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**Marine Protected Area Product Specification**

**Appendix A**

**Data Classification and Encoding Guide**

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**MONACO**

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# Overview

## Preface

The “Data Classification and Encoding Guide” has been developed to provide consistent, standardized instructions for encoding S-100 compliant Marine Protected Area (MPA) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-122 encoding to meet IHO standards for the proper display of Marine Protected Area information in an ECDIS. The document describes how to encode information that the modeller considers relevant to an MPA. The content of an MPA product is at the discretion of the producing authority provided that the conventions described within this document are followed. A “producing authority” is a Hydrographic Office (HO) or an organization authorized by a government, HO or other relevant government institution to produce nautical publication information.

The entire S-100 Standard, including the S-122 MPA Product Specification, is available at the following web site, <http://www.iho.int>.

## S-122 Appendix A; Data Classification and Encoding Guide – Metadata

Note: This information uniquely identifies this Appendix to the Product Specification and provides information about its creation and maintenance.

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## Terms, definitions and abbreviations

### Terms and definitions

|  |  |
| --- | --- |
| **aggregation** | special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component (see composition) |
| **association** | semantic relationship between two or more classifiers that specifies connections among their instancesNOTE: A binary association is an association among exactly two classifiers (including the possibility of an association from a classifier to itself |
| **attribute** | named property of an entityNOTE: Describes the geometrical, topological, thematic, or other characteristic of an entity |
| **composition** | special form of **association** that specifies a “strong aggregation”. In a composition association, if a container object is deleted then all of the objects it contains are deleted as well. |
| **curve** | 1-dimensional **geometric primitive**, representing the continuous image of a lineNOTE: The **boundary** of a **curve** is the **set** of **points** at either end of the **curve**. If the **curve** is a cycle, the two ends are identical, and the **curve** (if topologically closed) is considered to not have a boundary. The first **point** is called the **start point**, and the last **point** is the **end point**. Connectivity of the curve is guaranteed by the “continuous image of a line” |
| **enumeration** | a fixed list which contains valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list. |
| **feature** | abstraction of real world phenomenaNOTE: A feature may occur as a type or an instance. The terms “feature type” or “feature instance” should be used when only one is meant.EXAMPLE: The feature instance named “Turning Torso Tower” may be classified with other phenomena into a feature type “tower”. |
| **geometric primitive** | geometric object representing a single, connected, homogeneous element of geometryNOTE: Geometric primitives are non-decomposed objects that present information about geometric configuration. They include **points, curves, surfaces** |
| **maximum display scale** | the largest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (largest scale) of the scale range of the dataset |
| **minimum display scale** | the smallest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (smallest scale) of the scale range of the dataset |
| **point** | 0-dimensional geometric primitive, representing a positionNOTE: The **boundary** of a point is the empty set |
| **surface** | connected 2-dimensional geometric primitive, representing the continuous image of a region of a planeNOTE: The boundary of a surface is the set of oriented, closed **curves** that delineate the limits of the surface |

### Abbreviations

|  |  |
| --- | --- |
| ECDIS | Electronic Chart Display and Information System |
| ENC | Electronic Navigational Chart |
| GML | Geography Markup Language |
| GNSS | Global Navigation Satellite System |
| HO | Hydrographic Office |
| IHO | International Hydrographic Organization |
| IMO | International Maritime Organization |
| ISO | International Organization for Standardization |
| MPA | Marine Protected Area |
| SOLAS | Safety of Life at Sea |
| UNCLOS | United Nations Convention on the Law of the Sea |

### Use of language

Within this document:

 “Must” indicates a mandatory requirement;

 “Should” indicates an optional requirement, that is the recommended process to be followed, but is not mandatory;

 “May” means “allowed to” or “could possibly”, and is not mandatory.

### Maintenance

Changes to the Data Classification and Encoding Guide must occur in accordance with the S-122 MPA Product Specification clause ????.

# General

The S-122 Data Classification and Encoding Guide describes how data describing the real world should be captured using the types defined in the S-122 Feature Catalogue (see S-122 XXXX). It provides the encoding rules and guidance required to create S-122 MPAs. This standard is specifically concerned with those entities in the real world that are of relevance to marine protection. The hydrographic regime for MPAs is considered to be geo-spatial. As a result, the model defines real world entities as a combination of descriptive and spatial characteristics. Within the model these sets of characteristics are defined in terms of spatial, feature and information types. A type is defined as a stereotype of class that is used to specify a domain of instances (objects) together with the operations applicable to the objects. A type may have attributes and may be related to other types.

The types used within S-122 are described below. Within this document feature types, information types, associations and attributes appear in bold text.

## Feature types

Feature types contain descriptive attributes and do not contain any geometry (i.e. information about the shape and position of a real world entity).

Features have two aspects – feature type and feature instance. A feature type is a class and is defined in a Feature Catalogue. A feature instance is a single occurrence of the feature type and represented as an object in a dataset. A feature instance is located by a relationship to one or more spatial instances. A feature instance may exist without referencing a spatial instance.

S-122 makes use of the following feature types:

**Geographic (Geo) feature type** – carries the descriptive characteristics of a real world entity.

**Meta feature type** – contains information about other features.

### Charted background features

Due to the fact that MPA based on GML, the MPA product could be used as an overlay of an ENC or any other GIS applications. Consequently, all necessary features to provide a charted background should be provided by the underlying application.

### Geometric primitives

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

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

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | C | S | N |
| Marine Protected Area | X |  | X |  |
| Restricted Area | X |  | X |  |
| Traffic Control Service | X |  | X |  |
| Obstruction | X |  | X |  |
| Wrecks | X |  | X |  |

Table 2‑1 Features permitted for MPA and their geometric primitives

### Capture density guideline

It is recommended that curves and surface boundaries should not be encoded at a point density greater than 0.3mm at the maximum display scale for the MPA data.

[Note: Compilation scale is the scale the data is captured to, and is not stored in the dataset. Only minimum and maximum display scales values are stored in the dataset.]

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84. Long lines may need to have additional coordinates inserted to cater for the effects of projection change.

The presentation of line styles may be affected by curve length. Therefore, the encoder must be aware that splitting a curve into numerous small curves may result in poor symbolization.

[consider diagram]

## Information types

An information type is an identifiable object that can be associated with features in order to carry information particular to the associated features. An example of the use of an information type may be the requirement to include a note on particular regulations which apply for a specified area. Information types can also be associated with other information types. This may be done where there is further information that is relevant to the information type.

Information types carry attributes but not geometry.

## Attributes

Attributes may be simple type or complex type. Complex (C) attributes are aggregates of other attributes that can be simple type or complex type attributes. Simple attributes are assigned to one of 10 types (see clause 2.3.2).

The binding of attributes to feature types, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity is defined in the Feature Catalogue. Within this document, the allowable attributes are included in the description of each feature type, as well as the allowable values for enumeration type attributes.

### Multiplicity

In order to control the number of allowed attribute values or sub-attribute instances within a complex attribute, S-100 uses the concept of multiplicity. This defines lower and upper limits for the number of values, whether the order of the instances has meaning and if an attribute is mandatory or not. Common examples are shown in the table below:

Format : MinOccurs, MaxOccurs (if \* Infinite) (ordered) – sequential

|  |  |
| --- | --- |
| Multiplicity | Explanation |
| 0,1 | An instance is not required; there can be only one instance. |
| 1,1 | An instance is required and there must only be one instance. |
| 0,\* | An instance is not required and there can be an infinite number of instances. |
| 1,\* | An instance is required and there can be an infinite number of instances. |
| 1,\* (ordered) | An instance is required and there can be an infinite number of instances, the order of which has a specific meaning. |
| 2,2 | Two instances are required and no more than two. |

Table 2‑2 Multiplicity of attributes

### Simple attribute types

Each simple attribute is assigned to one of 10 types (in alphabetic order):

|  |  |  |
| --- | --- | --- |
| BO | Boolean: | A value representing binary logic. The value can be either True or False. The default state for Boolean type attributes (i.e. where the attribute is not populated for the feature) is False. |
| CL | Code Lists: | A redefined list from which some information take their values. A code list could either be closed or open. A code list has following properties: 1. A description of the code list type, 2. The URI where the list could be found and 3. An encoding instruction. |
| DA | Date: | A date provides values for year, month and day according to the Gregorian Calendar. Character encoding of a date is a string which must follow the calendar date format (complete representation, basic format) for date specified by the appropriate S-100 section.Example: 19980918 (YYYYMMDD) |
| EN | Enumeration: | A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list. |
| IN | Integer: | A signed integer number. The representation of an integer is encapsulation and usage dependent. Integer attribute values must not be padded by non-significant zeroes. For example, for a number of 19, the value populated for the attribute must be 19 and not 019.Examples: 29, -65547 |
| 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.Real attribute values must not be padded by non-significant zeroes. For example, for a signal period of 2.5 seconds, the value populated for the attribute signal period must be 2.5 and not 02.50.Examples: 23.501, -0.0001234, -23.0, 3.141296 |
| TD | Truncated Date: | One or more significant components of the modelling date are omitted.Example: ----02-- (Year and date not encoded) |
| TE | Free text: | A CharacterString is an arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets. |
| TI | Time: | A time is given by an hour, minute and second. Character encoding of a time is a string that follows the local time (complete representation, basic format) format defined by the appropriate S-100 section.Time zone according to UTC is optional.Example: 183059 or 183059+0100 or 183059ZThe 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 as examples. Geneva: 152746+0100 New York: 152746-0500DT Date and Time: A DateTime is a combination of a date and a time type. Character encoding of a DateTime shall follow the rules described by the appropriate S-100 section.Example: 19850412T101530 |

Table 2‑3 Simple attribute types

### Mandatory and conditional attributes

Some attributes are mandatory and must be populated for a given feature type. There are some reasons why attribute values may be considered mandatory:

* They are required to support correct portrayal;
* Certain features make no logical sense without specific attributes;
* Some attributes are required for safety of navigation.

Within this document, mandatory attributes are those with a multiplicity of 1,1 or 1,n (n>1) or 1,\*. The multiplicity is identified in the description of each feature type. For easy reference, the table below summarises the mandatory attributes for each feature type (note that mandatory sub-attributes of complex attributes are not included in these tables):

| Feature | Mandatory Attributes |
| --- | --- |
| Marine Protected Area | To be determined |
| Restricted Area | To be determined |
| Traffic Control Service | To be determined |
| Obstruction | To be determined |
| Wrecks | To be determined |

Table 2‑4 Mandatory attributes for MPA features

NOTE 1: Note that sub-attributes of complex attributes, as well as the complex attribute itself, may also be designated as mandatory (see NOTE 2 below). “Conditional” mandatory attributes are not identified in the Tables below other than by comments in the Remarks for the relevant feature, but are indicated in Tables above by the following additional text:

 at least one of for **Obstruction, Wreck**

Compilers must consider these conditional circumstances when encoding features for MPA, as well as any additional information given in the feature class descriptions in this document. For example, when encoding a **Marine Protected Area**, the mandatory attributes are at least one of **category of marine protected area** or **restricted area** – if **restricted area** is known but **category of restricted area** is not known, then **category of restricted area** must not be populated with an empty (null) value, as it is not mandatory in this case.

NOTE 2: For complex attributes, at least one sub-attribute is mandatory (or conditionally mandatory) so as such mandatory sub-attributes of complex attributes have not been included in the Table above. Where the sub-attribute of a complex is conditionally, this is indicated in the Remarks section for the relevant feature Table entries below.

### Missing attribute values

Where a value of a mandatory attribute is not known, the attribute must be populated with an empty (null) value.

Where the value of a non-mandatory attribute is not known, the attribute should not be included in the dataset.

In a base dataset (EN application profile), when an attribute code is present but the attribute value is missing, it means that the producer wishes to indicate that this attribute value is unknown.

In an update dataset (ER application profile), when an attribute code is present but the attribute value is missing it means:

* that the value of this attribute is to be replaced by an empty (null) value if it was present in the original dataset, or
* that an empty (null) value is to be inserted if the attribute was not present in the original dataset.

### Portrayal feature attributes

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

|  |  |
| --- | --- |
| Display name | this Boolean attribute determines if the text for a name should display. If not populated the default rules provided in the portrayal catalogue will be used. |
| Information  | population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| Pictorial representation | population of this attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| Scale minimum | value at which the feature will be removed from the display if application of scale minimum is enabled in the ECDIS (see clause X.X). |
| Textual description | population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| Visually conspicuous | this Boolean attribute determines that visually conspicuous features are shown in black colour rather than brown. |

### Textual information

The information classes **Restrictions, Recommendation, Regulations, Nautical Information** and **Supplementary Information** (see clause X.X) may be used to encode additional textual information associated to a feature or a group of features. The **Supplementary Information** is associated to the relevant features using the association additional information (see clause X.X). The **Restrictions, Recommendation, Regulations, Nautical Information** are associated to the relevant features using the association **providedBy**. Controversy, the relevant features are associated by the **Restrictions, Recommendation, Regulations, Nautical Information** using the association **provides**.

The complex attributes **information** and **textual description** must not be used when it is possible to encode the information by means of any other attribute. Under certain ECDIS display settings the “information” symbol will display when these attributes are populated. Therefore producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter.

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

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

Remarks:

* For Guidance on encoding names of features, see clause X.X.

### Spatial attribute types

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



Spatial quality attributes are carried in an information class called **Spatial quality**. Only points, multipoints and curves can be associated with **Spatial quality**. Currently, no use case for associating surfaces with spatial quality attributes is known, therefore this is prohibited. Vertical uncertainty is prohibited for curves as this dimension is not supported by curves.

### Dates

When encoding dates using the attributes **fixed date range**, **periodic date range**, **reported date** and no specific year, month or day is required, the values must apply in conformance to the relevant S-100 Part.

* No specific year required, same day each year: ----MMDD
* No specific year required, same month each year: ----MM--
* No specific day required: YYYYMM--
* No specific month required: YYYY----

Notes: YYYY = calendar year; MM = month; DD = day.

 The dashes (-) indicating that the year, month or date is not needed must be included.

### Indeterminate dates

See S-100 Edition 2.0.0 section 1-4.5.3.9.

### Predefined derived Types

See S-100 Edition 2.0.0 section 1-4.6.

### Times

If it is required to show the beginning and end of the active period of a feature, it must be encoded using the complex attribute **time range**, sub-attributes **time end** and **time start**. When using these sub-attributes, all times must be encoded as Coordinated Universal Time (UTC). The attribute descriptions for **time end** and **time start** states that the mandatory format is YYYYMMDDThhmmss, where T is the separator, and this format must be used.

### Attributes referencing external files

#### Reference to textual files

The information classes **Restrictions, Recommendation, Regulations, Nautical Information** should be used to encode textual information.

The information class **Supplementary Information** and the related attributes must not be used when it is possible to encode the information by means of the information classes mentioned above. Under certain ECDIS display settings the “information” symbol will display when these attributes are populated. Therefore producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter.

The files referenced by **textual content**, sub-complex attribute **information**, sub attribute **file reference** must be .TXT, .HTM or .XML files, and may contain formatted text. It is up to the Producing Authority to determine the most suitable means of encoding a particular piece of text. Files must only use UTF-8 character encoding.

Remarks:

* Clause X.X of this Product Specification main document specifies the content of an exchange set, including the option to include textual files.
* In some cases, for external files referenced by the **text content** sub-complex attribute **information** with sub-attribute **language** populated as a language other than English, encoders have created text files using local character encoding that may not be interpreted correctly by an ECDIS and therefore not readable by the user. Encoders must encode national text files (files referenced by the sub-attribute **file reference**) using UTF-8 character encoding. This means that the encoding of the characters in text files must match the encoding of other textual national attributes (i.e. **feature name, information** with value other than English populated for sub-attribute **language**) within the dataset.

#### Reference to pictorial files

If it is required to indicate a drawing or a photograph, the information class **Supplementary Information** (see clause X.X), attribute **pictorial representation** must be used to indicate the file name (without the path) of the external graphical file. The **Supplementary Information** is associated to the relevant feature using the association **additional information** (see clause X.X). Picture files that form part of the ENC must be in Tagged Image File (TIF) format 6.0.

Consideration should be given to the addition of the “information” symbol in some ECDIS display settings where **pictorial representation** is populated, which may contribute to ECDIS screen clutter. **Pictorial representation** should therefore only be populated where the information is considered important in terms of safety of navigation and protection of the marine environment.

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

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

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

* Content of the graphic: The information contained in the graphic should supplement, in terms of navigational relevance, the encoding of the associated feature.
* Aspect: Graphics should provide perspective relevant to the view of the mariner. For example, an image of the top of a bridge derived from a photograph taken from the top of a bridge tower or nearby building does not provide the mariner with any information relevant to their location, and should not be included. However, an image derived from a photograph taken from a vessel approaching the bridge may be considered relevant.
* Suitability for display in ECDIS: Graphics should be such that all the information in the graphic is legible in the ECDIS display. For example, text included in diagrams or tables must be large enough so as to be legible when the file is opened in the ECDIS display. Images included in a graphical file should also be appropriately scaled such that they comfortably fit in the picture display window on the ECDIS (i.e. do not only take up a very small area of the window; or are so large that the image needs to be panned to see the entire image). Consideration must also be given to variation in ships’ bridge lighting conditions. It is recommended that, where possible, associated files are tested by opening the file in an ECDIS prior to publication of the ENC.

## Associations

### Association classes

Association classes allow relationships to be characterized by one or more attributes. The attributes of the association class belong to the association itself, not to any of the classes it connects. An association class is both an association and a class.

Example: There are two pilot boarding places in the fairway approaching a particular harbor, for “close” and “distant”. Due to channel, tide, and prevailing weather conditions, port regulations state that vessels with hazardous cargo & larger dimensions *must* embark or disembark pilots at the distant pilot boarding place, vessels of smaller dimensions are *recommended* to use the distant boarding place, and national warships are *exempt* from using pilots and need not use the pilot boarding place. The relationship between the boarding place feature and the class that is characterized by “must”, “should”, or “need not”. It can be modeled as:

* A class defining “who”. Instances of the “who” class are sets of vessels characterized by specified cargo type, dimensions, and military vs. civilian ownership.
* A feature corresponding to the pilot boarding place, i.e., “where.”
* The relationship between “who” and “where” is an association class characterized by an attribute which can take values must/should/need-not.

## Datasets

### Types of Datasets

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

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

|  |  |
| --- | --- |
| Update: | Changing some information in an existing dataset. |
| Re-issue of a dataset: | Including all the Updates applied to the original dataset up to the date of the reissue. A Rere-issue does not contain any new information additional to that previously issued by Updates. |
| New dataset: | Including new information which has not been previously distributed by Updates. Each New Edition of a dataset must have the same name as the dataset that it replaces. A New Edition can also be MPA data that has previously been produced for this area and at the same maximum display scale. |
| New Edition of a dataset: |

### Overlay exchange sets

**Overlay** S-122 exchange sets are intended to be used together with S-101 ENC (or similar data products) as a base layer. The base layer is expected to provide navigational and visual context. Generally, an overlay S-122 dataset does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-122 application schema does not include any feature for designating a region as “other”, or “not a protected area” (i.e., there is no S-122 equivalent to the S-101 **Unsurveyed Area**). Further, an overlay exchange set does not include features that provide auxiliary information such as bathymetry within a protected area or marks that may have been installed to indicate the limits of a protected area.

### Data coverage

A MPA dataset can contain more than one **Data Coverage** (see clause X.X). The data boundary is defined by the extent of the **Data Coverage** meta features. Data must only be present within **Data Coverage** meta features.

When a feature extends across datasets of overlapping scale ranges, its geometry must be split at the boundaries of the **Data Coverage** features and its complete attribute description must be repeated in each dataset.

A MPA Update dataset must not change the extent of the data coverage for the base MPA Product. Where the extent of the data coverage for a base MPA Product is to be changed, this must be done by issuing a New Edition of the Product.

### Discovery metadata

Discovery metadata is intended to allow applications to find out important information about datasets and accompanying support files to be examined without accessing the data itself (or without reading the support file). Discovery metadata includes, but is not limited to:

* information identifying the product specification and encoding format;
* edition and version numbers, production/release date, and other details of data creation and updating;
* data coverage of the dataset;
* summary descriptions of content, purpose, use, and limitations;
* identification and contact information for the producer and distributor of the dataset.

The mandatory components for discovery metadata are defined in S-100 Edition 2.0.0 Appendix 4A-D and consist of:

1. Exchange catalogue – a single exchange catalogue for an exchange set. (Subsets of exchange sets are not envisaged – if they are necessary, each may need its own catalogue?) Elements are defined in S-100 App. 4A § D-2.2 (**S100\_ExchangeCatalogue**).
2. Dataset discovery metadata for each dataset in the exchange set. Elements are defined in S-100 App. 4A § D-2.6 (**S100\_DatasetDiscoveryMetaData**).
3. Support file discovery metadata for each support file in the exchange set. Elements are defined in S-100 App. 4A § D-2.11 (**S100\_SupportFileDiscoveryMetaData**).

Discovery metadata is generally encoded separately from the dataset itself so as to allow applications to read it without processing the dataset itself (i.e., decrypt, decompress, or load the dataset). The encoding format should be easily machine-readable and therefore may be different from the dataset, e.g., the discovery data may be in XML while the data is encoded as ISO 8211 format.

The content and structure of discovery metadata for this product specification is defined in ... (XML format defined by an XML schema available from [www.iho.int](http://www.iho.int)? URL: [TBD]?)

### Dataset attributes

Dataset attributes contain metadata that apply to the whole dataset. MPA attributes use the ATTR subfield. See table below for details.

[Insert table with all dataset attributes]

### Dataset units

The depth, height and positional uncertainty units in a dataset must be metres.

### Dataset coordinate multiplication factor

The coordinate multiplication factor stored in the CMFX and CMFY subfield values in the Dataset Structure Information field must be set to 10000000 (107).

### Dataset Coverage

MPA datasets are spatially limited. All data within the dataset must have the same minimum scale. The maximum scale can be different.

In areas which include neighbouring producer nations, producing agencies should co-operate to agree on dataset boundaries and ensure no data overlap within scale ranges. Where possible, adjoining nations should agree on common data boundaries within a technical arrangement based on cartographic convenience and benefit to the mariner.

If an MPA extend the product coverage and the adjoining, e.g. due to delay in the production process by the neighbouring HO product doesn’t exist, an indication should be placed at the outer edge of the product.

### Dataset Feature Object Identifiers

Each feature and information instance within an MPA must have a unique universal Feature Object Identifier [FOID]. Where a real-world feature has multiple geometric elements within a single MPA dataset due to the MPA dataset scheme, the same FOID may be used to identify multiple instances of the same feature. Features within a dataset may carry multiple geometries.

Features split across multiple datasets may be identified by the same FOID. Features repeated in different scale ranges may be identified by the same FOID.

Feature Object Identifiers must not be reused, even when a feature has been deleted.

### 180° Meridian of Longitude

Datasets must not cross the 180° meridian of longitude.

## Geographic names

### Feature names

If it is required to encode an international or national geographic name, it must be done using complex attribute **feature name** (see clause X.X).

If it is required to encode a geographic name for which there is no existing feature, a specific **Marine Protected Area, Restricted Area** or **Traffic Control Service** area feature must be created (see clauses X.X, X.X and X.X). In order to minimise the data volume, these features should, where possible, use the geometry of existing features.

National geographic names can be left in their original national language in a non-English iteration of the sub-attribute **feature name** (but only if the national language can be expressed using lexical level 0 or 1), or transliterated or transcribed and used in an English iteration of the sub-attribute **feature name**, in which case the national name should be populated in an additional iteration of the **feature name** with sub-attribute **language** populated with the relevant national language value in accordance with the relevant S-100 section.

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

1. Named points or capes that do not contain navigational aids should be encoded as **Land Region** features (of type surface or point), with the geographic name encoded using **feature name**.
2. Named points or capes that contain one navigational aid should be encoded using **feature name** on the structure feature associated with the navigational aid. If more than one navigational aid exists on the point or cape or if the point or cape and the structure feature have different names, a **Land Region** feature (of type surface or point) should be encoded, with the geographic name of the point or cape encoded using **feature name.**
3. A group of hydrographic features (e.g. **Seabed Area, Underwater/Awash Rock, Obstruction**), associated with a particular geographic name, should have the name encoded using **feature name** on a **Sea Area/Named Water Area** feature (of type surface or point). The name should not be encoded on the individual hydrographic features.
4. A major island name close to primary shipping corridors should be encoded using **feature name** on the **Land Area** feature delimiting the island. A group of islands associated with a geographic name should have the name encoded using **feature name** on a **Land Region** feature (of type surface or point).
5. A named island group or archipelago should be encoded using **feature name** on an **Island Group** named aggregation feature (see clause X.X). Where individual islands within the group are named, these should be encoded using **feature name** on the **Land Area** feature delimiting the island.
6. Named features listed in Hydrographic Office’s Sailing Directions that may assist in navigation should be encoded using feature name on the relevant feature (e.g. **Land Region, Underwater/Awash Rock, Seabed Area, Sea Area/Named Water Area, Obstruction**).
7. If it is required to encode an administrative area of international, national, provincial or municipal jurisdiction that may have legal inference, it must be done using an **Administration Area** feature, with the name encoded using **feature name**.
8. If it is required to encode a major city along the coast, it must be done using **Built-Up Area** or **Administration Area** features (see clause X.X), with the name encoded using **feature name**.
9. If it is required to encode the name of a navigable river, lake or canal, it must be done using a **Sea Area/Named Water Area** feature, with the name encoded using feature name.

In all instances, if the exact extent of the feature to be named is known, a surface feature must be created. If the exact extent is not known, or the area is too small at the maximum display scale of the MPA dataset, an existing or specifically encoded point feature should be used to encode the geographic name.

### Text placement

The cartographic feature **Text Placement** (see S-101 DCEG clause X.X) is used specifically to place text cartographically. The properties of the **Text Placement** feature are described as follows;

Geometry (point) – the point location of the centre of the text string.

Text type – the attribute (or class) which is to be placed.

Flip bearing – the angle forming a semi circle within which the text can be placed.

The **Text Placement** feature is associated to the feature which carries the text being placed. The attribute **text type** determines which text string is to be displayed if more than one is present. The **Text Placement** feature ensures that as an MPA screen rotates from “north up” (e.g. if display is set to “course up”) text can remain readable, or clear other important charted information.

To avoid clutter by providing the same name of a feature in both underlying ENC and MPA product, the text placement rules of MPA context features should be identical to the rules used for the underlying ENC.

## Sample scale minimum policy

The following policy for the application of **scale minimum** (see clause X.X) to an MPA portfolio is based on the mandatory ENC cell compilation scales listed in the S-101 DCEG clause X.X. While the procedure described below to determine the **scale minimum** value for features in an MPA Product is recommended, the **scale minimum** values used are at the discretion of the Producing Authority. Authorities should cooperate at the regional or RENC level to determine a **scale minimum** policy that results in suitable and consistent display of MPA data for the mariner across and, where required between, regions.

**Scale minimum** values used must be selected from the following list:

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

Table 2‑5 Scale minimum list

* **scale minimum** values for features within an MPA should be set to either 1, 2, 3 or 4 steps smaller scale than the maximum display scale of the MPA data.
* The table below lists the step values (i.e. 1, 2, 3 or 4) that may be applied for specific feature classes together with any relevant conditions and additional flexibilities.

Following this process provides an automated approach to setting **scale minimum** which takes account of the relative importance of different feature classes, and will achieve sufficient de-cluttering even where there are large gaps in the scales of coverage available.

Unless the step values outlined in the table have been manually adjusted, this approach takes no direct account of the relative importance of individual occurrences of a feature, and may result in the situation where a feature disappears and then reappears as the user zooms out on their ECDIS display. To address these remaining issues, the following additional process steps should be applied:

* Linear and area features (excluding those features subject to extensive generalisation e.g. **Depth Contour**) that extend beyond the coverage of a dataset and exist in an overlapping smaller scale dataset should be assigned the same **scale minimum** value as the **scale minimum** value of the corresponding feature in the smaller scale dataset.
* The **scale minimum** value of an individual occurrence of a feature should be set to either 1, 2, 3 or 4 steps smaller scale than the compilation scale of the smallest scale MPA that the feature would appear on (i.e. assuming full coverage across all compilation scales).

The following notes apply to the table below:

1. Producers should be prepared to deviate from the step values specified when the significance of the feature dictates, e.g. the recommended number of steps for a **Light** feature is 4, but there will be circumstances where a **Light** feature is so important that no **scale minimum** value be applied; alternatively, the light could be so minor that a step value of 1 can be applied.
2. **Scale minimum** should only be applied to navigational aids where they contribute to “screen clutter” and where their removal from the display does not constitute a risk to safe navigation.
3. It is generally accepted that features making up a navigational aid will have the same attributes, and therefore those with Master/Slave relationships should be assigned the same **scale minimum** value.
4. The elements comprising a range system (see clause X.X.X) must have the same **scale minimum** value, which should be the value corresponding to the largest step value of the features comprising the range system. For instance, for a range system comprising a **Navigation Line, Recommended Track** and navigation aids, the decision may be not to apply **scale minimum** to the navigation aids (in accordance to Note 2 above), in which case the **Navigation Line** and **Recommended Track** must also not have **scale minimum** applied. Similarly, all features comprising a routeing measure (see clause 10.2) should have the same **scale minimum** value.

| **FEATURE** | **PRIMITIVE** | **CONDITION** | **scale minimum STEPS** |
| --- | --- | --- | --- |
| Marine Protected Area | Point/Surface | to be determined |  |
| Restricted Area | Point/Surface | to be determined |  |
| Traffic Control Service | Point/Surface | to be determined |  |
| Obstruction | see S-101 | see S-101 | see S-101 |
| Wrecks | see S-101 | see S-101 | see S-101 |

Table 2‑6 Scale minimum steps

## Masking

To improve the look and feel of the display of MPAs in ECDIS for the mariner certain features, or certain edges of features, should be masked (see S-122 clause X.X). For example, the boundaries of anchorage area symbols overwrite coincident pontoon symbols:



Figure 1 Overwriting symbols - example

### Surface features crossing MPA cell boundaries

When a single feature of type surface crosses the boundaries of adjoining MPA products, mask the edge where it shares the geometry of the boundary in each MPA:



Figure 2 Surface feature crossing MPA products boundaries

This allows the features to be displayed as a single feature of type surface rather than being divided at the MPA product boundary and having the representation of two separate features.

NOTE: Some production software will automatically truncate (mask) features at the cell boundary.

NOTE: Occasionally an edge of the boundary of an area actually coincides with the MPA product boundary. Where this occurs and the production system applies automatic truncation (masking) of this edge, the compiler must “unmask” that edge so as to avoid the appearance of the area to be “open ended”.

Where features of type surface extend beyond the entire limit of data coverage for the MPA product (see S-101 DCEG clause X.X), all edges of these area features should be masked.

Figure 3 Surface features extending beyond the entire limit of data coverage

The following table lists those features of type surface that should have edges masked where the boundary of the area crosses or extends beyond the MPA product limit or the area of data coverage of the MPA product.

| **Feature Type** | **Comment** |
| --- | --- |
| Marine Protected Area |  |
| Restricted Area |  |
| Traffic Control Service |  |
| Obstruction |  |
| Wrecks |  |

Table 2‑7Features of which edges have to be masked when crossing the MPA product boundary

### Surface objects having symbol pattern fill

Surfaces symbolised with a patterned fill, and for which the outer edge of the surface has no significance (or is subject to change or intermittent), e.g. **Vegetation** (see Figure Surface feature with pattern fill below) feature, may have the boundary of the surface masked to reduce screen clutter.

Figure 4 Surface feature with pattern fill

Compilers must take care that the surface is large enough at the maximum display scale of the MPA data (and at smaller maximum display scales at which it is intended that the feature should be displayed) so that at least one pattern symbol is displayed in the area. If this is not the case, the boundary of the surface should not be masked. Alternatively, a point feature may be encoded instead of the surface feature. It may be useful to load and display the MPA in an ECDIS in order to assist with making decisions as to the best encoding option to adopt in individual circumstances.

### “Linear” surface features

If it is required to encode a linear feature when the only allowable primitive for the relevant feature type is surface (e.g. a “linear” maritime jurisdiction area (see clause X.X)), a “very narrow surface” should be encoded. An edge of this surface should correspond to the position of the line. All other edges should be masked.



Figure 5 “Linear” maritime jurisdiction area

# Description of table format for S-122 meta and geo features

**X.X Clause heading**

|  |
| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-122 [Geo/Information] Feature: Feature (S-57 Acronym)** S-101 feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
| *Real World*Example if real world instance(s) of the Feature. | *Paper Chart Symbol*Example(s) of paper chart equivalent symbology for the Feature (if applicable). | *ECDIS Symbol*Example(s) of proposed ECDIS symbology for the Feature. |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of beer  |  | 1 : ale2 : lager3 : porter4 : stout5 : pilsener6 : bock beer7 : wheat beer | EN | 1,1 |
| This section liststhe 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). | This section liststhe corresponding S-57 attribute acronym. A blank cell indicates no corresponding S-57 acronym. | This section liststhe allowable encoding values for S-101 (for enumerate (E) Type attributes only). Further information about the attribute is available in Section XX. | Attribute type (see clause X.X). | Multiplicity describes the “cardinality” of the attribute in regard to the feature. If “(ordered)” is included, the order of the instances matters. See clause X.X. |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND) |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| **Feature associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| AssociationAggregationComposition | Name of the Association | Role Name | Features that are at the other end of the association |  |
| INT 1 Reference: The INT 1 location(s) of the Feature – by INT1 Section and Section Number (if applicable).**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.Remarks:* 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 (if required).Remarks:* Additional encoding guidance relevant to the scenario (if required).

Distinction: List of features in the Product Specification distinct from the Feature. |

Remarks:

* S-122 Attribute: Indentation of attributes indicates sub-attributes of complex attributes. Complex attributes may also be sub-attributes of complex attributes, which is indicated by further indentation of the attribute name in the tables.
* S-122 Attribute: Attributes shown in grey text are ECDIS “system” attributes which are not visible to the encoder, but are populated by the ENC production system in order to assist with portrayal of ENC data in ECDIS (see Section X.X).
* S-57 Acronym: S-57 attribute acronyms shown in italic style text have been re-modelled in S-101 from S-57.
* Allowable Encoding Value: For (EN) type attributes, the enumerates listed are only those allowable for the particular occurrence of the attribute relevant to the feature. Allowable values may vary for the attribute depending on the feature to which the attribute is bound. Such bindings are defined in the S-122 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-122 can be found in Section X.X – Attribute and Enumerate Descriptions – of this document.
* Type: The prefix (C) indicates that the attribute is a complex attribute. Complex attributes are aggregates of other attributes that can be simple type or complex type (see clause X.X). The prefix (S) indicates that the attribute is a sub-attribute of a complex attribute. Complex attributes that are sub-attributes of a complex attribute, and their sub-attributes, are indicated by indentation of the attribute name in the S-122 Attribute column.

# Metadata Features

## Introduction

The maximum use must be made of meta features to reduce the attribution on individual features. In a base dataset (EN Application profile, see S-122 MPA Product Specification main document clause X.X), some meta features are mandatory.

## Mandatory meta features

These mandatory meta features are in the following list:

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

## Data coverage meta feature

**Data Coverage**: In order to assist in data discovery, the meta feature **Data Coverage** must be used to provide coverage of the part of the dataset covered by Skin of the Earth features. See clause X.X.

## Quality of non-bathymetric data

|  |
| --- |
| IHO Definition: **QUALITY OF NON-BATHYMETRIC DATA**. An area within which the best estimate of the overall uncertainty of the data is uniform. The overall uncertainty takes into account for example the source accuracy, chart scale, digitising accuracy etc. (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** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-101 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Horizontal distance uncertainty | (HORACC) |  | RE | 0,1 |
| Orientation uncertainty |  |  | RE | 0,1 |
| Positional uncertainty  | (POSACC) |  | RE | 1,1 |
| Survey date range |  |  | C | 0,1  |
|  Date end | *(SUREND)* | ISO 8601:2004 | (S) DA | 1,1 |
|  Date start | *(SURSTA)* | ISO 8601:2004 | (S) DA | 0,1 |
| Vertical uncertainty | (VERACC) |  | RE | 0,1 |
| INT 1 Reference: Quality of positionsThe meta feature **Quality of Non-bathymetric Data** may be used to provide an indication of the overall uncertainty of position for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information.The attributes **quality of position** and **positional uncertainty** may be applied to any spatial type, in order to qualify the location of a feature.**Horizontal distance uncertainty, quality of position** and **positional uncertainty** must not be applied to the spatial type of any geo feature if they are identical to the **horizontal distance uncertainty, quality of position** and **positional uncertainty** values of the underlying meta feature.**quality of position** gives qualitative information, whereas **positional uncertainty** gives quantitative information.**Positional uncertainty** on the **Quality of Non-bathymetric Data** applies to non-bathymetric data situated within the area, while **quality of position** or **positional uncertainty** on the associated spatial types qualifies the location of the **Quality of Non-bathymetric Data** feature itself.Meta features **Quality of Non-bathymetric Data** and **Quality of Bathymetric Data** should not overlap.Remarks:* No remarks.

Distinction: Quality of bathymetric data; quality of survey. |

# Geo Features

## Marine Protected Area

|  |
| --- |
| IHO Definition: **MARINE PROTECTED AREA:** Any area of the intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment. (IUCN – The World Conservation Union. 1998. Resolution 17.38 of the 17th General Assembly of the IUCN. Gland, Switzerland and Cambridge, UK.). |
| **S-101 Geo Feature: MarineProtectedArea** |
| **Primitives: Curve, Surface** |
| *Real World*. | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-101 Attribute** | **S-57 Acronym** | **Allowable Encoding Value**  | **Type** | **Multiplicity** |
| Category of IUCN |  | 1 : Category Ia2 : Category Ib3 : Category II4 : Category III5 : Category IV6 : Category V7 : Category VI | EN | 0,1 |
| Category of restrictions | (CATREA) | 4: nature reserve5: bird sanctuary6: game reserve7: seal sanctuary10: historic wreck area20: research area22: fish sanctuary23: ecological reserve27: Environmentally Sensitive Sea Area (ESSA)28: Particularly Sensitive Sea Area (PSSA)29: Coral Sanctuary | EN | 0,\* |
| Jurisdiction | (JRSDTN) | 1: international2: national2: national sub-division | EN |  |
| Restriction | (RESTRN) | 1: anchoring prohibited2: anchoring restricted3: fishing prohibited4: fishing restricted5: trawling prohibited6: trawling restricted7: entry prohibited8: entry restricted9: dredging prohibited10: dredging restricted11: diving prohibited12: diving restricted13: no wake14: area to be avoided15: construction prohibited16: discharging prohibited17: discharging restricted18: industrial or mineral exploration/ development prohibited19: industrial or mineral exploration/ development restricted20: drilling prohibited21: drilling restricted22: removal of historical artifacts prohibited23: cargo transhipment (lightering) prohibited24: dragging prohibited25: stopping prohibited26: landing prohibited27: speed restricted | EN | 0,\* |
| Status | (STATUS) | 1: permanent2: occasional3: recommended4: not in use5: periodic/intermittent6: reserved7: temporary8: private9: mandatory13: historic14: public16 : watched17: un-watched | EN | 0,\* |
| Graphic |  |  | C | 0,\* |
|  Pictorial representation | (PICREP) |  | TE | 0,1 |
|  Picture Caption |  |  | TE | 0,1 |
|  Source Date |  |  | S(DA) | 0,1 |
|  Picture Information |  |  | TE | 0,1 |
|  Bearing Information |  |  | C | 0,1 |
|  Cardinal Direction |  |  | EN | 0,1 |
|  Distance |  |  | RE | 0,1 |
|  Information |  |  | C | 0,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Orientation | (ORIENT) |  | C | 0,1 |
|  Orientation Uncertainty |  |  | R | 0,1 |
|  Orientation Value |  |  | R |  |
|  Sector Limit |  |  | C | 0,1 |
|  Sector Limit One |  |  | R |  |
|  Sector Limit Two |  |  | R |  |
| Scale maximum | (SCAMAX) | See clause X.X | IN | 0,1 |
| Scale minimum  | (SCAMIN) | See clause X.X | IN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|   |  |  |  |  |
| **Feature associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Association |  | Supported by | **Authority** | 0,\* |
| Association |  | Supported by | **Restrictions, Regulations, Recommendations, Nautical Information** | 0,\* |
| INT 1 Reference: nilIntroductory remarks. Marine Protected Areas normally specified by IUCN. If the specification can’t be provided the CATIUC attribute has to set to "unknown". Navigation within Marine Protected areas can be limited by regulations/restrictions and recommendations. That information is usually provided by relevant authorities.Remarks:nilRemarks:nilDistinction: Caution area; Marine farm/culture; Military practice area; Restricted area |

## Traffic Control Services

|  |
| --- |
| IHO Definition: **TRAFFIC CONTROL SERVICES:** A service implemented by a relevant authority for shipping, e.g. traffic control, information, assistance. |
| **S-101 Geo Feature: TrafficControlServices** |
| **Primitives: Surface** |
| *Real World*. | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value**  | **Type** | **Multiplicity** |
| Category of traffic control services |  | 1 : Vessel Traffic Service2 : Port Service3 : Ship Reporting System4 : Broadcast Service | EN | 0,1 |
| Requirements for maintenance of listening watch |  |  | S (TE) | 0,1 |
| Service access procedure |  |  | S (TE) | 0,1 |
| Scale maximum | (SCAMAX) | See clause X.X | IN | 0,1 |
| Scale minimum  | (SCAMIN) | See clause X.X | IN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|   |  |  |  |  |
| **Feature associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Association | srvControl | controlAuthority | **Authority** | 0,\* |
| Association |  |  | **Service Hours** | 0,\* |
| Association | trafficServRept | reptForTrafficServ | **Ship Report** | 0,\* |
| Association |  |  | **Contact Details** | 0,\* |
| Association |  | permission | **Applicability** | 0,\* |
| Association |  | provides | **Restrictions, Regulations, Recommendations, Nautical Information** | 0,\* |
| INT 1 Reference: nilIntroductory remarks.Remarks:The area geometry presents where the service is provided.Remarks:nilDistinction: |

## Restricted Area

|  |
| --- |
| IHO Definition: **RESTRICTED AREA:** A specified area on land or water designated by an appropriate authority within which access or navigation is restricted in accordance with certain specified conditions. (Adapted from IHO Dictionary – S-32). |
| **S-101 Geo Feature: Restricted Area (RESARE)** |
| **Primitives: Surface** |
| *Real World*. | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-101 Attribute** | **S-57 Acronym** | **Allowable Encoding Value**  | **Type** | **Multiplicity** |
| Category of restrictions | (CATREA) | 4: nature reserve5: bird sanctuary6: game reserve7: seal sanctuary10: historic wreck area20: research area22: fish sanctuary23: ecological reserve27: Environmentally Sensitive Sea Area (ESSA)28: Particularly Sensitive Sea Area (PSSA)29: Coral Sanctuary | EN | 0,\* |
| Restriction | (RESTRN) | 1: anchoring prohibited2: anchoring restricted3: fishing prohibited4: fishing restricted5: trawling prohibited6: trawling restricted7: entry prohibited8: entry restricted9: dredging prohibited10: dredging restricted11: diving prohibited12: diving restricted13: no wake14: area to be avoided15: construction prohibited16: discharging prohibited17: discharging restricted18: industrial or mineral exploration/ development prohibited19: industrial or mineral exploration/ development restricted20: drilling prohibited21: drilling restricted22: removal of historical artifacts prohibited23: cargo transhipment (lightering) prohibited24: dragging prohibited25: stopping prohibited26: landing prohibited27: speed restricted | EN | 0,\* |
| Status | (STATUS) | 1 : permanent2 : occasional3 : recommended4: not in use5 : periodic/intermittent6 : reserved7: temporary8: private9 : mandatory13: historic14: public16 : watched17 : un-watched | EN | 0,\* |
| Scale maximum | (SCAMAX) | See clause X.X | IN | 0,1 |
| Scale minimum  | (SCAMIN) | See clause X.X | IN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|   |  |  |  |  |
| **Feature associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Association |  | Supported by | **Authority** | 0,\* |
| Association |  | Supported by | **Restrictions, Regulations, Recommendations, Nautical Information** | 0,\* |
| INT 1 Reference: L 3, 5.2; M 29.1, N 2.1-2, 20-22, 25, 26, 31, 34, 63 **16.26.1 Restricted areas in general (see S-4 – B-431.4; B-435.7; B-435.11; B-437.1-7; B-439.2-4; B-445.9; B-448; B-448.1 and B-449.5)**There are many types of areas within which certain activities are discouraged or prohibited, or from which certain classes of vessels are excluded. The general term for all areas in which certain aspects of navigation may be restricted or prohibited by regulations is “Restricted Area”, or equivalent. The word “prohibited”, or its equivalent, may appear in terms relating to activities which are contrary to the regulations, e.g. “Anchoring Prohibited”, “Entry Prohibited”.If it is required to encode a restricted area, it must be done using the feature **Restricted Area** or **Marine Protected Areas.**Remarks:The attribute **category of restricted area** is used to describe the reason for the regulation, while the attribute **restriction** describes the restrictions.An associated instance of the information types **Restrictions**, **Regulations**, **Recommendations** and **Nautical Information**, complex attributes **text content** sub-attribute **information** or solely attribute **information** may be used to provide an additional explanation about the restriction, where required. **Supplementary Information** (see clause X.X), complex attributes **information** or **textual description** may be used if the information cannot be encoded by using the information types mention at the paragraph above.If it is required to encode an area for which the mariner must be made aware of circumstances influencing the safety of navigation, it must be done using the feature **Caution Area** (see clause X.X). This feature may be used to identify a danger, a risk, a rule or advice (e.g. an area of continually changing depths) whichis not directly related to a particular feature.**16.26.1.3 Nature reserves (see S-4 – B-437.3)**If it is required to encode a marine nature reserve area, it must be done using a **Restricted Area** feature, with attribute **category of restricted area** = *4* (nature reserve).**16.26.1.4 Speed limits (see S-4 – B-430.2)**Speed is often limited inside MPAs in order to protect the species that inhabit the area. If it is required to encode this restriction, it must be done using a **Restricted Area** feature, with the attribute **restriction** = *27* (speed restricted), with the speed limit and its unit of measurement encoded using an associated instance of the information type **Regulations** (see clause X.X), **16.26.1.5 Anchoring restricted (see S-4 – B-431.4)**If it is required to encode a restricted anchoring area, it must be done using a **Restricted Area** feature, or using other features with the attribute **restriction** (see clause X.X), where **restriction** = *1* (anchoring prohibited), or *2* (anchoring restricted). Additional information about the restriction should be encoded using an associated instance of the information type **Regulations** (see clause X.X).**16.26.1.6 Areas to be avoided (see S-4 – B-435.7)**If it is required to encode an IMO designated Area to be Avoided, it must be done using a **Restricted Area** feature, with attribute **restriction** = *14* (area to be avoided). **16.26.1.7 Environmentally Sensitive Sea Areas (see S-4 – B-437)**Environmentally Sensitive Sea Areas (ESSA) should be included on ENCs where there is a specifically identified requirement, and where it is practicable, given the maximum display scale of the ENC data and the extent of the ESSA. If there is no such requirement, or if it is not practicable, details of ESSA should only be inserted in associated publications, such as Sailing Directions. It should be noted that the inclusion of ESSA on smaller maximum display scale of the ENC data may be appropriate for voyage planning purposes.If it is required to encode an Environmentally Sensitive Sea Area, it must be done using a **Restricted Area** feature, with attribute **category of restricted area** = *27* (ESSA) or *28* (PSSA).An Environmentally Sensitive Sea Area that is shown on the source as a point symbol should be encoded using a small surface **Restricted Area** feature*.*Distinction: Marine Protected AreaRemarks:nil |

## Information Area

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# Cartographic Features

## Cartographic Features derived from S-101 (version 1.0)

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# Information Types

## Information Types derived from S-101 (version 1.0)

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## Authority

|  |
| --- |
| IHO Definition: **AUTHORITY**. A person or organisation having political or administrative power and control. (Oxford Dictionary of English). |
| **S-122 Information Feature: Authority** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Authority |  | 1 : customs2 : border control3 : police4 : port5 : immigration6 : health7 : coast guard8: agricultural9: military10: private company11: maritime police12: environmental13: fishery14: finance15: maritime | EN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Association |  | Supports | Marine Protected Area | 0,\* |
| Association |  | Supported by | Contact Details | 0,\* |
| Association |  | Supported by | Ship Report | 0,\* |
| Association |  | Supported by | Service Hours | 0,\* |
| INT 1 Reference: Remarks:* No remarks.

Distinction:  |

## Ship Report

|  |
| --- |
| IHO Definition: **SHIP REPORT**. This describes how a ship should report to a maritime authority, including when to report, what to report and whether the format conforms to the IMO standard. |
| **S-122 Information Feature: Ship Report** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Ship Report |  | 1 : Sailing Plan2 : position report3 : deviation report4 : final report5 : dangerous goods report6 : harmful substances report7 : marine pollutants report8 : any other report | EN | 1,\* |
| IMO Format for Reporting |  | True (Yes) | BO |  |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Notice Time |  |  | C | 1,\* |
|  Notice Time Hours |  |  |  | 0,\* (ordered) |
|  Notice Time Text |  |  |  | 0,1 |
|  Operation |  |  |  | 0,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Supports | Authority | 0,\* |
| Additional Information |  | Supports | Marine Service | 0,\* |
| Additional Information |  | Supported by | Applicability | 0,\* |
| INT 1 Reference: Remarks:* TXTCON is used to describe non-standard ship reports. The Associated Information Object APPLIC indicates characteristics of vessels which use this report.
* Distinction:
 |

## Contact Details

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| --- |
| IHO Definition: **CONTACT DETAILS**. Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. |
| **S-122 Information Feature: Contact Details** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Call name (unchanged from the current DCEG draft) | (CALNAM) |  | S(TE) | 0,1 |
| Call sign (unchanged from the current DCEG draft) | (CALSGN) |  |  |  |
| COMCHA (it is proposed to use it not exclusively for VHF Channels; see below) | (COMCHA) |  | TE | 0..\* |
| Maritime Mobile Service Identity (MMSI) Code |  |  | I | 0,1 |
| Category of channel or frequency preference |  |  | EN | 0,1 |
| Contact Instructions |  |  | S(TE) | 0,1 |
| Contact Address |  |  | C | 0,\* |
|  Delivery Point |  |  | S(TE) | 0,\* |
|  City Name |  |  | S(TE) | 0,1 |
|  Administrative Division |  |  | S(TE) | 0,1 |
|  Country |  |  | S(TE) | 0,1 |
|  Postal Code |  |  | S(TE) | 0,1 |
| Frequency pair |  |  | C | 0,1 |
|  Frequency shore station transmits |  |  | I | 0,\* |
|  Frequency shore station receives |  |  | I | 0,\* |
|  Contact Instructions |  |  | S(TE) | 0,\* |
| Online Resource |  |  | C | 0,\* |
|  Linkage |  | ISO 19115:2014 | S(URL) | 1,1 |
|  Protocol |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Application Profile |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Name of Resource |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Description |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Online function |  | ISO 19115:2014 | E(CL) | 0,1 |
|  Protocol Request |  | ISO 19115:2014 | S(TE) | 0,1 |
| Telecommunications |  |  | C | 0,\* |
|  Telecommunication Identifier |  |  | S(TE) | 1,1 |
|  Telecommunications Service Carrier |  |  | S(TE) | 0,1 |
|  Contact Instructions |  |  | S(TE) | 0,1 |
|  Telecommunications Service |  |  | E(CL)  | 0,\* |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Information |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Supports | Authority | 0,\* |
| INT 1 Reference: Remarks:* No remarks.

Distinction:  |

## Service Hours

|  |
| --- |
| IHO Definition: **SERVICE HOURS** The time when a service is available and known exceptions. |
| **S-122 Information Feature: Service Hours** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Working Schedule |  |  | C | 1,\* |
|  Day of the Week |  |  | EN | 0,7 (ordered) |
|  Working Hours of Day  |  |  | C | 0,1 |
|  Time reference |  |  | EN | 1 |
|  Time of Start of Work |  |  | TI | 1,\* (ordered) |
|  Time of End of Work |  |  | TI | 1,\* (ordered) |
|  Day of Wee Range  |  |  | C | 0,1 |
|  Day of Week |  |  | EN | 2 (ordered) |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Information |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Supports | Authority | 0,\* |
| Additional Information |  | Supported by  | Non Standard Working Day | 0,\* |
| INT 1 Reference: Remarks:* No remarks.

Distinction:  |

## Non Standard Working Day

|  |
| --- |
| IHO Definition: **NON STANDARD WORKING DAY** Days when many services are not available. Often days of festivity or recreation when normal working hours are limited, esp. a national or religious festival, etc. |
| **S-122 Information Feature: Non Standard Working Day** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Fixed Date |  | (((S-100 truncated Date)))) |  | 0,\* |
| Variable Date |  |  | S(TE) | 0,\* |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Information |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Supports  | Service Hours |  |
| INT 1 Reference: Remarks:* No remarks.

Distinction:  |

## Applicability

|  |
| --- |
| IHO Definition: **APPLICABILITY** Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area. |
| **S-122 Information Feature: Service Hours** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Ballast |  | 1=Yes  | BO | 0,1 |
| Category of Cargo |  | 1 : bulk2 : container3 : general4 : liquid5 : passenger6 : livestock7 : dangerous or hazardous | EN | 0,\* |
| Category of Dangerous or Hazardous Cargo |  | 1 : Class 1; Division 1.12 : Class 1; Division 1.23 : Class 1; Division 1.34 : Class 1; Division 1.45 : Class 1; Division 1.56 : Class 1; Division 1.67 : Class 2.18 : Class 2.29 : Class 2.310 : Class 311 : Class 4.112 : Class 4.213 : Class 4.314 : Class 5.115 : Class 5.216 : Class 6.117 : Class 6.218 : Class 719 : Class 820 : Class 921 : Harmful Substances in packaged form | EN | 0,\* |
| Category of Vessel Registry |  | 1: domestic2: foreign | EN | 0,1 |
| Category of Vessel |  | 1: general cargo vessel2: container carrier3: tanker4: bulk carrier5: passenger vessel6: roll-on roll-off7: refrigerated cargo vessel8: fishing vessel9: service10 : warship11: towed or pushed composite unit12: tug and tow | EN (CL) | 0,1 |
| Thickness of Ice Capability |  |  | IN |  |
| Logical Connectives |  | 1: logical conjunction2: logical disjunction | EN | 0,1 |
| Vessel Performance |  |  | TE |  |
| Underkeel Allowance |  |  | C | 0,1 |
|  underkeelAllowanceFixed |  |  | S (Real) | 0,1 |
|  underkeelAllowanceVariable |  |  | C | 0,1 |
|  underkeelAllowance VariableBeamBased |  |  | S (Real) | 0,1 |
|  underkeelAllowance VariableDraughtBased |  |  | S (Real) | 0,1 |
|  operation |  | 1: largest value2: smallest value | EN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Information |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Vessel Measurements |  |  | C | 0,\* |
|  Comparison Operator |  | 1: greater than2: greater than or equal to3: less than4: less than or equal to5: equal to6: not equal to |  | 1 |
|  Vessel Characteristics  |  |  |  | 1,1 |
|  Vessel Characteristics Value |  |  | RE | 1,1 |
|  Vessel Characteristics Units |  |  | EN | 1,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Supports | Marine Protected Area, Marine Service, Restricted Area | 0,\* |
| Additional Information |  | Supported by | Ship report | 0,\* |
| Additional Information |  | Supported by | **Restrictions, Regulations, Recommendations, Nautical Information** | 0,\* |
|  |  |  |  |  |
| INT 1 Reference: Remarks:* Vessel characteristics are specified as follows:

BALAST: The vessel is ballasted as described by this attribute.VSLMSM: The vessel or cargo matches the attribute value (for multi-valued attributes, matches at least one of the values).ICECAP, UKCLRN, PRFMNC attributes: The vessel matches the specified requirement. Absent attributes or null values are ignored.LOGCON states whether “all” or “at least one” of the specifications must be met.CATREL indicates the relationship between matching vessels and the associated information object or feature.Example:With one instance of APPLIC:VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=greater than, VSLVAL=50], CATVSL=3 (tanker), LOGCON=1 (and), CATREL=5 (required); associated to a PILBOP object: tankers with LOA > 50.0 m must use the PILBOPPRFMNC="Vessels with thrusters", MBRSHP=2; associated to a REGLTS object: Vessels with thrusters are exempted from the regulation.If VSLMSM becomes repeatable:VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=(>), VSLVAL=50], VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=(<), VSLVAL=90], CATDHC=19, LOGCON=1 (and), MBRSHP=1 (included);associated with **Regulations**: the regulation applies to vessels with LOA with more than 50.0 and less than 90.0 m. carrying MARPOL Class 8 corrosive substances. Same situation as above with one instance of VSLMSM:VSLMSM [[VSLCAR=length; VSLUNT=metre, VSLVAL=50; COMPOP=(>)],[VSLCAR=length; VSLUNT=metre, VSLVAL=90; COMPOP=(<)]], CATVSL=3 (tanker), LOGCON=1 (and), MBRSHP=1 (included);associated with a REGLTS: the regulation applies to vessels with LOA with more than 50.0 and less than 90.0 m. carrying MARPOL Class 8 corrosive substances.* Multiple values of **Category of Cargo** and of **Category of Dangerous Or Hazardous Cargo** should be treated as “inclusive OR” (i.e., if **Category of Cargo** =1 and 2, then it means vessels with either bulk or container cargo or both).

Distinction:  |

## Regulations

See principle structure at section 9.11

## Restrictions

See principle structure at section 9.11

## Recommendations

See principle structure at section 9.11

## Nautical Information

See principle structure at section

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| IHO Definition: **NAUTICAL INFORMATION** Nautical information about a related area or facility. |
| **S-122 Information Feature: Nautical information** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Authority |  | 1 : customs2 : border control3 : police4 : port5 : immigration6 : health7 : coast guard8: agricultural9: military10: private company11: maritime police12: environmental13: fishery14: finance15: maritime | EN | 0,1 |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | *(PEREND)* | ISO 8601: 2004 | (S) DA | 1,1 |
|  Date start | *(PERSTA)* | ISO 8601: 2004 | (S) DA | 1,1 |
| Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  | (((S-100 truncated Date)))) |  | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Additional Information |  | Provides for | **Each Feature Type** or **Information Area** |  |
| Additional Information |  | Supported by  | Applicability | 0,\* |
| INT 1 Reference: Remarks:Distinction: **Regulations, Recommendations, Restrictions, Supplementary information** |

# Association Class

## Additional Information

TBD

## Permission Type

|  |
| --- |
| IHO Definition: **PERMISSION TYPE** ?????????????????????????????? |
| **S-122 Information Feature: Permission Type** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Relationship |  | 1 : prohibited2 : not recommended3 : permitted4 : recommended5 : required | EN | 0,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| Permission Information |  | Permission | Ship report |  |
|  |  |  |  |  |
| INT 1 Reference: Remarks:Distinction:  |

## Inclusion Type

|  |
| --- |
| IHO Definition: **INCLUSION TYPE** ?????????????????????????????? |
| **S-122 Information Feature: Inclusion Type** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-122 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Membership |  | 1 : included2 : excluded | EN | 0,1 |
| **Information associations** |
| **Role Type** | **Association Name** | **Role** | **Features** | **Multiplicity** |
| If applicable to |  | Permission |  |  |
|  |  |  |  |  |
| INT 1 Reference: Remarks:Distinction:  |

# Associations

## Association names

### Additional information

|  |
| --- |
| **Additional information:** IHO Definition: An information association for the binding between at least one instance of a geo feature and an instance of an information type.Remarks:* A single information feature instance may be associated with more than one geo feature instance.
 |
| **Role Type** | **Role** | **Features** | **Multiplicity** |
| Association | Provided by | All Geo Features | 0,\* |
| Provides | **Supplementary Information** | 0,1 |

### ??????????

|  |
| --- |
| **?????????????:** IHO Definition: ????????????????????????????.Remarks:* No remarks.
 |
| **Role Type** | **Role** | **Features** | **Multiplicity** |
| Association | Component of |  |  |
| Consists of |  |  |

## Association Roles

### Component of

|  |
| --- |
| **Component of:** IHO Definition: A pointer to a part in a whole-part relationship. |

### Consists of

|  |
| --- |
| **Consists of:** IHO Definition: A pointer to the aggregate in a whole-part relationship. |

### Identifies

|  |
| --- |
| **Identifies:** IHO Definition: A pointer to a specific feature(s). |

### Positions

|  |
| --- |
| **Positions:** IHO Definition: A pointer to a specific cartographically positioned location for text. |

### Provided by

|  |
| --- |
| **Provided by:** IHO Definition: A pointer to a specific feature(s) for which further information is required. |

### Provides

|  |
| --- |
| **Provides:** IHO Definition: Acts as the authority and provider of a specified service. |

### Supported by

|  |
| --- |
| **Supported by:** IHO Definition: A pointer to the master feature that equipment feature(s) are supported by. |

### Supports

|  |
| --- |
| **Supports:** IHO Definition: A pointer to the equipment feature(s) supported by a master feature. |

### Updates

|  |
| --- |
| **Updates:** IHO Definition: A pointer to a feature that has been updated. |

# Geo Feature Attribute and Enumerate Descriptions

## Geo Feature Attribute and Enumerate Descriptions derived from S-101 (version 1.0)

# Meta Feature and Spatial Attribute and Enumerate Descriptions

## Meta Features and Spatial Attributes and Enumerate Descriptions derived from S-101 (version 1.0)

# Complex Attributes

## Complex Attributes derived from S-101 (version 1.0)

# ECDIS System (Portrayal) Attributes

## ECDIS System (Portrayal) Attributes derived from S-101 (version 1.0)

# Updating (see S-4 – B-600)