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IHO UNIVERSAL HYDROGRAPHIC DATA MODEL

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**Traffic Management Product Specification**

**Appendix A**

**Data Classification and Encoding Guide**

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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 Traffic Management (S-127) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-127 encoding to meet IHO standards for the proper display of Marine Traffic Management information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to a Traffic Management data product. The content of a dataset 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-127 Product Specification, is available at the following web site, http://www.iho.int.

## S-127 Appendix 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 Traffic Management product specification metadata

## Terms and definitions

This list is identical with the list in the main body of this product specification.

|  |  |
| --- | --- |
| **Term** | **Definition** |
| **aggregation** | special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component (see composition) |
| **application** | manipulation and processing of data in support of user requirements (ISO 19101) |
| **application schema** | **conceptual schema** for data required by one or more **applications** (ISO 19101) |
| **association** | semantic relationship between two or more classifiers that specifies connections among their instancesNOTE:  A binary association is an association among exactly two classifiers (including the possibility of an association from a classifier to itself) |
| **attribute** | named property of an entityNOTE:  Describes the geometrical, topological, thematic, or other characteristic of an entity |
| **boundary** | set that represents the limit of an entity (ISO 19107) |
| **composition** | special form of **association** that specifies a “strong aggregation”.  In a composition association, if a container object is deleted then all of the objects it contains are deleted as well. |
| **conceptual model** | model that defines concepts of a **universe of discourse** (ISO 19101) |
| **conceptual schema** | formal description of a **conceptual model** (ISO 19101) |
| **coverage** | **feature** that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal **domain** (ISO 19123)*EXAMPLE Raster image, polygon overlay, digital elevation matrix.* |
| **curve** | 1-dimensional **geometric primitive**, representing the continuous image of a lineNOTE: The **boundary** of a **curve** is the **set** of **points** at either end of the **curve**. If the **curve** is a cycle, the two ends are identical, and the **curve** (if topologically closed) is considered to not have a boundary. The first **point** is called the **start point**, and the last **point** is the **end point**. Connectivity of the curve is guaranteed by the “continuous image of a line” |
| **data product** | **dataset** or **dataset series** that conforms to a **data product specification** |
| **data product specification** | detailed description of a **dataset** or **dataset series** together with additional information that will enable it to be created, supplied to and used by another party*NOTE: A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a dataset. It may be used for production, sales, end-use or other purpose.* |
| **dataset** | identifiable collection of data (ISO 19115)*NOTE: A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature contained within a larger dataset. A hardcopy map or chart may be considered a dataset.* |
| **dataset series** | collection of **datasets** sharing the same product specification (ISO 19115) |
| **domain** | well-defined set (ISO/TS 19103)*NOTE: Well-defined means that the definition is both necessary and sufficient, as everything that satisfies the definition is in the set and everything that does not satisfy the definition is necessarily outside the set.* |
| **end point** | last point of a curve (ISO 19107) |
| **enumeration** | a fixed list which contains valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list. |
| **feature** | abstraction of real world phenomena (ISO 19101)*NOTE: A feature may occur as a type or an instance. Feature type or feature instance shall be used when only one is meant.*EXAMPLE:  The feature instance named “Turning Torso Tower” may be classified with other phenomena into a feature type “tower”. |
| **feature association** | relationship that links instances of one **feature** type with instances of the same or a different **feature** type (ISO19110)*NOTE 1; A feature association may occur as a type or an instance. Feature association type or feature association instance is used when only one is meant.**NOTE 2: Feature associations include aggregation of features.* |
| **feature attribute** | characteristic of a **feature** (ISO 19101)*NOTE 1: A feature attribute may occur as a type or an instance. Feature attribute type or feature attribute instance is used when only one is meant.**NOTE 2: A feature attribute type has a name, a data type and a domain associated to it. A feature attribute for a feature instance has an attribute value taken from the domain.* |
| **geographic data** | data with implicit or explicit reference to a location relative to the Earth (ISO 19109)*NOTE: Geographic information is also used as a term for information concerning phenomena implicitly or explicitly associated with a location relative to the Earth.* |
| **geometric primitive** | geometric object representing a single, connected, homogeneous element of geometryNOTE:  Geometric primitives are non-decomposed objects that present information about geometric configuration. They include **points, curves,** surface |
| **maximum display scale** | the largest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (largest scale) of the scale range of the dataset |
| **metadata** | data about data (ISO 19115) |
| **minimum display scale** | the smallest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (smallest scale) of the scale range of the dataset |
| **model** | abstraction of some aspects of reality (ISO 19109) |
| **point** | 0-dimensional geometric primitive, representing a positionNOTE:  The **boundary** of a point is the empty set |
| **portrayal** | presentation of information to humans (ISO 19117) |
| **quality** | totality of characteristics of a product that bear on its ability to satisfy stated and implied needs (ISO 19101) |
| **set** | unordered collection of related items (objects or values) with no repetition (ISO 19107) |
| **start point** | first point of a curve (ISO 19107) |
| **surface** | connected 2-dimensional geometric primitive, representing the continuous image of a region of a planeNOTE:  The boundary of a surface is the set of oriented, closed **curves** that delineate the limits of the surface |
| **universe of discourse** | view of the real or hypothetical world that includes everything of interest (ISO 19101) |

Table 1‑2 List of terms and definitions

## Abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Description** |
| DCEG | Data Classification and Encoding Guide |
| ECDIS | Electronic Chart Display and Information System |
| ENC | Electronic Navigational Chart |
| GML | Geography Markup Language |
| HO | Hydrographic Office |
| IHO | International Hydrographic Organization |
| IMO | International Maritime Organization |
| ISO | International Organization for Standardization |
| TRF | Marine Traffic Management |
| RENC | Regional ENC co-ordinating centre |
| UML | Unified Modelling Language |
| URL | Universal Resource Locator |
| XML | eXtensible Markup Language |

Table 1‑3 List of abbreviations

## 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-127 Product Specification clause X.X.

# General

## Introduction

This S-127 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-127 specification.

The S-127 specification contains an application schema (UML model) describing the conceptual domain model in terms of classes and relationships, and a Feature Catalogue (see S-127 Annex X) 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 (S-127 Product Specification clause X.X).

This section 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-127 and their encoding rules and guidelines are defined in detail in subsequent sections of this document.

Within this document the features, information types, associations and attributes appear in **bold text**.

## 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 one or more spatial primitive instances. 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 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).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature** | **P** | **C** | **S** | **N** |
| Radio Calling in Point | X | X |  |  |
| Signal Station Warning | X |  |  |  |
| Signal Station Traffic | X |  |  |  |
| Radar Range |  |  | X |  |
| Concentration of Shipping Hazard Area |  |  | X |  |
| Pilot District |  |  | X |  |
| Pilot Service |  |  | X |  |
| Underkeel Clearance Allowance Area |  |  | X |  |
| Underkeel Clearance Management Area |  |  | X |  |
| Routing Measure Area |  |  | X |  |
| Routing Measure Line |  | X |  |  |
| ISPS Code Security Level |  |  | X |  |
| Waterway Area |  |  | X |  |
| Pilot Boarding Place | X |  | X |  |
| Military Practice Area |  |  | X |  |
| Restricted Area, Regulatory |  |  | X |  |
| Restricted Area, Navigational |  |  | X |  |
| Vessel Traffic Service Area |  |  | X |  |
| Place of Refuge |  |  | X |  |
| Piracy Risk Area |  |  | X |  |

Table 2‑1 Features permitted and their spatial primitives

### Capture density guideline

The capture density will follow the recommendation of the S-101 (ENC) DCEG, that 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):

|  |  |  |
| --- | --- | --- |
| **Abbreviation** | **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: 19980918 (YYYYMMDD) |
| DT | Date and Time | A DateTime is a combination of a date and a time type.Example: 19850412T101530 (YYYYMMDDThhmmss) |
| 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: – – – –02– – (Year and date not encoded)The exact format depends on the encoding. A GML dataset would use a GML built-in type and encode it as <gMonth>--02<gMonth>.An 8211 data format based dataset would truncated encode the date as – – – –02– –. |
| 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  |
|  | URN |  |

Table 2‑2 Simple attribute types

### 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 marine protected area;

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.

For easy reference, the Table 2‑3 summarises the mandatory attributes for each feature.

| **Feature** | **Mandatory Attributes** |
| --- | --- |
| Radio Calling in Point |  |
| Signal Station Warning |  |
| Signal Station Traffic |  |
| Radar Range |  |
| Concentration of Shipping Hazard Area |  |
| Pilot District |  |
| Pilot Service |  |
| Underkeel Clearance Allowance Area |  |
| Underkeel Clearance Management Area |  |
| Routing Measure Area |  |
| Routing Measure Line |  |
| ISPS Code Security Level |  |
| Waterway Area |  |

Table 2‑3 Mandatory attributes for feature classes

### Conditional attributes

The 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). Mandatory sub-attributes of complex attributes have not been included in the Table 2‑3. Where the sub-attribute of a complex attribute is conditional, this is indicated in the Remarks section for the relevant feature class entries in chapter 5.

### 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 the Table 2‑4:

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

|  |  |
| --- | --- |
| **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. |

Table 2‑4 Multiplicity of attributes

### 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-127 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-127 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-127 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-127.



Figure 1 Spatial quality information

### Portrayal feature attributes

Traffic Management 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 2‑5 provides a list of attributes which have been adopted from the S-101 (ENC) product specification and which have specific influence on portrayal.

|  |  |
| --- | --- |
| **Attribute** | **Effects on portrayal** |
| **displayName** | This Boolean attribute determines if the text for a name should be displayed. If not populated the default rules provided in the portrayal catalogue will be used. |
| **information**  | Population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **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. |

Table 2‑5 Attributes which have effects on portrayal

Note: Since S-127 data is scale-independent, the S-101 attribute scaleMinimum is superfluous and not used in S-127 datasets.

### Textual information

Textual information may provide additional information essential to understand the presence of the Traffic Management and other features of an S-127 product. This information may also provide legal information pertaining to the S-127 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 section 2.4.8.2.

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

The information types **Restrictions, Recommendation, Regulations, 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, Recommendation, 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.

#### 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-127 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.

If the **text** sub-attribute of **information** is populated, the **headline**, **fileReference**, and **fileLocator** sub-attributes must not be populated.

#### 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 **sourceIndication** 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.

COMMENT: 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 2‑6 presents the following predefined derived types which are described in S-100 (§ 1-4.6 in Edition 3.0.0):

|  |  |  |
| --- | --- | --- |
| **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:s101:1:0:0:AnchorageArea  | URI  |

Table 2‑6 Predefined derived types

#### Reference to textual files

The information types **Restrictions, Recommendation, Regulations, NauticalInformation** should be used to encode textual information.

The files referenced by **textContent**, sub-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. 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 the tableTable 2‑7.

|  |  |  |
| --- | --- | --- |
| **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). |
| 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. |

Table 2‑7 Locators for external files

#### 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 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 2‑8.

|  |  |
| --- | --- |
| **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, consider that 10 Mb is the maximum allowable size of a dataset |

Table 2‑8 Graphics Characteristics

Additional information about the graphic file may be encoded in other sub-attributes of attribute **graphic**, as described in Section 2.4.13.

### Dates

Dates may be complete or truncated values. 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 § 1-2 Table 1-2; also Table 2‑9 of this DCEG).

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 (Informative)

Complete date values must be encoded in conformance with the Date format as specified in S-100 Ed. 3.0.0 (§§ 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 ISO 8211 format: 20100918

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

#### Truncated Dates (Informative)

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 Ed. 3.0.0 (§§ 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 in Edition 3.0.0) which define a default format (for ISO 8211) but also allow the use of built-in types.

To encode partial dates in the GML and ISO 8211 data formats:

|  |  |  |
| --- | --- | --- |
| **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> |

Table 2‑9 Date encoding in GML and ISO 8211 data formats

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 Ed. 3.0.0 § 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 start or end date is 28 or 29 February. S-100 Ed. 3.0.0 § 3-8 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, 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 not available on public holidays and the 5 of August of each year.

**ServiceHours**

 **scheduleByDoW**

 **categoryOfSchedule** =1 (normal operation)

 **tmIntervalsByDoW**

 **dayOfWeek** =1(Monday), 3(Wednesday)

 **dayOfWeekRanges** =0 (false)

 **timeReference** = 2 (LT)

 **tmIntervalsByDoW**

 **dayOfWeek** =4(Thursday), 6(Saturday)

 **dayOfWeekRanges** =1 (true)

 **timeReference** = 2 (LT)

 **timeOfDayStart** = 080000

 **timeOfDayEnd** = 160000

**NonStandardWorkingDay**

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

 **variableDate** = public holidays

If the days of week are known but the hours of availability are unknown, there is no time attribute and the **timeReference** attribute must be nilled as described in section 2.4.4.

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 section 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:

 **tmIntervalsByDoW**

 **dayOfWeek** =4(Thursday), 6(Saturday)

 **dayOfWeekRanges** =1 (true)

 **timeReference** = 2 (LT)

 **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.

### 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 **tmIntervalsByDoW** 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 section 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.

The source date can either be of a complete date (see chapter 2.4.10.1) or truncated date (see chapter 2.4.10.2) type.

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 chapter 2.4.13.1) 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-attributes **sectorBearing** and **orientation** 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 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 the figure, any single instance of **Radio Station** may link to any number of **Authority** instances, and vice versa.

### 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 1.1.4 (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 the roles are the RadioStation and Authority. 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-127 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 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 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 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 names **provides** and **providedBy**.

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

The **Restrictions, Recommendation, Regulations, Nautical Information** are associated to the relevant features using the association name **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 (section 6 – Product Specification) and listed in the documentation for individual types (Appendix A - DCEG). 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. Since S-100 edition 3.0.0 permits feature-information associations to be encoded only from the geographic feature to the information type and not vice versa, the information-to-feature link might be unavailable or treated differently from the feature-to-information link.

## Datasets

### Types of Datasets

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

The following types of dataset may be produced and contained within an exchange set:

|  |  |
| --- | --- |
| **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. |

Table 2‑10 Dataset types

### Overlay data sets

S-127 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-127 does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-127 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-127 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.

### Data coverage

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

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

A New edition dataset must not change the extent of the data coverage for the previous edition. Where the extent of the data coverage for a data product is to be changed, this must be done by issuing a New Dataset and terminating the previous one(s).

### 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.

S-127 uses the same components of discovery metadata as S-100. The mandatory components for discovery metadata are defined in S-100 Edition 3.0.0 Appendix 4A-D and consist of:

1. Exchange catalogue – a single exchange catalogue for an exchange set. (Subsets of exchange sets are not envisaged.) The elements are defined in S-100 App. 4A § D-2.2 (S100\_ExchangeCatalogue).
2. Dataset discovery metadata for each dataset in the exchange set. Elements are defined in S-100 App. 4A § D-2.6 (S100\_DatasetDiscoveryMetaData). Additional elements have been defined in the main specification.
3. Support file discovery metadata for each support file in the exchange set. Elements are defined in S-100 App. 4A § D-2.11 (S100\_SupportFileDiscoveryMetaData).

Discovery metadata is generally encoded separately from the dataset itself so as to allow applications to read it without processing the dataset itself (i.e., decrypt, decompress, or load the dataset). The encoding format should be easily machine-readable and therefore may be different from the dataset, e.g., the discovery data may be in XML while the data is encoded as GML 3.2.1 format.

The content and structure of discovery metadata for this product specification is defined in ... (XML format defined by an XML schema available from www.iho.int)

### 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 clause 10b-9.6.

### Dataset units

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

### Dataset Coverage

Traffic Management 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 a radio services feature extends outside the product coverage and the adjoining object does not exist, e.g. due to delay in the production process by the neighbouring HO product, an indication should be placed at the outer edge of the product.

### Dataset Feature Object Identifiers

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

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

FOID must not be reused, even when a feature has been deleted. However, the same feature can be deleted and added again later using the same FOID.

### 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**.

If it is required to encode a geographic name for which there is no existing feature, an **appropriate** area feature defined in clause X must be created. In order to minimise the data volume, these features should, where possible, use the geometry of existing features.

Geographic names should be encoded with the complex attribute **featureName. The complex attribute featureName consists of the simple sub-attributes language, name and a Boolean type to indicate whether that particular name is the displayName or not.**

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

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

1. A group of features, associated with a particular geographic name, should have the name encoded using **featureName** on an aggregation feature (of type surface or point, or no geometry, as appropriate). The name should not be encoded on the individual hydrographic features.
2. A group of service or forecast areas with the same attribute values associated with the same name should be encoded as spatial attributes of the same feature (so there would be only one feature with multiple spatial attributes for location).
3. 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 Warning Area**).

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

### Text placement

The cartographic feature **TextPlacement** is used specifically to place text cartographically. The properties of the **TextPlacement** feature are described as follows:

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

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

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

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

## Scale policy

Traffic Management 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. S-100 allows the association of multiple spatial attributes to a single feature instance. Each of these spatial attributes can in principle be qualified by maximum and minimum scales. **maximumDisplayScale** and **minimumDisplayScale** define the range of display scales within which a particular feature will be portrayed on the display if these scale minimum/maximum functions are enabled in the ECDIS or another GIS device. A geo feature with one or more spatial attributes can utilize the scale minimum and scale maximum attributes on the link to the spatial object. There are essentially two ways in which these attributes may be used.1. A producer may decide to use only a scale minimum value. This option is employed when the data producer wish to turn off the display of a feature above certain scales. This is particularly useful in areas with high data density, and when it is expected that the data will be used a larger scale where data clutter might become an issue. Features are therefore encoded with an applicable value, which represent the scale at which the producer wishes to turn off the feature.2. A producer may decide to provide several pairs of scale minimum and scale maximum values. This decision may be based on the fact that for one particular feature different spatial instances in different scale ranges should be provided to supply this particular feature with more detailed geographic representation at larger scales.

An example can be a building which has two spatial objects associated, first one with only scale minimum value encoded at 21999, and the second spatial object encoded with scale maximum at 22000 and scale minimum encoded with 999999. These values would enable the use of a highly-detailed geometry at larger scales than 22000, and a less detailed geometry at scales of 22000 and less, while the building would be turned off at scales of 999999 and less.

A similar strategy can be followed to enable boundaries to conform to a scale-dependent geometry such as a coastline. Conformance at different scales can achieved by using minimum/maximum scales on spatial attributes to indicate which particular geometry should be used at a given scale.

Authorities should cooperate at the regional or RENC level to determine a recommended scale range at which the portrayal of the information is suitable and consistent.

|  |
| --- |
| **Scale** |
| NULL (only allowed on minimum display scale where the maximum display scale = 10,000,000) |
| 1:10,000,000 |
| 1:3,500,000 |
| 1:1,500,000 |
| 1:700,000 |
| 1:350,000 |
| 1:180,000 |
| 1:90,000 |
| 1:45,000 |
| 1:22,000 |
| 1:12,000 |
| 1:8,000 |
| 1:4,000 |
| 1:3,000 |
| 1:2,000 |
| 1:1,000 |

**Table 2-11 Minimum display and maximum display scales**

## Masking

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

### Surface features crossing cell boundaries

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



Figure 5 Surface feature crossing MRS products boundaries

Figure 7 Surface feature crossing MPA products boundaries

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

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

NOTE: Occasionally an edge of the boundary of an area actually coincides with the data 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 data product (see clause 4.3), all edges of these area features should be masked.

Figure 6 Surface features extending beyond the entire limit of data coverage

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

| **Feature Type** | **Comment** |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Table 2‑11 Features of which edges have to be masked when crossing the dataset boundary

### “Linear” surface features

If it is required to encode a linear feature when the only allowable primitive for the relevant feature type is surface (e.g. a service area along a track, or channel), a “very narrow surface” should be encoded. The suggested extent is 0.3mm wide at viewing scales (keeping in mind that S-100 permits different spatial attributes at different scales.) An edge of this surface should correspond to the position of the line. All other edges should be masked.



Figure 7 “Linear” Radio Services

# Description of table format for feature and information types

**X.X Clause heading**

|  |
| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo/Information] Feature: Feature (S-57 Acronym)** S-127 feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
| *Real World*Example if real world instance(s) of the Feature. | *Paper Chart Symbol*Example(s) of paper chart equivalent symbology for the Feature (if applicable). | *ECDIS Symbol*Example(s) of proposed ECDIS symbology for the Feature. |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of beer  |  | 1 : ale2 : lager3 : porter4 : stout5 : pilsener6 : bock beer7 : wheat beer | EN | 1,1 |
| This section lists the allowable attributes for the S-127 feature. Attributes are listed in alphabetical order. Sub-attributes (Type prefix (S)) of complex (Type C) attributes are listed in alphabetical order and indented directly under the entry for the complex attribute (see below for example). | This section lists the corresponding S-57 attribute acronym. A blank cell indicates no corresponding S-57 acronym. | This section lists the allowable encoding values for S-127 (for enumerate (E) Type attributes only). Further information about the attribute is available in Section XX. | Attribute type (see clause X.X). | Multiplicity describes the “cardinality” of the attribute in regard to the feature. If “(ordered)” is included, the order of the instances matters. See clause X.X. |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND) |  | (S) DA | 0,1 |
|  Date start | (DATSTA) |  | (S) DA | 0,1 |
| **Feature/information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| AggrAssoComp | Name of the Association | **Feature or Information Type at “this” end** | At “this” end | At “this” endx..y | **Feature or Information Type(s) at “other” end**  | Role name | At “other” endx..y |
| INT 1 Reference:The INT 1 location(s) of the Feature – by INT1 Section and Section Number (if applicable).**X.X.X Sub-clause heading(s) (see S-4 – B-YYY.Y)**Introductory remarks. Includes information regarding the real world entity/situation requiring the encoding of the Feature in the ENC, and where required nautical cartographic principles relevant to the Feature to aid the compiler in determining encoding requirements.Specific instructions to encode the feature.Remarks:* Additional encoding guidance relevant to the feature.

**X.X.X.X Sub-sub-clause heading(s) (see S-4 – B-CCC.C)**Clauses related to specific encoding scenarios for the Feature (if required).Remarks:* Additional encoding guidance relevant to the scenario (if required).

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

Remarks:

S-127 Attribute: Indentation of attributes indicates sub-attributes of complex attributes. Complex attributes may also be sub-attributes of complex attributes, which is indicated by further indentation of the attribute name in the tables.

S-127 Attribute: Attributes shown in grey text are ECDIS “system” attributes which are not visible to the encoder, but are populated by the ENC production system in order to assist with portrayal of ENC data in ECDIS.

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-127 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-127 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 X). The prefix (S) indicates that the attribute is a sub-attribute of a complex attribute. Complex attributes that are sub-attributes of a complex attribute, and their sub-attributes, are indicated by indentation of the attribute name in the S-127 Attribute column.

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 a 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 feature instance at both ends. Associations that are not mandatory should be encoded if and only if they convey useful information.

# Metadata Features

## Introduction

The maximum use must be made of meta features to reduce the attribution on individual features. Some meta features are mandatory in a dataset, see S-127 Product Specification main document clauses X.X.

## Mandatory meta features

The mandatory meta features are given in the following list:

DataCoverage

QualityOfNonBathymetricData

## Data coverage meta feature

**Data Coverage**: In order to assist in data discovery, the meta feature **Data Coverage** must be used to provide the area of coverage of the S-127 dataset. This means that **Data Coverage** expresses where the presence or absence of S-127 geographic features is asserted. Unlike S-101 datasets, there is no ‘skin of the earth’ principle in S-127 and there may be regions covered by a **Data Coverage** but where no geographic S-127 feature is present.

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|  |
| --- |
| IHO Definition: **COVERAGE**. A geographical area that describes the coverage and extent of spatial types. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.210, November 2000).  |
| **S-127 Metadata Feature: Data Coverage (M\_COVR)**  |
| **Primitives: Surface** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Maximum display scale |  | maximum display scale < minimum display scale | IN | 1,1 |
| Minimum display scale |  | minimum display scale > maximum display scale | IN | 1,1 |
| INT 1 Reference: 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 use of S-127 data is scale-independent (see clause 2.8) and minimum display scale will normally be (null) and maximum display scale 1000 (the extreme values in the table of scales in the S-101 ENC, see Table 2-11). 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 (see the S-101 DCEG clause 3.4.1). Given that S-127 data will overlay ENC and possibly other datasets, the conditions described in S-101 clause 3.4.1 for displaying overscale warnings and setting the viewing scale may be overridden by interoperability constraints or the presence of higher-priority datasets. The specification of such behaviour is out of scope for this document (the S-100 interoperability specification should address it for ECDIS).Remarks:* This meta feature is intended to support an indication of coverage.
* Where a dataset consists of only one Data Coverage 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 Data Coverage.

Distinction: None |

## Quality of non-bathymetric data

|  |
| --- |
| IHO Definition:**QUALITY OF NON-BATHYMETRIC DATA**. An area within which the best estimate of the overall uncertainty of the data is uniform. The overall uncertainty takes into account for example the source accuracy, chart scale, digitising accuracy etc. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.208, November 2000). |
| **S-127 Metadata Feature: Quality of non-bathymetric data (M\_ACCY)** |
| **Primitives: Surface** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Information |  |  | C | 0,\* |
|  File locator |  |  | TE | 0,1 |
|  File reference |  |  | TE | 0,1 |
|  Headline |  |  | TE | 0,1 |
|  language |  | ISO 639-3 | TE | 0,1 |
|  Text |  |  | TE | 0,1 |
| Category of temporal variation |  | 1 : event2 : likely to change4 : unlikely to change5 : unassessed | EN | 1,1 |
| Data assessment |  | 1 : assessed2 : oceanic3 : unassessed | EN | 1,1 |
| Horizontal distance uncertainty | (HORACC) |  | RE | 0,1 |
| Direction uncertainty |  |  | RE | 0,1 |
| Horizontal Position uncertainty  | (POSACC) |  | C | 0,1 |
|  Uncertainty fixed |  |  | RE | 1,1 |
|  Uncertainty variable |  |  | RE | 0,1 |
| Source indication |  |  | C | 0,1 |
|  Category of authority |  | (all values) | EN | 0,1 |
|  country |  |  | TE | 0,1 |
|  Reported date |  |  | TD | 0,1 |
|  source |  |  | TE | 0,1 |
|  Source type |  | (all values) | EN | 0,1 |
|  Feature name |  |  | C | 0,1 |
|  Display name |  |  | BO | 0,1 |
|  Language |  |  | TE | 0,1 |
|  Name |  |  | TE | 1,1 |
| Survey date range |  |  | C | 0,1  |
|  Date end | *(SUREND)* | ISO 8601:2004 | TD | 1,1 |
|  Date start | *(SURSTA)* | ISO 8601:2004 | TD | 1,1 |
| INT 1 Reference: Quality of positionsThe meta feature **Quality of Non-bathymetric Data** may be used to provide an indication of the overall uncertainty of position for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information.The attributes **quality of position** and horizontal **position uncertainty** may be applied to any spatial type, in order to qualify the location of a feature.**Horizontal distance uncertainty, quality of position** and horizontal **position uncertainty** must not be applied to the spatial type of any geo feature if they are identical to the **horizontal distance uncertainty, quality of position** and **position uncertainty** values of the underlying meta feature.**quality of position** gives qualitative information, whereas **position uncertainty** gives quantitative information.**Position uncertainty** on the **Quality of Non-bathymetric Data** applies to non-bathymetric data situated within the area, while **quality of position** or **position uncertainty** on the associated spatial types qualifies the location of the **Quality of Non-bathymetric Data** feature itself.Meta features **Quality of Non-bathymetric Data** and **Quality of Bathymetric Data** must not overlap.Remarks:* No remarks.

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

# Geo 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.

## FeatureType

|  |
| --- |
| IHO Definition: **FEATURETYPE**.  |
| **S-127 Geo Feature: FeatureType (Abstract)** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | TD | 0,1 |
|  Date start | (DATSTA) |  | TD | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | (PEREND) | ISO 8601: 2004 | TD | 1,1 |
|  Date start | (PERSTA) | ISO 8601: 2004 | TD | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | (OBJNAM) (NOBJNM) |  | (S) TE | 1,1 |
| Source Indication | (SORIND) |  | C | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  |  | TD | 0,1 |
|  Country |  | ISO3166-1-alpha2 | TE | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| Text Content |  |  | C | 0,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  Information  |  |  | C | 0,\* |
|  File Locator |  |  | S (TE) | 0,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL | 1,1 |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Online Description |  | ISO 19115 (adapted) | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  | (all values) | EN | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  |  | TD | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) | (all values) | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Asso | additionalInformation | (any subtype of FeatureType) | informationProvidedFor | 1..\* | Nautical Information | providesInformation | 0..\* |
| Asso | associatedRxN | (any subtype of FeatureType) | appliesInLocation | 1..\* | Any subtype of AbstractRxN | theRxN | 0..\* |
| Asso | PermissionType (association class) | (any subtype of FeatureType) | vslLocation | 0..\* | Applicability | permission | 0..\* |
| INT 1 Reference: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 featureName attribute in complex attribute sourceIndication is intended for the name of the source.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.Remarks:* No remarks.

Distinction: |

## Organization Contact Area

|  |
| --- |
| IHO Definition: **ORGANIZATION CONTACT AREA**  |
| **S-127 Geo Feature: Organization Contact Area** **(Abstract)****SuperType: FeatureType (Abstract)** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
|  |  |  |  |  |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
|  |  |  |  |  | Contact Details |  |  |
| INT 1 Reference:TBDRemarks:* No remarks.

Distinction: |

## Supervised Area

|  |
| --- |
| IHO Definition: **SUPERVISED AREA** |
| **S-127 Geo Feature: Supervised Area** **(Abstract)****SuperType: Organisation Contact Area (Abstract)** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
|  |  |  |  |  |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
|  |  |  |  |  | Authority |  |  |
| INT 1 Reference:TBDRemarks:* No remarks.

Distinction: |

## Reportable Service Area

|  |
| --- |
| IHO Definition: **REPORTABLE SERVICE AREA** |
| **S-127 Geo Feature: Reportable Service Area** **(Abstract)****SuperType: Supervised Area** **(Abstract)** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
|  |  |  |  |  |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
|  |  |  |  |  | Ship Report |  |  |
| INT 1 Reference:TBDRemarks:* No remarks.

Distinction: |

## RADIO CALLING-IN POINT.

|  |
| --- |
| IHO Definition: **RADIO CALLING-IN POINT**. A designated position at which vessels are required to report to a Traffic Control Centre. Also called reporting point or radio reporting point. (IHO Dictionary – S-32). |
| **S-127 Geo Feature:** Radio calling-in point (RDOCAL)**SuperType: Feature Type** **(Abstract)** |
| **Primitives:** Point, Curve |
| TBD |
| INT 1 Reference: M 40.1-2**X.X Radio calling-in (reporting) points (see S-4 – B-488.1 and B-488.2)**Radio reporting points, also called radio calling-in points, have been established in certain busy waterways and port approaches to assist traffic control. On passing these points or crossing a defined line vessels are required to report on VHF to a Traffic Control Centre.If it is required to encode a radio reporting point or line, it must be done using the feature **Radio Calling-in Point**.Remarks:* Each **Radio Calling-in Point** feature of type point must carry at least one orientation. If it is required to encode the reciprocal orientation, to indicate that a bearing and its opposite apply to a **Radio Calling-in Point** feature, it must be done using attribute **traffic flow** = *4* (two-way). If the same position is used for another orientation (not opposite) of traffic flow, a second **orientation** complex attribute must be encoded.
* The complex attribute **feature name**, sub-attribute **name** is used to encode the name and/or alphanumeric designator of the **Radio Calling-in Point**.
* An associated instance of the information class **Information** (see clause X.X), complex attribute **information** is used to provide additional information, where required. For example, if the requirement to report by radio relates to certain classes of vessels only.
* **Radio Calling-in Point** features of type curve must be encoded such that resultant direction of the line (accounting for the direction of digitising and any subsequent reversal of the curve) is related such that the direction of traffic that is required to report is to the right. For curve features, it is not required to populate **orientation**.
* If it is required to encode the area of a Vessel Traffic Service (VTS) containing radio reporting points or requiring periodic position reporting, this should be done using the feature **Vessel Traffic Service Area** (see clause X.X).
* Each VHF-channel should be indicated, using the attribute **communication channel** (see clause X.X).

Distinction: Radio station; pilot boarding place; Vessel Traffic Service area. |

## Warning signal stations

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| --- |
| IHO Definition: **SIGNAL STATION, WARNING**. A warning signal station is a place on shore from whichwarning signals are made to ships at sea. (Adapted from IHO Dictionary – S-32 and Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2012). |
| **S-127 Geo Feature: Signal station warning (SISTAW)** |
| **Primitives: Point, Surface****SuperType: Organisation Contact Area** **(Abstract)** |
|  |
| INT 1 Reference: T 20, 26, 28-36**X.X Warning signal stations (see S-4 – B-494; B-496-7)**Signal stations communicating visually have declined in importance. They are encoded on the largestmaximum display scale ENC data not only for their main role of signalling information and instructions but also as a form of landmark. The signals generally exhibit lights by day and night but may display shapes or flags by day.If it is required to encode a warning signal station, it must be done using the feature **Signal Station Warning**.Remarks:* The **Signal Station Warning** must only be used to describe the function of the signal station, independent of the building or structure itself. If it is required to encode the building or structure housing the service, it must be done using an appropriate feature (e.g. **Building**, **Landmark**).
* Each VHF-channel should be indicated, using the attribute **communication channel** (see clause X.X).

Distinction: Signal station, traffic. |

## Radar Range

|  |
| --- |
| IHO Definition: **RADAR RANGE**. Indicates the coverage of a sea area by a radar surveillance station. Inside this area a vessel may request shore-based radar assistance, particularly in poor visibility. (Adapted from Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010). |
| **S-127 Geo Feature: Radar range (RADRNG)****SuperType: Feature type** **(Abstract)** |
| **Primitives: Surface** |
|  |
| INT 1 Reference: M 31**X.X Radar ranges (see S-4 – B-487.1)**Many large ports have a radar surveillance system covering their approaches to provide guidance for vessels, particularly in poor visibility. The maximum range of the system forms an arc or series of overlapping arcs. If it is required to encode a radar range, it must be done using the feature **Radar Range**.Remarks:* Each VHF-channel should be indicated, using the attribute **communication channel** (see clause X.X).

Distinction: Radar line; Vessel Traffic Service area. |

## Concentration of Shipping Hazard Area

|  |
| --- |
| IHO Definition: **Concentration of shipping hazard area**. An area where hazards, caused by concentrations of shipping, may occur. Hazards are risks to shipping, which stem from sources other than shoal water or obstructions. |
| **S-127 Geo Feature: Concentration of shipping hazard area (CONSHA)****SuperType: Feature Type** **(Abstract)** |
| **Primitives: Surface** |
|  |
| INT 1 Reference:**X.X.X Sub-clause heading(s) (**M-3: Chapter C Section 2.28**)**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. |

## Pilotage District

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| --- |
| IHO Definition: **PILOTAGE DISTRICT**. An area within which a pilotage direction exists. Such directions are regulated by a competent harbour authority which dictates circumstances under which they apply. (UK Pilotage Act 1987). |
| **S-127 Geo Feature: Pilotage district****SuperType: Feature type** **(Abstract)** |
| **Primitives: Surface** |
|  |
| INT 1 Reference:**X.X Pilotage districts (see S-4 – B-XXX)**If it is required to encode the area within which regulations regarding pilotage apply it should be done using the feature **Pilotage District**.Remarks:* To encode the relevant regulations, an instance of the information class **Nautical Information** (see clause X.X) must be associated to the **Pilotage District**.
* Where the limit of pilotage regulations are coincident with harbour or port limits it is not required to encode a **Pilotage District** feature.
* The relationship between the pilotage district and any associated pilot boarding places should be encoded using the feature association **Pilotage District Association** (see clause X.X).

Distinction: Pilot boarding place. |
|  |

## Pilot Boarding Place

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| --- |
| IHO Definition: **PILOT BOARDING PLACE.** A location offshore where a pilot may board a vessel inpreparation to piloting it through local waters. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010). |
| **S-127 Geo Feature: Pilot boarding place (PILBOP)****SuperType: Organisation Contact Area** **(Abstract)** |
| **Primitives: Point, Surface** |
|  |
| INT 1 Reference: T 1.1-4**X.X Pilot boarding places (see S-4 – B-491.1-2)**For a pilot boarding place, the pilot vessel may either cruise in the area or come out on request. Off some large ports pilots on outgoing ships may be disembarked at a different location. Pilots may board from a helicopter; it is then less important for a ship to reach the exact position of the boarding place but an approximate position should still be encoded. Some pilot stations are used solely for long-distance (deep-sea) pilots. Pilots may be in constant attendance, in regular attendance at certain limited times, or available by previous arrangement only. The primary purpose of encoded pilotage information is to show the position of the facility. Because of the many variations in the service provided, the main source of information on pilotage must be in an associated publication or product.If it is required to encode a pilot boarding place, it must be done using the feature **Pilot Boarding Place**.Remarks:* If it is required to encode the ship to shore or shore to ship contact information, it must be done using the information class **Contact Details** (see clause X.X). The **Contact Details** must be associated to the **Pilot Boarding Place** feature using the association **additional information**.
* If it is required to encode the area in which pilotage regulations apply, it should be done using the feature **Pilotage District** (see clause X.X). The relationship between the pilotage district and any associated pilot boarding places should be encoded using the feature association **Pilotage District Association** (seeclause X.X).

**X.X Pilot stations ashore (see S-4 – B-491.4)**If it is required to encode a pilot station ashore, it must be done using a **Building** or **Landmark** feature, with attribute **function** = *11* (pilot office) or *12* (pilot lookout).Distinction: Pilotage district. |

## Pilot Service

|  |
| --- |
| IHO Definition:  **PILOT SERVICE:** The service provided by a person who directs the movements of a vessel through pilot waters, usually a person who has demonstrated extensive knowledge of channels, aids to navigation, dangers to navigation, etc., in a particular area and is licensed for that area. (adapted from IHO Dictionary, S-32, 5th Edition, 3843) |
| **S-127 Geo Feature:  Pilot service (PLTSRV)** **SuperType: Reportable Service Area** **(Abstract)** |
| **Primitives: Surface** |
|  |
| 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. |

## Routeing Measure

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| --- |
| **IHO Definition: ROUTEING MEASURE:** An area or line designating the limits or central line of a routeing measure (or part of a routeing measure). Routeing measures include traffic separation schemes, deep-water routes, two-way routes, archipelagic sea lanes, and fairway systems. (NIPWG). |
| **S-127 Geo Feature:** Routeing Measure **(S-57 Acronym)** **SuperType: Feature Type** **(Abstract)** |
| **Primitives: Curve, Surface** |
|  |
| INT 1 Reference: ???**X.X.X Sub-clause heading(s) (see S-4 – B-YYY.Y)**The **RouteingMeasure** feature is a simplification of the tracks and routes features in the ENC. A **RouteingMeasure** feature is created by combining the spatial extents of the tracks and routes feature instances which together make up a specific track or route. The purpose of this feature in S-127 is to provide an indication of the existence of a route or track, as well as physical locations to which specific information can be associated in the form of information types. In S-127, each **RouteingMeasure** feature has only a category attribute that indicates the type of track or route.The table below indicates which S-101 features can be combined to create **RouteingMeasure** features of each category. Note that line features are used if and only if not covered by an appropriate track/route feature, or if information must be associated to the line that cannot be associated to an area feature.A suggested guide for deciding whether component S-101 features should be combined is whether they are aggregated to the same (or related) aggregate track/route features. E.g., combine TSS Lane Part and TSS Roundabout features that are associated with the same **TrafficSeparationScheme** feature in the ENC via a “Traffic Separation Scheme Aggregation” association. (**TrafficSeparationScheme** is an aggregate feature in S-101 that does not have its own geometry.)

| **Category of routeing measure** | **S-101 features used** |
| --- | --- |
| recommended route | Navigation line |
| Recommended track |
| Recommended route centreline (only if not covered by an area track/route feature) |
| Recommended traffic lane part |
| fairway system | Fairways |
| two-way route | Two-way route part |
| Two-way route |
| Recommended traffic lane part (when adjoining a two-way route) |
| deep-water route | Deep water route centreline (only if not covered by an area track/route feature) |
| Deep water route part |
| Deep water route |
| Recommended traffic lane part (when adjoining a deep-water route) |
| traffic separation scheme | Inshore traffic zone |
| Precautionary area |
| Traffic separation scheme lane part |
| Traffic separation zone |
| Traffic separation line (only if not covered by an area track/route feature) |
| Traffic separation scheme boundary (only if not covered by an area track/route feature) |
| Traffic separation scheme crossing |
| Traffic separation scheme roundabout |
| archipelagic sea lane | Archipelagic sea lane area |
| Archipelagic sea lane axis (only if not covered by an area track/route feature) |
| None. Encode as RadioCallingInPoint | Radio calling in point |
| none. Encode as RadarRange. | Radar range |

Remarks:* If different information must be associated to different parts of the track/route, create different **RouteingMeasure** features.

**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: None |

## Routeing Measure Area

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| **IHO Definition: ROUTEING MEASURE AREA:** Definition. (Authority for definition). |
| **S-127 Geo Feature:** Routeing Measure Area **(S-57 Acronym)** **SuperType: Feature Type** **(Abstract)** |
| **Primitives: Surface** |
|  |
| 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: Routeing Measure Line |

## Routeing Measure Line

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| **IHO Definition: ROUTEING MEASURE LINE:** Definition. (Authority for definition). |
| **S-127 Geo Feature:** Routeing Measure Line **(S-57 Acronym)** **SuperType: Feature Type** **(Abstract)** |
| **Primitives: Curve** |
|  |
| 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: Routeing Measure Area |

## Waterway Area

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| IHO Definition: WATERWAY AREA**:** A line of water (river, channel, etc) which can be utilized for communication or transport (IHO Dictionary, S-32, 5th Edition, 5881) |
| **S-127 Geo Feature:** Waterway area **(**WATARE**)** **SuperType: Organisation Contact Area** **(Abstract)** |
| **Primitives: Surface** |
|  |
| 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.If the value of dynamicResource is either mandatory or optional external dynamic, the external source must be encoded in an associated **ContactDetails** instance.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. |

## ISPS Code Security Level

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| IHO Definition: **SECURITY LEVEL ACCORDING TO ISPS CODE:** The area to which an International Ship and Port Facility Security (ISPS) level applies. The ISPS Code is a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. Definition of the levels are given in ispslv. (Extract from IMO Website.) |
| **S-127 Geo Feature: Security level according to ISPS Code (**SECLVL**)** **SuperType: Organisation Contact Area** **(Abstract)** |
| **Primitives: Point, Surface** |
|  |
| 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. |
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## Signal Station Traffic

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| IHO Definition: **SIGNAL STATION, TRAFFIC**. A traffic signal station is a place on shore from which signals are made to regulate the movement of traffic. (Adapted from IHO Dictionary – S-32 and S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.155, November 2000). |
| **S-127 Geo Feature: Signal station traffic (SISTAT)****SuperType: Organisation Contact Area** **(Abstract)** |
| **Primitives: Point, Surface** |
|  |
| INT 1 Reference: T 21-25.2**X.X.X Traffic signal stations (see S-4 – B-494-5)**Signal stations communicating visually have declined in importance. They are encoded on the largestmaximum display scale ENC data not only for their main role of signalling information and instructions but also as a form of landmark. The signals generally exhibit lights by day and night but may display shapes or flags by day.The nature of traffic signals varies from country to country and even from port to port. For charting purposes traffic signals can be considered to include, for instance:* Port entry and departure signals;
* Lock, docking and berthing signals;
* Bridge signals;
* International traffic signals.

If it is required to encode a traffic signal station, it must be done using the feature **Signal Station Traffic**.Remarks:* If it is required to encode a bridge light marking the centre of a navigable span, it must be done using the feature **Light**.
* The **Signal Station Traffic** must only be used to describe the function of the signal station, independent of the building or structure itself. If it is required to encode the building or structure housing the service, it must be done using an appropriate feature (e.g. **Building**, **Landmark**).
* Each VHF-channel should be indicated, using the attribute **communication channel** (see clause X.X).

Distinction: Signal station, warning. |

## Archipelagic SeaLane Complex

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Archipelagic SeaLane Axis

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Military Practice Area

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| IHO Definition: **MILITARY PRACTICE AREA**. An area within which naval, military or aerial exercises are carried out. Also called an exercise area. (Adapted from IHO Dictionary – S-32). |
| **S-127 Geo Feature: Military practice area (MIPARE)****SuperType: Supervised Area** **(Abstract)** |
| **Primitives: Point, Surface** |
|  |
| INT 1 Reference: N 30-33**X.X.X Military practice areas (see S-4 – B-441.1-6)**Military practice (or exercise) areas at sea are of various types and may be classified as follows with regard to their significance for the mariner:* Firing danger areas, sometimes called firing practice areas, i.e. permanent or temporary ranges, including bombing, torpedo and missile ranges.
* Mine-laying practice (and counter-measures) areas.
* Submarine exercise areas.
* Other exercise areas.

Some degree of restriction on navigation and other rights may be implied by the encoding of military practice areas. There may be varying interpretations of the validity of the restrictions and possible infringement of the rights of innocent passage through territorial waters and elsewhere. Where it is thought desirable to depict such areas, even though clear range procedure may be observed, or the areas appear to be a derogation of the freedom of the seas, mariners should be informed (not necessarily on ENCs) that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation. By this means infringements are not condoned but the mariner receives a warning which may be necessary for their safety.If it is required to encode a military practice area, it must be done using the feature **Military Practice Area**.Remarks:* Submarine exercise areas should generally not be encoded where submarines exercise over wide areas which it would not be practicable to depict, and over which cautions (to keep a good look out for them) are unlikely to be effective. They may, however, be encoded where they occur in or near major shipping lanes or port approaches.
* Firing danger areas at sea are frequently marked by IALA special buoys sometimes laid around the

perimeter of the area and/or by specially erected lights, beacons and targets. If required, all such features which could assist the navigator in identifying their position, or could be a hazard, must be encoded in the normal way,* The existence of mine laying (and counter-measures/clearance) practice areas implies the possibility of unexploded mines or depth charges on the sea floor, and also the presence of harmless practice mines.

Distinction: Caution area; restricted area navigational; restricted area regulatory; submarine transit lane. |

## Restricted Area Regulatory

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| IHO Definition: **RESTRICTED AREA**. A specified area on land or water designated by an appropriateauthority within which access or navigation is restricted in accordance with certain specified conditions.(Adapted from IHO Dictionary – S-32). A regulatory restricted area is an area where the restrictions have no direct impact on the navigation of a vessel in the area, but impact on the activities that can take place within the area. |
| **S-127 Geo Feature: Restricted area regulatory *(RESARE)*****SuperType: Supervised Area** **(Abstract)** |
| **Primitives: Surface** |
|  |
| INT 1 Reference: L 3; N 21-22, 25, 31, 34, 63**X.X.X Restricted areas in general (see S-4 – B-422; B-437.1-7; B-439; B-439.2-4; B-441.1; B-445.9; B-445.11-12; B-446.4 and B-448.1)**If it is required to encode a regulatory restricted area, it must be done using the feature **Restricted Area Regulatory**, or using other features having the attribute **restriction** (**Anchorage Area**, **Cable Area**, **Dumping Ground**, **Dredged Area**, **Deep Water Route Part**, **Fairway**, **Fishing Ground**, **Harbour Facility**, **Inshore Traffic Zone**, **Marine Farm/Culture**,**Military Practice Area**, **Offshore Production Area**, **Pipeline Submarine/On Land**, **Precautionary Area**, **Seaplane Landing Area**, **Submarine Pipeline Area**, **Submarine Transit Lane**, **Territorial Sea Area**, **Traffic Separation Scheme Crossing**, **Traffic Separation Scheme Lane Part**, **Traffic Separation Scheme Roundabout**).Remarks:* No remarks.

Distinction: Anchorage area; cable area; caution area; collision regulations limit; Deep Water route part; depth area; dredged area; dumping ground; fairway; information area; military practice area; restricted area navigational; submarine pipeline area; swept area. |

## Restricted Area Navigational

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| --- |
| IHO Definition: **RESTRICTED AREA**. A specified area on land or water designated by an appropriateauthority within which access or navigation is restricted in accordance with certain specified conditions.(Adapted from IHO Dictionary – S-32). A navigational restricted area is an area where the restrictions have a direct impact on the navigation of a vessel in the area. |
| **S-127 Geo Feature: Restricted area navigational *(RESARE)*****SuperType: Supervised Area** **(Abstract)** |
| **Primitives: Surface** |
|  |
| INT 1 Reference: L 3; N 21-22, 25, 31, 34, 63**X.X.X Restricted areas in general (see S-4 – B-422; B-430.2; B-431.4; B-435.7; B-435.11; B-437.1-7; B-439; B-439.2-4; B-441,1; B-445.9; B-445.11-12; B-446.4 and B-448.1)**If it is required to encode a regulatory restricted area, it must be done using the feature **Restricted Area Regulatory**, or using other features having the attribute **restriction** (**Anchorage Area**, **Cable Area**, **Dumping Ground**, **Dredged Area**, **Deep Water Route Part**, **Fairway**, **Fishing Ground**, **Harbour Facility**, **Inshore Traffic Zone**, **Marine Farm/Culture**,**Military Practice Area**, **Offshore Production Area**, **Pipeline Submarine/On Land**, **Precautionary Area**, **Seaplane Landing Area**, **Submarine Pipeline Area**, **Submarine Transit Lane**, **Territorial Sea Area**, **Traffic Separation Scheme Crossing**, **Traffic Separation Scheme Lane Part**, **Traffic Separation Scheme Roundabout**).Remarks:* **Restricted Area Navigational** must only be encoded if one of the allowable values for **restriction** apply for the area.
* The term “no anchoring area” is used to identify the IMO routeing measure of that name. Such areas, where required, must be encoded as **Restricted Area Navigational** with attribute **restriction** = *1* (anchoring prohibited).

Distinction: Anchorage area; cable area; caution area; collision regulations limit; Deep Water route part; depth area; dredged area; dumping ground; fairway; information area; military practice area; restricted area navigational; submarine pipeline area; swept area. |

## Two-Way Route Complex

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| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Recommended Route Centreline

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| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

Deep Water Route Complex

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| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Deep Water Route Centreline

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| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Fairway System Complex

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Traffic Separation Scheme Complex

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Range System Complex

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| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Navigation Line

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Recommended Track

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| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Underkeel Clearance Allowance Area

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| **IHO Definition: UNDERKEEL CLEARANCE ALLOWANCE AREA:** An area for which an authority has stated underkeel allowance requirements. |
| **S-127 Geo Feature: Underkeel clearance allowance area (UKAARE)****SuperType: Reportable Service Area** **(Abstract)** |
| **Primitives: Point, Surface** |
|  |
| 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:* Under keel allowance is either a fixed allowance in feet or metres or a variable allowance calculated from a percentage of the vessel's draught or beam

Distinction: Underkeel Clearance Management Area |

## Underkeel Clearance Management Area

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| IHO Definition: UNDERKEEL CLEARANCE MANAGEMENT AREA**:** An area for which an authority permits use of dynamic underkeel clearance information or provides dynamic information related to underkeel clearances. (NIPWG). |
| **S-127 Geo Feature:** Underkeel Clearance Management Area **(S-57 Acronym)****SuperType: Reportable Service Area** **(Abstract)** |
| **Primitives:** Allowable geometric primitive(s) **Surface** |
|  |
| 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.If the value of dynamicResource is either mandatory or optional external dynamic, the external source must be encoded in an associated **ContactDetails** instance.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: Underkeel Clearance Allowance Area |

## Piracy Risk Area

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| IHO Definition: **PIRACY AND ARMED ROBBERY RISK AREA:** An area where there is an increased risk of piracy or armed robbery. |
| **S-127 Geo Feature:** Piracy and armed robbery risk area **(**PIRARE**)** **SuperType: Reportable Service Area** **(Abstract)** |
| **Primitives: Surface** |
|  |
| References:UNCLOS Part V11M-3: Chapter C Section 2.2**X.X.X Sub-clause heading(s) (see S-4 – B-YYY.Y)**An area where there is a raised risk of piracy or armed robbery. Piracy consists of any of the following acts:1. any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:
	1. on the high seas, against another ship or aircraft, or against persons or property on board such ship or air-craft;
	2. against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;
2. any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;
3. any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b).

(United Nations Convention on the Law of the Sea – Article 101)Armed robbery takes place within the jurisdiction of a State.Regular bulletins come from the IMB Piracy Reporting Centre – Kuala Lumpur.Distinction: CTNARE; |
|  |

## Place of Refuge

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| IHO Definition: **PLACE OF REFUGE:** Definition. (Authority for definition). |
| **S-127 Geo Feature: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

## Vessel Traffic Service Area

|  |
| --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). |
| **S-127[Geo Feature/Information Type]: Feature (S-57 Acronym)** S-2?? feature and corresponding S-57 acronym (if applicable) |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** |
|  |
| 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. |

# Information types

## InformationType

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| --- |
| IHO Definition: **INFORMATIONTYPE**.  |
| **S-127 Information Feature: InformationType (Abstract)** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Fixed date range |  |  | C | 0,1  |
|  Date end | (DATEND)  |  | TD | 0,1 |
|  Date start | (DATSTA) |  | TD | 0,1 |
| Periodic date range |  |  | C | 0,\* |
|  Date end | (PEREND) | ISO 8601: 2004 | TD | 1,1 |
|  Date start | (PERSTA) | ISO 8601: 2004 | TD | 1,1 |
| Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | (OBJNAM) (NOBJNM) |  | (S) TE | 1,1 |
| Source Indication | (SORIND) |  | C | 0,1 |
|  Source Type |  | (all values) | EN | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  |  | TD | 0,1 |
|  Country |  | ISO3166-1-alpha2 | TE | 0,1 |
|  Category of Authority | (CATAUT) | (all values) | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Asso | additionalInformation | (any child of InformationType) | informationProvidedFor | 0,\* | Nautical Information | providesInformation | 0,\* |
| INT 1 Reference: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 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 fishing regulations for protected areas, consider whether (for example) there is a general regulation applicable to all protected 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 fishing regulations for Marine Conservation Areas” and associated to several MPA features, while a specific MPA feature can also have a specific regulation whose name is “Special fishing regulations for (named area)”.The featureName attribute in complex attribute sourceIndication is intended for the name of the source.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.Remarks:* No remarks.

Distinction: |

## AbstractRxN

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| IHO Definition: **ABSTRACTRXN**.  |
| **S-127 Information Feature: AbstractRxN (Abstract)****Supertype: InformationType** |
| **Primitives: None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Authority |  | 1 : customs2 : border control3 : police4 : port5 : immigration6 : health7 : coast guard8: agricultural9: military10: private company11: maritime police12: environmental13: fishery14: finance15: maritime | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 0,1 |
|  Information  |  |  | C | 0,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 0,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
| Graphic |  |  | C | 0,\* |
|  Pictorial representation | (PICREP) |  | TE | 0,1 |
|  Picture Caption |  |  | TE | 0,1 |
|  Source Date |  |  | S(DA) | 0,1 |
|  Picture Information |  |  | TE | 0,1 |
|  Bearing Information |  |  | C | 0,1 |
|  Cardinal Direction |  |  | EN | 0,1 |
|  Distance |  |  | RE | 0,1 |
|  Information |  |  | C | 0,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Orientation | (ORIENT) |  | C | 0,1 |
|  Orientation Uncertainty |  |  | RE | 0,1 |
|  Orientation Value |  |  | R |  |
|  Sector Bearing |  |  | RE | 0,2 ordered |
| rxnCode |  |  | C | 0,\* |
|  categoryOfRxN |  | 1: pertaining to navigation2: pertaining to communication3: pertaining to environmental protection4: pertaining to wildlife protection5: pertaining to security6: pertaining to customs7: pertaining to cargo operation8: pertaining to a place of safety or refuge9: pertaining to healthnatural resources or exploitation10: pertaining to a port11: pertaining to finance12: pertaining to agriculture | CL | 0,1 |
|  Action or activity |  | 1: navigating with a pilot2: entering port3: leaving port4: berthing5: slipping6: anchoring7: weighing anchor8: transiting9: overtaking10: reporting working cargo11: landing12: diving13: fishing14: discharging overboard15: passing | CL | 0,1 |
|  Headline |  |  | TE | 0,1 |
| **Inherited attributes** |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
|  |  |  |  |  |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Asso | InclusionType (association class) | Subtypes of AbstractRxN | theApplicableRxN | 0..\* | Applicability | isApplicableTo | 0,\* |
| Asso | associatedRxN | Subtypes of AbstractRxN | theRxN | 0..\* | Subtypes of FeatureType | appliesInLocation | 1..\* |
| Asso | relatedOrganisation | Subtypes of AbstractRxN | theInformation | 0..\* | Authority | theOrganisation | 0..\* |
| INT 1 Reference:AbstractRxN is the supertype of the four types intended primarily for encoding information from regulatory or other text sources. The attributes categoryOfRxN and actionOrActivity should be encoded wherever possible in order to allow software to classify the content according to the type of regulation (categoryOfRxN) and its effects on common maritime activities by both commercial and recreational vessels.At least one of the attributes textContent and graphic must be populated.Subtypes of AbstractRxN must not be associated to NauticalInformation, since this leads to chains of information types which have little or no meaning in reality.Remarks:* Association *associatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.

Distinction: |

## Nautical Information

|  |
| --- |
| IHO Definition: **NAUTICAL INFORMATION** Nautical information about a related area or facility. |
| **S-127 Information Feature:Nautical information****Supertype: AbstractRxN** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| Category of Authority |  |  | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
| Graphic |  |  | C | 0,\* |
| rxnCode |  |  | C | 0,\* |
|  |  |  |  |  |
| **Information associations** |
| **Role Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Multiplicity** |
| Asso | additionalInformation | Nautical Information | providesInformation | 0,\* | (any subtype of InformationType) | informationProvidedFor | 0,\* |
| Asso | additionalInformation | Nautical Information | providesInformation | 0..\* | (any subtype of FeatureType) | informationProvidedFor | 1..\* |
| Asso(inherited) | InclusionType (association class) | Subtypes of AbstractRxN | theApplicableRxN | 0..\* | Applicability | isApplicableTo | 0,\* |
| Asso (inherited) | associatedRxN | Subtypes of AbstractRxN | theRxN | 0..\* | Subtypes of FeatureType | appliesInLocation | 1..\* |
| Asso (inherited) | relatedOrganisation | Subtypes of AbstractRxN | theInformation | 0..\* | Authority | theOrganisation | 0..\* |
|  |  |  |  |  |  |  |  |
| INT 1 Reference:Nautical information is intended for material that is largely informative in nature, of which does not fit into the category of regulation, recommendation, or restriction.Remarks:* Association *additionalInformation* may be with a geographic feature or an information type. Association *associatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.

Distinction:**Regulations, Recommendations, Restrictions** |

## Regulations

|  |
| --- |
| IHO Definition: **REGULATIONS** Regulations for a related area or facility. |
| **S-127 Information Feature: Regulations****Supertype: AbstractRxN** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| Category of Authority |  |  | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
| Graphic |  |  | C | 0,\* |
| rxnCode |  |  | C | 0,\* |
|  |  |  |  |  |
| **Information associations** |
| **Role Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Multiplicity** |
| Asso(inherited) | InclusionType (association class) | Subtypes of AbstractRxN | theApplicableRxN | 0..\* | Applicability | isApplicableTo | 0,\* |
| Asso (inherited) | associatedRxN | Subtypes of AbstractRxN | theRxN | 0..\* | Subtypes of FeatureType | appliesInLocation | 1..\* |
| Asso (inherited) | relatedOrganisation | Subtypes of AbstractRxN | theInformation | 0..\* | Authority | theOrganisation | 0..\* |
| INT 1 Reference:Regulations features are 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, including port authorities.Remarks:* Association *associatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.

Distinction: **Nautical Information, Recommendations, Restrictions** |

## Restrictions

|  |
| --- |
| IHO Definition: **RESTRICTIONS** Restrictions for a related area or facility. |
| **S-127 Information Feature: Restrictions****Supertype: AbstractRxN** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| Category of Authority |  |  | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
| Graphic |  |  | C | 0,\* |
| rxnCode |  |  | C | 0,\* |
|  |  |  |  |  |
| **Information associations** |
| **Role Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Multiplicity** |
| Asso(inherited) | InclusionType (association class) | Subtypes of AbstractRxN | theApplicableRxN | 0..\* | Applicability | isApplicableTo | 0,\* |
| Asso (inherited) | associatedRxN | Subtypes of AbstractRxN | theRxN | 0..\* | Subtypes of FeatureType | appliesInLocation | 1..\* |
| Asso (inherited) | relatedOrganisation | Subtypes of AbstractRxN | theInformation | 0..\* | Authority | theOrganisation | 0..\* |
| INT 1 Reference: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 such as a port captain or US Coast Guard district.Remarks:* Association *associatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.

Distinction:**Nautical Information, Recommendations, Regulations** |

## Recommendations

|  |
| --- |
| IHO Definition: **RECOMENDATIONS** Recommendations for a related area or facility. |
| **S-127 Information Feature: Recommendations****Supertype: AbstractRxN** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| Category of Authority |  |  | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
| Graphic |  |  | C | 0,\* |
| rxnCode |  |  | C | 0,\* |
|  |  |  |  |  |
| **Information associations** |
| **Role Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Multiplicity** |
| Asso(inherited) | InclusionType (association class) | Subtypes of AbstractRxN | theApplicableRxN | 0..\* | Applicability | isApplicableTo | 0,\* |
| Asso (inherited) | associatedRxN | Subtypes of AbstractRxN | theRxN | 0..\* | Subtypes of FeatureType | appliesInLocation | 1..\* |
| Asso (inherited) | relatedOrganisation | Subtypes of AbstractRxN | theInformation | 0..\* | Authority | theOrganisation | 0..\* |
| INT 1 Reference:Remarks:* Association *associatedRxN* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.

Distinction:**Nautical Information, Recommendations, Restrictions** |

## Authority

|  |
| --- |
| IHO Definition: **AUTHORITY**. A person or organisation having political or administrative power and control. (Oxford Dictionary of English). |
| **S-127 Information Feature:Authority****Supertype: informationType** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Authority |  | 1 : customs2 : border control3 : police4 : port5 : immigration6 : health7 : coast guard8: agricultural9: military10: private company11: maritime police12: environmental13: fishery14: finance15: maritime | EN | 0,1 |
| Text Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  |  | TD | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult** | **Class** | **Role** | **Mult** |
| Assoc | srvControl | Authority | controlAuthority | 0..\* | (subtypes of SupervisedArea) | controlledService | 0..\* |
| Assoc | authorityContact | Authority | theAuthority | 0..\* | Contact Details | theContactDetails | 0..\* |
| Assoc | authorityHours | Authority | theAuthority\_srvHrs | 0..\* | Service Hours | theServiceHours | 0..\* |
| Assoc | relatedOrganisation | Authority | theOrganisation | 0..\* | Subtypes of AbstractRxN | theInformation | 0..\* |
| INT 1 Reference:Remarks:* No remarks.

Distinction: |

## Contact Details

|  |
| --- |
| IHO Definition: **CONTACT DETAILS**. Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. |
| **S-127 Information Feature:Contact Details** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Call name | (CALNAM) |  | S(TE) | 0,1 |
| Call sign | (CALSGN) |  |  | 0,1 |
| CommunicationChannel | (COMCHA) |  | TE | 0..\* |
| Maritime Mobile Service Identity (MMSI) Code |  |  | I | 0,1 |
| Category of communication preference (categoryOfCommPref) |  |  | EN | 0,1 |
| Contact Instructions |  |  | S(TE) | 0,1 |
| Contact Address |  |  | C | 0,\* |
|  Delivery Point |  |  | S(TE) | 0,\* |
|  City Name |  |  | S(TE) | 0,1 |
|  Administrative Division |  |  | S(TE) | 0,1 |
|  Country |  |  | S(TE) | 0,1 |
|  Postal Code |  |  | S(TE) | 0,1 |
| Frequency pair |  |  | C | 0,1 |
|  Frequency shore station transmits |  |  | I | 0,\* |
|  Frequency shore station receives |  |  | I | 0,\* |
| Online Resource |  |  | C | 0,\* |
|  Linkage |  | ISO 19115:2014 | S(URL) | 1,1 |
|  Protocol |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Application Profile |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Name of Resource |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Description |  | ISO 19115:2014 | S(TE) | 0,1 |
|  Online function |  | ISO 19115:2014 | E(CL) | 0,1 |
|  Protocol Request |  | ISO 19115:2014 | S(TE) | 0,1 |
| Telecommunications |  |  | C | 0,\* |
|  Telecommunication Identifier |  |  | S(TE) | 1,1 |
|  Telecommunications Service Carrier |  |  | S(TE) | 0,1 |
|  Contact Instructions |  |  | S(TE) | 0,1 |
|  Telecommunications Service |  |  | E(CL)  | 0,\* |
| RadioCommunications |  |  | C | 0..\* |
|  Category Of Communication Preference (categoryOfCommPref) |  |  |  |  |
|  Category of radio methods |  | 1: Low Frequency (LF) voice traffic2: Medium Frequency (MF) voice traffic3: High Frequency (HF) voice traffic4: Very High Frequency (VHF) voice traffic5: High Frequency Narrow Band Direct Printing6: NAVTEX7: SafetyNET8: NBDP Telegraphy (Narrow Band Direct Printing Telegraphy)9: facsimile10: NAVIP11: Low Frequency (LF) digital traffic12: Medium Frequency (MF) digital traffic13: High Frequency (HF) digital traffic14: Very High Frequency (VHF) digital traffic15: Low Frequency (LF) telegraph traffic16: Medium Frequency (MF) telegraph traffic17: High Frequency (HF) telegraph traffic18: Medium Frequency (MF) Digital Selective Call traffic19: High Frequency (HF) Digital Selective Call traffic20: Very High Frequency (VHF) Digital Selective Call traffic | EN | 0,\* |
|  Communication channel |  |  | TX | 0,\* |
|  Contact instructions |  |  | TX | 0,1 |
|  Frequency pair |  |  | C | 0,\* |
|  Frequency shore station receives |  |  | IN | 0,\* |
|  Frequency shore station transmits |  |  | IN | 0,\* |
|  Time intervals by Day of Week (tmIntervalsByDoW) |  |  | C | 0,\* |
|  Day of week |  | 1: monday2: tuesday3: wednesday4: thursday5: friday6: saturday7: sunday | EN | 0,7 |
|  Day of week is range |  |  | BO | 0,1 |
|  Time reference |  | 1: localTime2: UTC | EN | 1,1 |
|  Time of day start |  |  | TI | 0,\* |
|  Time of day end |  |  | TI | 0,\* |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Asso | srvContact | Authority  | theContactDetails | 0..\* | (subtypes of OrganisationContactArea) | servicePlace | 0,\* |
| Asso | authorityContact | Contact Details | theContactDetails | 0,\* | Authority | theAuthority | 0..\* |
| INT 1 Reference:When the complex attribute radioCommunications is used in ContactDetails, it can have only the sub-attributes indicated in this table.Remarks:* No remarks.

Distinction: |

## Ship Report

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| --- |
| IHO Definition:**SHIP REPORT**. This describes how a ship should report to a maritime authority, including when to report, what to report and whether the format conforms to the IMO standard. |
| **S-127 Information Feature:Ship Report** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Category of Ship Report |  | 1 : Sailing Plan2 : position report3 : deviation report4 : final report5 : dangerous goods report6 : harmful substances report7 : marine pollutants report8 : any other report | EN | 1,\* |
| IMO Format for Reporting |  | True (Yes)False (No) | BO | 1,1 |
| Textual Content |  |  | C | 1,\* |
|  Category of Text |  | 1: Abstract or summary2: Extract3: Full text | EN | 0,1 |
|  |  |  |  |  |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  File reference | *(TXTDSC) (NTXTDS)* |  | (S) TE | 1,1 |
|  Information  |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
|  Source Indication | (SORIND) |  | (S) TE | 0,1 |
|  Source Type |  |  |  | 0,1 |
|  Source |  |  | (S)TE | 0,1 |
|  Reported Date |  |  | TD | 0,1 |
|  Country |  | ISO3166-1-alpha2 |  | 0,1 |
|  Category of Authority | (CATAUT) |  | EN | 0,1 |
|  Feature name  |  |  | C | 0,\* |
|  Display name |  |  | (S) BO | 0,1 |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Name | *(OBJNAM) (NOBJNM)* |  | (S) TE | 1,1 |
|  Online Resource |  |  | C | 0,1 |
|  Linkage |  | ISO 19115-1:2014 | URL |  |
|  Protocol |  | ISO 19115 | (S) TE | 0,1 |
|  Application Profile |  | ISO 19115 | (S) TE | 0,1 |
|  Name of Resource |  | ISO 19115 | (S) TE | 0,1 |
|  Description |  | ISO 19115 | (S) TE | 0,1 |
|  Online function |  | 1: download2: information3: offline access4: order5: search6: complete metadata7: browse graphic8: upload9: email service10: browsing11: file access | EN | 0,1 |
|  Protocol Request |  | ISO 19115 | (S) TE | 0,1 |
| Notice Time |  |  | C | 1,\* |
|  Notice Time Hours |  |  | RE | 0,\* (ordered) |
|  Notice Time Text |  |  | TE | 0,1 |
|  Operation |  | 1: largest value2: smallest value | EN | 0,1 |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Multiplicity** |
| Assoc | reptAuthority | ShipReport | theShipReport | 0..\* | Authority | reportTo | 0..\* |
| Assoc | trafficServRept | ShipReport | reptForTrafficServ | 0..\* | (subtypes of ReportableServiceArea) | reptForLocation | 0..\* |
| Assoc | reportReqmt | ShipReport | theShipReport | 0..\* | Applicability | mustBeFiledBy | 0,\* |
| Asso (inherited) | additionalInformation | Any information type | informationProvidedFor | 0,\* | Nautical Information | providesInformation | 0,\* |
|  |  |  |  |  |  |  |  |
| INT 1 Reference:Remarks:* textContent is used to describe non-standard ship reports. The Associated Information Object Applicability indicates characteristics of vessels which use this report.
* Association *trafficServRept* is with a geographic feature. While an association from geographic feature to information type can be encoded in the geographic feature instance, the reverse association from the information type to the geographic feature may be omitted from the information type instance or encoded using the generic inverse association *invInformationAssociation* instead of the named role.
* Distinction:
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## Non Standard Working Day

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| IHO Definition:**NON STANDARD WORKING DAY** Days when many services are not available. Often days of festivity or recreation when normal working hours are limited, esp. a national or religious festival, etc. |
| **S-127 Information Feature:Non Standard Working Day** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Fixed Date |  |  | TD | 0,\* |
| Variable Date |  |  | S(TE) | 0,\* |
| Information |  |  | C | 1,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 1,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Assoc | exceptionalWorkday | NonStandardWorkingDay | partialWorkingDay | 0..\* | Hours | theServiceHours\_nsdy | 0..\* |
|  |  |  |  |  |  |  |  |
| INT 1 Reference:Remarks:* No remarks.

Distinction: |

## Service Hours

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| IHO Definition:**SERVICE HOURS** The time when a service is available and known exceptions. |
| **S-127 Information Feature:Service Hours** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Schedule by day of week |  |  | C | 1,\* |
|  Category of schedule |  | 1: normal operation2: closure3: unmanned operation | EN | 1,1 |
|  Time intervals by day of week |  |  | C | 1,\* |
|  Day of the Week |  | 1: monday2: tuesday3: wednesday4: thursday5: friday6: saturday7: sunday | EN | 0,7 (ordered) |
|  dayOfWeekIsRange |  |  | BO | 0,1 |
|  timeReference |  | 1: local time2: UTC | EN | 1,1 |
|  timeOfDayStart |  |  | TI | 0,\* (ordered) |
|  timeOfDayEnd |  |  | C | 0,\* (ordered) |
| Information |  |  | C | 0,\* |
|  Language |  | ISO 639-3 | (S) TE | 0,1 |
|  Text | *(INFORM) (NINFOM)* |  | (S) TE | 0,1 |
|  File Reference | *(TXTDSC)**(NTXTDS)* |  | S (TE) | 0,1 |
|  File Locator |  |  | S (TE) | 0,1 |
|  Headline |  |  | S (TE) | 0,1 |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Assoc | exceptionalWorkday | ServiceHours | theServiceHours\_nsdy | 0..\* | NonStandardWorkday | partialWorkingDay | 0..\* |
| Assoc | authorityHours | Service Hours | theServiceHours | 0,\* | Authority | theAuthority\_srvHrs | 0..\* |
| Asso (inherited) | Additional Information | Any information type | informationProvidedFor | 0,\* | Nautical Information | providesInformation | 0,\* |
| INT 1 Reference:Seasonal variations in service hours can be encoded using multiple **ServiceHours** instances with appropriate **periodicDateRange** values.Remarks:* No remarks.

Distinction: |

## Applicability

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| IHO Definition: **APPLICABILITY** Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area. |
| **S-127 Information Feature:Applicability** |
| **Primitives:None** |
| *Real World* | *Paper Chart Symbol* | *ECDIS Symbol* |
| **S-127 Attribute** | **S-57 Acronym** | **Allowable Encoding Value** | **Type** | **Multiplicity** |
| Ballast |  | 1=Yes 0=No | BO | 0,1 |
| Category of Cargo |  | 1 : bulk2 : container3 : general4 : liquid5 : passenger6 : livestock7 : dangerous or hazardous | EN | 0,\* |
| Category of Dangerous or Hazardous Cargo |  | 1 : IMDG Code Class 1; Div. 1.12 : IMDG Code Class 1; Div. 1.23 : IMDG Code Class 1; Div. 1.34 : IMDG Code Class 1; Div. 1.45 : IMDG Code Class 1; Division 1.56 : IMDG Code Class 1; Division 1.67 : IMDG Code Class 2.18 : IMDG Code Class 2.29 : IMDG Code Class 2.310 : IMDG Code Class 311 : IMDG Code Class 4.112 : IMDG Code Class 4.213 : IMDG Code Class 4.314 : IMDG Code Class 5.115 : IMDG Code Class 5.216 : IMDG Code Class 6.117 : IMDG Code Class 6.218 : IMDG Code Class 719 : IMDG Code Class 820 : IMDG Code Class 921 : Harmful Substances in packaged form | EN | 0,\* |
| Category of Vessel Registry |  | 1: domestic2: foreign | EN | 0,1 |
| Category of Vessel |  | 1: general cargo vessel2: container carrier3: tanker4: bulk carrier5: passenger vessel6: roll-on roll-off7: refrigerated cargo vessel8: fishing vessel9: service10 : warship11: towed or pushed composite unit12: tug and tow13 : light recreational14 : semi-submersible offshore installation15 : jack-up exploration or project installation16 : livestock carrier17 : sport fishing | EN (CL) | 0,1 |
| Thickness of Ice Capability |  |  | IN |  |
| Logical Connectives |  | 1: logical conjunction2: logical disjunction | EN | 0,1 |
| Vessel Performance |  |  | TE |  |
| Vessel Measurements |  |  | C | 0,\* |
|  Comparison Operator |  | 1: greater than2: greater than or equal to3: less than4: less than or equal to5: equal to6: not equal to |  | 1 |
|  Vessel Characteristics |  | 1: length overall2: length at waterline3: breadth4: draught5: height6: displacement tonnage7: displacement tonnage, light8: displacement tonnage, loaded9: deadweight tonnage10: gross tonnage11: net tonnage12: Panama Canal/Universal Measurement System net tonnage13: Suez Canal net tonnage14: Suez Canal Gross Tonnage | EN | 1,1 |
|  Vessel CharacteristicsValue |  |  | RE | 1,1 |
|  Vessel CharacteristicsUnits |  | 1: metre2: foot3: metric ton4: ton5: short ton6: gross ton7: net ton8: Panama Canal/Universal Measurement System net tonnage9: Suez Canal Net Tonnage10: none11: cubic metres12: Suez Canal gross tonnage | EN | 1,1 |
| **Inherited attributes** |  |  |  |  |
| Fixed date range |  |  | C | 0,1  |
| Periodic date range |  |  | C | 0,1  |
| Feature name  |  |  | C | 0,\* |
| Source Indication | (SORIND) |  | C | 0,1 |
| **Information associations** |
| **Type** | **Association Name** | **Class** | **Role** | **Mult.** | **Class** | **Role** | **Mult.** |
| Asso class | PermissionType | Applicability | permission | 0,\* | Any subtype of Featuretype | vslLocation | 0,\* |
| Asso class | InclusionType | Applicability | isApplicableTo | 0,\* | Any subtype of AbstractRxN | theApplicableRxN | 0,\* |
| INT 1 Reference:Remarks:* Vessel characteristics are specified as follows:

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

Distinction: |