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**Annex A**

**Data Classification and Encoding Guide**

**(Draft) Edition 1.2.0-20250705 – July 2025**

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**Document History**

Changes to this Specification are coordinated by the Nautical Information Provision Working Group, an IHO working group under HSSC. New editions will be made available via the IHO web site. Maintenance of the Specification shall conform to IHO Resolution 2/2007 (as amended).

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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 Radio Services (MRS) (S-123) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-123 encoding to meet IHO standards for the proper display of Marine Radio Services information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to an MRS. The content of an MRS 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 other organization authorized by a government, to produce definitive nautical information.

The entire S-100 Universal Hydrographic Data Model, including the S-123 MRS Product Specification, is available at the following web site, http://www.iho.int.

## S-123 Annex A - Data Classification and Encoding Guide – Metadata

Note: This information uniquely identifies this Data Classification and Encoding Guide to the Product Specification and provides information about its creation and maintenance.

|  |  |
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Table 1.1 MRS product specification metadata

## Terms and definitions

For terms and definitions, see the Marine Radio Services Product Specification, Clause 1.4.2.

## Abbreviations

For a list of abbreviations, see the Marine Radio Services Product Specification, Clause 1.4.3.

## 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, or recommended.

## Maintenance

Changes to the Data Classification and Encoding Guide must occur in accordance with the S-123 Product Specification clause 1.7.

# General

## Introduction

This S-123 Data Classification and Encoding Guide (DCEG) contains rules and guidance for converting data describing the real world into data products that conform to the S-123 specification.

The S-123 specification contains an application schema (UML model) describing the conceptual domain model in terms of classes and relationships, and a Feature Catalogue (see S-123 Annex C) that specifies the data model, i.e., specifies the data model types and associations corresponding to the various classes and relationships in the application schema.

To simplify the DCEG text, the various data model types will be provided without the suffixes “class”, “type” or “instance”; e.g. the term “feature” should be understood as “feature class” or “feature type” or “feature instance” as best fits the immediate context in which it is used (and where there might be confusion, it is written out in full as feature class/type/instance).The model defines real world entities as a combination of descriptive and spatial characteristics.

This clause of the DCEG contains general information needed to understand the encoding rules and describes fundamental common rules and constraints. It also describes datasets and metadata. The data model object types used within S-123 and their encoding rules and guidelines are defined in detail in subsequent clauses of this document.

Within this document the features, information types, associations, and attributes appear in **bold text** or *italic text*, to distinguish them from surrounding words.

## Descriptive characteristics

### Feature

A feature contains descriptive attributes that characterize real world entities.

The word ‘feature’ as used in the ISO 191xx series and in S-100 based product specifications has two distinct but related senses – ‘feature type’ and ‘feature instance’. A feature instance is a single occurrence of the feature and is represented as an object in a dataset.

The location of a feature instance on the Earth’s surface is indicated by a relationship to a spatial primitive instance. A feature instance may exist without referencing a spatial primitive instance.

#### Geographic feature class

**Geographic (Geo) feature types** carry the descriptive characteristics of a real world entity which is provided by a spatial primitive instance.

#### Meta feature class

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

#### Charted background feature

The MRS data product would mostly be visualized as an overlay of an ENC or other GIS applications. Consequently, all necessary descriptive and spatial characteristics to provide a charted background should be provided by the underlying application.

### Information type

An information type has no geometry and therefore is not associated to any spatial primitives to indicate its location.

An information type may have attributes and can be associated with features or other information types in order to carry information particular to these associated features or information types.

## Spatial characteristics

### Spatial primitives

The allowable spatial primitive for each feature is defined in the Feature Catalogue. Allowable spatial primitives are point, curve, and surface.

Within this document, allowable spatial primitives are included in the description of each feature. For easy reference, Table 2.1 below summarises the allowable spatial primitives for each feature. In the table, abbreviations are as follows: point (P), curve (C), surface (S), and none (N). Abstract features are excluded from this table since they cannot have feature instances in datasets.

Table 2.1 - Features and their spatial primitives

| **Feature** | **P** | **C** | **S** | **N** |
| --- | --- | --- | --- | --- |
| **Geographic Features** | | | | |
| RadioStation | P |  |  |  |
| RadioServiceArea |  |  | S |  |
| NavtexServiceArea |  |  | S |  |
| NavArea |  |  | S |  |
| MetArea |  |  | S |  |
| WeatherForecastAndWarningArea |  |  | S |  |
| GMDSSArea |  |  | S |  |
| SARRegion |  |  | S |  |
| ConnectivitySubscriptionArea | P |  | S |  |
| IndeterminateZone |  |  | S |  |
| ForecastAreaAggregate |  |  |  | N |
| RadioServiceAreaAggregate |  |  |  | N |
| **Meta Features** | | | | |
| DataCoverage |  |  | S |  |
| QualityOfNonBathymetricData |  |  | S |  |

### Capture density guideline

Coordinate density can have a significant impact on file size and system performance. A rule of thumb is to limit the coordinate density to 0.3 mm at maximum permitted display scale. For a scaleless product, the producer should keep in mind the expected scale range for typical use and the density of coordinates needed to suit the needs of the product.

The capture density will follow the recommendation of the S-101 (ENC) DCEG, which states curves and surface boundaries should not be encoded at a point density greater than 0.3 mm at permitted display scale.

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84, or as an arc or circle. 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.

## 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 (S) attributes are assigned to one of the types collected at clause 2.4.1.

The binding of attributes to a feature, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity are all defined in the Feature Catalogue.

Within this document, the allowable attributes are included in the description of each feature, as well as the allowable values for enumeration type attributes.

### Simple attribute types

Each simple attribute (S) is assigned to one of attribute types in Table 2.2 (in alphabetic order):

Table 2.2 - Simple attribute types

|  |  |  |
| --- | --- | --- |
| **Abbre viation** | **Attribute type** | **Description** |
| 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 List | A type of flexible enumeration (see “EN” below). A code list type is a list of literals which may be extended only in conformance with specified rules. Attributes of a code list type may take values from the list or other values which are defined according to the rules. The rules should be part of the specification of the individual codelist type. A code list could either be closed (fixed) or open (extensible).  A code list type has the 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.  Example (XML/GML): 1998-09-18 (YYYY-MM-DD)  S-123 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used. |
| DT | Date and Time | A DateTime is a combination of a date and a time type.  Example (XML/GML): 1985-04-12T10:15:30 (YYYY-MM-DDThh:mm:ss)  S-123 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used. |
| EN | Enumer-ation | 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:  A GML dataset would use a GML built-in type and encode it as  <gMonth>--02<gMonth>  S-123 uses only XML-based formats (including GML) and therefore the ISO “basic” format described in S-100 is not used. |
| 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. Time zone according to UTC is optional. Character encoding of a time is a string that follows the local time.  Example: 183059 or 183059+0100 or 183059Z |
| UI | URL | A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986).  EXAMPLE https://registry.iho.int |
| UN | URN | A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141.  EXAMPLE urn:mrn:iho:s123:1:0:0:RadioServiceArea |

### Mandatory attributes

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

* They are fundamental to the definition of a feature;
* They are required to support the correct portrayal of a feature instance;
* 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 attribute multiplicity is identified in the description of each feature class.

### Conditional attributes

The MRS feature classes or information types do not contain conditional attributes.

Complex attributes which are assigned to feature classes or information types have at least one sub-attribute which is mandatory (or conditionally mandatory). Where the sub-attribute of a complex attribute is conditional, this is indicated in the Remarks sub-clause for the relevant feature class entries.

If a complex attribute with all its sub-attributes optional (e.g., multiplicity 0,1 or 0,\*) is encoded, at least one of the sub-attributes must be populated.

### 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 must not be included in the dataset.

### 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 is significant, and if an attribute is mandatory. Common examples are shown in Table 2.3:

Format: MinOccurs, MaxOccurs (a \* indicates that infinite instances are possible, the term (ordered) indicates that the order of the provided instances is significant)

Table 2.3 - Multiplicity of attributes

|  |  |
| --- | --- |
| **Multiplicity** | **Explanation** |
| 0,1 | An instance is not required; if provided there must only be 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 is significant. |
| 2,2 | Two instances are required and there must be no more than two. |

### 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.

#### Quality of spatial attributes

The quality of spatial attributes in S-123 is described in a **Quality of Non-Bathymetric Data** meta-feature. This meta-feature defines areas within which uniform assessment exists for the quality. It is described in detail later in this document.

If the spatial quality attributes for an individual instance of a spatial primitive differ from the quality indicated in the overlying **Quality of Non-Bathymetric Data** meta-feature, the quality attributes for that instance are carried in an information class called **spatial quality**. Only points and curves can be associated with **spatial quality**. S-123 does not use multi-points. 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.

Note: S-123 does not make use of the S-101 **Quality of Bathymetric Data** meta- feature since depth range uncertainties are not needed. The **Quality of Non-Bathymetric Data** meta-feature has all the quality attributes needed by S-123.

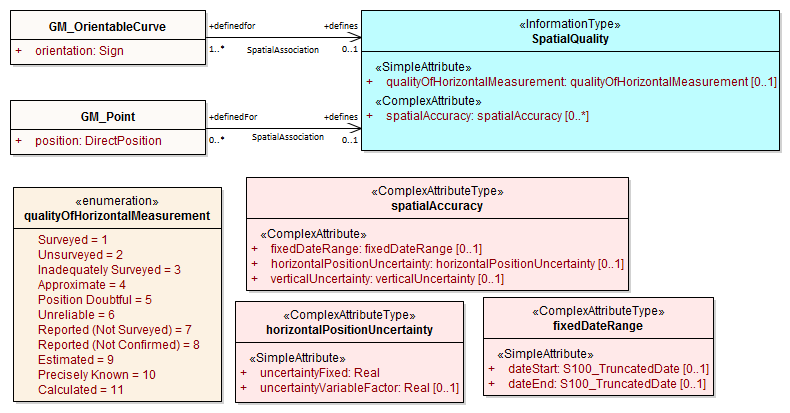


Figure 2.1 Spatial quality information

### Portrayal feature attributes

Marine Radio Services data products will be used 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. Table 2.4 provides a list of attributes which have specific influence on portrayal.

Table 2.4 - Attributes which have effects on portrayal

|  |  |
| --- | --- |
| **Attribute** | **Effects on portrayal** |
| **nameUsage** | The enumeration attribute classifies the type and display level of the name of a feature in an end-user system. |
| **information** | Population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **pictorialRepresentation** | The population of this Text attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **textContent** | The population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |

### Textual information

Textual information may provide additional information essential to understand the presence of the MRS and other features of an S-123 product. This information may also provide legal information pertaining to the S-123 product features.

The methods to provide textual information vary from the simple provision of short text, to the more structured provision of extensive text. The length of the text determines the method and the attribute selection, see clause 2.4.8.2.

#### Specialized information types for common kinds of textual information

The information types **Restrictions, Recommendations, Regulations, or NauticalInformation must be used to encode text information when the DCEG allows them to be associated to the feature or information type and the information is of the appropriate kind (a restriction, regulation, etc.).**

**In exceptional circumstances and only if the use of the information types Restrictions, Recommendations, or Regulations is not sufficient, NauticalInformation** can be used to encode additional textual information associated to a feature or a group of features.

In some cases, there may be a specialized attribute that is specifically intended for the data in question. If an appropriate specialized attribute is available, it must be used in preference to **information** or **textContent**. For example, feature names will generally be encoded in the **name** sub-attribute of complex attribute **featureName**, instead of **information**->**text**.

#### Textual information attributes

Textual information which is not appropriate for any of the Text-type attribute (or sub-attribute) allowed for the feature/information type should be encoded using either **information** or **textContent** complex attributes. Generally, either **information** or **textContent** is allowed, but not both.

#### Languages

Both **information** and **textContent** define a **language** sub-attribute for specifying the language in which the text is encoded.

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.

When a national language is used in the textual attributes, the English translation must also exist.

The specification of the *language* attribute in the IHO GI registry states “The language is encoded by a 3 character code following ISO 639-2/T.” These codes and the corresponding language names may be obtained from the codelist *S100\_MD\_LanguageCode* in the S-100 codelists file, which is part of the S-100 Edition 5.2.0 schemas distribution, at the URLs below:

* XML file:

https://schemas.s100dev.net/schemas/S100/5.2.0/resources/Codelists/cat/codelists.xml

* Web list:

https://schemas.s100dev.net/schemas/S100/5.2.0/resources/Codelists/cat/codelists.html

#### Minimal use of generalized text attributes

The complex attributes **information** and **textContent** must not be used when it is possible to encode the information by means of any other attribute. The population of these attributes provides symbols on an ECDIS screen. Therefore, producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter and text attributes should be populated only when the content conveys useful information.

#### Short textual information

The **text** sub-attribute of complex attribute **information** should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give brief information about a feature. The use of the complex attribute **information** as a stand-alone complex attribute is intentionally limited to the information types **ContactDetails, Applicability, NonStandardWorkingDay,** and **ServiceHours,** which do not need the additional attributes defined in **textContent**. The reason for the limited use of **information** as a stand-alone complex attribute is to provide a structured and harmonised approach to textual information within the S-123 product data sets.

The text populated in **text** must not exceed 300 characters. Character strings contained in **text** sub-attribute must be UTF-8 character encoding.

#### Complex or lengthy textual information

More complex encodings of text may use either **information** or **textContent**. The feature catalogue and the feature/information type definitions in this DCEG indicate whether **information** or **textContent** is allowed.

The complex attribute **textContent** also has **information** as a complex sub-attribute. If a short note must be encoded in a feature or information type which has only **textContent** as an attribute, it should be encoded as **textContent**->**information**->**text**.

Complex text information, such as text longer than 300 characters, formatted text, or HTML extracts from shipping regulations, must be encoded in a file named in either   
**information**->**fileReference** or **textContent**->**information**->**fileReference**. The construction **textContent**->**information**->**fileReference** should be used if the feature/information type provides **textContent** as complex attribute.

The complex attribute **information** defines an optional sub-attribute **headline** which may be used for a short title not exceeding 60 characters. The content should be short but informative – if the textual information is divided into sections, the most relevant section header from the referenced content may be a good choice for **headline**.

The complex attribute **textContent** defines an optional sub-attribute **categoryOfText** for indicating whether the text is the full text from the source, an extract from the source, or a summary prepared by the encoder. Populating **categoryOfText** is recommended whenever the textual information is taken or summarized from a law or regulation.

If it is considered necessary to include a description of the source of the textual information, the sub-attribute **source** of **textContent** must be used. Encoding a description of the source is strongly recommended for textual information whose source is considered as information the end-user must have, e.g., because the date of issue must be conveyed or because it cites official regulations which are frequently updated.

NOTE: Some government documents are frequently updated, e.g., the U.S. Electronic Code of Federal Regulations, which is currently updated every working day even though a particular section may be stable for years.

### Attributes referencing external files

#### Predefined derived types

Table 2.5 presents the following predefined derived types which are described in S-100 (§ 1-4.6):

Table 2.5 - Predefined derived types

|  |  |  |
| --- | --- | --- |
| **Name** | **Description** | **Derived from** |
| URI | A uniform resource identifier which character encoding shall follow the syntax rules as defined in RFC 3986.  EXAMPLE http://registry.iho.int | CharacterString |
| URL | A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986).  EXAMPLE http://registry.iho.int | URI |
| URN | A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141.  EXAMPLE urn:iho:s123:1:0:0:RadioServiceArea | URI |

#### Reference to textual files

The files referenced by complex attribute **information** and its sub-attribute **fileReference** 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 (as text, HTML, or XML). The format of the reference to the file should be a “file URI” (S-100 1-4.6).

Besides being bound to certain types, the complex attribute **information** is also a sub-attribute of the complex attribute **textContent**. This means that any type that binds **textContent** as an attribute can also contain a reference to a textual file via an **information** sub-attribute. In S-123, there are several features, information types, and complex attributes that bind either **textContent** or **information**.

The exchange language for textual information should be English. The sub-attribute **language** must be populated with an appropriate value to indicate the language used. Languages other than English may be used as a supplementary option. Generally this means, when a national language is used in the textual attributes, the English translation must also exist.

Files must only use UTF-8 character encoding even when the sub-attribute **language** is populated with a language other than English.

If it is necessary to indicate a specific section within a large text file, this may be done by encoding the location in the **fileLocator** sub-attribute of **information**, as described in Table 2.6.

Producers and application developers should note that the use of the **fileLocator** attribute enables a single support file to contain separate chunks of text referenced from different features, information types, or complex attribute. Adopting this practice enables producers to reduce the number of external files needed with a dataset.

Table 2.6 - Locators for external files

|  |  |  |
| --- | --- | --- |
| **Format** | **File extension** | **Content of fileLocator** |
| Text | TXT | The offset of the start of the section relative to the beginning of the file (the first character in the file has offset 0). (While allowed, locators to text files are not recommended; an HTML or XML file should be used instead.) |
| HTML | HTM | The HTML fragment identifier, i.e., the value of the HTML *name* or *id* attribute of the target (as defined in the relevant HTML specification). |
| XML | XML | The XML fragment identifier as defined in the relevant specification, e.g., the value of an *xml:id* attribute. |

#### Reference to external sources

References to Internet sources should be encoded using the **onlineResource** sub-attribute of **textContent**. Encoders should be aware that systems may not be able to access the Internet, so **onlineResource** should be used only for non-essential information.

Only sources that can be certified as secure and free from malicious downloads should be provided.

#### Reference to graphics

If it is required to indicate a graphic, the complex attribute **graphic** must be used. The sub-attribute **pictorialRepresentation** must be used to indicate the file name (without the path) of the external graphical file. Graphic files that form part of the data product must be content with the characteristics collected in Table 2.7.

Table 2.7 - Graphics characteristics

|  |  |
| --- | --- |
| **Characteristics** | **Values** |
| 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 |
| File size | Minimum, considering that 10 MB is the maximum allowable size of an MRS dataset |

Additional information about the graphic file may be encoded in other sub-attributes of attribute **graphic**, as described in clause 2.4.12.

### Dates

Dates may need to be encoded as complete or truncated values, depending on available information and allowed format for the particular attribute. The definition of the attribute will indicate if it must take a complete value (type *Date* or *DA*) or is allowed to take a truncated value (type *S100\_TruncatedDate* or *TD*). Complete and truncated dates are different value types (see S-100 § 1-4.5.2 Table 1-2).

For attributes that use the complete date type (type *Date* or *DA*), all their components (year, month, and day) must be specified.

For attributes that use the truncated date type (type *S100\_TruncatedDate* or *TD*), zero, one, or two of the year/month/day components may be omitted. If the year component is included, it must be specified using exactly 4 digits.

#### Complete Dates

Dates (except truncated dates, see the following clause) must be encoded in conformance with the Date format as specified in S-100 Ed. 5.2.0 (§ 1-4.5.2) which is the same as the DA format in Table 2.2 in this document. The data values have to be provided in accordance with the Gregorian Calendar starting with four digits for the year, two digits for the month and two digits for the day.

Example: The date 18 September 2010 is encoded as follows:

In the GML format: <date>2010-09-18</date>

Note that since both discovery metadata and GML datasets are XML files, both will use the “GML format” above.

#### Truncated Dates

In Truncated Dates one or more components (year, month, or day) of the date is not specified. Truncated date values must be encoded in conformance with the S100\_TruncatedDate format or equivalent as specified in S-100 (§§ 1-4.5.2 and 3-9) which is the same as the *TD* format in Table 2-2 in this document. If encoding attributes which can take truncated date values (e.g., **fixedDateRange**, **periodicDateRange**, **reportedDate)** and no specific year, month, or day is required, the values must be encoded in conformance with the truncated date format as specified in S-100 (§§ 1-4.5.2 and 3-9), using the format-specific type for XML/GML.

To encode partial dates in the XML/GML data format:

Table 2.8 - Date encoding format in XML and GML

|  |  |  |
| --- | --- | --- |
| **Description** | **ISO 8211** | **GML** |
| No specific year, same day each year | – – – –MMDD | <gMonthDay>––MM–DD</gMonthDay> |
| No specific year, same month each year | – – – –MM– – | <gMonth>––MM</gMonth> |
| No specific day | YYYYMM– – | <gYearMonth>YYYY–MM</gYearMonth> |
| No specific month and no specific day | YYYY– – – – | <gYear>YYYY</gYear> |

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

The dashes (–) indicating that the year, month, or date which is not specified must be included in the encoding (with no space between the dashes).

#### Start and end of ranges

In accordance with S-100 § 3-8, the start and end instants of a range or period are included in the range or period.

EXAMPLE 1: If the beginning of a date range is encoded as the complete date 01 January 2016, the period begins at 00:00:00 on 1 January 2016, and the whole of New Year’s Day is included in the period. If the end of the date range is encoded as 01 January 2016, the period ends at 24:00:00 on 1 January 2016, i.e., again the whole of New Year’s Day is included in the period.

EXAMPLE 2: If the beginning of a period is encoded in truncated date format as – – – –01– – (i.e., year and day not specified), the period begins at 00:00:00 on 1 January each year. If the end of the period is encoded as – – – –01– –, the period ends at 24:00:00 on 31 January each year.

Note 1) Particular care should be taken if the end date is 28 or 29 February. S-100 § 3-8.3 explains the implications for end of February. For example, the truncated date – – – –02– – will be interpreted as 29 February in leap years and 28 February in non-leap years, while – – – –0228 will be interpreted as 28 February in every year.

Note 2) In accordance with ISO practice[[1]](#footnote-1), 00:00:00 means midnight at the start of a day and 24:00:00 means midnight at the end of a day.

#### Schedules

Weekly service schedules of a feature can be comprehensively described by using the information types **ServiceHours** and **NonStandardWorkingDay**.

EXAMPLE: A feature service is available under normal operation status 24 hours/day on Monday and Wednesday and from 08:00 to 16:00 LT from Thursday to Saturday. The service is available by pre-arrangement on public holidays and the 5 of August of each year when they fall on days which would otherwise be normal working days.

**ServiceHours**

**scheduleByDayOfWeek**

**categoryOfSchedule** =1 (normal operation)

**timeIntervalsByDayofWeek**

**dayOfWeek** =2(Monday), 4(Wednesday)

**dayOfWeekIsRange** =0 (false)

**timeIntervalsByDayofWeek**

**dayOfWeek** =5(Thursday), 7(Saturday)

**dayOfWeekIsRange** =1 (true)

**timeOfDayStart** = 080000

**timeOfDayEnd** = 160000

**NonStandardWorkingDay**

**dateFixed** = – – – – 0805 (5 August)

**dateVariable** = public holidays

**information.text** = “By pre-arrangement”

The above example can be encoded as follows:

<S123:ServiceHours gml:id="(GML ID of ServiceHours)">

<scheduleByDayOfWeek>

<categoryOfSchedule code=”1”>Normal Operation</categoryOfSchedule>

<timeIntervalsByDayOfWeek>

<dayOfWeek code=”2”>Monday</dayOfWeek>

<dayOfWeek code=”3”>Wednesday</dayOfWeek>

<dayOfWeekIsRange>0</dayOfWeekIsRange>

<timeOfDayStart>00:00:00</timeOfDayStart>

<timeOfDayEnd>24:00:00</timeOfDayEnd>

</timeIntervalsByDayOfWeek>

<timeIntervalsByDayOfWeek>

<dayOfWeek code=”5”>Thursday</dayOfWeek>

<dayOfWeek code=”6”>Saturday</dayOfWeek>

<dayOfWeekIsRange>0</dayOfWeekIsRange>

<timeOfDayStart>08:00:00</timeOfDayStart>

<timeOfDayEnd>16:00:00</timeOfDayEnd>

</timeIntervalsByDayOfWeek>

</scheduleByDayOfWeek>

<partialWorkingDay xlink:href="(reference to NonStandardWorkingDay)"/>

</S123:ServiceHours>

<S123:NonStandardWorkingDay gml:id="(GML ID of NonStandardWorkingDay)">

<dateFixed><gMonthDay>--08-05</gMonthDay></dateFixed>

<dateVariable>public holidays</dateVariable>

<information><text>By pre-arrangement</text</information>

<theServiceHours\_nsdy xlink:href="(reference to ServiceHours)"/>

</S123:NonStandardWorkingDay>

If the days of week are known but the hours of availability are unknown, there is no time attribute. Twenty-four availability is indicated by encoding the availability period as 000000-240000. Special cases such as unknown can be explained in the **textContent** or **information** attribute of **ServiceHours**.

To encode two or more periods within the same day, repeat the **timeOfDayStart** and **timeOfDayEnd** attributes. If one of the times is not known, it may be nilled as described in clause 2.4.4.

For example, to encode open hours of 8 a.m. to 12 noon and 1 p.m. to 5 p.m. on Thursdays and Saturdays:

**timeIntervalsByDayofWeek**

**dayOfWeek** =5(Thursday), 7(Saturday)

**dayOfWeekIsRange** =0 (false)

**timeOfDayStart** = 080000

**timeOfDayStart** = 130000

**timeOfDayEnd** = 120000

**timeOfDayEnd** = 170000

The order of repeated **timeOfDayStart** and **timeOfDayEnd** attributes is significant, since intervals are specified by matching them pairwise in order.

UTC is indicated by the Z suffix. The absence of the Z suffix indicates local time.

The absence of any additional information other than date (fixed or variable) in **NonStandardWorkingDay** should be interpreted as closure on the specified days. Non-standard working days do not need to be associated with **ServiceHours** instances categorized as “closure” (*categoryOfSchedule=Closure*) because the closure is already indicated in the **ServiceHours** instance.

#### Times

If it is required to provide information of the start time and end time of an active period of a feature, it must be encoded using the attributes **timeOfDayStart** and **timeOfDayEnd**. The order has significance.

### Combination of date schedules and times

Schedule information can also include time of day. The complex attribute **timeIntervalsByDayofWeek** also includes **timeOfDayStart** and **timeOfDayEnd** attributes to encode the daily start and end times of service. Complete instructions on how to encode schedules are described in clause 2.4.10.4.

### Graphic information

A graphic file should be appropriate for the purpose and should supplement the information in terms of navigational relevance. Preferably, the graphic should provide perspective relevant to the view of the mariner. Graphics should be such that all the information in the graphic is legible in the application display.

Graphic information must be encoded using the complex attribute **graphic**. The simple sub-attribute **pictureInformation** should be used to provide credits to the picture creator, copyright owner etc.

Assuming that graphic information provides a coastal view, mariners are interested in knowing from which point on sea that graphic has been taken. The complex attribute **bearingInformation** (see clause 2.4.12.1) provides all necessary information.

#### Bearing information

The most accurate information should be provided if it is necessary to indicate a position from where a picture has been taken. **information** is a sub-complex attribute of **bearingInformation** and should be used to specify that no bearing information can be provided whenever such is the case. The sub-attribute **sectorLimit** can be used to describe a certain level of inaccuracy in the position determination.

## Associations

### Introduction

An association expresses a relationship between two classes - features, information types, or a feature and an information type. Objects in the dataset (instances of feature/information types) are related only if the link between them is encoded in the dataset.

EXAMPLE: An **Authority** information type provides the responsible authority information to the **Radio Station** feature. An association named **Service Control (srvControl)** is used to relate the two classes; roles are used to convey the meaning of the relationship.

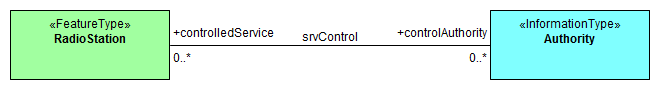


Figure 2.2 Information association relating a feature to an information type

An association end may have a multiplicity which describes how many instances the feature or information type instance at the other end is allowed to are to link to. In Figure 2.2, any single instance of **Radio Station** may link to any number of **Authority** instances.

### Association names

The association name is normally provided by the UML diagram at the middle of the connection line/arrow between the two involved classes and can be obtained from the feature and information type tables provided in this document).

Association names may be omitted in the UML diagrams for the following reasons:

a) the association is defined by an association class, see 2.5.4 (the name of the association class is used);

b) to avoid cluttering the diagram – however, the name is always documented in the feature/information type tables.

### Association roles

Either or both association ends can have a name (role). In Figure 2.2 the roles are **controlledService** and **controlAuthority**. This association expresses the relationship that a **Radio Station** may have any number of responsible **Authorit(ies)**, and an **Authority** may be responsible for any number of **Radio Stations**.

Roles may be also omitted from the diagram to reduce clutter – again, the role name is documented in the feature/information type tables.

Note: Instead of documenting every single role, Product Specifications may describe rules for defining default roles.

### 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 features or information types it connects. An association class is both an association and a class. Within an S-123 product the association classes **Permission Type** and **Inclusion Type** may be used for relating vessel classes to feature and information types.

#### Permission Type

This association class specifies the relationship of the vessel class to a feature, e.g., whether access to a feature (or use of a facility) is prohibited or permitted for a specified class of vessel. The class of vessel is described by the simple and complex attributes of the information type **Applicability** such as length, cargo, etc. The attributes of the association class describe the nature of the relationship, i.e., whether access to an area is permitted or prohibited, or whether use of a service is required or recommended.



Figure 2.3 Association class for hypothetical requirement for use of a radio service by a vessel type

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = Class 3 and an instance of feature **RadioServiceArea**, with **Permission Type**’s attribute **categoryOfRelationship** = required, means that vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code) must use the radio services provided in the **RadioServiceArea**.

#### Inclusion Type

This association class defines whether a specified customer (class of vessels, as described by **Applicability**) is excluded or included from a particular regulation, recommendation, etc. Again, the attributes of the association class describe the nature of the relationship; in this case whether the vessel is included or excluded from the regulation, etc.

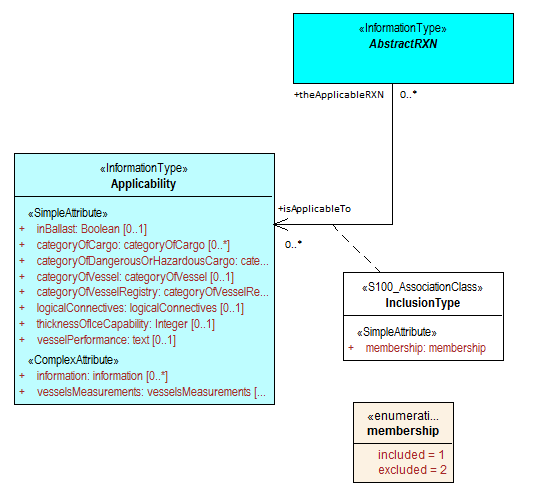


Figure 2.4 Association class for inclusion of vessel types in regulations

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = IMDG Code Class 3, with **Inclusion Type**’s attribute **membership** = included, and an association of a **Regulation** instance to the same Inclusion Type, means that the information provided by the **Regulation** (a sub-type of **AbstractRXN)** applies to vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code).

Note (1) Since **AbstractRXN** is an abstract type, it cannot have direct instances in the dataset. Only instances of its (non-abstract) sub-types can be used.

Note (2) Specific tools may use different presentations in their user interfaces, e.g., as two associations (as described in the text of the example), or one association with an association class also shown (as shown in Figure 2.4).

### Use of various associations

#### General

In general, associations must be encoded whenever the relationship is useful for navigation, monitoring, voyage or route planning, or reporting purposes, or any other purpose for which the dataset is intended. The multiplicity lower bound of “0” at an association end means only that the absence of a link to the relevant instance does not invalidate the dataset. The encoding instructions for individual feature and information types describe what associations are allowed and whether they are required or optional.

#### Generic association for uncategorized additional information

Unless other associations are specified, information types are associated to the relevant features using the association name **AdditionalInformation** and the role name **theInformation**.

#### Associations to Restrictions, Recommendation, Regulations, and Nautical Information

The **Restrictions, Recommendation, Regulations, Nautical Information** are associated to the relevant features using the association named **AssociatedRxN (inherited from their common abstract super-type)**. The roles at the ends of this association are **appliesInLocation** and **theRxN** (the Restriction, Regulation etc.).

If the regulation applies only to a specific class, or if it mentions an exempt class, an additional association to an **Applicability** object is encoded using the **InclusionType** association class.

#### Conventional Association

Certain features and information types may be permitted or required to have associations to other feature or information types. The allowed or mandatory associations for a feature/information type are shown in the application schema (clause 4 of the Product Specification) and listed in the documentation for individual types in this Annex. Definitions of the associations and roles are also given in the DCEG.

#### Where to Encode Associations

The presentation and management of associations will be determined by the user interface of the encoding software tools. S-100 permits feature-information associations to be encoded only from the geographic feature to the information type and not vice versa.

## Datasets

### Types of Datasets

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

Table 2.9 shows the types of datasets which may be produced and contained within an exchange set:

Table 2.9 - Dataset types

|  |  |
| --- | --- |
| **Dataset** | **Explanations** |
| New dataset: | Data for an area different (in coverage and/or extent) to existing datasets. |
| New Edition of a dataset: | A re-issue plus 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 and should have the same spatial extents. |
| Update dataset | Updated or new information. Contains information about objects being added, modified, or deleted. |

### Overlay data sets

S-123 datasets are intended to be used together with S-101 ENC (or similar data products) which will act as a base layer. The base layer is expected to provide navigational and visual context. Generally, an overlay dataset like S-123 does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-123 application schema does not include any feature for designating a region as “other”, or “not a radio service area” (i.e., there is no S-123 feature equivalent to the S-101 Unsurveyed Area). Further, an overlay dataset does not include features that provide auxiliary information such as bathymetry within a radio services area.

Due to the nature of the S-123 domain, certain features, for example GMDSSArea, may overlap coverage of S-101 ENC stemming from multiple data producers, outside the national borders of the originating data producer.

### Data coverage

A Marine Radio Services dataset can contain one or more **DataCoverage** features (see clause 4.4). The data boundary is defined by the extent of the **DataCoverage** meta features. Data must only be present within **DataCoverage** meta features.

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

As features may overlap other S-100 datasets from multiple data producers (see clause 2.6.2), the Data Coverage feature must also overlap other S-100 datasets in such cases.

An Update dataset must not extend the data coverage for the base dataset to which it applies. Where the extent of the data coverage for a base dataset is to be changed, this must be done by issuing a New Edition of the dataset.

### 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.

Discovery metadata is encoded in the exchange catalogue. S-123 uses the same classes and attributes for discovery metadata as S-100, but adds certain product-specific restrictions. The classes and attributes for generic discovery metadata are defined in S-100 Part 17. Constraints and restrictions specific to S-123 are defined in the S-123 Product Specification.

The schema for the exchange catalogue file (CATALOG.XML) for S-123 is the same as the S-100 generic schemas and is available from the schema server (https://schemas.s100dev.net).

### Dataset header metadata

Dataset header metadata contains structural and discovery metadata that apply to the whole dataset and are encoded in the dataset file. The elements are described in S-100 Part 10b.

### Dataset units

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

The geographic distance and range units must be nautical miles.

### Dataset Coverage

Marine Radio Services datasets are spatially limited.

In areas which include neighbouring producer nations, producing agencies should co-operate to agree on dataset boundaries and ensure no data overlap. 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 MRS feature extends outside the product coverage and the adjoining object does not exist, e.g. due to delay in the production of the neighbouring HO product, an indication should be placed at the outer edge of the product.

### Overlaps

The **DataCoverage** features within an MRS dataset must not overlap, however **DataCoverage** features from different MRS datasets may overlap.

### 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 **featureName**.

Geographic names should be encoded with the complex attribute **featureName. The complex attribute featureName consists of the simple sub-attributes language, name and nameUsage, which provides the encoder with options as to the name to display in certain system display settings.**

All area and point features within an MRS product should be encoded using **featureName if a name is available**.

Named features listed in Hydrographic Office’s Sailing Directions or other documents that may assist in locating service information should be encoded using feature name on the relevant feature (e.g. **Weather Forecast And Warning Area**).

## Scale policy

### General policy

MRS data must be compiled in the best applicable scale. The use of the data itself is "scale independent". That means that the data can be used at any scale.

### Scale policy for feature types

Unlike S-101, S-123 does not define scale minimum values or steps for individual feature types.

## Masking

To improve the look and feel of the display of MRSs in ECDIS for the mariner certain features, or certain edges of features, should be masked.

### Surface features crossing MRS cell boundaries

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

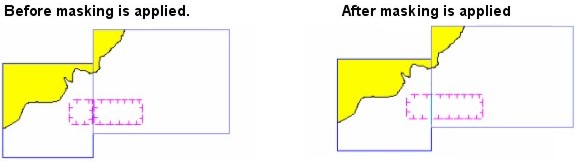


Figure 2.5 Surface feature crossing MRS products boundaries

This allows the features to be displayed as a single feature of type surface rather than being divided at the MRS 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 coincides with the MRS 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 MRS product (see clause 4.3), all edges of these area features should be masked.

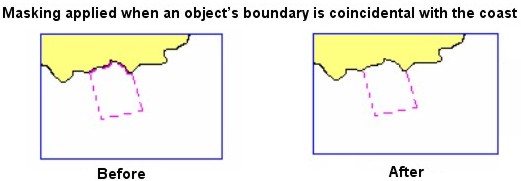
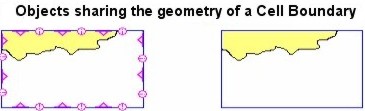


Figure 2.6 Surface features extending beyond the entire limit of data coverage

# Description of table format for feature and information types

**X.X Clause heading**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). | | | | | | | | | |
| **S-123[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-123 feature and corresponding S-57 acronym (if applicable) | | | | | | | | | |
| **Super-Type:** super-type (clause reference, should be hyperlink when published) | | | | | | | | | |
| **Sub-Types:** sub-types (clause references, should be hyperlinks when published) | | | | | | | | | |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** | | | | | | | | | |
| *Real World*  (Reserved) | | *Paper Chart Symbol*  (Reserved) | | | | | *ECDIS Symbol*  (Reserved) | | |
| **S-123 Attribute** | | | **S-57 Acronym** | | **Allowable Encoding Value** | | | **Type** | **Multiplicity** |
| This section lists the allowable **local** attributes for the S-123 feature or information type. | | |  | |  | | |  |  |
|  | | | | | | | | | |
| **Feature/information associations** (allowable **local** associations) | | | | | | | | | |
| **Type** | **Association Name** | | **Class** | **Role** | | **Mult.** | **Class** | **Role** | **Mult.** |
| association, aggregation, or composition | Name | | The name of the feature class (same as at the head of this table). | Role of this class. | |  | Name of the other class to which this class is linked. | Role of the other class. |  |
| If the class, role, and multiplicity for one end are missing, it means the association is unidirectional, that is, the binding for the association is only in one of the participating features or information types. This is sometimes the case for information associations that link a feature to an information type - the feature type has a binding to the information type, but not vice versa. | | | | | | | | | |
| 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:

The clause references in the super-type and sub-types fields should be hyperlinks when this DCEG is published, allowing navigation back and forth between a feature type and its super-type. This can be used to access guidance encoded in the feature table for a feature’s super-types.

S-123 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. Inherited attributes are not shown in the table, only locally defined attributes.

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-123 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-123 can be found in the Simple Attributes section of the printed feature catalogue 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 Product Specification main document clause 12.3). 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-123 Attribute column.

Introductory clauses may depict associations using a UML diagram showing the relationships that apply to the class and its super-classes (generalizations). Relationships which are inherited from super-classes are shown by including the super-classes and their associations in the diagram.

The usual UML conventions apply. For explanations of standard UML notations, see S-100 Part 1. For explanations of the conventions used for associations, see clause 2.5 in this DCEG.

Association ends and multiplicities: A lower bound of 0 in the multiplicity at any end of an association indicates only that the association is not mandatory for any particular instance of the feature at the other end (i.e., it is not mandatory for an instance of “that” feature type to have an association to a feature of “this” type). A lower bound of “1” means that if an instance of “that” type exists, it must be associated to an instance of “this” type. If the association is actually encoded then it amounts to saying that “this relationship exists between these two instances” and there must be an appropriate instance at both ends. Associations that are not mandatory should be encoded if and only if they convey useful information.

# Metadata Features

## Introduction

Meta-features are used to reduce the need to code quality and datum attributes in individual features, as well as to delimit the extent of data in the dataset. In a base dataset, some meta-features are mandatory (clause 4.2).

Horizontal and vertical uncertainties that apply to the majority of features are encoded as attributes of one or more **QualityOfNonBathymetricData** features together covering the same extent as the spatial union of the **DataCoverage** features in the dataset. Typically, there would be one **DataCoverage** feature and one **QualityOfNonBathymetricData** feature, having the same spatial extent.

Exceptional horizontal and vertical uncertainties are encoded in a **SpatialAccuracy** information type associated to particular spatial primitives.

## Mandatory meta features

The mandatory meta features are:

* **DataCoverage**
* **QualityOfNonBathymetricData**

## ****Maximum and minimum display scales****

Maximum and minimum values for the display scale attributes are specified in Table 4.1. These are the same as in S-101 except that the empty (null) value is not used in S-123.

Table 4.1 - Maximum and minimum display scale values (from S-101 PS)

|  |  |
| --- | --- |
| **maximum display scale** | **minimum display scale** |
| 10,000,000 | ~~empty (null)~~ |
| 3,500,000 | 10,000,000 |
| 1,500,000 | 3,500,000 |
| 700,000 | 1,500,000 |
| 350,000 | 700,000 |
| 180,000 | 350,000 |
| 90,000 | 180,000 |
| 45,000 | 90,000 |
| 22,000 | 45,000 |
| 12,000 | 22,000 |
| 8,000 | 12,000 |
| 4,000 | 8,000 |
| 3,000 | 4,000 |
| 2,000 | 3,000 |
| 1,000 | 2,000 |

## Data coverage meta feature

**DataCoverage**: In order to assist in data discovery, the meta feature **DataCoverage** must be used to provide the area of coverage of the S-123 dataset. This means that **DataCoverage** expresses where the presence or absence of S-123 geographic features is asserted. Unlike S-101 datasets, there is no ‘skin of the earth’ principle in S-123 and there may be regions covered by a **DataCoverage** but where no geographic S-123 feature is present.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A geographical area that describes the coverage and extent of spatial objects. | | | | | | |
| **S-10x Metadata Feature: Data Coverage (M\_COVR, M\_CSCL)** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Maximum Display Scale | (CSCALE) | | (see Table 4.1) | | IN | 1, 1 |
| Minimum Display Scale |  | | (see Table 4.1) | | IN | 1, 1 |
| Optimum Display Scale |  | | (see Table 4.1) | | IN | 0, 1 |
| Information | (INFORM) | |  | | C | 0, \* |
| File Locator |  | |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) | |  | | (S) TE | 0, 1 |
| Headline |  | |  | | (S) TE | 0, 1 |
| Language |  | | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) | |  | | (S) TE | 0, 1 |
| Interoperability Identifier |  | |  | | UN | 0, 1 |
| INT 1 Reference: General The meta feature **Data Coverage** encodes the area covered by the dataset. This feature is also used to provide the ECDIS with the scale information necessary for the determination of dataset loading and unloading in relation to the user selected viewing scale in the ECDIS.  There must be a minimum of one **Data Coverage** feature in a dataset. **Data Coverage** features must cover at least the extent of the spatial types in the dataset, and must not overlap.  The mandatory attribute **maximumDisplayScale** is used to indicate the largest intended viewing scale for the data.  The mandatory attribute **minimumDisplayScale** is used to indicate the smallest intended viewing scale for the data.  Typically, only a single **DataCoverage** feature should be used in a dataset. Datasets must have the same value for **minimumDisplayScale** for all **DataCoverage** features in the dataset.  The use of S-123 data is scale-independent (see clause 2.8) and maximum display scale will normally be 1000 (the extreme value in the table of scales in the S-101 ENC, see Table 4-1). Should a producer need to encode different maximum and minimum display scales from the extreme (i.e., create scale-dependent datasets), the values of maximum and minimum display scales should be harmonized with base layer S-101 datasets.  Remarks:   * This meta feature is intended to support an indication of coverage. * Where a dataset consists of only one **DataCoverage** feature, the value for the maximum display scale populated in the dataset discovery metadata must be the same as the value populated for maximum display scale on the **DataCoverage**. * For any **DataCoverage** feature, maximum display scale < minimum display scale.   Distinction: None | | | | | | |

## Quality of Non-Bathymetric Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: An area within which a uniform assessment of the quality of the non-bathymetric data exists. | | | | | |
| **S-123 Metadata Feature: Quality of Non-Bathymetric Data (M\_ACCY)** | | | | | |
| **Super Type:** | | | | | |
| **Primitives: surface** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Temporal Variation |  | 1 : Extreme Event  4 : Likely to Change  5 : Unlikely to Change | | EN | 0, 1 |
| Horizontal Distance Uncertainty | (HORACC) |  | | RE | 0, 1 |
| Horizontal Position Uncertainty |  |  | | C | 0, 1 |
| Uncertainty Fixed |  |  | | (S) RE | 1, 1 |
| Uncertainty Variable Factor |  |  | | (S) RE | 0, 1 |
| Orientation Uncertainty |  |  | | RE | 0, 1 |
| Survey Date Range |  |  | | C | 0, 1 |
| Date Start | (DATSTA) |  | | (S) TD | 0, 1 |
| Date End | (DATEND) |  | | (S) TD | 1, 1 |
| Vertical Uncertainty | (SOUACC)  (VERACC) |  | | C | 0, 1 |
| Uncertainty Fixed |  |  | | (S) RE | 1, 1 |
| Uncertainty Variable Factor |  |  | | (S) RE | 0, 1 |
| Information | (INFORM) |  | | C | 0, \* |
| File Locator |  |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline |  |  | | (S) TE | 0, 1 |
| Language |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Interoperability Identifier |  |  | | UN | 0, 1 |
| INT 1 Reference: Quality of positions, distances, or directions The meta feature **Quality of Non-bathymetric Data** may be used to provide an indication of the overall uncertainty of position, distance, or direction for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information (which is not part of the S-123 data model as currently defined anyway) nor should it be used to delimit peripheral areas where radio reception is uncertain or variable.  **Positional uncertainty** on the **Quality of Non-bathymetric Data** applies to non-bathymetric data situated within the area, while **positional uncertainty** on the associated spatial types qualifies the location of the **Quality of Non-bathymetric Data** feature itself.  Remarks:  Distinction: | | | | | |

# Geographic Features

This section describes abstract as well as non-abstract types. The abstract type **FeatureType** cannot be used directly, but defines attributes inherited by its sub-types. The encoding remarks in the description of **FeatureType** apply to its sub-types but may be overridden by remarks in the sub-type.

## Feature Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Generalized feature type which carries all the common attributes. | | | | | | |
| **S-123 Geo Feature: Feature Type** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: noGeometry** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Text Content | | (TXTCON) |  | | C | 0, \* |
| Category of Text | | (CATTXT) | 1 : Abstract or Summary  2 : Extract  3 : Full Text | | (S) EN | 0, 1 |
| Information | | (INFORM) |  | | (S) C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Online Resource | |  |  | | (S) C | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) UI | 1, 1 |
| Name of Resource | |  |  | | (S) TE | 0, 1 |
| Source | |  |  | | (S) TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | (S) TD | 0, 1 |
| Feature Name | |  |  | | C | 0, \* |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Name | | (OBJNAM)  (NOBJNM) |  | | (S) TE | 1, 1 |
| Name Usage | |  | 1 : Default Name Display  2 : Alternate Name Display  3 : No Chart Display | | (S) EN | 0, 1 |
| Fixed Date Range | |  |  | | C | 0, 1 |
| Date Start | | (DATSTA) |  | | (S) TD | 0, 1 |
| Date End | | (DATEND) |  | | (S) TD | 0, 1 |
| Time of Day Start | |  |  | | (S) TI | 0, 1 |
| Time of Day End | |  |  | | (S) TI | 0, 1 |
| Periodic Date Range | |  |  | | C | 0, \* |
| Date Start | | (DATSTA) |  | | (S) TD | 1, 1 |
| Date End | | (DATEND) |  | | (S) TD | 1, 1 |
| Source | |  |  | | TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | TD | 0, 1 |
| Interoperability Identifier | |  |  | | UN | 0, 1 |
| INT 1 Reference: Geographic features in general Where a complex attribute has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..\*), at least one of the sub-attributes must be populated.  The **additionalInformation** association to a **NauticalInfomation** object can be used to attach an additional chunk of information to an information type, and there is no applicable specific information type or association. This should be used sparingly if at all. Restrictions, regulations, etc., related to geographic features Navigation and other activities in areas can be limited by regulations/restrictions and recommendations. That information is usually provided by relevant authorities. If the feature has specific attributes to encode such information (such as a **restriction** attribute), those attributes must be used wherever possible; if the specific attributes are insufficient, an appropriate **Restrictions**, **Regulations**, **Recommendations**, or **NauticalInformation** information type can be associated to thefeature using an *associatedRxN* association. Restrictions, regulations, etc., that depend on vessel characteristics Information that is conditional on vessel characteristics may be encoded using the **PermissionType** association to an **Applicability** information type that defines the set of vessels to which the conditions apply.  Remarks:   * No remarks.   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Associated RxN | **AbstractRxN** | theRxN | 0, \* |
| association | Permission Type | **Applicability** | permission | 0, \* |
| association | Additional information | **NauticalInformation** | theInformation | 0, 1 |
| Asso | Text association | **TextPlacement** | theCartographicText | 0, 1 |

## Connectivity Subscription Area

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: An area of connectivity coverage available for the subscription of connectivity service. | | | | | | |
| **S-123 Geo Feature: Connectivity Subscription Area** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface, point** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Mult.** |
| Category of Connectivity Subscription | |  | 1 : Satellite Communication GEO  2 : Satellite Communication LEO  3 : Cellular Communication  4 : Terrestrial Ad-Hoc Communication | | EN | 0, 1 |
| Communication Standard | |  |  | | TE | 0, 1 |
| Estimated Range of Transmission | | (ESTRNG) |  | | RE | 0, 1 |
| Base Station Antenna Height | |  |  | | RE | 0, 1 |
| Frequency Range | |  |  | | C | 0, \* |
| Frequency Limit Lower | |  |  | | (S) IN | 1, 1 |
| Frequency Limit Upper | |  |  | | (S) IN | 1, 1 |
| Sector Limit | |  |  | | C | 0, \* |
| Sector Limit One | | (SECTR1) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| Sector Limit Two | | (SECTR2) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| Coverage Indication | |  |  | | C | 0, 1 |
| Minimum Received Power | |  |  | | (S) IN | 0, 1 |
| Presumed Receiver Antenna Height | |  |  | | (S) IN | 0, 1 |
| Minimum Signal to Interference Noise Ratio | |  |  | | (S) IN | 0, 1 |
| Status | | (STATUS) | 1 : Permanent  2 : Occasional  4 : Not in Use  5 : Periodic/Intermittent  7 : Temporary  8 : Private  14 : Public  16 : Watched  17 : Unwatched  24 : Strong  25 : Good  26 : Moderately  27 : Poor | | (S) EN | 0, \* |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, \* |
| INT 1 Reference:  Remarks:   * Name of the service/company may be coded by using the **featureName** attribute, which is inherited from the super type **FeatureType**. * Example for the attribute **communicationStandard**: 5G, 5G-A, or more specific terms. * The **estimatedRangeOfTransmission** and **sectorLimit** attributes are for use when the geometry is of Point type. * Reliability of communication, susceptibility to jamming or environmental factors may be indicated by using the **status** and/or **text** sub-attribute of the **coverageIndication** attribute. * If required, detailed QoS information may be provided via the association with a **ConnectivityQualityOfService** information type instance. * For the attribute values of **ConnectivitySubscriptionArea** features, the unit is Hz for frequency, dBm for power, dB for SINR.   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Connectivity Service | **Authority** | connectivityServiceProvider | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Available Quality of Service | **ConnectivityQualityOfService** | theQoS | 0, 1 |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## GMDSS Area

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: An area defined for a global communications service based upon automated systems, both satellite based and terrestrial, to provide distress alerting and promulgation of maritime safety information for mariners. | | | | | | |
| **S-123 Geo Feature: GMDSS Area** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Id NAVAREA | |  |  | | TE | 1, 1 |
| Nationality | | (NATION) |  | | TE | 0, 1 |
| Category of GMDSS Area | | (CATGMD) | 1 : Area A1  2 : Area A2  3 : Area A3  4 : Area A4 | | EN | 1, 1 |
| Area A3 Service Description | |  |  | | C | 0, 1 |
| Serving Mobile Satellite Service | |  | 1 : Inmarsat SafetyNET  2 : Iridium SafetyCast | | (S) EN | 1, \* |
| Satellite Ocean Region | |  |  | | (S) TE | 0, 1 |
| MSI Coastal Warning Area | |  |  | | (S) TE | 0, 1 |
| INT 1 Reference: GMDSS Sea Area Sea Area A1 means an area within the radiotelephone coverage of at least one very high frequency (VHF) coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government. [Within continuous VHF DSC coverage from a Coast Radio Station (CRS) with follow on VHF RT (Radio Telephony)]  Sea Area A2 means an area, excluding sea area A1, within the radiotelephone coverage of at least one medium frequency (MF) coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.  Sea Area A3 means an area, excluding sea areas A1 and A2, within the coverage of a recognized mobile satellite service supported by the ship earth station carried on board, in which continuous alerting is available.  Sea Area A4 means an area outside sea areas A1, A2 and A3.  Remarks:  **Satellite Ocean Region** attribute is for the encoding of the Inmarsat Ocean Region Area (IHO definition: the ocean region of the earth’s surface, within which a station can obtain line-of-sight communication, with an Inmarsat satellite). Example: AORE, AORW, IOR, POR.  Coastal warning area means a unique and precisely defined sea area within a NAVAREA/METAREA or Sub-area established by a coastal State for the purpose of coordinating the broadcast of coastal maritime safety information through the SafetyNET or SafetyCast service. Example: SRR (Search and Rescue Region)  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Radio Service Control | **RadioControlCentre** | theControlCentre | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## Indeterminate Zone

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A region in which the perception of a phenomenon or the availability of a service is known only to a specified level of confidence. | | | | | | |
| **S-123 Geo Feature: Indeterminate Zone (INDZON)** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Information Confidence | |  | 1 : Virtually Certain  2 : High Likelihood  3 : Medium Likelihood  4 : Low Likelihood | | EN | 0, 1 |
| INT 1 Reference:  Remarks:   * Indeterminate Zone feature instances associated to the same aggregate feature instance must not overlap.   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| Composition | Fuzzy zone aggregation | **FuzzyAreaAggregate** | theCollection | 1, 1 |

## METAREA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A geographical sea area (which may include inland seas, lakes and waterways navigable by seagoing ships) established for the purpose of coordinating the broadcast of marine meteorological information. | | | | | | |
| **S-123 Geo Feature: METAREA** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Id METAREA | |  |  | | TE | 1, 1 |
| Online Resource | |  |  | | C | 0, \* |
| Headline | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) UI | 1, 1 |
| Name of Resource | |  |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:  The term METAREA followed by a roman numeral and the extensions to uniquely identify a sub area, such as METAREA VIII(N) and METAREA VIII(S), is to be coded by using the **Feature Name** attribute.  Only the roman number is to be coded in the **Id METAREA** attribute.  The METAREA coordinator should be encoded as an associated **Authority**. The coordinating authority to be associated should be the issuing authority, not the preparation authority, of the METAREA.  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## NAVAREA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A geographical sea area (which may include inland seas, lakes and waterways navigable by seagoing ships) established for the purpose of coordinating the broadcast of navigational warnings. | | | | | | |
| **S-123 Geo Feature: NAVAREA** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Id NAVAREA |  | |  | | TE | 1, 1 |
| Online Resource |  | |  | | C | 0, \* |
| Headline |  | |  | | (S) TE | 0, 1 |
| Linkage |  | |  | | (S) UI | 1, 1 |
| Name of Resource |  | |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:  The term NAVAREA followed by a roman numeral and the extensions to uniquely identify a sub area, such as NAVAREA I Baltic Sea sub-area, is to be coded by using the **Feature Name** attribute. Only the roman number is to be coded in the **Id NAVAREA** attribute.  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## NAVTEX Service Area

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A unique and precisely defined sea area, wholly contained within the NAVTEX coverage area, for which maritime safety information is provided from a particular NAVTEX transmitter. | | | | | | |
| **S-123 Geo Feature: NAVTEX Service Area** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Type of NAVTEX Service | |  | 1 : International NAVTEX  2 : national NAVTEX | | EN | 1, 1 |
| Id NAVAREA | |  |  | | TE | 1, 1 |
| Transmitter Identification Character | |  |  | | TE | 1, 1 |
| Nationality | | (NATION) |  | | TE | 0, 1 |
| Status | | (STATUS) | 1 : Permanent  4 : Not in Use  7 : Temporary | | EN | 0, 1 |
| INT 1 Reference:  Remarks:  According to NAVTEX Manual (IMO MSC.1/Circ.1403/Rev.2), “the boundaries of the NAVTEX service area must be wholly contained within the coverage area, and must not overlap with adjacent NAVTEX service areas.” The range of the broadcast may cover more than the area described but the responsibility is strictly limited by international agreed borders.  Only the roman number is to be coded in the **Id NAVAREA** attribute.  The transmitter identification character (B1) is a single letter which is allocated to each transmitter. It is used to identify the broadcasts which are to be accepted by the receiver and those which are to be rejected, and also the time slot for the transmission.  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## Radio Service Area

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: The area where a radio service can be obtained and the characteristics of the radio transmission. | | | | | |
| **S-123 Geo Feature: Radio Service Area** | | | | | |
| **Super Type: FeatureType** | | | | | |
| **Primitives: surface** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Language Information | (LNGINF) |  | | TE | 0, 1 |
| Transmission Power |  | Minimum range: 0 | | RE | 0, 1 |
| Transmission of Traffic Lists |  |  | | BO | 0, 1 |
| Status | (STATUS) | 1 : Permanent  2 : Occasional  4 : Not in Use  5 : Periodic/Intermittent  7 : Temporary  8 : Private  14 : Public  16 : Watched  17 : Unwatched | | EN | 0, 1 |
| Hours of Watch |  |  | | TE | 0, 1 |
| INT 1 Reference:  Remarks:   * If it is required, use the **transmissionPower** attribute to encode he maximum power (unit: dBm) the radio service uses (or is authorized to use) for radio transmission. * For the **Hours of Watch** attribute, the hours are given in UTC or by the use of a service symbol. Examples from ITU List IV: “0000-0030 0730-0800”, “H24” ( “H24” means a continuous service) * Seasonal services can be encoded as distinct features with appropriate **periodicDateRange** attributes inherited from **InformationType**.   Where it is impractical to encode the radio coverage, e.g. a radio service in HF band,   1. the intended service area may be encoded instead, and associate it with information types such as **TransmissionDetails** and **BroadcastDetails**. 2. the extent of the radio coverage may also be indicated by using an associated **RadioStation** feature with its **estimatedRangeOfTransmission** attribute;   Distinction: | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Radio Service Control | **RadioControlCentre** | theControlCentre | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| association | Service provision area | **RadioStation** | serviceProvider | 0, \* |
| aggregation | Core aggregation | **RadioServiceAreaAggregate** | theCollection | 0, 1 |

## Radio Station

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A place equipped to transmit radio waves. Such a station may be either stationary or mobile, and may also be provided with a radio receiver. | | | | | | |
| **S-123 Geo Feature: Radio Station (RDOSTA, W/T Station)** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: point** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Radio Station | | (CATROS) | 5 : Radio Direction-Finding Station  10 : Differential GNSS  19 : Radio Telephone Station  20 : AIS Base Station | | EN | 0, 1 |
| Estimated Range of Transmission | | (ESTRNG) |  | | RE | 0, 1 |
| Transmission Content | |  |  | | TE | 0, 1 |
| Remote Controlled | |  |  | | BO | 0, 1 |
| Status | | (STATUS) | 1 : Permanent  2 : Occasional  4 : Not in Use  5 : Periodic/Intermittent  7 : Temporary  8 : Private  16 : Watched  17 : Unwatched | | EN | 0, 1 |
| Radiocommunication Identifier | |  |  | | C | 0, \* |
| Call Sign | | (CALSGN) |  | | (S) TE | 0, 1 |
| MMSI Code | |  |  | | (S) TE | 0, 1 |
| Selective Call Number | | (SELCAL) |  | | (S) IN | 0, 1 |
| Sector Limit | |  |  | | C | 0, \* |
| Sector Limit One | | (SECTR1) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| Sector Limit Two | | (SECTR2) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| Hours of Watch | |  |  | | TE | 0, 1 |
| INT 1 Reference:  Remarks:   * The **RadioStation** featuremust only be used to encode the technical equipment itself, the point of transmission of the signal. There is no requirement in S-123 to establish an association between the **RadioStation** feature and the structure in which it is installed. * Further information on the radio transmission characteristic may be encoded using an associated instance of the information class **TransmissionDetails**. * The area in which the radio service can be obtained is described by an association (Service provision area) to a geo feature with the role serviceArea, such as a **RadioServiceArea** or a **NavtexServiceArea** feature instance. * The unit for the value of **estimatedRangeOfTransmission** attribute must be nautical mile. * For the **Hours of Watch** attribute, the hours are given in UTC or by the use of a service symbol. Examples from ITU List IV: “0000-0030 0730-0800”, “H24” ( “H24” means a continuous service). * Seasonally operating stations can be encoded as distinct **RadioStation** features with appropriate **periodicDateRange** attributes inherited from the **InformationType**.   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Radio Service Control | **RadioControlCentre** | theControlCentre | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| association | Service provision area | **ConnectivitySubscriptionArea, GMDSSArea, MetArea, NavArea, NavtexServiceArea, RadioServiceArea, WeatherForecastAndWarningArea** | serviceArea | 0, \* |

## Weather Forecast and Warning Area

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: An area for which weather forecasts and warnings are provided for specified periods. | | | | | | |
| **S-123 Geo Feature: Weather Forecast and Warning Area (WETFCA)** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Forecast or Warning Area | |  | 1 : World Meteorological Organization (WMO)  2 : National High Seas  3 : National Offshore  4 : National Coastal  5 : National Inshore  6 : National Local  7 : Ice | | EN | 1, 1 |
| Id METAREA | |  |  | | TE | 0, 1 |
| Nationality | | (NATION) |  | | TE | 0, 1 |
| Status | | (STATUS) | 1 : Permanent  2 : Occasional  4 : Not in Use  5 : Periodic/Intermittent  7 : Temporary  8 : Private  14 : Public | | EN | 0, 1 |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Service contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Location hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Broadcast Service | **BroadcastDetails** | theBroadcastDetails | 0, \* |
| association | Transmission Service | **TransmissionDetails** | theTransmissionDetails | 0, \* |
| Asso | Service provision area | **RadioStation** | serviceProvider | 0, \* |

## Fuzzy Area Aggregate

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Aggregation of a geographic feature describing a service or phenomenon with zones of different confidence about the availability of the service, occurrence of the phenomenon, or applicability of the information described by the geographic feature. | | | | | | |
| **S-123 Geo Feature: Fuzzy Area Aggregate** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: noGeometry** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference: Aggregation of approximate areas in general A ‘fuzzy area’ will consist of a ‘core’ feature of the appropriate geographic feature type and the appropriate geometry (e.g., a **RadioServiceArea** area feature) and one or more ‘fuzzy’ **Indeterminate Zone** features (with surface geometry).  To encode fuzzy areas, cartographers must demarcate areas where the information is of uncertain applicability and associate the areas of uncertainty to the appropriate sub-type of **FuzzyAreaAggregate**, along with the area feature where the information is certain (the “core feature”).  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| composition | Fuzzy zone aggregation | **IndeterminateZone** | theComponent | 1, \* |

## Radio Service Area Aggregate

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Aggregation of areas where radio services from a single radio service are available to different levels of reliability. | | | | | | |
| **S-123 Geo Feature: Radio Service Area Aggregate** | | | | | | |
| **Super Type: FuzzyAreaAggregate** | | | | | | |
| **Primitives: noGeometry** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference:  Remarks:  Attributes should be encoded only if they apply to the collection of core feature and indeterminate zones. For example, if it is necessary to provide a note that applies to all the features collectively, it may be encoded in the inherited attribute **textContent** of the **RadioServiceAreaAggregate**.  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| aggregation | Core aggregation | **RadioServiceArea** | theComponent | 1, 1 |

## Search and Rescue Region

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A defined geographical area where a specific country or organization is designated to coordinate and provide search and rescue services. | | | | | | |
| **S-123 Geo Feature: Search and Rescue Region** | | | | | | |
| **Super Type: FeatureType** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Nationality | | (NATION) |  | | TE | 0, 1 |
| INT 1 Reference:  Remarks:    Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** | | |
| **Class** | **Role** | **Mult** |
| association | Service Coordination | **Authority** | coordinatingAuthority | 0, \* |
| association | Radio Service Control | **RadioControlCentre** | theControlCentre | 0, \* |
| association | Available Telemedical Assistance Service | **TelemedicalAssistanceService** | theTMAS | 0, \* |
| association | Service Contact | **ContactDetails** | theContactDetails | 0, \* |

# Cartographic Features

Cartographic feature types arenot used in S-123.

# Information types

## Information Type

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Generalized information type which carries all the common attributes. | | | | | | |
| **S-123 Information Type: Information Type** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Fixed Date Range | |  |  | | C | 0, 1 |
| Date Start | | (DATSTA) |  | | (S) TD | 0, 1 |
| Date End | | (DATEND) |  | | (S) TD | 0, 1 |
| Time of Day Start | |  |  | | (S) TI | 0, 1 |
| Time of Day End | |  |  | | (S) TI | 0, 1 |
| Periodic Date Range | |  |  | | C | 0, \* |
| Date Start | | (DATSTA) |  | | (S) TD | 1, 1 |
| Date End | | (DATEND) |  | | (S) TD | 1, 1 |
| Feature Name | |  |  | | C | 0, \* |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Name | | (OBJNAM)  (NOBJNM) |  | | (S) TE | 1, 1 |
| Name Usage | |  | 1 : Default Name Display  2 : Alternate Name Display  3 : No Chart Display | | (S) EN | 0, 1 |
| Source | |  |  | | TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | TD | 0, 1 |
| INT 1 Reference: Information types in general The InformationType is an abstract type. An abstract type cannot be used directly, but define attributes inherited by its sub-types. The encoding remarks of an abstract type apply to its sub-types but may be overridden by remarks in the sub-type.  Where a complex attribute to be used has all its sub-attributes optional (e.g., multiplicity 0..1 or 0..\*), at least one of the sub-attributes must be populated.  The **featureName** attribute of an instance of an information type can be used for a short title that is either a proper name (if such is relevant) or which describes the instance. For example, the **featureName** attribute of an **Authority** information type can be the name of a government agency.  FeatureName attributes of information types should not duplicate the geographic feature name of an associated feature, but should pertain to the information instance itself.  The **featureName** attribute should be populated only if the value conveys useful information to the end user. Some examples of such situations are:   * providing the name of an organisation, such as the name of an **Authority**. * distinguishing between instances – if multiple instances of the same information type are associated to the same feature type (or another information type), the different instances may be given descriptive names to make it easier for the mariner to distinguish their content.   Some information instances are associated to multiple features, in which case its name should be general enough to be relevant to all the features.  For example, if naming **Regulations** instances describing radio watch regulations for a service area, consider whether (for example) there is a general regulation applicable to all such areas in a jurisdiction and an exceptional **Regulations** object associated to a single area or a subset of areas in the jurisdiction. In this situation, the general regulations may be encoded with the name “General radio watch regulations” and associated to several features, while a specific service area feature can also have a specific regulation whose name is “Special radio regulations for (named area)”.  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |

## AbstractRxN

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: An abstract superclass for information types that encode rules, recommendations, and general information in text or graphic form. | | | | | | |
| **S-123 Information Type: AbstractRxN** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Authority | | (CATAUT) | 2 : Border Control  3 : Police  4 : Port  5 : Immigration  6 : Health  7 : Coast Guard  8 : Agricultural  9 : Military  10 : Private Company  11 : Maritime Police  12 : Environmental  13 : Fishery  14 : Finance  15 : Maritime  16 : Customs | | EN | 0, 1 |
| Text Content | | (TXTCON) |  | | C | 0, 1 |
| Category of Text | | (CATTXT) | 1 : Abstract or Summary  2 : Extract  3 : Full Text | | (S) EN | 0, 1 |
| Information | | (INFORM) |  | | (S) C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Online Resource | |  |  | | (S) C | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) UI | 1, 1 |
| Name of Resource | |  |  | | (S) TE | 0, 1 |
| Source | |  |  | | (S) TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | (S) TD | 0, 1 |
| Graphic | |  |  | | C | 0, 1 |
| Pictorial Representation | | (PICREP) |  | | (S) TE | 1, 1 |
| Picture Caption | |  |  | | (S) TE | 0, 1 |
| Source Date | | (SORDAT) |  | | (S) DA | 0, 1 |
| Picture Information | |  |  | | (S) TE | 0, 1 |
| Bearing Information | |  |  | | (S) C | 0, 1 |
| Distance | |  |  | | (S) RE | 0, 1 |
| Information | | (INFORM) |  | | (S) C | 0, 1 |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Orientation | |  |  | | (S) C | 0, 1 |
| Orientation Uncertainty | |  |  | | (S) RE | 0, 1 |
| Orientation Value | | (ORIENT) |  | | (S) RE | 1, 1 |
| Sector Limit | |  |  | | (S) C | 0, 1 |
| Sector Limit One | | (SECTR1) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| Sector Limit Two | | (SECTR2) |  | | (S) C | 1, 1 |
| Sector Bearing | | (SECTR1)  (SECTR2) |  | | (S) RE | 1, 1 |
| Sector Line Length | |  |  | | (S) RE | 0, 1 |
| RxN Code | |  |  | | C | 0, \* |
| Headline | |  |  | | (S) TE | 0, 1 |
| Category of RxN | |  |  | | (S) CL | 0, 1 |
| Action or Activity | |  |  | | (S) CL | 0, 1 |
| INT 1 Reference:  Remarks:   * Subtypes of **AbstractRxN** carry the same attributes, but differ in the nature of information they encode. There are currently four such subtypes: **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation**. * At least one attribute **textContent** must be populated. * The complex attribute **rxNCode** can be used to classify regulations (or recommendations, etc.) according to their principal subject (sub-attribute **categoryOfRxN**) and the type of vessel activity affected (sub-attribute **actionOrActivity**), as well as provide a sequence of brief topic headings (sub-attribute **headline**).   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | InclusionType | **Applicability** | isApplicableTo | 0, \* |

## Applicability

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: 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-123 Information Type: Applicability** | | | | | |
| **Super Type: InformationType** | | | | | |
| **Primitives: None** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| In Ballast |  |  | | BO | 0, 1 |
| Category of Vessel |  | 1 : General Cargo Vessel  2 : Container Carrier  3 : Tanker  4 : Bulk Carrier  5 : Passenger Vessel  6 : Roll-On Roll-Off  7 : Refrigerated Cargo Vessel  8 : Fishing Vessel  9 : Service  10 : Warship  11 : Towed or Pushed Composite Unit  12 : Tug and Tow  13 : Light Recreational  14 : Semi-Submersible Offshore Installation  15 : Jack-Up Exploration or Project Installation  16 : Livestock Carrier  17 : Sport Fishing | | CL | 0, \* |
| Category of Vessel Registry |  | 1 : Domestic  2 : Foreign | | EN | 0, 1 |
| Category of Cargo | (CATCGO) | 1 : Bulk  2 : Container  3 : General  4 : Liquid  5 : Passenger  6 : Livestock  7 : Dangerous or Hazardous  8 : Heavy Lift  9 : Ballast  10 : Dry Bulk Cargo  11 : Liquid Bulk Cargo  12 : Reefer Container Cargo  13 : Ro-Ro Cargo  14 : Project Cargo  15 : Break Bulk Cargo | | EN | 0, \* |
| Category Of Dangerous Or Hazardous Cargo | (CATDHC) | 1 : IMDG Code Class 1 Div. 1.1  2 : IMDG Code Class 1 Div. 1.2  3 : IMDG Code Class 1 Div. 1.3  4 : IMDG Code Class 1 Div. 1.4  5 : IMDG Code Class 1 Div. 1.5  6 : IMDG Code Class 1 Div. 1.6  7 : IMDG Code Class 2 Div. 2.1  8 : IMDG Code Class 2 Div. 2.2  9 : IMDG Code Class 2 Div. 2.3  10 : IMDG Code Class 3  11 : IMDG Code Class 4 Div. 4.1  12 : IMDG Code Class 4 Div. 4.2  13 : IMDG Code Class 4 Div. 4.3  14 : IMDG Code Class 5 Div. 5.1  15 : IMDG Code Class 5 Div. 5.2  16 : IMDG Code Class 6 Div. 6.1  17 : IMDG Code Class 6 Div. 6.2  18 : IMDG Code Class 7  19 : IMDG Code Class 8  20 : IMDG Code Class 9  21 : Harmful Substances in Packaged Form | | EN | 0, \* |
| Logical Connectives | (LOGCON) | 1 : Logical Conjunction  2 : Logical Disjunction | | EN | 0, 1 |
| Thickness of Ice Capability |  |  | | IN | 0, 1 |
| Vessel Performance |  |  | | TE | 0, 1 |
| Vessel Measurements Specification |  |  | | C | 0, \* |
| Vessels Characteristics | (VSLCAR) | 1 : Length Overall  2 : Length at Waterline  3 : Breadth  4 : Draught  6 : Displacement Tonnage  7 : Displacement Tonnage, Light  8 : Displacement Tonnage, Loaded  9 : Deadweight Tonnage  10 : Gross Tonnage  11 : Net Tonnage  12 : Panama Canal/Universal Measurement System Net Tonnage  13 : Suez Canal Net Tonnage | | (S) EN | 1, 1 |
| Vessels Characteristics Value |  |  | | (S) RE | 1, 1 |
| Vessels Characteristics Unit | (VSLUNT) | 1 : Metres  3 : Metric Ton  4 : Ton  5 : Short Ton  6 : Gross Ton  7 : Net Ton  9 : Suez Canal Net Tonnage | | (S) EN | 1, 1 |
| Comparison Operator | (COMPOP) | 1 : Greater Than  2 : Greater Than or Equal To  3 : Less Than  4 : Less Than or Equal To  5 : Equal To  6 : Not Equal To | | (S) EN | 1, 1 |
| Information | (INFORM) |  | | C | 0, \* |
| File Locator |  |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline |  |  | | (S) TE | 0, 1 |
| Language |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| INT 1 Reference: The use of the Applicability information type The **Applicability** information type is intended for defining sets of vessels according to their dimensions, capabilities, and cargo. Its attributes are intended for defining different limitation conditions, as described by their definitions.  Multiple instances of **Applicability** associated to the same feature or regulation are treated as “inclusive OR”, that is, each **Applicability** defines an independent set of vessels to which the regulation, permission or requirement applies (or which is specifically exempted, depending on the attribute encoded in the association class).  Remarks:   * 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). * Limitations which cannot be expressed using more specific attributes should be encoded in text form in the ***information*** attribute. * It is acceptable for an **Applicability** to have only the **information** attribute populated. * Vessel types which do not conform to any of the listed **categoryOfVessel** values should be encoded as “other: <text>” where <text> is a producer-supplied type name. * The attribute **logicalConnectives** has multiplicity lower bound 0 for the case where there is only a single limiting condition (for example, if the only condition is “length overall > 100m”) and must be omitted in such a situation. If there is more than one condition, **logicalConnectives** must be encoded. If **logicalConnectives** is omitted and there is more than one condition, the default value assumed is logical conjunction. * Mutually inconsistent measurements (e.g., draught > 10m and draught < 5m) are an error. * The **fixedDateRange** and **periodicDateRange** must not be used to define the commencement, termination, season, etc., of the regulation or feature to which **Applicability** is associated (fixed and periodic date ranges should be encoded in the regulation or feature instance instead).   Distinction: | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | InclusionType | **AbstractRxN** | theApplicableRxN | 0, \* |

## Authority

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: A person or organisation having political or administrative power and control. | | | | | | |
| **S-123 Information Type: Authority** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Authority | | (CATAUT) | 2 : Border Control  3 : Police  4 : Port  5 : Immigration  6 : Health  7 : Coast Guard  8 : Agricultural  9 : Military  10 : Private Company  11 : Maritime Police  12 : Environmental  13 : Fishery  14 : Finance  15 : Maritime  16 : Customs | | EN | 0, 1 |
| Text Content | | (TXTCON) |  | | C | 0, 1 |
| Category of Text | | (CATTXT) | 1 : Abstract or Summary  2 : Extract  3 : Full Text | | (S) EN | 0, 1 |
| Information | | (INFORM) |  | | (S) C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Online Resource | |  |  | | (S) C | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) UI | 1, 1 |
| Name of Resource | |  |  | | (S) TE | 0, 1 |
| Source | |  |  | | (S) TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | (S) TD | 0, 1 |
| INT 1 Reference: The use of the Authority information type The **Authority** information type is used for encoding information about organizations, including official authorities as well as private organizations.  For encoding the contact details for an organization, use an associated **ContactDetails** information type (see the information associations table below).  For encoding the general operating hours of an organization, use an associated **ServiceHours** information type.  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Authority contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Authority hours | **ServiceHours** | theServiceHours | 0, 1 |

## Broadcast Details

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Description of the content and schedule of a service using broadcast technology of radiocommunications to deliver information (to every receiver within a direct range). Online resource to access the content may also be included. | | | | | | |
| **S-123 Information Type: Broadcast Details** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Language | |  | ISO 639-2/T | | TE | 0, \* |
| Category of Broadcast/Communication | |  | 1 : Commercial  2 : Non-Commercial  3 : Public  4 : Non-Public | | EN | 0, 1 |
| Broadcast Content | |  |  | | C | 1, \* |
| Type of Broadcast Content | |  | 1 : Navigational warnings  2 : Meteorological warnings and forecasts  3 : SAR Information  4 : Marine security or piracy warnings  5 : Tsunamis or natural phenomena warnings  6 : Pilot and VTS service messages  7 : Military information  8 : Special service or application specific messages  9 : Ice Report | | (S) EN | 1, \* |
| Subject or Message Type Code | |  |  | | (S) TE | 0, \* |
| Subject Description | |  |  | | (S) TE | 0, 1 |
| Observation Time | | (OBSTIM) |  | | (S) TI | 0, 1 |
| Transmission Regularity | | (TRMREG) | 1 : Continuous  2 : Regular  3 : On Receipt  4 : As Required  5 : On Request | | (S) EN | 0, 1 |
| Times of Transmission | |  |  | | C | 0, \* |
| Minute Past Even Hours | | (MNTEVN) |  | | (S) IN | 0, 1 |
| Minute Past Odd Hours | | (MNTODD) |  | | (S) IN | 0, 1 |
| Minute Past Every Hour | | (MNTALL) |  | | (S) IN | 0, 1 |
| Transmission Time | |  |  | | (S) TI | 0, \* |
| Time Intervals by Day of Week | |  |  | | C | 0, \* |
| Day of Week | |  | 1 : Sunday  2 : Monday  3 : Tuesday  4 : Wednesday  5 : Thursday  6 : Friday  7 : Saturday | | (S) EN | 0, 7 (ordered) |
| Day of Week is Range | |  |  | | (S) BO | 0, 1 |
| Time of Day Start | |  |  | | (S) TI | 0, \* (ordered) |
| Time of Day End | |  |  | | (S) TI | 0, \* (ordered) |
| Online Resource | |  |  | | C | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) UI | 1, 1 |
| Name of Resource | |  |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:   * In addition to using the **typeOfBroadcastContent** attribute, **subjectDescription** attribute may be used to describe the broadcast content of a specific service. * The **subjectOrMessageTypeCode** is for encoding the subject code or message type specified for the communication system to indicate the transmitted content. For example, message type of DGNSS, subject code for NAVDAT messages or the B2 character used to indicate the subject group of the maritime safety information (MSI) message. B2 subject indicator character is used by the MSI receiver to identify the different classes of messages (MSC.1/Circ.1403/Rev.2).   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Broadcast Transmission | **TransmissionDetails** | theTransmissionDetails | 0, \* |

## Connectivity Quality of Service

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Information related to the Quality of Service (QoS) of the connectivity. | | | | | | |
| **S-123 Information Type: Connectivity Quality of Service** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Type of Connectivity Resource | |  | 1 : Guaranteed Bit Rate  2 : Non-Guaranteed Bit Rate  3 : Delay Critical Guaranteed Bit Rate  4 : Best Effort | | EN | 0, \* |
| Uplink Bandwidth | |  |  | | RE | 0, 1 |
| Downlink Bandwidth | |  |  | | RE | 0, 1 |
| Packet Delay | |  |  | | RE | 0, 1 |
| Maximum Data Burst Volume | |  |  | | IN | 0, 1 |
| Status | | (STATUS) | 1 : Permanent  2 : Occasional  4 : Not in Use  5 : Periodic/Intermittent  7 : Temporary  8 : Private  14 : Public  16 : Watched  17 : Unwatched  25 : Good  26 : Moderately  27 : Poor | | EN | 0, \* |
| Information | | (INFORM) |  | | C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:  For attribute values of **ConnectivityQualityOfService** information type instances, the unit is Mbps for bandwidth, ms for packet delay, bytes for maximum data burst volume.  Distinction: | | | | | | |

## Contact Details

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. | | | | | |
| **S-123 Information Type: Contact Details** | | | | | |
| **Super Type: InformationType** | | | | | |
| **Primitives: None** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Contact Instructions |  |  | | TE | 0, 1 |
| Contact Address |  |  | | C | 0, \* |
| Delivery Point | (DELPNT) |  | | (S) TE | 0, 1 |
| City Name | (CITYNM) |  | | (S) TE | 0, 1 |
| Administrative Division |  |  | | (S) TE | 0, 1 |
| Country Name |  |  | | (S) TE | 0, 1 |
| Postal Code | (POSCOD)  (Postcode)  (ZIP Code) |  | | (S) TE | 0, 1 |
| Frequency Pair |  |  | | C | 0, \* |
| Frequency Shore Station Receives | (FRQRXV) |  | | (S) IN | 0, 1 |
| Frequency Shore Station Transmits | (SIGFRQ)  (FRQTXM) |  | | (S) IN | 1, 1 |
| Information | (INFORM) |  | | C | 0, 1 |
| File Locator |  |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline |  |  | | (S) TE | 0, 1 |
| Language |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Online Resource |  |  | | C | 0, \* |
| Headline |  |  | | (S) TE | 0, 1 |
| Linkage |  |  | | (S) UI | 1, 1 |
| Name of Resource |  |  | | (S) TE | 0, 1 |
| Telecommunications |  |  | | C | 0, \* |
| Contact Instructions |  |  | | (S) TE | 0, 1 |
| Telecommunication Identifier |  |  | | (S) TE | 1, 1 |
| Telecommunication Service |  | 1 : Voice  2 : Facsimile  3 : SMS  4 : Data  5 : Streamed Data  6 : Telex  7 : Telegraph  8 : Email | | (S) EN | 0, 1 |
| Call Name |  |  | | TE | 0, 1 |
| Call Sign | (CALSGN) |  | | TE | 0, 1 |
| Communication Channel | (COMCHA) |  | | TE | 0, \* |
| MMSI Code |  |  | | TE | 0, 1 |
| Language |  | ISO 639-2/T | | TE | 0, 1 |
| INT 1 Reference: General The **ContactDetails** information type may be associated to:   * An **Authority** information type via an information association (*AuthorityContact*), in which case it encodes the contact information for the organization in general. * A geo feature via a feature association *ServiceContact*, in which case it encodes contact information particular to the specific feature, either because further information about the controlling authority is not available or because the contact is specific to the feature.   Remarks:   * If it is required to provide contact details and instructions in different languages, this must be done by associating an instance of **ContactDetails** per language, with the originating instance. The **Language** attribute must be used to designate the language of the instance. * The name of the contact (for example, the name of the agency, service, office, etc.) should be encoded in the **featureName** attribute, which is inherited from **InformationType**.   Distinction: | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Authority contact | **Authority, RadioControlCentre** | theAuthority | 0, 1 |

## Nautical Information

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Nautical information about a related area or facility. | | | | | | |
| **S-123 Information Type: Nautical Information** | | | | | | |
| **Super Type: AbstractRxN** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference:  **NauticalInformation** is intended for material that is largely informative in nature, of which does not fit into the category of regulation, recommendation, or restriction.  Remarks:  Distinction: | | | | | | |

## Non-Standard Working Day

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: Days when many services are not available. Often days of festivity or recreation or public holidays when normal working hours are limited, especially a national or religious festival, etc. | | | | | |
| **S-123 Information Type: Non-Standard Working Day** | | | | | |
| **Super Type: InformationType** | | | | | |
| **Primitives: None** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Information | (INFORM) |  | | C | 0, \* |
| File Locator |  |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline |  |  | | (S) TE | 0, 1 |
| Language |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Date Fixed |  |  | | TD | 0, \* |
| Date Variable |  |  | | TE | 0, \* |
| INT 1 Reference: Exceptions to usual workdays This information type is used to indicate days that are exceptions to a usual weekly office opening schedule or service availability schedule. It should be used to indicate holidays or similar exceptions to the normal weekly schedule described by an associated **ServiceHours** instance.  **NonStandardWorkingDay** should not be used to indicate days of the week when the office is normally closed or the service is normally unavailable. Regular weekly schedules can be described by **ServiceHours** alone.  The attribute **periodicDateRange** of **NonStandardWorkingDay** can be used in the event that service hours are the same but the variation in holidays or partial working days is seasonal – e.g., if an office is closed on “second Saturdays” only in December. To encode working hours that vary seasonally, encode multiple instances of **ServiceHours** instead, each with the appropriate **periodicDateRange**.  Attribute **periodicDateRange** should not be encoded if **fixedDate** or **variableDate** provide enough information to determine the day.  EXAMPLE: If the **variableDate** is “U.S. Thanksgiving”, **periodicDateRange** need not be encoded (the formula for determining the date of the Thanksgiving holiday is fixed as “the fourth Thursday in November” for the foreseeable future. (This information may be encoded as part the **variableDate**, thus: “U.S. Thanksgiving - fourth Thursday in November”.)  Remarks:   * Non-standard workdays which cannot be represented using fixed or variable dates should be encoded using the **information** complex attribute, preferably as a short description in the **text** sub-attribute of **information**. The information attribute can also be used for encoding any additional explanatory information if the explanation is essential knowledge for specifying the day. * The two date range attributes (**fixedDateRange** and **periodicDateRange**) inherited from **InformationType** should be used if the non-standard day applies only in specific years or periods (e.g., seasonally).   Distinction: | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Exceptional workday | **ServiceHours** | theServiceHours\_nsdy | 0, \* |

## Radio Control Centre

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: The control centre of the radio service or radio stations | | | | | | |
| **S-123 Information Type: Radio Control Centre** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Is MRCC |  | |  | | BO | 0, 1 |
| Accept AMVER |  | |  | | BO | 0, 1 |
| Information | (INFORM) | |  | | C | 0, \* |
| File Locator |  | |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) | |  | | (S) TE | 0, 1 |
| Headline |  | |  | | (S) TE | 0, 1 |
| Language |  | | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) | |  | | (S) TE | 0, 1 |
| Hours of Watch |  | |  | | TE | 0, 1 |
| INT 1 Reference:  Remarks:   * Maritime Rescue and Coordination Centres (MRCC) or Sub-centres are part of a constantly manned communications watch system. If it is required to encode a MRCC (or Sub-centres), it should be done using **RadioControlCentre**, with the Boolean attribute **isMRCC** = True. The name of the centre may be populated using the complex attribute feature name (sub-attribute name), for example MRCC Swansea * For the **Hours of Watch** attribute, the hours are given in UTC or by using a service symbol. Examples from ITU List IV: “0000-0030 0730-0800”, “H24” (“H24” means a continuous service)   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Authority contact | **ContactDetails** | theContactDetails | 0, \* |
| association | Authority hours | **ServiceHours** | theServiceHours | 0, 1 |
| association | Available Telemedical Assistance Service | **TelemedicalAssistanceService** | theTMAS | 0, \* |

## Recommendations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Recommendations for a related area or facility. | | | | | | |
| **S-123 Information Type: Recommendations (RCMDTS)** | | | | | | |
| **Super Type: AbstractRxN** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference: General **Recommendations** is intended for encoding suggestions, limitations, or preferred procedures that are not mandatory.  Remarks:  Distinction: | | | | | | |

## Regulations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Regulations for a related area or facility. | | | | | | |
| **S-123 Information Type: Regulations (REGLTS)** | | | | | | |
| **Super Type: AbstractRxN** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference: General **Regulations** is intended to be used for official rules, laws, and similar source material, i.e., sources that have the force of law or are mandated by a controlling authority. They will generally originate from some kind of administration or authority.  Remarks:  Distinction: | | | | | | |

## Restrictions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Restrictions for a related area or facility. | | | | | | |
| **S-123 Information Type: Restrictions (RESDES)** | | | | | | |
| **Super Type: AbstractRxN** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| INT 1 Reference: General **Restrictions** is intended for restrictions that constrain the activities of vessels temporarily with or without the legal force, or for longer terms without the force of law; they may be issued by a local authority.  Remarks:  Distinction: | | | | | | |

## Service Hours

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: The time when a service is available and known exceptions. | | | | | | |
| **S-123 Information Type: Service Hours** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Schedule by Day of Week | |  |  | | C | 1, \* |
| Category of Schedule | |  | 1 : Normal Operation  2 : Closure  3 : Unmanned Operation | | (S) EN | 0, 1 |
| Time Intervals by Day of Week | |  |  | | (S) C | 1, 10 |
| Day of Week | |  | 1 : Sunday  2 : Monday  3 : Tuesday  4 : Wednesday  5 : Thursday  6 : Friday  7 : Saturday | | (S) EN | 0, 7 (ordered) |
| Day of Week is Range | |  |  | | (S) BO | 0, 1 |
| Time of Day End | |  |  | | (S) TI | 0, \* (ordered) |
| Time of Day Start | |  |  | | (S) TI | 0, \* (ordered) |
| Information | | (INFORM) |  | | C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:  Seasonal variations in service hours can be encoded using multiple **Service Hours** instances with appropriate valuesof the **periodicDateRange** attribute inherited from the **InformationType**.  Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Authority hours | **Authority, RadioControlCentre** | theAuthority | 0, \* |
| association | Exceptional workday | **NonStandardWorkingDay** | partialWorkingDay | 0, \* |

## Spatial Quality

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: The indication of the quality of the locational information for features in a dataset. | | | | | | |
| **S-123 Information Type: Spatial Quality** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Quality of Horizontal Measurement | | (QUAPOS) | 4 : Approximate | | EN | 0, 1 |
| Spatial Accuracy | |  |  | | C | 0, 1 |
| Fixed Date Range | |  |  | | (S) C | 0, 1 |
| Date Start | | (DATSTA) |  | | (S) TD | 0, 1 |
| Date End | | (DATEND) |  | | (S) TD | 0, 1 |
| Time of Day Start | |  |  | | (S) TI | 0, 1 |
| Time of Day End | |  |  | | (S) TI | 0, 1 |
| Horizontal Position Uncertainty | |  |  | | (S) C | 0, 1 |
| Uncertainty Fixed | |  |  | | (S) RE | 1, 1 |
| Uncertainty Variable Factor | |  |  | | (S) RE | 0, 1 |
| Vertical Uncertainty | | (SOUACC)  (VERACC) |  | | (S) C | 0, 1 |
| Uncertainty Fixed | |  |  | | (S) RE | 1, 1 |
| Uncertainty Variable Factor | |  |  | | (S) RE | 0, 1 |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | |

## Transmission Details

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Description of the radiocommunication service with respect to the radio method and radio channels for the transfer of information by means of signals. | | | | | | |
| **S-123 Information Type: Transmission Details** | | | | | | |
| **Super Type: InformationType** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-123 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Type of Radio Service | |  | 1 : Digital Selective Calling (DSC)  2 : Radio Telephony (RT)  3 : Public correspondence service (CP)  4 : Radio Telegraphy (WT)  5 : Radiotelex (NBDP telegraphy)  6 : Radio facsimile  7 : Digital  8 : Data  9 : NAVTEX  10 : Enhanced Group Call (EGC)  11 : AIS  12 : ASM  13 : Satellite communication  14 : NAVDAT | | EN | 0, 1 |
| Frequency Band | |  | 1 : LF  2 : MF  3 : MF/HF  4 : HF  5 : VHF  6 : UHF | | EN | 0, 1 |
| Class of Emission | |  |  | | TE | 0, 1 |
| Communication Standard | |  |  | | TE | 0, 1 |
| Radio Channel Details | |  |  | | C | 1, \* |
| Communication Channel | | (COMCHA) |  | | (S) TE | 0, \* |
| Frequency Pair | |  |  | | (S) C | 0, \* |
| Frequency Shore Station Receives | | (FRQRXV) |  | | (S) IN | 0, 1 |
| Frequency Shore Station Transmits | | (SIGFRQ)  (FRQTXM) |  | | (S) IN | 1, 1 |
| Data Transmission Rate | |  |  | | (S) IN | 0, 1 |
| Transmission of Traffic Lists | |  |  | | (S) BO | 1, 1 |
| Hours of Watch | |  |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:   * For the **Hours of Watch** attribute, the hours are given in UTC or by using a service symbol. Examples from ITU List IV: “0000-0030 0730-0800”, “H24” ( “H24” means a continuous service)   Distinction: | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Broadcast Transmission | **BroadcastDetails** | theBroadcastDetails | 0, \* |

## Telemedical Assistance Service

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IHO Definition: A service to provide decision support and advice to the seafarer on board responsible for medical care. | | | | | |
| **S-123 Information Type: Telemedical Assistance Service** | | | | | |
| **Super Type: InformationType** | | | | | |
| **Primitives: None** | | | | | |
| *Real World* | *Paper Chart Symbol* | | *ECDIS Symbol* | | |
| **S-123 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Contact Instructions |  |  | | TE | 0, 1 |
| Information | (INFORM) |  | | C | 0, 1 |
| File Locator |  |  | | (S) TE | 0, 1 |
| File Reference | (TXTDSC)  (NTXTDS) |  | | (S) TE | 0, 1 |
| Headline |  |  | | (S) TE | 0, 1 |
| Language |  | ISO 639-2/T | | (S) TE | 1, 1 |
| Text | (INFORM)  (NINFOM) |  | | (S) TE | 0, 1 |
| Online Resource |  |  | | C | 0, \* |
| Headline |  |  | | (S) TE | 0, 1 |
| Linkage |  |  | | (S) UI | 1, 1 |
| Name of Resource |  |  | | (S) TE | 0, 1 |
| Telecommunications |  |  | | C | 0, \* |
| Contact Instructions |  |  | | (S) TE | 0, 1 |
| Telecommunication Identifier |  |  | | (S) TE | 1, 1 |
| Telecommunication Service |  | 1 : Voice  2 : Facsimile  3 : SMS  4 : Data  5 : Streamed Data  6 : Telex  7 : Telegraph  8 : Email | | (S) EN | 0, 1 |
| Language Information |  |  | | (S) TE | 0, 1 |
| INT 1 Reference:  Remarks:   * The **Language Information** attribute of the **TelemedicalAssistanceService** is used to describe the consultation languages of the TMAS service.   Distinction: | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | |
| **Type** | **Association Name** | **Association Ends** |  | |
| **Class** | **Role** | **Mult** |
| association | Radio Service Control | **RadioControlCentre** | theControlCentre | 0, \* |

# Association Class

## Inclusion Type

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Association class specifying the relationship between the subset of vessels described by an Applicability data object and a regulation (restriction, recommendation, or nautical information). | | | | | | | | | |
| **S-123 Information Association: Inclusion Type** | | | | | | | | | |
| **Super Type:** | | | | | | | | | |
| **Primitives: None** | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | *ECDIS Symbol* | | | |
| **S-123 Attribute** | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | | **Multiplicity** |
| Membership | |  | | | 1: included  2: excluded | | EN | | 0,1 |
| INT 1 Reference:  Remarks:  The GML format implements and uses association classes in accordance with ISO 19136-2. The association class is implemented as an information type instance with information associations to and from the two classes linked by the association, as listed above. A generic inverse association must be used if it is necessary to encode a reverse link to a feature instance.  Distinction: | | | | | | | | | |
| **Role Type** | **Role** | | | **Associated With** | | | | **Multiplicity** | |
| association | Is applicable to | | | **Applicability** | | | | 1, 1 | |
| The applicable RxN | | | **AbstractRxN** | | | | 1, 1 | |

## Permission Type

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in Applicability may (or must, etc.) transit, enter, or use a feature. | | | | | | | | | |
| **S-123 Information Association: Permission Type** | | | | | | | | | |
| **Super Type:** | | | | | | | | | |
| **Primitives: None** | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | *ECDIS Symbol* | | | |
| **S-123 Attribute** | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | | **Multiplicity** |
| Category of Relationship | |  | | | 1: prohibited  2: not recommended  3: permitted  4: recommended  5: required  6: not required | | EN | | 0,1 |
| INT 1 Reference:  Remarks:  The GML format implements and uses association classes in accordance with ISO 19136-2. The association class is implemented as an information type instance with information associations to and from the two classes linked by the association, as listed above. A generic inverse association must be used if it is necessary to encode a reverse link to a feature instance.  Distinction: | | | | | | | | | |
| **Role Type** | **Role** | | | **Associated With** | | | | **Multiplicity** | |
| association | Permission | | | **Applicability** | | | | 1, 1 | |
| Vessel location | | | **Feature Type** | | | | 1, 1 | |

# Textual Regulations and Notes

The information types **Regulations**, **Restrictions**, **Recommendations**, and **NauticalInformation** all inherit the attributes of their immediate abstract superclass **AbstractRxN**, which provides attributes *textContent* and *graphic* for textual and pictorial material respectively. The sub-attributes of its complex attribute *rxnCode* allow optional classification of the material encoded in *textContent/graphic* according to the type of material and the kind of nautical activity affected by it. The classifications in *rxNCode* sub-attributes *categoryOfRxN* and *actionOrActivity* are intended to facilitate software queries for information, while the sub-attribute headline provides additional topic headings for subject matter.

These four information types also inherit the attributes of abstract superclass **InformationType**, which allows encoding of the effective and expiry dates, if any, and the source of information, if it is necessary to encode that data.

**NauticalInformation** can be associated with any geographic feature through either an *AdditionalInformation* or *AssociatedRxN* association. *AdditionalInformation* should be used only when the information encoded in **NauticalInformation** is general in nature and does not supplement information encoded in a **Regulations**, **Restrictions**, or **Recommendations** object associated to the same feature.

The content of the regulation (recommendation, etc.) should be encoded in the *textContent* attribute, which is also inherited from the abstract superclass **InformationType**. It may be encoded inline (*textContent.information.text*) or in an external file (*textContent.information.fileReference*) depending on its length, on whether it is unique to the feature instance, and on whether the producer decides to include a support file containing multiple sections referenced from different places in the dataset.

These four information types are intended primarily for encoding textual information, such as that which derives from textual source material such as national or local laws or official publications.

All geo features may have an association to any of Regulations or its sibling information types. This association is *AssociatedRxN* and it is inherited from the root feature type **FeatureType**.

If it is necessary to identify an authority or organization related to a particular regulation (restriction, etc.) object, this may be done using the *RelatedOrganisation* association between **Regulations**, etc., and an **Authority** object.

Regulations applying only to vessels of specified types, exceeding specified dimensions, or carrying specified cargoes (or other limitations which apply only to subsets of vessels) are encoded by defining the subset of vessels using an **Applicability** instance and associating the **Regulations** object to that **Applicability**.

# Association Names

## Additional information

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: A feature association for the binding between at least one instance of a geo feature and an instance of an information type.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association |  | **Information Type, Feature Type** |  |
| The Information | **Information Type** | 0, \* |

## Associated RxN

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Association between a geographic location and a regulation, restriction, recommendation, or nautical information  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Applies in location | **Feature Type** |  |
| The RxN | **Abstract RxN** | 0, \* |

## Authority contact

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact information for an authority  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Authority | **Authority, Radio Control Centre** |  |
| Contact details | **Contact Details** | 0, \* |

## Authority hours

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Service hours for an authority  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Authority service hours | **Authority, Radio Control Centre** |  |
| Service Hours (reference) | **Service Hours** | 0, 1 |

## Available Quality of Service

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Available Quality of Service (QoS) within the area.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The QoS | **Connectivity Quality of Service** | 0, 1 |
| The QoS Area | **Connectivity Subscription Area** |  |

## Broadcast Service

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The broadcast content and schedule of a service area or facility  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Service place | **METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Radio Station, Weather Forecast and Warning Area** |  |
| The Broadcast Details | **Broadcast Details** | 0, \* |

## Broadcast Transmission

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The transmission details for the broadcast or the broadcast details available from the transmission  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Broadcast Details | **Broadcast Details** | 0, \* |
| The Transmission Details | **Transmission Details** | 0, \* |

## Connectivity Service

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The service that allows users to connect to the internet.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Connectivity Service Area | **Connectivity Subscription Area** |  |
| Connectivity Service Provider | **Authority** | 0, \* |

## Exceptional workday

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Exception to the usual working day  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The service hours for a non-standard workday | **Service Hours** | 0, \* |
| Partial working day | **Non-Standard Working Day** | 0, \* |

## InclusionType

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Association class specifying the relationship between the subset of vessels described by an Applicability data object and a regulation (restriction, recommendation, or nautical information).  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Is applicable to | **Applicability** | 0, \* |
| The applicable RxN | **AbstractRxN** | 0, \* |

## Location hours

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Working hours for a service or facility described by a geographic location  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Location service hours | **Connectivity Subscription Area, GMDSS Area, METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Radio Station, Weather Forecast and Warning Area** |  |
| Service Hours (reference) | **Service Hours** | 0, 1 |

## Permission Type

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in Applicability may (or must, etc.) transit, enter, or use a feature.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Permission | **Applicability** | 0, \* |
| Vessel location | **Feature Type** |  |

## Radio Service Control

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The radio control centre for a marine radio service  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Controlled Service | **GMDSS Area, Radio Service Area, Radio Station** |  |
| The Control Centre | **Radio Control Centre** | 0, \* |

## Related organisation

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Related organisation  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The organisation | **Authority** | 0, \* |
| The Information | **AbstractRxN** |  |

## Service contact

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact details for a service or facility  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Service place | **Connectivity Subscription Area, GMDSS Area, METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Radio Station, Weather Forecast and Warning Area** |  |
| Contact details | **Contact Details** | 0, \* |

## Service Coordination

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The coordinating authority for a service area  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Coordinated Service | **GMDSS Area, METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Radio Station, Weather Forecast and Warning Area** |  |
| Coordinating Authority | **Authority** | 0, \* |

## Spatial Association

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: An association for the binding between a spatial type and its spatial quality information.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| association | The Quality Information | **Spatial Quality** | 0, 1 |

## Transmission Service

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The radio transmission of a service area or facility  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Service place | **METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Radio Station, Weather Forecast and Warning Area** |  |
| The Transmission Details |  | 0, \* |

## Core aggregation

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and a geographic feature describing the service or phenomenon.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Aggregation | The Component | **Radio Service Area** |  |
| The Collection | **Radio Service Area Aggregate** | 0, 1 |

## Fuzzy zone aggregation

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and zones of uncertainty about the service or phenomenon.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Composition | The Component | **Indeterminate Zone** | 1, \* |
| The Collection | **Fuzzy Area Aggregate** | 1, 1 |

## Service provision area

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Association linking the location from which a service is provided and the area(s) served.  Remarks: | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Service provider | **Radio Station** | 0, \* |
| Service area | **Connectivity Subscription Area, GMDSS Area, METAREA, NAVAREA, NAVTEX Service Area, Radio Service Area, Weather Forecast and Warning Area** | 0, \* |

# Association Roles

## Applies in location

|  |
| --- |
| IHO Definition: The location in which the information item applies |

## Authority

|  |
| --- |
| IHO Definition: A pointer to an Authority object |

## Authority service hours

|  |
| --- |
| IHO Definition: The authority for which service hours are given |

## Connectivity Service Area

|  |
| --- |
| IHO Definition: The area where the connectivity service is provided. |

## Connectivity Service Provider

|  |
| --- |
| IHO Definition: The provider of the connectivity service. |

## Contact details

|  |
| --- |
| IHO Definition: A pointer to a Contact Details object |

## Coordinated Service

|  |
| --- |
| IHO Definition: The coordinated service area. |

## Coordinating Authority

|  |
| --- |
| IHO Definition: The authority coordinating the service provision. |

## Is applicable to

|  |
| --- |
| IHO Definition: The object or class of objects to which the regulation, restriction, recommendation, or nautical information applies |

## Location service hours

|  |
| --- |
| IHO Definition: The location for which service hours are given |

## Partial working day

|  |
| --- |
| IHO Definition: The work hours for a non-standard workday |

## Permission

|  |
| --- |
| IHO Definition: Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in Applicability may (or must, etc.) transit, enter, or use a feature. |

## Service area

|  |
| --- |
| IHO Definition: The area served by a service provider |

## Service Hours (reference)

|  |
| --- |
| IHO Definition: Service hours for an authority ore service provider |

## Service place

|  |
| --- |
| IHO Definition: Pointer to service or facility |

## Service provider

|  |
| --- |
| IHO Definition: Pointer to a feature from where a provider supplies a service |

## The applicable RxN

|  |
| --- |
| IHO Definition: The applicable regulation, restriction, recommendation or nautical information |

## The Broadcast Details

|  |
| --- |
| IHO Definition: The details of the broadcast service, such as the content and schedule. |

## The Collection

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

## The Component

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

## The Control Centre

|  |
| --- |
| IHO Definition: A pointer to the centre controlling or operating the service. |

## The Controlled Service

|  |
| --- |
| IHO Definition: A pointer to the controlled or operated service. |

## The Information

|  |
| --- |
| IHO Definition: A pointer to an object that provides more information about the referencing feature or information type. |

## The organisation

|  |
| --- |
| IHO Definition: The organisation to which information relates |

## The QoS

|  |
| --- |
| IHO Definition: The connectivity QoS information for the area. |

## The QoS Area

|  |
| --- |
| IHO Definition: The area where the connectivity QoS information applies. |

## The Quality Information

|  |
| --- |
| IHO Definition: A pointer to an information type providing spatial quality information. |

## The RxN

|  |
| --- |
| IHO Definition: The regulation, restriction, recommendation, or nautical information |

## The service hours for a non-standard workday

|  |
| --- |
| IHO Definition: The usual service hours to which an exception applies |

## The Transmission Details

|  |
| --- |
| IHO Definition: The details of the radio transmission service. |

## Vessel location

|  |
| --- |
| IHO Definition: The location to which the permission statement applies |

# Attribute and Enumerate Descriptions

## Accept AMVER

|  |
| --- |
| IHO Definition: A statement that expresses if it accepts AMVER (Automated Mutual-Assistance Vessel Rescue system) reports.  Remarks: |

## Action or Activity

|  |
| --- |
| IHO Definition: The action or activity of a vessel.  1) **Navigating With a Pilot**  IHO Definition: Carrying a qualified pilot as part of the vessel navigation team.  2) **Entering Port**  IHO Definition: Navigating a vessel into a port.  3) **Leaving Port**  IHO Definition: Navigating a vessel out of a port.  4) **Berthing**  IHO Definition: Attaching a vessel to a wharf or jetty.  5) **Slipping**  IHO Definition: Detaching a vessel from a wharf or jetty.  6) **Anchoring**  IHO Definition: Attaching a vessel to the seabed by means of an anchor and cable.  7) **Weighing Anchor**  IHO Definition: Detaching a vessel from the seabed by recovering an anchor and cable.  8) **Transiting**  IHO Definition: Navigating a vessel along a route or through a narrow gap, such as under a bridge or through a lock.  9) **Overtaking**  IHO Definition: Navigating a vessel past another traveling broadly in the same direction.  10) **Reporting**  IHO Definition: Providing details such as the name, location or intentions of a vessel.  11) **Working Cargo**  IHO Definition: Loading or unloading cargo.  12) **Landing**  IHO Definition: Placing crew or passengers on shore.  13) **Diving**  IHO Definition: A signal or message warning of diving activity.  14) **Fishing**  IHO Definition: Hunting or catching fish.  15) **Discharging Overboard**  IHO Definition: Releasing anything into the sea; often ballast water; or spoil from dredging elsewhere.  16) **Passing**  IHO Definition: Navigating a vessel past another travelling broadly in the opposite direction.  Remarks: |

## Administrative Division

|  |
| --- |
| IHO Definition: A generic term for an administrative region within a country at a level below that of the sovereign state.  Remarks: |

## Base Station Antenna Height

|  |
| --- |
| IHO Definition: Antenna height of the base station in meter.  Remarks: |

## Call Name

|  |
| --- |
| IHO Definition: The designated call name of a station; for example, radio station, radar station, pilot.  Remarks:  This is the name used when calling a radio station by radio; for example, "Singapore Pilots". |

## Call Sign

|  |
| --- |
| IHO Definition: The designated call-sign of a station (radio station, radar station, pilot, ...).  Remarks: |

## Contact Instructions

|  |
| --- |
| IHO Definition: Instructions provided on how to contact a particular person, organisation or service.  Remarks: |

## Category of Authority

|  |
| --- |
| IHO Definition: The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.  2) **Border Control**  IHO Definition: The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries.  3) **Police**  IHO Definition: The department of government, or civil force, charged with maintaining public order.  4) **Port**  IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.  5) **Immigration**  IHO Definition: The authority controlling people entering a country.  6) **Health**  IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.  7) **Coast Guard**  IHO Definition: Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.  8) **Agricultural**  IHO Definition: The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country.  9) **Military**  IHO Definition: A military authority which provides control of access to or approval for transit through designated areas or airspace.  10) **Private Company**  IHO Definition: A private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area.  11) **Maritime Police**  IHO Definition: A governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil.  12) **Environmental**  IHO Definition: An authority with responsibility for the protection of the environment.  13) **Fishery**  IHO Definition: An authority with responsibility for the control of fisheries.  14) **Finance**  IHO Definition: An authority with responsibility for the control and movement of money.  15) Maritime  IHO Definition: A national or regional authority charged with administration of maritime affairs.  16) **Customs**  IHO Definition: The agency or establishment for collecting duties, tolls.  Remarks: |

## Category of Broadcast/Communication

|  |
| --- |
| IHO Definition: Classification of broadcast or communications based on **public** availability and **commercial**/**non-commercial** nature.  1) Commercial  IHO Definition: A service operated with the intention of earning money.  2) Non-Commercial  IHO Definition: A service without any financial interest.  3) Public  IHO Definition: Belonging to, available to, used or shared by, the community as a whole and not restricted to private use.  4) **Non-Public**  IHO Definition: A service available for limited and predefined customers.  Remarks: |

## Category of Cargo

|  |
| --- |
| IHO Definition: Classification of the different types of cargo that a ship may be carrying.  1) **Bulk**  IHO Definition: Unpacked homogenous cargo poured loose in a certain space of a vessel, for example oil or grain.  2) **Container**  IHO Definition: One of a number of standard sized cargo carrying units, secured using standard corner attachments and bar.  3) **General**  IHO Definition: **Break bulk cargo** normally loaded by crane.  4) **Liquid**  IHO Definition: Any cargo loaded by pipeline.  5) **Passenger**  IHO Definition: A fee paying traveller.  6) **Livestock**  IHO Definition: Live animals carried in bulk.  7) **Dangerous or Hazardous**  IHO Definition: Dangerous or hazardous cargo as described by the IMO International Maritime Dangerous Goods code.  8) **Heavy Lift**  IHO Definition: Indivisible heavy items of weight generally over 100 tons, and width or height greater than 100 metres.  9) **Ballast**  IHO Definition: Material carried by a ship to ensure its stability.  10) **Dry Bulk Cargo**  IHO Definition: Commodity cargo that is transported unpackaged in large quantities. These types of goods usually need to be kept dry during the whole transportation period.  11) **Liquid Bulk Cargo**  IHO Definition: Liquids or gases that are transported in bulk and carried unpackaged.  12) **Reefer Container Cargo**  IHO Definition: Cargo transported in refrigerated containers, generally perishable commodities which require temperature-controlled transportation, such as fruit, meat, fish, vegetables, dairy products and other foods.  13) **Ro-Ro Cargo**  IHO Definition: Wheeled cargo, such as cars, busses, trucks, agricultural vehicles and cranes, that are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter.  14) **Project Cargo**  IHO Definition: Project cargo is a term used to broadly describe the national or international transportation of large, heavy, high value, or critical (to the project they are intended for) pieces of equipment. Also commonly referred to as heavy lift, this includes shipments made of various components which need disassembly for shipment and reassembly after delivery.  15) Break Bulk Cargo  IHO Definition: Goods that are stowed on board ship in individually counted units, and not in intermodal containers nor in bulk as with oil or grain.  Remarks:  If item 7 is used, the nature of dangerous or hazardous cargoes can be amplified with category of dangerous or hazardous cargo. |

## Category Of Dangerous Or Hazardous Cargo

|  |
| --- |
| IHO Definition: Classification of dangerous goods or hazardous materials based on the International Maritime Dangerous Goods Code (IMDG Code).  1) **IMDG Code Class 1 Div. 1.1**  IHO Definition: Explosives, Division 1: Substances and articles which have a mass explosion hazard.  2) **IMDG Code Class 1 Div. 1.2**  IHO Definition: Explosives, Division 2: Substances and articles which have a projection hazard but not a mass explosion hazard.  3) **IMDG Code Class 1 Div. 1.3**  IHO Definition: Explosives, Division 3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.  4) **IMDG Code Class 1 Div. 1.4**  IHO Definition: Explosives, Division 4: Substances and articles which present no significant hazard.  5) **IMDG Code Class 1 Div. 1.5**  IHO Definition: Explosives, Division 5: Very insensitive substances which have a mass explosion hazard.  6) **IMDG Code Class 1 Div. 1.6**  IHO Definition: Explosives, Division 6: Extremely insensitive articles which do not have a mass explosion hazard.  7) **IMDG Code Class 2 Div. 2.1**  IHO Definition: Gases, flammable gases.  8) **IMDG Code Class 2 Div. 2.2**  IHO Definition: Gases, non-flammable, non-toxic gases.  9) **IMDG Code Class 2 Div. 2.3**  IHO Definition: Gases, toxic gases.  10) **IMDG Code Class 3**  IHO Definition: Flammable liquids.  11) **IMDG Code Class 4 Div. 4.1**  IHO Definition: Flammable solids, self-reactive substances and desensitized explosives.  12) **IMDG Code Class 4 Div. 4.2**  IHO Definition: Substances liable to spontaneous combustion.  13) **IMDG Code Class 4 Div. 4.3**  IHO Definition: Substances which, in contact with water, emit flammable gases.  14) **IMDG Code Class 5 Div. 5.1**  IHO Definition: Oxidizing substances.  15) **IMDG Code Class 5 Div. 5.2**  IHO Definition: Organic peroxides.  16) **IMDG Code Class 6 Div. 6.1**  IHO Definition: Toxic substances.  17) **IMDG Code Class 6 Div. 6.2**  IHO Definition: Infectious substances.  18) **IMDG Code Class 7**  IHO Definition: Radioactive material.  19) **IMDG Code Class 8**  IHO Definition: Corrosive substances.  20) **IMDG Code Class 9**  IHO Definition: Miscellaneous dangerous substances and articles.  21) **Harmful Substances in Packaged Form**  IHO Definition: Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). Packaged form is defined as the forms of containment specified for harmful substances in the IMDG Code.  Remarks: |

## Category of Forecast or Warning Area

|  |
| --- |
| IHO Definition: Classification of weather forecast and weather warning areas based on source of warnings and forecasts.  1) **World Meteorological Organization (WMO)**  IHO Definition: The forecast and warning area defined by WMO.  2) **National High Seas**  IHO Definition: The forecast and warning area defined by national authorities covering High Seas.  3) **National Offshore**  IHO Definition: The forecast and warning area defined by national authorities covering offshore waters.  4) **National Coastal**  IHO Definition: The forecast and warning area defined by national authorities covering coastal waters.  5) **National Inshore**  IHO Definition: The forecast and warning area defined by national authorities covering inshore waters.  6) **National Local**  IHO Definition: The forecast and warning area defined by national authorities covering local waters.  7) **Ice**  IHO Definition: The solid form of water.  Remarks: |

## Category of GMDSS Area

|  |
| --- |
| IHO Definition: Classification of GMDSS areas based on availability of GMDSS services and GMDSS equipment requirements.  Note: The following IHO definitions are from the GI Registry, where the definitions of GMDSS sea areas, especially Area A3, are yet to be updated according to IMO’s new definitions for GMDSS.  1) **Area A1**  IHO Definition: Within range of VHF coast stations with continuous DSC alerting available (about 20 30 miles).  2) **Area A2**  IHO Definition: Beyond area A1, but within range of MF coastal stations with continuous DSC alerting available (about l00 miles).  3) **Area A3**  IHO Definition: Beyond Area 1 and Area 2, but within coverage of geostationary maritime communication satellites (in practice this means Inmarsat). This covers the area between roughly 70 deg N and 70 deg S.  4) **Area A4**  IHO Definition: The sea areas beyond Area 3. The most important of these is the sea around the North Pole (the area around the South Pole is mostly land). Geostationary satellites, which are positioned above the equator, cannot reach this far.  Remarks: |

## Category of Radio Station

|  |
| --- |
| IHO Definition: Classification of radio services offered by a radio station.  5) **Radio Direction-Finding Station**  IHO Definition: A radio station intended to determine only the direction of other stations by means of transmission from the latter.  9) **Loran C**  IHO Definition: A low frequency electronic position fixing system using pulsed transmissions at 100 Khz.  10) **Differential GNSS**  IHO Definition: Differential GNSS is implemented by placing a GNSS monitor receiver at a precisely known location. Instead of computing a navigation fix, the monitor determines the range error to every GNSS satellite it can track. These ranging errors are then transmitted to local users where they are applied as corrections before computing the navigation result.  19) **Radio Telephone Station**  IHO Definition: The equipment needed at one station to carry on two way voice communication by radio waves only.  20) **AIS Base Station**  IHO Definition: An AIS shore station for use by competent authorities to provide AIS service, manage the data link and enable effective ship to shore / shore to ship transmission of information.  Remarks: |

## Category of Relationship

|  |
| --- |
| IHO Definition: Expresses constraints or requirements on vessel actions or activities in relation to a geographic feature, facility, or service.  1) **Prohibited**  IHO Definition: Use of facility, waterway or service is forbidden.  2) **Not Recommended**  IHO Definition: Use of facility, waterway or service is not recommended.  3) **Permitted**  IHO Definition: Use of facility, waterway, or service is permitted but **not required**.  4) Recommended  IHO Definition: Use of facility, waterway, or service is recommended.  5) Required  IHO Definition: Use of facility, waterway, or service is required.  6) Not Required  IHO Definition: Use of facility, waterway, or service is not required.  Remarks: |

## Category of RxN

|  |
| --- |
| IHO Definition: The principal subject matter of regulations, restrictions, recommendations or nautical information.  1) **Navigation**  IHO Definition: The process of directing the movement of a craft from one point to another.  2) **Communication**  IHO Definition: Transmitting and/or receiving electronic communication signals.  3) **Environmental Protection**  IHO Definition: Pertaining to environmental protection.  4) **Wildlife Protection**  IHO Definition: Pertaining to wildlife protection.  5) **Security**  IHO Definition: Pertaining to security.  6) **Customs**  IHO Definition: The agency or establishment for collecting duties, tolls.  7) **Cargo Operation**  IHO Definition: Pertaining to cargo operations.  8) **Refuge**  IHO Definition: Pertaining to a place of safety or refuge.  9) **Health**  IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.  10) **Natural Resources or Exploitation**  IHO Definition: Pertaining to natural resources or exploitation.  11) **Port**  IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.  12) **Finance**  IHO Definition: An authority with responsibility for the control and movement of money.  13) **Agriculture**  IHO Definition: The science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products.  Remarks: |

## Category of Schedule

|  |
| --- |
| IHO Definition: The type of schedule, for instance opening, **closure**, etc.  1) **Normal Operation**  IHO Definition: The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.  2) Closure  IHO Definition: The service, office, or area is closed.  3) **Unmanned Operation**  IHO Definition: The service is available but not manned.  Remarks: |

## Category of Temporal Variation

|  |
| --- |
| IHO Definition: An assessment of the likelihood of change over time.  1) **Extreme Event**  IHO Definition: Indication of the possible impact of a significant event (for example hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor or landscape significantly.  4) Likely to Change  IHO Definition: Continuous or frequent change to non-bathymetric features (for example river siltation, glacier creep/recession, sand dunes, buoys, marine farms, etc).  5) **Unlikely to Change**  IHO Definition: Significant change to the seafloor is not expected.  Remarks: |

## Category of Text

|  |
| --- |
| IHO Definition: Classification of completeness of textual information in relation to the source material from which it is derived.  1) **Abstract or Summary**  IHO Definition: A statement summarizing the important points of a text.  2) **Extract**  IHO Definition: An excerpt or excerpts from a text.  3) **Full Text**  IHO Definition: The whole text.  Remarks: |

## Category of Vessel

|  |
| --- |
| IHO Definition: Classification of vessels by function or use.  1) **General Cargo Vessel**  IHO Definition: A vessel which is designed for carrying general cargo, e.g. boxes, sacks.  2) **Container Carrier**  IHO Definition: A vessel designed to carry ISO containers.  3) **Tanker**  IHO Definition: A vessel which is designed for carrying liquid goods, for example oil or water.  4) **Bulk Carrier**  IHO Definition: A vessel which is designed for carrying bulk goods, e.g. coal, ore or grain.  5) **Passenger Vessel**  IHO Definition: A day trip or cabin vessel constructed and equipped to carry more than 12 passengers.  6) **Roll-On Roll-Off**  IHO Definition: A vessel designed to allow road vehicles to be driven on and off; often a ferry.  7) **Refrigerated Cargo Vessel**  IHO Definition: A vessel designed to carry refrigerated cargo.  8) **Fishing Vessel**  IHO Definition: A vessel that is used and equipped for the fishing of living aquatic resources.  9) **Service**  IHO Definition: A vessel which provides a service such as a tug, anchor handler, survey or supply vessel.  10) **Warship**  IHO Definition: A vessel designed for the conduct of military operations.  11) **Towed or Pushed Composite Unit**  IHO Definition: Either a **tug and tow**, or any combination of a tug providing propulsion to barges or vessels secured ahead or alongside.  12) Tug and Tow  IHO Definition: A combination of tug(s) and non-powered tow(s).  13) **Light Recreational**  IHO Definition: A pleasure boat or watercraft, or an excursion vessel used for short cruises such as whale watching.  14) **Semi-Submersible Offshore Installation**  IHO Definition: An installation which is designed to float at all times and which is normally anchored in position when deployed in the offshore gas and oil industry.  15) **Jack-Up Exploration or Project Installation**  IHO Definition: An exploration or project installation with legs which can be raised and lowered. The legs are raised when the installation is re-positioned. When stationary the legs are lowered to the sea floor and the working platform is raised clear of the sea surface.  16) **Livestock Carrier**  IHO Definition: A vessel designed to carry large quantities of live animals.  17) **Sport Fishing**  IHO Definition: A vessel used in fishing for pleasure or competition.  Remarks: |

## Category of Vessel Registry

|  |
| --- |
| IHO Definition: The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location.  1) **Domestic**  IHO Definition: The vessel is registered or enrolled under the same national flag as the port, harbour, territorial sea, exclusive economic zone, or administrative area in which the object that possesses this attribute applies or is located.  2) **Foreign**  IHO Definition: The vessel is registered or enrolled under a national flag different from the port, harbour, territorial sea, exclusive economic zone, or other administrative area in which the object that possesses this attribute applies or is located.  Remarks: |

## Category of Connectivity Subscription

|  |
| --- |
| IHO Definition: Category of the communication system providing the connectivity coverage for subscription.  1) **Satellite Communication GEO**  IHO Definition: Communication using GEO (Geosynchronous Earth Orbit) satellites  2) **Satellite Communication LEO**  IHO Definition: Communication using LEO (Low Earth Orbit) satellites  3) **Cellular Communication**  IHO Definition: Communication using cellular network. Cellular netwotk or mobile network enables wireless communication between mobile devices. The final stage of connectivity is achieved by segmenting the comprehensive service area into several compact zones, each called a cell. A stationary transceiver, known as a cell site or base station, provides service in each cell. The cell site links to the primary network infrastructure, employing either a wireless or wired connection.  4) **Terrestrial Ad-Hoc Communication**  IHO Definition: Communication using ad-hoc networking, which uses whatever resources available to create communication paths from an end-user device to its desired destination, independent from central network infrastructure or administration.  Remarks: |

## Class of Emission

|  |
| --- |
| IHO Definition: The set of characteristics of an emission, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics. (ITU Radio Regulations)  Remarks:  For example, F1B, G2B, J3E |

## Communication Channel

|  |
| --- |
| IHO Definition: A channel number assigned to a specific radio frequency, frequencies or frequency band.  Remarks:  The expected input is the specific VHF-Channel. The attribute 'communication channel' encodes the various VHF-channels used for communication. |

## Communication Standard

|  |
| --- |
| IHO Definition: The communications standard applicable to accessing the radio service.  Remarks: |

## Comparison Operator

|  |
| --- |
| IHO Definition: Numerical comparison.  1) **Greater Than**  IHO Definition: The value of the left value is greater than that of the right.  2) **Greater Than or Equal To**  IHO Definition: The value of the left expression is greater than or equal to that of the right.  3) **Less Than**  IHO Definition: The value of the left expression is less than that of the right.  4) **Less Than or Equal To**  IHO Definition: The value of the left expression is less than or equal to that of the right.  5) Equal To  IHO Definition: The two values are equivalent.  6) **Not Equal To**  IHO Definition: The two values are not equivalent.  Remarks:  Provides the relation between the value given in the model and the real ship's value. |

## Country Name

|  |
| --- |
| IHO Definition: The name of a nation.  Remarks: |

## City Name

|  |
| --- |
| IHO Definition: The name of a town or city.  Remarks: |

## Data Transmission Rate

|  |
| --- |
| IHO Definition: The average number of bits communicated (transmitted) in 1 second. (ITU Terms and Definitions)  Remarks: |

## Date End

|  |
| --- |
| IHO Definition: The latest date on which an object (for example a buoy) will be present.  Remarks:   * The **Date End** should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). * When no specific month and/or day is required/known, indication of the month and/or day is omitted, and replaced with dashes (-). * When no specific year is required (that is, the event or date range ends at the same time each year) the following two cases may be considered:- same day each year: ----MMDD- same month each year: ----MM--This conforms to ISO 8601: 2004. * **Date End** indicates the latest date of an event or the end of a date range. It is used to indicate the end of a fixed date range, the end of a periodic date range, or the removal or cancellation of a feature at a specific date in the future. |

## Date Fixed

|  |
| --- |
| IHO Definition: The date of an event.  Remarks: |

## Date Start

|  |
| --- |
| IHO Definition: The earliest date on which an object (for example a buoy) will be present.  Remarks:   * The **Date Start** should be encoded using 4 digits for the calendar year (YYYY), 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). * When no specific month and/or day is required/known, indication of the month and/or day is omitted, and replaced with dashes (-). * When no specific year is required (that is, the event or date range ends at the same time each year) the following two cases may be considered:- same day each year: ----MMDD- same month each year: ----MM--This conforms to ISO 8601: 2004. * **Date Start** indicates the earliest date of an event or the start of a date range. It is used to indicate the start of a fixed date range, the start of a periodic date range, or the deployment or implementation of a feature at a specific date in the future. |

## Date Variable

|  |
| --- |
| IHO Definition: A day which is not fixed in the Gregorian calendar.  Remarks:  Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday. |

## Day of Week

|  |
| --- |
| IHO Definition: Any one of seven days in a week.  1) **Sunday**  IHO Definition: The day of the week following **Saturday** and preceding **Monday**.  2) Monday  IHO Definition: The day of the week following Sunday and preceding **Tuesday**.  3) Tuesday  IHO Definition: The day of the week following Monday and preceding **Wednesday**.  4) Wednesday  IHO Definition: The day of the week following Tuesday and preceding **Thursday**.  5) Thursday  IHO Definition: The day of the week following Wednesday and preceding **Friday**.  6) Friday  IHO Definition: The day of the week following Thursday and preceding Saturday.  7) Saturday  IHO Definition: The day of the week following Friday and preceding Sunday.  Remarks: |

## Day of Week is Range

|  |
| --- |
| IHO Definition: A statement expressing if the days of the week identified define a range or not.  Remarks:  A True value is an indication that the identified days of the week define a range between and inclusive of those days. |

## Delivery Point

|  |
| --- |
| IHO Definition: Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.  Remarks: |

## Distance

|  |
| --- |
| IHO Definition: A numeric measure of the spatial separation between two locations.  Remarks: |

## Downlink Bandwidth

|  |
| --- |
| IHO Definition: Downlink bandwidth in Mbps  Remarks: |

## Drawing Instruction

|  |
| --- |
| IHO Definition: Text describing one or more graphic elements that must be rendered in an end-user system.  Remarks: |

## Estimated Range of Transmission

|  |
| --- |
| IHO Definition: The estimated range of a non-optical electromagnetic transmission.  Remarks:  The estimated range (distance) assumes 'in vacuo' transmission and a standard antenna height of 5 metres. Thus it gives a hint to the mariner whether they are likely to receive transmission at a certain distance from an object. |

## File Locator

|  |
| --- |
| IHO Definition: The location of a fragment of text or other information in a support file.  Remarks:  Application schemas must describe how the associated file is identified. The associated file will commonly be named in a file reference co-attribute of the same complex attribute. Each DCEG must specify requirements for the format of the associated file and the semantics of file locator. For example, the value of file locator may be an HTML ID in an HTML file, line number in a text file) or a bookmark in a PDF file. |

## File Reference

|  |
| --- |
| IHO Definition: The file name of an externally referenced text file.  Remarks: |

## Frequency Band

|  |
| --- |
| IHO Definition: A continuous set of frequencies lying between two specified limiting frequencies. (Rec. ITU-R V.662-3)  1) **LF**  IHO Definition: Radio frequencies between 30 kHz and 300 kHz  2) **MF**  IHO Definition: Radio frequencies between 300 kHz and 3000 kHz  3) **MF/HF**  IHO Definition: Radio frequencies between 300 kHz and 30 MHz  4) HF  IHO Definition: Radio frequencies between 3 MHz and 30 MHz  5) **VHF**  IHO Definition: Radio frequencies between 30 MHz and 300 MHz  6) **UHF**  IHO Definition: Radio frequencies between 300 MHz and 3 GHz  Remarks: |

## Frequency Shore Station Receives

|  |
| --- |
| IHO Definition: The shore station receiver frequency.  Remarks:  Unit: Hertz(Hz); Example: 518kHz is to be coded as 518000. |

## Frequency Shore Station Transmits

|  |
| --- |
| IHO Definition: The shore station transmitter frequency.  Remarks:  Unit: Hertz(Hz); Example: 518kHz is to be coded as 518000. |

## Frequency Limit Lower

|  |
| --- |
| IHO Definition: Lower limit of the frequency range in Hz.  Remarks: |

## Frequency Limit Upper

|  |
| --- |
| IHO Definition: Upper limit of the frequency range in Hz.  Remarks: |

## Headline

|  |
| --- |
| IHO Definition: Words set at the head of a passage or page to introduce or categorize.  Remarks: |

## Hours of Watch

|  |
| --- |
| IHO Definition: The hours during which the watch on the radio channel is maintained. Hours are given in UTC, such as 0930-1000, or by using a service symbol such as "H24" for a 24 hour service.  Remarks: |

## Horizontal Distance Uncertainty

|  |
| --- |
| IHO Definition: The best estimate of the horizontal accuracy of horizontal clearances and distances.  Remarks: |

## Id METAREA

|  |
| --- |
| IHO Definition: The identifier for a METAREA.  Remarks: Only the roman number part of the METAREA is to be coded. |

## Id NAVAREA

|  |
| --- |
| IHO Definition: The identifier for a NAVAREA..  Remarks: Only the roman number part of the NAVAREA is to be coded. |

## In Ballast

|  |
| --- |
| IHO Definition: Whether the vessel is in ballast.  Remarks: |

## Information Confidence

|  |
| --- |
| IHO Definition: The likelihood that a vessel will experience the phenomenon described by a feature, or that the service described by the feature will be available.  1) **Virtually Certain**  IHO Definition: Virtually certain to be experienced by (or available to) an individual vessel; will be experienced by nearly all vessels.  2) **High Likelihood**  IHO Definition: Frequently experienced by (or available to) an individual vessel; experienced by a majority of vessels.  3) **Medium Likelihood**  IHO Definition: Occasionally experienced by (or available to) an individual vessel; experienced by (or available to) about half of all vessels.  4) **Low Likelihood**  IHO Definition: Unlikely, but sometimes (rarely) experienced by (or available to) an individual vessel; experienced by (or available to) a minority of vessels.  Remarks: |

## Interoperability Identifier

|  |
| --- |
| IHO Definition: A common unique identifier for entities which describe a single real-world feature, and which is used to identify instances of the feature in end-user systems where the feature may be included in multiple data product types.  Remarks: |

## Is MRCC

|  |
| --- |
| IHO Definition: A statement that expresses if a Coast Guard station performs the function of a Maritime Rescue and Coordination Centre.  Remarks:  A True value is an indication that an encoded **Radio Control Centre** performs the function of a Maritime Rescue and Coordination Centre. |

## Language

|  |
| --- |
| IHO Definition: The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.  Remarks:  The language is encoded by a 3 character code following ISO 639-2/T. |

## Language Information

|  |
| --- |
| IHO Definition: A description of the languages, alphabets and scripts in use.  Remarks: |

## Linkage

|  |
| --- |
| IHO Definition: Location (address) for online access using a URL/URI address or similar addressing scheme.  Remarks:  •For S-123, the attribute type URI is constrained to conformance with the HTTP or HTTPS protocols; that is, the character string must commence with http:// or https://. |

## Logical Connectives

|  |
| --- |
| IHO Definition: Expresses whether all the constraints described by its co-attributes must be satisfied, or only one such constraint need be satisfied.  1) **Logical Conjunction**  IHO Definition: All the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true.  2) **Logical Disjunction**  IHO Definition: At least one of the conditions described by the other attributes of the object, or sub-attributes of the same complex attributes, is true.  Remarks:  Is intended to be used with co-attributes that encode limits on vessel dimensions, type of cargo, and other characteristics. The combination of constraints described by **logicalConnectives** and its co-attributes defines a subset of vessels to which information described by a feature or information type instance applies (or does not apply, is required, recommended, etc.). The relationship between the vessel subset and the information is indicated by an association - see **PermissionType** and **InclusionType**). The two listed values of logicalConnective are two of the basic operations of Boolean logic. The third basic operation (not) is not used. |

## Maximum Data Burst Volume

|  |
| --- |
| IHO Definition: Maximum data burst volume in bytes  Remarks: |

## Maximum Display Scale

|  |
| --- |
| IHO Definition: The value considered by the Data Producer to be the maximum (largest) scale at which the data is to be displayed before it can be considered to be "grossly overscaled".  Remarks: |

## Membership

|  |
| --- |
| IHO Definition: Indicates whether a vessel is **included** or **excluded** from the regulation/restriction/recommendation/nautical information.  1) Included  IHO Definition: Vessels with these characteristics are included in the regulation/ restriction/ recommendation/ nautical information.  2) Excluded  IHO Definition: Vessels with these characteristics are excluded from the regulation/ restriction/ recommendation/ nautical information.  Remarks: |

## Minimum Display Scale

|  |
| --- |
| IHO Definition: The smallest intended viewing scale for the data.  Remarks: |

## Minimum Received Power

|  |
| --- |
| IHO Definition: Minimum received power in dBm.  Remarks: |

## Minimum Signal to Interference Noise Ratio

|  |
| --- |
| IHO Definition: The minimum value of Signal to Interference plus Noise Ratio (SINR) in dB.  Remarks: |

## Minute Past Even Hours

|  |
| --- |
| IHO Definition: The minute past even hours when a routine transmission starts.  Remarks:  Minute (time) is a closed interval going from 0 to 59 seconds (time) and indicated the duration of a period of time. |

## Minute Past Every Hour

|  |
| --- |
| IHO Definition: The minute past every hour when a routine transmission starts.  Remarks:  Minute (time) is a closed interval going from 0 to 59 seconds (time) and indicated the duration of a period of time. |

## Minute Past Odd Hours

|  |
| --- |
| IHO Definition: The minute past odd hours when a routine transmission starts.  Remarks:  Minute (time) is a closed interval going from 0 to 59 seconds (time) and indicated the duration of a period of time. |

## MMSI Code

|  |
| --- |
| IHO Definition: The Maritime Mobile Service Identity (MMSI) Code is formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations, and group calls. These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically.  Remarks:  MMSI code is a 9-digit identity. The assignment of the identities in the maritime mobile service follows the Recommendation ITU-R M.585. The MMSI code to be assigned to a coast station or station located on land starts with 00, while the identity to be assigned to automatic identification systems aids to navigation (AIS AtoN) starts with 99. |

## MSI Coastal Warning Area

|  |
| --- |
| IHO Definition: The coastal warning area identification letter(s) to be selected to receive the Maritime Safety Information (MSI) for the corresponding coastal warning area(s).  Remarks:  For example, ABCEFKM |

## Name

|  |
| --- |
| IHO Definition: The individual name of a feature.  Remarks: |

## Name of Resource

|  |
| --- |
| IHO Definition: Name of the online resource.  Remarks: |

## Name Usage

|  |
| --- |
| IHO Definition: Classification of the type and display level of the name of a feature in an end-user system.  1) **Default Name Display**  IHO Definition: The name is intended to be displayed when the end-user system is set to the default name/text display setting.  2) **Alternate Name Display**  IHO Definition: The name is intended to be displayed when the end-user system is set to an alternate name/text display setting, for example an alternate language.  3) **No Chart Display**  IHO Definition: The name or text is not intended to be displayed.  Remarks: |

## Nationality

|  |
| --- |
| IHO Definition: Identifier of membership of a particular nation.  Remarks: |

## Observation Time

|  |
| --- |
| IHO Definition: The time on each day when observations are made.  Remarks: |

## Orientation Uncertainty

|  |
| --- |
| IHO Definition: The best estimate of the accuracy of a bearing.  Remarks: |

## Orientation Value

|  |
| --- |
| IHO Definition: The angular distance measured from true north to the major axis of the feature.  Remarks: |

## Packet Delay

|  |
| --- |
| IHO Definition: Packet delay in ms  Remarks: |

## Pictorial Representation

|  |
| --- |
| IHO Definition: The file name of an externally referenced picture file.  Remarks:  The 'pictorial representation' could be a drawing or a photo. The string encodes the file name of an external graphic file (pixel/vector). |

## Picture Caption

|  |
| --- |
| IHO Definition: Short description of the purpose of the image.  Remarks: |

## Picture Information

|  |
| --- |
| IHO Definition: A set of information to provide credits to picture creator, copyright owner etc.  Remarks: |

## Postal Code

|  |
| --- |
| IHO Definition: Known in various countries as a postcode, or ZIP code, the postal code is a series of letters and/or digits that identifies each postal delivery area.  Remarks: |

## Presumed Receiver Antenna Height

|  |
| --- |
| IHO Definition: Presumed receiver antenna height for the calculation of radio coverage.  Remarks: |

## Quality of Horizontal Measurement

|  |
| --- |
| IHO Definition: The degree of reliability attributed to a position.  4) **Approximate**  IHO Definition: A position that is considered to be less than third-order accuracy, but is generally considered to be within 30.5 metres of its correct geographic location. Also may apply to a feature whose position does not remain fixed.  Remarks: |

## Remote Controlled

|  |
| --- |
| IHO Definition: A statement that expresses if it is remote controlled.  Remarks: |

## Reported Date

|  |
| --- |
| IHO Definition: The date that the item was observed, done, or investigated.  Remarks: |

## Satellite Ocean Region

|  |
| --- |
| IHO Definition: The identifier of the ocean region area, within which a station can obtain line-of-sight communication, with an Inmarsat satellite.  Remarks:  To be coded by using the name such as IOR, POR, AORE, or AORW. |

## Scale Minimum

|  |
| --- |
| IHO Definition: The minimum scale at which the feature may be used for example for ECDIS presentation.  Remarks: |

## Sector Bearing

|  |
| --- |
| IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector bearing specifies the limit of the sector.  Remarks:  The values given to the common limits of adjacent sectors should be identical. The orientation of bearing is from seaward to the central object. This conforms with the method used in 'List of Lights' publications. A generic term such as 'to shore' cannot be used; a specific bearing must be encoded. Where a sector limit is defined as 'to the shore', it should be encoded using a value that ensures that, when the limit is drawn, it will fall entirely on land. |

## Sector Line Length

|  |
| --- |
| IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector line length specifies the displayed length of the line, in ground units, defining the limit of the sector.  Remarks: |

## Selective Call Number

|  |
| --- |
| IHO Definition: When stations of the maritime mobile service (direct printing telegraphy) use selective calling devices, their Selective Call numbers (SELCAL) are formed of four digits (coast stations).  Remarks: |

## Serving Mobile Satellite Service

|  |
| --- |
| IHO Definition: The Recognized Mobile Satellite Service (RMSS) providing the service through a satellite system that is recognized by the IMO, for use in the GMDSS  1) **Inmarsat SafetyNET**  IHO Definition: An international automatic direct-printing satellite-based service using Inmarsat C Enhanced Group Call (EGC) system for the promulgation of Maritime Safety Information (MSI), navigational and meteorological warnings, meteorological forecasts, Search and Rescue (SAR) related information and other urgent safety-related messages to ships.  2) **Iridium SafetyCast**  IHO Definition: A service based on Iridium mobile-satellite system for the promulgation of Maritime Safety Information (MSI), navigational and meteorological warnings, meteorological forecasts, SAR-related information and other urgent safety-related messages to ships.  Remarks: |

## Source Date

|  |
| --- |
| IHO Definition: The production date of the source; for example the date of measurement.  Remarks: |

## Source

|  |
| --- |
| IHO Definition: The publication, document, or reference work from which information comes or is acquired.  Remarks: |

## Status

|  |
| --- |
| IHO Definition: The condition of an object at a given instant in time.  1) **Permanent**  IHO Definition: Intended to last or function indefinitely.  2) **Occasional**  IHO Definition: Acting on special occasions; happening irregularly.  4) **Not in Use**  IHO Definition: Use has ceased, but the facility still exists intact; disused.  5) **Periodic/Intermittent**  IHO Definition: Recurring at intervals.  7) **Temporary**  IHO Definition: Meant to last only for a time.  8) **Private**  IHO Definition: Administered by an individual or corporation, rather than a State or a **public** body.  14) Public  IHO Definition: Belonging to, available to, used or shared by, the community as a whole and not restricted to private use.  16) **Watched**  IHO Definition: Looked at or observed over a period of time especially so as to be aware of any movement or change.  17) **Unwatched**  IHO Definition: Usually automatic in operation, without any permanently-stationed personnel to superintend it.  24) **Strong**  IHO Definition: Not easily broken or destroyed.  25) **Good**  IHO Definition: In a satisfactory condition to use.  26) **Moderately**  IHO Definition: Fairly but not very.  27) **Poor**  IHO Definition: Not as good as it could be or should.  Remarks: |

## Subject Description

|  |
| --- |
| IHO Definition: Descriptions of the subject of the transmitted message.  Remarks: |

## Subject or Message Type Code

|  |
| --- |
| IHO Definition: A code specified for a communication system to indicate the subject group or message type of the transmitted content, e.g., message type of DGNSS, subject code for NAVDAT, or subject indicator character for NAVTEX.  Remarks: |

## Telecommunication Identifier

|  |
| --- |
| IHO Definition: An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.  Remarks: |

## Telecommunication Service

|  |
| --- |
| IHO Definition: Classification of methods of communication over a distance by electrical, electronic, or electromagnetic means.  1) **Voice**  IHO Definition: The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking.  2) **Facsimile**  IHO Definition: A system of transmitting and reproducing graphic matter (as printing or still pictures) by means of signals sent over telephone lines.  3) **SMS**  IHO Definition: Short Message Service is a form of text messaging communication on phones and mobile phones.  4) **Data**  IHO Definition: A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing.  5) **Streamed Data**  IHO Definition: Data that is constantly received by and presented to an end-user while being delivered by a provider.  6) **Telex**  IHO Definition: A system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter).  7) **Telegraph**  IHO Definition: An apparatus, system or process for communication at a distance by electric transmission over wire.  8) **Email**  IHO Definition: Messages and other data exchanged between individuals using computers in a network.  Remarks: |

## Text

|  |
| --- |
| IHO Definition: A non-formatted digital text string.  Remarks:  Should be used, for example, to hold the information that is for short cautionary or explanatory notes. Therefore, text populated in text must not exceed 300 characters. Text may be in English, or in a national language. No formatting of text is possible within text. If formatted text, or text strings exceeding 300 characters, is required, then an alternate concept should be used. |

## Thickness of Ice Capability

|  |
| --- |
| IHO Definition: The thickness of ice that the ship can safely transit.  Remarks: |

## Time of Day End

|  |
| --- |
| IHO Definition: The time corresponding to the end of an active period.  Remarks:  The time of day end must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004. |

## Time of Day Start

|  |
| --- |
| IHO Definition: The time corresponding to the start of an active period.  Remarks:  The time of day start must be encoded using 2 digits for the hour (hh), 2 digits for the minutes(mm) and 2 digits for the seconds (ss). This conforms to ISO 8601:2004. |

## Transmission Content

|  |
| --- |
| IHO Definition: Content of transmission.  Remarks:  Other than MSI. |

## Transmitter Identification Character

|  |
| --- |
| IHO Definition: The NAVTEX transmitter identification character is a single unique letter, which is allocated to each transmitter. It is used to identify the broadcasts, which are to be accepted by the receiver, those which are to be rejected, and the time slot for the transmission.  Remarks:  The transmitter identification character should be indicated by a single character (A-Z). |

## Transmission of Traffic Lists

|  |
| --- |
| IHO Definition: Describes whether a station transmits traffic lists.  Remarks: |

## Transmission Power

|  |
| --- |
| IHO Definition: The maximum power the radio service uses (or is authorized to use) for radio transmission.  Remarks:  The calculation of the power depends on the type of signal. The value encoded must be the actual transmission power, if this is known to be different from the authorized transmission power. (47 CFR 80.215 (19 April 2017), adapted.) |

## Transmission Regularity

|  |
| --- |
| IHO Definition: Classification of **regular**ity or conditions for transmission.  1) **Continuous**  IHO Definition: Transmission is made continuously.  2) Regular  IHO Definition: Transmission is made regularly according to a schedule.  3) **On Receipt**  IHO Definition: Transmission is made when warning or information is received from another authority.  4) **As Required**  IHO Definition: Transmission is made under specified conditions or when needed.  5) **On Request**  IHO Definition: When you ask for it.  Remarks: |

## Transmission Time

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| IHO Definition: The time in the day when scheduled transmissions start.  Remarks: |

## Type of Broadcast Content

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| IHO Definition: Categorization of the broadcast content by subject.  1) **Navigational warnings**  IHO Definition: Messages containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974.  2) **Meteorological warnings and forecasts**  IHO Definition: Marine meteorological warning and forecast information in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974  3) **SAR Information**  IHO Definition: Broadcast message with information about an ongoing Search and Rescue operation.  4) **Marine security or piracy warnings**  IHO Definition: Security-related requirements in accordance to International Ship and Port Facility Security (ISPS) Code, or warnings related to acts of piracy and armed robbery against ships  5) **Tsunamis or natural phenomena warnings**  IHO Definition: Warnings realted to tsunamis and other natural phenomena, such as abnormal changes to sea level  6) **Pilot and VTS service messages**  IHO Definition: Messages related to pilot and VTS service, such as temporary alterations, movement or suspension to pilot or VTS services  7) **Military information**  IHO Definition: Information concerning military events, such as military exercises, missile firings.  8) **Special service or application specific messages**  IHO Definition: Broadcast for special services or other application specific messages  9) **Ice Report**  IHO Definition: Report of the ice situation and restrictions to shipping.  Remarks: |

## Type of Connectivity Resource

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| --- |
| IHO Definition: Categorization of the connectivity resource by Quality o Service (QoS).  1) **Guaranteed Bit Rate**  IHO Definition: The type of Quality of Service (QoS) Flow or a QoS parameter that defines the minimum data rate that must be guaranteed for a specific service or traffic flow.  2) **Non-Guaranteed Bit Rate**  IHO Definition: The type of Quality of Service (QoS) Flow that does not provide the end-user a guaranteed flow bit rate, typically used for non-time-sensitive applications, e.g., web browsing, buffered streaming, and instant messenger applications  3) **Delay Critical Guaranteed Bit Rate**  IHO Definition: The type of Quality of Service (QoS) Flow that provides latencies significantly lower than guaranteed flow bit rate. Typically used in mission critical application like automation or intelligent transportation systems  4) **Best Effort**  IHO Definition: The network or service that does not support quality of service, does its best to deliver packets, but does not guarantee delivery or control delay  Remarks: |

## Type of NAVTEX Service

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| --- |
| IHO Definition: Type of service of the NAVTEX, an international one or a national one. (IMO MSC.1/Circ.1403/Rev.2 NAVTEX Manual)  1) **International NAVTEX**  IHO Definition: The coordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language. (IMO MSC.1/Circ.1403/Rev.2 NAVTEX Manual)  2) national NAVTEX  IHO Definition: The broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz and languages as decided by the Administration concerned. (IMO MSC.1/Circ.1403/Rev.2 NAVTEX Manual)  Remarks: |

## Type of Radio Service

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| --- |
| IHO Definition: Categorization of the radio service by the technology or system  1) **Digital Selective Calling (DSC)**  IHO Definition: Radio service using digital selective calling (DSC) techniques.  2) **Radio Telephony (RT)**  IHO Definition: Radio service using radio telephony (RT).  3) **Public correspondence service (CP)**  IHO Definition: Radio service with the coast station providing a public correspondence service.  4) **Radio Telegraphy (WT)**  IHO Definition: Radio service using Radio Telegraphy (WT)  5) **Radiotelex (NBDP telegraphy)**  IHO Definition: Radio service using Narrow-Band Direct-Printing (NBDP) telegraphy  6) **Radio facsimile**  IHO Definition: Radio service using radio facsimile  7) Digital  IHO Definition: Radio service using digital modulation in the transmitted signal  8) **Data**  IHO Definition: Radio service using data communication  9) **NAVTEX**  IHO Definition: The system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.  10) **Enhanced Group Call (EGC)**  IHO Definition: The broadcast of coordinated maritime safety information and search and rescue related information, to a defined geographical area using a recognized mobile satellite service.  11) **AIS**  IHO Definition: Automatic Identification System  12) **ASM**  IHO Definition: Application Specific Message  13) **Satellite communication**  IHO Definition: Communication using a satellite system  14) **NAVDAT**  IHO Definition: A digital system referred to as navigational data for broadcasting maritime safety and security related information from shore-to-ship  Remarks:. |

## Uncertainty Fixed

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| --- |
| IHO Definition: The best estimate of the fixed horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.  Remarks: |

## Uncertainty Variable Factor

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| --- |
| IHO Definition: The factor to be applied to the variable component of an uncertainty equation so as to provide the best estimate of the variable horizontal or vertical accuracy component for positions, depths, heights, vertical distances and vertical clearances.  Remarks: |

## Uplink Bandwidth

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| --- |
| IHO Definition: Uplink bandwith in Mbps  Remarks: |

## Vessels Characteristics

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| IHO Definition: Characteristics of vessels.  1) **Length Overall**  IHO Definition: The maximum length of the ship.  2) **Length at Waterline**  IHO Definition: The ship's length measured at the waterline.  3) **Breadth**  IHO Definition: The width or beam of the vessel.  4) **Draught**  IHO Definition: The depth of water necessary to float a vessel fully loaded.  6) **Displacement Tonnage**  IHO Definition: A measurement of the weight of the vessel, usually used for warships. (Merchant ships are usually measured based on the volume of cargo space; see tonnage). Displacement is expressed either in long tons of 2,240 pounds or metric tonnes of 1,000 kg. Since the two units are very close in size (2,240 pounds = 1,016 kg and 1,000 kg = 2,205 pounds), it is common not to distinguish between them. To preserve secrecy, nations sometimes misstate a warship's displacement.  7) **Displacement Tonnage, Light**  IHO Definition: The weight of the ship excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level.  8) **Displacement Tonnage, Loaded**  IHO Definition: The weight of the ship including cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage, which brings the vessel down to her load draft.  9) **Deadweight Tonnage**  IHO Definition: The difference between displacement, light and displacement, loaded. A measure of the ship's total carrying capacity.  10) **Gross Tonnage**  IHO Definition: The entire internal cubic capacity of the ship expressed in tons of 100 cubic feet to the ton, except certain spaces with are exempted such as: peak and other tanks for water ballast, open forecastle bridge and poop, access of hatchways, certain light and air spaces, domes of skylights, condenser, anchor gear, steering gear, wheel house, galley and cabin for passengers.  11) **Net Tonnage**  IHO Definition: Obtained from the gross tonnage by deducting crew and navigating spaces and allowances for propulsion machinery.  12) **Panama Canal/Universal Measurement System Net Tonnage**  IHO Definition: The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity.  13) **Suez Canal Net Tonnage**  IHO Definition: The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.  Remarks: |

## Vessels Characteristics Unit

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| --- |
| IHO Definition: The unit used for vessel characteristics attribute.  1) **Metres**  IHO Definition: The basic unit of length in the International System of Units (SI) system.  3) **Metric Ton**  IHO Definition: The tonne or metric ton (U.S.), often redundantly referred to as a metric tonne, is a unit of mass equal to 1,000 kg (2,205 lb) or approximately the mass of one cubic metre of water at four degrees Celsius. It is sometimes abbreviated as mt in the United States, but this conflicts with other SI symbols. The tonne is not a unit in the International System of Units (SI), but is accepted for use with the SI. In SI units and prefixes, the tonne is a megagram (Mg). The Imperial and US customary units comparable to the tonne are both spelled ton in English, though they differ in mass. Pronunciation of tonne (the word used in the UK) and ton is usually identical, but is not too confusing unless accuracy is important as the tonne and UK long ton differ by only 1.6.  4) Ton  IHO Definition: Long ton (weight ton or imperial ton) is the name for the unit called the "ton" in the avoirdupois or Imperial system of measurements, as used in the United Kingdom and several other Commonwealth countries. It has been mostly replaced by the tonne, and in the United States by the **short ton**. One long ton is equal to 2,240 pounds (1,016 kg) or 35 cubic feet (0.9911 m) of salt water with a density of 64 lb/ft (1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST).  5) Short Ton  IHO Definition: A unit of weight equal to 2,000 pounds (907.18474 kg). In the United States it is often called simply ton without distinguishing it from the metric ton (tonne, 1,000 kilograms) or the long ton (2,240 pounds / 1,016.0469088 kilograms); rather, the other two are specifically noted. There are, however, some US applications for which unspecified tons normally means long tons (for example, Navy ships) or metric tons (world grain production figures). Both the long and short ton are defined as 20 hundredweights, but a hundredweight is 100 pounds (45.359237 kg) in the US system (short or net hundredweight) and 112 pounds (50.80234544 kg) in the Imperial system (long or gross hundredweight).  6) **Gross Ton**  IHO Definition: Gross tonnage (GT) is a function of the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity.Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship.  7) **Net Ton**  IHO Definition: Net tonnage (NT) is based on a calculation of the volume of all cargo spaces of the ship. It indicates a vessels earning space and is a function of the moulded volume of all cargo spaces of the ship.  9) **Suez Canal Net Tonnage**  IHO Definition: The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate.  Remarks: |

## Vessels Characteristics Value

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| --- |
| IHO Definition: The value of a particular characteristic such as a dimension or tonnage of a vessel.  Remarks:  Indicates range limits in expressions characterizing vessels by dimensions and tonnages. The unit of measure, characteristic, and comparison operator (greater, less, etc.) are encoded separately. |

## Vessel Performance

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| IHO Definition: A description of the required handling characteristics of a vessel including hull design, main and auxiliary machinery, cargo handling equipment, navigation equipment and manoeuvring behaviour.  Remarks: |

## Coast Station Identification Code

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| IHO Definition: A code, issued according to a standard and coordination procedure, to identify the transmission of a coast radio station.  Remarks: |

# Complex Attributes

## Area A3 Service Description

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| --- |
| IHO Definition: Description of the radio service for area A3 of the Global Maritime Distress and Safety System (GMDSS).  Sub-attributes:  **Serving Mobile Satellite Service** (see clause 12.93)  **Satellite Ocean Region** (see clause 12.88)  **MSI Coastal Warning Area** (see clause 12.71)  Remarks: |

## Bearing Information

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| --- |
| IHO Definition: A bearing is the direction one object is from another object.  Sub-attributes:  **Distance** (see clause 12.37)  **Information** (see clause 13.12)  **Orientation** (see clause 13.14)  **Sector Limit** (see clause 13.20)  Remarks: |

## Broadcast Content

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| --- |
| IHO Definition: Details related to the content of the broadcast.  Sub-attributes:  **Type of Broadcast Content** (see clause 12.111)  **Subject or Message Type Code** (see clause 12.98)  **Subject Description** (see clause 12.97)  **Observation Time** (see clause 12.76)  **Transmission Regularity** (see clause 12.109)  Remarks: |

## Contact Address

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| --- |
| IHO Definition: Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it.  Sub-attributes:  **Delivery Point** (see clause 12.36)  **City Name** (see clause 12.28)  **Administrative Division** (see clause 12.3)  **Country Name** (see clause 12.27)  **Postal Code** (see clause 12.83)  Remarks: |

## Coverage Indication

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| --- |
| IHO Definition: Details related to the indication of the radio coverage.  Sub-attributes:  **Minimum Received Power** (see clause 12.65)  **Presumed Receiver Antenna Height** (see clause 12.84)  **Minimum Signal to Interference Noise Ratio** (see clause 12.66)  **Status** (see clause 12.96)  **Text** (see clause 12.101)  Remarks: |

## Feature Name

|  |
| --- |
| IHO Definition: Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.  Sub-attributes:  **Language** (see clause 12.57)  **Name** (see clause 12.72)  **Name Usage** (see clause 12.74)  Remarks: |

## Fixed Date Range

|  |
| --- |
| IHO Definition: An active period of a single fixed event or occurrence, as the date range between discrete start and end dates.  Sub-attributes:  **Date Start** (see clause 12.32)  **Date End** (see clause 12.30)  **Time of Day Start** (see clause 12.104)  **Time of Day End** (see clause 12.103)  Remarks:  Dates must be encoded in the format YYYYMMDD; using 4 digits for the calendar year (YYYY) and, optionally, 2 digits for the month (MM) (for example April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, the values are replaced with dashes (-). The date range of a recurring event or occurrence must be encoded using **periodicDateRange**. |

## Frequency Pair

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| IHO Definition: A pair of frequencies for transmitting and receiving radio signals. The shore station transmits and receives on the frequencies indicated.  Sub-attributes:  **Frequency Shore Station Receives** (see clause 12.44)  **Frequency Shore Station Transmits** (see clause 12.45)  Remarks: |

## Frequency Range

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| --- |
| IHO Definition: Frequency range of the electromagnetic spectrum in which the transmission is provided.  Sub-attributes:  **Frequency Limit Lower** (see clause 12.46)  **Frequency Limit Upper** (see clause 12.47)  Remarks:. |

## Graphic

|  |
| --- |
| IHO Definition: Pictorial information such as a photograph, sketch or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.  Sub-attributes:  **Pictorial Representation** (see clause 12.80)  **Picture Caption** (see clause 12.81)  **Source Date** (see clause 12.94)  **Picture Information** (see clause 12.82)  **Bearing Information** (see clause 13.2)  Remarks:  •No remarks. |

## Horizontal Position Uncertainty

|  |
| --- |
| IHO Definition: The best estimate of the accuracy of a position.  Sub-attributes:  **Uncertainty Fixed** (see clause 12.115)  **Uncertainty Variable Factor** (see clause 12.116)  Remarks: |

## Information

|  |
| --- |
| IHO Definition: Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text.  Sub-attributes:  **File Locator** (see clause 12.41)  **File Reference** (see clause 12.42)  **Headline** (see clause 12.48)  **Language** (see clause 12.57)  **Text** (see clause 12.101)  Remarks:  At least one of the sub-attributes file reference or text must be populated. The sub-attribute file reference is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute file reference. |

## Online Resource

|  |
| --- |
| IHO Definition: Information about online sources from which a resource or data can be obtained.  Sub-attributes:  **Headline** (see clause 12.48)  **Linkage** (see clause 12.59)  **Name of Resource** (see clause 12.73)  Remarks: |

## Orientation

|  |
| --- |
| IHO Definition: (1) The angular distance measured from true north to the major axis of the feature. (2) In ECDIS, the mode in which information on the ECDIS is being presented. Typical modes include: north-up - as shown on a nautical chart, north is at the top of the display; Ships head-up - based on the actual heading of the ship, (e.g. Ships gyrocompass); course-up display - based on the course or route being taken.  Sub-attributes:  **Orientation Uncertainty** (see clause 12.77)  **Orientation Value** (see clause 12.78)  Remarks: |

## Periodic Date Range

|  |
| --- |
| IHO Definition: The active period of a recurring event or occurrence.  Sub-attributes:  **Date Start** (see clause 12.32)  **Date End** (see clause 12.30)  Remarks: |

## Radio Channel Details

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| IHO Definition: Details related to the radio channel used in the radio service.  Sub-attributes:  **Communication Channel** (see clause 12.24)  **Frequency Pair** (see clause 13.8)  **Data Transmission Rate** (see clause 12.29)  **Transmission of Traffic Lists** (see clause 12.107)  **Hours of Watch** (see clause 12.49)  Remarks: |

## Radiocommunication Identifier

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| --- |
| IHO Definition: Identifiers of the radio station in various maritime radiocommunication services.  Sub-attributes:  **Call Sign** (see clause 12.6)  **MMSI Code** (see clause 12.70)  **Selective Call Number** (see clause 12.92)  **Coast Station Identification Code** (see clause 12.122)  Remarks: |

## RxN Code

|  |
| --- |
| IHO Definition: A summary of the impact of the most common types of regulation, restriction, recommendation and nautical information on a vessel.  Sub-attributes:  **Headline** (see clause 12.48)  **Category of RxN** (see clause 12.16)  **Action or Activity** (see clause 12.2)  Remarks: |

## Schedule by Day of Week

|  |
| --- |
| IHO Definition: The nature and timings of a daily schedule by days of the week.  Sub-attributes:  **Category of Schedule** (see clause 12.17)  **Time Intervals by Day of Week** (see clause 13.27)  Remarks: |

## Sector Limit

|  |
| --- |
| IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. The sector limit specifies the limits of the sector In a clockwise direction around the central feature (for example a light).  Sub-attributes:  **Sector Limit One** (see clause 13.21)  **Sector Limit Two** (see clause 13.22)  Remarks: |

## Sector Limit One

|  |
| --- |
| IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector limit one specifies the first limit of the sector. The order of sector limit one and sector limit two is clockwise around the central feature (for example a light).  Sub-attributes:  **Sector Bearing** (see clause 12.90)  **Sector Line Length** (see clause 12.91)  Remarks: |

## Sector Limit Two

|  |
| --- |
| IHO Definition: A sector is the part of a circle between two straight lines drawn from the centre to the circumference. Sector limit two specifies the second limit of the sector. The order of sector limit one and sector limit two is clockwise around the central feature (for example a light).  Sub-attributes:  **Sector Bearing** (see clause 12.89)  **Sector Line Length** (see clause 12.90)  Remarks: |

## Spatial Accuracy

|  |
| --- |
| IHO Definition: Provides an indication of the vertical and horizontal positional uncertainty of bathymetric data, optionally within a specified date range.  Sub-attributes:  **Fixed Date Range** (see clause 13.7)  **Horizontal Position Uncertainty** (see clause 13.11)  **Vertical Uncertainty** (see clause 13.29)  Remarks: |

## Survey Date Range

|  |
| --- |
| IHO Definition: The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.  Sub-attributes:  **Date Start** (see clause 12.32)  **Date End** (see clause 12.30)  Remarks: |

## Telecommunications

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| --- |
| IHO Definition: A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.  Sub-attributes:  **Contact Instructions** (see clause 12.7)  **Telecommunication Identifier** (see clause 12.99)  **Telecommunication Service** (see clause 12.100)  Remarks:  If no value is populated for the sub-attribute telecommunication service, this means the service is by voice communication. If no value is populated for the sub-attribute telecommunication carrier, this means the service is by land line communication. |

## Text Content

|  |
| --- |
| IHO Definition: Textual material, or a pointer to a resource providing textual material. May be accompanied by basic information about its source and relationship to the source.  Sub-attributes:  **Category of Text** (see clause 12.19)  **Information** (see clause 13.12)  **Online Resource** (see clause 13.13)  **Source** (see clause 12.95)  **Reported Date** (see clause 12.87)  Remarks:  Exactly one of sub-attributes onlineResource or information must be completed in one instance of textContent. Product specifications may restrict the use or content of onlineResource for security. For example, a product specification may forbid populating onlineResource. Product specification authors must consider whether applications using the data product may be prevented from accessing off-system resources by security policies. |

## Time Intervals by Day of Week

|  |
| --- |
| IHO Definition: The regular weekly operation times of a service or schedule.  Sub-attributes:  **Day of Week** (see clause 12.34)  **Day of Week is Range** (see clause 12.35)  **Time of Day End** (see clause 12.103)  **Time of Day Start** (see clause 12.104)  Remarks: |

## Times of Transmission

|  |
| --- |
| IHO Definition: One or more times in the day when the radio station starts a routine transmission, normally expressed in UTC or local time.  Sub-attributes:  **Minute Past Even Hours** (see clause 12.67)  **Minute Past Odd Hours** (see clause 12.69)  **Minute Past Every Hour** (see clause 12.68)  **Transmission Time** (see clause 12.110)  Remarks: |

## Vertical Uncertainty

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| --- |
| IHO Definition: The best estimate of the vertical accuracy of depths, heights, vertical distances and vertical clearances.  Sub-attributes:  **Uncertainty Fixed** (see clause 12.115)  **Uncertainty Variable Factor** (see clause 12.116)  Remarks: |

## Vessel Measurements Specification

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| --- |
| IHO Definition: Combinations of values of measurable characteristics or dimensions of vessels, used to specify size and tonnage ranges.  Sub-attributes:  **Vessels Characteristics** (see clause 12.118)  **Vessels Characteristics Value** (see clause 12.120)  **Vessels Characteristics Unit** (see clause 12.119)  **Comparison Operator** (see clause 12.26)  Remarks:  Combines (i) specifications of vessels' measurable characteristics (length, beam, tonnages, etc.), (ii) limit values for the specified characteristics (with units), (iii) arithmetical comparison operators (greater than, etc.), and (iv) logical operators (AND/OR) to define a subset of vessels characterized by the specified ranges. For example, the combination (draught, 10.5, metres, greaterThan) describes "vessels with draught greater than 10.5 metres". |

1. S-100 and by extension S-123 have not adopted ISO 8601-1/2 (2019). [↑](#footnote-ref-1)