives may be further constrained dependant on the

S-101 Annex A Xxxx 2024 Edition 2.0.0

Teh Stand
Add guidance on restricted encoding/geometric primitives combinations? Refer Christian email 06/10/22.

4 Data Classification and Encoding Guide

attribution applied to a feature instance. Where this occurs, these constraints are described in the feature Table entries in Sections 3-24.

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

Administration Area		C	S		
Anchor Berth	P		S		
Archipelagic Sea Lane			S	N	
Archipelagic Sea Lane Axis		C			
Bollard	P				
Building	P		S		
Airport/Airfield	P		S		
Anchorage Area	P		S		
Archipelagic Sea Lane Area			S		
Berth	P	C	S		
Bridge		C	S	N	
Built-up Area	P		S		

Teh Stand 26 minutes ago Deleted:

No impact on FC.

Conformity to be assured by S-101 validation checks.

For discussion: Should a summary Table be included in DCEG clause 2.3?



- Added nameUsage and deleted displayName from portrayal feature attributes summary.

2.4.5 Portrayal feature attributes

The primary use of ENC is within ECDIS where ENC data is displayed based on the rules defined within the S-101 Portrayal Catalogue. While most ECDIS portrayal is based on attributes describing the instance of a particular feature in the real world, certain feature attributes are used in portrayal rules to provide additional functionality in the ECDIS or information to the Mariner. The following attributes have specific influence on portrayal:

fixed date range; periodic date range – population of these complex attributes determines when the feature will be added (sub-attribute **date start**) and/or removed (sub-attribute **date end**) from the display in some ECDIS display settings (see clause 2.4.8).

information – population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user.

name usage – this sub-attribute determines the priority and level of display (full display or Pick Report only) where multiple instances of the complex attribute **feature name** are encoded for a single feature instance, based on Mariner's selected ECDIS display settings (see clause 2.5.8)

pictorial representation – population of this attribute will result in the display of the magenta information symbol to highlight additional information to the user.

scale minimum – value at which the feature will be removed from the display if application of scale minimum is enabled in the ECDIS (see clause 2.5.9).

Teh Stand Deleted: display name – this Boolean attribute determines if the text for a name should display. If not populated the default rules provided in the Portrayal Catalogue will be used.¶

Teh Stand
Refer to email from Alvaro 19/01/24 and [S-101 Documentation and FC GitHub Issue #109](#).

Refer to [S-101 Documentation and FC GitHub Issue #109](#).

No impact on FC.

- Clarified final paragraph of clause 2.4.7 to add multipoint geometry and the meta feature QualityOfBathymetricData as allowed to be associated with SpatialQuality.

Spatial quality attributes are carried in the information type **Spatial Quality** (see clause 24.5). Only **point, multipoint and curve geometry and the meta feature Quality of Bathymetric Data** can be associated with **Spatial Quality**. Currently no use case for associating surfaces with spatial quality attributes is known, therefore this is prohibited; however it is allowable for **Spatial Quality** to be associated with the curves comprising the spatial edges (boundaries) of surface features. Vertical uncertainty is prohibited for curves as this dimension is not supported by curves.

2.4.8 Dates

When encoding dates using the attributes **dredged date, fixed date range, reported date, reference year for magnetic variation, survey date range** and **swept date**, the following values

Teh Stand janvier 31, 2024
Refer to email from Pete Duguid 26/01/24.

Teh Stand Deleted: s

Teh Stand Deleted: pointsets

Teh Stand Deleted: s

No impact on FC (consistency with feature and association tables).



IHO

DCEG EDITION 2.0.0 DRAFT CHANGES (3)

International Hydrographic Organization

- Corrections to Sample scaleMinimum Table (Table 2-8, clause 2.5.9).

FEATURE	PRIMITIVE	CONDITION	scale minimum STEPS
GEO FEATURES			
Administration Area	Curve/Surface		3
Airport/Airfield	Point/Surface		1
Anchor Berth	Point/Surface	If restriction defined	3
Anchor Berth	Point/Surface		1
Anchorage Area	Point/Surface		2
Archipelagic Sea Lane	Surface		4
Archipelagic Sea Lane Area	Surface		4
Archipelagic Sea Lane Axis	Curve		4
Berth	Point/Curve/Surface		1
Boilard	Point		1
Bridge	Curve/Surface	Covered by a surface Depth Area , Dredged Area , or Unsurveyed Area feature	4
Bridge	Curve/Surface	If visual prominence = 1 (visually conspicuous) or radar conspicuous = True and covered by a surface Land Area , Dock Area , or Lock Basin feature	NOT SET
Bridge	Curve/Surface		1
Building	Point/Surface	If visual prominence = 1 (visually conspicuous) or radar conspicuous = True or function contains value 33 (light support)	3

Teh Stand
 Row related to ~~visualProminence~~ removed as ~~visualProminence~~ is not an allowable attribute for ~~AirportAirfield~~. Refer email from Richard C 05/12/23.

Teh Stand
 Deleted: Airport/Airfield

No impact on FC.

Radar Reflector	Point	If Equipment scale minimum should match that of Structure	3
Radar Station	Point		2
Radar Transponder Beacon	Point	If Equipment scale minimum should match that of Structure	3
Radio Calling-In Point	Point/Curve		3
Radio Station	Point		1
Railway	Curve		1
Range System	Surface		3
Rapids	Curve/Surface		1

Teh Stand
 Refer to email from Richard C 04/01/23.

Teh Stand
 Deleted: If Equipment **scale minimum** should match that of Structure

Teh Stand
 Refer to email from Richard C 04/01/23.

Teh Stand
 Deleted: If Equipment **scale minimum** should match that of Structure



- Added the UpdatedInformation association to the meta features.

text	(INFORM) (NINFOM)		(S) TE	0,1 †
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
Updates	Updated Information (see clause 25.19)	Update Information	Association	0,1

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

INT 1 Reference: M 32.1-2

3.4.1 Quality of non-bathymetric data (see S-4 – B-487.2)

The meta feature Quality of Non-Bathymetric Data may be used to provide an indication of the overall uncertainty of position for bathymetric information.

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
Identifies	Updated Information (see clause 25.19)	Most meta features and all Geo features	Association	0,*

† 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:

3.12.1 Update information

25.19 Updated information

IHO Definition: UPDATED INFORMATION. A feature association for the binding between an update information metadata feature and updated feature(s) that it identifies.

Remarks:

- An updated dataset feature can be any feature or information type instance that is subject to an ENC Update.

Role Type	Role	Associated With	Multiplicity
Association	Updates	Update Information	0,1
	Identifies	Administration Area, Airport/Airfield, Anchor Berth, Anchorage Area, Archipelagic Sea Lane, Archipelagic Sea Lane Area, Archipelagic Sea Lane Axis, Berth, Bollard, Bridge, Building, Built-Up Area, Cable Area, Cable Overhead, Cable Submarine, Canal, Cardinal Beacon, Cardinal Buoy, Cargo Transhipment Area, Causeway, Caution Area, Checkpoint, Coast Guard Station, Coastline, Collision Regulations Limit, Contiguous Zone, Continental Shelf Area, Conveyor, Crane, Current – Non-Gravitational, Custom Zone, Dam, Daymark, Deep Water Route, Deep Water Route Centreline, Deep Water Route Part, Depth Area, Depth Contour, Depth – No Bottom Found, Discoloured Water, Distance Mark, Dock Area, Dolphin, Dredged Area, Dry Dock, Dumping Ground, Dyke, Emergency Wreck Marking Buoy, Exclusive Economic Zone, Fairway, Fairway System, Fence/Wall, Ferry Route, Fishery Zone, Fishing Facility, Fishing Ground, Floating Dock, Fog Signal, Fortified Structure, Foul Ground, Free Port Area, Gate, Gridiron, Harbour Area (Administrative), Harbour Facility, Helipad, Hulk, Ice Area, Information Area, Inshore Traffic Zone, Installation Buoy, Island Group, Isolated Danger Beacon, Isolated Danger Buoy, Lake, Land Area, Land Elevation, Land Region, Landmark, Lateral Beacon, Lateral Buoy, Light Air Obstruction, Light All Around, Light Float, Light Fog Detector, Light Sector, Light Vessel, Local Direction of Buoyage, Local Magnetic Anomaly, Lock Basin, Log Pond, Magnetic Variation, Marine Farm/Culture, Marine Pollution Regulations Area, Military Practice Area, Mooring Area, Mooring Buoy, Mooring Trot, Navigation Line, Navigational System of Marks, Obstruction, Offshore Platform, Offshore Production Area, Oil Barrier, Physical AIS Aid to Navigation, Pile, Pilot Boarding Place, Pilotage District, Pipeline Overhead, Pipeline Submarine/On Land, Pontoon, Precautionary Area, Production/Storage Area, Pylon/Bridge Support, Quality of Bathymetric Data, Quality of Non-Bathymetric Data, Quality of Survey, Radar Line, Radar Range, Radar Reflector, Radar Station, Radar Transponder Beacon, Radio Calling-In Point, Radio Station, Railway, Range System, Rapids, Recommended Route Centreline, Recommended Track, Recommended Traffic Lane Part, Rescue Station, Restricted Area, Retroreflector, River, Road, Runway, Safe Water Beacon, Safe Water Buoy, Sandwave, Sea Area/Named Water Area, Seabed Area, Seagrass, Seaplane Landing Area, Separation Zone or Line, Shoreline Construction, Signal Station Traffic, Signal Station Warning, Silo/Tank, Small Craft Facility, Slope Topline, Sloping Ground, Sounding, Sounding Datum, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Spring, Straight Territorial Sea Baseline, Submarine Pipeline Area, Submarine Transit Lane, Swept Area, Territorial Sea Area, Tidal Stream Panel Data, Tidal Stream – Flood/Ebb, Tideway, Traffic Separation Scheme, Traffic Separation Scheme Boundary, Traffic Separation Scheme Crossing, Traffic Separation Scheme Lane Part, Traffic Separation Scheme Roundabout, Tunnel, Two-Way Route, Two-Way Route Part, Underwater/Awash Rock, Unsurveyed Area, Vegetation, Vertical Datum of Data, Vessel Traffic Service Area, Virtual AIS Aid to Navigation, Water Turbulence, Waterfall, Weed/Kelp, Wind Turbine, Wreck	0,* {1,* [C]}

Teh Stand Deleted: All

Impacts on FC.

NOTE: Not applied to DataCoverage feature (can only be updated by New Edition)



- Clarified that the vertical uncertainty associated with survey reliability is to be encoded using an instance of SpatialQuality associated to the geometry of individual geo features or an instance of QualityOfBathymetricData.

3.11.1 Survey reliability and source of bathymetric data

The survey reliability and/or details of the source surveys used in compilation may be encoded using the meta feature **Quality of Survey**.

Quality of Survey can apply to bathymetry (for example, underwater rocks), non-bathymetry (for example, navigational aids) and a combination of these (for example, LIDAR survey).

Remarks:

- To express completeness of bathymetric data, the complex attribute **features detected** should be encoded.

S-101 Annex A

Xxxx.2024

Edition 2.0.0

No impact on FC.

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Data Classification and Encoding Guide

features detected indicates that a systematic method of exploring the seafloor was undertaken to detect significant features. The sub-attributes **size of features detected** and **least depth of detected features measured** must not be encoded unless the sub-attribute **significant features detected** is set to *True*.

- If ~~it is required to encode a vertical uncertainty value~~, it must be encoded using ~~the complex attribute~~ **vertical uncertainty on an instance of** the information type **Spatial Quality** (see clause 24.5), associated to ~~the relevant feature(s) point, multipoint and curve geometry, or an instance of~~ the meta feature **Quality of Bathymetric Data** (see clause 3.8).
- If the attribute **measurement distance maximum** is set to 0 (zero) for the full area of the survey, the attribute **full seafloor coverage achieved** should be set to yes.

Teh Stand

Deleted: the complex attribute **vertical uncertainty** is required it is required



- Corrected the Type for the Component of Role for the AidsToNavigationAssociation to Aggregation for the relevant target features.
 - Building, Bridge, SpanFixed, SpanOpening, Conveyor, PipelineOverhead, PylonBridgeSupport, Landmark, SiloTank, WindTurbine, FortifiedStructure, Hulk, Pile, ShorelineConstruction, Crane, Dolphin, FloatingDock, Pontoon, FishingFacility, OffshorePlatform, Bouy and Beacon features, LightFloat, LightVessel

pictorial representation	(PICREP)	See clause 2.4.12.2	IE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
Supports	Structure/Equipment (see clause 25.15)	Daymark, Distance Mark, Fog Signal, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Association	0,*
Component of	Aids to Navigation Association (see clause 25.2)	Deep Water Route, Fairway System, Traffic Separation	Aggregation	0,1

Teh Stand January 17, 2024 Deleted: Association

25.2 Aids to navigation association

IHO Definition: AID TO NAVIGATION ASSOCIATION. A feature association for the binding between navigational aids and the traffic systems (such as routing measures) that they define.

Remarks:

- The features comprising an Aids to Navigation Association must include at least one of any of the features included in the "Consists of" role associated to one or more of the corresponding features in the "Component of" role.

Role Type	Role	Associated With	Multiplicity
Aggregation	Component of	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	0,1
	Consists of	Cardinal Beacon, Cardinal Buoy, Daymark, Emergency Wreck Marking Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Pile, Safe Water Beacon, Safe Water Buoy, Special Purpose/General Beacon, Special Purpose/General Buoy	0,* {1,* [C]}
Role Type	Role	Associated With	Multiplicity
Aggregation	Component of	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	0,1
	Consists of	Building, Crane, Dolphin, Fishing Facility, Fortified Structure, Landmark, Mooring Buoy, Offshore Platform, Silo/Tank, Wind Turbine	0,* {1,* [C]}
Role Type	Role	Associated With	Multiplicity
Aggregation	Component of	Fairway System, Traffic Separation Scheme, Two-Way Route	0,1
	Consists of	Bridge, Conveyor, Floating Dock, Hulk, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Shoreline Construction, Span Fixed, Span Opening	0,* {1,* [C]}

Teh Stand Deleted: Association

Teh Stand Deleted: Association

Teh Stand Deleted: Association

Impacts on FC.



- Added new bridge encoding examples (Figures) (clause 6.2.2).

6.6.2 Examples of Encoding Common Bridge Types

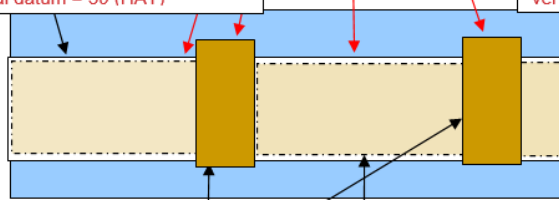
LIFTING BRIDGE

Bridge feature (surface): Geometry of all components
 category of opening bridge = 4 (lifting bridge)
 feature name = *Tower Bridge*
 opening bridge = *True*

Consists of
(associated by Bridge Aggregation)

Span Fixed
 vertical clearance fixed
 vertical clearance value = 6
 vertical uncertainty = 0.5
 vertical datum = 30 (HAT)

Span Fixed
 vertical clearance fixed
 vertical clearance value = 6
 vertical uncertainty = 0.5
 vertical datum = 30 (HAT)



Pylon/Bridge Support
 category of pylon = 4 (bridge pylon/tower)

Span Opening
 vertical clearance open
 vertical clearance unlimited = *True*
 vertical clearance closed
 vertical clearance value = 7.0
 vertical uncertainty = 0.5
 horizontal clearance fixed
 horizontal clearance value = 60.0
 vertical datum = 3 (Mean Sea Level)

Figure 6-2 - Lifting bridge - Example

SWING BRIDGE

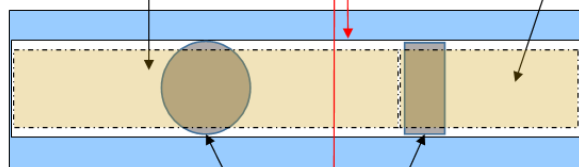
Bridge feature (surface): Geometry of all components
 category of opening bridge = 3 (swing bridge)
 feature name = *Draaibrug Sas van Gent*
 opening bridge = *True*

Consists of
(associated by Bridge Aggregation)



Span Opening
 vertical clearance open
 vertical clearance unlimited = *True*
 vertical clearance closed
 vertical clearance value = 7.0
 vertical uncertainty = 0.5
 horizontal clearance fixed
 horizontal clearance value = 60.0
 vertical datum = 3 (Mean Sea Level)

Span Fixed
 vertical clearance fixed
 vertical clearance value = 6.5
 vertical uncertainty = 0.5
 vertical datum = 3 (Mean Sea Level)



Pylon/Bridge Support
 category of pylon = 4 (bridge pylon/tower)

Figure 6-5 - Swing bridge) - Example

PONTOON BRIDGE (Opening)

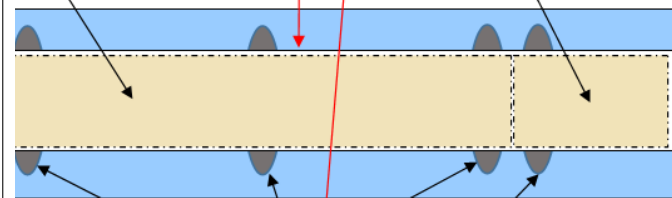


Bridge feature (surface): Geometry of all components
 bridge construction = 3 (pontoon bridge)
 category of opening bridge = 6 (pontoon bridge)
 feature name = *Konigin Emmabrug*
 opening bridge = *True*

Consists of
(associated by Bridge Aggregation)

Span Opening
 vertical clearance unlimited = *True*
 vertical clearance closed
 vertical clearance value = 0.0
 vertical datum = 3 (Mean Sea Level)

Span Fixed
 vertical clearance fixed
 vertical clearance value = 0.0



Pontoon

Figure 6-3 - Pontoon bridge (opening) - Example

No impact on FC.



- Added value 21 (cement) as an allowable enumerate value for attribute product on feature Conveyor.
 - Use case provided by FR.

6.9 Conveyor

IHO Definition: CONVEYOR. A mechanical device for conveying bulk material or people using an endless moving belt or series of rollers. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

S-101 Geo Feature: Conveyor (CONVYR)

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
category of conveyor	(CATCON)	1 : aerial cableway 2 : belt conveyor 3 : flume 4 : lift/elevator	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	EN	0,1 †

multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features			(S) IN	0,1
product	(PRODCT)	4 : stone 5 : coal 6 : ore 10 : bauxite 11 : coke 12 : iron ingots 13 : salt 14 : sand 15 : timber 16 : sawdust/wood chips 17 : scrap metal 21 : cement 22 : grain 25 : clay	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See clause 2.4.8	TD	0,1
status	(STATUS)	4 : not in use 12 : illuminated	EN	0,*

Impacts on FC.



- Added Pontoon as an allowable feature for inclusion in the association BridgeAggregation.

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
Component of	Bridge Aggregation (see clause 25.4)	Bridge	Aggregation	0,*
Supports	Structure/Equipment (see clause 25.15)	Bollard, Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Association	0,*
Component of	Aids to Navigation Association (see clause 25.2)	Fairway System, Traffic Separation Scheme, Two-Way Route	Aggregation	0,1
Updates	Updated Information (see clause 25.19)	Update Information	Association	0,1
Positions	Text Association (see clause 25.16)	Text Placement	Association	0,1
Provides Information	Additional Information (see clause 25.1)	Nautical Information	Association	0,1

25.4 Bridge aggregation

IHO Definition: **BRIDGE AGGREGATION**. A feature association for the binding between a bridge and its component features.

Remarks:

- The features comprising a **Bridge Aggregation** must include at least one **Span Fixed** or **Span Opening** feature.
- A bridge over non-navigable water at the optimum display scale of the ENC data, which does not require its individual components to be encoded, must be encoded, where required, as a **Bridge** feature of type curve or surface (see clause 6.6).

Role Type	Role	Associated With	Multiplicity
Aggregation	Component of	Bridge	0,1
	Consists of	Span Fixed, Span Opening, Pontoon, Pylon/Bridge Support	0,* {1,* [C]}

Impacts on FC.

† The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

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 16

8.18.1 Pontoons (see S-4 – B-324.3)

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



- Corrected complex attribute verticalClearanceOpen for feature Gate to be consistent with feature SpanOpening (addition of mandatory sub-attribute verticalClearanceUnlimited and amendment of multiplicity of sub-attribute verticalClearanceValue).

† For encoded gates that are navigable at the optimum display scale of the ENC data, the attribute **horizontal clearance open** is mandatory.

The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

[The sub-attribute vertical clearance value for the complex attribute vertical clearance open is mandatory.](#)

[the sub-attribute vertical clearance unlimited is set to False.](#)

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

INT 1 Reference: F 27, 41.1-2, 42-43

8.10.1 Gates (see S-4 – B-326.5-7)

If it is required to encode a gate that controls the flow of water, it must be done using the feature **Gate**. Gates should always be encoded in the closed (to the sea) position.

Remarks:

- Gate** of type surface must also be covered by a **Depth Area**, **Dredged Area**, **Unsurveyed Area** or **Land Area** feature.
- The attribute **depth range minimum value** is used to encode the minimum depth over the sill, where known.
- [Where the vertical clearance of the gate in the open position is unlimited, the Boolean sub-attribute vertical clearance unlimited must be set to True.](#)

Distinction: Dry Dock; Floating Dock.

Impacts on FC.

8.10 Gate

IHO Definition: GATE. A structure that may be swung, drawn, or lowered to block an entrance or passageway on a watercourse. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2012).

S-101 Geo Feature: Gate (GATCON)

Primitives: Point, Curve, Surface

Real World	Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of gate	(CATGAT)	2 : flood barrage gate 3 : caisson 4 : lock gate 5 : dike gate 6 : sluice	EN	0,1
condition	(CONDTN)	1 : under construction 2 : ruined 6 : planned construction	EN	0,1
depth range minimum value	(DRVAL1)		RE	0,1
feature name		See clause 2.5.8	C	0,*
language		ISO 639-2/T	(S) TE	1,1
name	(OE/NAME) (NOE/NAME)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †
horizontal clearance open			C	0,1 †
horizontal clearance value	(HORCLR)		(S) RE	1,1
horizontal distance uncertainty	(HORACC)		(S) RE	0,1
nature of construction	(NATCON)	1 : masonry 2 : concrete 6 : wooden 7 : metal	EN	0,*
quality of vertical measurement	(QUASOU)	2 : depth or least depth unknown 3 : doubtful sounding 4 : unreliable sounding 6 : least depth known 7 : least depth unknown, safe clearance at value shown	EN	0,*
status	(STATUS)	1 : permanent 4 : not in use 6 : reserved 16 : watched 17 : unwatched	EN	0,*
vertical clearance open			C	0,1
vertical clearance unlimited			(S) BO	1,1

vertical clearance value	(VERCLR)		(S) RE	0,1
vertical uncertainty			(S) C	0,1
uncertainty fixed	(VERACC)		(S) RE	1,1
uncertainty variable factor			(S) RE	0,1



- Added complex attribute fixedDateRange as an allowable value for features DeepWaterRoute, MooringTrot, RangeSystem, TrafficSeparationScheme and TwoWayRoute.
 - Inconsistency identified with “no geometry” features (ENC Conversion Sub-Group).

15.15 Deep Water route

IHO Definition: DEEP WATER ROUTE. A route within defined limits which has been accurately surveyed for clearance of sea bottom and submerged obstacles as indicated on the chart. (IMO Ships' Routing).				
S-101 Geo Feature: Deep Water Route (C_AGGR)				
Primitives: Surface, None				
<i>Real World</i>		<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
feature name		See clause 2.5.8	C	0,*
language		ISO 639-2/T	(S) TE	1,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †
fixed date range		See clause 2.4.8	C	0,1 <input type="checkbox"/>
date end	(DATEND)		(S) ID	0,1 †
date start	(DATSTA)		(S) ID	0,1 †
IMO adopted	(CATTSS)		BO	0,1
interoperability identifier		MRN (see clause 27.113)	TE	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,*

Impacts on FC.

† The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

[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 27.1-3

15.15.1 Deep Water routes (see S4 – B-435.3)

If it is required to define a complete Deep Water route (DW) system, the features **Deep Water Route Centreline**, **Deep Water Route Part** and any associated navigation aids must be associated with the feature **Deep Water Route** using the associations **Deep Water Route Aggregation** (see clause 25.6) and **Aids to Navigation Association** (see clause 25.2)

Remarks:

- The name of the DW, where known, must be populated using the complex attribute **feature name**. Where it is required for the name to be displayed in the ECDIS, the **Deep Water Route** must be encoded using surface geometry. The extent of the geometry of the **Deep Water Route** should utilise the geometry of the components of the route so as to cover its full extent.
- Where it is required to populate textual information for the DW, this should be done using the complex attribute **information** (see clause 2.4.6) for the **Deep Water Route**; or if the information is considered essential for safe navigation, using a **Caution Area** feature (see clause 16.10).

Distinction: Fairway System; Traffic Separation Scheme; Two-Way Route.



- Amended Clause 13.6.1, Remarks 16th bullet to distinguish between FAD and a wreck deliberately sunk to perform the function of a fish haven.

Inactive submarine volcanos must be encoded, if required, using a **Sea Area** feature (see clause 9.1).

- Platforms which have been cut-off above the seabed must be encoded as **Obstruction**, while platforms which have been cut-off to the level of the seabed should be encoded as **Foul Ground** (see clause 13.7).
- In certain circumstances where an obstruction is always dry (for example cribs), it must be covered by a **Land Area** feature.
- Features that are considered to be subsurface Fish Aggregating Devices (FAD) must be encoded as **Obstruction**, with **category of obstruction** = 5 (fish haven), unless the **feature** is a vessel that has been deliberately sunk to **perform the function of** a fish haven, which should be encoded as a **Wreck** feature (see clause 13.5).
- If it is required to encode a subsurface ocean data acquisition system (ODAS), whether on the seabed or suspended in the water column by a subsurface float, it must be done using **Obstruction** with **category of obstruction** = 14 (subsurface ocean data acquisition system (ODAS)). An ODAS buoy must be encoded as a **Special Purpose/General Buoy** feature (see clause 20.5).

Teh Stand Deleted: FAD

TS Teh Stand

DCEG SubWG meeting 3: needs more work. Distinc FAD and fish haven. SHOW: Show

Reply

No impact on FC.



- Added new Remark prohibiting Obstruction of geometric primitive curve where attribute categoryOfObstruction is populated s 23 (mangrove).

13.6.1.1 Mangroves (see S-4 – B-312.4)

Where the source indicates that a mangrove area is in the intertidal area, an **Obstruction** feature of type area, with attribute **category of obstruction** = 23 (mangrove) should be encoded on top of the portion of the intertidal area (**Depth Area** with attributes **depth range minimum value** = -H and **depth range maximum value** = 0 – see clause 11.7.3) where the mangrove coverage exists. The mandatory attribute **water level effect** should be populated with 1 (partially submerged at high water); and the conditional mandatory attribute

height populated with the approximate altitude of the highest point of the top of the mangroves if known or an empty (null) value if not. The seaward spatial type(s) of the mangrove area should be associated to an instance of the information type **Spatial Quality** (see clause 24.5) having the attribute **quality of horizontal measurement** = 4 (approximate). The landward edge of the mangrove area representing the high water line should be encoded as **Coastline** (see clause 5.3), having no value populated for the attribute **category of coastline**, and no value for **quality of horizontal measurement** on the related spatial type(s).

If it is required to encode an individual mangrove tree within the intertidal area, this must be done using an **Obstruction** feature of type point, with attribute **category of obstruction** = 23 (mangrove).

Where mangrove areas are required to be generalised on smaller optimum display scale ENC datasets such that the seaward edge of the mangrove only is to be indicated as the “apparent” coastline, this must be done using the feature **Coastline** (see clause 5.3).

Remarks:

- The encoding of Obstruction of type curve and having attribute category of obstruction = 23 (mangrove) is prohibited.

Distinction: Depth Area; Fishing Facility; Foul Ground; Marine Farm/Culture; Underwater/awash Rock; Water Turbulence; Wreck.

copy

TS **Teh Stand**
 Refer to [S-164 Sub-Group Git](#)
 February 02, 2024, 9:01 AM

No impact on FC.

Conformance to be assured by ENC Validation Check.



- Added attribute communicationChannel and amended encoding guidance to specify single communication channel instances should be encoded on the relevant feature but multiple instances of the same communication channel should be encoded using an associated ContactDetails feature.
 - HarbourFacility, Pilot Boarding Place, RadioCallingInPoint.
 - Guidance amended to be consistent throughout the document.

15.27 Radio calling-in point

IHO Definition: **RADIO CALLING-IN POINT**. A designated position at which vessels are required to report to a Traffic Control Centre. Also called reporting point or radio reporting point. (IHO Dictionary – S-32).

S-101 Geo Feature: Radio Calling-In Point (RDOCAL)

Primitives: Point, Curve

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

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
communication channel	(COMCHA)		TE	0..1
feature name		See clause 2.5.8	C	0..*
language		ISO 639-2/T	(S) TE	1,1
name	(OBNAM) (NOBJNM)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †
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 †

- If it is required to encode the area of a Vessel Traffic Service (VTS) containing radio reporting points or requiring periodic position reporting, this should be done using the feature **Vessel Traffic Service Area** (see clause 22.2).
- Each VHF-channel should be indicated [using the attribute communication channel \(see clause 27.76\)](#). [Alternately, if the same VHF-channel\(s\) apply to multiple features in the dataset, this should be indicated through an associated instance of the information type Contact Details, attribute communication channel \(see clause 24.1\).](#)

Distinction: Radio Station; Pilot Boarding Place; Vessel Traffic Service Area.

Jeff Wootton

Modelling consistency: Attribute **communication channel** has been included in S-101 (not a valid attribute for CGUSTA in S-57). Suggest that this should be modelled so as to require an associated instance of **Contact Details**.
IHO_Sec: Given the proposed change to re-introduce complex attribute **information** to the individual geo features, suggest that a similar approach may be taken for **communication channel**? If so, will need to revisit other features that formerly had communication channel as an allowable attribute.

Impacts on FC.



- Corrected Table 19-1 to remove columns for IQ and IVQ (no longer valid light characteristics in S-4).

19.1.1 Rhythms of lights (see S-4 – B-471.2)

The principal character of a light is its rhythm (although, strictly, fixed lights and some alternating lights are not "rhythmic").

If it is required to encode the rhythms of lights, this must be done using the complex attribute **rhythm of light**, sub-attributes **light characteristic** and **signal group**. When populating **rhythm of light**, the sub-attributes **signal group**, **signal period** and **signal sequence** are only valid for non-fixed lights (that is, sub-attribute **light characteristic** ≠ 1 (fixed)), with **signal group** and **signal period** being mandatory.

The use of these sub-attributes is defined in the following Table; it contains the most common examples of coding; other coding combinations are possible:

Rhythms of lights	F	Oc	Oc(2)	Oc(2+3)	Iso	FI	FI(3)	LFI
light characteristic	1	8	8	8	7	2	2	3
signal group	prohibited	(1)	(2)	(2+3)	(1)	(1)	(3)	(1)

Rhythms of lights	Q	Q(3)	VQ	VQ(3)	UQ	IUQ
light characteristic	4	4	5	5	6	11
signal group	(1)	(3)	(1)	(3)	(1)	()

Rhythms of lights	Mo(K)	F&F	Q(6)+LFI	VQ(6)+LFI	AlWR	AlFIWR	AlFI(2W+1R)	ALoc(4)WR
light characteristic	12	13	25	26	28	19	19	17
signal group	(K)	(1)(1)	(6)(1)	(6)(1)	()	(1)	(2+1)	(4)

Table 19-1 – Rhythms of lights – Common encoding examples

Some lights recently constructed may appear to the Mariner as "fixed and flashing - FFL" by night, while the real-world feature actually comprises two separate lights vertically disposed, one fixed and the other flashing (F&F). When it is known that two separate features actually exist, they must be encoded as separate light features, in this case two **Light All Around** features, one with complex attribute **rhythm of light**, sub-attribute **light characteristic** = 1 (fixed) and the other with **light characteristic** = 2 (flashing), and not as one **Light All Around** with **light characteristic** = 13 (fixed/flash).

TS Teh Stand ⋮ ✎ 📌

Columns for IQ and IVQ removed (no longer valid light characteristics). Refer to email from Christina 22/12/23 and IHO Sec response 16/01/24.

January 16, 2024, 7:38 AM

Reply

Impacts on FC.

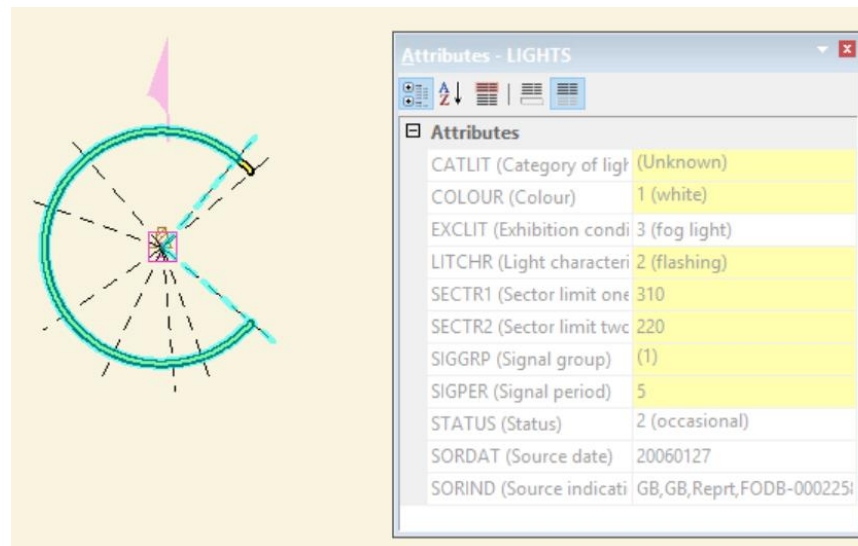


- Added attribute exhibitionConditionOfLight value 3 (fog signal) as an allowable value for feature LightSectored.
 - Use case provided by UK.

Refer to [S-101 Documentation and FC GitHub Issue #107](#) (closed).

19.3 Sector light

<i>IHO Definition:</i> SECTOR LIGHT. A light presenting different appearances (in particular, different colours) over various parts of the horizon of interest to maritime navigation. (IHO Dictionary – S-32).				
S-101 Geo Feature: Light Sectored (LIGHTS)				
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
category of light	(CATLIT)	4 : leading light 5 : aero light 8 : flood light 9 : strip light 10 : subsidiary light 11 : spotlight 12 : front 13 : rear 14 : lower 15 : upper 17 : emergency 18 : bearing light 19 : horizontally disposed 20 : vertically disposed	EN	0,*
exhibition condition of light	(EXCLIT)	1 : light shown without change of character 2 : daytime light 3 : fog light 4 : night light	EN	0,1
feature name		See clause 2.5.8	C	0,*



Impacts on FC.



- Added new guidance for encoding virtual AIS aids to navigation intended to serve a purpose other than those defined in attribute virtualAIS AidToNavigationType.

21.3.1 Virtual Automatic Identification System (AIS) aids to navigation (see S-4 – B-480-484)

If it is required to encode a virtual AIS aid to navigation, it must be done using the feature **Virtual AIS Aid to Navigation**.

Remarks:

- Virtual AIS aids to navigation should only be encoded where it is known that the Virtual aid is intended to be permanent, or deployed for a specified fixed period. Where it is known that a Virtual AIS aid to navigation is moved or withdrawn on a regular basis and/or at short notice, such that implementing these changes through the application of ENC Updates is impractical, the Virtual aid should not be encoded.
- **If the virtual AIS aid to navigation is intended to serve a purpose other than the types defined in attribute virtual AIS aid to navigation type, it should be encoded using virtual AIS aid to navigation type = 1 (special purpose), and the purpose encoded using the complex attribute information, sub-attribute text.**
- The unique Maritime Mobile Service Identity (MMSI) code for the virtual AIS aid to navigation should be encoded, where known, using the attribute **MMSI code**.

Distinction: Physical AIS Aid to Navigation; Radar Station; Radio Station; Radio Calling-In Point.

Markup Area

JW

Jeff Wootton



For attribute **virtual AIS aid to navigation type**, there may be other types of AtoNs (current list only includes IALA purposes).

IHO Sec: Suggest that a similar approach is taken to that of topmark, with new value for **virtual AIS aid to navigation type** of other purpose (see **purpose information**) and new complex attribute **purpose information**.

Have included this text as an interim solution.

February 11, 2024, 10:54 AM

No impact on FC.



- Corrected association TextAssociation to add missing feature SweptArea to the identifies Role.

25.16 Text association

IHO Definition: TEXT ASSOCIATION. A feature association for the binding between a geo feature and the cartographically positioned location for text.

Remarks:

- A **Text Association** must include one of any of the geo features included in the following list associated to a single **Text Placement** feature.

Role Type	Role	Associated With	Multiplicity
Composition	Positions	Text Placement	0,1
	Identifies	Administration Area, Airport/Airfield, Anchor Berth, Anchorage Area, Archipelagic Sea Lane, Archipelagic Sea Lane Area, Archipelagic Sea Lane Axis, Berth, Bollard, Bridge, Building, Built-Up Area, Cable Area, Cable Overhead, Cable Submarine, Canal, Cardinal Beacon, Cardinal Buoy, Cargo Transshipment Area, Causeway, Checkpoint, Coast Guard Station, Coastline, Collision Regulations Limit, Continental Shelf Area, Conveyor, Crane, Current – Non-Gravitational, Dam, Daymark, Deep Water Route, Deep Water Route Centreline, Deep Water Route Part, Distance Mark, Dock Area, Dolphin, Dredged Area, Dry Dock, Dumping Ground, Dyke, Emergency Wreck Marking Buoy, Fairway, Fairway System, Fence/Wall, Ferry Route, Fishery Zone, Fishing Facility, Fishing Ground, Floating Dock, Fog Signal, Fortified Structure, Foul Ground, Free Port Area, Gate, Gridiron, Harbour Area (Administrative), Harbour Facility, Helipad, Hulk, Ice Area, Information Area, Installation Buoy, Island Group, Isolated Danger Beacon,	0,1 {1,1 [C]}

Impacts on FC.

³ See clauses 18.2 and 19.1.8.

⁴ See clauses 6.9, 6.10 and 20.17

		Isolated Danger Buoy, Lake, Land Area, Land Elevation, Land Region, Landmark, Lateral Beacon, Lateral Buoy, Light Air Obstruction, Light All Around, Light Float, Light Fog Detector, Light Sector, Light Vessel, Local Magnetic Anomaly, Lock Basin, Log Pond, Marine Farm/Culture, Marine Pollution Regulations Area, Military Practice Area, Mooring Area, Mooring Buoy, Mooring Trot, Obstruction, Offshore Platform, Offshore Production Area, Oil Barrier, Physical AIS Aid to Navigation, Pile, Pilot Boarding Place, Pilotage District, Pipeline Overhead, Pipeline Submarine/On Land, Pontoon, Precautionary Area, Production/Storage Area, Pylon/Bridge Support, Radar Line, Radar Range, Radar Station, Radar Transponder Beacon, Radio Calling-In Point, Radio Station, Railway, Range System, Rapids, Recommended Route Centreline, Recommended Track, Rescue Station, Restricted Area, River, Road, Runway, Safe Water Beacon, Safe Water Buoy, Sea Area/Named Water Area, Seabed Area, Seagrass, Seaplane Landing Area, Shoreline Construction, Signal Station Traffic, Signal Station Warning, Silo/Tank, Slope Topline, Sloping Ground, Small Craft Facility, Sounding, Special Purpose/General Beacon, Special Purpose/General Buoy, Spring, Submarine Pipeline Area, Submarine Transit Lane, Swept Area , Tidal Stream Panel Data, Tidal Stream – Flood/Ebb, Tideway, Traffic Separation Scheme, Tunnel, Two-Way	
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- Corrected Note 1 for attribute categoryOfZoneOfConfidenceInData to include the Information type SpatialQuality in providing additional quality information.

C	± 500 m	Depth (m)	Accuracy (m)	corrected, depth anomalies may be expected.	conducted on an opportunity basis such as soundings on passage.
		10	± 2.5		
		30	± 3.5		
		100	± 7.0		
		1000	± 52.0		
D	Worse than zone of confidence C	Worse than zone of confidence C	Full area search not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.	
U	Unassessed – The quality of the bathymetric data has yet to be assessed				

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

Explanatory notes quoted in the Table:

¹ The allocation of a Zone of Confidence (ZOC) indicates that particular data meets minimum criteria for position and depth accuracy and seafloor coverage defined in this Table. ZOC categories reflect a charting standard and not just a hydrographic survey standard. Depth and position accuracies specified for each ZOC category refer to the errors of the final depicted soundings and include not only survey errors but also other errors introduced in the chart production process. Data is further qualified in [Meta Feature Type Quality](#) of [Bathymetric Data](#) (see clause 3.8) and [associated Information Type Spatial Quality](#) (see clause 24.5) attributes as follows:

- a) Positional Accuracy (**horizontal position uncertainty**) and Sounding Accuracy (**vertical uncertainty**)

No impact on FC.

[on the associated instance of Spatial Quality](#) may be used to indicate that a higher position or depth accuracy has been achieved than defined in this Table (for example a survey where full seafloor coverage was not achieved could not be classified higher than ZOC B; however, if the position accuracy was, for instance, ± 15 metres, the attribute **horizontal position uncertainty** could be used to indicate this).

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

c) The complex attribute **survey date range** [on the Quality of Bathymetric Data feature](#) is used to indicate the start and end dates of the survey(s) covering the area.

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

³ Depth accuracy of depicted soundings = $a + (b-d)/100$ at 95% CI (2.00 sigma), where d = depth in metres at the critical depth. Depth accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

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

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

A full seafloor search indicates that a systematic survey was conducted using detection systems, depth measurement systems, procedures, and trained personnel designed to detect and measure depths on

Teh Stand Deleted: Class



IHO

DCEG EDITION 2.0.0 DRAFT CHANGES (20)

International
Hydrographic
Organization

- Corrected the definition of attribute maximumPermittedVesselLength to refer to length rather than draught.

27.125 maximum permitted vessel length

IHO Definition: **MAXIMUM PERMITTED VESSEL LENGTH.** The maximum length of a vessel permitted in channel or dock, at a berth, or at an anchorage or mooring.

Attribute Type: Real

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

Resolution: 0.1m

Format: xxx.x

Example: **30.5** for a maximum permitted vessel length of 30.5 metres

Remarks:

- No remarks.

Teh Stand January 16, 2024
Deleted: draught

Impacts on FC.



- Removed redundant complex attribute updateDescription.

29.35 value of local magnetic anomaly

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

Indication: The complex attribute encodes the range of the local magnetic anomaly.

Sub-attributes: **magnetic anomaly value** see clause 27.121
 reference direction see clause 27.147

Remarks:

- No remarks.

Teh Stand Tuesday
Deleted: <#>update description

Teh Stand
Deleted: <#>¶
IHO Definition: **UPDATE DESCRIPTION.** The textual description of changes included in an update.¶
Indication: The complex attribute provides additional textual information describing changes made to an ENC dataset resulting from application of an ENC Update.¶
Sub-attributes: **language** → see clause 27.112¶
 → **text** → see clause 27.176¶
Remarks:¶
 <#>The sub-attribute **text** is populated with a brief description of the changes made when the Update is applied, for example: **Navigational aids inserted**¶
 → **Changes to depths alongside and new pontoons added**

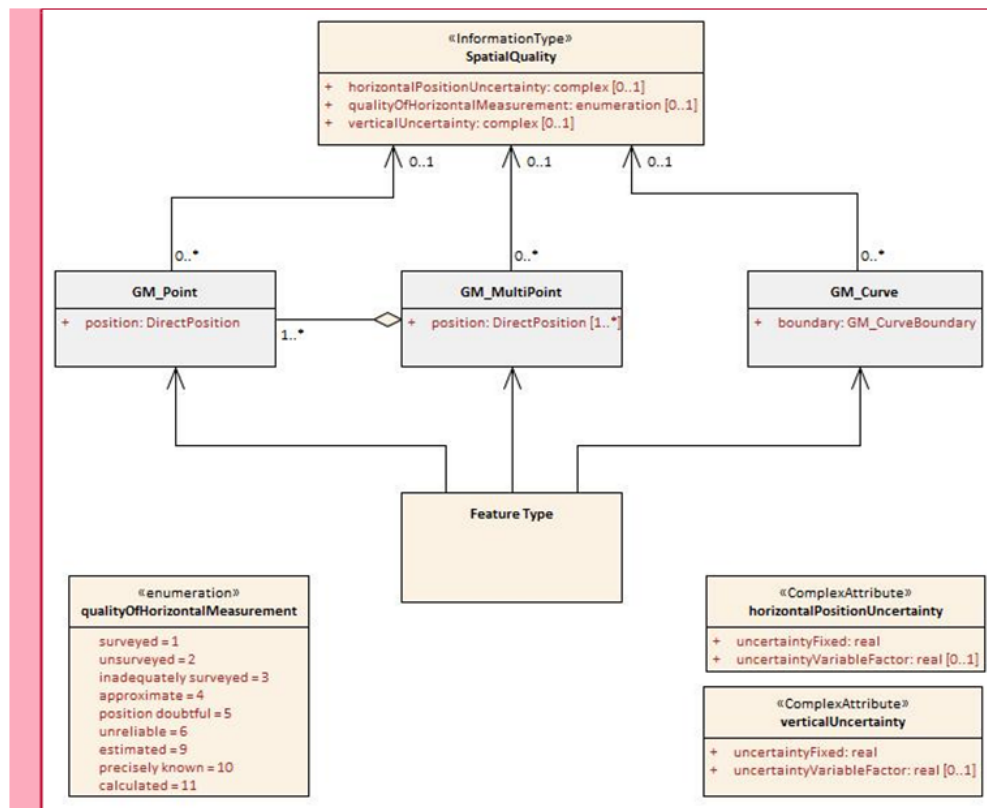
No impact on FC.



- Figure 2-1 – Spatial Quality information type – requires review/update.

2.4.7 Spatial attribute types

Spatial attribute types must contain referenced geometry and may be associated with spatial quality attributes. Each spatial attribute instance must be referenced by a feature instance or another spatial attribute instance.



Teh Stand décembre 21, 2022
 Figure needs to be reviewed based on allowing spatial edges of surface type features to be associated with **Spatial Quality**.

Refer also to [S-101 Documentation](#) and [FC GitHub Issue #105](#).

Figure 2-1 – Spatial Quality information type



IHO

OTHER ISSUES: ADD ATTRIBUTE REPORTED DATE TO LAND AREA

International Hydrographic Organization

- Requested so as to be able to encode works in progress or planned.

5.4 Land area

IHO Definition: LAND AREA. The solid portion of the Earth's surface, as opposed to sea, water. (IHO Dictionary – S-32).

S-101 Geo Feature: Land Area (LNDARE)

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
condition	(CONDTN)	1 : under construction 3 : under reclamation 5 : planned construction	EN	0,1
feature name		See clause 2.5.8	C	0,*
language		ISO 639-2/T	(S) TE	1,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †
status	(STATUS)	18 : existence doubtful	EN	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1

8.1.2 Works at sea (see S-4 – B-329.2-5)

Works at sea which will extend the coastline seaward, where the line of the future coastline (including piers, etc) is known, must be encoded, where required, as described in clause 8.1 above, using the appropriate features. The existing coastline should remain until the works are completed and the new coastline has been established. The area of reclamation or construction must also be covered by the appropriate feature(s) from the Skin of the Earth. This may be **Depth Area** at commencement of the works, or if the works are planned and have not yet commenced; **Unsurveyed Area** while reclamation/construction is in progress but the area is still covered by water; or **Land Area** where the area of the works has been reclaimed (that is, is always dry).

Teh Stand ⋮ ✎ 👍

ENC Conversion Sub-Group meeting 31/01/24:
Suggest adding attribute reportedDate to facilitate encoding of works in progress or planned. Refer to [S-101 Documentation and FC Issue #111](#).

February 01, 2024, 11:27 AM

Reply

Refer also to [S-101 Documentation and FC GitHub Issue #111](#).

The screenshot shows a GitHub issue page for the repository 'iho-ohi / S-101-Documentation-and-FC'. The issue title is 'Add attribute reportedDate to feature LandArea #111'. It is marked as 'Open' and was opened by JeffWootton last week. The issue description includes a reference to '4.6.10 Works in progress and projected (see S-4 – B-329)' and lists features to be encoded: LNDARE, SLCONS, DRYDOC, PIPSOL. The issue has 29 comments, 1 pull request, and 18 stars. Labels include 'DCEG', 'Feature Catalogue', and 'For S-101 Ed 2.0.0'.



IHO

OTHER ISSUES: ALLOWABLE FORMATS FOR PICTURE FILES

International Hydrographic Organization

- Should other file formats other than .TIF be allowed?

value other than English populated for sub-attribute **language**) within the dataset.

2.4.12.2 Reference to pictorial files

The attribute **pictorial representation** should only be populated where the information is considered important in terms of safety of navigation and protection of the marine environment. Picture files that form part of the ENC must be in Tagged Image File (TIF) format 6.0.

Encoders should also consider, when including a reference to an external graphics file, whether the file is appropriate in terms of:

- Size of the file: Graphics files should be kept to a minimum file size, and should be considered in relation to the maximum allowable size of an ENC dataset (10Mb). Therefore, for example, a graphic file of 100Mb should be considered to be inappropriate. Using the following values as a guideline for TIF files will ensure acceptable size files:

Recommended Resolution:	96 DPI
Minimum Size <u>x,y</u> :	200,200 pixels
Maximum Size <u>x,y</u> :	800,800 pixels
Bit Depth:	8 Bit Indexed Colour
Compression:	LZW
Format:	Tiff 6.0

Table 2-4 – Recommended formatting for TIF files

- Content of the graphic: The information contained in the graphic should supplement, in terms of navigational relevance, the encoding of the associated feature. For example, an image of a standard IALA special purpose buoy that duplicates the attribution of the associated **Special Purpose/General Buoy** provides no relevant supplementary information to the Mariner (and may be considered to be double encoding), and therefore should not be included.
- Aspect: Graphics should provide perspective relevant to the view of the Mariner. For example, an image of the top of a bridge derived from a photograph taken from the top of a bridge tower or nearby building does not provide the Mariner with any information relevant to their location, and should not be included. However, an image derived from a photograph taken from a vessel approaching the bridge may be considered relevant.

Teh Stand octobre 30, 2023
 Different formats allowable for picture files? Refer to email from Christina Ulrich 26/10/23 and [S-101 Documentation and FC Issue #113](#).

Refer also to [S-101 Documentation and FC GitHub Issue #113](#).

The screenshot shows a GitHub issue page for 'iho-ohi / S-101-Documentation-and-FC'. The issue title is 'New allowable formats for S-101 Support Files? #113'. It was opened by JeffWootton yesterday and has 2 comments. A comment from JeffWootton states: 'It has been suggested that additional file formats should be considered for S-101 support picture files (currently only .TIF). Please refer to email correspondence with Christina Ulrich (SevenCs): [Support File Format Correspondence.docx](#)'. The issue is labeled with 'DCEG', 'enhancement', and 'question'. The right sidebar shows 'Assignees: No one—assign yourself', 'Labels: DCEG, enhancement, question', 'Projects: None yet', and 'Milestone:'. The top navigation bar includes 'Code', 'Issues 29', 'Pull requests 1', 'Actions', 'Projects', 'Wiki', 'Security', and 'Insights'.



- Noting naming of buoy and beacon features in Edition 1.2.0, done for consistency between IHO Hydrographic Dictionary, GI Registry and S-101, suggest that a review is conducted on all other features in the DCEG (and possibly some attributes and enumerates) to ensure similar consistency.
 - Possible candidates: Light features; cables, pipelines.
 - Suggest that for S-101 Edition 2.0.0 this review is constrained only to terms that are both hydrographic dictionary and S-101 terms.

English

Use the "Quick Search" box to locate your required term and/or definition. The following "Search conditions" can be used to refine your search: "Contains", "E" or "Does not equal."

« 1 »

Refresh Export

<input type="checkbox"/>	Eng ID	Term	Definition
<input type="checkbox"/>	1898	<i>fog detector light</i>	A light used to automatically determine conditions of visibility which warrant the turning on or off of a sound signal.

« 1 »

19.4 Fog detector light

IHO Definition: FOG DETECTOR LIGHT. A fog detector light is a light used to automatically determine conditions of visibility which warrant the turning on or off of a sound signal. (IHO Dictionary – S-32).				
S-101 Geo Feature: Light Fog Detector (LIGHTS)				
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
colour	(COLOUR)	1 : white 3 : red 4 : green	EN	0,*



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OTHER ISSUES: FORMAT OF INTEROPERABILITY IDENTIFIER

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- Attribute type for interoperabilityIdentifier is currently defined as free text.
 - Format prescribes that the format is URN.
- S-100 includes the predefined derived type URN.
- Should the type for interoperabilityIdentifier be amended to URN?

27.113 interoperability identifier

IHO Definition: INTEROPERABILITY IDENTIFIER. A common unique identifier for entities which desc single real-world feature, and which is used to identify instances of the feature in end-user systems whe feature may be included in multiple data product types. (IHO Nautical Information Provision Working C 2023).

Attribute Type: Free text

Indication: The identifier is encoded using the Marine Resource Name (MRN) concept and names administered by IALA, that follows the syntax and semantics for URNs specified in RFC 2141.

Format: urn:mrn:[Organisational ID]:..... (mandatory)

Example: urn:mrn:iho:mc:1234.5

Table 1-2 — Data Types

Name	Description
Integer	A signed integer number, the representation of an integer is encapsulation and usage dependent. EXAMPLES 29, -65547
PositiveInteger	An unsigned integer number greater than 0.
NonNegativeInteger	An unsigned integer number greater than or equal to 0.
Real	A signed real (floating point) number consisting of a mantissa and an exponent, the representation of a real is encapsulation and usage dependent. EXAMPLES 23.501, -1.234E-4, -23.0
Boolean	A value representing binary logic. The value can be either true or false.
CharacterString	A CharacterString is an arbitrary-length sequence of characters including accents and special characters from repertoire of one of the adopted character sets.
Date	A date gives values for year, month and day according to the Gregorian Calendar. Character encoding of a date is a string which shall follow the calendar date format (complete representation, basic format) for date specified by ISO 8601. EXAMPLE 19900910 (YYYYMMDD) In XML formats, the XML Schema standard type should be used instead of the ISO 8601 basic representation (which is not a standard type in XML). EXAMPLE: 1990-09-10
Time	A time is given by an hour, minute and second in the 24-hour clock system. Character encoding of a time shall be a complete representation of the basic format as defined in ISO 8601. Complete representation means that hours, minutes and seconds shall be used. Basic format means that separating characters are omitted. Time is preferably expressed as Universal Time Coordinated (UTC). EXAMPLE 103059Z Time may be expressed as a Local Time with a given offset to UTC. EXAMPLE 103059+0100 Time may be expressed as a Local Time without a specified offset to UTC.

Is, see S-100 Part 3, clause 3-10.

S100_DatasetDiscoveryMetadata

Role Name	Name	Description	Mult	Type	Remarks
Class	S100_DatasetDiscoveryMetadata	Metadata about the individual datasets in the Exchange Catalogue	-	-	-
Attribute	fileName	Dataset file name	1	URI	See Part 1, clause 1-4.6
Attribute	description	Short description giving the area or location covered by the dataset	0..1	CharacterString	For example, a harbour or port name, between two named locations etc
Attribute	datasetID	Dataset ID expressed as a Marine Resource Name	0..1	URN	The URN must be an MRN
Attribute	compressionFlag	Indicates if the resource is compressed	1	Boolean	True indicates a compressed dataset resource

1-4.6 Predefined derived types

Derived types are derived from the basic types or other derived types by restriction of the range of allowed values. The following derived types are defined in S-100. Product Specifications may define additional derived types.

Table 1-4 — Predefined Derived Types

Name	Description	Derived From
URI	A uniform resource identifier as defined in RFC 3986. Character encoding of a URI shall follow the syntax rules defined in RFC 3986. EXAMPLE http://registry.iho.int	CharacterString
URL	A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986). EXAMPLE http://registry.iho.int	URI
URN	A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141. EXAMPLE urn:iho:s101:1:0:0:AnchorageArea	URI



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OUTSTANDING ACTIONS/ISSUES

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- (Clause 2.5.8) Graphical and tabular examples of encoding of geographic names required (*not critical for Edition 2.0.0*).
- (Clause 2.5.8.1) Enhanced introductory guidance on encoding TextPlacement required (Action S-101PT10-04 and [S-101 Documentation and FC Issue #7](#)) (*not critical for Edition 2.0.0*).
- (Clause 2.5.10) Improved guidance on masking (Action PortSG-60 and [S-101 Documentation and FC Issue #26](#)) (*not critical for Edition 2.0.0*).
- (Clause 4.1) Possible removal of point as an allowable geometric primitive for feature MagneticVariation ([S-101 Documentation and FC Issue #115](#)) (***decision required for Edition 2.0.0***).
- (Clause 5.11) Allowable values of waterLevelEffect for LandRegion ([S-101 Documentation and FC Issue #116](#)) (***decision required for Edition 2.0.0***).
- (Clause 5.15.1) Allow SlopeTopline to be encoded in the water ([S-101 Documentation and FC Issue #117](#)) (*not critical for Edition 2.0.0*).



- (Clause 5.11) Add inTheWater as an allowable attribute for feature BuiltUpArea ([S-101 Documentation and FC Issue #118](#)) (***decision required for Edition 2.0.0***).
- (Clause 6.10) CableOverhead - allowable value for attribute categoryOfCable ([S-101 Documentation and FC Issue #119](#)) (***decision required for Edition 2.0.0***).
- New feature DepthDiscontinuity (is this still a valid proposal) ([S-101 Documentation and FC Issue #120](#)) (***decision required for Edition 2.0.0***).
- (Clause 13.6.2) Figure showing encoding for mangroves required (*not critical for Edition 2.0.0*).
- Multiplicity of “system” attribute flareBearing ([S-101 Documentation and FC Issue #121](#)) (***decision required for Edition 2.0.0***).
- (Clause 19.3.1.3) Figure showing encoding of “oscillating” light sectors required (*not critical for Edition 2.0.0*).



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OUTSTANDING ACTIONS/ISSUES (3)

- Review of Section 31 (*not critical for Edition 2.0.0*).

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DCEG PROPOSED WAY AHEAD

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- Apply all changes approved at S-101PT12 and circulate draft Edition 2.0.0 to S-101PT members for review (by 21 February 2024).
- S-101PT review (feedback by end of March 2024).
- DCEG Sub-Group (and possibly Associations Sub-Group) meeting(s) to adjudicate review comments, address all outstanding GitHub Issues and agree on final amendments to DCEG (early April 2024).
- Submit final draft of DCEG Edition 2.0.0 to KHOA for preparation of first cut of Edition 2.0.0 Feature Catalogue (mid-April 2024).
- Circulate final draft to DCEG Sub-Group for review of final changes made and feedback (on final changes only) (mid-April 2024).
- Finalize draft Edition 2.0.0 for submission to S-101PT13 (mid-May 2024).
- S-101PT approval of final draft S-101 DCEG (S-101PT13 – June 2024).



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SUMMARY OF QUESTIONS FOR S-101PT

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- Should a summary Table be included in DCEG clause 2.3 for restricted allowable geometric primitives based on encoded attribution?
- Is a review of Figure 2-1 – Spatial Quality (UML) required? If so who (Raphael)?
- Should attribute reportedDate be added as an allowable attribute for LandArea?
- Should formats other than .TIF be allowable for picture files in S-101?
- Should the type for interoperabilityIdentifier be amended to URN?



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ACTIONS REQUESTED OF S-101PT

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- **Note** the progress in the development of S-101 DCEG Edition 2.0.0.
- **Discuss** and **Approve** the changes made so far in S-101 Edition 2.0.0 DCEG.
- **Address** the questions included in this Paper (previous slide) and assign appropriate Actions.
- **Agree** the proposal to review S-101 feature names for consistency with IHO Hydrographic Dictionary.
- **Agree** on the proposed way forward for S-101 DCEG Edition 2.0.0 development.
- **Initiate** further action as required.



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THANK YOU

S-101PT12 Remote (VTC) Meeting, 13-15 February 2024