

**Annex A Data Classification and Encoding
Guide**

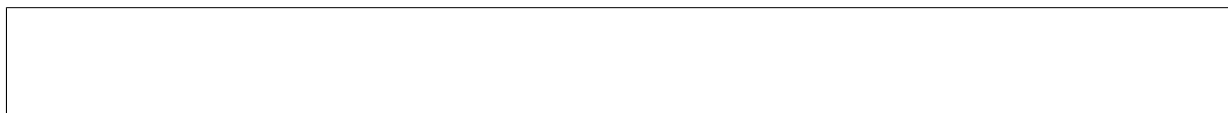
IHO Electronic Navigational Chart (ENC) Product Specification

Edition 2.0.0 – December 2024

IHO



International
Hydrographic
Organization



1 Overview

1.2 S-101 Annex A; Data Classification and Encoding Guide — Metadata

NOTE

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Contact	International Hydrographic Organization 4b, quai Antoine 1er B.P. 445 MC 98011 MONACO CEDEX Telephone: +377 93 10 81 00 Fax: +377 93 10 81 40
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2 General

2.4 Attributes

2.4.2 Simple attribute types

EN	Enumeration: A fixed list of valid identifiers of named literal values. Attributes of an enumeration type may only take values from this list. The complete list of allowable values for S-101 enumeration type attributes is included in Sections 27, 28, and 30 ; these values may be further constrained for the binding of the attribute to specific feature and information types.
BO	Boolean: A value representing binary logic. The value can be either (1) <i>True</i> , (2) <i>False</i> or empty (Unknown). The “default state” for Boolean type attributes, unless stated otherwise in this document, is <i>False</i> for instances where the

	attribute is allowable for a feature, is non-mandatory and has not been populated (and is therefore not included for the feature instance). An empty (Unknown) value should only be populated where the Boolean type attribute is mandatory but the value (<i>True</i> or <i>False</i>) is not known to the encoder.
RE	Real: A signed Real (floating point) number consisting of a mantissa and an exponent. The representation of a real is encapsulation and usage dependent. In S-100, “precision”, as it applies to the IHO GI Registry and the S-101 Feature Catalogue, is defined as a non-negative integer expressing the constraint of the exponent of a real number (that is, “1” means the real number is constrained to a precision of 0.1; “2” means the real number is constrained to a precision of 0.01; etc) (S-100 Part 2a, Section 2a-4.2.10). For the attribute descriptions included in Sections 27, 28, and 30 of this document, the values quoted for precision are expressed in more “human-readable” terms as the exponent of the real type attribute (0.1, 0.01, 0.001, ...). Examples: 23.501, -0.0001234, -23.0, 3.141296
IN	Integer: A signed integer number. The representation of an integer is encapsulation and usage dependent. Examples: 29, -65547
TE	Text: A <code>CharacterString</code>, that is an arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets.
TD	Truncated Date (S100_TruncatedDate): Allows a partial date to be encoded as an extension to the ISO 8601 compliant date attribute type values for year, month and day according to the Gregorian Calendar. Character encoding of a date is a string which follows the calendar date format (complete representation, basic format) for date specified by ISO 8601. See Clause 2.4.8. Example: 19610922 (YYYYMMDD)
TI	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: 183059Z

	Time may be expressed as a Local Time with a given offset to UTC. Example: 183059+0100 Time may be expressed as a Local Time without a specified offset to UTC. Example: 183059 The complete representation of the time of 27 minutes and 46 seconds past 15 hours locally in Geneva (in winter one hour ahead of UTC), and in New York (in winter five hours behind UTC), together with the indication of the difference between the time scale of local time and UTC, are used below as examples. Geneva: 152746+0100 New York: 152746-0500 The service hours for a service, that is available all year in an area where Daylight Saving Hour affects the offset to UTC, could be expressed as Local Time without specified offset. Example: Opening: 074500 Closing: 161500
URI	Universal Resource Identifier: A derivation of <code>CharacterString</code>. URI is a uniform resource identifier as defined in RFC 3986. Character encoding of a URI must follow the syntax rules defined in RFC 3986. For S-101, the attribute type URI is constrained to conformance with the HTTP or HTTPS protocols; that is, the character string must commence with <i>http://</i> or <i>https://</i>. Example: https://registry.iho.int
URN	Universal Resource Name: A derivation of the <code>CharacterString</code> predefined derived type Universal Resource Identifier (URI). URN allows a persistent, location-independent, resource identifier to be encoded that follows the syntax and semantics for URNs specified in RFC 2141. For S-101, the attribute type URN is used mainly to define Maritime Resource Names (MRN), typically in the IHO namespace — <i>urn:mrn:iho:....</i> Example: urn:mrn:iho:s101:2:0:0:AnchorageArea

2.5 Datasets

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2.5.9 Sample scale minimum policy

Table 2-6 — scale minimum values

19999999
9999999
4999999
3499999
1499999
999999
699999
499999
349999
259999
179999
119999
89999
59999
44999
29999
21999
17999
11999
7999
3999
2999
1999
999

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NOTE

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- 2)
- 3)
- 4)
- 5)

2.6 Description of table format for S-101 meta, geo and information features

IHO Definition: FEATURE: Definition. (Authority for definition).				
S-101 Geo Feature: Feature (S-57 Acronym) S-101 feature type, name and corresponding S-57 acronym				
Primitives: Point, Curve, Surface, None Allowable geometric primitive(s)				
<i>Real World</i> Example(s) of real-world instance(s) of the Feature.	<i>Paper Chart Symbol</i> Example(s) of paper chart equivalent symbology for the Feature.	<i>ECDIS Symbol</i> Example(s) of ECDIS symbology for the Feature.		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of beer		1: ale 2: lager 3: porter 4: stout 5: pilsener 6: bock beer 7: wheat beer 8: pale ale 9: indian pale ale	EN	1,1
This section lists the full list of allowable attributes for the S-101 feature. Attributes are listed in alphabetical order. Sub-attributes (Type prefix (S)) of complex (Type C) attributes are listed in alphabetical order and indented directly under the entry for the complex attribute (see below for example). Note that a complex attribute may have simple or complex attributes as sub-complex attributes.	This section lists the corresponding S-57 attribute acronym. A blank cell indicates no corresponding S-57 acronym.	This section lists the allowable encoding values for S-101 (for enumeration (E) Type attributes only). Further information about the attribute is available in Sections 27 to 30 .	Attribute type (see Clause 2.4.2).	Multiplicity describes the “cardinality” of the attribute in regard to the feature. See Clause 2.4.1 .
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1a
date start	(DATSTA)		(S) TD	0,1a
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDTS)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
Role name	Name of Association (see Section 25.xx)	Feature or Information Type(s)	Association/Aggregation/Composition	0,1
See Section 26 .	See Section 25 .	Corresponds to the feature(s) that the subject feature may be associated to. See Section 25	Association type.	The individual multiplicity to which the subject feature may be associated to the “Associated to” feature(s) (see Section 25).
For each instance of information, at least one of the sub-attributes file reference or text must be populated. The “[†]” superscript in the Multiplicity column indicates a “conditional” mandatory attribute. See Clause 2.4.3. <u>INT 1 Reference</u>: The INT 1 location(s) of the Feature — by INT1 Section and Section Number. X.X.X Sub-clause heading(s) (see S-4 — B-YYY.Y) Introductory remarks. Includes information regarding the real world entity/situation requiring the encoding of the Feature in the ENC, and where required nautical cartographic principles relevant to the Feature to aid the compiler in determining encoding requirements. Specific instructions to encode the feature. Note that in all sub-clauses feature types and association names are shown in Bold Capitalised Text; attributes (complex, sub- and simple) are shown in bold lower case text; and attribute values (including enumerate codes) are shown in <i>italic text</i>. <u>Remarks</u>: - Additional encoding guidance relevant to the feature. X.X.X.X Sub-sub-clause heading(s) (see S-4 — B-CCC.C) Clauses related to specific encoding scenarios for the Feature. (Not required for all Features). <u>Remarks</u>: - Additional encoding guidance relevant to the scenario (only if required). <u>Distinction</u>: List of features in the Product Specification distinct from the Feature.				
^a For each instance of fixed date range, at least one of the sub-attributes date end or date start must be populated.				

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3 Metadata Features

3.4 Quality of non-bathymetric data

IHO Definition: QUALITY OF NON-BATHYMETRIC DATA. An area within which a uniform assessment of the quality of the non-bathymetric data exists. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 1, Page 1.208, November 2000).				
S-101 Metadata Feature: Quality of Non-Bathymetric Data (M_ACCY)				
Primitives: 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 temporal variation		1: extreme event 4: likely to change	EN	0,1
horizontal distance uncertainty	(HORACC)		RE	0,1
horizontal position uncertainty	(POSACC)		C	1,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
orientation uncertainty			RE	0,1
survey date range		See Clause 2.4.8	C	0,1
date end	(SUREND)		(S) TD	1,1
date start	(SURSTA)		(S) TD	0,1
vertical uncertainty	(VERACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

3.7 Local direction of buoyage

IHO Definition: LOCAL DIRECTION OF BUOYAGE . An area within which the navigational system of marks has been established in relation to a specific direction. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 1, Page 1.214, November 2000).				
S-101 Metadata Feature: Local Direction of Buoyage (<i>M_NSYS</i>)				
Primitives: 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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	1,1
orientation value	(ORIENT)		RE	1,1
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) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

3.8 Quality of bathymetric data

IHO Definition: QUALITY OF BATHYMETRIC DATA . An area within which a uniform assessment of the quality of the bathymetric data exists. (S-57 Edition 3.1, Appendix A—Chapter 1, Page 1.216, November 2000).				
S-101 Metadata Feature: Quality of Bathymetric Data (M_QUAL)				
Primitives: 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 temporal variation		1: extreme event 2: likely to change and significant shoaling expected 3: likely to change but significant shoaling not expected 5: unlikely to change 6: unassessed	EN	1,1
data assessment		1: assessed 2: assessed (oceanic) 3: unassessed	EN	1,1
depth range maximum value	(DRVAL2)		RE	0,1
depth range minimum value	(DRVAL1)		RE	0,1
features detected			C	1,1
least depth of detected features measured			(S) BO	1,1
significant features detected			(S) BO	1,1
size of features detected			(S) RE	0,1
full seafloor coverage achieved			BO	1,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
survey date range		See Clause 2.4.8	C	0,1
date end	(SUREND)		(S) TD	1,1

date start	(SURSTA)		(S) TD	0,1
zone of confidence			C	1,*
category of zone of confidence in data	CATZOC	1: zone of confidence A 12: zone of confidence A 23: zone of confidence B 4: zone of confidence C 5: zone of confidence D 6: zone of confidence U	EN	1,1
fixed date range		See Clause 2.4.8	(S) C	0,1 a
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal position uncertainty	(HORACC)		(S) C	0,1 a
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical uncertainty	(SOUACC)		(S) C	0,1 a
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
-	Quality of Bathymetric Data Composition (see Clause 25.12)	Spatial Quality	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a The sub-complex attribute **fixed date range** is mandatory if more than one instance of the complex attribute **zone of confidence** is encoded. The sub-complex attributes **horizontal position uncertainty** and **vertical uncertainty** are mandatory if the **Quality of Bathymetric Data** instance is not associated to a **Spatial Quality** instance using the association **Quality of Bathymetric Data Composition**. 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.

3.9 Sounding datum

IHO Definition: SOUNDING DATUM . The horizontal plane or tidal datum to which soundings have been reduced. Also called datum for sounding reduction. (Adapted from IHO Dictionary — S-32).				
S-101 Metadata Feature: Sounding Datum (M_SDAT)				
Primitives: 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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
vertical datum	(VERDAT)	1: mean low water springs 2: mean lower low water springs 3: mean sea level 4: lowest low water 5: mean low water 6: lowest low water springs 7: approximate mean low water springs 8: indian spring low water 9: low water springs 10: approximate lowest astronomical tide 11: nearly lowest low water 12: mean lower low water 13: low water 14: approximate mean low water 15: approximate mean lower low water 19: approximate mean sea level 22: equinoctial spring low water 23: lowest astronomical tide 24: local datum 25: international great lakes datum 1985 26: mean water level 27: lower low water large tide 44: baltic sea chart datum 2000	EN	1,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDS)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

3.10 Vertical datum of data

IHO Definition: VERTICAL DATUM OF DATA . Any level surface (for example Mean Sea Level) taken as a surface of reference to which the elevations within a data set are reduced. Also called datum level, reference level, reference plane, levelling datum, datum for heights. (Adapted from IHO Dictionary — S-32).				
S-101 Metadata Feature: Vertical Datum of Data (M_VDAT)				
Primitives: 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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	1,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

3.11 Quality of survey

IHO Definition: QUALITY OF SURVEY . An area within which a uniform assessment of the reliability of source survey information exists. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.218, November 2000).				
S-101 Metadata Feature: Quality of Survey (M_SREL)				
Primitives: Curve, 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
depth range maximum value	(DRVAL2)		RE	0,1
depth range minimum value	(DRVAL1)		RE	0,1
features detected			C	0,1
least depth of detected features measured			(S) BO	1,1
significant features detected			(S) BO	1,1
size of features detected			(S) RE	0,1
full seafloor coverage achieved			BO	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
line spacing maximum			IN	0,1
line spacing minimum			IN	0,1
measurement distance maximum	(SDISMX)		RE	0,1
measurement distance minimum	(SDISMN)		RE	0,1
quality of horizontal measurement	(QUAPOS)	4: approximate	EN	0,1
quality of vertical measurement	(QUASOU)	1: depth known	EN	0,*

		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 8: value reported (not surveyed) 9: value reported (not confirmed) 10: maintained depth 11: not regularly maintained		
scale value maximum	(SCVAL1)	scale value maximum < scale value minimum	IN	0,1
scale value minimum	(SCVAL2)	scale value minimum > scale value maximum	IN	0,1
survey authority	(SURATH)		TE	1,1
survey date range		See Clause 2.4.8	C	1,1
date end	(SUREND)		(S) TD	1,1
date start	(SURSTA)		(S) TD	0,1
survey type	(SURTYP)	1: reconnaissance/sketch survey 2: controlled survey 4: examination survey 5: passage survey 6: remotely sensed 7: full coverage 8: systematic survey 9: non-systematic survey 10: inadequately surveyed 11: spot-sounding survey 12: acoustically swept survey 13: mechanically swept survey	EN	1,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 4: found by diver 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 10: photogrammetry 11: satellite imagery 12: found by levelling 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

4 Geo Features — Magnetic Data

4.1 Magnetic variation

IHO Definition: MAGNETIC VARIATION. The angle between the magnetic and geographic meridians at any place, expressed in degrees east or west to indicate the direction of magnetic north from true north. Also called magnetic declination. (IHO Dictionary — S-32).				
S-101 Geo Feature: Magnetic Variation (MAGVAR)				
Primitives: Point, Curve, 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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reference year for magnetic variation	(RYRMGV)	See Clause 2.4.8 (YYYY----)	TD	1,1
value of annual change in magnetic variation	(VALACM)	+/- minutes. Positive (unsigned) value indicates easterly. Negative value indicates westerly	RE	1,1
value of magnetic variation	(VALMAG)	+/- degrees. Positive (unsigned) value indicates easterly. Negative value indicates westerly	RE	1,1
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) (NXTDSC)		(S) TE	0,1a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

4.2 Local magnetic anomaly

IHO Definition: LOCAL MAGNETIC ANOMALY. An anomaly of the magnetic field of the Earth, extending over a relatively small area, due to local magnetic influences. Also called local attraction or magnetic anomaly. (IHO Dictionary — S-32).				
S-101 Geo Feature: Local Magnetic Anomaly (LOCMAG)				
Primitives: Point, Curve, 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
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 a
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The sub-attribute name usage may be mandatory for certain encoding combinations for instances of complex attribute feature name . See Clause 2.5.8 . 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.				

5 Geo Features — Natural Features

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5.3 Coastline

<u>IHO Definition:</u> COASTLINE . The line where shore and water meet. Shoreline and coastline are generally used synonymously. (IHO Dictionary — S-32).
S-101 Geo Feature: Coastline (COALNE)
Primitives: Curve

<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 coastline	(CATCOA)	1: steep coast 2: flat coast 6: glacier, seaward end 7: mangrove 8: marshy shore 10: ice coast	EN	0,1
colour	(COLOUR)	1: white 2: black 3: red 4: green 6: yellow 7: grey 8: brown 11: orange 13: pink	EN	0,*
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of surface	(NATSUR)	1: mud 2: clay 3: silt 4: sand 5: stone 6: gravel 7: pebbles 8: cobbles 9: rock 11: lava 14: coral 17: shells	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
visual prominence	(CONVIS)	1: visually conspicuous 2: not visually conspicuous 3: prominent	EN	0,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

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>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
condition	(COND TN)	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	(<i>OBJNAM</i>) (<i>NOBJNM</i>)		(S) TE	1,1
name usage		1: default name display 2: alternate name display	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reported date	(<i>SORDAT</i>)	See Clause 2.4.8	TD	0,1
status	(<i>STATUS</i>)	18: existence doubtful	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Island Aggregation (see Clause 25.9)	Island Group	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.5 Island group

IHO Definition: ISLAND GROUP . A named group of islands, including archipelagos.				
S-101 Geo Feature: Island Group (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	1,*
language		ISO 639-2/T	(S) TE	1,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1: default name display	(S) EN	0,1 a

		2: alternate name display		
interoperability identifier		MRN (see Clause 27.114)	URN	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFORM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Collection	Island Aggregation (see Clause 25.9)	Land Area, Island Group	Aggregation	0,1
The Component	Island Aggregation (see Clause 25.9)	Land Area, Island Group	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.7 River

IHO Definition: RIVER . A relatively large natural stream of water. (IHO Dictionary — S-32)				
S-101 Geo Feature: River (RIVERS)				
Primitives: Curve, 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
status	(STATUS)	5: periodic/intermittent	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.8 Rapids

IHO Definition: RAPIDS . Portions of a stream with accelerated current where it descends rapidly but without a break in the slope of the bed sufficient to form a waterfall. Usually used in the plural. (IHO Dictionary — S-32).				
S-101 Geo Feature: Rapids (RAPIDS)				
Primitives: Curve, 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
vertical length	(VERLEN)		RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.9 Waterfall

IHO Definition: WATERFALL. A vertically descending part of a watercourse where it falls from a height (for example: over a rock or a precipice). In place names, commonly shortened to fall or falls, for example Niagara Falls. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

S-101 Geo Feature: Waterfall (WATFAL)

Primitives: Point, Curve

<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	(S) EN	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
vertical length	(VERLEN)		RE	0,1	
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) (NXTDSC)		(S) TE	0,1 a	
headline			(S) TE	0,1	
language		ISO 639-2/T	(S) TE	1,1	
text	(INFORM) (NINFOM)		(S) TE	0,1 a	
Feature Associations					
S-101 Role	Association Type	Associated to	Type	Multiplicity	
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*	
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1	
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*	
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*	
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.					

5.11 Land region

IHO Definition: LAND REGION . An area of natural or cultivated scenery defined by its geographical characteristics and may be known by its proper name. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 1, Page 1.92, November 2000).				
S-101 Geo Feature: Land Region (LNDGRN)				
Primitives: Point, Curve, 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 land region	(CATLND)	1: fen 2: marsh 3: bog 4: heathland 5: mountain range 6: lowlands 7: canyon lands 8: paddy field 9: agricultural land 10: savanna/grassland 11: parkland 12: swamp 13: landslide 14: lava flow 15: salt pan 16: moraine 17: crater 18: cave 19: rock column or pinnacle 20: cay 21: wadi	EN	0,* a
feature name		See Clause 2.5.8	C	0,* a
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of surface	(NATSUR)	1: mud 2: clay 3: silt 4: sand 5: stone 6: gravel 7: pebbles 8: cobbles 9: rock 11: lava 14: coral 17: shells 18: boulder	EN	0,*
water level effect	(WATLEV)	1: partly submerged at high water	EN	0,1

		6: subject to inundation or flooding		
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a At least one of the attributes category of land region or feature name must be populated. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.15 Slope topline

IHO Definition: SLOPE TOPLINE. The upper marking of a slope, for example the ridge line or the separation line between two different gradients. (S-57 Edition 3.1, Appendix A— Chapter 1, Page 1.160, November 2000).				
S-101 Geo Feature: Slope Topline (SLOTOP)				
Primitives: Curve				
<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 slope	(CATSLO)	1: cutting 2: embankment 6: cliff	EN	0,1
colour	(COLOUR)	1: white 2: black	EN	0,*

		3: red 4: green 6: yellow 7: grey 8: brown 11: orange 13: pink		
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of surface	(NATSUR)	4: sand 5: stone 6: gravel 7: pebbles 9: rock 11: lava	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

5.16 Tideway

IHO Definition: TIDEWAY . A channel through which a tidal current runs. (IHO Dictionary — S-32).					
S-101 Geo Feature: Tideway (TIDEWY)					
Primitives: Curve, Surface					
Real World		Paper Chart Symbol		ECDIS Symbol	
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	(S) EN	0,1 a
interoperability identifier			MRN (see Clause 27.114)	URN	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) (NXTDTS)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to		Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information		Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement		Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information		Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
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^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

6 Geo Features — Cultural Features

6.1 Built-up area

IHO Definition: BUILT-UP AREA. An area of land or construction over the water containing a concentration of buildings and/or other structures. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Built-Up Area (BUAARE)				
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 built-up area	(CATBUA)	1: urban area 2: settlement 3: village 4: town 5: city 6: holiday village	EN	0,1
condition	(CONDTN)	1: under construction 2: ruined 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	(S) EN	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

6.2 Building

IHO Definition: BUILDING . A free-standing self-supporting construction that is roofed, usually walled, and is intended for human occupancy (for example: a place of work or recreation) and/or habitation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Building (BUISSL)				
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
building shape	(BUISHP)	5: high-rise building 6: pyramid 7: cylindrical 8: spherical 9: cubic	EN	0,1
colour	(COLOUR)	1: white 2: black 3: red 4: green	EN	0,* (ordered)

		5: blue 6: yellow 7: grey 8: brown 9: amber 10: violet 11: orange 12: magenta 13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	EN	0,1 a
condition	(COND TN)	1: under construction 2: ruined 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
function	(FUNCTN)	2: harbour-masters office 3: customs office 4: health office 5: hospital 6: post office 7: hotel 8: railway station 9: police station 10: water-police station 11: pilot office 12: pilot lookout 13: bank office 14: headquarters for district control 15: transit shed/warehouse 16: factory 17: power station 18: administrative 19: educational facility 20: church 21: chapel 22: temple 23: pagoda 24: Shinto shrine 25: Buddhist temple 26: mosque 27: marabout 28: lookout 29: communication 30: television 31: radio 32: radar	EN	0,*

		33: light support 34: microwave 35: cooling 36: observation 37: timeball 38: clock 39: control 40: airship mooring 41: stadium 42: bus station 44: sea rescue control 45: observatory 46: ore crusher 47: boathouse 48: pumping station		
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features			(S) IN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 8: glass reinforced plastic 12: glass	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 7: temporary 8: private 12: illuminated 13: historic 14: public	EN	0,*
vertical length	(VERLEN)		RE	0,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1

in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Helipad, 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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The sub-attribute colour pattern is mandatory for buildings that have more than one value populated for the sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

6.4 Runway

IHO Definition: RUNWAY. A defined area, on a land aerodrome, prepared for the landing and take-off run of aircraft. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Runway (RUNWAY)				
Primitives: Curve, Surface				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
condition	(COND TN)	1: under construction 2: ruined	EN	0,1

		3: under reclamation 5: planned construction		
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 4: hard surfaced 5: unsurfaced 6: wooden 7: metal	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 12: illuminated 14: public	EN	0,*
scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

6.11 Pipeline overhead

IHO Definition: OVERHEAD PIPELINE . A string of interconnected pipes, supported by pylons and passing over or nearby navigable waters, used for the transport of matter, nowadays mainly oil or gas. (Adapted from IHO Dictionary — S-32 and S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.119, November 2000).					
S-101 Geo Feature: Pipeline Overhead (PIPOHD)					
Primitives: Curve					
<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 pipeline/pipe	(CATPIP)	2: outfall pipe 3: intake pipe 4: sewer 6: supply pipe	EN	0,1	
condition	(CONDTN)	1: under construction 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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
multiplicity of features			C	0,1	
multiplicity known			(S) BO	1,1	
number of features			(S) IN	0,1	

product	(PRODUCT)	1: oil 2: gas 3: water 7: chemicals 8: drinking water 9: milk 18: liquefied natural gas 19: liquefied petroleum gas 20: wine 22: grain	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 4: not in use 7: temporary 12: illuminated	EN	0,*
vertical clearance fixed			C	0,1 a
vertical clearance value	(VERCLR)		(S) RE	1,1
vertical uncertainty	(VERACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: International great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	0,1
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) (NTXTDS)		(S) TE	0,1 a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Radar Reflector	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For overhead pipelines over navigable water, the attribute vertical clearance fixed is mandatory. At least one of the sub-attributes date end or date start must be populated. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

6.14 Railway

IHO Definition: RAILWAY . A rail or set of parallel rails on which a train, tram, or rail wagon runs. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Railway (RAILWY)				
Primitives: Curve				
<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
condition	(COND TN)	1: under construction 2: ruined 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	(S) EN	0,1 a

		2: alternate name display		
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 4: not in use 6: reserved 12: illuminated 13: historic 14: public	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 .				

6.15 Road

IHO Definition: ROAD. A route with a specially prepared surface that is intended for use by wheeled vehicles or pedestrians. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2013).

S-101 Geo Feature: Road (ROADWY)

Primitives: Curve, 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 road	(CATROD)	1: motorway 2: major road 3: minor road 4: track/path 5: major street 6: minor street	EN	0,1
condition	(CONDTN)	1: under construction 2: ruined 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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	4: hard surfaced 5: unsurfaced	EN	0,*
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 4: not in use 6: reserved 7: temporary 8: private 12: illuminated 13: historic 14: public	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

7 Geo Features — Landmarks

7.2 Landmark

IHO Definition: LANDMARK. Any prominent object at a fixed location on land which can be used in determining a location or a direction. (IHO Dictionary — S-32).				
S-101 Geo Feature: Landmark (LNDMRK)				
Primitives: Point, Curve, 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 landmark	(CATLMK)	1: cairn 2: cemetery 3: chimney 4: dish aerial 5: flagstaff 6: flare stack 7: mast 8: windsock 9: monument 10: column/pillar 11: memorial plaque 12: obelisk 13: statue 14: cross 15: dome 16: radar scanner 17: tower 18: windmill 20: spire/minaret 21: large rock or boulder on land 22: triangulation mark 23: boundary mark 24: observation wheel 25: torii 26: bridge 27: dam	EN	1,*

category of special purpose mark	(CATSPM)	16: leading mark 17: measured distance mark 41: clearing mark	EN	0,*
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 a
condition	(CONDTN)	1: under construction 2: ruined 4: wingless 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
function	(FUNCTN)	2: harbour-masters office 3: customs office 4: health office 5: hospital 6: post office 7: hotel 8: railway station 9: police station 10: water-police station 11: pilot office 12: pilot lookout 13: bank office 14: headquarters for district control 15: transit shed/warehouse 16: factory 17: power station 18: administrative 19: educational facility 20: church 21: chapel 22: temple 23: pagoda	EN	0,*

		24: Shinto shrine 25: Buddhist temple 26: mosque 27: marabout 28: lookout 29: communication 30: television 31: radio 32: radar 33: light support 34: microwave 35: cooling 36: observation 37: timeball 38: clock 39: control 40: airship mooring 41: stadium 42: bus station 44: sea rescue control 45: observatory 46: ore crusher 47: boathouse 48: pumping station		
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features			(S) IN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 3: loose boulders 6: wooden 7: metal 8: glass reinforced plastic 11: latticed 12: glass	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 12: illuminated 13: historic 14: public	EN	0,*
vertical length	(VERLEN)		RE	0,1
visual prominence	(CONVIS)	1: visually conspicuous 2: not visually conspicuous 3: prominent	EN	1,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Helipad, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for landmarks that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

7.4 Wind turbine

IHO Definition: **WIND TURBINE**. A tower and associated equipment that generates electrical power from wind. They can be sited offshore and may be either fixed or floating. (IHO Dictionary — S-32).

S-101 Geo Feature: Wind Turbine (LNDMRK)

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 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 a	
condition	(COND TN)	1: under construction 4: wingless 5: planned construction	EN	0,1	
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
height	(HEIGHT)		RE	0,1	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
multiplicity of features			C	0,1	
multiplicity known			(S) BO	1,1	
number of features			(S) IN	0,1	
nature of construction	(NATCON)	2: concreted	EN	0,*	

		6: wooden 7: metal 8: glass reinforced plastic 11: latticed		
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 8: private 12: illuminated 13: historic 14: public 28: buoyed	EN	0,*
vertical clearance fixed			C	0,1
vertical clearance value	(VERCLR)		(S) RE	1,1
vertical uncertainty	(VERACC)		(S) RE	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	0,1
vertical length	(VERLEN)		RE	0,1
visual prominence	(CONVIS)	1: visually conspicuous 2: not visually conspicuous 3: prominent	EN	0,1
water level effect	(WATLEV)	2: always dry 7: floating	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) (NTXTDS)		(S) TE	0,1 a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for bridges that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

7.5 Fortified structure

IHO Definition: **FORTIFIED STRUCTURE**. A structure that is specifically designed or reinforced to provide for defence from armed attack. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

S-101 Geo Feature: Fortified Structure (FORSTC)

Primitives: Point, Curve, 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 fortified structure	(CATFOR)	1: castle 2: fort 3: battery 4: blockhouse 5: fortified tower 6: redoubt 8: fortified submarine shelter 9: rampart	EN	0,1
condition	(CONDTN)	1: under construction 2: ruined	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	(S) EN	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 3: loose boulders 6: wooden 7: metal	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 7: temporary 8: private 12: illuminated 13: historic 14: public 28: buoyed	EN	0,*
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(INFORM) (NINFOM)		(S) TE	0,1 ^a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Bollard, Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sected, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

7.6 Production/storage area

IHO Definition: PRODUCTION/STORAGE AREA . An area on land for the exploitation or storage of natural resources. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.124, November 2000).				
S-101 Geo Feature: Production/Storage Area (PRDARE)				
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 production area	(CATPRA)	1: quarry	EN	1,1

		2: mine 3: stockpile 4: power station area 5: refinery area 6: timber yard 7: factory area 8: tank farm 9: wind farm 10: slag heap/spoil heap 11: production plant 12: solar farm		
condition	(CONDTN)	1: under construction 2: ruined 3: under reclamation 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
product	(PRODCT)	1: oil 2: gas 3: water 4: stone 5: coal 6: ore 7: chemicals 8: drinking water 9: milk 10: bauxite 11: coke 12: iron ingots 13: salt 14: sand 15: timber 16: sawdust/wood chips 17: scrap metal 18: liquefied natural gas 19: liquefied petroleum gas 20: wine 21: cement 22: grain 23: electricity 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,*
vertical length	(VERLEN)		RE	0,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8 Geo Features — Ports

8.5 Dyke

IHO Definition: DYKE . A dyke (or dike) is an artificial embankment to contain or hold back water. (Adapted from IHO Dictionary — S-32).					
S-101 Geo Feature: Dyke (DYKCON)					
Primitives: Curve, 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	
condition	(CONDTN)	1: under construction 2: ruined 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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
height	(HEIGHT)		RE	0,1	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
nature of construction	(NATCON)	1: masonry 2: concreted 3: loose boulders 4: hard surfaced 5: unsurfaced 6: wooden 7: metal	EN	0,*	
radar conspicuous	(CONRAD)		BO	0,1	
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1	
vertical length	(VERLEN)		RE	0,1	
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) (NXTDTS)		(S) TE	0,1 a	
headline			(S) TE	0,1	

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.7 Structure over navigable water

IHO Definition: STRUCTURE OVER NAVIGABLE WATER . A roofed structure erected, or partly erected, over a body of water, to provide protection for a vessel or its cargo.				
S-101 Geo Feature: Structure Over Navigable Water				
Primitives: 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 structure		1: boathouse 2: covered bulk terminal 3: covered wharf 4: covered service terminal 5: covered passenger terminal	EN	0,*
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	EN	0,* (ordered)

		13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	EN	0,1 a
condition	(COND TN)	1: under construction 2: ruined 5: planned construction	EN	0,1
feature name			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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
horizontal clearance fixed			C	1,1
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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 8: glass reinforced plastic 11: latticed 12: glass	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
product	(PRO DCT)	7: chemicals 12: iron ingots 13: salt 21: cement 22: grain 25: clay	EN	0,1
radar conspicuous	(CONRAD)		BO	0,1

reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 4: not in use 5: periodic/intermittent 7: temporary 8: private 12: illuminated 14: public	EN	0,*
vertical clearance fixed			C	1,1
vertical clearance value	(VERCLR)		(S) RE	1,1
vertical uncertainty	(VERACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	0,1
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Roofed Structure	Roofed Structure Aggregation (see Clause 25.14)	Pylon/Bridge Support	Aggregation	0,1
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The sub-attribute colour pattern is mandatory for structures over navigable water that have more than one value populated for the sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.9 Canal

IHO Definition: CANAL . An artificial waterway with no flow, or a controlled flow, used for navigation, or for draining or irrigating land (ditch). (IHO Dictionary — S-32).					
S-101 Geo Feature: Canal (CANALS)					
Primitives: Curve, 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 canal	(CATCAN)	1: transportation 2: drainage		EN	0,1

		3: irrigation		
condition	(COND TN)	1: under construction 2: ruined 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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal clearance fixed			C	0,1
horizontal clearance value	(HORCLR)		(S) RE	1,1
horizontal distance uncertainty	(HORACC)		(S) RE	0,1
horizontal width	(HORWID)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 3: recommended 4: not in use 5: periodic/intermittent 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

8.10 Distance mark

IHO Definition: DISTANCE MARK . A distance mark indicates the distance measured from an origin and consists of either a solid visible structure or a distinct location without special installation. Usually found on canals. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.55, November 2000).				
S-101 Geo Feature: Distance Mark (DISMAR)				
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
distance mark visible	(CATDIS)		BO	1,1
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
measured distance value	(INFORM) (NINFOM)		C	1,1
distance unit of measurement		1: metres 2: yards 3: kilometres 4: statute miles 5: nautical miles	(S) EN	1,1
reference location			(S) TE	0,1
waterway distance			(S) RE	1,1

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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.11 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				
<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 gate	(CATGAT)	2: flood barrage gate 3: caisson 4: lock gate 5: dyke gate 6: sluice	EN	0,1
condition	(COND TN)	1: under construction 2: ruined 5: 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	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1: default name display 2: alternate name display	(S) EN	0,1 a
horizontal clearance open			C	0,1 a
horizontal clearance value	(HORCLR)		(S) RE	1,1
horizontal distance uncertainty	(HORACC)		(S) RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 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 a
vertical uncertainty	(VERACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	0,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day,	Association	0,*

		Service Hours, Nautical Information		
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For encoded gates that are navigable at the optimum display scale of the ENC data, the attribute horizontal clearance open is mandatory. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . 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 <i>False</i> . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

8.13 Crane

IHO Definition: CRANE. A machine for lifting, shifting and lowering objects or materials by means of a swinging boom or with a lifting apparatus supported on an overhead track. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Crane (CRANES)				
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 crane	(CATCRN)	2: container crane/gantry 3: sheerlegs 4: travelling crane 5: A-frame 6: goliath crane	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 a
condition	(CONDTN)	1: under construction 2: ruined 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	(S) EN	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
lifting capacity	(LIFCAP)		RE	0,1
orientation			C	0,1
orientation uncertainty			(S) RE	0,1
orientation value	(ORIENT)		(S) RE	1,1
radar conspicuous	(CONRAD)		BO	0,1
radius	(RADIUS)	Metres	RE	0,1
status	(STATUS)	1: permanent 4: not in use 6: reserved 12: illuminated	EN	0,*
vertical clearance fixed			C	0,1
vertical clearance value	(VERCLR)		(S) RE	1,1
vertical uncertainty	(VERACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: Mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	EN	0,1
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
in the water			BO	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for cranes that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

8.14 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

<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 cargo		1: bulk 2: container 3: general 4: liquid 5: passenger 6: livestock 7: dangerous or hazardous 8: heavy lift 9: ballast 10: dry bulk cargo 11: liquid bulk cargo 12: reefer container cargo 13: Ro-Ro cargo 14: project cargo 15: break bulk cargo	EN	0,*
feature name		See Clause 2.5.8	C	1,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal clearance length			RE	0,1
horizontal clearance width			RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1
minimum berth depth	(DRVAL1)		RE	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
quality of vertical measurement	(QUASOU)	1: depth known 2: depth or least depth unknown	EN	0,*
status	(STATUS)	1: permanent	EN	0,*

		2: occasional 5: periodic/intermittent 7: temporary 9: mandatory 12: illuminated		
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Mooring Trot Aggregation (see Clause 25.10)	Mooring Trot	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.15 Dolphin

IHO Definition: 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. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Dolphin (MORFAC)				
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 dolphin	(CATMOR)	1: mooring dolphin 2: deviation dolphin 3: berthing dolphin 4: fender or breasting dolphin	EN	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 a
condition	(CONDTN)	1: under construction 2: ruined 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry	EN	0,*

		2: concreted 6: wooden 7: metal		
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 2: occasional 3: recommended 4: not in use 5: intermittent 6: reserved 7: temporary 8: private 12: illuminated 14: public 18: existence doubtful	EN	0,*
vertical length	(VERLEN)		RE	0,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Bollard, 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	Composition	0,1

The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for dolphins that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.17 Dry dock

IHO Definition: DRY DOCK . An artificial basin fitted with a gate or caisson, into which vessels can be floated and the water pumped out to expose the vessel's bottom. Also called graving dock. (IHO Dictionary — S-32).					
S-101 Geo Feature: Dry Dock (DRYDOC)					
Primitives: 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	
condition	(COND TN)	1: under construction 2: ruined 3: under reclamation 5: planned construction	EN	0,1	
depth range minimum value	(DRVAL1)		RE	0,1	
elevation	(ELEVAT)		RE	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	(S) EN	0,1 ^a	
fixed date range		See Clause 2.4.8	C	0,1	

date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal clearance length			RE	0,1
horizontal clearance width	(HORCLR)		RE	0,1
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1
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 8: value reported (not surveyed) 9: value reported (not confirmed)	EN	0,*
status	(STATUS)	1: permanent 4: not in use 6: reserved 8: private 12: illuminated 14: public	EN	0,*
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

8.19 Pontoon

IHO Definition: PONTOON . A floating structure, usually rectangular in shape which serves as landing, pier head, bridge support, etc. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Pontoon (PONTON)				
Primitives: Curve, 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
condition	(COND TN)	1: under construction 2: ruined 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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
radar conspicuous	(CONRAD)		BO	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional	EN	0,*

		4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 12: illuminated 14: public		
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Bridge Aggregation (see Clause 25.4)	Bridge	Association	0,*
The Component	Aids to Navigation Association (see Clause 25.2)	Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.20 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				
<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 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		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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught			RE	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1

date start	(PERSTA)		(S) TD	1,1
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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.21 Gridiron

IHO Definition: GRIDIRON . A structure in the intertidal zone serving as a support for vessels at low stages of the tide to permit work on the exposed portion of the vessel's hull. (IHO Dictionary — S-32).		
S-101 Geo Feature: Gridiron (GRIDRN)		
Primitives: 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
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	(S) EN	0,1 a
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 11: latticed	EN	0,*
status	(STATUS)	1: permanent 4: not in use 6: reserved 8: private 14: public 28: buoyed	EN	0,*
vertical length	(VERLEN)		RE	0,1
water level effect	(WATLEV)	1: partly submerged at high water 4: covers and uncovers 5: awash	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1

-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

8.22 Lock basin

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				
<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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 4: not in use 6: reserved 8: private 13: historic	EN	0,*

		14: public 16: watched 17: unwatched		
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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

8.23 Mooring trot

IHO Definition: MOORING TROT. A mooring is a place where a vessel may be secured. (IHI Dictionary — S-32). A mooring trot is a mooring that is composed of ground tackle, mooring cables, buoys and mooring berths on junction cables.				
S-101 Geo Feature: Mooring Trot (C_AGGR)				
Primitives: Surface, None				
<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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Collection	Mooring Trot Aggregation (see Clause 25.10)	Berth, Cable Submarine, Mooring Buoy, Obstruction	Aggregation	0,1
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

10 Geo Features — Tides, Currents

10.2 Tidal stream — flood/ebb

IHO Definition: **TIDAL STREAM**. Approximate tidal stream rates given as discrete rate values for flood and ebb flow during springs. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.173, November 2000).

S-101 Geo Feature: Tidal Stream — Flood/Ebb (TS_FEB)

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 tidal stream	(CAT_TS)	1: flood stream 2: ebb stream 3: other tidal flow	EN	1,1	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
orientation			C	1,1	
orientation uncertainty			(S) RE	0,1	
orientation value	(ORIENT)		(S) RE	1,1	
speed			C	1,1	
speed maximum	(CURVEL)	35.0 ≥ speed maximum > speed minimum	(S) RE	1,1	
speed minimum		0 < speed minimum < speed maximum	(S) RE	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) (NXTDSC)		(S) TE	0,1 a	
headline			(S) TE	0,1	
language		ISO 639-2/T	(S) TE	1,1	
text	(INFORM) (NINFOM)		(S) TE	0,1 a	

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

10.3 Current — non-gravitational

IHO Definition: CURRENT — NON-GRAVITATIONAL. Any current that is caused by other than tide producing force. (IHO Dictionary — S-32).				
S-101 Geo Feature: Current — Non-Gravitational (CURENT)				
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
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
orientation			C	1,1
orientation uncertainty			(S) RE	0,1
orientation value	(ORIENT)		(S) RE	1,1
periodic date range		See Clause 2.4.8	C	0,*

date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
speed			C	1,1
speed maximum	(CURVEL)	35.0 ≥ speed maximum > speed minimum	(S) RE	1,1
speed minimum		0 < speed minimum < speed maximum	(S) RE	0,1
status	(STATUS)	5: periodic/intermittent	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

10.4 Water turbulence

IHO Definition: **WATER TURBULENCE**. The disturbance of water caused by the interaction of any combination of waves, currents, tidal streams, wind, shoal patches and obstructions. (IHO Dictionary — S-32).

S-101 Geo Feature: Water Turbulence (WATTUR)

Primitives: Point, Curve, Surface

Real World		Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute		S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of water turbulence		(CATWAT)	1: breakers 2: eddies 3: overfalls 4: tide rips 5: bombora	EN	1,1
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	(S) EN	0,1 a
interoperability identifier			MRN (see Clause 27.114)	URN	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) (NTXTDS)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to	Type	Multiplicity	
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*	
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1	
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*	
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*	
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.					

10.5 Tidal stream panel data

IHO Definition: TIDAL STREAM PANEL DATA . Approximate tidal stream characteristics given as discrete value sets at a specified interval before and/or after a high or low water. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 1, Page 1.176, November 2000).				
S-101 Geo Feature: Tidal Stream Panel Data (TS_PAD)				
Primitives: Point, Surface				
<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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
station name	(TS_TSP)		TE	1,1
station number	(TS_TSP)		TE	0,1
tidal stream panel values	(TS_TSP)		C	1,* (ordered)
reference tide		1: high water 2: low water	(S) EN	1,1
reference tide type		1: springs 2: neaps 3: mean	(S) EN	1,1
stream depth			(S) RE	0,1
tidal stream value			(S) C	1,* (ordered)
orientation			(S) C	1,1
orientation uncertainty			(S) RE	0,1
orientation value			(S) RE	1,1
speed maximum		35.0≥speed maximum	(S) RE	1,1
time relative to tide			(S) RE	1,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11 Geo Features — Depths

11.3 Sounding

IHO Definition: SOUNDING . Measured or charted depth of water (may be a drying height), or the measurement of such a depth, which has been reduced to a vertical datum. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Sounding (SOUNDG)				
Primitives: Pointset				
<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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
quality of vertical measurement	(QUASOU)	1: depth known 3: doubtful sounding 4: unreliable sounding 8: value reported (not surveyed)	EN	0,*

		9: value reported (not confirmed)		
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	18: existence doubtful	EN	0,1
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 4: found by diver 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 10: photogrammetry 11: satellite imagery 12: found by levelling 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11.4 Dredged area

IHO Definition: DREDGED AREA . An area of the bottom of a body of water which has been deepened by dredging. (IHO Dictionary — S-32).				
S-101 Geo Feature: Dredged Area (DRGARE)				
Primitives: 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
depth range maximum value	(DRVAL2)	$DRVAL2 \geq DRVAL1$	RE	0,1
depth range minimum value	(DRVAL1)	$DRVAL1 \leq DRVAL2$	RE	1,1
dredged date	(SORDAT)		TD	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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught			RE	0,1
quality of vertical measurement	(QUASOU)	10: maintained depth 11: not regularly maintained	EN	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 11: diving prohibited 12: diving restricted 13: no wake 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 23: cargo transshipment (lightening) prohibited 25: stopping prohibited 27: speed restricted 39: swimming prohibited	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam	EN	0,*

		8: swept by vertical acoustic system 9: found by electromagnetic sensor 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept		
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) 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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11.5 Swept area

IHO Definition: SWEPT AREA . An area that has been determined to be clear of navigational dangers to a specified depth. (IHO Dictionary — S-32).				
S-101 Geo Feature: Swept Area (SWPARE)				
Primitives: 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
depth range minimum value	(DRVAL1)		RE	1,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
swept date	(SORDAT)		TD	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) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11.6 Depth contour

IHO Definition: DEPTH CONTOUR . A line connecting points of equal water depth which is sometimes significantly displaced outside of soundings, symbols, and other chart detail for clarity as well as generalization. Depth contours therefore often represent an approximate location of the line of equal depth as related to the surveyed line delineated on the source. (IHO Dictionary — S-32).				
S-101 Geo Feature: Depth Contour (DEPCNT)				
Primitives: Curve				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
value of depth contour	(VALDCO)		RE	1,1
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) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11.7 Depth area

IHO Definition: DEPTH AREA . A water area whose depth is within a defined range of values. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.51, November 2000).
S-101 Geo Feature: Depth Area (DEPARE)
Primitives: Surface

Real World		Paper Chart Symbol		ECDIS Symbol	
S-101 Attribute		S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
depth range maximum value		(DRVAL2)	DRVAL2 > DRVAL1	RE	1,1
depth range minimum value		(DRVAL1)	DRVAL1 < DRVAL2	RE	1,1
interoperability identifier			MRN (see Clause 27.114)	URN	0,1
information			See Clause 2.4.6	C	0,*
file locator				(S) TE	0,1
file reference		(TXTDSC) (NXTDSC)		(S) TE	0,1a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations					
S-101 Role	Association Type	Associated to		Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information		Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information		Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality		Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.					

11.8 Depth — no bottom found

IHO Definition: DEPTH — NO BOTTOM FOUND . Upon investigation the bottom was not found at this depth. (Adapted from IHO Dictionary — S-32).					
S-101 Geo Feature: Depth — No Bottom Found (SOUNDG)					
Primitives: Pointset					
<i>Real World</i>		<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value		Type	Multiplicity
interoperability identifier		MRN (see Clause 27.114)		URN	0,1
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 5: found by lead line		EN	0,*

		8: swept by vertical acoustic system 9: found by electromagnetic sensor 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept		
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	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

11.10 Unsurveyed area

<u>IHO Definition:</u> UNSURVEYED AREA . An area where hydrographic survey data is non-existent. (IHO Dictionary — S-32).				
S-101 Geo Feature: Unsurveyed Area (UNSARE)				
Primitives: 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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
information		See Clause 2.4.6	C	0,*
file locator			(S) TE	0,1

file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

12 Geo Features — Nature of the Seabed

12.1 Seabed area

IHO Definition: SEABED AREA. A region of the bottom including the material of which it is composed and its physical characteristics. Also called nature of bottom, character (or characteristics) of the bottom, or quality of the bottom. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Seabed Area (SBDARE)				
Primitives: Point, Curve, 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
surface characteristics			C	1,* (ordered)
nature of surface	(NATSUR)	1: mud 2: clay	(S) EN	0,1 a

		3: silt 4: sand 5: stone 6: gravel 7: pebbles 8: cobbles 9: rock 11: lava 14: coral 17: shells 18: boulder		
nature of surface — qualifying terms	(NATQUA)	1: fine 2: medium 3: coarse 4: broken 5: sticky 6: soft 7: stiff 8: volcanic 9: calcareous 10: hard	(S) EN	0,3 a
underlying layer			(S) IN	0,1
water level effect	(WATLEV)	3: always under water/ submerged 4: covers and uncovers 5: awash	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of surface				

characteristics, at least one of the sub-attributes **nature of surface** or **nature of surface — qualifying terms** must be populated. For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

12.2 Weed/kelp

IHO Definition: WEED/KELP . Any macroscopic marine alga. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Weed/Kelp (WEDKLP)				
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 weed/kelp	(CATWED)	1: kelp 2: seaweed 4: sargasso	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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1

-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

12.5 Spring

<u>IHO Definition:</u> SPRING . A natural issue of water or other substances from the earth. One on the bottom of the sea is called a submarine spring. (IHO Dictionary — S-32).				
S-101 Geo Feature: Spring (SPRING)				
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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

13 Geo Features — Rocks, Wrecks, Foul Ground, Obstructions

13.5 Wreck

<u>IHO Definition:</u> WRECK . The ruined remains of a stranded or sunken vessel which has been rendered useless. (IHO Dictionary — S-32).				
S-101 Geo Feature: Wreck (WRECKS)				
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 wreck	(CATWRK)	1: non-dangerous wreck 2: dangerous wreck 3: distributed remains of wreck 4: wreck showing mast/masts 5: wreck showing any portion of hull or superstructure	EN	0,1 a
exposition of sounding	(EXPSOU)	1: within the range of depth of the surrounding depth area 2: shoaler than the range of depth of the surrounding depth area 3: deeper than the range of depth of the surrounding depth area	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	(S) EN	0,1 a
height	(HEIGHT)		RE	0,1

interoperability identifier		MRN (see Clause 27.114)	URN	0,1
quality of vertical measurement	(QUASOU)	1: depth known 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 8: value reported (not surveyed) 9: value reported (not confirmed)	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	7: temporary 13: historic 18: existence doubtful	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 4: found by diver 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 10: photogrammetry 11: satellite imagery 12: found by levelling 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
value of sounding	(VALSOU)		RE	0,1 a
visual prominence	(CONVIS)	1: visually conspicuous 2: not visually conspicuous 3: prominent	EN	0,1
water level effect	(WATLEV)	1: partly submerged at high water 2: always dry 3: always under water/ submerged 4: covers and uncovers 5: awash	EN	1,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
default clearance depth		See Clause 30.1	RE	0,1 a
surrounding depth			RE	1,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Exactly one of the attributes category of wreck or value of sounding must be populated; category of wreck is mandatory if the attribute height has been populated with a value. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated. The ECDIS “system” attribute default clearance depth must be populated with a value, which must not be an empty (null) value, if the attribute height has not been populated and the attribute category of wreck is populated or the attribute value of sounding is populated with an empty (null) value.				

13.7 Foul ground

IHO Definition: FOUL GROUND. Areas over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (IHO Dictionary — S-32).		
S-101 Geo Feature: Foul Ground (OBSTRN)		
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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
quality of vertical measurement	(QUASOU)	1: depth known 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 8: value reported (not surveyed) 9: value reported (not confirmed)	EN	0,*
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	13: historic 18: existence doubtful 28: buoyed	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 4: found by diver 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 10: photogrammetry 11: satellite imagery 12: found by levelling 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
value of sounding	(VALSOU)		RE	0,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

13.8 Discoloured water

IHO Definition: DISCOLOURED WATER. Unnatural coloured areas in the sea which may or may not indicate the existence of shoals. (NOAA — Nautical Chart Manual, Volume 1).				
S-101 Geo Feature: Discoloured Water (CTNARE)				
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
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
reported date	(SORDAT)	See Clause 2.4.8	TD	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) (NTXTDS)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

13.9 Fishing facility

IHO Definition: FISHING FACILITY . A structure for fishing purposes which can be an obstruction to ships in general. The position of these structures may vary frequently over time. (S-57 Edition 3.1, Appendix A—Chapter 1, Page 1.70, November 2000, as amended).				
S-101 Geo Feature: Fishing Facility (FSHFAC)				
Primitives: Point, Curve, 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 fishing facility	(CATFIF)	1: fishing stake 2: fish trap 3: fish weir 4: tunny net	EN	0,1
condition	(COND TN)	1: under construction 2: ruined 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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1

reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
status	(STATUS)	1: permanent 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 12: illuminated 18: existence doubtful 28: buoyed	EN	0,*
vertical length	(VERLEN)		RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

14 Geo Features — Offshore Installations

14.1 Offshore platform

14.1.2 Wellheads (see S-4 — B-445.1)

category of obstruction	2 — wellhead
height status	4 — not in use (disused)
vertical length	vertical length of the wellhead above the seabed
water level effect	2 — always dry (for wellheads that protrude at high water) 3 — always under water/submerged

14.3 Submarine cable area

IHO Definition: SUBMARINE CABLE AREA . An area which contains one or more submarine cables. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.70, November 2000, as amended).				
S-101 Geo Feature: Cable Area (CBLARE)				
Primitives: 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 cable	(CATCBL)	1: power line 7: ferry 10: telecommunications cable	EN	0,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a

interoperability identifier		MRN (see Clause 27.114)	URN	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 7: entry prohibited 8: entry restricted 9: dredging prohibited 11: diving prohibited 12: diving restricted 13: no wake 14: area to be avoided 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 20: drilling prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted 39: swimming prohibited	EN	0,*
status	(STATUS)	1: permanent 7: temporary 13: historic	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

14.4 Pipeline

IHO Definition: PIPELINE . A connected set of pipes for conveying liquids, slurries, or gases. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2012).				
S-101 Geo Feature: Pipeline Submarine/On Land (PIPSOL)				
Primitives: Curve				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
buried depth	(BURDEP)		RE	0,1
category of pipeline/pipe	(CATPIP)	2: outfall pipe 3: intake pipe 4: sewer 5: bubbler system 6: supply pipe 7: bubble curtain	EN	0,*
condition	(COND TN)	1: under construction 5: planned construction	EN	0,1
depth range minimum value	(DRVAL1)	$DRVAL1 \leq DRVAL2$	RE	0,1
depth range maximum value	(DRVAL2)	$DRVAL2 \geq DRVAL1$	RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1

multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features			(S) IN	0,1
product	(PRODCT)	1: oil 2: gas 3: water 7: chemicals 8: drinking water 9: milk 18: liquefied natural gas 19: liquefied petroleum gas	EN	0,*
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
restriction	(RESTRN)	1: anchoring prohibited 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 8: entry restricted 9: dredging prohibited 11: diving prohibited 12: diving restricted 13: no wake 14: area to be avoided 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 20: drilling prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 26: landing prohibited 39: swimming prohibited	EN	0,*
status	(STATUS)	1: permanent 4: not in use 7: temporary 12: illuminated	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

14.5 Submarine pipeline area

IHO Definition: SUBMARINE PIPELINE AREA . An area containing one or more submarine pipelines. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.118, November 2000).				
S-101 Geo Feature: Submarine Pipeline Area (PIPARE)				
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 pipeline/pipe	(CATPIP)	2: outfall pipe 3: intake pipe 4: sewer 5: bubbler system 6: supply pipe	EN	0,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
product	(PRODCT)	1: oil	EN	0,*

		2: gas 3: water 7: chemicals 8: drinking water 18: liquefied natural gas 19: liquefied petroleum gas		
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 7: entry prohibited 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 14: area to be avoided 15: construction prohibited 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 26: landing prohibited 27: speed restricted 39: swimming prohibited	EN	0,*
status	(STATUS)	1: permanent 4: not in use 7: temporary	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 ^a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

14.6 Offshore production area

14.6.2 Offshore tanker loading systems (see S-4 — B-445.4)

15 Geo Features — Tracks and Routes

15.5 Recommended track

<u>IHO Definition:</u> RECOMMENDED TRACK . A route which has been specially examined to ensure so far as possible that it is free of dangers and along which ships are advised to navigate. (IMO Ships' Routeing).				
S-101 Geo Feature: Recommended Track (RECTRC)				
Primitives: Curve				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
based on fixed marks	(CATTRK)		BO	1,1
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	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1: default name display 2: alternate name display	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1
orientation value	(ORIENT)		RE	1,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
quality of vertical measurement	(QUASOU)	1: depth known 2: depth or least depth unknown 6: least depth known	EN	0,*
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 6: reserved 8: private 9: mandatory 14: public	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 2: found by side scan sonar 3: found by multi beam 8: swept by vertical acoustic system 9: found by electromagnetic sensor 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
traffic flow	(TRAFIC)	1: inbound 2: outbound 3: one-way 4: two-way	EN	1,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.6 Range system

IHO Definition: RANGE SYSTEM. Two or more features in the same horizontal direction, particularly those features so placed as navigational aids to mark any line of importance to vessels, as a channel. The one nearest the observer is the front mark and the one farthest from the observer is the rear mark. (Adapted from IHO Dictionary — S-32).				
S-101 Geo Feature: Range System (C_AGGR)				
Primitives: Curve, 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	(S) EN	0,1 a

		2: alternate name display		
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught			RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Collection	Range System Aggregation (see Clause 25.13)	Cardinal Beacon, Building, Daymark, Dolphin, Fortified Structure, Isolated Danger Beacon, Landmark, Lateral Beacon, Light All Around, Light Sector, Navigation Line, Pile, Radar Transponder Beacon, Range System, Recommended Route Centreline, Recommended Track, Safe Water Beacon, Silo/Tank, Special Purpose/ General Beacon	Aggregation	0,1
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Aggregation	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.7 Fairway

IHO Definition: FAIRWAY. That part of a river, harbour and so on, where the main navigable channel for vessels of larger size lies. It is also the usual course followed by vessels entering or leaving harbours, called "ship channel". (International Maritime Dictionary, 2 nd Edition).					
S-101 Geo Feature: Fairway (FAIRWY)					
Primitives: 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	
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	(OBJNAM) (NOBJNM)		(S) TE	1,1	
name usage		1: default name display 2: alternate name display	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
maximum permitted draught			RE	0,1	
orientation value	(ORIENT)		RE	0,1	
quality of vertical measurement	(QUASOU)	1: depth known 2: depth or least depth unknown 6: least depth known	EN	0,*	
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited	EN	0,*	

		12: diving restricted 13: no wake 15: construction prohibited 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted 39: swimming prohibited		
status	(STATUS)	1: permanent 3: recommended 6: reserved 7: temporary 9: mandatory 28: buoyed	EN	0,*
traffic flow	(TRAFIC)	1: inbound 2: outbound 3: one-way 4: two-way	EN	0,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Fairway Aggregation (see Clause 25.7)	Fairway System	Association	1,*
The Primary Feature	Fairway Auxiliary (see Clause 25.8)	Cardinal Beacon, Cardinal Buoy, Caution Area, Daymark, Dredged Area, Isolated Danger Beacon, Isolated Danger Buoy, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Landmark, Pile, Range System, Recommended Route Centreline, Recommended Track, Restricted Area, Safe Water Beacon, Safe Water Buoy, Special Purpose/General Beacon, Special Purpose/General Buoy, Swept Area	Aggregation	0,1
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.11 Two-way route

IHO Definition: TWO-WAY ROUTE. A route within defined limits inside which two way traffic is established, aimed at providing safe passage of ships through waters where navigation is difficult or dangerous. (IMO Ships' Routing).				
S-101 Geo Feature: Two-Way Route				
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught			RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Collection	Two-Way Route Aggregation (see Clause 25.19)	Two-Way Route Part	Aggregation	0,1
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Collection	Aids to Navigation Association (see Clause 25.2)	Building, Bridge, Cardinal Beacon, Cardinal Buoy, Conveyor, Crane, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/	Aggregation	0,1

		General Buoy, Structure Over Navigable Water, Wind Turbine		
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.12 Recommended traffic lane part

IHO Definition: RECOMMENDED TRAFFIC LANE PART. A traffic flow pattern indicating a recommended directional movement of traffic where it is impractical or unnecessary to adopt an established direction of traffic flow. (IMO Ships' Routing).					
S-101 Geo Feature: Recommended Traffic Lane Part (RCTLPT)					
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	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
orientation value	(ORIENT)		RE	1,1	
status	(STATUS)	1: permanent 6: reserved 9: mandatory	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) (NTXTDS)		(S) TE	0,1 a	
headline			(S) TE	0,1	

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a 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.				

15.13 Deep water route centreline

IHO Definition: DEEP WATER ROUTE CENTRELINE. The Deep Water route centreline indicates the centreline of a route, the width of which is not explicitly defined. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.49, November 2000).				
S-101 Geo Feature: Deep Water Route Centreline (DWRTCL)				
Primitives: Curve				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
based on fixed marks	(CATTRK)		BO	1,1
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	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1: default name display 2: alternate name display	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
IMO adopted	(CATTSS)		BO	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1

orientation value	(ORIENT)		RE	1,1
quality of vertical measurement	(QUASOU)	1: depth known 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 3: recommended 6: reserved 9: mandatory	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 3: found by multi beam 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
traffic flow	(TRAFIC)	1: inbound 2: outbound 3: one-way 4: two-way	EN	1,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Deep Water Route Aggregation (see Clause 25.6)	Deep Water Route	Association	0,*

The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.14 Deep water route part

IHO Definition: DEEP WATER ROUTE PART . An area of a deep water route within which ships proceed in the same direction.				
S-101 Geo Feature: Deep Water Route Part (DWRTP)				
Primitives: 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
depth range minimum value	(DRVAL1)		RE	1,1
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
IMO adopted	(CATTSS)		BO	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
orientation value	(ORIENT)		RE	1,1
quality of vertical measurement	(QUASOU)	1: depth known	EN	0,*

		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		
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transhipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted	EN	0,*
status	(STATUS)	1: permanent 3: recommended 6: reserved 9: mandatory 28: buoyed	EN	0,*
technique of vertical measurement	(TECSOU)	1: found by echo sounder 3: found by multi beam 5: found by lead line 8: swept by vertical acoustic system 9: found by electromagnetic sensor 13: swept by side scan sonar 15: found by LIDAR 16: synthetic aperture radar 17: hyperspectral imagery 18: mechanically swept	EN	0,*
traffic flow	(TRAFIC)	1: inbound 2: outbound 3: one-way 4: two-way	EN	1,1
vertical uncertainty	(SOUACC)		C	0,1
uncertainty fixed			(S) RE	1,1

uncertainty variable factor			(S) RE	0,1
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Deep Water Route Aggregation (see Clause 25.6)	Deep Water Route	Association	0,*
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

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						
Real World		Paper Chart Symbol		ECDIS Symbol		
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		(S) EN	0,1 a
fixed date range			See Clause 2.4.8		C	0,1
date end		(DATEND)			(S) TD	0,1 a
date start		(DATSTA)			(S) TD	0,1 a
IMO adopted		(CATTSS)			BO	0,1
interoperability identifier			MRN (see Clause 27.114)		URN	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) (NXTDS)			(S) TE	0,1 a
headline					(S) TE	0,1
language			ISO 639-2/T		(S) TE	1,1
text		(INFORM) (NINFOM)			(S) TE	0,1 a
Feature Associations						
S-101 Role	Association Type	Associated to		Type	Multiplicity	
The Collection	Deep Water Route Aggregation (see Clause 25.6)	Deep Water Route		Aggregation	0,1	
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme		Association	0,*	
The Collection	Aids to Navigation Association (see Clause 25.2)	Building, Cardinal Beacon, Cardinal Buoy, Crane, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Fortified Structure, Isolated		Aggregation	0,1	

		Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Safe Water Beacon, Safe Water Buoy, Silo/Tank, Special Purpose/General Beacon, Special Purpose/General Buoy, Wind Turbine		
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,1
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.16 Inshore traffic zone

IHO Definition: INSHORE TRAFFIC ZONE. A routing measure comprising a designated area between the landward boundary of a traffic separation scheme and the adjacent coast, to be used in accordance with the provisions of the International Regulations for Preventing Collisions at Sea. (Adapted from IMO Ships' Routing).				
S-101 Geo Feature: Inshore Traffic Zone (ISTZNE)				
Primitives: 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
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted	EN	0,*

		9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transhipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted		
status	(STATUS)	1: permanent 3: recommended 6: reserved 9: mandatory 16: watched 17: unwatched	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*

The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a 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.

15.17 Precautionary area

IHO Definition: PRECAUTIONARY AREA. A routing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended. (IMO Ships' Routing).					
S-101 Geo Feature: Precautionary Area (PRCARE)					
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	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
IMO adopted	(CATTSS)		BO	0,1	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 14: area to be avoided	EN	0,*	

		16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted		
status	(STATUS)	1: permanent 9: mandatory 28: buoyed	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	0,1
scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
information		See Clause 2.4.6	C	1,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.19 Separation zone or line

IHO Definition: SEPARATION ZONE OR LINE. A zone or line separating the traffic lanes in which ships are proceeding in opposite, or nearly opposite directions; or separating a traffic lane from the 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				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
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 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*

The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a 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.

15.22 Traffic separation scheme roundabout

IHO Definition: TRAFFIC SEPARATION SCHEME ROUNDABOUT. A routing measure comprising a separation point or circular separation zone and a circular traffic lane within defined limits. Traffic within the roundabout is separated by moving in a counter-clockwise direction around the separation point or zone. (IMO Ships' Routing).					
S-101 Geo Feature: Traffic Separation Scheme Roundabout (TSSRON)					
Primitives: 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	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted	EN	0,*	

		22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted		
status	(STATUS)	1: permanent 3: recommended 6: reserved 9: mandatory	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a 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.				

15.23 Traffic separation scheme

IHO Definition: TRAFFIC SEPARATION SCHEME . A routing measure aimed at the separation of opposing streams of traffic by appropriate means and by the establishment of traffic lanes. (IHO Dictionary — S-32).					
S-101 Geo Feature: Traffic Separation Scheme					
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	(S) EN	0,1 a
fixed date range			See Clause 2.4.8	C	0,1
date end		(DATEND)		(S) TD	0,1 a
date start		(DATSTA)		(S) TD	0,1 a
IMO adopted		(CATTSS)		BO	0,1
interoperability identifier			MRN (see Clause 27.114)	URN	0,1
maximum permitted draught				RE	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) (NXTDSC)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to		Type	Multiplicity
The Collection	Traffic Separation Scheme Aggregation (see Clause 25.18)	Deep Water Route, Deep Water Route Centreline, Deep Water Route Part, Inshore Traffic Zone, Precautionary Area, Restricted Area, Separation Zone or Line, Traffic Separation Scheme, Traffic Separation Scheme Boundary, Traffic Separation Scheme Crossing, Traffic Separation Scheme Lane		Aggregation	0,1

		Part, Traffic Separation Scheme Roundabout, Two-Way Route, Two-Way Route Part		
The Component	Traffic Separation Scheme Aggregation (see Clause 25.18)	Traffic Separation Scheme	Association	0,*
The Collection	Aids to Navigation Association (see Clause 25.2)	Building, Bridge, Cardinal Beacon, Cardinal Buoy, Conveyor, Crane, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine	Aggregation	0,1
The Component	Caution Area Association (see Clause 25.5)	Caution Area	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.26 Archipelagic Sea Lane

IHO Definition: **ARCHIPELAGIC SEA LANE**. Sea lanes designated by an archipelagic State for the passage of ships and aircraft. The Archipelagic Sea Lane aggregates all component parts of an Archipelagic Sea Lane system. (Adapted from IHO Dictionary — S-32).

S-101 Geo Feature: Archipelagic Sea Lane (C_AGGR)**Primitives:** Surface, None

Real World		Paper Chart Symbol	ECDIS Symbol		
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	(S) EN	0,1 a
fixed date range			See Clause 2.4.8	C	0,1
date end		(DATEND)		(S) TD	0,1 a
date start		(DATSTA)		(S) TD	0,1 a
interoperability identifier			MRN (see Clause 27.114)	URN	0,1
nationality		(NATION)		TE	1,1
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) (NXTDSC)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to	Type	Multiplicity	
The Collection	ASL Aggregation (see Clause 25.3)	Archipelagic Sea Lane Area, Archipelagic Sea Lane Axis	Aggregation	0,1	
The Collection	Aids to Navigation Association (see Clause 25.2)	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	Aggregation	0,1	

		Beacon, Special Purpose/ General Buoy		
The Component	Caution Area Association (see Clause 25.5)	Caution Area	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

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					
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity	
communication channel	(COMCHA)		TE	0,*	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
orientation value	(ORIENT)		RE	0,2 a	
periodic date range		See Clause 2.4.8	C	0,*	

date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 3: recommended 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 9: mandatory	EN	0,*
traffic flow	(TRAFIC)	1: inbound 2: outbound 3: one-way 4: two-way	EN	1,1
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) (NXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a For radio calling-in points of type point, the attribute **orientation value** is mandatory. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

15.28 Ferry route

IHO Definition: FERRY ROUTE . A route in a body of water where a ferry crosses from one shoreline to another. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Ferry Route (FERYRT)				
Primitives: Curve, 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 ferry	(CATFRY)	1: free moving ferry 2: cable ferry 3: ice ferry 5: high speed ferry	EN	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 9: mandatory 14: public	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

15.29 Radar line

IHO Definition: RADAR LINE. Recommended tracks along which ships can be guided by coastal radar stations in the event of bad visibility. (IHO Dictionary — S-32).				
S-101 Geo Feature: Radar Line (RADLNE)				
Primitives: Curve				
<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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
orientation value	(ORIENT)		RE	1,1
status	(STATUS)	1: permanent 2: occasional 3: recommended 4: not in use 7: temporary	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

15.31 Radar station

IHO Definition: RADAR STATION. A station with a transmitter emitting pulses of ultra-high frequency radio waves which are reflected by solid objects and are detected upon their return to the sending station. (International Maritime Dictionary, 2 nd Edition).				
S-101 Geo Feature: Radar Station (RADSTA)				
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
call sign	(CALSGN)		TE	0,1
category of radar station	(CATRAS)	1: radar surveillance station 2: coast radar station	EN	0,*
communication channel	(COMCHA)		TE	0,*
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	(S) EN	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 7: temporary 8: private	EN	0,*
value of maximum range	(VALMXR)		RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

16 Geo Features — Areas, limits

16.4 Mooring area

IHO Definition: MOORING AREA . An area in which vessels may be secured to mooring buoys (adapted from IHO dictionary — S-32).					
S-101 Geo Feature: Mooring Area (ACHARE)					
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 mooring area	(CATCH)	1: small craft mooring area 2: mooring area for visitors 3: mooring area for tankers	EN	0,*	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1	
maximum permitted vessel length	(INFORM) (NINFOM)		RE	0,1	
periodic date range		See Clause 2.4.8	C	0,*	
date end	(PEREND)		(S) TD	1,1	
date start	(PERSTA)		(S) TD	1,1	
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 15: construction prohibited 16: discharging prohibited 17: discharging restricted	EN	0,*	

		18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted 39: swimming prohibited 42: power-driven vessels prohibited		
status	(STATUS)	1: permanent 2: occasional 3: recommended 5: periodic/intermittent 6: reserved 7: temporary 8: private 9: mandatory 14: public	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	EN	1,1
vessel class			(S) TE	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) (NXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1

-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

16.6 Seaplane landing area

IHO Definition: SEAPLANE LANDING AREA . A designated portion of water for the landing and take-off of seaplanes. (S-57 Edition 3.1, Appendix A— Chapter 1, Page 1.152, November 2000).				
S-101 Geo Feature: Seaplane Landing Area (SPLARE)				
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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 7: entry prohibited 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 15: construction prohibited 16: discharging prohibited 17: discharging restricted	EN	0,*

		18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted 39: swimming prohibited		
status	(STATUS)	1: permanent 2: occasional 3: recommended 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 9: mandatory 14: public	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1

-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.7 Dumping ground

IHO Definition: DUMPING GROUND. A sea area where dredged material or other potentially more harmful material, for example explosives, chemical waste, is deliberately deposited. (S-57 Edition 3.1, Appendix A—Chapter 1, Page 1.59, November 2000).				
S-101 Geo Feature: Dumping Ground (DMPGRD)				
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 dumping ground	(CATDPG)	2: chemical waste dumping ground 3: nuclear waste dumping ground 4: explosives dumping ground 5: spoil ground 6: vessel dumping ground	EN	0,*
date disused			TD	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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 7: entry prohibited 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake	EN	0,*

		17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted		
status	(STATUS)	1: permanent 2: occasional 4: not in use 6: reserved 7: temporary	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.9 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>		
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		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	(S) EN	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
nationality	(NATION)		TE	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) (NTXTDS)		(S) TE	0,1 a	
headline			(S) TE	0,1	
language		ISO 639-2/T	(S) TE	1,1	
text	(INFORM) (NINFOM)		(S) TE	0,1 a	
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1	

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.10 Cargo transshipment area

IHO Definition: CARGO TRANSHIPMENT AREA. An area designated for transfer of cargo from one vessel to another sometimes in order to reduce a vessel's draught. (IHO Dictionary — S-32).					
S-101 Geo Feature: Cargo Transshipment Area (CTSARE)					
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	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
periodic date range		See Clause 2.4.8	C	0,*	
date end	(PEREND)		(S) TD	1,1	
date start	(PERSTA)		(S) TD	1,1	
restriction	(RESTRN)	2: anchoring restricted 3: fishing prohibited	EN	0,*	

		4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 15: construction prohibited 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 24: dragging prohibited 27: speed restricted 39: swimming prohibited		
status	(STATUS)	1: permanent 2: occasional 3: recommended 5: periodic/intermittent 6: reserved 7: temporary 9: mandatory	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

16.11 Caution area

IHO Definition: CAUTION AREA. Generally, an area where the mariner has to be made aware of circumstances influencing the safety of navigation. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.33, November 2000).				
S-101 Geo Feature: Caution Area (CTNARE)				
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
condition	(COND TN)	1: under construction 3: under reclamation 5: planned construction	EN	0,1
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATE ND)		(S) TD	0,1 a
date start	(DATE STA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PERE ND)		(S) TD	1,1
date start	(PERE STA)		(S) TD	1,1
reported date	(SOR DATE)	See Clause 2.4.8	TD	0,1
status	(STAT US)	5: periodic/intermittent 7: temporary	EN	0,1

scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
information		See Clause 2.4.6	C	0,* ^a
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 ^a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 ^a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1 ^a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Collection	Caution Area Association (see Clause 25.5)	Archipelagic Sea Lane, Traffic Separation Scheme	Aggregation	0,1
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of fixed date range , at least one of the sub-attributes date end or date start must be populated. At least one of the attributes information or pictorial representation must be populated. For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.12 Information area

IHO Definition: INFORMATION AREA. An area for which general information regarding navigation, but not directly related to safety of navigation, is available.				
S-101 Geo Feature: Information Area (M_NPUB)				
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
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
information		See Clause 2.4.6	C	0,* a
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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. At least one of the attributes information or pictorial representation must be populated. For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.13 Contiguous Zone

IHO Definition: CONTIGUOUS ZONE. A zone contiguous to a coastal State's Territorial Sea, which may not extend beyond 24 nautical miles from the baselines from which the breadth of the Territorial Sea is measured. The coastal State may exercise certain control in this zone subject to the provisions of International Law. (IHO Dictionary — S-32).

S-101 Geo Feature: Contiguous Zone (CONZNE)

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 a
date start		(DATSTA)		(S) TD	0,1 a
in dispute				BO	0,1
interoperability identifier			MRN (see Clause 27.114)	URN	0,1
nationality		(NATION)		TE	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) (NXTDSC)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to		Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information		Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information		Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality		Association	0,*
^a 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.					

16.14 Continental Shelf area

IHO Definition: **CONTINENTAL SHELF AREA**. The Continental Shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its Territorial Sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the Territorial Sea is measured where the outer edge of the continental margin does not extend up to that distance. (IHO Publication C-51).

S-101 Geo Feature: Continental Shelf Area (COSARE)**Primitives: Curve, 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
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	(S) EN	0,1 a
interoperability identifier			MRN (see Clause 27.114)	URN	0,1
nationality		(NATION)		TE	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) (NXTDSC)		(S) TE	0,1 a
headline				(S) TE	0,1
language			ISO 639-2/T	(S) TE	1,1
text		(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations					
S-101 Role	Association Type	Associated to	Type	Multiplicity	
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*	
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1	
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*	

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.16 Exclusive Economic Zone

IHO Definition: EXCLUSIVE ECONOMIC ZONE. An area, not exceeding 200 nautical miles from the baselines from which the breadth of the Territorial Sea is measured, subject to a specific legal regime established in the United Nations Convention on the Law of the Sea under which the coastal state has certain rights and jurisdiction. (IHO Dictionary — S-32).				
S-101 Geo Feature: Exclusive Economic Zone (EXEZNE)				
Primitives: Curve, 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
in dispute			BO	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nationality	(NATION)		TE	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) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.17 Fishery zone

IHO Definition: FISHERY ZONE . The offshore zone in which exclusive fishing rights and management are held by the coastal nation. (IHO Dictionary — S-32).				
S-101 Geo Feature: Fishery Zone (FSHZNE)				
Primitives: 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nationality	(NATION)		TE	1,1
status	(STATUS)	1: permanent 5: periodic/intermittent 6: reserved 7: temporary	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.18 Fishing ground

<u>IHO Definition:</u> FISHING GROUND . A water area in which fishing is frequently carried on. (IHO Dictionary — S-32).					
S-101 Geo Feature: Fishing Ground (FSHGRD)					
Primitives: 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	
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	(S) EN	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
periodic date range		See Clause 2.4.8	C	0,*	
date end	(PEREND)		(S) TD	1,1	
date start	(PERSTA)		(S) TD	1,1	
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 15: construction prohibited 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited	EN	0,*	

		23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 26: landing prohibited 27: speed restricted 39: swimming prohibited		
status	(STATUS)	1: permanent 5: periodic/intermittent 6: reserved 7: temporary 8: private 14: public 16: watched 17: unwatched 28: buoyed	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.19 Free port area

IHO Definition: FREE PORT AREA . A port where certain import and export duties are waived (unless goods pass into the country) to facilitate reshipment to other countries. (IHO Dictionary — S-32).				
S-101 Geo Feature: Free Port Area (FRPARE)				
Primitives: 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
status	(STATUS)	1: permanent 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
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^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

16.20 Harbour area (administrative)

<u>IHO Definition:</u> HARBOUR AREA . The area over which a harbour authority has jurisdiction. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.80, November 2000).					
S-101 Geo Feature: Harbour Area (Administrative) (HRBARE)					
Primitives: 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	
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	(S) EN	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	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,*	
file locator			(S) TE	0,1	
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a	
headline			(S) TE	0,1	
language		ISO 639-2/T	(S) TE	1,1	
text	(INFORM) (NINFOM)		(S) TE	0,1 a	

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.21 Log pond

IHO Definition: LOG POND. A maritime area enclosed with connected floating timbers used as a staging area for sawn logs. (S-57 Edition 3.1, Appendix A— Chapter 1, Page 1.102, November 2000).				
S-101 Geo Feature: Log Pond (LOGPON)				
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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 6: reserved 7: temporary 8: private	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 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.24 Territorial Sea area

IHO Definition: TERRITORIAL SEA AREA. A belt of water of a defined breadth but not exceeding 12 nautical miles measured seaward from the Territorial Sea Baseline. (IHO Dictionary — S-32).				
S-101 Geo Feature: Territorial Sea Area (TESARE)				
Primitives: Curve, 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
in dispute			BO	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nationality	(NATION)		TE	1,*
restriction	(RESTRN)	2: anchoring restricted 4: fishing restricted 6: trawling restricted 8: entry restricted	EN	0,*

		9: dredging prohibited 10: dredging restricted 12: diving restricted 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 27: speed restricted		
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.25 Submarine transit lane

IHO Definition: SUBMARINE TRANSIT LANE. A lane where submarines may navigate under water or at the surface. (IHO Dictionary — S-32).				
S-101 Geo Feature: Submarine Transit Lane (SUBTLN)				
Primitives: 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nationality	(NATION)		TE	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 7: entry prohibited 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 22: removal of historical artefacts prohibited 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 25: stopping prohibited 27: speed restricted	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour 3: miles per hour 4: knots	(S) EN	1,1

vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

16.27 Collision regulations limit

IHO Definition: COLLISION REGULATIONS LIMIT. Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs). The demarcation line between inland navigation rules and international navigation rules.				
S-101 Geo Feature: Collision Regulations Limit				
Primitives: Curve				
<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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
regulation citation			TE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

16.28 Marine pollution regulations area

IHO Definition: MARINE POLLUTION REGULATIONS AREA . The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. (International Maritime Organization).				
S-101 Geo Feature: Marine Pollution Regulations Area				
Primitives: 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
regulation citation			TE	0,1
scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
information		See Clause 2.4.6	C	0,* a
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Mandatory if not associated to an instance of the information type Nautical Information . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of				

names is enabled by the Mariner. See [Clause 2.5.8](#). For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

19 Geo Features — Lights

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19.1 Lights: General

19.1.5 Leading lights (see S-4 — B-475.6)

category of light =	4,12	front leading light
	4,13	rear leading light
	4,14	lower leading light
	4,15	upper leading light

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19.2 Light all around

IHO Definition: **ALL AROUND LIGHT**. An all around light is a light that is visible over the whole horizon of interest to marine navigation and having no change in the characteristics of the light.

S-101 Geo Feature: Light All Around (LIGHTS)

Primitives: Point

Real World	Paper Chart Symbol	ECDIS Symbol		
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,*
colour	(COLOUR)	1: white 3: red	EN	1,* (ordered)

		4: green 5: blue 6: yellow 9: amber 10: violet 11: orange		
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,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
flare bearing			IN	0,1
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
light visibility	(LITVIS)	1: high intensity 2: low intensity	EN	0,1
major light			BO	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features	(MLTYLT)		(S) IN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
rhythm of light			C	1,1
light characteristic	(LITCHR)	1: fixed 2: flashing 3: long-flashing 4: quick-flashing 5: very quick-flashing 6: ultra quick-flashing 7: isophased 8: occulting	(S) EN	1,1

		11: interrupted ultra quick flashing 12: morse 13: fixed and flash 14: flash and long-flash 15: occulting and flash 16: fixed and long-flash 17: occulting alternating 18: long-flash alternating 19: flash alternating 25: quick-flash plus long-flash 26: very quick-flash plus long-flash 27: ultra quick-flash plus long-flash 28: alternating 29: fixed and alternating flashing		
signal group	(SIGGRP)		(S) TE	0,* (ordered) a
signal period	(SIGPER)		(S) RE	0,1 a
signal sequence	(SIGSEQ)		(S) C	0,* (ordered)
signal duration			(S) RE	1,1
signal status		1: lit/sound 2: eclipsed/silent	(S) EN	1,1
signal generation	(SIGGEN)	5: radio activated 6: call activated	EN	0,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 11: extinguished 14: public 15: synchronized 16: watched 17: unwatched	EN	0,*
value of nominal range	(VALNMR)		RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: Approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water	EN	0,1

		30: highest astronomical tide 44: baltic sea chart datum 2000		
vertical length	(VERLEN)		RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Fog Signal, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sectored, Radar Transponder Beacon, Retroreflector	Composition	0,1
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a For non-fixed lights (that is, sub-attribute **light characteristic** ≠ 1 (fixed)), the sub-attributes **signal group** and **signal period** are mandatory. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

^b See [Clauses 18.2](#) and [19.1.8](#).

19.4 Light fog detector

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 5: blue 6: yellow 9: amber 10: violet 11: orange	EN	0,*	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
flare bearing			IN	0,1	
height	(HEIGHT)		RE	0,1	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	

periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
rhythm of light			C	0,1
light characteristic	(LITCHR)	1: fixed 2: flashing 3: long-flashing 4: quick-flashing 5: very quick-flashing 6: ultra quick-flashing 7: isophased 8: occulting 11: interrupted ultra quick flashing 12: morse 13: fixed and flash 14: flash and long-flash 15: occulting and flash 16: fixed and long-flash 17: occulting alternating 18: long-flash alternating 19: flash alternating 25: quick-flash plus long-flash 26: very quick-flash plus long-flash 27: ultra quick-flash plus long-flash 28: alternating 29: fixed and alternating flashing	(S) EN	1,1
signal group	(SIGGRP)		(S) TE	0,* (ordered) a
signal period	(SIGPER)		(S) RE	0,1 a
signal sequence	(SIGSEQ)		(S) C	0,* (ordered)
signal duration			(S) RE	1,1
signal status		1: lit/sound 2: eclipsed/silent	(S) EN	1,1
signal generation	(SIGGEN)	5: radio activated 6: call activated	EN	0,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 11: extinguished 14: public 15: synchronized 16: watched 17: unwatched	EN	0,*
vertical datum	(VERDAT)	3: mean sea level	EN	0,1

		13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000		
vertical length	(VERLEN)		RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*

The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a For non-fixed lights (that is, sub-attribute **light characteristic** ≠ 1 (fixed)), the sub-attributes **signal group** and **signal period** are mandatory. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

19.5 Light air obstruction

IHO Definition: AIR OBSTRUCTION LIGHT . An air obstruction light is a light marking an obstacle which constitutes a danger to air navigation. (IHO Dictionary — S-32).					
S-101 Geo Feature: Light Air Obstruction (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 5: blue 6: yellow 9: amber 10: violet 11: orange	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,*	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	

date start	(DATSTA)		(S) TD	0,1 a
flare bearing			IN	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
height	(HEIGHT)		RE	0,1
light visibility	(LITVIS)	1: high intensity 2: low intensity 3: faint 4: intensified 5: unintensified 6: visibility deliberately restricted 7: obscured 8: partially obscured 9: visible in line of range	EN	0,*
multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features	(MLTYLT)		(S) IN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
rhythm of light			C	0,1
light characteristic	(LITCHR)	1: fixed 2: flashing 3: long-flashing 4: quick-flashing 5: very quick-flashing 6: ultra quick-flashing 7: isophased 8: occulting 11: interrupted ultra quick flashing 12: morse 13: fixed and flash 14: flash and long-flash 15: occulting and flash 16: fixed and long-flash 17: occulting alternating 18: long-flash alternating 19: flash alternating 25: quick-flash plus long-flash 26: very quick-flash plus long-flash 27: ultra quick-flash plus long-flash 28: alternating 29: fixed and alternating flashing	(S) EN	1,1
signal group	(SIGGRP)		(S) TE	0,* (ordered) a
signal period	(SIGPER)		(S) RE	0,1 a

signal sequence	(SIGSEQ)		(S) C	0,* (ordered)
signal duration			(S) RE	1,1
signal status		1: lit/sound 2: eclipsed/silent	(S) EN	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 11: extinguished 14: public 15: synchronized 16: watched 17: unwatched	EN	0,*
value of nominal range	(VALNMR)		RE	0,1
vertical datum	(VERDAT)	3: mean sea level 13: low water 16: mean high water 17: mean high water springs 18: high water 19: approximate mean sea level 20: high water springs 21: mean higher high water 24: local datum 25: international great lakes datum 1985 26: mean water level 28: higher high water large tide 29: nearly highest high water 30: highest astronomical tide 44: baltic sea chart datum 2000	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Bridge, Building, Crane, Conveyor, Landmark, Offshore Platform, Pylon/	Association	0,*

		Bridge Support, Span Fixed, Span Opening, Structure Over Navigable Water, Wind Turbine		
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a For non-fixed lights (that is, sub-attribute light characteristic ≠ 1 (fixed)), the sub-attributes signal group and signal period are mandatory. Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20 Geo Features — Buoys, Beacons

20.2 Cardinal buoy

IHO Definition: CARDINAL BUOY . A cardinal buoy is used in conjunction with the compass to indicate where the mariner may find the best navigable water. It is placed in one of the four quadrants (North, East, South and West), bounded by inter-cardinal bearings from the point marked. (UKHO NP 735, 5 th Edition).					
S-101 Geo Feature: Cardinal Buoy (BOYCAR)					
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 cardinal mark	(CATCAM)	1: north cardinal mark 2: east cardinal mark 3: south cardinal mark 4: west cardinal mark	EN	1,1	
colour	(COLOUR)	1: white 2: black 3: red	EN	1,* (ordered)	

		4: green 5: blue 6: yellow 7: grey 8: brown 9: amber 10: violet 11: orange 12: magenta 13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	EN	0,1 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	6: wooden 7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 7: temporary 8: private 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	0,1
colour	(COLOUR)	1: white 2: black 3: red	(S) EN	0,* (ordered)

		4: green 5: blue 6: yellow 7: grey 8: brown 9: amber 10: violet 11: orange 12: magenta 13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)	(S) EN	1,1
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFOM)		(S) TE	1,1
vertical length	(VERLEN)		RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for buoys/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.4 Safe water buoy

IHO Definition: SAFE WATER BUOY . A safe water buoy is used to indicate that there is navigable water around the mark. (UKHO NP 735, 5 th Edition).				
S-101 Geo Feature: Safe Water Buoy (BOYSAW)				
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
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	1,* (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 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system	EN	0,1

		11: main European inland waterway marking system		
nature of construction	(NATCON)	6: wooden 7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 7: temporary 8: private 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,* (ordered)
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal)	(S) EN	1,1

		21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)		
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
vertical length	(VERLEN)		RE	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	(<i>TXTDSC</i>) (<i>NTXTDS</i>)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*

The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a The attribute/sub-attribute **colour pattern** is mandatory for buoys/topmarks that have more than one value populated for the attribute/sub-attribute **colour**. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

20.5 Special purpose/general buoy

IHO Definition: SPECIAL PURPOSE/GENERAL BUOY. A special purpose buoy is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners. (UKHO NP 735, 5 th Edition).				
S-101 Geo Feature: Special Purpose/General Buoy (BOYSPP)				
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 special purpose mark	(CATSPM)	1: firing danger area mark 2: target mark 3: marker ship mark 4: degaussing range mark 5: barge mark 6: cable mark 7: spoil ground mark 8: outfall mark 9: ODAS 10: recording mark 11: seaplane anchorage mark 12: recreation zone mark 14: mooring mark 15: LANBY 17: measured distance mark 18: notice mark	EN	1,*

		19: TSS mark (Traffic Separation Scheme) 20: anchoring prohibited mark 21: berthing prohibited mark 22: overtaking prohibited mark 23: two-way traffic prohibited mark 24: reduced wake mark 25: speed limit mark 26: stop mark 27: general warning mark 28: sound ship's siren mark 29: restricted vertical clearance mark 30: maximum vessel's draught mark 31: restricted horizontal clearance mark 32: strong current warning mark 33: berthing permitted mark 34: overhead power cable mark 35: channel edge gradient mark 36: telephone mark 37: ferry crossing mark 39: pipeline mark 40: anchorage mark 42: control mark 43: diving mark 45: foul ground mark 46: yachting mark 47: heliport mark 48: GNSS mark 49: seaplane landing mark 50: entry prohibited mark 51: work in progress mark 52: mark with unknown purpose 53: wellhead mark 54: channel separation mark 55: marine farm mark 56: artificial reef mark 57: ice mark 58: nature reserve mark 59: fish aggregating device 60: wreck mark 61: customs mark 62: causeway mark 63: wave recorder		
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	EN	1,* (ordered)

		13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	EN	0,1 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	6: wooden 7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 7: temporary 8: private 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,* (ordered)

		13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)	(S) EN	1,1
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
vertical length	(VERLEN)		RE	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	(<i>TXTDSC</i>) (<i>NTXTDS</i>)		(S) TE	0,1 a
headline			(S) TE	0,1

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 ^a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for buoys/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.6 Emergency wreck marking buoy

IHO Definition: EMERGENCY WRECK MARKING BUOY. An emergency wreck marking buoy is a buoy moored on or above a new wreck, designed to provide a prominent (both visual and radio) and easily identifiable temporary first response. (Adapted from UKHO NP 735, 6th Edition).
S-101 Geo Feature: Emergency Wreck Marking Buoy
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	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	1,* (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 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	6: wooden 7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1
topmark	(TOPMAR)		C	0,1
colour	(COLOUR)	1: white 2: black	(S) EN	0,* (ordered)

		3: red 4: green 5: blue 6: yellow 7: grey 8: brown 9: amber 10: violet 11: orange 12: magenta 13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)	(S) EN	1,1
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
vertical length	(VERLEN)		RE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for buoys/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

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

<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
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 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
maximum permitted draught	(INFORM) (NINFOM)		RE	0,1
maximum permitted vessel length	(INFORM) (NINFOM)		RE	0,1
nature of construction	(NATCON)	7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1

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,*
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Mooring Trot Aggregation (see Clause 25.10)	Mooring Trot	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a The attribute **colour pattern** is mandatory for buoys that have more than one value populated for the attribute **colour**. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

20.9 Lateral beacon

<u>IHO Definition:</u> LATERAL BEACON. A lateral beacon is used to indicate the port or starboard hand side of the route to be followed. They are generally used for well defined channels and are used in conjunction with a conventional direction of buoyage. (UKHO NP 735, 5th Edition).					
S-101 Geo Feature: Lateral Beacon (BCNLAT)					
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	
beacon shape	(BCNSHP)	1: stake, pole, perch, post 2: withy 3: beacon tower 4: lattice beacon 5: pile beacon 6: cairn 7: buoyant beacon	EN	1,1	
category of lateral mark	(CATLAM)	1: port-hand lateral mark 2: starboard-hand lateral mark 3: preferred channel to starboard lateral mark 4: preferred channel to port lateral mark	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	1,* (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 a	
condition	(COND TN)	1: under construction 2: ruined 5: planned construction	EN	0,1	
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 8: glass reinforced plastic	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
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 8: private 12: illuminated 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,* (ordered)
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes	(S) EN	0,1 a

		3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe		
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)	(S) EN	1,1
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFOM)		(S) TE	1,1
vertical length	(VERLEN)		RE	0,1
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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1

language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 ^a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for beacons/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.10 Cardinal beacon

IHO Definition: CARDINAL BEACON. A cardinal beacon is used in conjunction with the compass to indicate where the mariner may find the best navigable water. It is placed in one of the four quadrants (North, East, South and West), bounded by inter-cardinal bearings from the point marked. (UKHO NP 735, 5th Edition).

S-101 Geo Feature: Cardinal Beacon (BCNCAR)				
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
beacon shape	(BCNSHP)	1: stake, pole, perch, post 2: withy 3: beacon tower 4: lattice beacon 5: pile beacon 6: cairn 7: buoyant beacon	EN	1,1
category of cardinal mark	(CATCAM)	1: north cardinal mark 2: east cardinal mark 3: south cardinal mark 4: west cardinal mark	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	1,* (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 a
condition	(CONDTN)	1: under construction 2: ruined 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1

interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 8: glass reinforced plastic	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
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 8: private 12: illuminated 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,1 * (ordered)
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point)	(S) EN	1,1

		11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)		
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
vertical length	(VERLEN)		RE	0,1
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	(<i>TXTDSC</i>) (<i>NTXTDS</i>)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light	Composition	0,1

		Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning		
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
Component of	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for beacons/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.13 Special purpose/general beacon

IHO Definition: SPECIAL PURPOSE/GENERAL BEACON . A special purpose beacon is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners. (UKHO NP 735, 5 th Edition).				
S-101 Geo Feature: Special Purpose/General Beacon (BCNSPP)				
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
beacon shape	(BCNSHP)	1: stake, pole, perch, post 2: withy 3: beacon tower 4: lattice beacon 5: pile beacon 6: cairn	EN	1,1

		7: buoyant beacon		
category of special purpose mark	(CATSPM)	1: firing danger area mark 2: target mark 3: marker ship mark 4: degaussing range mark 5: barge mark 6: cable mark 7: spoil ground mark 8: outfall mark 10: recording mark 11: seaplane anchorage mark 12: recreation zone mark 14: mooring mark 16: leading mark 17: measured distance mark 18: notice mark 19: TSS mark (Traffic Separation Scheme) 20: anchoring prohibited mark 21: berthing prohibited mark 22: overtaking prohibited mark 23: two-way traffic prohibited mark 24: reduced wake mark 25: speed limit mark 26: stop mark 27: general warning mark 28: sound ship's siren mark 29: restricted vertical clearance mark 30: maximum vessel's draught mark 31: restricted horizontal clearance mark 32: strong current warning mark 33: berthing permitted mark 34: overhead power cable mark 35: channel edge gradient mark 36: telephone mark 37: ferry crossing mark 39: pipeline mark 40: anchorage mark 41: clearing mark 42: control mark 43: diving mark 44: refuge beacon 45: foul ground mark 46: yachting mark 47: heliport mark 48: GNSS mark 49: seaplane landing mark 50: entry prohibited mark 51: work in progress mark 52: mark with unknown purpose 53: wellhead mark 54: channel separation mark 55: marine farm mark 56: artificial reef mark 57: ice mark	EN	1,*

		58: nature reserve mark 60: wreck mark 61: customs mark 62: causeway mark 63: wave recorder		
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	1,* (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 a
condition	(CONDTN)	1: under construction 2: ruined 5: planned construction	EN	0,1
elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
marks navigational — system of	(MARSYS)	1: IALA A 2: IALA B 9: no system 11: main European inland waterway marking system	EN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 6: wooden 7: metal 8: glass reinforced plastic	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*

date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
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 8: private 12: illuminated 18: existence doubtful	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,* (ordered)
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down)	(S) EN	1,1

		26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)		
shape information			(S) C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFOM)		(S) TE	1,1
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*

The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for beacons/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.13.1 Special purpose/general beacons (see S-4 — B-461.3 and B-467)

Table 20-1 — IALA special purpose beacons — Common types

Feature	INT1	Feature	beacon shape	category of special purpose mark
Minor not permanent mark	Q90	Beacon ***	1	
Cairn	Q100	Beacon ***	6	
Beacon tower	Q110	Beacon ***	3	
Lattice beacon	Q111	Beacon ***	4	
Leading beacon	Q120	Special Purpose/ General Beacon		16
Beacon marking a clearing line	Q121	Special Purpose/ General Beacon		41
Beacon marking measured distance	Q122	Special Purpose/ General Beacon		17
Cable landing beacon	Q123	Special Purpose/ General Beacon		6
Outfall landing beacon	Q123	Special Purpose/ General Beacon		8
Pipeline landing beacon	Q123	Special Purpose/ General Beacon		39
Refuge beacon	Q124	Special Purpose/ General Beacon		44

Feature	INT1	Feature	beacon shape	category of special purpose mark
Firing practice area beacon	Q125	Special Purpose/ General Beacon		1
Notice board	Q126	Special Purpose/ General Beacon		18
Buoyant beacon	P5	Special Purpose/ General Beacon	7	

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20.14 Daymark

IHO Definition: DAYMARK. The identifying characteristics of an aid to navigation which serve to facilitate its recognition against a daylight viewing background. On those structures that do not by themselves present an adequate viewing area to be seen at the required distance, the aid is made more visible by affixing a daymark to the structure. A daymark so affixed has a distinctive colour and shape depending on the purpose of the aid. (IHO Dictionary — S-32, Edition 5).

S-101 Geo Feature: Daymark (DAYMAR)

Primitives: Point

Real World	Paper Chart Symbol		ECDIS Symbol	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of special purpose mark	(CATSPM)	1: firing danger area mark 2: target mark 3: marker ship mark 4: degaussing range mark 5: barge mark 6: cable mark 7: spoil ground mark 8: outfall mark 10: recording mark 11: seaplane anchorage mark 12: recreation zone mark 14: mooring mark 15: LANBY 16: leading mark 17: measured distance mark 18: notice mark 19: TSS mark (Traffic Separation Scheme) 20: anchoring prohibited mark 21: berthing prohibited mark 22: overtaking prohibited mark 23: two-way traffic prohibited mark 24: reduced wake mark 25: speed limit mark	EN	0,*

		26: stop mark 27: general warning mark 28: sound ship's siren mark 29: restricted vertical clearance mark 30: maximum vessel's draught mark 31: restricted horizontal clearance mark 32: strong current warning mark 33: berthing permitted mark 34: overhead power cable mark 35: channel edge gradient mark 36: telephone mark 37: ferry crossing mark 39: pipeline mark 40: anchorage mark 41: clearing mark 42: control mark 43: diving mark 44: refuge beacon 45: foul ground mark 46: yachting mark 47: heliport mark 48: GNSS mark 49: seaplane landing mark 50: entry prohibited mark 51: work in progress mark 52: mark with unknown purpose 53: wellhead mark 54: channel separation mark 55: marine farm mark 56: artificial reef mark 57: ice mark 58: nature reserve mark 60: wreck mark 61: customs mark 62: causeway mark 63: wave recorder		
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	1,* (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 a

elevation	(ELEVAT)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
height	(HEIGHT)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 4: hard surfaced 6: wooden 7: metal 8: glass reinforced plastic 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 4: not in use 5: periodic/intermittent 7: temporary 8: private 12: illuminated	EN	0,*
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up) 10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical)	EN	1,1

		22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)		
vertical length	(VERLEN)		RE	0,1
shape information			C	0,*
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
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	(<i>TXTDSC</i>) (<i>NTXTDS</i>)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Composition	0,1
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger	Association	0,*

		Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck		
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Component	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Updated Object	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for daymarks that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.14.1 Daymarks (see S-4 — B-455.9)

Table 20-2 — Daymarks — Examples

Feature	INT1	Feature	category of special purpose mark	Other attributes
Coloured or white mark	Q101	Daymark		nature of construction = 9

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

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20.15 Light float

IHO Definition: LIGHT FLOAT . A boat-like structure used instead of a light buoy in waters where strong streams or currents are experienced, or when a greater elevation than that of a light buoy is necessary. (IHO Dictionary — S-32).					
S-101 Geo Feature: Light Float (LITFLT)					
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 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	1,* (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 a	
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	(S) EN	0,1 a	

fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	6: wooden 7: metal 11: latticed	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 14: public 16: watched 17: unwatched	EN	0,*
topmark	(TOPMAR)		C	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	(S) EN	0,* (ordered)
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	(S) EN	0,1 a
topmark/daymark shape	(TOPSHP)	1: cone (point up) 2: cone (point down) 3: sphere 4: 2 spheres 5: cylinder 6: board 7: x-shaped 8: upright cross 9: cube (point up)	(S) EN	1,1

		10: 2 cones (point to point) 11: 2 cones (base to base) 12: rhombus 13: 2 cones (points upward) 14: 2 cones (points downward) 15: besom (point up) 16: besom (point down) 17: flag 18: sphere over a rhombus 19: square 20: rectangle (horizontal) 21: rectangle (vertical) 22: trapezium (up) 23: trapezium (down) 24: triangle (point up) 25: triangle (point down) 26: circle 27: two upright crosses (one over the other) 28: T-shape 29: triangle pointing up over a circle 30: upright cross over a circle 31: rhombus over a circle 32: circle over a triangle pointing up 33: other shape (see shape information)		
shape information			(S) C	0,1
language		ISO 639-2/T	(S) TE	0,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	1,1
vertical length	(VERLEN)		RE	0,1
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	(<i>TXTDSC</i>) (<i>NTXTDS</i>)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(<i>INFORM</i>) (<i>NINFOM</i>)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	Daymark, Distance Mark, Fog Signal, Light All Around,	Association	0,1

		Light Fog Detector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning		
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute/sub-attribute colour pattern is mandatory for light floats/topmarks that have more than one value populated for the attribute/sub-attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.16 Light vessel

IHO Definition: LIGHT VESSEL. A distinctively marked vessel anchored or moored at a charted point, to serve as an aid to navigation. By night, it displays a characteristic light(s) and is usually equipped with other devices, such as fog signal, submarine sound signal, and radio-beacon, to assist navigation. (IHO Dictionary — S-32).				
S-101 Geo Feature: Light Vessel (LITVES)				
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 2: black 3: red 4: green 5: blue 6: yellow 7: grey 8: brown 9: amber 10: violet	EN	1,* (ordered)

		11: orange 12: magenta 13: pink		
colour pattern	(COLPAT)	1: horizontal stripes 2: vertical stripes 3: diagonal stripes 4: squared 5: stripes (direction unknown) 6: border stripe	EN	0,1 a
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal length	(HORLEN)		RE	0,1
horizontal width	(HORWID)		RE	0,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	6: wooden 7: metal	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar conspicuous	(CONRAD)		BO	0,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 14: public 16: watched 17: unwatched	EN	0,*
vertical length	(VERLEN)		RE	0,1
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) (NXTDSC)		(S) TE	0,1 a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Structure	Structure/Equipment (see Clause 25.16)	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	Composition	0,1
The Component	Aids to Navigation Association (see Clause 25.2)	Archipelagic Sea Lane, Deep Water Route, Fairway System, Traffic Separation Scheme, Two-Way Route	Association	0,*
The Auxiliary Feature	Fairway Auxiliary (see Clause 25.8)	Fairway	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for light vessels that have more than one value populated for the attribute colour . Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

20.17 Retroreflector

IHO Definition: **RETROREFLECTOR**. A means of distinguishing unlighted marks at night. Retroreflective material is secured to the mark in a particular pattern to reflect back light. (UKHO NP 735, 5th Edition).

S-101 Geo Feature: Retroreflector (RETRFL)

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 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 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
height	(HEIGHT)		RE	0,1	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	
periodic date range		See Clause 2.4.8	C	0,*	
date end	(PEREND)		(S) TD	1,1	
date start	(PERSTA)		(S) TD	1,1	
status	(STATUS)	1: permanent 4: not in use 8: private	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 a	
headline			(S) TE	0,1	
language		ISO 639-2/T	(S) TE	1,1	
text	(INFORM) (NINFOM)		(S) TE	0,1 a	
Feature Associations					
S-101 Role	Association Type	Associated to	Type	Multiplicity	
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building,	Association	0,*	

		Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck		
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Additional Information (see Clause 25.1)	Nautical Information	Association	0,1
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a The attribute colour pattern is mandatory for retroreflectors 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.				

20.19 Fog signal

IHO Definition: FOG SIGNAL . A warning signal transmitted by a vessel, or aid to navigation, during periods of low visibility. Also, the device producing such a signal. (IHO Dictionary — S-32).				
S-101 Geo Feature: Fog Signal (FOGSIG)				
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 fog signal	(CATFOG)	1: explosive 2: diaphone 3: siren 4: nautophone 5: reed 6: tyfon 7: bell	EN	1,1

		8: whistle 9: gong 10: horn		
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
signal frequency	(SIGFRQ)		IN	0,1
signal generation	(SIGGEN)	1: automatically 2: by wave action 3: by hand 4: by wind 5: radio activated 6: call activated	EN	0,1
signal group	(SIGGRP)		TE	0,1
signal period	(SIGPER)		RE	0,1
signal sequence	(SIGSEQ)		C	0,* (ordered)
signal duration			(S) RE	1,1
signal status		1: lit/sound 2: eclipsed/silent	(S) EN	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 15: synchronized	EN	0,*
value of maximum range	(VALMXR)		RE	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) (NTXTDS)		(S) TE	0,1 a

headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

21 Geo Features — Radar, Radio

21.2 Physical AIS aid to navigation

IHO Definition: PHYSICAL AIS AID TO NAVIGATION . An Automatic Identification System (AIS) message 21 transmitted from a physical Aid to Navigation, or transmitted from an AIS station for an Aid to Navigation which physically exists. (Adapted from IALA Recommendation A-126).				
S-101 Geo Feature: Physical AIS Aid to Navigation				
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
estimated range of transmission	(ESTRNG)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
MMSI code		Unique 9 digit code	TE	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 5: periodic/intermittent 7: temporary	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

21.4 Radio station

IHO Definition: RADIO STATION . A place equipped to transmit radio waves. Such a station may be either stationary or mobile, and may also be provided with a radio receiver. (Adapted from IHO Dictionary — S-32).		
S-101 Geo Feature: Radio Station (RDOSTA)		
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
call sign	(CALSGN)		TE	0,1
category of radio station	(CATROS)	5: radio direction-finding station 10: differential GNSS 11: Toran 14: Chaika 19: radio telephone station 20: AIS base station	EN	0,*
communication channel	(COMCHA)		TE	0,*
estimated range of transmission	(ESTRNG)		RE	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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
frequency pair			C	0,1
frequency shore station receives			(S) IN	0,1
frequency shore station transmits	(SIGFRQ)		(S) IN	1,1
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1

text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

21.5 Radar transponder beacon

IHO Definition: RADAR TRANSPONDER BEACON. A transponder beacon transmitting a coded signal on radar frequency, permitting an interrogating craft to determine the bearing and range of the transponder. (IHO Dictionary — S-32).				
S-101 Geo Feature: Radar Transponder Beacon (RTPBCN)				
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 radar transponder beacon	(CATRTB)	1: ramark, radar beacon transmitting continuously 2: racon, radar transponder beacon 3: leading racon/radar transponder beacon	EN	1,1
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a

date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
radar wave length	(RADWAL)		C	0,2
radar band			(S) TE	1,1
wave length value			(S) RE	1,1
sector limit			C	0,1
sector limit one	(SECTR1)		(S) C	1,1
sector bearing		sector limit one/sector bearing $\neq$ sector limit two/sector bearing (0 = 360)	(S) RE	1,1
sector line length			(S) RE	0,1
sector limit two	(SECTR2)		(S) C	1,1
sector bearing		sector limit two/sector bearing $\neq$ sector limit one/sector bearing (0 = 360)	(S) RE	1,1
sector line length			(S) RE	0,1
signal group	(SIGGRP)		TE	0,1
signal sequence	(SIGSEQ)		C	0,* (ordered)
signal duration			(S) RE	1,1
signal status		1: lit/sound 2: eclipsed/silent	(S) EN	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private	EN	0,*
value of maximum range	(VALMXR)		RE	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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
Component of	Range System Aggregation (see Clause 25.13)	Range System	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

22 Geo Features — Services

22.1 Pilot boarding place

IHO Definition: PILOT BOARDING PLACE . A location offshore where a pilot may board a vessel in preparation to piloting it through local waters. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).				
S-101 Geo Feature: Pilot Boarding Place (PILBOP)				
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 pilot boarding place	(CATPIL)	1: boarding by pilot-cruising vessel 2: boarding by helicopter 3: pilot comes out from shore	EN	0,1
category of preference		1: primary 2: alternate	EN	0,1
communication channel	(COMCHA)		TE	0,*
destination			TE	0,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
pilot movement		1: embarkation 2: disembarkation 3: pilot change	EN	0,*
status	(STATUS)	1: permanent 2: occasional 5: periodic/intermittent 6: reserved 9: mandatory 16: watched 17: unwatched 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) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Component	Pilotage District Association (see Clause 25.11)	Pilotage District	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

22.2 Vessel traffic service

IHO Definition: VESSEL TRAFFIC SERVICE . The area of any service implemented by a relevant authority primarily designed to improve safety and efficiency of traffic flow and the protection of the environment. It may range from simple information messages, to extensive organisation of the traffic involving national or regional schemes. (IHO Dictionary — S-32).				
S-101 Geo Feature: Vessel Traffic Service Area (ADMARE)				
Primitives: 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
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

22.3 Coast Guard station

IHO Definition: COAST GUARD STATION . A station at which a visual/radio/radar marine watch is kept either continuously or at certain times only.(IHO Dictionary — S-32).				
S-101 Geo Feature: Coast Guard Station (CGUSTA)				
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
communication channel	(COMCHA)		TE	0,*

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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
is MRCC			BO	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 4: not in use 5: periodic/intermittent 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,*

-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

22.4 Warning signal station

IHO Definition: WARNING SIGNAL STATION. A warning signal station is a place on shore from which warning signals are made to ships at sea. (Adapted from IHO Dictionary — S-32 and Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2012).				
S-101 Geo Feature: Signal Station Warning (SISTAW)				
Primitives: Point, Surface				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of signal station, warning	(CATSIW)	1: danger 2: maritime obstruction 3: cable 4: military practice 5: distress 6: weather 7: storm 8: ice warning 9: time 10: tide 11: tidal stream 12: tide gauge 13: tide scale 14: diving 15: water level gauge	EN	1,*
communication channel	(COMCHA)		TE	0,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1

date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 12: illuminated 14: public 15: synchronized 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*

The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

22.5 Traffic signal station

IHO Definition: TRAFFIC SIGNAL STATION . A traffic signal station is a place on shore from which signals are made to regulate the movement of traffic. (Adapted from IHO Dictionary — S-32 and S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.155, November 2000).				
S-101 Geo Feature: Signal Station Traffic (SISTAT)				
Primitives: Point, Surface				
<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of signal station, traffic	(CATSIT)	1: port control 2: port entry and departure 3: International Port Traffic 4: berthing signal station 5: dock 6: lock 7: flood barrage station 8: bridge passage 9: dredging 10: traffic control light	EN	1,*
communication channel	(COMCHA)		TE	0,*
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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*

date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 12: illuminated 14: public 15: synchronized 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Equipment	Structure/Equipment (see Clause 25.16)	Cardinal Beacon, Cardinal Buoy, Bridge, Building, Crane, Conveyor, Daymark, Dolphin, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fortified Structure, Hulk, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Lateral Beacon, Lateral Buoy, Light Float, Light Vessel, Mooring Buoy, Offshore Platform, Pile, Pipeline Overhead, Pontoon, Pylon/Bridge Support, Safe Water Beacon, Safe Water Buoy, Shoreline Construction, Silo/Tank, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Structure Over Navigable Water, Wind Turbine, Wreck	Association	0,*

The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

22.6 Rescue station

IHO Definition: RESCUE STATION . A place where equipment for saving life at is maintained. (IHO Dictionary — S-32).					
S-101 Geo Feature: Rescue Station (RSCSTA)					
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 rescue station	(CATRSC)	1: rescue station with lifeboat 2: rescue station with rocket 4: refuge for shipwrecked mariners 5: refuge for intertidal area walkers 6: lifeboat lying at a mooring 7: aid radio station 8: first aid equipment	EN	0,*	
communication channel	(COMCHA)		TE	0,*	
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	(S) EN	0,1 a	
fixed date range		See Clause 2.4.8	C	0,1	
date end	(DATEND)		(S) TD	0,1 a	
date start	(DATSTA)		(S) TD	0,1 a	
interoperability identifier		MRN (see Clause 27.114)	URN	0,1	

periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 4: not in use 5: periodic/intermittent 7: temporary 8: private 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*

^a Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.

22.7 Harbour facility

IHO Definition: **HARBOUR FACILITY**. A Harbour installation with a service or commercial operation of public interest. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.81, November 2000).

S-101 Geo Feature: Harbour Facility (HRBFAC)				
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 harbour facility	(CATHAF)	1: RoRo-terminal 3: ferry terminal 4: fishing harbour 5: yacht harbour/marina 6: naval base 7: tanker terminal 8: passenger terminal 9: shipyard 10: container terminal 11: bulk terminal 12: ship lift 13: straddle carrier 14: service harbour 15: pilotage service	EN	1,*
communication channel	(COMCHA)		TE	0,*
condition	(CONDTN)	1: under construction 2: ruined 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	(S) EN	0,1 a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
nature of construction	(NATCON)	1: masonry 2: concreted 3: loose boulders 6: wooden 7: metal	EN	0,*
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
product	(PRODCT)	1: oil 2: gas 3: water 4: stone 5: coal 6: ore 7: chemicals	EN	0,1

		8: drinking water 9: milk 10: bauxite 11: coke 12: iron ingots 13: salt 14: sand 15: timber 16: sawdust/wood chips 17: scrap metal 18: liquefied natural gas 19: liquefied petroleum gas 20: wine 21: cement 22: grain 25: clay		
reported date	(SORDAT)	See Clause 2.4.8	TD	0,1
restriction	(RESTRN)	1: anchoring prohibited 2: anchoring restricted 3: fishing prohibited 4: fishing restricted 5: trawling prohibited 6: trawling restricted 8: entry restricted 9: dredging prohibited 10: dredging restricted 11: diving prohibited 12: diving restricted 13: no wake 15: construction prohibited 16: discharging prohibited 17: discharging restricted 18: industrial or mineral exploration/development prohibited 19: industrial or mineral exploration/development restricted 20: drilling prohibited 21: drilling restricted 23: cargo transshipment (lightening) prohibited 24: dragging prohibited 27: speed restricted	EN	0,*
status	(STATUS)	1: permanent 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 9: mandatory 12: illuminated 13: historic 14: public 16: watched 17: unwatched	EN	0,*
vessel speed limit			C	0,*
speed limit			(S) RE	1,1
speed units		2: kilometres per hour	(S) EN	1,1

		3: miles per hour 4: knots		
vessel class			(S) TE	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) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFORM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. 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.				

22.8 Small craft facility

IHO Definition: SMALL CRAFT FACILITY . A place at which a service generally of interest to small craft or pleasure boats is available. (S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.162, November 2000).				
S-101 Geo Feature: Small Craft Facility (SMCFAC)				
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 small craft facility	(CATSCF)	1: visitors berth 2: nautical club	EN	1,*

		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 30: scrubbing berth 31: picnic area 32: mechanics workshop 33: guard and/or security service		
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	(S) EN	0,1 a
interoperability identifier		MRN (see Clause 27.114)	URN	0,1
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
status	(STATUS)	1: permanent 2: occasional 3: recommended 4: not in use 5: periodic/intermittent 6: reserved 7: temporary 8: private 9: mandatory 12: illuminated 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,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Updated Object	Updated Information (see Clause 25.21)	Update Information	Association	0,*
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1
-	Additional Information (see Clause 25.1)	Contact Details, Nautical Information	Association	0,*
-	Spatial Association (see Clause 25.15)	Spatial Quality	Association	0,*
^a Complex attribute feature name , sub-attribute name usage is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See Clause 2.5.8 . For each instance of information , at least one of the sub-attributes file reference or text must be populated.				

23 Cartographic Features

23.1 Text placement

IHO Definition: TEXT PLACEMENT. The Text Placement feature is used in association with the Feature Name attribute or a light description to optimize text positioning in ECDIS.				
S-101 Cartographic Feature: Text Placement				
Primitives: Point				
<i>Real World</i>	<i>Paper Chart Symbol</i>		<i>ECDIS Symbol</i>	
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
text offset bearing			IN	1,1
text offset distance			IN	1,
text rotation			BO	0,1

text type		1: name 2: feature characteristic	EN	1,2
scale minimum	(SCAMIN)	See Clause 2.5.9	IN	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Cartographic Text	Text Association (see Clause 25.17).	See next row	Association	0,2
Associated to: 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 Buoy, Cardinal Beacon, Cargo Transshipment Area, Causeway, Chart 1 Feature, 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, 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, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Spring, Structure Over Navigable Water, Submarine Pipeline Area, Submarine Transit Lane, Tidal Stream Panel Data, Tidal Stream — Flood/Ebb, Tideway, Traffic Separation Scheme, Tunnel, Two-Way Route, Underwater/Awash Rock, Vegetation, Vessel Traffic Service Area, Virtual AIS Aid to Navigation, Water Turbulence, Waterfall, Weed/Kelp, Wind Turbine, Wreck				

24 Information types

24.1 Contact details

IHO Definition: CONTACT DETAILS. Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems.				
S-101 Information Type: Contact Details				
Primitives: 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
call sign	(CALSGN)		TE	0,1
communication channel	(COMCHA)		TE	0,*

contact instructions	(INFORM)		TE	0,1
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1a
date start	(DATSTA)		(S) TD	0,1a
frequency pair			C	0,*
frequency shore station receives			(S) IN	0,1
frequency shore station transmits	(SIGFRQ)		(S) IN	0,1
MMSI code		Unique 9 digit code	TE	0,1
online resource			C	0,*
headline			(S) TE	0,1
linkage		ISO 19115:2014	(S) URI	1,1
name of resource		ISO 19115:2014	(S) TE	0,1
telecommunications			C	0,*
contact instructions			(S) TE	0,1
telecommunication identifier			(S) TE	1,1
telecommunication service		1: voice 2: facsimile 3: SMS 4: data 5: streamed data 6: telex 7: telegraph 8: email	(S) EN	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Information	Additional Information (see Clause 25.1).	See next row	Association	0,1
Associated to: Administration Area, Airport/Airfield, Anchor Berth, Anchorage Area, Berth, Bridge, Building, Cable Area, Cable Overhead, Cable Submarine, Cardinal Beacon, Cardinal Buoy, Checkpoint, Coast Guard Station, Conveyor, Crane, Daymark, Dock Area, Dolphin, Dry Dock, Emergency Wreck Marking Buoy, Fishing Facility, Floating Dock, Fog Signal, Gate, Harbour Area (Administrative), Harbour Facility, Helipad, Installation Buoy, Isolated Danger Beacon, Isolated Danger Buoy, Landmark, Land Region, Lateral Beacon, Lateral Buoy, Light All Around, Light Float, Light Sector, Light Vessel, Lock Basin, Marine Farm/Culture, Mooring Area, Mooring Buoy, Mooring Trot, Mooring Buoy, Offshore Platform, Offshore Production Area, Pilot Boarding Place, Pilotage District, Pipeline Overhead, Pipeline Submarine/On Land, Production/Storage Area, Radar Range, Radar Station, Radio Calling-In Point, Radio Station, Railway, Rescue Station, Runway, Safe Water Beacon, Safe Water Buoy, Seaplane Landing Area, Signal Station Traffic, Signal Station Warning, Silo/Tank, Small Craft Facility, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Submarine Pipeline Area, Tunnel, Vessel Traffic Service Area, Wind Turbine				
^a For each instance of fixed date range , at least one of the sub-attributes date end or date start must be populated.				

24.2 Service hours

IHO Definition: SERVICE HOURS . The time when a service is available and known exceptions.				
S-101 Information Type: Service Hours				
Primitives: 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
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
schedule by day of week			C	1,*
category of schedule		1: normal operation 2: closure 3: unmanned operation	(S) EN	0,1
time intervals by day of week			(S) C	1,*
day of week		1: Sunday 2: Monday 3: Tuesday 4: Wednesday 5: Thursday 6: Friday 7: Saturday	(S) EN	0,7 (ordered) a
day of week is range			(S) BO	0,1
time of day end			(S) TI	0,* (ordered) a
time of day start			(S) TI	0,* (ordered) a
information			C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Information	Additional Information (see Clause 25.1).	See next row	Association	0,1
Associated to: Airport/Airfield, Anchor Berth, Anchorage Area, Berth, Bridge, Building, Checkpoint, Coast Guard Station, Conveyor, Crane, Dock Area, Dry Dock, Floating Dock, Gate, Helipad, Landmark, Lock Basin, Mooring Area, Production/Storage Area, Radio Calling-In Point, Runway, Seaplane Landing Area, Span Fixed, Span Opening				
^a For each instance of time intervals by day of week , at least one of the sub-attributes day of week , time of day start or time of day end must be populated. Where populated, the number of instances of time of day start must be the same as the number of instances of time of day end . 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.				

24.3 Non-standard working day

IHO Definition: NON-STANDARD WORKING DAY . Days when many services are not available. Often days of festivity or recreation or public holidays when normal working hours are limited, especially a national or religious festival, etc. (S-127 Edition 1.0.0).				
S-101 Information Type: Non-Standard Working Day				
Primitives: 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
date fixed		See Clause 2.4.8	TD	0,* a
date variable			TE	0,* a
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
information			C	0,*
file locator			(S) TE	0,1
file reference	(TXTDSC) (NTXTDS)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Information	Additional Information (see Clause 25.1).	See next row	Association	0,1
Associated to: Airport/Airfield, Anchor Berth, Anchorage Area, Berth, Bridge, Building, Checkpoint, Coast Guard Station, Conveyor, Crane, Dock Area, Dry Dock, Floating Dock, Gate, Helipad, Landmark, Lock Basin, Mooring Area, Production/Storage Area, Radio Calling-In Point, Runway, Seaplane Landing Area, Span Fixed, Span Opening				
^a At least one of the attributes date fixed or date variable must be populated. 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.				

24.4 Nautical information

IHO Definition: NAUTICAL INFORMATION . Nautical information about a related area or facility.				
S-101 Information Type: Nautical Information				
Primitives: 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
fixed date range		See Clause 2.4.8	C	0,1
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
periodic date range		See Clause 2.4.8	C	0,*
date end	(PEREND)		(S) TD	1,1
date start	(PERSTA)		(S) TD	1,1
information		See Clause 2.4.6	C	0,* a
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1 a
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 a
pictorial representation	(PICREP)	See Clause 2.4.12.2	TE	0,1 a

Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Information	Additional Information (see Clause 25.1).	See next row	Association	0,1
Associated to: 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, Caution Area, Checkpoint, Coastline, Coast Guard Station, 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, Landmark, Land Region, 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, Magnetic Variation, Marine Farm/Culture, Marine Pollution Regulations Area, Military Practice Area, Mooring Area, Mooring Buoy, Mooring Trot, Mooring Buoy, Navigation Line, Obstruction, Offshore Platform, Offshore Production Area, Oil Barrier, Physical AIS Aid to Navigation, Pile, Pilotage District, Pilot Boarding Place, Pipeline Overhead, Pipeline Submarine/On Land, Pontoon, Precautionary Area, Production/Storage Area, Pylon/Bridge Support, 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, Shoreline Construction, Signal Station Traffic, Signal Station Warning, Silo/Tank, Slope Topline, Sloping Ground, Small Craft Facility, Sounding, Span Fixed, Span Opening, Special Purpose/General Beacon, Special Purpose/General Buoy, Spring, Straight Territorial Sea Baseline, Structure Over Navigable Water, Submarine Pipeline Area, Submarine Transit Lane, Swept Area, Territorial Sea Area, Tidal Stream Panel Data, Tidal Stream — Flood/Ebb, Tideway, Separation Zone or Line, 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, Vessel Traffic Service Area, Virtual AIS Aid to Navigation, Water Turbulence, Waterfall, Weed/Kelp, Wind Turbine, Wreck				
^a At least one of the attributes information or pictorial representation must be populated. 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.				

24.5 Spatial quality

IHO Definition: SPATIAL QUALITY . The indication of the quality of the locational information for features in a dataset.		
S-101 Information Type: Spatial Quality		
Primitives: 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
quality of horizontal measurement	(QUAPOS)	4: approximate	EN	0,1 a
spatial accuracy			C	0,* a
fixed date range		See Clause 2.4.8	(S) C	0,1 a
date end	(DATEND)		(S) TD	0,1 a
date start	(DATSTA)		(S) TD	0,1 a
horizontal position uncertainty	(POSACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
vertical uncertainty	(SOUACC)		(S) C	0,1
uncertainty fixed			(S) RE	1,1
uncertainty variable factor			(S) RE	0,1
Feature Associations				
S-101 Role	Association Type	Associated to	Type	Multiplicity
The Quality Information	Quality of Bathymetric Data Composition (see Clause 25.12)	Quality of Bathymetric Data	Association	0,1
The Quality Information	Spatial Association (see Clause 25.15).	Spatial types (see Clause 2.4.7)	Association	0,1
^a At least one of the attributes quality of horizontal measurement or spatial accuracy must be encoded. The sub-complex attribute fixed date range is mandatory if more than one instance of the complex attribute spatial accuracy is encoded. For each instance of fixed date range , at least one of the sub-attributes date end or date start must be populated.				

25 Association Names



Figure 25-1 — Two-Way Route Part UML relationship diagram

NOTE 1

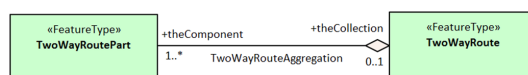


Figure 25-2 — Two-Way Route Aggregation

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NOTE 2

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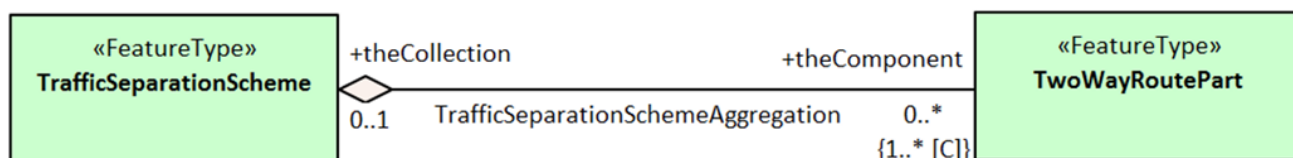


Figure 25-3 — Traffic Separation Scheme Aggregation

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-
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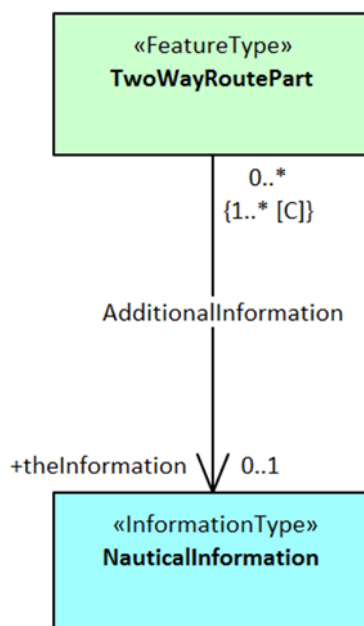


Figure 25-4 — Additional Information

25.7 Fairway aggregation

IHO Definition: FAIRWAY AGGREGATION. A feature association for the binding between related fairways comprising a fairway system.

Remarks:

- A **Fairway Aggregation** must, if required, include at least two **Fairway** features associated to a **Fairway System** feature. Note, however, that within a single dataset the **Fairway Aggregation** may contain only a single **Fairway** feature due to splitting the fairway system at the ENC cell limits.
- The **Fairway System** may additionally be associated to the aids to navigation marking the components of the fairway using the association **Aids to Navigation Association** (see [Clause 25.2](#)).

Role Type	Role	Associated With	Multiplicity
Aggregation	The Collection	Fairway System	0,1
Association	The Component	Fairway	0,*

25.9 Island aggregation

IHO Definition: ISLAND AGGREGATION. A feature association for the binding between a named group of islands.

Remarks:

- An **Island Aggregation** must, if required, include at least one **Land Area** or **Island Group** feature associated to an **Island Group** feature.

Role Type	Role	Associated With	Multiplicity
Aggregation	The Collection	Island Group	0,1
Association	The Component	Land Area, Island Group	0,*

26 Association Roles

26.1 The auxiliary feature

IHO Definition: **THE AUXILIARY FEATURE.** A pointer to incidental, secondary or supplementary features related to the referenced feature.

26.2 The cartographic text

IHO Definition: **THE CARTOGRAPHIC TEXT.** A pointer to a specific cartographically positioned location for text.

26.7 The position provider

IHO Definition: **THE POSITION PROVIDER.** A pointer to a specific feature(s).

26.8 The primary feature

IHO Definition: **THE PRIMARY FEATURE.** A pointer to a feature to which incidental, secondary or supplementary features are related.

26.9 The quality information

IHO Definition: **THE QUALITY INFORMATION.** A pointer to an information type providing spatial quality information.

26.11 The structure

IHO Definition: **THE STRUCTURE.** A pointer to the feature that equipment feature(s) are supported by.

26.12 The support

IHO Definition: **THE SUPPORT.** A pointer to the feature(s) that support a structure.

26.13 The update

IHO Definition: **THE UPDATE.** A pointer to a feature that describes changes made to a dataset.

26.14 The updated object

IHO Definition: **THE UPDATED OBJECT.** A pointer to a feature that has been updated.

27 Geo Feature Attribute and Enumerate Descriptions

27.2 beacon shape (BCNSHP)

IHO Definition: **BEACON SHAPE.** Describes the characteristic geometric form of the beacon. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Attribute Type: Enumeration

1) **stake, pole, perch, post**

IHO Definition: An elongated wood or metal pole, driven into the ground or seabed, which serves as a navigational aid or a support for a navigational aid. (Adapted from IHO Dictionary — S-32).

2) **withy**

IHO Definition: A tree without roots stuck or spoiled into the bottom of the sea to serve as a navigational aid. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.5, November 2000).

3) **beacon tower**

IHO Definition: A solid structure of the order of 10 metres in height used as a navigational aid. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.5, November 2000).

4) **lattice beacon**

IHO Definition: A structure consisting of strips of metal or wood crossed or interlaced to form a structure to serve as an aid to navigation or as a support for an aid to navigation. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.5, November 2000).

5) **pile beacon**

IHO Definition: A long heavy timber(s) or section(s) of steel, wood, concrete, etc., forced into the seabed to serve as an aid to navigation or as a support for an aid to navigation. (Adapted from IHO Dictionary — S-32 and Navigation Dictionary, US National Oceanic and Atmospheric Administration — NOAA, 1969).

6) **cairn**

IHO Definition: A mound of stones, usually conical or pyramidal, raised as a landmark or to designate a point of importance in surveying. (IHO Dictionary — S-32).

7) **buoyant beacon**

IHO Definition: A tall spar-like beacon fitted with a permanently submerged buoyancy chamber, the lower end of the body is secured to seabed sinker either by a flexible joint or by a cable under tension. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.5, November 2000).

Remarks:

- No remarks.

27.3 bridge construction (CATBRG)

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

Attribute Type: Enumeration

1) **arch**

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

2) **viaduct**

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

3) **pontoon bridge**

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

4) **suspension bridge**

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

5) **transporter bridge**

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

Remarks:

- No remarks.

27.4 bridge function (CATBRG)

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

Attribute Type: Enumeration

1) **vehicular**

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

2) **rail**

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

3) **pedestrian**

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

4) **aqueduct**

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

Remarks:

- No remarks.

27.5 building shape (BUISHP)

IHO Definition: **BUILDING SHAPE.** The specific shape of the building.

Attribute Type: Enumeration

1) **high-rise building**

IHO Definition: A building having many storeys. (The New Shorter Oxford English Dictionary, 1993).

2) **pyramid**

IHO Definition: A polyhedron of which one face is a polygon of any number of sides, and the other faces are triangles with a common vertex. (The New Shorter Oxford English Dictionary, 1993).

3) **cylindrical**

IHO Definition: Shaped like a cylinder, which is a solid geometrical figure generated by straight lines fixed in direction and describing with one of its points a closed curve, especially a circle. (The New Shorter Oxford English Dictionary, 1993).

4) **spherical**

IHO Definition: Shaped like a sphere, which is a body the surface of which is at all points equidistant from the centre. (The New Shorter Oxford English Dictionary, 1993).

5) **cubic**

IHO Definition: A shape the sides of which are six equal squares; a regular hexahedron. (The New Shorter Oxford English Dictionary, 1993).

Remarks:

- No remarks.

27.6 buoy shape (BOYSHP)

IHO Definition: **BUOY SHAPE.** The principal shape and/or design of a buoy. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Attribute Type: Enumeration

1) **conical**

IHO Definition: The upper part of the body above the water-line, or the greater part of the superstructure, has approximately the shape or the appearance of a pointed cone with the point upwards. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

2) **can**

IHO Definition: The upper part of the body above the water-line, or the greater part of the superstructure, has the shape of a cylinder, or a truncated cone that approximates to a cylinder, with a flat end uppermost. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

3) **spherical**

IHO Definition: Shaped like a sphere, which is a body the surface of which is at all points equidistant from the centre. (The New Shorter Oxford English Dictionary, 1993).

4) **pillar**

IHO Definition: The upper part of the body above the water-line, or the greater part of the superstructure is a narrow vertical structure, pillar or lattice tower. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

5) **spar**

IHO Definition: The upper part of the body above the water-line, or the greater part of the superstructure, has the form of a pole, or of a very long cylinder, floating upright. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

6) **barrel**

IHO Definition: The upper part of the body above the water-line, or the greater part of the superstructure, has the form of a barrel or cylinder floating horizontally. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

7) **superbuoy**

IHO Definition: A very large buoy designed to carry a signal light of high luminous intensity at a high elevation. (IHO Dictionary — S-32).

8) **ice buoy**

IHO Definition: A specially constructed shuttle shaped buoy which is used in ice conditions. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.7, November 2000).

Remarks:

- The principal shapes are those recommended in the International Association of Lighthouse Authorities — IALA System.

27.7 buried depth (BURDEP)

IHO Definition: **BURIED DEPTH.** The depth below the seabed to which an object is buried. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.8, November 2000).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 20

Range closure: Left half-open interval (minimum < **buried depth** ≤ maximum)

Example: **2.5** for a depth of 2.5 metres

Remarks:

- No remarks.

27.8 call sign (CALSGN)

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

Attribute Type: Text

Remarks:

- The attribute **call sign** should contain no more than 150 characters.

27.9 category of airport/airfield (CATAIR)

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

Attribute Type: Enumeration

1) **military aeroplane airport**

IHO Definition: A large military airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (Adapted from The Macquarie Dictionary, 1988).

2) **civil aeroplane airport**

IHO Definition: A large airfield usually equipped with a control tower, hangars and accommodation for the receiving and discharging of passengers or cargo. (The Macquarie Dictionary, 1988).

3) **military heliport**

IHO Definition: A landing place for helicopters controlled by the military. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.10, November 2000).

4) **civil heliport**

IHO Definition: A landing place for helicopters, often the roof of a building. (The Macquarie Dictionary, 1988).

5) **glider airfield**

IHO Definition: An area of land set aside for the take-off and landing of gliders. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.10, November 2000).

6) **small planes airfield**

IHO Definition: An area of land set aside for the take-off and landing of small aeroplanes. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.10, November 2000).

7) **emergency airfield**

IHO Definition: An area of land set aside for the take-off and landing of aeroplanes or helicopters in times of emergency. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.10, November 2000).

8) **search and rescue airfield**

IHO Definition: An area of land set aside for the take-off and landing of aeroplanes or helicopters in times of search and rescue.

Remarks:

- No remarks.

27.10 category of anchorage (CATACH)

IHO Definition: CATEGORY OF ANCHORAGE. Classification of an area where different use types of vessel can remain static.

Attribute Type: Enumeration

1) **unrestricted anchorage**

IHO Definition: An area in which vessels anchor or may anchor. (IHO Dictionary—S-32).

2) **deep water anchorage**

IHO Definition: An area in which vessels of deep draught anchor or may anchor. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

3) **tanker anchorage**

IHO Definition: An area in which tankers anchor or may anchor. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

4) **quarantine anchorage**

IHO Definition: An area where a vessel anchors when satisfying quarantine regulations. (IHO Dictionary—S-32).

5) **seaplane anchorage**

IHO Definition: An area in which seaplanes anchor or may anchor. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

6) **small craft anchorage**

IHO Definition: An area in which yachts and small boats anchor or may anchor. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

7) **anchorage for periods up to 24 hours**

IHO Definition: An area in which vessels anchor or may anchor for periods of up to 24 hours. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

8) **anchorage for a limited period of time**

IHO Definition: An area in which vessels may anchor for a period of time not to exceed a specific limit. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.11, November 2000).

9) **waiting anchorage**

IHO Definition: An area in which vessels anchor or may anchor while waiting, for example, for access to a port or berth.

10) **reported anchorage**

IHO Definition: A location not defined by a regulatory authority that has been reported to be suitable and safe for anchoring.

Remarks:

- No remarks.

27.11 category of built-up area (CATBUA)

IHO Definition: **CATEGORY OF BUILT-UP AREA.** Human settlement classification.

Attribute Type: Enumeration

1) **urban area**

IHO Definition: An area predominantly occupied by man-made structures used for residential, commercial, and industrial purposes. (Nautical Chart Manual, US Department of Commerce, 1992).

2) **settlement**

IHO Definition: A continuously occupied concentration of tents or lightweight fixed structures (for example: huts) serving as residences. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **village**

IHO Definition: A self-contained group of houses and associated buildings, usually in a country area. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **town**

IHO Definition: An inhabited place larger and more regularly built and with more complete and independent local government than a village but not incorporated as a city. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **city**

IHO Definition: A major town inhabited by a large permanent community with all essential services. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **holiday village**

IHO Definition: A complex for holiday-makers with cottages, shops, and entertainment, on site, which is mainly populated on a seasonal basis. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

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).

2) **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).

3) **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).

4) **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, 2016).

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

5) **junction cable**

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

6) **telecommunications cable**

IHO Definition: A cable used for the transmission and reception of modulated communication waves/signals. (Adapted from Wikipedia).

Remarks:

- No remarks.

27.13 category of canal (CATCAN)

IHO Definition: **CATEGORY OF CANAL.** Classification of an artificial waterway used for travel, drainage, or irrigation.

Attribute Type: Enumeration

- 1) **transportation**
IHO Definition: A canal used for navigation as part of a transport system. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.17, November 2000).
- 2) **drainage**
IHO Definition: A canal used to drain excess water from surrounding land. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.17, November 2000).
- 3) **irrigation**
IHO Definition: A canal used to supply water for the purpose of irrigation. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.17, November 2000).

Remarks:

- No remarks.

27.14 category of cardinal mark (CATCAM)

IHO Definition: **CATEGORY OF CARDINAL MARK.** The four quadrants (north, east, south and west) are bounded by the true bearings NW-NE, NE-SE, SE-SW and SW-NW taken from the point of interest.

A cardinal mark is named after the quadrant in which it is placed.

The name of the cardinal mark indicates that it should be passed to the named side of the mark. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.18, November 2000).

Attribute Type: Enumeration

- 1) **north cardinal mark**
IHO Definition: Quadrant bounded by the true bearing NW-NE taken from the point of interest; it should be passed to the north side of the mark. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.18, November 2000).
- 2) **east cardinal mark**
IHO Definition: Quadrant bounded by the true bearing NE-SE taken from the point of interest. It should be passed to the east side of the mark. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.18, November 2000).
- 3) **south cardinal mark**
IHO Definition: Quadrant bounded by the true bearing SE-SW taken from the point of interest; it should be passed to the south side of the mark. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.18, November 2000).
- 4) **west cardinal mark**
IHO Definition: Quadrant bounded by the true bearing SW-NW taken from the point of interest; it should be passed to the west side of the mark. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.18, November 2000).

Remarks:

- Cardinal marks do not have a distinctive shape but are normally pillar or spar. To conform to the IALA Maritime Buoyage System, they are always coloured in yellow and black horizontal bands and their distinctive double cone top-marks are always black. Cardinal marks may also have a special system of flashing white lights and if such lights are fitted they are encoded as separate **Light** features.

27.15 category of cargo

IHO Definition: **CATEGORY OF CARGO.** Classification of the different types of cargo that a ship may be carrying. (IHO Nautical Information Provision Working Group, 2016).

Attribute Type: Enumeration

- 1) **bulk**
IHO Definition: Unpacked homogenous cargo poured loose in a certain space of a vessel, for example oil or grain. (Inland ENC Harmonization Group, Feature Catalogue Edition 2.4).
- 2) **container**
IHO Definition: One of a number of standard sized cargo carrying units, secured using standard corner attachments and bar. (IHO Nautical Information Provision Working Group, 2016).
- 3) **general**
IHO Definition: Break bulk cargo normally loaded by crane. (IHO Nautical Information Provision Working Group, 2016).
- 4) **liquid**
IHO Definition: Any cargo loaded by pipeline. (IHO Nautical Information Provision Working Group, 2016).
- 5) **passenger**
IHO Definition: A fee paying traveller. (IHO Nautical Information Provision Working Group, 2016).
- 6) **livestock**
IHO Definition: Live animals carried in bulk. (IHO Nautical Information Provision Working Group, 2016).
- 7) **dangerous or hazardous**
IHO Definition: Dangerous or hazardous cargo as described by the IMO International Maritime Dangerous Goods code. (IHO Nautical Information Provision Working Group, 2016).
- 8) **heavy lift**
IHO Definition: Indivisible heavy items of weight generally over 100 tons, and width or height greater than 100 metres. (Adapted from Wikipedia).
- 9) **ballast**
IHO Definition: Material carried by a ship to ensure its stability. (Adapted from Oxford English Dictionary).
- 10) **dry bulk cargo**
IHO Definition: Commodity cargo that is transported unpackaged in large quantities. These types of goods usually need to be kept dry during the whole transportation period. (Adapted from WÄRTSILÄ Encyclopedia of Marine and Energy Technology).
- 11) **liquid bulk cargo**
IHO Definition: Liquids or gases that are transported in bulk and carried unpackaged. (Adapted from Wikipedia).
- 12) **reefer container cargo**
IHO Definition: Cargo transported in refrigerated containers, generally perishable commodities which require temperature-controlled transportation, such as fruit, meat, fish, vegetables, dairy products and other foods. (Adapted from Wikipedia).
- 13) **Ro-Ro cargo**
IHO Definition: Wheeled cargo, such as cars, busses, trucks, agricultural vehicles and cranes, that are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter. (Wikipedia).
- 14) **project cargo**
IHO Definition: Project cargo is a term used to broadly describe the national or international transportation of large, heavy, high value, or critical (to the project they are intended for) pieces of equipment. Also commonly referred to as heavy lift, this includes shipments made of various components which need disassembly for shipment and reassembly after delivery. (Wikipedia).
- 15) **break bulk cargo**
IHO Definition: Goods that are stowed on board ship in individually counted units, and not in intermodal containers nor in bulk as with oil or grain. (Adapted from Wikipedia).

Remarks:

- No remarks.

27.16 category of checkpoint (CATCHP)

IHO Definition: **CATEGORY OF CHECKPOINT.** Classification of a place where vehicles or travellers are stopped for identification or inspection.

Attribute Type: Enumeration

- 1) **custom**
IHO Definition: Serves as a government checkpoint where customs duties are collected, the flow of goods are regulated and restrictions enforced, and shipments or vehicles are cleared for entering or leaving a country. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

27.17 category of coastline (CATCOA)

IHO Definition: **CATEGORY OF COASTLINE.** Physical condition of the coastline.

Attribute Type: Enumeration

1) **steep coast**

IHO Definition: A coast backed by rock or earth cliffs, gives a good radar return and is useful for visual identification from a considerable distance off, where cliffs alternate with low lying coast along the shoreline. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.20, November 2000).

2) **flat coast**

IHO Definition: A level coast with no obvious topographic features. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.20, November 2000).

3) **glacier, seaward end**

IHO Definition: Projecting seaward extension of glacier, usually afloat. (IHO Dictionary — S-32).

4) **mangrove**

IHO Definition: One of several genera of tropical trees or shrubs which produce many prop roots and grow along low-lying coasts into shallow water. (IHO Dictionary — S-32).

5) **marshy shore**

IHO Definition: A shoreline area made up of spongy land saturated with water. It may have a shallow covering of water, usually with a considerable amount of vegetation appearing above the surface. (Adapted from IHO Dictionary — S-32).

6) **ice coast**

IHO Definition: A vertical cliff forming the seaward edge of an ice shelf, ranging in height from 2 metres to 50 metres or more above sea level. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.21, November 2000).

Remarks:

- ~No remarks.~

27.18 category of conveyor (CATCON)

IHO Definition: **CATEGORY OF CONVEYOR.** Classification of conveyor used for moving goods from one location to another.

Attribute Type: Enumeration

1) **aerial cableway**

IHO Definition: A transportation system consisting of load cables strung between pylons on which carrier units (for example: cars or buckets intended to transport people, material, and/or equipment) are suspended. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **belt conveyor**

IHO Definition: A conveyor along which material or people are transported by means of a moving belt. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.23, November 2000).

3) **flume**

IHO Definition: An artificial channel, usually an inclined chute or trough, for carrying water to furnish power, transport logs down a mountainside, etc. (Websters New World Dictionary Third College Edition).

4) **lift/elevator**

IHO Definition: Any of various mechanical devices for raising objects or materials.

Remarks:

- No remarks.

27.19 category of crane (CATCRN)

IHO Definition: **CATEGORY OF CRANE.** Classification of machines used for hoisting and moving heavy objects.

Attribute Type: Enumeration

1) **container crane/gantry**

IHO Definition: A high speed, shore-based crane used in the lift-on/lift-off operation of specially constructed containers. (Adapted from Nautical Chart Manual, US Department of Commerce, Coast and Geodetic Survey, 7th Edition).

2) **sheerlegs**

- IHO Definition: A tripodal structure used in dockyards and harbours for stepping masts or lifting loads in to and out of vessels. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.25, November 2000).
- 3) **travelling crane**
IHO Definition: A crane mounted on rails (track) that can move (usually parallel to the wharf face) in order to load and unload cargo vessels. (Canadian Hydrographic Service).
 - 4) **A-frame**
IHO Definition: A type of crane shaped like the letter “A”. (Canadian Hydrographic Service).
 - 5) **goliath crane**
IHO Definition: A powerful travelling crane mounted on a movable gantry of large span. (Merriam-Webster Dictionary).
- Remarks:
- No remarks.

27.20 category of dam (CATDAM)

- IHO Definition: **CATEGORY OF DAM.** Classification of a structure acting as barrier to water flow.
- Attribute Type: Enumeration
- 1) **weir**
IHO Definition: A dam erected across a river to raise the level of the water. A fence of stakes set in a river or along the shore as a trap for fish. The word is now restricted to smaller works, the larger are called dams. (IHO Dictionary — S-32).
 - 2) **dam**
IHO Definition: A barrier to check or confine anything in motion; particularly one constructed to hold back water and raise its level to form a reservoir, or to prevent flooding. (IHO Dictionary — S-32).
 - 3) **flood barrage**
IHO Definition: An opening dam across a channel which, when required, is closed to control flood waters. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.26, November 2000).
- Remarks:
- No remarks.

27.22 category of dolphin

- IHO Definition: **CATEGORY OF DOLPHIN.** Classification of a post or group of posts, used for mooring or warping a vessel. (Adapted from IHO dictionary — S-32).
- Attribute Type: Enumeration
- 1) **mooring dolphin**
IHO Definition: A post or group of posts driven into the seabed or riverbed, used as a mooring point for vessels. (Adapted from Wikipedia).
 - 2) **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).
 - 3) **berthing dolphin**
IHO Definition: A post or group of posts driven into the seabed or riverbed, used to extend the berth of a vessel by providing extra mooring points.
 - 4) **fender or breasting dolphin**
IHO Definition: A post or group of posts driven into the seabed or riverbed, used to assist in berthing of vessels by taking up some berthing loads; keep vessels from pressing against the pier structure; or to protect structures from possible impact by ships.
- Remarks:
- No remarks.

27.25 category of ferry (CATFRY)

IHO Definition: **CATEGORY OF FERRY.** Classification of the manoeuvrability of the ferry vessel, not the various types of ferry vessel.

Attribute Type: Enumeration

1) **free moving ferry**

IHO Definition: A ferry which may have routes that vary with weather, tide and traffic. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.32, November 2000).

2) **cable ferry**

IHO Definition: A ferry that follows a fixed route guided by a cable. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.32, November 2000).

3) **ice ferry**

IHO Definition: A winter-time ferry which crosses a lead. (Finnish Maritime Administration).

4) **high speed ferry** **IHO Definition:** A high speed water vessel for civilian use.

Remarks:

- The attribute “category of ferry” does not encode the various types of ferry vessel, but the manoeuvrability of the ferry. The value “cable ferry” indicates a ferry that follows a fixed route guided by a cable. A cable ferry may hinder the flow of other traffic.

27.26 category of fishing facility (CATFIF)

IHO Definition: **CATEGORY OF FISHING FACILITY.** Classification of fishing facility provided based on different fishing methods.

Attribute Type: Enumeration

1) **fishing stake**

IHO Definition: Poles or stakes placed in shallow water to outline a fishing ground or to catch fish. (IHO Dictionary — S-32).

2) **fish trap**

IHO Definition: A structure (usually portable) for catching fish. (Adapted from IHO Dictionary — S-32).

3) **fish weir**

IHO Definition: A fence of stakes or stones set in a river or along the shore to trap fish. (Adapted from IHO Dictionary — S-32).

4) **tunny net**

IHO Definition: A net built at sea for catching tunny. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.27 category of fog signal (CATFOG)

IHO Definition: **CATEGORY OF FOG SIGNAL.** Classification of the various means of generating the fog signal.

Attribute Type: Enumeration

1) **explosive**

IHO Definition: A signal produced by the firing of explosive charges. (Admiralty List of Lights and Fog Signals).

2) **diaphone**

IHO Definition: A diaphone uses compressed air and generally emits a powerful low-pitched sound, which often concludes with a brief sound of suddenly lowered pitch, termed the “grunt”. (Admiralty List of Lights and Fog Signals).

3) **siren**

IHO Definition: A type of fog signal apparatus which produces sound by virtue of the passage of air through slots or holes in a revolving disk. (IHO Dictionary — S-32).

4) **nautophone**

IHO Definition: A horn having a diaphragm oscillated by electricity. (IHO Dictionary — S-32).

5) **reed**

IHO Definition: A reed uses compressed air and emits a weak, high pitched sound. (Admiralty List of Lights and Fog Signals).

6) **tyfon**

IHO Definition: A diaphragm horn which operates under the influence of compressed air or steam. (IHO Dictionary — S-32).

7) **bell**

IHO Definition: A ringing sound with a short range. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.34, November 2000).

8) **whistle**

IHO Definition: A distinctive sound made by a jet of air passing through an orifice. The apparatus may be operated automatically, by hand or by air being forced up a tube by waves acting on a buoy. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.34, November 2000).

9) **gong**

IHO Definition: A sound produced by vibration of a disc when struck. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.34, November 2000).

10) **horn**

IHO Definition: A horn uses compressed air or electricity to vibrate a diaphragm and exists in a variety of types which differ greatly in their sound and power. (Admiralty List of Lights and Fog Signals).

Remarks:

- The apparatus may be operated automatically, by hand or by wave action.
- The attribute “category of fog signal” encodes the various means of generating the signal. The classification “horn” is the generic term for fog signals “nautophone”, “reed” and “tyfon”.

27.28 category of fortified structure (CATFOR)

IHO Definition: **CATEGORY OF FORTIFIED STRUCTURE.** Classification of the different types of fortified structure.

Attribute Type: Enumeration

1) **castle**

IHO Definition: A large fortified building or structure. (Adapted from The Collins Dictionary).

2) **fort**

IHO Definition: A fortified enclosure, building, or position able to be defended against an enemy. (The Collins Dictionary).

3) **battery**

IHO Definition: A fortified structure on which artillery is mounted. (The Collins Dictionary).

4) **blockhouse**

IHO Definition: A concrete structure strengthened to give protection against enemy fire, with apertures to allow defensive gunfire. (The Collins Dictionary).

5) **fortified tower**

IHO Definition: A small circular fort with very thick walls (for example Martello tower). (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

6) **redoubt**

IHO Definition: An outwork or fieldwork usually square or polygonal and without flanking defences. (Concise Oxford Dictionary).

7) **fortified submarine shelter**

IHO Definition: A fortified pen to hold submarines.

8) **rampart**

IHO Definition: Anything serving as a bulwark or defence.

Remarks:

- No remarks.

27.30 category of harbour facility (CATHAF)

IHO Definition: **CATEGORY OF HARBOUR FACILITY.** Classification of harbour use.

Attribute Type: Enumeration

1) **RoRo terminal**

IHO Definition: A terminal for roll-on roll-off ferries. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).

2) **ferry terminal**

IHO Definition: A terminal for passenger and vehicle ferries. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).

- 3) **fishing harbour**
IHO Definition: A harbour with facilities for fishing boats. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
 - 4) **yacht harbour/marina**
IHO Definition: A harbour facility for small boats, yachts, etc., where supplies, repairs, and various services are available. (IHO Dictionary — S-32).
 - 5) **naval base**
IHO Definition: A centre of operations for naval vessels. (Adapted from The Collins Dictionary).
 - 6) **tanker terminal**
IHO Definition: A terminal for the bulk handling of liquid cargoes. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
 - 7) **passenger terminal**
IHO Definition: A terminal for the loading and unloading of passengers. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
 - 8) **shipyard**
IHO Definition: A place where ships are built or repaired. (IHO Dictionary — S-32).
 - 9) **container terminal**
IHO Definition: A terminal with facilities to load/unload or store shipping containers. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000, as amended).
 - 10) **bulk terminal**
IHO Definition: A terminal for the handling of bulk materials such as iron ore, coal, etc. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
 - 11) **ship lift**
IHO Definition: A platform powered by synchronous electric motors (for example syncrolift) used to lift vessels (larger than boats) in and out of the water. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
 - 12) **straddle carrier**
IHO Definition: A wheeled vehicle designed to lift and carry containers or vessels within its own framework. It is used for moving, and sometimes stacking, shipping containers and vessels. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.39, November 2000).
 - 13) **service harbour**
IHO Definition: A harbour within which the floating equipment (dredges, tugs ...) of harbour services are stationed.
 - 14) **pilotage service**
IHO Definition: The services of a person who directs the movements of a vessel through pilot waters, usually a person who has demonstrated extensive knowledge of channels, aids to navigation, dangers to navigation, etc., in a particular area and is licensed for that area, are available. (Adapted from IHO Hydrographic Dictionary — S-32).
- Remarks:
- No remarks.

27.31 category of hulk (CATHLK)

IHO Definition: **CATEGORY OF HULK.** Classification of an old or unseaworthy ship used for a new function.

Attribute Type: Enumeration

- 1) **floating restaurant**
IHO Definition: A permanently moored floating structure (for example: an old ship) that is used as a restaurant. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 2) **historic ship**
IHO Definition: A ship of historical interest permanently moored as a tourist attraction. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 3) **floating museum**
IHO Definition: A permanently moored floating structure (for example: an old ship) that is used as a museum. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 4) **floating accommodation**
IHO Definition: A permanently moored floating structure (for example: an old ship) that is used for accommodation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 5) **floating breakwater**
IHO Definition: A permanently moored floating structure, often constructed from old ships, used as a breakwater. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.40, November 2000).
- 6) **casino**
IHO Definition: A permanently moored floating structure, such as an old ship, used as a casino boat.
- 7) **training vessel**

IHO Definition: A permanently moored floating structure, often constructed from old ships, used for training purposes.

Remarks:

- No remarks.

27.32 category of ice (CATICE)

IHO Definition: **CATEGORY OF ICE.** Classification of ice.

Attribute Type: Enumeration

1) **fast ice**

IHO Definition: Sea ice which remains fast, generally in the position where originally formed, and which may attain a considerable thickness. It is found along coasts, where it is attached to the shore, or over shoals, where it may be held in position by islands, grounded icebergs or grounded polar ice. (IHO Dictionary — S-32).

2) **glacier**

IHO Definition: A mass of snow and ice continuously moving from higher to lower ground or, if afloat, continuously spreading. (IHO Dictionary — S-32).

3) **polar ice**

IHO Definition: Sea ice that is more than one year old (in contrast to winter ice). The WMO code defines polar ice as any sea ice more than one year old and more than 3 metres thick. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.33 category of installation buoy (CATINB)

IHO Definition: **CATEGORY OF INSTALLATION BUOY.** Classification of fixed installation buoy.

Attribute Type: Enumeration

1) **catenary anchor leg mooring**

IHO Definition: Incorporates a large buoy which remains on the surface at all times and is moored by 4 or more anchors. Mooring hawsers and cargo hoses lead from a turntable on top of the buoy, so that the buoy does not turn as the ship swings to wind and stream. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.42, November 2000).

2) **single buoy mooring**

IHO Definition: A large mooring buoy used by tankers to load and unload in port approaches or in offshore oil and gas fields. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.35 category of landmark (CATLMK)

IHO Definition: **CATEGORY OF LANDMARK.** Classification of prominent cultural and natural features in the landscape.

Attribute Type: Enumeration

1) **cairn**

IHO Definition: A mound of stones, usually conical or pyramidal, raised as a landmark or to designate a point of importance in surveying. (IHO Dictionary — S-32).

2) **cemetery**

IHO Definition: A site and associated structures devoted to the burial of the dead. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **chimney**

IHO Definition: A vertical structure containing a passage or flue for discharging smoke and gases of combustion. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **dish aerial**

- IHO Definition: A parabolic aerial for the receipt and transmission of high frequency radio signals. (IHO Dictionary — S-32).
- 5) **flagstaff**
IHO Definition: A staff or pole on which flags are raised. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 6) **flare stack**
IHO Definition: A tall structure used for burning-off waste oil or gas. (IHO Dictionary — S-32).
 - 7) **mast**
IHO Definition: A relatively tall structure usually held vertical by guy lines.
 - 8) **windsock**
IHO Definition: A tapered fabric sleeve mounted so as to catch and swing with the wind, thus indicating the wind direction. (Navigation Dictionary, US National Oceanic and Atmospheric Administration — NOAA, 1969).
 - 9) **monument**
IHO Definition: A structure erected and/or maintained as a memorial to a person and/or event. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 10) **column/pillar**
IHO Definition: A cylindrical or slightly tapering body of considerably greater length than diameter erected vertically. (Oxford English Dictionary).
 - 11) **memorial plaque**
IHO Definition: A slab of metal, usually ornamented, erected as a memorial to a person or event. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.46, November 2000).
 - 12) **obelisk**
IHO Definition: A tapering shaft usually of stone or concrete, square or rectangular in section, with a pyramidal apex. (Adapted from Oxford English Dictionary).
 - 13) **statue**
IHO Definition: A representation of a living being, sculptured, moulded, or cast in a variety of materials (for example: marble, metal, or plaster). (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 14) **cross**
IHO Definition: A monument, or other structure in form of a cross. (Funk & Wagnalls Dictionary).
 - 15) **dome**
IHO Definition: A landmark comprising a hemispherical or spheroidal shaped structure. (Adapted from the Macquarie Dictionary).
 - 16) **radar scanner**
IHO Definition: A device used for directing a radar beam through a search pattern. (Adapted from Navigation Dictionary, US National Oceanic and Atmospheric Administration — NOAA, 1969).
 - 17) **tower**
IHO Definition: A relatively tall, narrow structure that may either stand alone or may form part of another structure. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 18) **windmill**
IHO Definition: A system of vanes attached to a tower and driven by wind (excluding wind turbines). (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 19) **spire/minaret**
IHO Definition: A tall conical or pyramid-shaped structure often built on the roof or tower of a building, especially a church or mosque. (Adapted from The New Shorter Oxford English Dictionary, 1993).
 - 20) **large rock or boulder on land**
IHO Definition: An isolated rocky formation or a single large stone. (Adapted from IHO Dictionary — S-32).
 - 21) **triangulation mark**
IHO Definition: A recoverable point on the earth, whose geographic position has been determined by angular methods with geodetic instruments. A triangulation point is a selected point, which has been marked with a station mark, or it is a conspicuous natural or artificial feature. (IHO Dictionary — S-32).
 - 22) **boundary mark**
IHO Definition: A marker identifying the location of a surveyed boundary line. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 23) **observation wheel**
IHO Definition: Wheels with passenger cars mounted external to the rim and independently rotated by electric motors. (Wikipedia, 2019).
 - 24) **torii**
IHO Definition: A form of decorative gateway or portal, consisting of two upright wooden posts connected at the top by two horizontal crosspieces, commonly found at the entrance to Shinto temples.
 - 25) **bridge**
IHO Definition: 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).
 - 26) **dam**
IHO Definition: A barrier to check or confine anything in motion; particularly one constructed to hold back water and raise its level to form a reservoir, or to prevent flooding. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.37 category of light (CATLIT)

IHO Definition: **CATEGORY OF LIGHT.** Classification of different light types.

Attribute Type: Enumeration

- 1) **leading light**
IHO Definition: A light associated with other lights so as to form a leading line to be followed. (Adapted from IHO Dictionary — S-32).
- 2) **aero light**
IHO Definition: An aero light is established for aeronautical navigation and may be of higher power than marine lights and visible from well offshore. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.48, November 2000).
- 3) **flood light**
IHO Definition: A broad beam light used to illuminate a structure or area. (Adapted from The Collins Dictionary).
- 4) **strip light**
IHO Definition: A light whose source has a linear form generally horizontal, which can reach a length of several metres. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.48, November 2000).
- 5) **subsidiary light**
IHO Definition: A light placed on or near the support of a main light and having a special use in navigation. (Admiralty List of Radio Signals, UK Hydrographic Office).
- 6) **spotlight**
IHO Definition: A powerful light focused so as to illuminate a small area. (The Collins Dictionary).
- 7) **front**
IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 8) **rear**
IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 9) **lower**
IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 10) **upper**
IHO Definition: Term used with leading lights to describe the position of the light on the lead as viewed from seaward. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 11) **emergency**
IHO Definition: A light available as a backup to a main light which will be illuminated should the main light fail. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 12) **bearing light**
IHO Definition: A light which enables its approximate bearing to be obtained without the use of a compass. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 13) **horizontally disposed**
IHO Definition: A group of lights of identical character and almost identical position, that are disposed horizontally. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).
- 14) **vertically disposed**
IHO Definition: A group of lights of identical character and almost identical position, that are disposed vertically. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.49, November 2000).

Remarks:

- Marine light (a light intended primarily for marine navigation) is not included in the above list. All lights are considered to be marine lights unless the attribute “category of light” indicates otherwise.

27.38 category of marine farm/culture (CATMFA)

IHO Definition: **CATEGORY OF MARINE FARM/CULTURE.** Classification of an area of water devoted to the raising, breeding, or production of a specific aquatic animal.

Attribute Type: Enumeration

- 1) **crustaceans**
IHO Definition: Hard shelled animals, for example crabs or lobsters. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.50, November 2000).
 - 2) **edible bivalve molluscs**
IHO Definition: A two-part hinged external shell covering that contains a soft-bodied invertebrate. (Adapted from NOAA National Ocean Service).
 - 3) **fish**
IHO Definition: Vertebrate cold blooded animal with gills, living in water. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.50, November 2000).
 - 4) **seaweed**
IHO Definition: The general name for marine plants of the Algae class which grow in long narrow ribbons. (International Maritime Dictionary, 2nd Ed.).
 - 5) **pearl culture farm**
IHO Definition: An area where pearls are artificially cultivated. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.50, November 2000).
- Remarks:
- No remarks.

27.39 category of military practice area (CATMPA)

- IHO Definition: **CATEGORY OF MILITARY PRACTICE AREA.** Classification of area by military use.
- Attribute Type: Enumeration
- 1) **torpedo exercise area**
IHO Definition: An area within which exercises are carried out with torpedoes. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.52, November 2000).
 - 2) **submarine exercise area**
IHO Definition: An area within which submarine exercises are carried out. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.52, November 2000).
 - 3) **firing danger area**
IHO Definition: Areas for bombing and missile exercises. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.52, November 2000).
 - 4) **mine-laying practice area**
IHO Definition: An area within which mine laying exercises are carried out. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.52, November 2000).
 - 5) **small arms firing range**
IHO Definition: An area for shooting pistols, rifles and machine guns etc. at a target. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.52, November 2000).
- Remarks:
- No remarks.

27.40 category of mooring area

- IHO Definition: **CATEGORY OF MOORING AREA.** Classification of an area in which vessels may be secured to mooring buoys. (Adapted from IHO dictionary — S-32).
- Attribute Type: Enumeration
- 1) **small craft mooring area**
IHO Definition: An area in which yachts and small boats moor. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.11, November 2000).
 - 2) **mooring area for visitors**
IHO Definition: An area set aside for the mooring of visiting vessels. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.92, November 2000).
 - 3) **mooring area for tankers** IHO Definition: An area set aside for the mooring of tankers. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.92, November 2000).
- Remarks:
- No remarks.

27.41 category of navigation line (CATNAV)

IHO Definition: **CATEGORY OF NAVIGATION LINE.** Classification of route guidance given to vessels.

Attribute Type: Enumeration

1) **clearing line**

IHO Definition: A straight line that marks the boundary between a safe and a dangerous area or that passes clear of a navigational danger. (Adapted from IHO Dictionary, S-32).

2) **transit line**

IHO Definition: A line passing through one or more fixed marks. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.55, November 2000).

3) **leading line bearing a recommended track** **IHO Definition:** A line passing through one or more clearly defined objects, along the path of which a vessel can approach safely up to a certain distance off. (Adapted from IHO Dictionary, S-32).

Remarks:

- No remarks.

27.42 category of obstruction (CATOBS)

IHO Definition: **CATEGORY OF OBSTRUCTION.** Classification of objects that impede movement.

Attribute Type: Enumeration

1) **snag/stump**

IHO Definition: A tree, branch or broken pile embedded in the ocean floor, river or lake bottom and not visible on the surface, forming thereby a hazard to vessels. (IHO Dictionary — S-32).

2) **wellhead**

IHO Definition: A submarine structure projecting some distance above the seabed and capping a temporarily abandoned or suspended oil or gas well. (IHO Dictionary — S-32).

3) **diffuser**

IHO Definition: A structure on an outfall through which liquids are discharged. The structure will usually project above the level of the outfall and can be an obstruction to navigation. (IHO Dictionary — S-32).

4) **crib**

IHO Definition: A permanent marine structure usually designed to support or elevate pipelines; especially a structure enclosing a screening device at the offshore end of a potable water intake pipe. The structure is commonly a heavy timber enclosure that has been sunken with rocks or other debris. (IHO Dictionary — S-32).

5) **fish haven**

IHO Definition: Areas established by private interests, usually sport fishermen, to simulate natural reefs and wrecks that attract fish. The reefs are constructed by dumping assorted junk in areas which may be of very small extent or may stretch a considerable distance along a depth contour. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.56, November 2000).

6) **foul area**

IHO Definition: An area of numerous unidentified dangers to navigation. The area serves as a warning to the mariner that all dangers are not identified individually and that navigation through the area may be hazardous. (IHO Dictionary — S-32).

7) **ice boom**

IHO Definition: Floating barriers, anchored to the bottom, used to deflect the path of floating ice in order to prevent the obstruction of locks, intakes, etc., and to prevent damage to bridge piers and other structures. (Canadian Hydrographic Service, Chart specifications).

8) **ground tackle**

IHO Definition: Equipment such as anchors, concrete blocks, chains and cables, etc., used to position floating structures such as trot and mooring buoys etc. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.57, November 2000).

9) **boom**

IHO Definition: A floating barrier used to protect a river or harbour mouth or to create a sheltered area for storage purposes. (IHO Dictionary — S-32).

10) **wave energy device**

IHO Definition: A device to extract energy from the surface motion of ocean waves or from pressure fluctuations below the surface.

11) **subsurface ocean data acquisition system**

IHO Definition: A submerged device, not being a ship, together with its appurtenant equipment, deployed at sea essentially for the purpose of collecting, storing or transmitting samples or data relating to the marine environment. (Adapted from Wikipedia, 2018).

12) **artificial reef**

- IHO Definition: A man-made structure that may mimic some of the characteristics of a natural reef, intended to attract sea life. (Adapted from NOAA National Ocean Service).
- 13) **template**
IHO Definition: A structure placed on the seafloor below a drilling rig to guide the drill. (Adapted from IHO Chart Specifications, S-4).
- 14) **manifold**
IHO Definition: A large steel structure up to 20 metres in height above the seafloor, or a steel frame secured to the seafloor with piles to anchor the end of a submarine pipeline, for delivery to a production platform. (Adapted from IHO Chart Specifications, S-4).
- 15) **submerged pingo**
IHO Definition: A hill of soil-covered ice pushed up by hydrostatic pressure in an area of permafrost that is located underwater.
- 16) **remains of platform**
IHO Definition: The distributed remains of a platform.
- 17) **scientific instrument**
IHO Definition: An instrument used for scientific purposes.
- 18) **underwater turbine**
IHO Definition: Any of various machines having a rotor, usually with vanes or blades, driven by the pressure, momentum, or reactive thrust of a moving fluid, as steam, water, hot gases, or air, either occurring in the form of free jets or as a fluid passing through and entirely filling a housing around the rotor and is located underwater.
- 19) **active submarine volcano**
IHO Definition: An active seabed volcano, which may be submerged or projecting above the water at the chart sounding datum. (Adapted from IHO Dictionary — S-32).
- 20) **shark net**
IHO Definition: A submerged net placed around beaches to reduce shark attacks on swimmers. (Wikipedia).
- 21) **mangrove**
IHO Definition: One of several genera of tropical trees or shrubs which produce many prop roots and grow along low-lying coasts into shallow water. (IHO Dictionary — S-32).
- Remarks:
- No remarks.

27.43 category of offshore platform (CATOFP)

IHO Definition: **CATEGORY OF OFFSHORE PLATFORM.** Classification of an offshore raised structure.

Attribute Type: Enumeration

- 1) **oil rig**
IHO Definition: A temporary mobile structure, either fixed or floating, used in the exploration stages of oil and gas fields. (IHO Dictionary — S-32).
- 2) **production platform**
IHO Definition: A term used to indicate a permanent offshore structure equipped to control the flow of oil or gas. It does not include entirely submarine structures. (Adapted from IHO Dictionary — S-32).
- 3) **observation/research platform**
IHO Definition: A platform from which one's surroundings or events can be observed, noted or recorded such as for scientific study. (Adapted from IHO Dictionary — S-32, Edition 5).
- 4) **articulated loading platform**
IHO Definition: A metal lattice tower, buoyant at one end and attached at the other by a universal joint to a concrete filled base on the seabed. The platform may be fitted with a helicopter platform, emergency accommodation and hawser/hose retrieval. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994).
- 5) **single anchor leg mooring**
IHO Definition: A rigid frame or tube with a buoyancy device at its upper end, secured at its lower end to a universal joint on a large steel or concrete base resting on the seabed, and at its upper end to a mooring buoy by a chain or wire. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994).
- 6) **mooring tower**
IHO Definition: A platform secured to the seabed and surmounted by a turntable to which ships moor. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (12), May 1994).
- 7) **artificial island**
IHO Definition: A man-made structure usually built for the exploration or exploitation of marine resources, marine scientific research, tidal observations, etc. (Adapted from IHO Dictionary — S-32).
- 8) **floating production, storage and off-loading vessel**
IHO Definition: An offshore facility consisting of a moored tanker/barge by which the product is extracted, stored and exported. (Adapted from United Kingdom Hydrographic Office CSDO 607.2 (13), May 1994).

9) **accommodation platform**

IHO Definition: A platform used primarily for eating, sleeping and recreation purposes. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.59, November 2000).

10) **navigation, communication and control buoy**

IHO Definition: A floating structure with control room, power and storage facilities, attached to the seabed by a flexible pipeline and cables. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.59, November 2000).

11) **floating oil tank**

IHO Definition: A floating structure, anchored to the seabed, for storing oil. (Adapted from IHO Hydrographic Dictionary — S-32).

Remarks:

- No remarks.

27.44 category of offshore production area (CATPRA)

IHO Definition: **CATEGORY OF OFFSHORE PRODUCTION AREA.** Classification of an area at sea within which there are production facilities. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 1, Page 1.113, November 2000).

Attribute Type: Enumeration

1) **wind farm**

IHO Definition: A collection of wind turbines that are collocated and are organized as a single power generation unit. (IHO Dictionary — S-32).

2) **wave farm**

IHO Definition: A collection of collocated devices which harness wave energy and are organized as a single power generation unit. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **current farm**

IHO Definition: A collection of collocated devices which harness current (for example tidal) energy and are organized as a single power generation unit. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

4) **tank farm**

IHO Definition: A collection of collocated large-capacity tanks in which petroleum, natural gas, or liquid petrochemicals are stored. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **seabed material extraction area**

IHO Definition: An area in which materials forming, or under, the seabed are removed.

6) **solar farm**

IHO Definition: A large-scale photovoltaic system (PV system) designed for the supply of merchant power into the electricity grid. They are differentiated from most building-mounted and other decentralised solar power applications because they supply power at the utility level, rather than to a local user or users. The generic expression utility-scale solar is sometimes used to describe this type of project. (Wikipedia).

Remarks:

- No remarks.

27.46 category of opening bridge (CATBRG)

IHO Definition: **CATEGORY OF OPENING BRIDGE.** Classification of opening structures spanning and providing passage over a gap or barrier, such as a river or roadway.

Attribute Type: Enumeration

1) **swing bridge**

IHO Definition: A movable bridge (or span thereof) which rotates in a horizontal plane about a vertical pivot to allow the passage of vessels. (Adapted from IHO Dictionary — S-32).

2) **lifting bridge**

IHO Definition: A movable bridge (or span thereof) which is capable of being lifted vertically to allow vessels to pass beneath. (Adapted from IHO Dictionary — S-32).

3) **bascule bridge**

IHO Definition: A counterpoise bridge rotated in a vertical plane about an axis at one or both ends. (IHO Dictionary — S-32).

4) **drawbridge**

IHO Definition: A general name for bridges of which part or the entire span of the bridge may be raised or drawn aside to allow ships to pass through. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.48 category of pilot boarding place (CATPIL)

IHO Definition: **CATEGORY OF PILOT BOARDING PLACE.** Classification of pilot boarding method.

Attribute Type: Enumeration

- 1) **boarding by pilot-cruising vessel**
IHO Definition: Pilot boards from a cruising vessel. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.62, November 2000).
- 2) **boarding by helicopter**
IHO Definition: Pilot boards by helicopter which comes out from the shore. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.62, November 2000).
- 3) **pilot comes out from shore**
IHO Definition: Pilot embarks from a vessel or disembarks to a vessel which comes out from the shore on request. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.62, November 2000).

Remarks:

- No remarks.

27.50 category of preference

IHO Definition: **CATEGORY OF PREFERENCE.** The selection of a first choice compared to other options.

Attribute Type: Enumeration

- 1) **primary**
IHO Definition: The preferred first choice used in normal conditions.
- 2) **alternate**
IHO Definition: The preferred choice in extraordinary conditions.

Remarks:

- No remarks.

27.51 category of production area (CATPRA)

IHO Definition: **CATEGORY OF PRODUCTION AREA.** Classification of an area set aside for heavy industry.

Attribute Type: Enumeration

- 1) **quarry**
IHO Definition: An open-air excavation for the extraction of stone intended principally for use in construction. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 2) **mine**
IHO Definition: An excavation made in the terrain for the purpose of extracting and/or exploiting natural resources. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 3) **stockpile**
IHO Definition: A reserve stock of material, equipment or other supplies. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.64, November 2000).
- 4) **power station area**
IHO Definition: A facility including one or more buildings and equipment used for power generation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 5) **refinery area**
IHO Definition: A facility where petroleum and/or petroleum products are refined. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 6) **timber yard**

- IHO Definition: An open tract for the storage of wooden lumber and timbers. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 7) **factory area**
IHO Definition: A group of buildings where goods are manufactured. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.64, November 2000).
 - 8) **tank farm**
IHO Definition: A collection of collocated large-capacity tanks in which petroleum, natural gas, or liquid petrochemicals are stored. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 9) **wind farm**
IHO Definition: A collection of wind turbines that are collocated and are organized as a single power generation unit. (IHO Dictionary — S-32).
 - 10) **slag heap/spoil heap**
IHO Definition: Hill of refuse from a mine, industrial plant etc. on land. (Adapted from Concise Oxford Dictionary).
 - 11) **production plant**
IHO Definition: A plant where production takes place.
 - 12) **solar farm**
IHO Definition: A large-scale photovoltaic system (PV system) designed for the supply of merchant power into the electricity grid. They are differentiated from most building-mounted and other decentralised solar power applications because they supply power at the utility level, rather than to a local user or users. The generic expression utility-scale solar is sometimes used to describe this type of project. (Wikipedia).
- Remarks:
- No remarks.

27.52 category of pylon (CATPYL)

- IHO Definition: **CATEGORY OF PYLON.** Classification of the pylon based on the service it is supporting.
- Attribute Type: Enumeration
- 1) **power transmission pylon/pole**
IHO Definition: A pylon or pole that supports one or more power lines. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 2) **telephone/telegraph pylon/pole**
IHO Definition: A pylon or pole that supports one or more communication lines. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 3) **aerial cableway pylon**
IHO Definition: A tower or pylon supporting steel cables which convey cars, buckets, or other suspended carrier units. (Adapted from Defence Geospatial Information Working Group; Feature and Attribute Coding Catalogue, Edition 1.2).
 - 4) **bridge pylon/tower**
IHO Definition: A tower and/or pylon from which the deck of a bridge is suspended. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 5) **bridge pier**
IHO Definition: A pillar or abutment that supports a bridge span. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 6) **pipeline pylon**
IHO Definition: A tower or pylon supporting a suspended pipeline or pipelines. (Adapted from Defence Geospatial Information Working Group; Feature and Attribute Coding Catalogue, Edition 1.2).
- Remarks:
- No remarks.

27.53 category of radar station (CATRAS)

- IHO Definition: **CATEGORY OF RADAR STATION.** Classification of radar station based on the services offered.
- Attribute Type: Enumeration
- 1) **radar surveillance station**
IHO Definition: A radar station established for traffic surveillance. (IHO Dictionary — S-32).
 - 2) **coast radar station**

IHO Definition: A shore-based station which the mariner can contact by radio to obtain a position. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.68, November 2000).
Remarks:

- No remarks.

27.54 category of radar transponder beacon (CATRTB)

IHO Definition: **CATEGORY OF RADAR TRANSPONDER BEACON.** Classification of radar transponder beacon based on functionality.

Attribute Type: Enumeration

- 1) **ramark, radar beacon transmitting continuously**
IHO Definition: A radar marker beacon which continuously transmits a signal appearing as a radial line on a radar screen, the line indicating the direction of the beacon. Ramarks are intended primarily for marine use. The name “ramark” is derived from the words radar marker. (IHO Dictionary — S-32).
- 2) **racon, radar transponder beacon**
IHO Definition: A radar beacon which returns a coded signal which provides identification of the beacon, as well as range and bearing. The range and bearing are indicated by the location of the first character received on the radar screen. The name “racon” is derived from the words radar beacon. (IHO Dictionary — S-32).
- 3) **leading racon/radar transponder beacon**
IHO Definition: A radar beacon that may be used (in conjunction with at least one other radar beacon) to indicate a leading line. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.69, November 2000).

Remarks:

- No remarks.

27.55 category of radio station (CATROS)

IHO Definition: **CATEGORY OF RADIO STATION.** Classification of radio services offered by a radio station.

Attribute Type: Enumeration

- 1) **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).
- 2) **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).
- 3) **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).
- 4) **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).
- 5) **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).
- 6) **AIS base station**
IHO Definition: An AIS shore station for use by competent authorities to provide AIS service, manage the data link and enable effective ship to shore / shore to ship transmission of information. (Derived from IALA Guideline G1082).

Remarks:

- None.

27.56 category of rescue station (CATRSC)

IHO Definition: **CATEGORY OF RESCUE STATION.** Classification of aid station based on life saving equipment.

Attribute Type: Enumeration

- 1) **rescue station with lifeboat**
IHO Definition: A place where equipment for saving life at sea is maintained; the type of lifeboat may vary from fast, long distance boats to inflatable inshore boats. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).
- 2) **rescue station with rocket**
IHO Definition: A life saving station equipped with line-carrying rocket apparatus. (IHO Dictionary — S-32).
- 3) **refuge for shipwrecked mariners**
IHO Definition: Shelter or protection from danger or distress at sea. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).
- 4) **refuge for intertidal area walkers**
IHO Definition: Shelter or protection from danger in areas exposed to extreme and sudden tides or tidal streams. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).
- 5) **lifeboat lying at a mooring**
IHO Definition: A place where a lifeboat is moored ready for use. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).
- 6) **aid radio station**
IHO Definition: A radio station reserved for emergency situations; might also be a public telephone. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).
- 7) **first aid equipment**
IHO Definition: A place where first aid equipment is available. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.74, November 2000).

Remarks:

- No remarks.

27.57 category of restricted area (CATREA)

IHO Definition: **CATEGORY OF RESTRICTED AREA.** The official legal status of each kind of restricted area defines the kind of restriction(s), for example the restriction for a 'game reserve' may be 'entering prohibited'.

Attribute Type: Enumeration

- 1) **offshore safety zone**
IHO Definition: The area around an offshore installation within which vessels are prohibited from entering without permission. Special regulations protect installations within a safety zone and vessels of all nationalities are required to respect the zone. (IHO Dictionary — S-32).
- 2) **nature reserve**
IHO Definition: A tract of land or water managed so as to preserve its flora, fauna, physical features, etc. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.75, November 2000, as amended).
- 3) **bird sanctuary**
IHO Definition: A place where birds are bred and protected. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.75, November 2000).
- 4) **game reserve**
IHO Definition: A place where wild animals or birds hunted for sport or food are kept undisturbed for private use. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.75, November 2000).
- 5) **seal sanctuary**
IHO Definition: A place where seals are protected. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.75, November 2000).
- 6) **degaussing range**
IHO Definition: An area, usually about two cables diameter, within which ships' magnetic fields may be measured; sensing instruments and cables are installed on the seabed in the range and there are cables leading from the range to a control position ashore. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.76, November 2000).
- 7) **military area**
IHO Definition: An area controlled by the military in which restrictions may apply. (Australian Hydrographic Office).
- 8) **historic wreck area**
IHO Definition: An area around certain wrecks of historical importance to protect the wrecks from unauthorized interference by diving, salvage or deposition (including anchoring). (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.76, November 2000).
- 9) **navigational aid safety zone**
IHO Definition: An area around a navigational aid which vessels are prohibited from entering. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.76, November 2000).
- 10) **minefield**

	<u>IHO Definition:</u> An area laid and maintained with explosive mines for defence or practice purposes. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
11)	swimming area <u>IHO Definition:</u> An area in which people may swim and therefore vessel movement may be restricted. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
12)	waiting area <u>IHO Definition:</u> An area reserved for vessels waiting to enter a harbour. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
13)	research area <u>IHO Definition:</u> An area where marine research takes place. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
14)	dredging area <u>IHO Definition:</u> An area where dredging is taking place. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
15)	fish sanctuary <u>IHO Definition:</u> A place where fish (including shellfish and crustaceans) are protected. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000, as amended).
16)	ecological reserve <u>IHO Definition:</u> A tract of land or water managed so as to preserve the relation of plants and living creatures to each other and to their surroundings. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000, as amended).
17)	no wake area <u>IHO Definition:</u> An area in which a vessels' speed must be reduced in order to reduce the size of the wake it produces. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
18)	swinging area <u>IHO Definition:</u> An area where vessels turn. (Service Hydrographique et Océanographique de la Marine, France).
19)	environmentally sensitive sea area <u>IHO Definition:</u> A generic term which may be used to describe a wide range of areas, considered sensitive for a variety of environmental reasons. (IHO Chart Specifications, S-4).
20)	particularly sensitive sea area <u>IHO Definition:</u> An area that needs special protection through action by IMO because of its significance for regional ecological, socio-economic or scientific reasons and because it may be vulnerable to damage by international shipping activities. (IHO Chart Specifications, S-4).
21)	disengagement area <u>IHO Definition:</u> An area near a fairway where vessels can go to clear the way or make an about turn and possibly return to a waiting area when nautical conditions impose it.
22)	port security area <u>IHO Definition:</u> An area in which defence, law and treaty enforcement, and counter-terrorism activities that fall within the port and maritime domain apply. (Adapted from Wikipedia).
23)	coral sanctuary <u>IHO Definition:</u> A place where coral is protected.
24)	recreation area <u>IHO Definition:</u> An area within which recreational activities regularly take place and therefore vessel movement may be restricted. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.76, November 2000).
	<u>Remarks:</u>
	The official legal status of each kind of restricted area defines the kind of restriction(s), for example the restriction for a "game preserve" may be "entering prohibited"; the restriction for an "anchoring prohibition area" is "anchoring prohibited".

27.58 category of road (CATROD)

	<u>IHO Definition:</u> CATEGORY OF ROAD. Classification of a road based on size.
	<u>Attribute Type:</u> Enumeration
1)	motorway <u>IHO Definition:</u> A limited access dual carriageway road specially designed for fast long-distance traffic and subject to special regulations concerning its use. It may have more than two lanes. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
2)	major road <u>IHO Definition:</u> A hard surfaced (metalled) road; a main through route. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.77, November 2000).
3)	minor road

IHO Definition: A secondary road for local traffic. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.77, November 2000).

4) **track/path**

IHO Definition: Track — a rough path or way formed by use. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Path — a way or track laid down for walking or made by continual treading. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

5) **major street**

IHO Definition: A main road, in an urban area, for through traffic. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.77, November 2000).

6) **minor street**

IHO Definition: A secondary road, in an urban area, for local traffic. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.77, November 2000).

Remarks:

- No remarks.

27.59 category of schedule

IHO Definition: **CATEGORY OF SCHEDULE.** The type of schedule, for instance opening, closure, etc.

Attribute Type: Enumeration

1) **normal operation**

IHO Definition: The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.

2) **closure**

IHO Definition: The service, office, or area is closed.

3) **unmanned operation**

IHO Definition: The service is available but not manned.

Remarks:

- No remarks.

27.60 category of sea area (CATSEA)

IHO Definition: **CATEGORY OF SEA AREA.** Classification of an area based on its physical characteristics.

Attribute Type: Enumeration

1) **gat**

IHO Definition: A natural or artificial passage or channel through shoals or steep banks, or across a line of banks lying between two channels. (IHO Dictionary — S-32).

2) **bank**

IHO Definition: An elevation of the seafloor, at depths generally less than 200 m, but sufficient for safe surface navigation, commonly found on the continental shelf or near an island. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).

3) **deep**

IHO Definition: In oceanography, an obsolete term which was generally restricted to depths greater than 6,000 m. (IHO Dictionary — S-32).

4) **bay**

IHO Definition: A wide indentation in the coastline generally smaller than a gulf and larger than a cove. For the purposes of the United Nations Convention on the Law of the Sea, a bay is a well-marked indentation whose penetration is in such proportion to the width of its mouth as to contain land locked waters and constitute more than a mere curvature of the coast. (IHO Dictionary — S-32).

5) **trench**

IHO Definition: A long, deep, asymmetrical depression with relatively steep sides, that is associated with subduction. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).

6) **basin**

IHO Definition: A depression of the seafloor more or less equidimensional in plan and of variable extent. (IHO Dictionary — S-32).

7) **mud flats**

IHO Definition: A level tract of land, as the bed of a dry lake or an area frequently uncovered at low tide. Usually in plural. (IHO Dictionary — S-32).

8) **reef**

- IHO Definition: A shallow elevation composed of consolidated material that may constitute a hazard to surface navigation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 9) **ledge**
IHO Definition: A rocky formation continuous with and fringing the shore. (IHO Dictionary — S-32).
 - 10) **canyon**
IHO Definition: An elongated, narrow, steep-sided depression that generally deepens down-slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
 - 11) **narrows**
IHO Definition: A navigable narrow part of a bay, strait, river, etc. (IHO Dictionary — S-32).
 - 12) **shoal**
IHO Definition: A shallow elevation composed of unconsolidated material that may constitute a hazard to surface navigation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 13) **knoll**
IHO Definition: A distinct elevation with a rounded profile less than 1000m above the surrounding relief as measured from the deepest isobath that surrounds most of the feature. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
 - 14) **ridge**
IHO Definition: An elongated elevation of varying complexity and size, generally having steep sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 15) **seamount**
IHO Definition: A distinct generally equidimensional elevation greater than 1000m above the surrounding relief as measured from the deepest isobath that surrounds most of the feature. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 16) **pinnacle**
IHO Definition: Any high tower or spire-shaped pillar or rock or coral, alone or cresting a summit. It may extend above the surface of the water. It may or may not be a hazard to surface navigation. (IHO Dictionary — S-32).
 - 17) **abyssal plain**
IHO Definition: An extensive, flat, gently sloping or nearly level region at abyssal depths. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition).
 - 18) **plateau**
IHO Definition: A large, relatively flat elevation that is higher than the surrounding relief with one or more relatively steep sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 19) **spur**
IHO Definition: A subordinate ridge protruding from a larger feature. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 20) **shelf**
IHO Definition: The flat or gently sloping region adjacent to a continent or around an island that extends from the low water line to a depth, generally about 200m, where there is a marked increase in downward slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 21) **trough**
IHO Definition: A long depression generally wide and flat bottomed with symmetrical and parallel sides. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 22) **saddle**
IHO Definition: A broad pass or col in a ridge, rise or other elevation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 23) **abyssal hill**
IHO Definition: An isolated small elevation on the deep seafloor. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 24) **apron**
IHO Definition: A gently dipping slope, with a smooth surface, commonly found around groups of islands and seamounts. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
 - 25) **archipelagic apron**
IHO Definition: A gentle slope with a generally smooth surface of the seafloor, characteristically found around groups of islands or seamounts. (Adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
 - 26) **borderland**
IHO Definition: A region adjacent to a continent, normally occupied by or bordering a shelf and sometimes emerging as islands, that is irregular or blocky in plan or profile, with depths well in excess of those typical of a shelf. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
 - 27) **continental margin**
IHO Definition: The zone, generally consisting of shelf, slope and continental rise, separating the continent from the deep seafloor or abyssal plain or plain. Occasionally a trench may be present in place of a continental rise. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
 - 28) **continental rise**

- IHO Definition: A gentle slope rising from the oceanic depths towards the foot of a continental slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 29) **escarpment**
IHO Definition: An elongated, characteristically linear, steep slope separating horizontal or gently sloping areas of the seafloor. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 30) **fan**
IHO Definition: A relatively smooth, depositional feature continuously deepening away from a sediment source commonly located at the lower termination of a canyon or canyon system. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 31) **fracture zone**
IHO Definition: A long narrow zone of irregular topography formed by the movement of tectonic plates associated with an offset of a spreading ridge axis, characterized by steep-sided and/or asymmetrical ridges, troughs or escarpments. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 32) **gap**
IHO Definition: A narrow break in a ridge, rise or other elevation. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 33) **guyot**
IHO Definition: A seamount having a comparatively smooth flat top. (IHO Dictionary — S-32 and IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 34) **hill**
IHO Definition: A distinct elevation generally of irregular shape, less than 1000m above the surrounding relief as measured from the deepest isobath that surrounds most of the feature. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 35) **hole**
IHO Definition: A depression of limited extent with all sides rising steeply from a relatively flat bottom. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 36) **levee**
IHO Definition: A depositional embankment bordering a canyon, valley or sea channel. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 37) **median valley**
IHO Definition: The axial depression of the mid-oceanic ridge system. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 38) **moat**
IHO Definition: An annular or partially annular depression commonly located at the base of seamounts, islands and other isolated elevations. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.1.0).
- 39) **mountains**
IHO Definition: A natural elevation of the earth's surface rising more or less abruptly from the surrounding level, and attaining an altitude which, relatively to adjacent elevations, is impressive or notable. (IHO Dictionary — S-32).
- 40) **peak**
IHO Definition: A conical or pointed elevation on a larger feature such as a seamount. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 41) **province**
IHO Definition: A geographically distinct region with a number of shared physiographic characteristics that contrast with those in the surrounding areas. This term should be modified with the generic term that best describes the majority of features in the region, for example "Seamount" in Baja California Seamount Province. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 42) **rise**
IHO Definition: A broad elevation that generally rises gently and smoothly from the surrounding relief. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 43) **sea channel**
IHO Definition: An elongated, meandering depression, usually occurring on a gently sloping plain or fan. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 44) **seamount chain**
IHO Definition: Several seamounts in linear or arcuate alignment. (Adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, 2nd Edition).
- 45) **shelf-edge**
IHO Definition: The line along which there is a marked increase in slope at the seaward margin of a shelf. (Adapted from IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 46) **sill**
IHO Definition: A relatively shallow barrier between BASINS that may inhibit water movement. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 47) **slope**

- IHO Definition: The sloping region that deepens from a shelf to the point where there is a general decrease in gradient. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 48) **terrace**
IHO Definition: A flat or gently sloping region, generally long and narrow, bounded along one edge by a steeper descending slope and along the other by a steeper ascending slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 49) **valley**
IHO Definition: An elongated depression that generally widens and deepens down-slope. (IHO-IOC Publication B-6, Standardization of Undersea Feature Names, Edition 4.2.0).
- 50) **canal**
IHO Definition: An artificial waterway with no flow, or a controlled flow, used for navigation, or for draining or irrigating land (ditch). (IHO Dictionary — S-32).
- 51) **lake**
IHO Definition: A large body of water entirely surrounded by land. (IHO Dictionary — S-32).
- 52) **river**
IHO Definition: A relatively large natural stream of water. (IHO Dictionary — S-32).
- 53) **reach**
IHO Definition: A straight section of a river, especially a navigable river between two bends; or an arm of the sea extending into the land. (Adapted from IHO Dictionary — S-32).
- 54) **intertidal cay**
IHO Definition: A low, flat island of sand, coral, etc. awash or submerged at high water. (Adapted from IHO Dictionary — S-32).
- 55) **submarine volcano**
IHO Definition: A seabed volcano, submerged at the chart sounding datum, which may or may not be active. (IHO Dictionary — S-32).
- Remarks:
- No remarks.

27.61 category of shoreline construction (CATSLC)

IHO Definition: **CATEGORY OF SHORELINE CONSTRUCTION.** Classification of shoreline construction based on use.

Attribute Type: Enumeration

- 1) **breakwater**
IHO Definition: A structure protecting a shore area, harbour, anchorage, or basin from waves. (IHO Dictionary — S-32).
- 2) **groyne**
IHO Definition: A low artificial wall-like structure of durable material extending from the land to seaward for a particular purpose, such as to protect the coast or to force a current to scour a channel. (IHO Dictionary — S-32).
- 3) **mole**
IHO Definition: A form of breakwater alongside which vessels may lie on the sheltered side only; in some cases it may lie entirely within an artificial harbour, permitting vessels to lie along both sides. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.84, November 2000).
- 4) **pier (jetty)**
IHO Definition: A long, narrow structure extending into the water to afford a berthing place for vessels, to serve as a promenade, etc. (IHO Dictionary — S-32).
- 5) **promenade pier**
IHO Definition: A pier built only for recreational purposes. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.84, November 2000).
- 6) **wharf**
IHO Definition: A structure serving as a berthing place for vessels. (IHO Dictionary — S-32).
- 7) **training wall**
IHO Definition: A wall or bank, often submerged, built to direct or confine the flow of a river or tidal current, or to promote a scour action. (Adapted from IHO Dictionary — S-32 and IHO Chart Specifications, S-4).
- 8) **rip rap**
IHO Definition: A layer of broken rock, cobbles, boulders, or fragments of sufficient size to resist the erosive forces of flowing water and wave action. (Adapted from Marine Chart Manual, US National Oceanic and Atmospheric Administration — NOAA, 1992).
- 9) **revetment**
IHO Definition: Facing of stone or other material, either permanent or temporary, placed along the edge of a stream, river or canal to stabilize the bank and to protect it from the erosive action of the stream. (Adapted from IHO Dictionary — S-32).

- 10) **sea wall**
IHO Definition: An embankment or wall for protection against waves or tidal action along a shore or water front. (IHO Dictionary — S-32).
 - 11) **landing steps**
IHO Definition: Steps at the shoreline as the connection between land and water on different levels. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 12) **ramp**
IHO Definition: A sloping structure which may include rails that can either be used, as a landing place, at variable water levels, for small vessels, landing ships, or a ferry boat, or for hauling a cradle carrying a vessel. (Adapted from IHO Dictionary — S-32).
 - 13) **slipway**
IHO Definition: The prepared and usually reinforced inclined surface on which keel- and bilge-blocks are laid for supporting a vessel under construction. (IHO Dictionary — S-32).
 - 14) **fender**
IHO Definition: A protective structure designed to cushion the impact of a vessel and prevent damage. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 15) **solid face wharf**
IHO Definition: A wharf consisting of a solid wall of concrete, masonry, wood etc., such that the water cannot circulate freely under the wharf. The type of construction affects ship-handling; for example, a solid face wharf may give shelter from tidal streams, but under certain circumstances a cushion of water may build up between such a wharf and a ship attempting to berth at it, causing difficulties in ship handling. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.85, November 2000).
 - 16) **open face wharf**
IHO Definition: A wharf supported on piles or other structures which allow free circulation of water under the wharf. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.85, November 2000).
 - 17) **log ramp**
IHO Definition: An inclined plane used to dump logs into the water for transport, or to haul logs out of the water for processing. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 18) **swimming facility**
IHO Definition: An artificial pool or swimming enclosure, especially one in the open air, which may be constructed of wire mesh or heavy netting supported by cables, buoys or piles, for swimming in. (Adapted from the Macquarie Concise Dictionary).
 - 19) **quay**
IHO Definition: A wharf approximately parallel to the shoreline and accommodating ships on one side only, the other side being attached to the shore. It is usually of solid construction, as contrasted with the open pile construction usually used for piers. (IHO Dictionary — S-32).
 - 20) **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).
- Remarks:
- No remarks.

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).
- 6) **lock**
IHO Definition: A signal station for the control of vessels entering or leaving a lock. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.86, November 2000).
- 7) **flood barrage station**
IHO Definition: A signal station for the control of vessels wishing to pass through a flood control barrage. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.86, November 2000).
- 8) **bridge passage**
IHO Definition: A signal station for the control of vessels wishing to pass under a bridge. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.86, November 2000).
- 9) **dredging**
IHO Definition: A signal station indicating when dredging is in progress. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.86, November 2000).
- 10) **traffic control light**
IHO Definition: Visual signal lights placed in a waterway to indicate to shipping the movements authorized at the time at which they are shown. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.86, November 2000).
- Remarks:**
- No remarks.

27.63 category of signal station, warning (CATSIW)

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

Attribute Type: Enumeration

- 1) **danger**
IHO Definition: A signal or message warning of the presence of a danger to navigation. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 2) **maritime obstruction**
IHO Definition: A signal or message warning of the presence of a maritime obstruction. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 3) **cable**
IHO Definition: A signal or message warning of the presence of a cable. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 4) **military practice**
IHO Definition: A signal or message warning of activity in a military practice area. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 5) **distress**
IHO Definition: A station that may receive or transmit distress signals. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 6) **weather**
IHO Definition: A visual signal displayed to indicate a weather forecast. (IHO Dictionary—S-32).
- 7) **storm**
IHO Definition: A signal or message conveying information about storm conditions. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 8) **ice warning**
IHO Definition: A signal or message conveying information about ice conditions. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.87, November 2000).
- 9) **time**
IHO Definition: An accurate signal marking a specified time or time interval. It is used primarily for determining errors of timepieces. Such signals are usually sent from an observatory by radio, but visual signals are used at some ports. (IHO Dictionary—S-32).
- 10) **tide**
IHO Definition: A signal or message conveying information on tidal conditions in the area in question. (IHO Dictionary—S-32).
- 11) **tidal stream**
IHO Definition: A signal or message conveying information on condition of tidal currents in the area in question. (IHO Dictionary—S-32).
- 12) **tide gauge**
IHO Definition: A device for measuring the height of tide. A graduated staff in a sheltered area where visual observations can be made; or it may consist of an elaborate recording instrument making a continuous

graphic record of tide height against time. Such an instrument is usually actuated by a float in a pipe communicating with the sea through a small hole which filters out shorter waves. (IHO Dictionary — S-32).

13) **tide scale**

IHO Definition: A visual scale which directly shows the height of the water above chart datum or a local datum. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.88, November 2000).

14) **diving**

IHO Definition: A signal or message warning of diving activity. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.88, November 2000).

15) **water level gauge**

IHO Definition: A device for measuring and conveying information about the water level (non-tidal) in the area in question. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.88, November 2000).

Remarks:

- No remarks.

27.64 category of silo/tank (CATSIL)

IHO Definition: **CATEGORY OF SILO/TANK.** Classification based on the product for which a silo or tank is used.

Attribute Type: Enumeration

1) **silo in general**

IHO Definition: A large storage structure used for storing loose materials. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **tank in general**

IHO Definition: A fixed structure for storing liquids. (IHO Dictionary — S-32).

3) **grain elevator**

IHO Definition: A storage building for grain. Usually a tall frame, metal or concrete structure with an especially compartmented interior. (The New Encyclopaedia Britannica Micropaedia, 15th Edition).

4) **water tower**

IHO Definition: A tower supporting an elevated storage tank of water. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Remarks:

- No remarks.

27.65 category of slope (CATSLO)

IHO Definition: **CATEGORY OF SLOPE.** Classification of a stretch of ground forming a natural or artificial incline.

Attribute Type: Enumeration

1) **cutting**

IHO Definition: An excavation through high ground for a road, canal, etc. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.90, November 2000).

2) **embankment**

IHO Definition: A man-made raised long mound of earth or other material. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

3) **dune**

IHO Definition: A mound, ridge or hill of drifted material on the sea coast or in a desert. (Adapted from IHO Dictionary — S-32).

4) **hill**

IHO Definition: A small isolated elevation, smaller than a mountain. (IHO Dictionary — S-32).

5) **pingo**

IHO Definition: A dome-shaped hill formed in a permafrost area when the hydrostatic pressure of freezing ground water causes the upheaval of a layer of frozen ground. (Encyclopaedia Britannica Mycropaedia, 15th Edition).

6) **cliff**

IHO Definition: Land rising abruptly for a considerable distance above the water or surrounding land. (IHO Dictionary — S-32).

7) **scree**

IHO Definition: A mass of detritus, forming a precipitous, strong slope upon a mountain-side. Also the material composing such a slope. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.67 category of special purpose mark (CATSPM)

IHO Definition: **CATEGORY OF SPECIAL PURPOSE MARK.** Classification of an aid to navigation which signifies some special purpose.

Attribute Type: Enumeration

- 1) **firing danger mark**
IHO Definition: A mark used to indicate a firing danger area, usually at sea. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 2) **target mark**
IHO Definition: Any object toward which something is directed. The distinctive marking or instrumentation of a ground point to aid its identification on a photograph. (Adapted from IHO Dictionary — S-32).
- 3) **marker ship mark**
IHO Definition: A mark marking the position of a ship which is used as a target during some military exercise. (Bundesamt für Seeschifffahrt und Hydrographie, Germany).
- 4) **degaussing range mark**
IHO Definition: A mark used to indicate a degaussing range. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 5) **barge mark**
IHO Definition: A mark of relevance to barges. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 6) **cable mark**
IHO Definition: A mark used to indicate the position of submarine cables or the point at which they run on to the land. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 7) **spoil ground mark**
IHO Definition: A mark used to indicate the limit of a spoil ground. (Adapted from IHO Dictionary — S-32).
- 8) **outfall mark**
IHO Definition: A mark used to indicate the position of an outfall or the point at which it leaves the land. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 9) **ODAS**
IHO Definition: Ocean Data Acquisition System. (IHO Dictionary — S-32).
- 10) **recording mark**
IHO Definition: A mark used to record data for scientific purposes. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 11) **seaplane anchorage mark**
IHO Definition: A mark used to indicate a seaplane anchorage. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 12) **recreation zone mark**
IHO Definition: A mark used to indicate a recreation zone. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 13) **mooring mark**
IHO Definition: A mark indicating a mooring or moorings. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 14) **LANBY**
IHO Definition: A large buoy designed to take the place of a lightship where construction of an offshore light station is not feasible. (IHO Dictionary — S-32).
- 15) **leading mark**
IHO Definition: Aids to navigation or other indicators so located as to indicate the path to be followed. Leading marks identify a leading line when they are in transit. (IHO Dictionary — S-32).
- 16) **measured distance mark**
IHO Definition: A mark forming part of a transit indicating one end of a measured distance. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 17) **notice mark**
IHO Definition: A notice board or sign indicating information to the mariner. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 18) **TSS Mark**
IHO Definition: A mark indicating a Traffic Separation Scheme. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.94, November 2000).
- 19) **anchoring prohibited mark**

- IHO Definition: A mark indicating an anchoring prohibited area. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 20) **berthing prohibited mark**
IHO Definition: A mark indicating that berthing is prohibited. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 21) **overtaking prohibited mark**
IHO Definition: A mark indicating that overtaking is prohibited. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 22) **two-way traffic prohibited mark**
IHO Definition: A mark indicating a one-way route. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 23) **reduced wake mark**
IHO Definition: A mark indicating that vessels must not generate excessive wake. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 24) **speed limit mark**
IHO Definition: A mark indicating that a speed limit applies. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 25) **stop mark**
IHO Definition: A mark indicating the place where the bow of a ship must stop when traffic lights show red. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 26) **general warning mark**
IHO Definition: A mark indicating that special caution must be exercised in the vicinity of the mark. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 27) **sound ship's siren mark**
IHO Definition: A mark indicating that a ship should sound its siren or horn. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 28) **restricted vertical clearance mark**
IHO Definition: A mark indicating the minimum vertical space available for passage. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 29) **maximum vessel's draught mark**
IHO Definition: A mark indicating the maximum draught of vessel permitted. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 30) **restricted horizontal clearance mark**
IHO Definition: A mark indicating the minimum horizontal space available for passage. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 31) **strong current warning mark**
IHO Definition: A mark warning of strong currents. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 32) **berthing permitted mark**
IHO Definition: A mark indicating that berthing is allowed. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 33) **overhead power cable mark**
IHO Definition: A mark indicating an overhead power cable. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 34) **channel edge gradient mark**
IHO Definition: A mark indicating the gradient of the slope of a dredge channel edge. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 35) **telephone mark**
IHO Definition: A mark indicating the presence of a telephone. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 36) **ferry crossing mark**
IHO Definition: A mark indicating that a ferry route crosses the ship route; often used with a 'sound ship's siren' mark. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 37) **pipeline mark**
IHO Definition: A mark used to indicate the position of submarine pipelines or the point at which they run on to the land. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 38) **anchorage mark**
IHO Definition: A mark indicating an anchorage area. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 39) **clearing mark**
IHO Definition: A mark used to indicate a clearing line. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.95, November 2000).
- 40) **control mark**
IHO Definition: A mark indicating the location at which a restriction or requirement exists. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.96, November 2000).
- 41) **diving mark**

- IHO Definition: A mark indicating that diving may take place in the vicinity. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 42) **refuge beacon**
IHO Definition: A mark providing or indicating a place of safety. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.95, November 2000).
- 43) **foul ground mark**
IHO Definition: A mark indicating a foul ground. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 44) **yachting mark**
IHO Definition: A mark installed for use by yachtsmen. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 45) **helipoint mark**
IHO Definition: A mark indicating an area where helicopters may land. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 46) **GNSS mark**
IHO Definition: A mark indicating a location at which a GNSS position has been accurately determined. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 47) **seaplane landing mark**
IHO Definition: A mark indicating an area where seaplanes land. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 48) **entry prohibited mark**
IHO Definition: A mark indicating that entry is prohibited. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 49) **work in progress mark**
IHO Definition: A mark indicating that work (generally construction) is in progress. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 50) **mark with unknown purpose**
IHO Definition: A mark whose detailed characteristics are unknown. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 51) **wellhead mark**
IHO Definition: A mark indicating a borehole that produces or is capable of producing oil or natural gas. (Adapted from IHO Dictionary — S-32).
- 52) **channel separation mark**
IHO Definition: A mark indicating the point at which a channel divides separately into two channels. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 53) **marine farm mark**
IHO Definition: A mark indicating the existence of a fish, mussel, oyster or pearl farm/culture. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 54) **artificial reef mark**
IHO Definition: A mark indicating the existence or the extent of an artificial reef. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.96, November 2000).
- 55) **ice mark**
IHO Definition: A mark, used year round, that may be submerged when ice passes through the area.
- 56) **nature reserve mark**
IHO Definition: A mark used to define the boundary of a nature reserve.
- 57) **fish aggregating device**
IHO Definition: A fish aggregating (or aggregation) device (FAD) is a man-made object used to attract ocean going pelagic fish such as marlin, tuna and mahi-mahi (dolphin fish). They usually consist of buoys or floats tethered to the ocean floor with concrete blocks or adrift. (Wikipedia, 2017).
- 58) **wreck mark**
IHO Definition: A mark used to indicate the existence of a wreck.
- 59) **customs mark**
IHO Definition: A mark used to indicate the existence of a customs checkpoint.
- 60) **causeway mark**
IHO Definition: A mark used to indicate the existence of a causeway.
- 61) **wave recorder**
IHO Definition: A surface following buoy used to measure wave activity.
- Remarks:
- A mark may be a beacon, a buoy, a signpost or may take another form.

27.68 category of structure

IHO Definition: **CATEGORY OF STRUCTURE.** Classification of a covered or partially covered area where different use types of vessel can berth.

Attribute Type: Enumeration

- 1) **boathouse**
IHO Definition: A building or shed, usually built partly over water, for sheltering a boat or boats.
- 2) **covered bulk terminal**
IHO Definition: A covered or partially covered terminal for the handling of bulk materials such as iron ore, coal, etc. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).
- 3) **covered wharf**
IHO Definition: A covered or partially covered structure serving as a berthing place for vessels. (Adapted from IHO Dictionary — S-32).
- 4) **covered service terminal**
IHO Definition: A covered or partially covered terminal within which the floating equipment (dredges, tugs ...) of harbour services are berthed and serviced.
- 5) **covered passenger terminal**
IHO Definition: A covered or partially covered terminal for the loading and unloading of passengers. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.38, November 2000).

Remarks:

- No remarks.

27.69 category of tidal stream (CAT_TS)

IHO Definition: **CATEGORY OF TIDAL STREAM.** Classification of the alternating horizontal movement of water associated with the rise and fall of the tide caused by tide producing forces.

Attribute Type: Enumeration

- 1) **flood stream**
IHO Definition: The horizontal movement of water associated with the rising tide. Flood streams generally set towards the shore, or in the direction of the tide progression. (Adapted from IHO Dictionary — S-32).
- 2) **ebb stream**
IHO Definition: The horizontal movement of water associated with falling tide. Ebb streams generally set seaward, or in the opposite direction to the tide progression. (IHO Dictionary — S-32).
- 3) **other tidal flow**
IHO Definition: Any other horizontal movement of water associated with tides, for example rotary flow. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.97, November 2000).

Remarks:

- No remarks.

27.70 category of vegetation (CATVEG)

IHO Definition: **CATEGORY OF VEGETATION.** Classification of the plant life of an area or region.

Attribute Type: Enumeration

- 1) **bush**
IHO Definition: A shrub or clump of shrubs with stems of moderate length. (The Concise Oxford Dictionary).
- 2) **deciduous wood**
IHO Definition: A wood with trees that shed their leaves annually. (Bundesamt für Seeschifffahrt und Hydrographie, Germany).
- 3) **coniferous wood**
IHO Definition: A wood with evergreen trees of a group usually bearing cones, including yews, cedars and redwoods. (Bundesamt für Seeschifffahrt und Hydrographie, Germany).
- 4) **wood in general (inc mixed wood)**
IHO Definition: Growing trees densely occupying a tract of land. (The Concise Oxford Dictionary).
- 5) **reed**
IHO Definition: Any of various water or marsh plants with a firm stem. (The Concise Oxford Dictionary).
- 6) **tree in general**
IHO Definition: An individual woody perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 7) **evergreen tree**
IHO Definition: Having green foliage all the year round. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- 8) **coniferous tree**

	<u>IHO Definition:</u> A cone-bearing, needle-leaved or scale-leaved evergreen tree. (Adapted from The New Encyclopaedia Britannica, 15 th Edition 1991).
9)	palm tree <u>IHO Definition:</u> A tropical or sub-tropical tree, shrub or vine having a tall, unbranched, columnar trunk. The trunk is crowned by a tuft or large, pleated fan or feather shaped leaves with stout sheathing and often prickly petioles (stalks), the persistent bases of which frequently clothe the trunk. (Adapted from The New Encyclopedia Britannica, 15 th Edition 1991).
10)	nipa palm tree <u>IHO Definition:</u> A rare palm tree with regular branching involving equal or sub-equal division of the apex that results in forking. (Adapted from The New Encyclopedia Britannica, 15 th Edition 1991).
11)	casuarina tree <u>IHO Definition:</u> A tree characterized by slender, green, often drooping branches that are deeply grooved and that bear, at intervals, whorls of fine leaves. (Adapted from The New Encyclopedia Britannica, 15 th Edition 1991).
12)	eucalypt tree <u>IHO Definition:</u> An instance of a large genus of mostly very large trees (90 metres). (Adapted from The New Encyclopaedia Britannica, 15 th Edition 1991).
13)	deciduous tree <u>IHO Definition:</u> Sheds its leaves each year at the end of the period of growth. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
14)	filao tree <u>IHO Definition:</u> Casuarina equisetifolia, the most widespread and well-known member of the family Casuarinaceae. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
	<u>Remarks:</u>
	No remarks.

27.71 category of water turbulence (CATWAT)

	<u>IHO Definition:</u> CATEGORY OF WATER TURBULENCE. Classification of an unstable sea state.
	<u>Attribute Type:</u> Enumeration
1)	breakers <u>IHO Definition:</u> A wave breaking on the shore, over a reef, etc. Breakers may be roughly classified into three kinds, although the categories may overlap: spilling breakers break gradually over a considerable distance; plunging breakers tend to curl over and break with a crash; and surging breakers peak up, but then instead of spilling or plunging they surge up on the beach face. The French word “brisant” is also used for the obstacle causing the breaking of the wave. (IHO Dictionary — S-32).
2)	eddies <u>IHO Definition:</u> Circular movements of water usually formed where currents pass obstructions, between two adjacent currents flowing counter to each other, or along the edge of a permanent current. (IHO Dictionary — S-32).
3)	overfalls <u>IHO Definition:</u> Short, breaking waves occurring when a strong current passes over a shoal or other submarine obstruction or meets a contrary current or wind. (IHO Dictionary — S-32).
4)	tide rips <u>IHO Definition:</u> Small waves formed on the surface of water by the meeting of opposing tidal currents or by a tidal current crossing an irregular bottom. Vertical oscillation, rather than progressive waves, is characteristic of tide rips. (IHO Dictionary — S-32).
5)	bombora <u>IHO Definition:</u> A wave that forms over a submerged offshore reef or rock, sometimes (in very calm weather or at high tide) nearly swelling but in other conditions breaking heavily and producing a dangerous stretch of broken water; the reef or rock itself. (Australian National Dictionary).
	<u>Remarks:</u>
	No remarks.

27.72 category of weed/kelp (CATWED)

	<u>IHO Definition:</u> CATEGORY OF WEED/KELP. Classification of marine vegetation of the algae class.
	<u>Attribute Type:</u> Enumeration

- 1) **kelp**
IHO Definition: A giant plant sometimes 60 metres long with no roots, it is anchored by hold-fasts or tendrils up to 10 metres long, that cling to rock. Gas filled bubbles on fronds act as floats keeping the kelp just below the surface. (Earth Sciences References; Mary McNeil).
 - 2) **seaweed**
IHO Definition: The general name for marine plants of the algae class which grow in long narrow ribbons. (International Maritime Dictionary, 2nd Edition).
 - 3) **sargasso**
IHO Definition: A certain type of seaweed, or more generally, a large floating mass of this seaweed. (IHO Dictionary — S-32).
- Remarks:
- No remarks.

27.73 category of wreck (CATWRK)

IHO Definition: **CATEGORY OF WRECK.** Classification of a wrecked or ruined ship.

Attribute Type: Enumeration

- 1) **non-dangerous wreck**
IHO Definition: A wreck which is not considered to be dangerous to surface navigation. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.105, November 2000).
- 2) **dangerous wreck**
IHO Definition: A wreck submerged at such a depth as to be considered dangerous to surface navigation. (IHO Dictionary — S-32).
- 3) **distributed remains of wreck**
IHO Definition: A substantively decayed wreck over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.105, November 2000).
- 4) **wreck showing mast/masts**
IHO Definition: Wreck of which only the mast(s) is visible at the sounding datum indicated. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.105, November 2000).
- 5) **wreck showing any portion of hull or superstructure**
IHO Definition: Wreck of which any portion of the hull or superstructure is visible at the sounding datum indicated. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.105, November 2000).

Remarks:

- No remarks.

27.74 category of zone of confidence in data (CATZOC)

IHO Definition: **CATEGORY OF ZONE OF CONFIDENCE IN DATA.** Classification of the zone of confidence in data within an area based on the positional accuracy, survey equipment and coverage.

Attribute Type: Enumeration

- 1) **zone of confidence A1**
IHO Definition: Positional Accuracy +/- 5 metres + 5% depth; Depth Accuracy 0.5 metre + 1% depth; Full area search undertaken. Significant seafloor features detected and depths measured; Controlled, systematic survey, high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multibeam, channel or mechanical sweep system. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.107, November 2000).
- 2) **zone of confidence A2**
IHO Definition: ~Positional Accuracy +/- 20 metres; Depth Accuracy 1.0 metre + 2% depth; Full area search undertaken. Significant seafloor features detected and depths measured; Controlled, systematic survey achieving position and depth accuracy less than ZOC A1 and using a modern survey echosounder and a sonar or mechanical sweep system.~ (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.107, November 2000).
- 3) **zone of confidence B**
IHO Definition: Positional Accuracy +/- 50 metres; Depth Accuracy 1.0 metre + 2% depth; Full area search not achieved, uncharted features hazardous to surface navigation are not expected but may exist; Controlled, systematic survey achieving similar depth but lesser position accuracies than ZOCA2, using a modern survey echosounder, but no sonar or mechanical sweep system. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.107, November 2000).

- 4) **zone of confidence C**
IHO Definition: Positional Accuracy +/- 500 metres; Depth Accuracy 2.0 metre + 5% depth; Full area search not achieved, depth anomalies may be expected; Low accuracy survey or data collected on an opportunity basis such as soundings on passage. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.107, November 2000).
- 5) **zone of confidence D**
IHO Definition: Positional Accuracy worse than ZOC C; Depth Accuracy worse than ZOC 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. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.107, November 2000).
- 6) **zone of confidence U**
IHO Definition: The quality of the bathymetric data has yet to be assessed. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.107, November 2000).

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27.75 colour (COLOUR)

IHO Definition: **COLOUR.** The property possessed by an object of producing different sensations on the eye as a result of the way it reflects or emits light.

Attribute Type: Enumeration

- 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**

Remarks:

- No remarks.

27.76 colour pattern (COLPAT)

IHO Definition: **COLOUR PATTERN.** A regular repeated design containing more than one colour.

Attribute Type: Enumeration

- 1) **horizontal stripes**
IHO Definition: Straight bands or stripes of differing colours oriented horizontally. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.113, November 2000).
- 2) **vertical stripes**
IHO Definition: Straight bands or stripes of differing colours oriented vertically. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.113, November 2000).
- 3) **diagonal stripes**
IHO Definition: Straight bands or stripes of differing colours oriented diagonally (that is, not horizontally or vertically). (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.113, November 2000).
- 4) **squared**
IHO Definition: Often referred to as checker plate, where alternate colours are used to create squares similar to a chess or draught board. The pattern may be straight or diagonal. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.113, November 2000).
- 5) **stripes (direction unknown)**
IHO Definition: Straight bands or stripes of differing colours oriented in an unknown direction. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.113, November 2000).
- 6) **border stripe**

IHO Definition: A band or stripe of colour which is displayed around the outer edge of the feature, which may also form a border to an inner pattern or plain colour. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.113, November 2000).

Remarks:

- No remarks.

27.77 communication channel (COMCHA)

27.79 contact instructions

IHO Definition: **CONTACT INSTRUCTIONS.** Instructions provided on how to contact a particular person, organisation or service.

Attribute Type: Text

Remarks:

- Where required, **contact instructions** should also provide information on the access times for a particular person, organisation or service.
- The attribute **contact instructions** should contain no more than 300 characters.

27.80 date disused

27.81 date end (DATEND, PEREND, SUREND)

IHO Definition: **DATE END.** 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.

27.82 date fixed

IHO Definition: **DATE FIXED.** The date of an event.

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:

----MMDD

(same day each year, **mandatory**)

----MM--

(same month each year, **mandatory**)

Example: ----0908 for 08 September each year. ----02-- for February of each year.

Remarks:

- No remarks.

27.83 date start (DATSTA, PERSTA, SURSTA)

27.84 date variable

IHO Definition: **DATE VARIABLE**. A day which is not fixed in the Gregorian calendar.

Attribute Type: Text

Indication: The string encodes a recurring day each year that is not fixed in the Gregorian calendar.

Example: **Fourth Thursday in November Easter Sunday**

Remarks:

- The attribute **date variable** should contain no more than 150 characters.

27.85 day of week

IHO Definition: **DAY OF WEEK**. Any one of seven days in a week.

Attribute Type: Enumeration

1) **Sunday**

IHO Definition: The day of the week following Saturday and precedingMonday.

2) **Monday**

IHO Definition: The day of the week following Sunday and precedingTuesday.

3) **Tuesday**

IHO Definition: The day of the week following Monday and precedingWednesday.

1) **Wednesday**

IHO Definition: The day of the week following Tuesday and precedingThursday.

2) **Thursday**

IHO Definition: The day of the week following Wednesday and precedingFriday.

3) **Friday**

IHO Definition: The day of the week following Thursday and precedingSaturday.

4) **Saturday**

IHO Definition: The day of the week following Friday and precedingSunday.

Remarks:

- No remarks.

27.87 depth range maximum value (DRVAL2)

IHO Definition: **DEPTH RANGE MAXIMUM VALUE**. The maximum (deepest) value of a depth range. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.125, November 2000).

Attribute Type: Real

Unit: Metre (m)

Precision: 0.1m

Minimum range: -30

Maximum range: 12500

Range closure: Open interval (minimum < **depth range maximum** < maximum)

Example: **100** for a maximum depth of 100 metres-**0.5** for a deepest drying depth of 0.5 metres

Remarks:

- Depth range is the depth from a specified sounding datum as a depth interval bounded by the minimum (shoalest) and maximum (deepest) depth values. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
- Where the area dries, the value is negative or zero (0).

27.90 distance mark visible (CATDIS)

IHO Definition: **DISTANCE MARK VISIBLE.** A statement indicating whether a distance mark is visible or not.

Attribute Type: Boolean

Indication: A True value is an indication that the distance mark is visible.

Remarks:

- A **Distance Mark** feature having attribute **distance mark visible** = *True* is required to be associated to a structure feature using the feature association **Structure/Equipment** (see [Clause 25.16](#)).

27.91 distance unit of measurement

IHO Definition: **DISTANCE UNIT OF MEASUREMENT.** A specified amount of a quantity, as of length, by comparison with which any other quantity of the same kind is measured or estimated.

Attribute Type: Enumeration

1) metres

IHO Definition: The basic unit of length in the International System of Units (SI) system. (Adapted from IHO Dictionary — S-32).

2) yards

IHO Definition: ~A common unit of linear measure in English-speaking countries, equal to 3 feet or 36 inches, and equivalent to 0.9144 metre.~ (Adapted from Wikipedia).

3) kilometres

IHO Definition: A unit of length, the common measure of distances equal to 1000 metres, and equivalent to 3280.8 feet or 0.621 mile.

4) statute miles

IHO Definition: A unit equal to 5280 feet. (Merriam-Webster Dictionary — 2019).

5) nautical miles

IHO Definition: A unit of length equal to 1,852 metres. This value was approved by the International Hydrographic Conference of 1929 and has been adopted by nearly all maritime states. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.92 dredged date

27.93 elevation (ELEVAT)

IHO Definition: ELEVATION. The altitude of the ground level of a feature, measured from a specified vertical datum. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.127, November 2000).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 8850

Range closure: Closed interval (minimum $\leq$ **elevation** $\leq$ maximum)

Example: **47** for an elevation of 47 metres

Remarks:

- No remarks.

27.95 exhibition condition of light (EXCLIT)

IHO Definition: EXHIBITION CONDITION OF LIGHT. The outward display of the light.

Attribute Type: Enumeration

1) **light shown without change of character**

IHO Definition: A light shown throughout the 24 hours without change of character. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.129, November 2000).

2) **daytime light**

IHO Definition: A light which is only exhibited by day. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.129, November 2000).

3) **fog light**

IHO Definition: A light which is exhibited in fog or conditions of reduced visibility. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.129, November 2000).

4) **night light**

IHO Definition: A light which is only exhibited at night. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.129, November 2000).

Remarks:

- No remarks.

27.96 exposition of sounding (EXPSOU)

IHO Definition: EXPOSITION OF SOUNDING. Indicates the relationship of the depth of a feature to the range of depth of the surrounding depth area.

Attribute Type: Enumeration

1) **within the range of depth of the surrounding depth area**

IHO Definition: The depth corresponds to the depth range of the surrounding depth area; that is, the depth is not shoaler than the minimum depth of the surrounding depth area or deeper than the maximum depth of the surrounding depth area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.130, November 2000).

2) **shoaler than the range of depth of the surrounding depth area**

IHO Definition: The depth is shoaler than the minimum depth of the surrounding depth area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.130, November 2000).

3) **deeper than the range of depth of the surrounding depth area**

IHO Definition: The depth is deeper than the maximum depth of the surrounding depth area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.130, November 2000).

Remarks:

- This attribute indicates features with a “value of sounding” not within the range of depth of the surrounding depth area. These features could be a potential danger for navigation.

27.97 file locator

IHO Definition: **FILE LOCATOR.** The location of a fragment of text or other information in a support file.

Attribute Type: Text

Indication: For S-101, the string encodes the location of a single fragment of text or other information contained in an ENC support file.

Example: p-224.105(a)(1)

Remarks:

- No remarks.

27.98 file reference (TXTDSC, NTXTDS)

IHO Definition: **FILE REFERENCE.** The file name of an externally referenced text file. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.209, November 2000).

Attribute Type: Text

Indication: For S-101, the string encodes the file name of a single textual ENC support file that contains the textual information.

Format: 101CCCC0000000000000000.EEE(See S-101 Main document, clause 11.4.3 (mandatory))

Remarks:

- The attribute **file reference** indicates that a file containing text extracted from relevant pilot books or nautical publications is available.
- The files referenced by **file reference** must be .TXT and may contain formatted text.
- The files referenced by this attribute generally contain long text strings.

27.99 flare bearing

IHO Definition: **FLARE BEARING.** 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 defaults. The value encoded corresponds to a bearing away from the position of the light.

Unit: Degree (°)

Minimum range: 0

Maximum range: 360

Range closure: Right half-open interval (minimum ≤ **flare bearing** < maximum)

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

Remarks:

- The attribute **flare bearing** may be populated to cartographically align light flares where it is required to display the flare at a different bearing from the default. For example, **flare bearing** may be populated to align the flare along a transit or leading line (noting that in such cases the bearing to be encoded will be the reciprocal (+/- 180# of the bearing encoded for the navigational line); or to avoid other important encoded information.
- The default bearing of a light flare (135°) is provided as a function of the S-101 Portrayal Catalogue. Where two all-around lights are collocated, one of the light flares is displayed at a bearing of 45°, also as a function of the S-101 Portrayal Catalogue, as follows:
 - If one of the lights is a white, yellow or orange light, it is displayed at a bearing of 45°.
 - If none of the lights is a white, yellow or orange light there is no preference.

27.100 flare stack

IHO Definition: **FLARE STACK**. A tall structure used for burning-off waste oil or gas. (IHO Dictionary — S-32).

Attribute Type: Boolean

Indication: A True value is an indication that the offshore platform contains a flare stack.

Remarks:

- The attribute **flare stack** is a statement expressing whether an offshore platform has a stack used for burning-off waste oil or gas or not.

27.101 frequency shore station receives

IHO Definition: **FREQUENCY SHORE STATION RECEIVES**. The shore station receiver frequency. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.187, November 2000).

Attribute Type: Integer

Unit: Hertz (Hz)

Minimum range: 0

Range closure: Left half-open ray (minimum < **frequency shore station receives**)

Example: **950000000** for a radio signal centred on 950 MHz

Remarks:

- No remarks.

27.102 frequency shore station transmits (SIGFRQ)

IHO Definition: **FREQUENCY SHORE STATION TRANSMITS**. The shore station transmitter frequency. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.187, November 2000).

Attribute Type: Integer

Unit: Hertz (Hz)

Minimum range: 0

Range closure: Left half-open ray (minimum < **frequency shore station transmits**)

Example: **950000000** for a radio signal centred on 950 MHz

Remarks:

- No remarks.

27.104 headline

IHO Definition: **HEADLINE**. Words set at the head of a passage or page to introduce or categorize. (Merriam-Webster Dictionary — 2012).

Attribute Type: Text

Indication: The string encodes the heading relevant to a text string or information contained in an ENC support file.

Example: **Description of table format for S-101 meta and geo features**

Remarks:

- The attribute **headline** should contain no more than 100 characters.

27.105 height (HEIGHT)

IHO Definition: HEIGHT. The value of the vertical distance to the highest point of the feature, measured from a specified vertical datum. (S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.134, November 2000).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 8850

Range closure: Left half-open interval (minimum < height ≤ maximum)

Example: 73 for a height of 73 metres

Remarks:

- Height must not be used for floating features.

27.106 horizontal clearance length

IHO Definition: HORIZONTAL CLEARANCE LENGTH. The length of a feature, such as a lock or basin, which is available for safe navigation. This may, or may not, be the same as the total physical length of the feature. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.137, November 2000).

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

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < horizontal clearance length)

Example: 75 for a horizontal clearance length of 75 metres

Remarks:

- No remarks.

27.107 horizontal clearance value (HORCLR)

IHO Definition: HORIZONTAL CLEARANCE VALUE. The physical horizontal clearance distance between two points on a feature, such as a bridge span, dock, gate, lock or tunnel.

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < horizontal clearance value)

Example: 125 for a horizontal clearance of 125 metres

Remarks:

- No remarks.

27.108 horizontal clearance width

IHO Definition: HORIZONTAL CLEARANCE WIDTH. The width of a feature, such as a lock or basin, which is available for safe navigation. This may, or may not, be the same as the total physical width of the feature. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.137, November 2000).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < **horizontal clearance width**)

Example: **30** for a horizontal clearance width of 30 metres

Remarks:

- No remarks.

27.109 horizontal length (HORLEN)

IHO Definition: **HORIZONTAL LENGTH.** A measurement of the longer of two linear axis. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < **horizontal length**)

Example: **95** for a length of 95 metres

Remarks:

- No remarks.

27.110 horizontal width (HORWID)

IHO Definition: **HORIZONTAL WIDTH.** A measurement of the shorter of two linear axis. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < **horizontal width**)

Example: **12.6** for a width of 12.6 metres

Remarks:

- No remarks.

27.111 ice factor (ICEFAC)

IHO Definition: **ICE FACTOR.** The value of the maximum variation in the vertical clearance of an overhead cable due to an accumulation of ice. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.140, November 2000).

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 20

Range closure: Left half-open interval (minimum < **ice factor** ≤ maximum)

Example: **2.5** for a reduction of 2.5 metres in the vertical clearance.

Remarks:

- No remarks.

27.113 in dispute

IHO Definition: **IN DISPUTE**. A statement that expresses if an area is in a jurisdictional dispute.

Attribute Type: Boolean

Indication: A True value is an indication that the area defined is in jurisdictional dispute.

Remarks:

- No remarks.

27.114 interoperability identifier

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

Attribute Type: Universal Resource Name (URN)

Indication: The identifier is encoded using the Maritime Resource Name (MRN) concept and namespace, 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**

Remarks:

- For further information regarding MRNs, see S-100 Part 3, clause 3-10.

27.116 jurisdiction (JRSDTN)

IHO Definition: **JURISDICTION**. The jurisdiction applicable to an administrative area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.142, November 2000).

Attribute Type: Enumeration

1) **international**

IHO Definition: Involving more than one country; covering more than one national area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.142, November 2000).

2) **national**

IHO Definition: An area administered or controlled by a single nation. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.142, November 2000).

3) **national sub-division**

IHO Definition: An area smaller than the nation in which it lies. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.142, November 2000).

Remarks:

- No remarks.

27.117 language

IHO Definition: LANGUAGE. The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.

Attribute Type: Text

Indication: The language is encoded by a character code following ISO 639-2/T.

Format: c3 (mandatory)

Example: **eng** for English

Remarks:

- The attribute **language** indicates the language of the specific text.

27.118 lifting capacity (LIFCAP)

IHO Definition: LIFTING CAPACITY. The specific safe lifting capacity of a feature. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.145, November 2000).

Attribute Type: Real

Unit: Tonne (t)

Precision: 0-1t

Minimum range: 0

Range closure: Left half-open ray (minimum < **lifting capacity**)

Example: **120** for a lifting capacity of 120 tonnes

Remarks:

- No remarks.

27.120 light visibility (LITVIS)

IHO Definition: LIGHT VISIBILITY. The specific visibility of a light, with respect to the light's intensity and ease of recognition. ~Attribute Type: ~ Enumeration

1) **high intensity**

IHO Definition: Non-marine lights with a higher power than marine lights and visible from well off shore (often "Aero" lights). (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.148, November 2000).

2) **low intensity**

IHO Definition: Non-marine lights with lower power than marine lights. (Bundesamt für Seeschifffahrt und Hydrographie, Germany).

3) **faint**

IHO Definition: A decrease in the apparent intensity of a light which may occur in the case of partial obstructions. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.148, November 2000).

4) **intensified**

IHO Definition: A light in a sector is intensified (that is, has longer range than other sectors). (Bundesamt für Seeschifffahrt und Hydrographie, Germany).

5) **unintensified**

IHO Definition: A light in a sector is unintensified (that is, has shorter range than other sectors). (Bundesamt für Seeschifffahrt und Hydrographie, Germany).

6) **visibility deliberately restricted**

IHO Definition: A light sector is deliberately reduced in intensity, for example to reduce its effect on a built-up area. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.148, November 2000).

7) **obscured**

IHO Definition: Said of the arc of a light sector designated by its limiting bearings in which the light is not visible from seaward. (IHO Dictionary — S-32).

8) **partially obscured**

IHO Definition: This value specifies that parts of the sector are obscured. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.148, November 2000).

9) **visible in line of range**

IHO Definition: Lights that must be in line to be visible.

Remarks:

- The attribute “light visibility” encodes the specific visibility of a light, with respect to the light’s intensity and ease of recognition.

27.121 linkage

IHO Definition: **LINKAGE**. Location (address) for online access using a URL/URI address or similar addressing scheme. (Adapted from ISO 19115-1:2014).

Attribute Type: URI

Indication: Character encoding of a URI must follow the syntax rules defined in RFC 3986.

Format: **http://.....** or **https://.....** (mandatory)

Remarks:

- For S-101, the attribute type URI is constrained to conformance with the HTTP or HTTPS protocols; that is, the character string must commence with *http://* or *https://*.

27.122 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 (°)

Minimum range: 0

Maximum range: 180

Range closure: Left half-open interval (minimum < **magnetic anomaly value** ≤ maximum)

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.

27.123 major light

IHO Definition: **MAJOR LIGHT**. A statement expressing if a light is considered to be a major light in terms of ECDIS display in a particular area.

Attribute Type: Boolean

Indication: A True value is an indication that the light is considered to be a major light.

Remarks:

- The attribute **major light** is only intended to provide an indication to the ECDIS that the light is considered to be an important light in terms of its display. As such this is a cartographic attribute to aid the compiler in determining the most appropriate display for a light; it is not intended to be used as a formal classification method for lights.

27.125 maximum permitted draught

IHO Definition: **MAXIMUM PERMITTED DRAUGHT.** The maximum draught of a vessel permitted along a route, in a channel or dock, at a berth, or over a submerged feature.

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 30

Range closure: Left half-open interval (minimum < **maximum permitted draught** ≤ maximum)

Example: **14.5** for a maximum permitted draught of 14.5 metres

Remarks:

- No remarks.

27.127 measured distance

IHO Definition: **MEASURED DISTANCE.** A course at sea, whose ends are indicated by ranges ashore, and whose length has been accurately measured for determining the speed of vessels. (IHO Dictionary — S-32).

Attribute Type: Integer

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

Minimum range: 0

Range closure: Left half-open ray (minimum < **measured distance**)

Example: **1445** for a measured distance of 1445 metres

Remarks:

- No remarks.

27.128 minimum berth depth (DRVAL1)

IHO Definition: **MINIMUM BERTH DEPTH.** 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: Defined as an attribute in the ENC dataset metadata: metre (m)

Precision: 0.1m

Minimum range: 0

Maximum range: 30

Range closure: Left half-open interval (minimum < **minimum berth depth** ≤ maximum)

Example: **14.6** for a minimum berth depth of 14.6 metres

Remarks:

- No remarks.

27.131 multiplicity known

IHO Definition: **MULTIPLICITY KNOWN.** The number of features of identical character that exist as a co-located group is or is not known. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.150, November 2000).

Attribute Type: Boolean

Indication: A True value is an indication that the exact number of features is known.

Remarks:

- No remarks.

27.132 name (*OBJNAM*, *NOBJNM*)

IHO Definition: **NAME.** The individual name of a feature. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.158, November 2000).

Attribute Type: Text

Indication: Name of feature (c...): String of characters.

Format: c...

Example: Monaco

Remarks:

- The attribute **name** encodes the individual name of a feature (see [Clause 2.5.8](#)).
- The attribute **name** should contain no more than 75 characters.

27.133 name of resource

IHO Definition: **NAME OF RESOURCE.** Name of the online resource. (ISO 19115).

Attribute Type: Text

Indication: String of characters.

Format: c...

Example: International Hydrographic Organization

Remarks:

- The attribute **name of resource** encodes the name of an online resource. The URL/URI for accessing the resource is populated using the attribute **linkage**.
- The attribute **name of resource** should contain no more than 100 characters.

27.134 name usage

IHO Definition: **NAME USAGE.** Classification of the type and display level of the name of a feature in an end-user system.

Attribute Type: Enumeration

1) **default name display**

IHO Definition: The name is intended to be displayed when the end-user system is set to the default name/text display setting.

2) **alternate name display**

IHO Definition: The name is intended to be displayed when the end-user system is set to an alternate name/text display setting, for example an alternate language.

Remarks:

- For ECDIS, all encoded instances of the complex attribute **feature name** will be able to be viewed in the ECDIS Pick Report, regardless of the value populated for **name usage**.

27.135 nationality (NATION)

27.136 nature of construction (NATCON)

IHO Definition: **NATURE OF CONSTRUCTION.** The building's primary construction material.

Attribute Type: Enumeration

1) **masonry**

IHO Definition: Constructed of stones or bricks, usually quarried, shaped, and mortared. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **concreted**

IHO Definition: Constructed of concrete, a material made of sand and gravel that is united by cement into a hardened mass used for roads, foundations, etc. (Adapted from the Illustrated Contemporary Dictionary, Encyclopedic Edition, 1978).

3) **loose boulders**

IHO Definition: Constructed from large stones or blocks of concrete, often placed loosely for protection against waves or water turbulence. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

4) **hard surfaced**

IHO Definition: Constructed with a surface of hard material, usually a term applied to roads surfaced with asphalt or concrete. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

5) **unsurfaced**

IHO Definition: Constructed with no extra protection, usually a term applied to roads not surfaced with a hard material. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

6) **wooden**

IHO Definition: Constructed from wood. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

7) **metal**

IHO Definition: Constructed from metal. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

8) **glass reinforced plastic**

IHO Definition: Constructed from a plastic material strengthened with fibres of glass. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.152, November 2000).

9) **latticed**

IHO Definition: A structure of crossed wooden or metal strips usually arranged to form a diagonal pattern of open spaces between the strips.

10) **glass**

IHO Definition: 1. Any artificial or natural substance having similar properties and composition, as fused borax, obsidian, or the like. 2. Something made of such a substance, as a windowpane.

Remarks:

- No remarks.

27.137 nature of surface (NATSUR)

IHO Definition: **NATURE OF SURFACE.** The general material which the land surface or the seabed is composed.

Attribute Type: Enumeration

1) **mud**

IHO Definition: Soft, wet earth. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.153, November 2000).

2) **clay**

IHO Definition: (Particles of less than 0.002mm); stiff, sticky earth that becomes hard when baked. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.153, November 2000).

3) **silt**

IHO Definition: An unconsolidated sediment whose particles range in size from 0.0039 to 0.0625 millimetres in diameter (between clay and sand size). (IHO Dictionary — S-32).

4) **sand**

IHO Definition: Loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter. (IHO Dictionary — S-32).

5) **stone**

- IHO Definition: A general term for rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses. (IHO Dictionary — S-32).
- 6) **gravel**
IHO Definition: (Particles of 2.0 — 4.0mm); small stones with coarse sand. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.153, November 2000).
 - 7) **pebbles**
IHO Definition: A small stone worn smooth and rounded by the action of water, sand, ice, etc. ranging in diameter between 4 and 64 millimetres. (IHO Dictionary — S-32).
 - 8) **cobbles**
IHO Definition: A naturally rounded stone larger than a pebble. (IHO Dictionary — S-32).
 - 9) **rock**
IHO Definition: Any formation of natural origin that constitutes an integral part of the lithosphere. The natural occurring material that forms firm, hard, and solid masses. (Adapted from IHO Dictionary — S-32).
 - 10) **lava**
IHO Definition: The fluid or semi-fluid matter flowing from a volcano. The substance that results from the cooling of the molten rock. Part of the ocean bed is composed of lava. (IHO Dictionary — S-32).
 - 11) **coral**
IHO Definition: Hard calcareous skeletons of many tribes of marine polyps. (IHO Dictionary — S-32).
 - 12) **shells**
IHO Definition: The hard outside covering of an animal. Part of the ocean bed is composed of numerous shells of marine animals. (IHO Dictionary — S-32).
 - 13) **boulder**
IHO Definition: A rounded rock with diameter of 256 millimetres or larger. (Adapted from IHO Dictionary — S-32).
- Remarks:
- The attribute “nature of surface” encodes the general nature of the material of which the land surface or the seabed is composed.
 - Mixed bottom: where the seabed comprises a mixture of material, the main constituent is given first for example fine sand with mud and shells would be indicated as 4,1,17.
 - Mud, sand, stone, rock are terms used for the general description. Clay, silt, gravel, pebbles, cobbles are more specific terms related to particle size.

27.138 nature of surface — qualifying terms (NATQUA)

IHO Definition: **NATURE OF SURFACE — QUALIFYING TERMS.** The nature of various forms of natural surface materials in terms of their size, morphology and consistency.

Attribute Type: Enumeration

- 1) **fine**
IHO Definition: Falls within the smallest size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.155, November 2000).
- 2) **medium**
IHO Definition: Falls within the moderate size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.155, November 2000).
- 3) **coarse**
IHO Definition: Falls within the largest size continuum for a particular nature of surface term. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.155, November 2000).
- 4) **broken**
IHO Definition: Fractured or in pieces. (Adapted from Webster's II New Riverside Dictionary, 1984).
- 5) **sticky**
IHO Definition: Having an adhesive or glue like property. (Adapted from Webster's II New Riverside Dictionary, 1984).
- 6) **soft**
IHO Definition: Not hard or firm. (Adapted from Webster's II New Riverside Dictionary, 1984).
- 7) **stiff**
IHO Definition: Not pliant; thick, resistant to flow. (Adapted from Webster's II New Riverside Dictionary, 1984).
- 8) **volcanic**
IHO Definition: Composed of or containing material ejected from a volcano. (Adapted from Webster's II New Riverside Dictionary, 1984).
- 9) **calcareous**
IHO Definition: Composed of or containing calcium or calcium carbonate. (IHO Dictionary — S-32).
- 10) **hard**

IHO Definition: Firm; usually refers to an area of the seafloor not covered by unconsolidated sediment. (IHO Dictionary—S-32 and adapted from Webster's II New Riverside Dictionary, 1984). Remarks: The attribute “nature of surface—qualifying terms” encodes the nature of various forms of natural surface materials in terms of their size, morphology and consistency.
--

27.139 number of features

IHO Definition: NUMBER OF FEATURES. The number of features of identical character that exist as a co-located group. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.150, November 2000). Attribute Type: Integer Unit: None Minimum range: 2 Range closure: Left closed ray (minimum $\leq$ number of features) Example: 3 for 3 co-located cables Remarks: The attribute number of features must only be used to indicate the number of entities of a feature, where known, that are co-located (for example 3 overhead cables suspended over a body of water between 2 pylons), and this information is considered to be of use to the Mariner. Where possible, features must be encoded individually.

27.140 opening bridge (CATBRG)

IHO Definition: OPENING BRIDGE. A bridge that is closed when set for carrying road traffic and open when set to permit marine traffic to pass through the waterway it crosses. Modern opening (movable) bridges are either bascule, vertical lift or swing. (Adapted from McGraw-Hill Encyclopedia of Science and Technology, 7th Edition, 1992). Attribute Type: Boolean Indication: A True value is an indication that one or more spans of the bridge are opening. Remarks: No remarks.

27.141 orientation value (ORIENT)

IHO Definition: ORIENTATION VALUE. The angular distance measured from true north to the major axis of the feature. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010). Attribute Type: Real Unit: Degree (°) Precision: 0.01° Minimum range: 0 Maximum range: 360 Range closure: Right half-open interval (minimum $\leq$ orientation value < maximum) Example: 246.7 for an orientation value of 246.7 degrees Remarks: An orientation quoted as 360° must be encoded as 0.
--

27.143 pilot movement

IHO Definition: PILOT MOVEMENT. Classification of pilot activity by arrival, departure, or change of pilot. It may also describe the place where the pilot's advice begins, ends, or is transferred to a different pilot.

Attribute Type: Enumeration

1) **embarkation**

IHO Definition: The place where vessels not being navigated according to a pilot's instructions pick up a pilot while in transit from sea to a port or constricted waters for future navigation under pilot instructions.

2) **disembarkation**

IHO Definition: The place where vessels being navigated under a pilot's instructions in transit from sea to a port or constricted waters drop the pilot and proceed without being subject to pilot instructions.

3) **pilot change**

IHO Definition: The place where vessels being navigated under a pilot's instructions drop off the pilot and pick up a different pilot for future navigation under pilot's instructions.

Remarks:

- No remarks.

27.144 product (PRODUCT)

IHO Definition: PRODUCT. The various substances which are transported, stored or exploited.

Attribute Type: Enumeration

1) **oil**

IHO Definition: A thick, slippery liquid that will not dissolve in water, usually petroleum based in the context of storage tanks. (Adapted from the Oxford Minidictionary, Third Edition).

2) **gas**

IHO Definition: A substance with particles that can move freely, usually a fuel substance in the context of storage tanks. (Adapted from the Oxford Minidictionary, Third Edition).

3) **water**

IHO Definition: A colourless, odourless, tasteless liquid that is a compound of hydrogen and oxygen. (Adapted from the Oxford Minidictionary, Third Edition).

4) **stone**

IHO Definition: A general term for rock and rock fragments ranging in size from pebbles and gravel to boulders or large rock masses. (IHO Dictionary — S-32).

5) **coal**

IHO Definition: A hard black mineral that is burned as fuel. (Adapted from the Oxford Minidictionary, Third Edition).

6) **ore**

IHO Definition: A solid rock or mineral from which metal is obtained. (Adapted from the Oxford Minidictionary, Third Edition).

7) **chemicals**

IHO Definition: Any substance obtained by or used in a chemical process. (Adapted from the Oxford Minidictionary, Third Edition).

8) **drinking water**

IHO Definition: Water that is suitable for human consumption. (Adapted from the Oxford Minidictionary, Third Edition).

9) **milk**

IHO Definition: A white fluid secreted by female mammals as food for their young. (Adapted from the Oxford Minidictionary, Third Edition).

10) **bauxite**

IHO Definition: A mineral from which aluminum is obtained. (Adapted from the Oxford Minidictionary, Third Edition).

11) **coke**

IHO Definition: A solid substance obtained after gas and tar have been extracted from coal, used as a fuel. (Adapted from the Oxford Minidictionary, Third Edition).

12) **iron ingots**

IHO Definition: An oblong lump of cast iron metal. (Adapted from the Oxford Minidictionary, Third Edition).

13) **salt**

IHO Definition: Sodium chloride obtained from mines or by the evaporation of sea water. (Adapted from the Oxford Minidictionary, Third Edition).

14) **sand**

IHO Definition: Loose material consisting of small but easily distinguishable, separate grains, between 0.0625 and 2.000 millimetres in diameter. (IHO Dictionary — S-32).

- 15) **timber**
IHO Definition: Wood prepared for use in building or carpentry. (Adapted from the Oxford Minidictionary, Third Edition).
 - 16) **sawdust/wood chips**
IHO Definition: Powdery fragments of wood made in sawing timber or coarse chips produced for use in manufacturing pressed board. (Adapted from the Oxford Minidictionary, Third Edition).
 - 17) **scrap metal**
IHO Definition: Discarded metal suitable for being reprocessed. (Adapted from the Oxford Minidictionary, Third Edition).
 - 18) **liquefied natural gas**
IHO Definition: Natural gas that has been liquefied for ease of transport by cooling the gas to -162 Celsius. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 19) **liquefied petroleum gas**
IHO Definition: A compressed gas consisting of flammable light hydrocarbons and derived from petroleum. (Adapted from the Websters New World Dictionary).
 - 20) **wine**
IHO Definition: The fermented juice of grapes. (Adapted from the Websters New World Dictionary).
 - 21) **cement**
IHO Definition: A substance made of powdered lime and clay, mixed with water. (Adapted from the Websters New World Dictionary).
 - 22) **grain**
IHO Definition: A small hard seed, especially that of any cereal plant such as wheat, rice, corn, rye etc. (Adapted from the Websters New World Dictionary).
 - 23) **electricity**
IHO Definition: Electric charge or current.
 - 24) **ice**
IHO Definition: The solid form of water. (IHO Dictionary — S-32).
 - 25) **clay**
IHO Definition: (Particles of less than 0.002mm); stiff, sticky earth that becomes hard when baked. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.153, November 2000).
- Remarks:
- The attribute “product” encodes the various substances which are transported, stored or exploited.

27.145 radar band

IHO Definition: **RADAR BAND.** The band code character of the electromagnetic spectrum within which radar wave lengths lie.

Attribute Type: Text

Indication: Radar band ©.

Format: C(mandatory)

Example: X for the (X) — Band.

Remarks:

- Radar transponder beacons generally work on the 3cm (X) — Band or the 10cm (S) — Band wave lengths. Nevertheless, wave lengths outside the marine band are used.

27.146 radar conspicuous (CONRAD)

IHO Definition: **RADAR CONSPICUOUS.** A feature which returns a strong radar echo. (IHO Dictionary, S-32).

Attribute Type: Boolean

Indication: A True value is an indication that the feature returns a strong radar echo.

Default value: False

Remarks:

- **Radar conspicuous** applies to both features that themselves provide a strong radar echo; or return a strong radar echo as a result of being fitted with a radar reflector or a Radar Target Enhancer.

27.147 radius (RADIUS)

IHO Definition: RADIUS. The vector extending from the centre to the periphery of a circular or spherical feature. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.173, November 2000).

Attribute Type: Real

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

Precision: 0-1m

Minimum range: 0

Range closure: Left half-open ray (minimum < radius)

Example: **26** for a radius of 26 metres

Remarks:

- No remarks.

27.148 reference direction

IHO Definition: REFERENCE DIRECTION. 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.

27.149 reference location

IHO Definition: REFERENCE LOCATION. Information relating to the point of origin for a measured distance as indicated on a distance mark.

Attribute Type: Text

Indication: Reference location (c...).

Format: c...

Example: **Storey Bridge** for a distance mark marking a specified distance from Storey Bridge.

Remarks:

- The attribute **reference location** should contain no more than 75 characters.

27.150 reference tide

IHO Definition: REFERENCE TIDE. The reference tide to which the series of tidal stream values apply.

Attribute Type: Enumeration

1) **high water**

IHO Definition: The highest level reached at a place by the water surface in one oscillation. (IHO Dictionary — S-32).

2) **low water**

IHO Definition: The lowest level reached at a place by the water surface in one oscillation. (IHO Dictionary — S-32).

Remarks:

- No remarks.

27.151 reference tide type

IHO Definition: **REFERENCE TIDE TYPE.** The type of tide range (that is, mean spring tide, mean neap tide or mean tide) for which a set of tidal stream rates and directions apply.

Attribute Type: Enumeration

1) **springs**

IHO Definition: The tides of increased range occurring near the times of full moon and new moon. (IHO Dictionary, S-32).

2) **neaps**

IHO Definition: The tides of decreased range occurring near the times of first and last quarter.

3) **mean**

IHO Definition: The tides of mean range occurring between spring and neap tides.

Remarks:

- No remarks.

27.152 reference year for magnetic variation (RYRMGV)

IHO Definition: **REFERENCE YEAR FOR MAGNETIC VARIATION.** The reference calendar year for magnetic variation values. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.176, November 2000).

Attribute Type: Truncated date

Unit: Four digit year indication (YYYY)

Example: 2009----

Remarks:

- The dashes (----) must be included in all cases.

27.154 reported date (SORDAT)

IHO Definition: **REPORTED DATE.** The date that the item was observed, done, or investigated.

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:

Example: 20101129 for 29 November 2010 as the reported date.

Remarks:

- The attribute **reported date** indicates the date that information regarding a feature has been supplied to a Producing Authority.

27.156 scale minimum (SCAMIN)

IHO Definition: **SCALE MINIMUM.** The minimum scale at which the feature may be used for example for ECDIS presentation.

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:89 999 is encoded as 89999.

Unit: None

Minimum range: 999

Maximum range: 19999999

Range closure: Closed interval (minimum $\leq$ **scale minimum** $\leq$ maximum)

Example: If a particular minimum scale is specified as 1:89 999 (encoded as **89999**), and an example of a smaller scale would be 1:179 999 (encoded as **179999**).

The **scale minimum** value of a feature determines the display scale below which the feature is no longer displayed. Its purpose is to reduce clutter, to prioritise the display of features and to improve display speed. In encoding its value, the producing authority should consider these factors, as well as the scale at which the feature is no longer likely to be required for navigation. In order to optimize the performance and clarity of the ENC, it is a mandatory requirement on ENCs that **scale minimum** is used.

Remarks:

- **scale minimum** only affects the display of a feature on an ECDIS, not its presence in the Electronic Navigational Data Service (ENDS).
- If **scale minimum** is not encoded, the feature is displayed at all scales.
- Where **scale minimum** is used, it must always be set to a scale less (that is, to a smaller scale) than the optimum display scale of the data as described in [Clause 2.5.5](#). Failure to follow this rule will mean that features will not be displayed on the ECDIS until the overscale indication is activated. See [Clause 2.5.9](#), [Table 2-6](#), for the list of mandatory **scale minimum** values.
- Skin of the Earth and Meta features must always be displayed. Therefore, **scale minimum** must not be encoded on Skin of the Earth and Meta features.
- If the same feature exists in datasets of different optimum display scales, the same **scale minimum** value must be assigned to each occurrence of the feature.

27.158 sector line length

IHO Definition: **SECTOR LINE LENGTH**. A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition). **sector line length** specifies the displayed length of the line, in ground units, defining the limit of the sector.

Attribute Type: Real

Unit: Nautical mile (M)

Precision: 0.01M

Minimum range: 0

Range closure: Left half-open ray (minimum $<$ **sector line length**)

Example: **5.15** for a sector line length of 5.15 nautical miles

Remarks:

- The attribute **sector line length** is used to override the default sector line length in ECDIS for light sectors that are considered to be particularly critical to safe navigation.
- Sector lines should be displayed such that they cover the area where they are useful to Mariners.
- Sector lines must not extend beyond the nominal range of the light sector.

27.159 signal duration

IHO Definition: **SIGNAL DURATION**. The time occupied by a single instance of light/sound or eclipse/silence in a signal sequence.

Attribute Type: Real

Unit: Seconds (s)

Precision: 0-01s

Minimum range: 0

Maximum range: 60

Range closure: Left half-open interval (minimum $<$ **signal duration** $\leq$ maximum)

Example: **2.5** for an duration of 2.5 seconds

Remarks:

- No remarks.

27.160 signal frequency (SIGFRQ)

IHO Definition: **SIGNAL FREQUENCY.** The frequency of a signal. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.187, November 2000).

Attribute Type: Integer

Unit: Hertz (Hz)

Minimum range: 0

Range closure: Left half-open ray (minimum < **signal frequency**)

Example: **950000000** for a radio signal centred on 950 MHz

Remarks:

- No remarks.

27.161 signal generation (SIGGEN)

IHO Definition: **SIGNAL GENERATION.** The mechanism used to generate a fog or light signal.

Attribute Type: Enumeration

1) **automatically**

IHO Definition: Signal generation is initiated by a self regulating mechanism such as a timer or light sensor. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.188, November 2000).

2) **by wave action**

IHO Definition: The signal is generated by the motion of the sea surface such as a bell in a buoy. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.188, November 2000).

3) **by hand**

IHO Definition: The signal is generated by a manually operated mechanism such as a hand cranked siren. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.188, November 2000).

4) **by wind**

IHO Definition: The signal is generated by the motion of air such as a wind driven whistle. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.188, November 2000).

5) **radio activated**

IHO Definition: Activated by radio signal.

6) **call activated**

IHO Definition: Activated by making a call to a manned station.

Remarks:

- The attribute “signal generation” encodes the mechanism used to generate a fog signal.

27.162 signal group (SIGGRP)

IHO Definition: **SIGNAL GROUP.** The number of signals, the combination of signals or the Morse character(s) within one period of full sequence. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.189, November 2000).

Attribute Type: Text

Indication: The signal group of a light is encoded using brackets to separate the individual groups. A group of signals may be a single number, a chain of numbers separated by “+”, a sequence of up to 4 letters or a letter and a number.

A fixed light has no signal group.

Where no specific signal group is given for one of the light characteristics, this should be shown by an empty pair of brackets.

Format: @@...

Examples:

Light Characteristic	Signal Group
VQ(6)+LFI	(6)(1)
LFI+FI(2+3)	(1)(2+3)
FI(2)+LFI	(2)(1)
FFI	()(1)
Mo(AA)	(AA)
AIFI(2W+1R)	(2+1)
AILFIWR	(1)
FOcW	()(1)
AIoc(4)WR	(4)
AIWR	()
Iso	(1)
IQ	()

Remarks:

- In the above examples, where there is more than one group included in the rhythm of the light (for example (6)(1)), each group is encoded using a separate instance of **signal group**; in this case the first instance of **signal group** would be (6) and the second instance would be (1).
- The attribute **signal group** should contain no more than 15 characters.

27.164 signal status

IHO Definition: **SIGNAL STATUS**. The indication of an element of a signal sequence being a period of light/sound or eclipse/silence.

Attribute Type: Enumeration

1) **lit/sound**

IHO Definition: The indication of an element of a signal sequence being a period of light or sound.

2) **eclipsed/silent**

IHO Definition: The indication of an element of a signal sequence being a period of eclipse or silence.

Remarks:

- No remarks.

27.165 speed limit

IHO Definition: **SPEED LIMIT**. The maximum allowed rate of travel in an area.

Attribute Type: Real

Unit: Defined by complex attribute **vessel speed limit**, sub-attribute **speed units** (see [Clause 27.168](#)).

Precision: 0-1

Minimum range: 0

Maximum range: 35

Range closure: Left half-open interval (minimum < **speed limit** ≤ maximum)

Example: **4.5** for a speed limit of 4.5 knots (or other speed unit of measure as defined by **speed units**)

Remarks:

- No remarks.

27.168 speed units

IHO Definition: **SPEED UNITS**. The units for description of speed. (S-412 WMO Weather Product Specification, 2017).

Attribute Type: Enumeration

1) **kilometres per hour**

IHO Definition: A unit of speed, expressing the number of kilometres travelled in one hour. (Wikipedia).

2) **miles per hour**

IHO Definition: An imperial and United States customary unit of speed expressing the number of statute miles covered in one hour. (Wikipedia).

3) **knots**

IHO Definition: A nautical unit of speed. One knot is one nautical mile per hour. The name is derived from the knots in the log line. (IHO Dictionary, S-32).

Remarks:

- No remarks.

27.169 station name

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

Attribute Type: Text

Indication: Name of tidal stream station (c...): String of characters.

Format: c...

Example: **Darwin** for the Darwin tide station.

Remarks:

- The attribute **station name** should contain no more than 50 characters.

27.170 station number

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

Attribute Type: Text

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

Format: c...

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

Remarks:

- The attribute **station number** should contain no more than 15 characters.

27.171 status (STATUS)

IHO Definition: **STATUS**. The condition of an object at a given instant in time.

Attribute Type: Enumeration

- 1) **permanent**
IHO Definition: Intended to last or function indefinitely. (The Concise Oxford Dictionary, 7th Edition).
 - 2) **occasional**
IHO Definition: Acting on special occasions; happening irregularly. (The Concise Oxford Dictionary, 7th Edition).
 - 3) **recommended**
IHO Definition: Presented as worthy of confidence, acceptance, use, etc. (The Macquarie Dictionary, 1988).
 - 4) **not in use**
IHO Definition: Use has ceased, but the facility still exists intact; disused. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 5) **periodic/intermittent**
IHO Definition: Recurring at intervals. (The Concise Oxford Dictionary, 7th Edition).
 - 6) **reserved**
IHO Definition: Set apart for some specific use. (Adapted from The Concise Oxford Dictionary, 7th Edition).
 - 7) **temporary**
IHO Definition: Meant to last only for a time. (The Concise Oxford Dictionary).
 - 8) **private**
IHO Definition: Administered by an individual or corporation, rather than a State or a public body. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
 - 9) **mandatory**
IHO Definition: Compulsory; enforced. (The Concise Oxford Dictionary, 7th Edition).
 - 10) **extinguished**
IHO Definition: No longer lit. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.197, November 2000).
 - 11) **illuminated**
IHO Definition: Lit by flood lights, strip lights, etc. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.198, November 2000).
 - 12) **historic**
IHO Definition: Famous in history; of historical interest. (The Concise Oxford Dictionary, 7th Edition).
 - 13) **public**
IHO Definition: Belonging to, available to, used or shared by, the community as a whole and not restricted to private use. (Adapted from The New Shorter Oxford English Dictionary, 1993).
 - 14) **synchronized**
IHO Definition: Occur at a time, coincide in point of time, be contemporary or simultaneous. (The New Shorter Oxford English Dictionary, 1993).
 - 15) **watched**
IHO Definition: Looked at or observed over a period of time especially so as to be aware of any movement or change. (adapted from The New Shorter Oxford English Dictionary, 1993).
 - 16) **unwatched**
IHO Definition: Usually automatic in operation, without any permanently-stationed personnel to superintend it. (Adapted from IHO Dictionary — S-32).
 - 17) **existence doubtful**
IHO Definition: A feature that has been reported but has not been definitely determined to exist. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.198, November 2000).
 - 18) **buoyed**
IHO Definition: Marked by buoys. (Australian Hydrographic Office).
- Remarks:
- No remarks.

27.172 stream depth

IHO Definition: **STREAM DEPTH.** The depth below the sea surface to which the tidal stream data refers relative to the sounding datum.

Attribute Type: Real

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

Precision: 0.1m

Minimum range: 0

Maximum range: 200

Range closure: Closed interval (minimum ≤ **stream depth** ≤ maximum)

<u>Examples:</u>	0	for surface tidal stream data
	15	for tidal stream data collected at a depth of 15 metres
<u>Remarks:</u>		
• No remarks.		

27.173 swept date

<u>IHO Definition:</u> SWEPT DATE . The date that the area was swept by a survey.
<u>Attribute Type:</u> Truncated date
<u>Indication:</u> 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 .
<u>Format:</u>
YYYYMMDD (full date, mandatory)
YYYYMM-- (no specific day required — mandatory) YYYY---- (no specific month required — mandatory)
<u>Example:</u> 20101203 for 03 December 2010 as the swept date.
<u>Remarks:</u>
• No remarks.

27.174 technique of vertical measurement (TECSOU)

<u>IHO Definition:</u> TECHNIQUE OF VERTICAL MEASUREMENT . Survey method used to obtain depth information.
<u>Attribute Type:</u> Enumeration
1) found by echo sounder <u>IHO Definition:</u> The depth was measured by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultrasonic signal and return of its echo from the bottom. (Adapted from IHO Dictionary — S-32).
2) found by side scan sonar <u>IHO Definition:</u> The depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the seabed and generate a record of the seabed configuration. (Adapted from IHO Dictionary — S-32).
3) found by multi beam <u>IHO Definition:</u> The depth was measured by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship's track. (Adapted from IHO Dictionary — S-32).
4) found by diver <u>IHO Definition:</u> The depth was determined by a person skilled in the practice of diving. (Adapted from IHO Dictionary — S-32).
5) found by lead line <u>IHO Definition:</u> The depth was measured by using a line, graduated with attached marks and fastened to a sounding lead. (Adapted from IHO Dictionary — S-32).
6) swept by vertical acoustic system <u>IHO Definition:</u> The given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.207, November 2000).
7) found by electromagnetic sensor <u>IHO Definition:</u> The depth was determined by using an instrument that compares electromagnetic signals. (Adapted from IHO Dictionary — S-32).
8) photogrammetry <u>IHO Definition:</u> The science or art of obtaining reliable measurements from photographs. (IHO Dictionary — S-32).

- 9) **satellite imagery**
IHO Definition: The depth was determined by using instruments placed aboard an artificial satellite. (Adapted from IHO Dictionary — S-32).
 - 10) **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).
 - 11) **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).
 - 12) **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).
 - 13) **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).
 - 14) **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.
 - 15) **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.

27.175 telecommunication identifier

IHO Definition: **TELECOMMUNICATION IDENTIFIER.** An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.

Attribute Type: TextIndication:

Format: c...

Example: **+61 2 4223 6500; pilsener@beer.com**

Remarks:

- The telecommunication identifier should include the international and any applicable regional codes.
- The attribute **telecommunication identifier** should contain no more than 50 characters.

27.178 text offset bearing

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

Attribute Type: Integer

Unit: Degree (°)

Minimum range: 0

Maximum range: 360

Range closure: Right half-open interval (minimum ≤ **text offset bearing** < maximum)

Example: **246** for a text offset bearing of 246 degrees

Remarks:

- An orientation quoted as 360° must be encoded as 0.

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

27.181 text type

IHO Definition: **TEXT TYPE.** The attribute from which a text string is derived.

Attribute Type: Enumeration

1) **name**

IHO Definition: See [Clause 27.132](#).

2) **feature characteristic**

IHO Definition: A distinguishing trait, quality, or property of a feature class. (Adapted from Merriam-Webster Dictionary — 2024).

Remarks:

- For **text type** = 1 (name), ~the t~ext display preference is the name of the feature (see [Clause 27.132](#))~.
- For **text type** = 2 (feature characteristic), ~the t~ext display preference is the textual feature characteristics for which the corresponding S-101 portrayal rule implements a standardized textual string based on the attribution for the binding feature. If the portrayal rule implements more than one textual string for a feature based on multiple attributes (for example the vertical and horizontal clearances for a bridge span, or the construction of a light characteristic), the text labels will all be listed, one after the other.~

27.182 time of day end

27.183 time of day start

IHO Definition: **TIME OF DAY START.** The time corresponding to the start of an active period.

Attribute Type: Time

Indication: The “time of day start” must be encoded using 2 digits for the hour (hh), 2 digits for the minutes (mm) and 2 digits for the seconds (ss). Additional characters are added dependant on the time zone indication (UTC or offset to UTC). This conforms to ISO 8601.

Format: hhmmssZ:: (**mandatory** for UTC time) hhmmss+hhmm:: (**mandatory** for local time with UTC offset)
hhmmss:: (**mandatory** for local time without offset)

Example:

094500Z for a period starting at 09:45 am UTC.
094500+0100 for a period starting at 09:45 am local time, 1 hour ahead of UTC.
094500 for a period starting at 09:45 am local time, without specified offset to UTC.

Remarks:

- Local time expressed without a specified offset to UTC is used where the same time of day applies locally, regardless of any local seasonal time adjustments (for example daylight saving (or Summer) time).

27.184 time relative to tide

IHO Definition: **TIME RELATIVE TO TIDE.** The time difference relative to the reference tide.

Attribute Type: Real

Unit: Hour

Precision: 0.1 hour

Minimum range: -6

Maximum range: 6

Range closure: Closed interval (minimum $\leq$ tide relative to tide $\leq$ maximum)

Example: 1.5 for 1.5 hours after the referenced tide -1.5 for 1.5 hours before the referenced tide

Remarks:

- Positive values are time after the referenced tide, negative values are time before the referenced tide.

27.185 topmark/daymark shape (TOPSHP)

IHO Definition: **TOPMARK/DAYMARK SHAPE.** The shape a topmark or daymark exhibits.

Attribute Type: Enumeration

- 1) **cone (point up)**
IHO Definition: Is where the vertex points up. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.222, November 2000).
- 2) **cone (point down)**
IHO Definition: Is where the vertex points down. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.222, November 2000).
- 3) **sphere**
IHO Definition: A curved surface all points of which are equidistant from a fixed point within, called the centre. (IHO Dictionary—S-32).
- 4) **2 spheres**
IHO Definition: Two spheres, one above the other. Two black spheres are commonly used as an International Association of Lighthouse Authorities—IALA topmark (isolated danger). (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 5) **cylinder**
IHO Definition: A solid geometrical figure generated by straight lines fixed in direction and describing with one of point a closed curve, especially a circle (in which case the figure is circular cylinder, its ends being parallel circles). (The New Shorter Oxford English Dictionary, 1993, vol 2).
- 6) **board**
IHO Definition: Usually of rectangular shape, made from timber or metal and used to provide a contrast with the natural background of a daymark. The actual daymark is often painted on to this board. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 7) **x-shaped**
IHO Definition: Having a shape or a cross-section like the capital letter X. (The New Shorter Oxford English Dictionary, 1993, vol 2).
- 8) **upright cross**
IHO Definition: A cross with one vertical member and one horizontal member; that is, similar in shape to the character “+”. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 9) **cube (point up)**
IHO Definition: A cube standing on one of its vertexes. A cube is a solid contained by six equal squares, a regular hexahedron (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 10) **2 cones (point to point)**
IHO Definition: 2 cones, one above the other, with their vertices together in the centre. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 11) **2 cones (base to base)**
IHO Definition: 2 cones, one above the other, with their bases together in the centre and their vertices pointing up and down. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 12) **rhombus**
IHO Definition: A plane figure having four equal sides and equal opposite angles (two acute and two obtuse); an oblique equilateral parallelogram. (The New Shorter Oxford English Dictionary, 1993, vol 2).
- 13) **2 cones (points upward)**
IHO Definition: 2 cones, one above the other, with their vertices pointing up. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 14) **2 cones (points downward)**
IHO Definition: 2 cones, one above the other, with their vertices pointing down. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.223, November 2000).
- 15) **besom (point up)**
IHO Definition: A bundle of rods or twigs. A besom, point up is where the thicker (untied) end of the besom is at the bottom. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 16) **besom (point down)**
IHO Definition: A bundle of rods or twigs. A besom, point down is where the thinner (tied) end of the besom is at the bottom. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 17) **flag**

- IHO Definition: A flag mounted on a short pole. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).
- 18) **sphere over a rhombus**
IHO Definition: A sphere located above a rhombus. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).
- 19) **square**
IHO Definition: A plane figure with four right angles and four equal straight sides (The New Shorter Oxford English Dictionary, 1993, vol 2).
- 20) **rectangle (horizontal)**
IHO Definition: A horizontal rectangle is where the two longer opposite sides are standing horizontally. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 21) **rectangle (vertical)**
IHO Definition: A vertical rectangle is where the two longer opposite sides are standing vertically. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 22) **trapezium (up)**
IHO Definition: A quadrilateral having one pair of opposite sides parallel, and which stands on its longer parallel side. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 23) **trapezium (down)**
IHO Definition: A quadrilateral having one pair of opposite sides parallel, and which stands on its shorter parallel side. (Adapted from The New Shorter Oxford English Dictionary, 1993, vol 2).
- 1) **triangle (point up)**
IHO Definition: A figure having three angles and three sides, and which has a vertex at the top. (Adapted from New Shorter Oxford English Dictionary, 1993, vol 2).
- 2) **triangle (point down)**
IHO Definition: A figure having three angles and three sides, and which has a side at the top. (Adapted from New Shorter Oxford English Dictionary, 1993, vol 2).
- 3) **circle**
IHO Definition: A perfectly round plane figure whose circumference is everywhere equidistant from its centre. (The New Shorter Oxford English Dictionary, 1993, vol 1).
- 4) **two upright crosses (one over the other)**
IHO Definition: Two upright crosses, generally vertically disposed one above the other. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 5) **T-shape**
IHO Definition: Having a shape like the capital letter T. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 6) **triangle pointing up over a circle**
IHO Definition: A triangle, vertex uppermost, located above a circle. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 7) **upright cross over a circle**
IHO Definition: An upright cross located above a circle. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 8) **rhombus over a circle**
IHO Definition: A rhombus located above a circle. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 9) **circle over a triangle pointing up**
IHO Definition: A circle located over a triangle, vertex uppermost. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.224, November 2000).
- 10) **other shape (see shape information)**
IHO Definition: An uncommon and/or non-standardized shape as textually described using an associated attribute.

Remarks:

- **Cone:** A solid figure generated by straight lines drawn from a fixed point (the vertex) to a circle in a plane not containing the vertex. (The New Shorter Oxford English Dictionary, 1993, vol 2). Cones are commonly used as International Association of Lighthouse Authorities — IALA topmarks (lateral). (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.222, November 2000).
- Spheres are commonly used as International Association of Lighthouse Authorities — IALA topmarks (safe water). (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).
- Cylinders are commonly used as International Association of Lighthouse Authorities — IALA topmarks (lateral). (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).
- An x-shape as an International Association of Lighthouse Authorities — IALA topmark should be 3 dimensional in shape. It is made of at least three crossed bars. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).
- A rectangle is a plane figure with four right angles and four straight sides, opposite sides being parallel and equal in length. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.223, November 2000).

27.186 traffic flow (TRAFIC)

IHO Definition: **TRAFFIC FLOW.** Direction of vessels passing a reference point.

Attribute Type: Enumeration

1) **inbound**

IHO Definition: Traffic flow in a general direction toward a port or similar destination. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.225, November 2000).

2) **outbound**

IHO Definition: Traffic flow in a general direction away from a port or similar point of origin. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.225, November 2000).

3) **one-way**

IHO Definition: Traffic flow in one general direction only. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.225, November 2000).

4) **two-way**

IHO Definition: Traffic flow in two generally opposite directions. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.225, November 2000).

Remarks:

- No remarks.

27.192 value of nominal range (VALNMR)

IHO Definition: **VALUE OF NOMINAL RANGE.** The luminous range of a light in a homogenous atmosphere in which the meteorological visibility is 10 sea miles. (IHO Dictionary — S-32).

Attribute Type: Real

Unit: Nautical mile (M)

Precision: 0.1M

Minimum range: 0

Maximum range: 30

Range closure: Left half-open interval (minimum < **value of nominal range** ≤ maximum)

Example: **14** for a nominal range of 14 nautical miles

Remarks:

- None.

27.193 value of sounding (VALSOU)**27.195 vertical clearance value (VERCLR) (VERCCL, VERCOP, VERCSA)**

IHO Definition: **VERTICAL CLEARANCE VALUE.** The vertical clearance measured from the horizontal plane towards the feature overhead. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.234, November 2000).

Attribute Type: Real

Unit: Defined as an attribute in the ENC Dataset Discovery Metadata: metre (m)

Precision: 0.1m

Minimum range: 0

Range closure: Left half-open ray (minimum < **vertical clearance value**)

Example: **7.6** for a vertical clearance of 7.6 metres

Remarks:

- No remarks.

27.196 vertical datum (VERDAT)

IHO Definition: VERTICAL DATUM. The reference level used for expressing the vertical measurements of points on the earth's surface. Also called datum level, reference plane, levelling datum, datum for sounding reduction, datum for heights. (Adapted from IHO Dictionary, S-32).

Attribute Type: Enumeration

- 1) **mean low water springs**
IHO Definition: The average height of the low waters of spring tides. This level is used as a tidal datum in some areas. (IHO Dictionary — S-32).
- 2) **mean lower low water springs**
IHO Definition: The average height of lower low water springs at a place. (IHO Dictionary — S-32).
- 3) **mean sea level**
IHO Definition: The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level. (IHO Dictionary — S-32).
- 4) **lowest low water**
IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.239, November 2000).
- 5) **mean low water**
IHO Definition: The average height of all low waters at a place over a 19-year period. (IHO Dictionary — S-32).
- 6) **lowest low water springs**
IHO Definition: An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years. (Australian Hydrographic Office).
- 7) **approximate mean low water springs**
IHO Definition: An arbitrary level, usually within 0.3m from that of mean low water springs (MLWS). (Australian Hydrographic Office).
- 8) **indian spring low water**
IHO Definition: An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. It was first used in waters surrounding India. (IHO Dictionary — S-32).
A tidal datum approximating the lowest water level observed at a place, originated by G.H. Darwin for the tides of India at a level below MSL being equal to the sum of amplitudes of the harmonic constituents M2, S2, K1 and O1; usually below that of the lower low water at spring tides. Also called Indian tide plane. (Australian Hydrographic Office).
- 9) **low water springs**
IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS). (Australian Hydrographic Office).
- 10) **approximate lowest astronomical tide**
IHO Definition: An arbitrary level, usually within 0.3m from that of lowest astronomical tide (LAT). (Australian Hydrographic Office).
- 11) **nearly lowest low water**
IHO Definition: An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian spring low water (ISLW). (Australian Hydrographic Office).
- 12) **mean lower low water**
IHO Definition: The average height of the lower low waters at a place over a 19-year period. (IHO Dictionary — S-32).
- 13) **low water**
IHO Definition: The lowest level reached at a place by the water surface in one oscillation. (IHO Dictionary — S-32).
- 14) **approximate mean low water**
IHO Definition: An arbitrary level, usually within 0.3m from that of mean low water (MLW). (Australian Hydrographic Office).
- 15) **approximate mean lower low water**
IHO Definition: An arbitrary level, usually within 0.3m from that of mean lower low water (MLLW). (Australian Hydrographic Office).
- 16) **mean high water**
IHO Definition: The average height of all high waters at a place over a 19-year period. (IHO Dictionary, S-32).
- 17) **mean high water springs**
IHO Definition: The average height of the high waters of spring tides. (IHO Dictionary, S-32).
- 18) **high water**

IHO Definition: The highest level reached at a place by the water surface in one oscillation. (IHO Dictionary, S-32).

19) **approximate mean sea level**

IHO Definition: An arbitrary level, usually within 0.3m from that of mean sea level (MSL). (Australian Hydrographic Office).

20) **high water springs**

IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS). (Australian Hydrographic Office).

21) **mean higher high water**

IHO Definition: The average height of higher high waters at a place over a 19-year period. (IHO Dictionary, S-32).

22) **equinoctial spring low water**

IHO Definition: The level of low water springs near the time of an equinox. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

23) **lowest astronomical tide**

IHO Definition: The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. (IHO Dictionary—S-32).

24) **local datum**

IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

25) **international Great Lakes Datum 1985**

IHO Definition: A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Père, Quebec, over the period 1970 to 1988. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

26) **mean water level**

IHO Definition: The average of all hourly water levels over the available period of record. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

27) **lower low water large tide**

IHO Definition: The average of the lowest low waters, one from each of 19 years of observations. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

28) **higher high water large tide**

IHO Definition: The average of the highest high waters, one from each of 19 years of observations. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

29) **nearly highest high water**

IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.240, November 2000).

30) **highest astronomical tide**

IHO Definition: The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. (IHO Dictionary, S-32).

31) **baltic sea chart datum 2000**

IHO Definition: The datum refers to each Baltic country's realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP). (Baltic Sea Hydrographic Commission).

Remarks:

- This attribute is used to specify the datum to which both heights (vertical datum) and soundings (sounding datum) are referred.
- When the vertical datum is unknown, such as water areas above locks, the value "local datum" should be used, and further details may be encoded using the complex attribute **information** (see [Clause 2.4.6](#)).
- The ± 0.3 m approximation quoted in the "approximate" levels is arbitrary and follows the British example of their definition for "approximate LAT".

27.198 vessel class

IHO Definition: **VESSEL CLASS.** The classification of a vessel, normally as defined by length or gross tonnage.

Indication: The string encodes the classification of a vessel, normally by length or gross tonnage.

Attribute Type: Text

Remarks:

- The attribute **vessel class** should contain no more than 50 characters.

27.202 water level effect (WATLEV)

IHO Definition: WATER LEVEL EFFECT. The effect of the surrounding water on an object. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.243 (Remarks), November 2000).

Attribute Type: Enumeration

1) **partly submerged at high water**

IHO Definition: Partially covered and partially dry at high water. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.243, November 2000).

2) **always dry**

IHO Definition: Not covered at high water under average meteorological conditions. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.243, November 2000).

3) **always under water/submerged**

IHO Definition: Remains covered by water at all times under average meteorological conditions. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.243, November 2000).

4) **covers and uncovers**

IHO Definition: Expression intended to indicate an area of a reef or other projection from the bottom of a body of water which periodically extends above and is submerged below the surface. Also referred to as dries or uncovers. (IHO Dictionary — S-32).

5) **awash**

IHO Definition: Flush with, or washed by the waves at low water under average meteorological conditions. (Adapted from IHO Dictionary — S-32).

6) **subject to inundation or flooding**

IHO Definition: An area periodically covered by flood water, excluding tidal waters. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

7) **floating**

IHO Definition: Resting or moving on the surface of a liquid without sinking. (Concise Oxford Dictionary).

Remarks:

- The attribute “water level effect” encodes the effect of the surrounding water on a feature.

27.203 waterway distance

IHO Definition: WATERWAY DISTANCE. The length of the space between two points along a waterway. (Adapted from Oxford English Dictionary).

Attribute Type: Real

Unit: Defined by the sub-attribute **distance unit of measurement** (see [Clause 27.91](#)).

Precision: 0.1

Minimum range: 0

Range closure: Left half-open ray (minimum < **waterway distance**)

Example: **2.5** for a waterway distance value of 2.5 nautical miles (where **distance unit of measurement** is populated as 5 (nautical mile)).

Remarks:

- No remarks.

27.204 wave length value

IHO Definition: WAVE LENGTH VALUE. The distance between two successive peaks (or other points of identical phase) on an electromagnetic wave. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.172, November 2000).

Attribute Type: Real

Unit: Metre (m)

Precision: 0.01m

Minimum range: 0

Range closure: Left half-open ray (minimum < **wave length value**)

Example: **0.03** for a radar transponder beacon in the wave length “3cm (X)—Band”.

Remarks:

- Radar transponder beacons generally work on the 3cm (X)—Band or the 10cm (S)—Band wave lengths. Nevertheless, wave lengths outside the marine band are used.

28 Meta Feature and Spatial Attribute and Enumerate Descriptions

28.1 category of temporal variation

IHO Definition: **CATEGORY OF TEMPORAL VARIATION.** An assessment of the likelihood of change over time.

Attribute Type: Enumeration

- 1) **extreme event**
IHO Definition: Indication of the possible impact of a significant event (for example hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor or landscape significantly.
- 2) **likely to change and significant shoaling expected**
IHO Definition: Continuous or frequent change (for example river siltation, sand waves, seasonal storms, icebergs, etc) that is likely to result in new significant shoaling.
- 3) **likely to change but significant shoaling not expected**
IHO Definition: Continuous or frequent change (for example sand wave shift, seasonal storms, icebergs, etc) that is not likely to result in new significant shoaling.
- 4) **likely to change**
IHO Definition: Continuous or frequent change to non-bathymetric features (for example river siltation, glacier creep/recession, sand dunes, buoys, marine farms, etc).
- 5) **unlikely to change**
IHO Definition: Significant change to the seafloor is not expected.
- 6) **unassessed**
IHO Definition: Not having been assessed.

Remarks:

- No remarks.

28.2 data assessment

IHO Definition: **DATA ASSESSMENT.** The categorization of the assessment level of bathymetric data for an area.

Attribute Type: Enumeration

- 1) **assessed**
IHO Definition: The quality of the bathymetric data has been assessed.
- 2) **assessed (Oceanic)**
IHO Definition: The quality of oceanic bathymetric data (depths deeper than 200 metres) has been assessed, however details are not required.
- 3) **unassessed**
IHO Definition: Not having been assessed.

Remarks:

- No remarks.

28.3 drawing index

IHO Definition: **DRAWING INDEX.** A numeric value used to indicate that datasets are intended to form a seamless presentation.

Attribute Type: Integer
Indication: Datasets that share a common value are intended to form a seamless presentation.

Unit: None

Minimum range: 1

Range closure: Left closed ray (minimum $\leq$ **drawing index**)

Example: 1 for a dataset intended to be viewed seamlessly with other datasets having drawing index value set to 1.

Remarks:

- The attribute **drawing index** is required where the datasets intended to form a seamless presentation do not share a common minimum display scale. Also required if the dataset may need to form a seamless presentation with one or more S-57 datasets, in which case the value should correspond to the usage band of the adjoining or overlapping S-57 dataset(s).

28.4 full seafloor coverage achieved

IHO Definition: **FULL SEAFLOOR COVERAGE ACHIEVED**. Expression stating if full seafloor coverage has been achieved in the area covered by hydrographic surveys.

Attribute Type: Boolean

Indication: A True value is an indication that full seafloor coverage for an area covered by hydrographic survey(s) has been achieved.

Remarks:

- full seafloor coverage achieved** applies to both the spatial completeness of feature detection and to the spatial completeness of the measurement of the regular seafloor. The former is further specified by the complex attribute **features detected**, the latter by the attributes **depth range maximum value** and **depth range minimum value**.

28.6 least depth of detected features measured

IHO Definition: **LEAST DEPTH OF DETECTED FEATURES MEASURED**. Expression stating if the least depth of detected features in an area was measured.

Attribute Type: Boolean

Indication: A True value is an indication that the characteristics of a hydrographic survey are such that the least depth of significant seafloor features can be determined.

Remarks:

- A feature in this context is any object, whether manmade or not, projecting above the seafloor, which may be a danger for surface navigation (reference: IHO publication S-44).
- least depth of detected features measured** does not describe the least depth of features that were actually detected during a hydrographic survey, but the ability of the survey to detect the least depth of features with a maximum uncertainty as defined in IHO publication S-44.

28.7 line spacing maximum

IHO Definition: **LINE SPACING MAXIMUM**. The maximum distance between hydrographic survey lines.

Attribute Type: Integer

Unit: metre

Minimum range: 0

Range closure: Left half-open ray (minimum $<$ **line spacing maximum**)

Example: 250 for a maximum distance between sounding lines of 250 metres.

Remarks:

- No remarks.

28.9 maximum display scale (CSCALE)

IHO Definition: **MAXIMUM DISPLAY SCALE.** The value considered by the Data Producer to be the maximum (largest) scale at which the data is to be displayed before it can be considered to be “grossly overscaled”.

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:22 000 is encoded as 22000.

Unit: none

Minimum range: 1

Maximum range: 10000000

Range closure: Closed interval (minimum $\leq$ **maximum display scale** $\leq$ maximum)

Example: **12000** for a maximum display scale of scale of 1:12000

Remarks:

- **Maximum display scale** provides a reference for the user selected viewing scale in the ECDIS at which the overscale warning will be displayed if there is no larger optimum display scale ENC dataset available.
- This attribute is only used in conjunction with the Meta feature **Data Coverage** which is used to define polygons of equal largest intended viewing scale. See [Clause 3.5.1](#), [Table 3-2](#), for the list of mandatory **maximum display scale** values.

28.10 measurement distance maximum (SDISMX)

IHO Definition: **MEASUREMENT DISTANCE MAXIMUM.** The maximum spacing of the principal measurement lines of a hydrographic survey.

Attribute Type: Integer

Unit: metre

Precision: 1m

Minimum range: 0

Range closure: Left half-open ray (minimum $<$ **measurement distance maximum**)

Example: **30** for a maximum distance between sounding along a sounding line of 30 metres.

Remarks:

- Note that, in spite of the representation of a depth measurement with a single discrete point position, it actually represents an area with a certain footprint on the seafloor.

28.12 minimum display scale

IHO Definition: **MINIMUM DISPLAY SCALE.** The smallest intended viewing scale for the data.

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:700 000 is encoded as 700000.

Unit: none

Minimum range: 2000

Maximum range: 10000000

Range closure: Closed interval (minimum $\leq$ **minimum display scale** $\leq$ maximum)

Example: **700000** for a minimum display scale of scale of 1:700000

Remarks:

- **Minimum display scale** is intended to be used in a series of ENC cells covering a geographic area to determine the dataset loading strategy as the user selected viewing scale becomes larger.
- This attribute is only used in conjunction with the Meta feature **Data Coverage** which is used to define polygons of equal smallest intended viewing scale. **minimum display scale** should therefore not be confused with the attribute **scale minimum**. See [Clause 3.5.1](#), [Table 3-2](#), for the list of mandatory **minimum display scale** values.

28.13 optimum display scale (CSCALE)

IHO Definition: **OPTIMUM DISPLAY SCALE**. The largest intended viewing scale for the data.

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:22 000 is encoded as 22000.

Unit: none

Minimum range: 1000

Maximum range: 10000000

Range closure: Closed interval (minimum $\leq$ **optimum display scale** $\leq$ maximum)

Example: **12000** for an optimum display scale of scale of 1:12000

Remarks:

- **optimum display scale** provides a reference for the user selected viewing scale in the ECDIS at which the overscale indication will be displayed if there is no larger optimum display scale ENC dataset available, as well as the ECDIS viewing scale when the cell is loaded.
- This attribute is only used in conjunction with the Meta feature **Data Coverage** which is used to define polygons of equal largest intended viewing scale. See [Clause 3.5.1](#), [Table 3-2](#), for the list of mandatory **optimum display scale** values.

28.14 orientation uncertainty

IHO Definition: **ORIENTATION UNCERTAINTY**. The best estimate of the accuracy of a bearing.

Attribute Type: Real

Unit: Degree (°)

Precision: 0.001°

Minimum range: 0

Maximum range: 360

Range closure: Right half-open interval (minimum $\leq$ **orientation uncertainty** $<$ maximum)

Example: **0.005** for an error of 0.005 degrees

Remarks:

- No remarks.

28.15 quality of horizontal measurement (QUAPOS)

IHO Definition: **QUALITY OF HORIZONTAL MEASUREMENT**. The degree of reliability attributed to a position.

Attribute Type: Enumeration

- 1) **approximate**

IHO Definition: A position that is considered to be less than third-order accuracy, but is generally considered to be within 30.5 metres of its correct geographic location. Also may apply to a feature whose position does not remain fixed. (Adapted from IHO Dictionary — S-32, and IHO Specifications, S-4 — B-424.1).

Remarks:

- ~No remarks.~

28.16 quality of vertical measurement (QUASOU)

IHO Definition: **QUALITY OF VERTICAL MEASUREMENT.** The reliability of the value of a sounding.

Attribute Type: Enumeration

1) **depth known**

IHO Definition: The depth from the chart datum to the seabed (or to the top of a drying feature) is known. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

2) **depth or least depth unknown**

IHO Definition: The depth from chart datum to the seabed, or the shoalest depth of the feature is unknown. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000, as amended).

3) **doubtful sounding**

IHO Definition: A depth that may be less than indicated. (Adapted from IHO Dictionary — S-32).

4) **unreliable sounding**

IHO Definition: A depth that is considered to be an unreliable value. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000).

5) **least depth known**

IHO Definition: The shoalest depth over a feature is of known value. (Adapted from IHO Dictionary — S-32).

6) **least depth unknown, safe clearance at value shown**

IHO Definition: The least depth over a feature is unknown, but there is considered to be safe clearance at this depth. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000).

7) **value reported (not surveyed)**

IHO Definition: Depth value obtained from a report, but not fully surveyed. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000).

8) **value reported (not confirmed)**

IHO Definition: Depth value obtained from a report, which it has not been possible to confirm. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000).

9) **maintained depth**

IHO Definition: The depth at which a channel is kept by human influence, usually by dredging. (IHO Dictionary — S-32).

10) **not regularly maintained**

IHO Definition: Depths may be altered by human influence, but will not be routinely maintained. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.169, November 2000).

Remarks:

- The attribute **quality of vertical measurement** indicates the reliability of the value of sounding.

28.17 scale value maximum (SCVAL1)

IHO Definition: **SCALE VALUE MAXIMUM.** The largest scale for the range of survey scale. (Adapted from S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.182, November 2000).

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit: none

Minimum range: 0

Range closure: Left half-open ray (minimum < **scale value maximum**)

Example: **25000** for a scale of 1:25000

Remarks:

- No remarks.

28.18 scale value minimum (SCVAL2)

IHO Definition: **SCALE VALUE MINIMUM.** The smallest scale for the range of survey scale. (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.183, November 2000).

Attribute Type: Integer

Indication: The modulus of the scale is indicated, that is 1:250 000 is encoded as 250000.

Unit: none

Minimum range: 0

Range closure: Left half-open ray (minimum < **scale value minimum**)

Example: **250000** for a scale of 1:250000

Remarks:

- No remarks.

28.19 significant features detected

IHO Definition: **SIGNIFICANT FEATURES DETECTED.** A statement expressing if significant features have or have not been detected in the course of a survey.

Attribute Type: Boolean

Indication: A True value is an indication that the characteristics of a hydrographic survey are such that significant seafloor features could be detected.

Remarks:

- A feature in this context is any object, whether manmade or not, projecting above the seafloor, which may be a danger for surface navigation (reference: IHO publication S-44). **Significant features detected** does not describe if significant features were actually detected during a hydrographic survey, but whether the survey had the capacity to detect significant features.

28.20 size of features detected

IHO Definition: **SIZE OF FEATURES DETECTED.** The size of detected bathymetric features in an area.

Attribute Type: Real

Unit: cubic metre

Precision: 0.01 cubic metres

Minimum range: 0

Range closure: Left half-open ray (minimum < **size of features detected**)

Example: **32.5** for a survey capable of detecting significant seafloor features of a minimum size of 32.5 cubic metres.

Remarks:

- A feature in this context is any object, whether manmade or not, projecting above the seafloor, which may be a danger for surface navigation (reference: IHO publication S-44).
- **Size of features detected** does not describe the actual size of features detected during a hydrographic survey, but the size of the smallest feature that the survey was capable of detecting with a high probability.

28.21 source

IHO Definition: **SOURCE.** The publication, document, or reference work from which information comes or is acquired.

Attribute Type: Text

Indication: Source (c...): String of characters.

Example: **Notice to Mariners 3245/24**

Remarks:

- The attribute **source** may be populated with the corresponding paper chart Notice to Mariners numbers, although other references are permitted.
- The attribute **source** should contain no more than 150 characters.

28.22 survey authority (SURATH)

IHO Definition: **SURVEY AUTHORITY.** The authority which was responsible for the survey. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.200, November 2000).

Attribute Type: Text

Indication: Survey authority (c...): String of characters.

Format: c...

Example: **Australian Hydrographic Office Port of Melbourne Authority**

Remarks:

- The attribute “survey authority” encodes the name of the source survey authority.
- The attribute **survey authority** should contain no more than 100 characters.

28.23 survey type (SURTYP)

IHO Definition: **SURVEY TYPE.** Classification of the different survey types.

Attribute Type: Enumeration

1) **reconnaissance/sketch survey**

IHO Definition: A survey made (due to lack of time or facilities) to a lower degree of accuracy and detail than the chosen scale would normally indicate. (IHO Dictionary — S-32).

2) **controlled survey**

IHO Definition: A thorough survey usually conducted with reference to guidelines. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.203, November 2000).

3) **examination survey**

IHO Definition: A survey principally aimed at the investigation of underwater obstructions and dangers. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.203, November 2000).

4) **passage survey**

IHO Definition: A survey where soundings are acquired by vessels on passage. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.203, November 2000).

5) **remotely sensed**

IHO Definition: A survey where features have been positioned and delimited using remote sensing techniques. (S-57 Edition 3.1, Appendix A — Chapter 2, Page 2.203, November 2000).

6) **full coverage**

IHO Definition: A survey achieving 100% coverage using systematic, controlled techniques providing full seafloor coverage or full coverage to a defined depth and an investigation of all contacts.

7) **systematic survey**

IHO Definition: A controlled survey but full coverage may not have been achieved.

8) **non-systematic survey**

IHO Definition: A survey of lower quality than a full coverage and systematic survey. Such surveys may be further categorized as reconnaissance, sketch, track, passage, remotely sensed and spot-sounding surveys.

9) **inadequately surveyed**

IHO Definition: Not surveyed to modern standards; or due to its age, scale, or positional or vertical uncertainties is not suitable to the type of navigation expected in the area. (Adapted from IHO Data Quality Working Group (DQWG)).

10) **spot-sounding survey**

IHO Definition: A survey that uses a regular (for example grid) or irregular pattern of soundings obtained one at a time, and normally with very wide spacing.

11) **acoustically swept survey**

12) **mechanically swept survey**

Remarks:

- No remarks.

- The maximum of the one-dimensional error (for vertical) or two-dimensional error (for horizontal). The error is assumed to be positive and negative. The plus/minus character must not be encoded.

28.27 uncertainty variable factor

IHO Definition: **UNCERTAINTY VARIABLE FACTOR.** The factor to be applied to the variable component of an uncertainty equation so as to provide the best estimate of the variable horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.

Attribute Type: Real

Indication: The fraction that equates to the factor (or percentage) contributing to the variable uncertainty component is indicated, that is a factor of 5% is encoded as 0.05.

Precision: 0.01

Minimum range: 0

Maximum range: 1

Range closure: Open interval (minimum < **uncertainty variable factor** < maximum)

Example: The positional accuracy for the highest accuracy for hydrographic data in a **Spatial Quality** feature is quoted as “± 5 metres + 10% depth”. The variable component in this example is depth, and the factor to be applied to the depth at a location in order to provide the variable uncertainty is **0.1**.

In this example, at a depth of 25 metres, the variable uncertainty would be 2.5 metres, and the overall best estimate of the positional accuracy would be ± 7.5 metres.

Remarks:

- No remarks.

29 Complex Attributes

29.1 directional character

IHO Definition: **DIRECTIONAL CHARACTER.** A directional light is a light illuminating a sector of very narrow angle and intended to mark a direction to follow. (IHO Dictionary — S-32).

Indication: The complex attribute defines whether the light is a moiré effect light and encodes the orientation of the directional light sector.

Sub-attributes:

Remarks:

- No remarks.

29.2 feature name

IHO Definition: **FEATURE NAME.** Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.

Indication: The complex attribute provides the encoder with options as to the name to display in certain system display settings.

Sub-attributes:

Remarks:

- For further information regarding the population of the complex attribute **feature name**, in particular the encoding of multiple instances of **feature name** for a single feature instance, see [Clause 2.5.8](#).

29.3 features detected

IHO Definition: **FEATURES DETECTED**. The uniform assessment of detected features.

Indication:

Sub-attributes:

Remarks:

- A feature in this context is meant to be any object, whether manmade or not, projecting above the seafloor, which may be a danger for surface navigation. (Refer to IHO publication S-44). **features detected** does not describe if features were actually detected during a hydrographic survey, but whether the survey had the capacity to detect features.

29.4 fixed date range

IHO Definition: **FIXED DATE RANGE**. An active period of a single fixed event or occurrence, as the date range between discrete start and end dates.

Indication: The complex attribute describes single fixed period, as the date range between its sub-attributes.

Sub-attributes:

date end see [Clause 27.81](#)

date start see [Clause 27.83](#)

Remarks:

- The sub-attributes **date start** and **date end** must be encoded in the format YYYYMMDD; using 4 digits for the calendar year (YYYY) and, optionally, 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, the values are replaced with dashes (-).

29.5 frequency pair

29.6 horizontal clearance fixed

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

Indication: The complex attribute encodes the horizontal distance

Sub-attributes:

horizontal clearance value see [Clause 27.107](#)

horizontal distance uncertainty see [Clause 28.5](#)

Remarks:

- No remarks.

29.7 horizontal clearance open

29.8 horizontal position uncertainty (POSACC)

IHO Definition: **HORIZONTAL POSITION UNCERTAINTY**. The best estimate of the accuracy of a position. (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.255, November 2000).

Indication: The complex attribute encodes the horizontal uncertainty associated with any horizontal measurement.

<u>Sub-attributes:</u>	uncertainty fixed	see Clause 28.26
	uncertainty variable factor	see Clause 28.27
<u>Remarks:</u>		
The expected input is the maximum of the two-dimensional error. The error is assumed to be positive and negative.		

29.9 information

29.11 measured distance value

<u>IHO Definition:</u> MEASURED DISTANCE VALUE. The distance value indicated on a distance mark, or the distance between two measured distance marks.		
<u>Indication:</u>		
<u>Sub-attributes:</u>	distance unit of measurement	see Clause 27.91
	reference location	see Clause 27.149
	waterway distance	see Clause 27.203
<u>Remarks:</u>		
No remarks.		

29.12 multiplicity of features

29.13 online resource

<u>IHO Definition:</u> ONLINE RESOURCE. Information about online sources from which a resource or data can be obtained. (Adapted from ISO 19115).		
<u>Indication:</u> The complex attribute describes the access to online resources according to ISO 19115.		
<u>Sub-attributes:</u>		
<u>Remarks:</u>		
No remarks.		

29.14 orientation

<u>IHO Definition:</u> ORIENTATION. The angular distance measured from true north to the major axis of the feature. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).		
<u>Indication:</u> The complex attribute provides the orientation value together with a measure of the uncertainty of the value.		
<u>Sub-attributes:</u>		
<u>Remarks:</u>		
No remarks.		

29.15 periodic date range

IHO Definition: **PERIODIC DATE RANGE.** The active period of a recurring event or occurrence.

Indication: The complex attribute describes the active period for a seasonal feature (for example a buoy), as the dates between its sub-attributes.

Sub-attributes:

date end

see [Clause 27.81](#)

date start

see [Clause 27.83](#)

Remarks:

- The sub-attributes **date start** and **date end** must be encoded in the format ----MMDD; using 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific day is required/known, the values are replaced with dashes (-).

29.16 radar wave length (RADWAL)

29.17 rhythm of light

IHO Definition: **RHYTHM OF LIGHT.** The sequence of times occupied by intervals of light/sound and eclipse/silence for all light characteristics or sound signals.

Indication: The complex attribute describes the rhythm of a light (or a light sector).

Sub-attributes:

Remarks:

- No remarks.

29.18 schedule by day of week

IHO Definition: **SCHEDULE BY DAY OF WEEK.** The nature and timings of a daily schedule by days of the week.

Indication: The complex attribute encodes the regular schedule for a service.

Sub-attributes:

category of schedule

see [Clause 27.59](#)

time intervals by day of week

see [Clause 29.33](#)

Remarks:

- No remarks.

29.19 sector characteristics

29.20 sector information

IHO Definition: **SECTOR INFORMATION.** Additional textual information about a light sector.

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

Remarks:

- This complex attribute should be used, for example, to hold the information related to the characteristics of a complex light sector.

- No formatting of text is possible within **sector information**. If formatted text is required, then an associated text file referenced by the complex attribute **information**, sub-attribute **file reference** must be used (see [Clause 27.98](#)).

29.21 sector limit

IHO Definition: SECTOR LIMIT. A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition).

The sector limit specifies the limits of the sector in a clockwise direction around the central feature (for example a light). (Adapted from S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.184, November 2000).

Indication: The complex attribute describes the angle of a light sector as defined by the sub-attributes.

Sub-attributes:	sector limit one	see Clause 29.22
	sector limit two	see Clause 29.23

Remarks:

- No remarks.

29.22 sector limit one (SECTR1)

IHO Definition: SECTOR LIMIT ONE. A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition). **sector limit one** specifies the first limit of the sector. The order of **sector limit one** and **sector limit two** is clockwise around the central feature (for example a light). (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.184, November 2000).

Indication: The complex attribute describes the line or bearing of a light where the character changes or the light is obscured.

Sub-attributes:	sector bearing	see Clause 27.157
	sector line length	see Clause 27.158

Remarks:

- The values given to the common limits of adjacent sectors should be identical.
- The orientation of the bearing is from seaward to the central feature. This conforms with the method used in "List of Lights" publications.
- A generic term such as "to shore" cannot be used; a specific bearing must be encoded. Where a light sector limit is defined as "to the shore", it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land.

29.23 sector limit two (SECTR2)

IHO Definition: SECTOR LIMIT TWO. A sector is the part of a circle between two straight lines drawn from the centre to the circumference. (Advanced Learner's Dictionary, 2nd Edition). **sector limit two** specifies the second limit of the sector. The order of **sector limit one** and **sector limit two** is clockwise around the central feature (for example a light). (S-57 Edition 3.1, Appendix A—Chapter 2, Page 2.184, November 2000).

Indication: The complex attribute describes the line or bearing of a light where the character changes or the light is obscured.

Sub-attributes:

Remarks:

- The values given to the common limits of adjacent sectors should be identical.
- The orientation of the bearing is from seaward to the central feature. This conforms with the method used in "List of Lights" publications.
- A generic term such as "to shore" cannot be used; a specific bearing must be encoded. Where a light sector limit is defined as "to the shore", it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land.

29.24 shape information

IHO Definition: **SHAPE INFORMATION**. Textual information about the shape of a non-standard topmark.

Indication: The complex attribute provides additional textual information that cannot be provided using the attribute **topmark/daymark shape**.

Remarks:

- No formatting of text is possible within **shape information**. If formatted text is required, then an associated text file referenced by the complex attribute **information** must be used (see [Clause 29.9](#)).

29.25 signal sequence (*SIGSEQ*)

29.26 spatial accuracy

IHO Definition: **SPATIAL ACCURACY**. Provides an indication of the vertical and horizontal positional uncertainty of bathymetric data, optionally within a specified date range.

Indication: The complex attribute defines the horizontal and vertical position accuracy of bathymetric features, which may optionally be degraded over time.

Sub-attributes:

Remarks:

- See [Clauses 3.8](#) and [24.5](#) for encoding guidance for the population of the sub-complex attributes **horizontal position uncertainty** and **vertical uncertainty**.

29.27 speed

IHO Definition: **SPEED**. Rate of motion. The terms speed and velocity are often used interchangeably, but speed is a scalar, having magnitude only, while velocity is a vector quantity, having both magnitude and direction. (Adapted from IHO Dictionary, S-32).

Indication: The complex attribute encodes the range of the speed at a location.

Sub-attributes:

speed maximum see [Clause 27.166](#)

speed minimum see [Clause 27.167](#)

Remarks:

- No remarks.

29.28 surface characteristics

IHO Definition: **SURFACE CHARACTERISTICS**. The general nature of the material of which the land surface or the seabed is composed.

Indication:

Sub-attributes:

nature of surface see [Clause 27.137](#)

**nature of surface —
qualifying terms** see [Clause 27.138](#)

underlying layer see [Clause 27.187](#)

Remarks:

- No remarks.

29.29 survey date range

IHO Definition: SURVEY DATE RANGE. The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

Indication: The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

Remarks:

- The sub-attributes **date start** and **date end** must be encoded using 4 digits for the calendar year (YYYY) and, optionally, 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is replaced with dashes (-).

29.30 telecommunications

IHO Definition: TELECOMMUNICATIONS. A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.

Indication: The complex attribute describes the different telecommunications methods and contact details.

Sub-attributes:

Remarks:

- If no value is populated for the sub-attribute **telecommunication service**, this means the service is by voice communication.

29.31 tidal stream panel values

29.32 tidal stream value

29.33 time intervals by day of week

29.34 topmark (*TOPMAR*)

IHO Definition: TOPMARK. A characteristic shape secured at the top of a buoy or beacon to aid in its identification. (IHO Dictionary — S-32).

Indication:

Remarks:

- No remarks.

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 27.122](#)

reference direction see [Clause 27.148](#)

Remarks:

- No remarks.

29.36 vertical clearance closed

IHO Definition: VERTICAL CLEARANCE CLOSED. The vertical clearance of a feature in closed condition (for example a closed lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.235, November 2000).

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

Sub-attributes:

Remarks:

- No remarks.

29.37 vertical clearance fixed

29.38 vertical clearance open

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

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

Sub-attributes:

vertical clearance unlimited	see Clause 27.194
vertical clearance value	see Clause 27.195
vertical uncertainty	see Clause 29.40

Remarks:

- No remarks.

29.39 vertical clearance safe

IHO Definition: VERTICAL CLEARANCE SAFE. The safe vertical clearance of a feature measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A— Chapter 2, Page 2.237, November 2000).

Indication: The complex attribute encodes the safe vertical distance from a defined vertical datum to the lowest point of an electrical cable over navigable water.

Remarks:

- No remarks.

29.40 vertical uncertainty (SOUACC, VERACC)

IHO Definition: VERTICAL UNCERTAINTY. The best estimate of the vertical accuracy of depths, heights, vertical distances and vertical clearances.

Indication: The complex attribute encodes the vertical uncertainty associated with any vertical measurement.

Remarks:

- No remarks.

29.41 vessel speed limit

IHO Definition: **VESSEL SPEED LIMIT**. The maximum allowed rate of travel for a vessel in an area in knots.

Indication: The complex attribute describes the speed limit for vessels in an area where speed is restricted.

Remarks:

- The speed limit in an area may differ for different classes of vessel.

29.42 zone of confidence

30 ECDIS System (Portrayal) Attributes

30.1 default clearance depth

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

Attribute Type: Real

Unit: Defined as an attribute in the ENC Dataset Discovery Metadata: metre (m)

Precision: 0-1m

Minimum range: -30

Maximum range: 12500

Range closure:

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

Remarks:

- The attribute **default clearance depth** must be populated with a value, which must not be an empty (null) value, only if the attribute **value of sounding** for the feature instance is populated with an empty (null) value and the attribute **height**, if an allowable attribute for the feature, is not populated.
- The value for **default clearance depth** is determined from the attribute **depth range minimum value** for the surrounding encoded **Depth Area(s)** or **Dredged Area** (see [Clauses 11.4](#) and [11.7](#)) in accordance with the Tables below. For an area feature covered by more than one depth area, the **default clearance depth** is determined based on the **depth range minimum value** of the shoalest of the depth areas covering the feature.
- The auto-populated value for **default clearance depth** may be amended by the Data Producer if the resulting isolated danger indication in the ECDIS is not considered appropriate (if, for example, it is known that vessels having a draught deeper than 20.1 metres are able to navigate safely in the area; or if the Data Producer wishes to indicate that only vessels to a specified draught that is less than 20 metres may navigate safely in the area).
- A drying height is indicated by a negative value. The following Tables provide an indication for the values (if relevant) to be populated for the attribute **default clearance depth**. The Tables have been partitioned such that the top section has the precondition that the target feature (**Obstruction**, **Underwater/Awash Rock** or **Wreck**) is completely covered by **Depth Area** and/or **Dredged Area** feature(s) having a known value for the attribute **depth range minimum value**; and the bottom section has the precondition that the target feature is of unknown depth (attribute **value of sounding** = Unknown) and is completely or partially covered by an **Unsurveyed Area** feature, or a **Depth Area** and/or **Dredged Area** feature having an unknown value for the attribute **depth range minimum value**. In the Tables:
- The symbol “/” indicates that this attribute is not relevant for the feature instance and therefore is not present. Where “/” appears in the **default clearance depth** column, the attribute must not be populated.
- A blank indicates that the attribute may have any allowable value, including an unknown (empty (null)) value. For non-mandatory attributes, a blank also indicates that the attribute may not be present.
- Where attribute values are quoted:

- Enumerate values separated by commas indicate that any one of the listed values may be populated; **"Known"** means that the attribute is mandatory and has been populated with a value; "Unknown" means that the attribute is mandatory and is therefore present, but has not been populated with a value; **"Empty (null)"** means that the attribute is not mandatory, but is present and has no value. For the purposes of these Tables, **"Empty (null)"** also equates to the non-mandatory attribute not being present for the feature instance. "Least Depth" in the **default clearance depth** column is related to the underlying Skin of the Earth depth feature(s) where the value for attribute **depth range minimum value** for the covering **Depth Area** and/or **Dredged Area** feature(s) is known, and is determined as follows:
 - For features of geometric primitive point covered by a **Depth Area** or **Dredged Area** feature; or for features of geometric primitive curve or surface covered by a single **Depth Area** or **Dredged Area** feature, the value of the attribute **depth range minimum value** for the **Depth Area** or **Dredged Area**.
 - For features of geometric primitive curve or surface covered by multiple **Depth Area** and/or **Dredged Area** features, the shoalest value of the attribute **depth range minimum value** for the **Depth Area/Dredged Area** features.

30.2 in the water

IHO Definition: **IN THE WATER**. An indication if the feature is located in or over navigable water.

Attribute Type: Boolean

Indication: A True value is an indication that the feature is located in or over navigable water.

Remarks:

- A True value is an indication that the feature is to be included in the ECDIS Base Display viewing group.

30.4 surrounding depth

IHO Definition: **SURROUNDING DEPTH**. The depth value determined for seabed around an underwater hazard, based on the depth of the surrounding area.

Attribute Type: Real

Unit: Defined as an attribute in the ENC Dataset Discovery Metadata: metre (m)

Precision: 0.1m

Minimum range: -30

Maximum range: 12500

Range closure: Open interval (minimum < **surrounding depth** < maximum)

Example: **20** for a surrounding depth of 20 metres

Remarks:

- The value for **surrounding depth** is determined from the attribute **depth range minimum value** for the surrounding encoded **Depth Area(s)** or **Dredged Area** (see [Clauses 11.4](#) and [11.7](#)). For an area feature covered by more than one depth area, the **surrounding depth** is determined as the **depth range minimum value** of the deeper of the depth areas covering the feature.
- **surrounding depth** must be populated with a value, which must not be an empty (null) value.
- For features that fall entirely within an **Unsurveyed Area** feature, **surrounding depth** must be populated with value 0. If an area feature falls partly within **Unsurveyed Area** and partly within **Depth Area** or **Dredged Area** features, **surrounding depth** must be populated in accordance with the first bullet above.
- **surrounding depth** is used by the production software to determine the depth value to be used by the ECDIS at which a feature is to be considered to be in "safe" or "unsafe" water based on the Mariner's selected safety depth.

32 ECDIS Chart 1 Features and Attributes

32.1 Chart 1 feature

IHO Definition: **CHART 1 FEATURE**. A feature which exists to support the rendering of graphics or text in order to provide additional information that cannot be encoded using other features.

S-101 Geo Feature: Chart 1 Feature

Primitives: Point, Pointset, Curve, 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
drawing instruction	(SYMINS)		TE	0,* a
feature name		See Clause 2.5.8	C	0,* a
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	(S) EN	0,1 a

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
The Position Provider	Text Association (see Clause 25.17).	Text Placement	Composition	0,1

^a At least one of the attributes **drawing instruction** or **feature name** must be populated. Complex attribute **feature name**, sub-attribute **name usage** is mandatory if the name is intended to be displayed when display of names is enabled by the Mariner. See [Clause 2.5.8](#).

32.2 drawing instruction

IHO Definition: DRAWING INSTRUCTION . Text describing one or more graphic elements that must be rendered in an end-user system.
<u>Attribute Type:</u> Text
<u>Indication:</u> The string encodes one or more drawing instructions as described in S-100 Part 9a and S-100 clause 13-6.1.
<u>Format:</u> (c...)
<u>Example:</u> ('PointInstruction:BOYMOR11')
<u>Remarks:</u>
Each symbol instruction must be enclosed using brackets.