INTERNATIONAL HYDROGRAPHIC ORGANIZATION

# IHO GEOSPATIAL STANDARD FOR MARINE PROTECTED AREAS

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Marine Protected Areas - Product Specification

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MONACO

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## Record of Document Maintenance

Changes to this Product Specification are coordinated by the IHO Standardization of Nautical Publications Working Group (SNPWG). New editions will be made available via the IHO web site. Maintenance of the Product Specification shall conform to IHO Technical Resolution 2/2007 (revised 2010).

| Date | Description | Authority | Version |
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# Contents

# 1 Introduction

This document has been produced by the IHO Standardisation of Nautical Products Working Group in response to a requirement to produce a data product that can be used as a Marine Information Overlay (MIO) within an Electronic Chart Display and Information Systems. It is based on the IHO S-100 framework specification and the ISO 19100 series of standards. It is a vector product specification that is primarily intended for encoding the extent and nature of Marine Protected Areas, for navigational purposes.

The United Nations Convention on the Law of the Sea (UNCLOS) identifies certain categories of Marine Protected Areas which may require higher standards of environmental protection. Article 194(5) places an obligation on parties to take measures necessary to protect and preserve rare or fragile ecosystems. Part IX of UNCLOS identifies enclosed or semi-enclosed areas, such as a gulf, bay, basin, or sea between two or more countries, as places where countries shall endeavour to coordinate the management of environmental protection activities. In respect of Particularly Sensitive Sea Areas (PSSA), Article 211(6)(a) UNCLOS makes provision for a State to submit to the "competent international organization" (IMO for shipping), special mandatory measures concerning the protection from vessel sourced pollution.

UNCLOS thus creates an overall structure for the protection and preservation of the marine environment and places a general obligation on States to implement global conventions addressing particular forms of pollution protection and regional agreements tailored to the requirements of discrete sea areas.

# 2 Data Product Specification Metadata

This section provides metadata about the creation of this data product specification.

**Title:** IHO S-10X Marine Protected Areas – Data Product Specification

**S-100 Version:** 1.0.0 (January 2010)

**MPA Version**: 0.0.1 Draft

**Date**: April 2011

**Language**: English

**Classification:** Unclassified

**Contact:** International Hydrographic Bureau

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## 2.1 Maintenance:

This document is maintained by the IHO Standardization of Nautical Publications Working Group (SNPWG). New editions will be published as determined by the Hydrographic Standards and Services Committee (HSSC) (in conformance with IHO Technical Resolution 2/2007 - revised 2010), and will be made available for download from the IHO web site (www.IHO.int)

*(Note: NOAA Version includes text extracted from TR 2/2007. Propose not to include this as the PS will have to change whenever the TS changes)*

# 3 Overview

## 3.1 Informal Description

A Marine Protected Area (MPA) is a protected area whose boundaries include an area of ocean. They include areas of the intertidal or sub-tidal terrain, together with their overlying water and associated flora, fauna, historical and cultural features, which have been reserved by law or other effective means to protect part or all of, the enclosed environment. For example, MPA's may be established to protect fish species, rare habitat area, or entire ecosystems.

MPAs can range from, simple declarations to protect a resource, to areas that are extensively regulated. The degree to which environmental regulations affect shipping varies according to whether MPA's are located in territorial waters, exclusive economic zones, or high seas. These limits are regulated by the law of the sea. Most MPAs are located in the territorial waters of coastal states, where enforcement can be ensured. MPAs can also however be established in a state's exclusive economic zone and even within international waters. For example in 1999, Italy, France and Monaco jointly established a cetacean sanctuary in the Ligurian Sea named the Pelagos Sanctuary for Mediterranean Marine Mammals. This sanctuary includes both national and international waters.

## 3.2 Data product specification metadata

This section provides metadata about the creation of this data product specification.

**Title:** SNPWG MIO (Prototype) – Marine Protected Areas

**Dataset reference date:** 2011-03-01

**Dataset responsible party:** International Hydrographic Organization

**Dataset language:** English

**Dataset topic category:** Marine Protected Areas

## 3.3 References

The following normative documents contain provisions that, through reference in this text, constitute provisions of this document.

IHO S.100 IHO Universal Hydrographic Data Model

ISO 19101-2:2008 Geographic Information - Rules for Application Schema

ISO/TS 19103:2005 Geographic information - Conceptual schema language

ISO 19106:2004 Geographic Information - Profiles

ISO 19109:2005 Geographic Information - Rules for Application Schema

ISO 19111:2003 Geographic information - Spatial referencing by coordinates

ISO 19115:2003 Geographic information - Metadata

ISO 19115-2:2009 Geographic information - Metadata: Extensions for imagery and gridded data

ISO 19123:2005 Geographic information - Schema for coverage geometry and functions

ISO 19129:2009 Geographic information - Imagery gridded and coverage data framework

ISO 19131:2007 Geographic information - Data product specifications

## 3.4 Terms, definitions and abbreviations

### Terms and Definitions

**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]

**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.

**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 or feature attribute 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.

**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.

**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.

**metadata**
data about data [ISO 19115]

**model**
abstraction of some aspects of reality [ISO 19109]

**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]

**universe of discourse**
view of the real or hypothetical world that includes everything of interest [ISO 19101]

## 3.5 Abbreviations

| | |
|---|---|
| ASCII | American Standard Code for Information Interchange |
| ENC | Electronic Navigational Chart |
| GML | Geography Markup Language |
| IHO | International Hydrographic Organization |
| IOC | International Oceanographic Commission |
| ISO | International Organization for Standardization |
| MPA | Marine Protected Are |
| MIO | Marine Information Overlay |
| NIO | Nautical Publications Information Overlay |
| UML | Unified Modelling Language |
| URI | Uniformed Resource Identifier |
| URL | Uniform Resource Locator |
| WMS | Web Map Service |
| WFS | Web Feature Service |
| www | World Wide Web |
| WGS | World Geodetic System |
| XML | Extensible Markup Language |
| XSLT | eXtensible Stylesheet Language Transformations |

## 4 Specification Scope

Unlike S-100 ENCs which may have “scalable” and “non-scalable” variants, Marine Protected Areas data products are homogeneous (i.e. have common properties) their format or structure do not vary. This product specification describes one data product and therefore requires only one scope which is described below;

*(The term ‘specification scope’ originates from the International Standard ISO19131. It is not intended to express the purpose for the creation of a data specification or the potential use of data, but identifies partitions of the data specification where specific requirements apply).*

**Scope ID:** Marine Protected Areas datasets.

**Hierarchical level:** 005 – (from 19115 - MD_ScopeCode)

**Hierarchical level name:** dataset

**Level description:** information applies to the dataset

**Extent:** EX_GeographicExtent - Global coverage of maritime areas. EX_TemporalExtent and EX_VerticalExtent are not defined for this product specification.

## 5 MPA Data Product Identification

The following information is intended to describe the MPA data product.

**Title:** Nautical Publications Information Overlay - Marine Protected Areas

**Abstract:** Data product describing Marine Protected Areas that are of significance to mariners and others operating in the maritime domain.

**Purpose:** A data product for encoding and transferring MPA information for use with ECDIS as NIOs.

**Topic category:** environment, oceans, boundaries (see 19115 MD_TopicCategoryCode)

**Content:** A conformant data set may contain features defined by the MPA Feature Catalogue and described in the Application Schema shown in Figure 2.

**Description:** Areas where MPAs are applicable.

**Spatial Extent:**

**Description:** Areas specific to marine navigation.

**East Bounding Longitude**: 180
**West Bounding Longitude**: -180
**North Bounding Latitude**: 90
**South Bounding Latitude:** -90

**Specific Purpose:** MPA datasets provide information regarding the location and nature of various national and international marine protected areas. They provide supplementary information overlay in Electronic Chart Display and Information System (ECDIS) and Electronic Chart Systems (ECS). Supplementary means additional, non mandatory information not already covered by existing International Maritime Organization (IMO), International Hydrographic

Organization (IHO), and International Electrotechnical Commission (IEC) standards or specifications.

**Spatial representation type:** vector

# 6 Data Content and Structure

MPAs are feature-based with all features and properties being derived from the IHO Feature Concept Dictionary. The geographical extent of MPAs are encoded as vector entities which are derived from the geometry element **GM_Object** (from the ISO S-100 framework standard and ISO 19107). GM_Object can be of type Point, Curve (Line) or Surface (Area). Definitions for all feature classes and properties used in this product specification are managed by the IHO online GII registry (www.registry.iho.int).

The feature catalogue (described in Annexes A, B, and C provides a description of the feature class types, attributes, attribute values and relationships used in this product specification. Figure 1 below provides an overview of the MPA domain model.

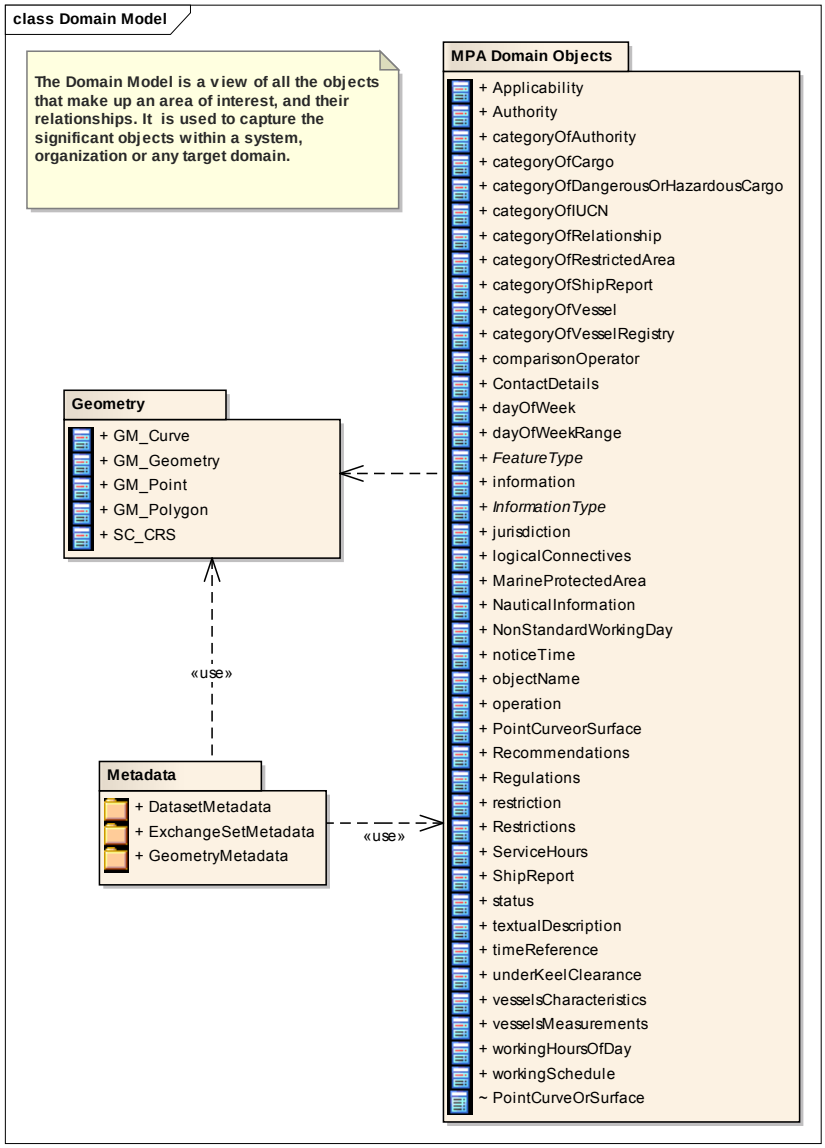

**Figure 1 - Domain Model Overview**

## 6.1 Application Schema

The UML model shown in Figure 2 below illustrates a simplified version of the MPA application schema. It includes a general description of elements used to construct the application schema, and the relationships between them. These elements include features types, information types, simple attributes, complex attributes, aggregations and associations. A brief description of these are provided below, however they are also described in the feature catalogue.

A feature is an abstraction of real world phenomena. GF_FeatureType is a metaclass that is instantiated as classes that represent individual feature types. A certain feature type is the class used for all instances of that feature type. The instance of a class that represents an individual feature type is called feature instances. In object-oriented modelling, feature types are equivalent to classes and feature instances are equivalent to objects.

An information type is an identifiable object that can be associated with features in order to carry information pertaining to the associated features. S100_GF_InformationType is the class intended for information types within S-100. A primary object carrying a Chart Note for example, may contain text in English and an associated supplementary information object may be used to carry the same text in another language.

Simple Attributes can be enumerations, codelists or simple types (e.g. integer or character string).

Complex attributes are properties of a feature which can be divided into multiple sub attributes and are used where objects have properties that better fit a hierarchical structure. They provide a better construct for encoding list attributes on objects such as light sectors.

Aggregation are used represent features that are related to each other.

A feature association is a relationship that links instances of one feature type with instances of the same or a different feature type. Each relationship has a name and two roles thus giving a more detailed representation of the real world relationships within the dataset. The MPA application schema is presented as a UML model in figure 2 below.

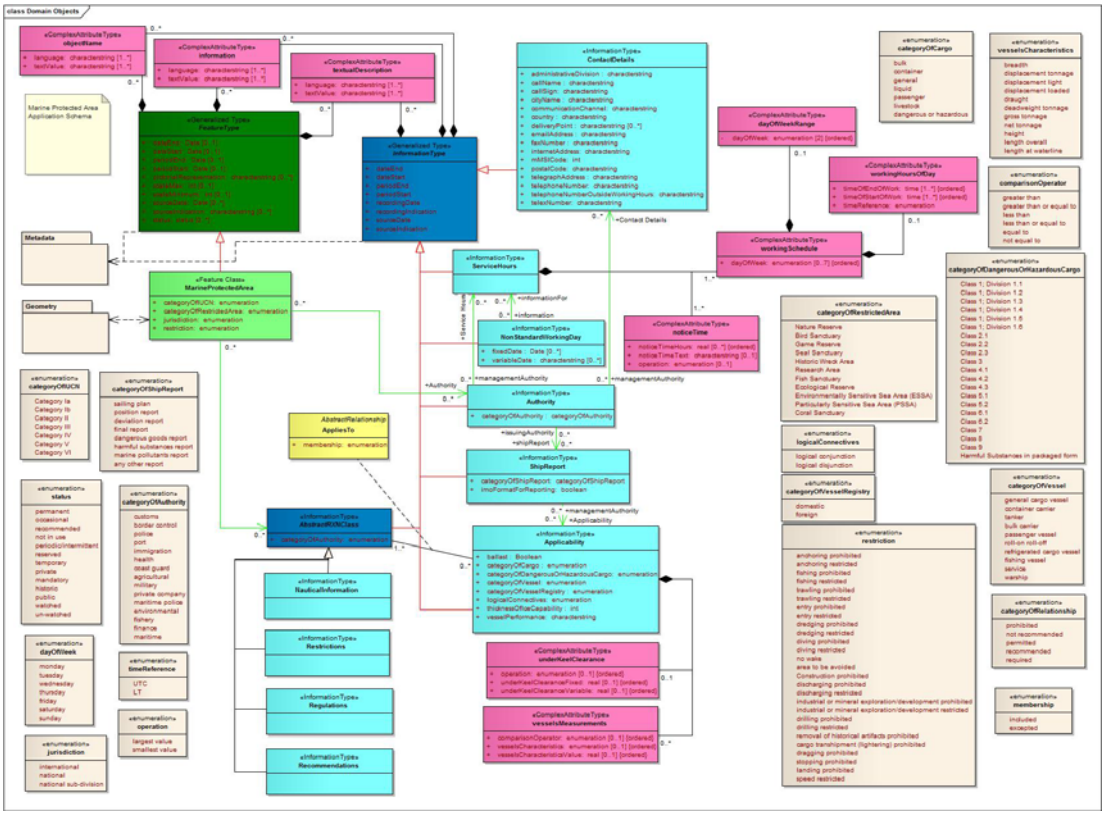

**Figure 2 – MPA Application Schema.**

## 6.2 Feature Catalogue

The S-10X Feature Catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an MPA. A brief description of the items listed above has been included at Annex A. A machine readable version of the catalogue that conforming to the S-100 XML Feature Catalogue Schema is available for download from the IHO web site (http://www.iho.int/SNPWG_Schemas/MPA/.....).

# 7 Reference Systems

The MPA product defined in the specification are intended to be used as auxiliary ENC information in ECDIS. Although the ENC product specification requires the use of a compound CRS (i.e. 2D geodetic CRS [based on WGS84] and a separate vertical CRS based on sounding datum), this product specification requires a simple CRS. The CRS used for this product specification is World Geodetic System (WGS) 84 which is defined by the the European Petroleum Survey Group (EPSG) code 4326, (or similar - North American Datum 1983 / Canadian Spatial Reference System).

Spatial data are expressed in latitude (φ) and longitude (λ) geographic coordinates. Longitude values are stored as a negative number to represent a position west of the prime meridian (0°). Latitude values are stored as a negative number to represent a position south of the Equator (0°). Coordinates are expressed as real value, degree / degree decimal format. All vertical units must be in meters.

Datasets conforming to this product specification are not projected.

Spatial reference system:

Horizontal coordinate reference system: WGS 84 (or equivalent). *(WGS84 was designed for navigation applications and the WGS 84 coordinates are usually expressed as latitude, longitude and ellipsoid height).*

Projection: None

Vertical coordinate reference system: WGS 84 (or equivalent) *(Is there a need to define a different (sounding) vertical reference system?).*

Temporal reference system: Gregorian calendar

Coordinate reference system registry: EPSG Geodetic Parameter Dataset

Reference date: 2010 - xx - xx

Date type according to ISO 19115 standard: 002 - publication

Responsible party: OGP – International Organisation of Oil and Gas Producers

URL: **http://www.epsg.org**

Coordinate reference system identifier (CRSID): 4326 (or 4617 for NAD 83)

Code space: EPSG – European Petroleum Survey Group

# 8 Geometric Representation

Geometric representation is the digital description of the spatial component of an object as described in S-100 and ISO 19107. This product specification uses three types of geometric primitive: GM_Point, GM_Curve, and GM_Polygone (GM_Surface). See Figure 3 below.

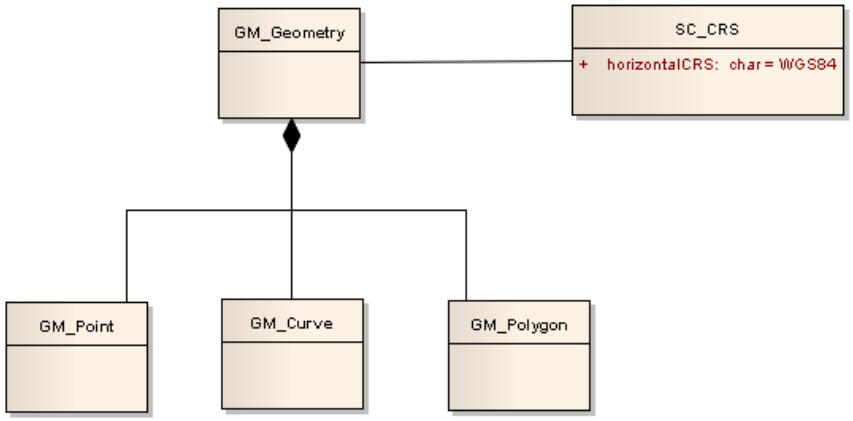


**Figure 3 - Geometric Primitives**

**GM_Curve**

Relationships: Association
GM_Curve,, GM_Geometry

**GM_Geometry**

Relationships: Association
GM_Polygon, GM_Geometry, GM_Curve, GM_Geometry, GM_Point, GM_Geometry, GM_Geometry, SC_CRS

**GM_Point**

Relationships: Association
GM_Point, GM_Geometry.

**GM_Polygon**

Relationships: Association
GM_Polygon, GM_Geometry

**SC_CRS**

| Name | Type | Init |
|---|---|---|
| horizontalCRS | char | WGS84 (EPSG: 4326) |

Relationships: Association
GM_Geometry, SC_CRS

# 9 Data Product Delivery

**Delivery medium information**

Units of delivery; (DPS_DeliveryInformation.deliveryMedium > DPS_DeliveryMedium.unitsOfDelivery) Data cells *(will MPA unites be cells matching ENCs or will they be delivered in other unite sizes?)*

**Medium name** (DPS_DeliveryInformation.deliveryMedium > DPS_DeliveryMedium.mediumName) CD or Online via HTTP / FTP download.

**Delivery format information**

Format name; (DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.formatName) Geography Markup Language – GML

# 10 Metadata

The MPA metadata description is based on the S-100 metadata document section, which is a profile of the ISO 19115 standard. These documents provide a structure for describing digital geographic data and define metadata elements, a common set of metadata terminology, definitions and extension procedures.

Two main types of metadata are described in this product specification; dataset metadata and exchange set metadata.

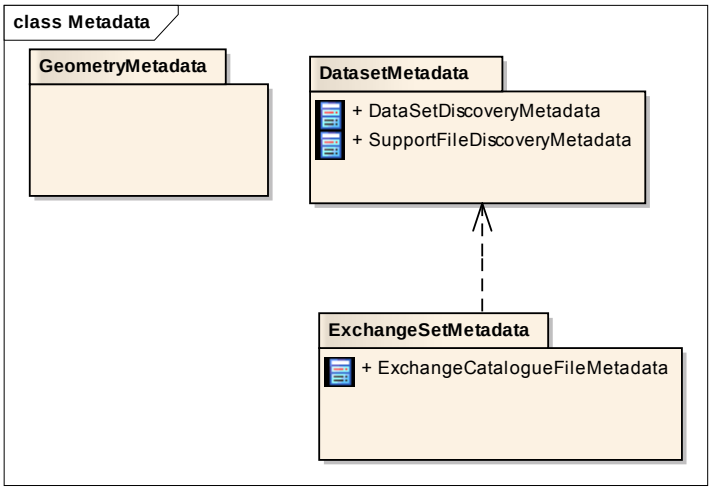


**Figure 4 – Metadata**

## 10.1 Dataset Metadata

Dataset metadata is intended to describe information about a dataset or data resource. It facilitates the management and exploitation of data and is an important requirement for understanding the characteristics of a dataset (and or data resource). Whereas dataset metadata is usually fairly comprehensive, there is also a requirement for a constrained subset of metadata elements that are usually required for discovery purposes. Discovery metadata are often used for building web catalogues, and can help users to determine whether a product or service is fit for purpose and how/where they can be accessed.

### 10.2 Information about the documented metadata (if provided as a separate resource)

| Description | Path | Obligation |
|---|---|---|
| Metadata file identifier | MD_Metadata.fileIdentifier *(for this profile obligation has been changed to M)* | O |
| Metadata language | MD_Metadata.language | C1 |
| Metadata character set | MD_Metadata.characterSet | C2 |
| Metadata file parent identifier | MD_Metadata.parentIdentifier | C3 |
| Metadata point of contact | MD_Metadata.contact > CI_ResponsibleParty | M |
| Metadata date stamp | MD_Metadata.dateStamp | M |
| Metadata standard name | MD_Metadata.metadataStandardName | O |
| Metadata standard version | MD_Metadata.metadataStandardVersion | O |

### 10.3 Information about the dataset (dataset series) or resource S

| Name | Path | Obligation |
|---|---|---|
| Dataset title | MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title | M |
| Dataset reference date | MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date | M |
| Abstract describing the data | MD_Metadata.identificationInfo > MD_DataIdentification.abstract | M |
| Dataset responsible party | MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty | O |
| Spatial representation type | MD_Metadata.identificationInfo > MD_DataIdentification.spatialRepresentationType | O |
| Spatial resolution of the dataset | MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.distance or MD_Resolution.equivalentScale | O |
| Dataset language | MD_Metadata.identificationInfo > MD_DataIdentification.language | M |
| Dataset character set | MD_Metadata.identificationInfo > MD_DataIdentification.characterSet | C2 |
| Dataset topic category | MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory | M |
| Geographic location of the dataset (by four coordinates or by description) | MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox or EX_GeographicDescription | C |

| | | |
|---|---|---|
| Temporal extent information for the dataset | MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.temporalElement | O |
| Vertical extent information for the dataset | MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.verticalElement > EX_VerticalExtent | O |
| Lineage | MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage | O |
| Reference system | MD_Metadata.referenceSystemInfo > MD_ReferenceSystem.referenceSystemIdentifier > RS_Identifier | O |
| Distribution Format | MD_Metadata.distributionInfo > MD_Distribution > MD_Format | O |
| On-line resource | MD_Metadata.distributionInfo > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource | O |

C1 – language: must be documented if not defined by the encoding process
C2 – characterSet: must be documented if ISO 10646-1 is not used and not defined by the encoding process
C3 – parentIdentifier: must be documented if part of a series
*(Source: Adapted from Table 3 – Core metadata for geographic datasets (ISO 19115:2005)).*

## 10.4 Exchange Set Metadata

Frequently datasets are packaged and distributed as composites exchange sets by third party vendors. An exchange set could contain many different types of datasets, sourced from different data producers. For example an exchange set may contain numerous dataset files, ancillary data files, discovery metadata files and others. Exchange set metadata contains metadata about the contents of the exchange set and metadata about the data distributor.

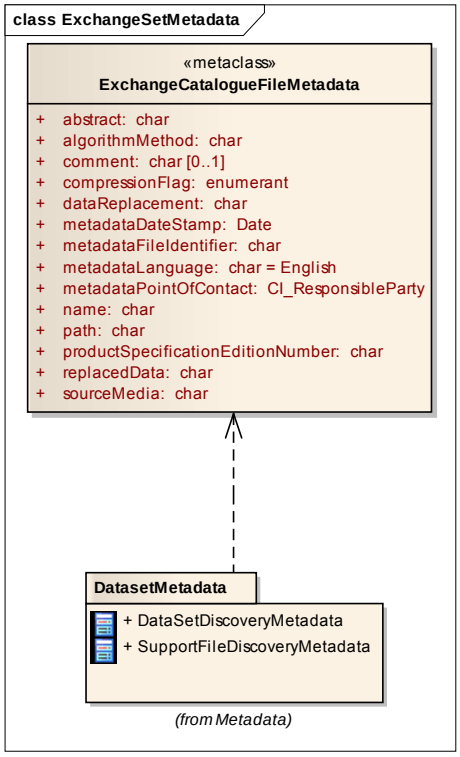


**Figure X Exchange Set Metadata**

A data set that conforms to this Product Specification should contain the following discovery level metadata (see section X of the S-100 Standard (Framework): *(Question to reviewers – will the metadata be part of the dataset or provided as a separate file? – **this needs to be considered from the data service provider perspective as well**).*

## 10.5 Exchange Catalogue File Metadata

### (Stereotype: «metaclass», Package: ExchangeSetMetadata)

| | Name | Type | Init | Notes |
|---|---|---|---|---|
| | abstract | char | | |
| | algorithmMethod | char | | |
| | comment | char | | |
| | compressionFlag | enumerant | | |

| | | | | |
|---|---|---|---|---|
| | dataReplacement | char | | |
| | metadataDateStamp | Date | | |
| | metadataFileIdentifier | char | | |
| | metadataLanguage | char | English | |
| | metadataPointOfContact | CI_ResponsibleParty | | |
| | name | char | | |
| | path | char | | |
| | productSpecificationEditionNumber | char | | |
| | replacedData | char | | |
| | sourceMedia | char | | |

Relationships; Association
DatasetMetadata, ExchangeCatalogueFileMetadata

## 11 Data Encoding

The principal encoding and exchange format for MPA products will be the Open Geospatial Consortium (OGC), Geography Markup Language (GML). GML is an XML grammar designed to express geographical features. It serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions. The concept of feature in GML is very general and includes not only conventional "vector" or discrete objects, but also coverages.

## 12 Delivery Format Information

Although the delivery formats for ENC data cell are either the ISO 8211 format or internal proprietary SENC format, MPA datasets will be delivered in the Geography Markup Language (GML) Format. The MPA delivery format will be described by the following ISO-19131 elements;

Format name - DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.formatName (GML)

- Delivery format version - DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.version.3.2.1
- Specification description - DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.specification) Geography Markup Language – GML – 3.2.1, OpenGIS® Implementation Specification, 27 August 2007, OGC Document Number 01-029
- Language - DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.language) French, English
- Character set - DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.characterSet > MD_CharacterSetCode) 004 – utf8

# 13 Portrayal

Needs to be completed – further information required.

**Annex A**

# FEATURE CATALOGUE

## FEATURE TYPES (CLASSES)

*Note to reviewers – all the Feature Classes, Attributes and Enumerated code lists have been included as annexes to the Product specification – they should probably be moved to the feature catalogue – when we have one.*

**MPA Abstract Feature**
Feature Type - «Generalized Type»

Notes: Generalized feature type which carries all the common attributes.

| Camel Case Description of Attributes | Type | Notes |
|---|---|---|
| dateEnd | Date | |
| dateStart | Date | |
| periodEnd | Date | |
| periodStart | Date | |
| pictorialRepresentation | characterstring | link to external file |
| scaleMax | int | |
| scaleMinimum | int | |
| sourceDate | Date | |
| sourceIndication | characterstring | |
| status | status | |

Relationships

| Multiplicity / Association |
|---|
| MarineProtectedArea . FeatureType. |
| **0..* /** textualDescription. FeatureType. |
| **0..* /** information. FeatureType. |
| **0..* /** objectName. FeatureType. |

### Marine Protected Area Acronym: mpaare

Feature Type «Feature Class» Camel case: **MarineProtectedArea**

Definition: Any area of the intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment. (IUCN – The World Conservation Union. 1998. Resolution 17.38 of the 17th General Assembly of the IUCN. Gland, Switzerland and Cambridge, UK).

| Attributes | Type | Notes |
|---|---|---|
| categoryOfIUCN | enumeration | (International Union for Conservation of Nature and Natural Resources) |
| categoryOfRestrictedArea | enumeration | |
| jurisdiction | enumeration | |
| restriction | enumeration | |

Relationships

| Multiplicity / Association |
|---|
| PointCurveorSurface.<br>MarineProtectedArea . |
| MarineProtectedArea . FeatureType. |
| **0..*/** MarineProtectedArea .<br>**0..*/** NauticalInformation .Information |
| **0..* /** MarineProtectedArea .<br>**0..*/** Restrictions .Restrictions |
| **0..*/** MarineProtectedArea .<br>**0..*/** Regulations .Regulations |
| **0..*/** MarineProtectedArea .<br>**0..*/** Authority.Authority |
| **0..*/** MarineProtectedArea .<br>**0..*/** Recommendations .Recommendations |
| MarineProtectedArea . Geometry |

# INFORMATION TYPES

## Abstract Class - InformationType

Feature Type: «Generalized Type»

Notes: Generalized information type which carry all the common attributes.

| Attributes (camelCase) | Type | Multiplicity |
|---|---|---|
| dateEnd | DATEND | 0..1 |
| dateStart | DATSTA | 0..1 |
| periodEnd | PEREND | 0..1 |
| periodStart | PERSTA | 0..1 |
| recordingDate | | |
| recordingIndication | | |
| sourceDate | SORDAT | 0..1 |
| sourceIndication | SORIND | 0..1 |

Relationships

| Association Multiplicity / Association |
|---|
| NonStandardWorkingDay.InformationType. |
| **0..* /** objectName. InformationType |
| Applicability . InformationType. |
| Regulations . InformationType |
| NauticalInformation . InformationType |
| Restrictions . InformationType |
| ShipReport. InformationType |
| Authority. InformationType |
| ServiceHours . InformationType |
| **0..* /** textualDescription. InformationType |
| **0..* /** information. InformationType |
| Recommendations . InformationType |

## Applicability

Alpha code: **APPLIC**

Feature Type: «InformationType»

Camel Case: **Applicability**

Definition: Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area.

| Attributes (camelCase) | Type | Code Multiplicity | Notes |
|---|---|---|---|
| ballast | Boolean | BALAST | Expected input: ID Meaning<br>True: vessel is in ballast<br>False: vessel is not in ballast<br>Definitions:<br>True: Vessel is predominantly empty of cargo and stabilised with the use of ballast water<br>False: Vessel is carrying cargo and is not ballasted<br>Remarks: No remarks. |
| categoryOfCargo | enumeration | CATCGO | |
| categoryOfDangerousOrHazardousCargo | enumeation | CATDHC | |
| categoryOfRelationship | enumeration | CATREL | |
| categoryOfVessel | enumeration | CATRGY | Definitions: The thickness of ice that the ship can safely transit<br>Indication:<br>Unit: centimetres<br>Resolution: 1<br>Format: xxx<br>Example:080 for ice which has a thickness of 80 cm<br>Remarks: No remarks |
| categoryOfVesselRegistry | enumeration | | |
| logicalConnectives | enumeration | LOGCON | |
| thicknessOfIceCapability | int | ICECAP | Definitions: The thickness of ice that the ship can safely transit<br>Indication:<br>Unit: centimetres<br>Resolution: 1<br>Format: xxx<br>Example: 080 for ice which has a thickness of 80 cm<br>Remarks: No remarks |
| vesselPerformance | characterstring | PRFMNC | Definitions: A description of the required handling characteristics of a vessel including hull design, main and auxilliary machinery, cargo handling equipment, navigation equipment and manoeuvring behaviour. |

Relationships

| Multiplicity / Association |
|---|
| **0..* /** Regulations .<br>**0..* /** Applicability .Applicability |
| **0..* /** Restrictions .<br>**0..* /** Applicability .Applicability |
| **0..* /** vesselsMeasurements .<br>Applicability . |
| **0..* /** NauticalInformation .<br>**0..* /** Applicability .Applicability |
| **0..* /** ShipReport.managementAuthority<br>**0..* /** Applicability .Applicability |
| **0..* /** Recommendations .<br>**0..* /** Applicability .Applicability |
| Applicability .<br>InformationType. |
| **0..1 /** underKeelClearance .<br>Applicability . |

## Authority

Alpha code: **AUTORI**

Feature Type: «InformationType»

Camel Case: **Authority**

Definition: A person or organisation having political or administrative power and control. (Oxford Dictionary of English)

References:

Remarks: No remarks.

Distinctions: natinf; rcmdts; resdes;

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfAuthority | categoryOfAuthority | CATAUT [1] | |

Relationships

| Multiplicity / Association |
|---|
| **0..*/** Authority.managementAuthority<br>**0..* /** ServiceHours .ServiceHours |
| **0..* /** Authority.issuingAuthority<br>**0..* /** ShipReport.shipReport |
| **0..* /** Authority.managementAuthority<br>**0..* /** ContactDetails .ContactDetails |
| **0..* /** MarineProtectedArea .<br>**0..* /** Authority.Authority |
| Authority.<br>InformationType. |

## Contact Details

Alpha code: **CONDET**

Feature Type: «InformationType»

Camel Case: **ContactDetails**

Definition: Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems.

References: M-3: unspecified;

Remarks: No remarks.

Distinction: No distinctions.

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| administrativeDivision | characterstring | ADMDIV [0..1] | Administrative division is a generic term for an administrative region within a country at a level below that of the sovereign state. |
| callName | characterstring | CALNAM [0..1] | The designated call name of a station, e.g. radio station, radar station, pilot. This is the name used when calling a radio station by radio i.e. "Singapore Pilots". |
| callSign | characterstring | CALSGN [1] | The designated call-sign of a radio station. |
| cityName | characterstring | CITYNM [0..1] | The name of a town or city. |
| communicationChannel | characterstring | COMCHA [1..*] | A channel number assigned to a specific radio frequency, frequencies or frequency band. |
| country | characterstring | CONTRY [0..1] | The name of a nation. (Adapted from The American Heritage Dictionaries) |
| deliveryPoint | characterstring | DELPNT [0..*] | Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box. |
| emailAddress | characterstring | EMAILS | An address assigned to an organisation or person to send or receive electronic mail. |
| faxNumber | characterstring | NUMFAX | A number assigned to a fax machine. |
| internetAddress | characterstring | ADRNET | An Internet address (for example, http://www.hmco.com/trade/), usually consisting of the access protocol (http), the domain name (www.hmco.com), and optionally the path to a file or resource residing on that server (trade). (The American Heritage Dictionaries) |
| mMSICode | int | MMSICO | The Maritime Mobile Service Identity (MMSI) Code is formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations, and group calls. These identities are formed in such a way that |

| | | | |
|---|---|---|---|
| | | | the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically. |
| postalCode | characterstring | POSCOD | Known in various countries as a postcode, or ZIP code, the postal code is a series of letters and/or digits that identifies each postal delivery area. |
| telegraphAddress | characterstring | ADRTLG | The telegraphic address assigned to an organisation. |
| telephoneNumber | characterstring | NUMTEL | A number assigned to a telephone. |
| telephoneNumberOutsideWorkingHours | characterstring | NMTLOW | A number assigned to a service for use outside working hours. |
| telexNumber | characterstring | TXTDSC | Numbers assigned to a telex machine as a unique identifier. |

Relationship

| **Multiplicity / Association** |
|---|
| **0..* /** Authority.managementAuthority<br>**0..* /** ContactDetails .ContactDetails |
| ContactDetails .<br>InformationType. |

## Nautical information

Alpha Code: **NATINF**

Feature Type: «InformationType»

Camel Case: **NauticalInformation**

Definition: Nautical information about a related area or facility.

References: INT 1: M-3: Chapter C 2.2.1, C 2.7, C 2.8, Chater 3 Section C, Chapter 3 Section E, M-4:

Remarks: No remarks;

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfAuthority | enumeration | CATAUT | |

Relationships

| Multiplicity / Association |
|---|
| **0..* /** NauticalInformation .<br>**0..* /** Applicability .Applicability |
| **0..* /** MarineProtectedArea .<br>**0..* /**NauticalInformation .Information |
| NauticalInformation . Information. |

**Non-standard working day** Alpha code: **NWKDAY**

Feature Type: «InformationType» Camel Case: **NonStandardWorkingDay**

Definition: 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.

References: INT 1: M-3: M-4:

Remarks: No remarks.

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| fixedDate | Date | FIXDAT [0… *] | The date when a festival or national holiday recurs on the same day each year in the Gregorian calender. |
| variableDate | characterstring | VARDAT [0… *] | A day which is not fixed in the Gregorian calendar.<br>Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday. |

Relationships

| Multiplicity / Association |
|---|
| NonStandardWorkingDay. InformationType. |
| **0..* /** NonStandardWorkingDay.information |
| **0..* /** ServiceHours .informationFor |

## Recommendations Alpha Code: **RCMDTS**

Feature Type «InformationType» CamelCase: **Recommendations**

Definition: Recommendations for a related area or facility.

References: INT 1: M-3: Chapter C 2.2.1, C 2.7, C 2.8, C 3.19, C 3.21 M-4:

Remarks:

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfAuthority | enumeration | CATAUT | |

Relationships

| Multiplicity / Association |
|---|
| **0..* /** MarineProtectedArea .<br>**0..* /** Recommendations .Recommendations |
| **0..* /** Recommendations .<br>**0..* /** Applicability .Applicability |
| Recommendations .<br>InformationType. |

## Regulations

Alpha code: **REGLTS**

Feature Type «InformationType»

Camel Case: **Regulations**

Definition: Regulations for a related area or facility.

References: INT 1: M-3: Chapter C 2.2.1, C 2.7, C 2.8, C 3.19, C 3.21 M-4:

Remarks: No remarks.

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfAuthority | enumeration | CATAUT [1] | |

Relationships

| Multiplicity / Association |
|---|
| **0..* /** Regulations .<br>**0..* /** Applicability .Applicability |
| **0..* /** MarineProtectedArea .<br>**0..* /** Regulations .Regulations |
| Regulations .<br>InformationType. |

## Restrictions

Alpha Code: **RESDES**

Feature Type «InformationType»

Camel case: **Restrictions**

Definition: Restrictions for a related area or facility.

References: INT 1: M-3: Chapter C 2.2.1, C 2.7, C 2.8, C 3.19, C 3.21 M-4:

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfAuthority | enumeration | CATAUT | |

Relationships

| Multiplicity / Association |
|---|
| **0..* /** Restrictions .<br>**0..* /** Applicability .Applicability |
| **0..* /** MarineProtectedArea .<br>**0..* /** Restrictions .Restrictions |
| Restrictions . InformationType. |

**Service hours** Alpha code: **SRVHRS**

Feature Type «InformationType» Camel Case: **ServiceHours**

Definition: The time when a service is available and known exceptions.

No Attributes defined

Relationships

| **Multiplicity / Association** |
|---|
| **1..* /** noticeTime . ServiceHours . |
| **0..* /** Authority.managementAuthority<br>**0..* /** ServiceHours .ServiceHours |
| **1..* /** workingSchedule. ServiceHours . |
| **0..* /** NonStandardWorkingDay.information<br>**0..* /** ServiceHours .informationFor |
| ServiceHours . InformationType. |

**IMO Ship Report** Alpha code: **SHPREP**

Feature Type «InformationType» Camel Case: **ImoShipReport**

Definition: 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.

References: IMO Resolution A 851(20) adopted 27 November 1997

Remarks: TXTDSC and NTXTDS are used to describe non-standard ship reports. The Associated Information Object chalim indicates characteristics of vessels which use this report.

| Attributes (camelCase) | Type | | Notes |
|---|---|---|---|
| categoryOfShipReport | categoryOfShipReport | CATREP [1] | |
| imoFormatForReporting | boolean | IMOREP [0…1] | |

Relationships

| Association |
|---|
| **0..* /** ShipReport.managementAuthority<br>**0..* /** Applicability .Applicability |
| **0..* /** Authority.issuingAuthority<br>**0..* /** ShipReport.shipReport |
| ShipReport. InformationType. |

## Annex C

## FEATURE ATTRIBUTES

Attribute: **Category of restricted area** Alpha code: **CATREA**

Attribute type: Simple

Camel case: **categoryOfRestrictedArea** Data Type: Enumeration

Definition: *get definition from GII*

Values:

| Code | Name | Definition |
|---|---|---|
| 1 | offshore safety zone | the area around an offshore installation within which vessels are prohibited from entering without permission; special regulations protect installations within a safety zone and vessels of all nationalities are required to respect the zone. (IHO Dictionary, S-32, 5th Edition, 4471) |
| 4 | nature reserve | a tract of land managed so as to preserve its flora, fauna, physical features, etc |
| 5 | bird sanctuary | a place where birds are bred and protected. |
| 6 | game reserve | a place where wild animals or birds hunted for sport or food are kept undisturbed for private use. |
| 7 | seal sanctuary | a place where seals are protected. |
| 8 | degaussing range | an area, usually about two cables diameter, within which ships' magnetic fields may be measured; sensing instruments and cables are installed on the sea bed in the range and there are cables leading from the range to a control position ashore. (IHO Chart Specifications, S-4) |
| 9 | military area | an area controlled by the military in which restrictions may apply. (Hydrographic Service, Royal Australian Navy) |
| 10 | historic wreck area | an area around certain wrecks of historical importance to protect the wrecks from unauthorized interference by diving, salvage or deposition (including anchoring). (IHO Chart Specifications, S-4) |
| 12 | navigational aid safety zone | an area around a navigational aid which vessels are prohibited from entering. |
| 14 | minefield | an area laid and maintained with explosive mines for defence or practice purposes. |
| 18 | swimming area | an area in which people may swim and therefore vessel movement may be restricted. |
| 19 | waiting area | an area reserved for vessels waiting to enter a harbour. |
| 20 | research area | an area where marine research takes place. |

| | | |
|---|---|---|
| 21 | dredging area | an area where dredging is taking place. |
| 22 | fish sanctuary | a place where fish are protected |
| 23 | ecological reserve: | a tract of land managed so as to preserve the relation of plants and living creatures to each other and to their surroundings. |
| 24 | no wake area | an area in which a vessels' speed must be reduced in order to reduce the size of the wake it produces. |
| 25 | swinging area | an area where vessels turn. (Service Hydrographique et Océanographique de la Marine, France). |
| 26 | water skiing area | an area within which people may water ski and therefore vessel movement m be restricted. |
| 27 | ESSA | Environmentally Sensitive Sea Area - a generic term which may be used to describe a wide range of areas, considered sensitive for a variety of environmental reasons. (IHO Chart Specifications, S-4) |
| 28 | PSSA | Particularly Sensitive Sea Area - an area that needs special protection through action by IMO because of its significance for regional ecological, socio-economic or scientific reasons and because it may be vulnerable to damage by international shipping activities. (IHO Chart Specifications, S-4. |

References:

Remarks:

The official legal status of each kind of restricted area defines the kind of restriction(s), e.g. the restriction for a 'game reserve' may be 'entering prohibited'. The following two categories of restricted areas are of particular relevance to Marine Protected Areas;

Environmentally Sensitive Sea Areas pertain specifically to shipping and are described in the IHO S-4 publication as Environmentally Sensitive Sea Areas (ESSA) which is a generic term used to describe a wide range of areas. These include Particularly Sensitive Sea Areas (PSSAs), Special Area designation, Emission Control Area Designation, Areas to be Avoided, No Anchoring Areas, and Mandatory Ship Reporting Systems. The IMO is the only international body responsible for designating Particularly Sensitive Sea Areas and adopting associated protective measures and submissions for their designation may only be made by Member Governments of the IMO.

There are two broad types of Environmentally Sensitive Sea Areas (ESSA):

a. those established to protect specific types of nature from disturbance (usually close inshore and established under national legislation); see S-4 section B-437.3;

b. those specifically designated in response to wider environmental considerations, potentially 'the total environment' (usually including some degree of risk from shipping, possibly covering extensive sea areas, and established under state, national or international legislation); see S-4 sections B- 437.4, B-437.5, B-437.6, B-437.7, B-437.9.

The relationships between the different types of ESSA and the relevant paragraphs in S-4, B-437 are tabulated as follows:

Legal basis for PSSA's - The United Nations Convention on the Law of the Sea (UNCLOS) identifies certain categories of areas which may require higher standards of environmental protection. Article 194(5) places an obligation on parties to take measures necessary to protect and preserve rare or fragile ecosystems. Part IX of UNCLOS identifies enclosed or semi-enclosed areas, such as a gulf, bay, basin, or sea between two or more countries, as places where countries shall endeavour to coordinate management and environmental protection. Most importantly in respect of PSSA's, however, is Article 211(6)(a) which makes provision for a State to submit to the "competent international organization" (IMO for shipping) for its approval proposals for special mandatory measures within their exclusive economic zones which require extra protection from vessel sourced pollution for recognized technical reasons.

UNCLOS thus creates an overall structure for the protection and preservation of the marine environment and a general obligation for States to implement and elaborate upon this structure through both global conventions addressing particular forms of pollution and regional agreements tailored to the requirements of discrete sea areas.

## International Union for Conservation of Nature and Natural Resources (IUCN) Categories

Attribute: **IUCN Categories** Alpha code: **IUCNCD** *(new)*

Attribute type: Simple

Camel case: **categoryOfIUCN** Data Type: Enumeration

**Definition:** A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

Values:

| Code | Name | Definition |
|---|---|---|
| 1 | Category Ia | Strict Nature Reserve |
| 2 | Category Ib | Wilderness Area |
| 3 | Category II | National Park |
| 4 | Category III | Natural Monument |
| 5 | Category IV | Habitat/Species |
| 6 | Category IV | Protected Landscape/Seascape |
| 7 | Category IV | Managed Resource Protected Area |

**References:** International Union for Conservation of Nature and Natural Resources (http://www.unep-wcmc.org/protected_areas/categories/index.html)

**Remarks:** Protected Area Management Categories. IUCN has defined a series of six protected area management categories, based on primary management objective. In summary, these are:

Ia. Strict Nature Reserve: protected area managed mainly for science Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.

Ib. Wilderness Area: protected area managed mainly for wilderness protection Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

II. National Park: protected area managed mainly for ecosystem protection and recreation Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

III. Natural Monument: protected area managed mainly for conservation of specific natural feature Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.

IV. Habitat/Species Management Area: protected area managed mainly for conservation through management intervention Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

V. Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

VI. Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

Attribute: **Category of authority** Alpha code: **CATAUT**

Attribute type: Simple

Camel case: **categoryOfAuthority** Data Type: Enumeration

**Definition:** the persons or the body exercising power or command; as, the local authorities of the States; the military authorities.

**Values:**

| Code | Name | Definition |
|---|---|---|
| 1 | customs | The agency or establishment for collecting duties, tolls. (Merriam-Websters online Dictionary 23rd February 2006, amended). |
| 2 | border control | The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries (adapted from Merriam-Websters online Dictionary 23rd February 2006). |
| 3 | police | The department of government, or civil force, charged with maintaining public order. (Adapted from OED) |
| 4 | port | Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department (NP 100 8th Edition 14 Oct 2004) |
| 5 | immigration | The authority controlling people entering a country. |
| 6 | health | The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique. |
| 7 | coast guard | Organisation keeping watch on shipping and coastal waters according to governmental |
| 8 | agricultural | The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country |
| 9 | military | A military authority which provides control of access to or approval for transit through designated areas or airspace. |
| 10 | private company | a private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area. |
| 11 | maritime police | a governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil. |
| 12 | environmental | an authority with responsibility for the protection of the environment. |
| 13 | fishery | an authority with responsibility for the control of fisheries. |
| 14 | finance | an authority with responsibility for the control and movement of money |
| 15 | maritime | a national or regional authority charged with administration of maritime affairs. |

References: INT 1: unspecified; M-4: unspecified;

Remarks: No remarks.

Attribute: **Status** Alpha code: **STATUS**

Attribute type: Simple

Camel case: **status** Data Type: Enumeration

| Code | Label | Definition | References |
|---|---|---|---|
| 1 | permanent | intended to last or function indefinitely. (The Concise Oxford Dictionary, 7th Edition) | |
| 2 | occasional | acting on special occasions; happening irregularly. (The Concise Oxford Dictionary, 7th Edition) | INT 1: IP 50; M-4: 473.2; |
| 3 | recommended | presented as worthy of confidence, acceptance, use, etc. (The Macquarie Dictionary, 1988) | INT 1: IN 10; M-4: 431.1; |
| 4 | not in use | no longer used for the purpose intended; disused. | INT 1: IL 14, 44; M-4: 444.7; |
| 5 | periodic/intermittent | recurring at intervals. (The Concise Oxford Dictionary, 7th Edition) | INT 1: IC 21; IQ 71; M-4: 353.3; 460.5; |
| 6 | reserved | set apart for some specific use. (adapted from The Concise Oxford Dictionary, 7th Edition) | INT 1: IN 12.9; |
| 7 | temporary | meant to last only for a time. (The Concise Oxford Dictionary) | INT 1: IP 54; |
| 8 | private | not in public ownership or operation. | INT 1: IQ 70; |
| 9 | mandatory | compulsory; enforced. (The Concise Oxford Dictionary, 7th Edition) | |
| 11 | extinguished | no longer lit | |
| 12 | illuminated | lit by floodlights, strip lights, etc. | |
| 13 | historic | famous in history; of historical interest. (The Concise Oxford Dictionary, 7th Edition) | |
| 14 | public | belonging to, available to, used or shared by, the community as a whole and not restricted to private use. (adapted from The New Shorter Oxford English Dictionary, 1993) | |
| 15 | synchronized | occur at a time, coincide in point of time, be contemporary or simultaneous. (The New Shorter Oxford English Dictionary, 1993) | |
| 16 | watched | looked at or observed over a period of time especially so as to be aware of any movement or change. (adapted from The New Shorter Oxford English Dictionary, 1993) | |
| 17 | un-watched | usually automatic in operation, without any permanently-stationed personnel to superintend it. (adapted from IHO Dictionary, S-32, 5th Edition, 2814) | |
| 18 | existence doubtful | an object that has been reported but has not been definitely determined to exist | |

References: ?

Remarks: No remarks

Attribute: **Category of IMO ship report** Alpha code: **CATREP**

Attribute type: Simple

Camel case: **categoryOfImoShipReport** Data Type: Enumeration

Definition: ?

Values:

| Code | Name | Definition |
|---|---|---|
| 1 | sailing plan | before or as near as possible to the time of departure from a port within a system or when entering the area covered by a system [for instance A, B, J, X etc] |
| 2 | position report | when necessary to ensure effective operation of the system |
| 3 | deviation report | when the ship's position varies significantly from the position that would have been predicted from previous reports, when changing the reported route, or as decided by the master |
| 4 | final report | on arrival at the destination or on leaving the area covered by the system |
| 5 | dangerous goods report | when an incident takes place involving the loss or likely loss overboard of packaged dangerous goods, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges, into the sea |
| 6 | harmful substances report | when an incident takes place involving the discharge or probable discharge of oil (Annex I of MARPOL 73/78) or noxious liquid substances in bulk (Annex II of MARPOL 73/78) |
| 7 | marine pollutants report | in the case of the loss or likely loss overboard of harmful substances in packaged form, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges identified in the International Maritime Goods Code as marine pollutants (Annex III of MARPOL 73/78). |
| 8 | any other report | any other report should be made in accordance with the system procedures as notified in accordance with paragraph 9 of the general principles |

References: Appendix to IMO Resolution A.851(20) GENERAL PRINCIPLES FOR SHIP REPORTING SYSTEMS AND SHIP REPORTING REQUIREMENTS, INCLUDING GUIDELINES FOR REPORTING INCIDENTS INVOLVING DANGEROUS GOODS, HARMFUL SUBSTANCES AND/OR MARINE POLLUTANTS. (URL: http://www.imo.org/includes/blastDataOnly.asp/data_id%3D22635/A851(20).pdf)

Remarks: Through Resolution A.851(20), the IMO encourages authorities to require standard formats and procedures for ship reporting specified at 1 to 7 above but recognises that some authorities require amended formats and these cases are covered by 8 above.

Attribute: **Category of Cargo** Alpha code: **CAT???**

Attribute type: Simple

Camel case: **categoryOfCargo** Data Type: Enumeration

Definition: ?

Values:

Note: If item 7 is used, the nature of dangerous or hazardous cargoes can be amplified with category of dangerous or hazardous cargo.

| Code | Name | Definition |
|---|---|---|
| | bulk | Normally dry cargo which is transported to and from the vessel on conveyors or grabs |
| | container | One of a number of standard sized cargo carrying units, secured using standard corner attachments and bars |
| | general | Break bulk cargo normally loaded by crane |
| | liquid | Any cargo loaded by pipeline |
| | passenger | A fee paying traveller |
| | livestock | Live animals carried in bulk |
| | dangerous or hazardous | Dangerous or hazardous cargo as described by the IMO International Maritime Dangerous Goods code |

Attribute: **Category of Dangerous or Hazardous Cargo** Alpha code: **CAT???**

Attribute type: Simple

Camel case: **categoryOfDangerousOrHazardousCargo** Data Type: Enumeration

Remarks: Substances (including mixtures and solutions) and articles subject to the provisions of the International Maritime Dangerous Goods (IMDG) Code are assigned to one of the classes 1-9 according to the hazard or the most predominant of the hazards they present. Some of these classes are subdivided into divisions. These classes or divisions are as listed in IDs 1 : 20 above. (Adapted from IMDG code www.imo.org).

| Code | Name | Description |
|---|---|---|
| | Class 1; Division 1.1 | Explosives, Division 1: substances and articles which have a mass explosion hazard |
| | Class 1; Division 1.2 | Explosives, Division 2: substances and articles which have a projection hazard but not a mass explosion hazard |
| | Class 1; Division 1.3 | Explosives, Division 3: substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard |
| | Class 1; Division 1.4 | Explosives, Division 4: substances and articles which present no significant hazard |
| | Class 1; Division 1.5 | Explosives, Division 5: very insensitive substances which have a mass explosion hazard |
| | Class 1; Division 1.6 | Explosives, Division 6: extremely insensitive articles which do not have a mass explosion hazard |
| | Class 2.1 | Gases, flammable gases |
| | Class 2.2 | Gases, non-flammable, non-toxic gases |
| | Class 2.3 | Gases, toxic gases |
| | Class 3 | flammable liquids |
| | Class 4.1 | flammable solids, self-reactive substances and desensitized explosives |
| | Class 4.2 | substances liable to spontaneous combustion |
| | Class 4.3 | substances which, in contact with water, emit flammable gases |
| | Class 5.1 | oxidizing substances |
| | Class 5.2 | organic peroxides |
| | Class 6.1 | toxic substances |
| | Class 6.2 | infectious substances |
| | Class 7 | Radioactive material |
| | Class 8 | Corrosive substances |
| | Class 9 | Miscellaneous dangerous substances and articles |
| | Harmful Substances in packaged form | Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). Packaged form is defined as the forms of containment specified for harmful substances in the IMDG Code. (MARPOL (73/78) Annex III) |

Attribute: **Category of Relationship** Alpha code: **CAT???**

Attribute type: Simple

Camel case: **categoryOfRelationship** Data Type: Enumeration

Definition: This attribute describes the interpretation of an “APPLIC” information object in the context of the object(s) with which it is associated.

Alternative definition: This attribute describes how the information object "APPLICABILITY" controls the relationship between other objects.

Remarks: (The conditions under which the limitation operates are those expressed by the “CHALIM” object to which this attribute is bound. - Original remark for LIMTYP to be deleted).

(The conditions under which the relationship operates are those expressed by the "APPLIC" information object to which this attribute is bound. - simple transposition of words - hard to understand)

Proposed Alternative remarks: APPLICABILTY, to which this attribute is bound, expresses the relationship between two other objects ?features?. For example it could be used to express the combined impact on a vessel of an area, to which regulations apply, and attributes like the vessel's tonnage, length or nation of registration.

Distinction: No distinctions.

| Code | Name | Description |
|---|---|---|
| | prohibited | use of facility (boarding place, etc.) by vessels satisfying the conditions is prohibited |
| | not recommended | use of facility (boarding place, etc.) by vessels satisfying the conditions is not recommended |
| | permitted | use of facility (boarding place, etc.) by vessels satisfying the conditions is permitted but not required |
| | recommended | use of facility (boarding place, etc.) by vessels satisfying the conditions is recommended |
| | required | use of facility (boarding place, etc.) by vessels satisfying the conditions is required |
| | included | associated information object applies to vessels satisfying the conditions |
| | excepted | associated information object does not apply to vessels satisfying the conditions |

Attribute: **Day of Week** Alpha code: **???**

Attribute type: Simple

Camel case: **dayOfWeek** Data Type: Enumeration

| Code | Name | Description |
|---|---|---|
| | monday | monday - the day of the week before Tuesday and following Sunday |
| | tuesday | tuesday - the day of the week before Wednesday and following Monday |
| | wednesday | wednesday - the day of the week before Thursday and following Tuesday |
| | thursday | thursday - the day of the week before Friday and following Wednesday |
| | friday | friday - the day of the week before Saturday and following Thursday |
| | saturday | saturday - the day of the week before Sunday and following Friday (together with Sunday forming part of the weekend) |
| | sunday | sunday - the day of the week before Monday and following Saturday (together with Saturday forms part of the weekend) |

Attribute: **Jurisdiction** **Alpha code:** ???

Attribute type: Simple

Camel case: **jurisdiction** Data Type: Enumeration

| Code | Name | Description |
|---|---|---|
| | international | involving more than one country; covering more than one national area. |
| | national | an area administered or controlled by a single nation. |
| | national sub-division | an area smaller than the nation in which it lies. |

Attribute: **Operation** **Alpha code:** ???

Attribute type: Simple

Camel case: **operation** Data Type: Enumeration

OPERAT is intended to be used in conjunction with other attributes (or sub-attributes of a complex attribute) to indicate how their values must be combined in order to describe a condition. Null attributes are ignored.

Example:
Complex attribute UKCLRN with sub-attributes UKCFIX=2.5, UKCVAR=10.00, OPERAT=1 indicates that the under-keel clearance required is the greater of 2.5 metres or 10% of the ship's draught.

| Code | Name | Description |
|---|---|---|
| | largest value | largest value:<br>The largest value computed from the applicable attributes or sub-attributes |
| | smallest value | smallest value:<br>The smallest value computed from the applicable attributes or sub-attributes |

Attribute: **Restriction** **Alpha code:** ???

Attribute type: Simple

Camel case: **restriction** Data Type: Enumeration

The official legal statue of each kind of restricted area defines the kind of restriction(s), e.g. the restriction for ' a game preserve' may be 'entry prohibited', the restriction for an 'anchoring prohibition' is 'anchoring prohibited'.

| Code | Name | Description |
|---|---|---|
| | anchoring prohibited | an area within which anchoring is not permitted. |
| | anchoring restricted | a specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions. |
| | fishing prohibited | an area within which fishing is not permitted. |
| | fishing restricted | a specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions. |
| | trawling prohibited | an area within which trawling is not permitted. |
| | trawling restricted | a specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions. |
| | entry prohibited | an area within which navigation and/or anchoring is prohibited. (adapted from IHO Dictionary, S-32, 5th Edition, 4044) |
| | entry restricted | a specified area designated by appropriate authority, within which navigation is<br><br>restricted in accordance with certain specified conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 4366) |
| | dredging prohibited | an area within which dredging is not permitted. |
| | dredging restricted | a specified area designated by appropriate authority, within which dredging is restricted in accordance with certain specified conditions. |
| | diving prohibited | an area within which diving is not permitted. |
| | diving restricted | a specified area designated by appropriate authority, within which diving is restricted in accordance with certain specified conditions. |
| | no wake | mariners must adjust the speed of their vessels to reduce the wave or wash which may cause erosion or disturb moored vessels. |
| | area to be avoided | an IMO designated area to be avoided, defined as a routeing measure. (adapted from IHO Chart Specifications, M-4, 435.7) |
| | Construction prohibited | the erection of permanent or temporary fixed structures or artificial islands is prohibited. |
| | discharging prohibited | an area within which discharging or dumping is prohibited |

| | | |
|---|---|---|
| | discharging restricted | a specified area designated by an appropriate authority, within which discharging<br><br>or dumping is restricted in accordance with specified conditions. |
| | industrial or mineral exploration/development prohibited | an area within which industrial or mineral exploration and development are prohibited. |
| | industrial or mineral exploration/development restricted | a specified area designated by an appropriate authority, within which industrial or mineral exploration and development is restricted in accordance with certain specified conditions. |
| | drilling prohibited | an area within which excavating a hole on the sea-bottom with a drill is prohibited. |
| | drilling restricted | a specified area designated by an appropriate authority, within which excavating a hole on the sea-bottom with a drill is restricted in accordance with certain specified conditions. |
| | removal of historical artifacts prohibited | an area within which the removal of historical artifacts is prohibited. |
| | cargo transhipment (lightering) prohibited | an area in which cargo transhipment (lightering) is prohibited. |
| | dragging prohibited | an area in which the dragging of anything along the bottom, e.g. bottom trawling, is prohibited. |
| | stopping prohibited | an area in which a vessel is prohibited from stopping. |
| | landing prohibited | an area in which landing is prohibited. |
| | speed restricted | an area within which speed is restricted. |

Attribute: **Logical Connectives** **Alpha code:** ???

Attribute type: Simple

Camel case: **logicalConnectives** Data Type: Enumeration

APPLIC/VSLMSM/VSLCAR=10/VSLVAL=50.0/COMPOP=1,
APPLIC/VSLMSM/VSLCAR=6/VSLVAL=10.0/COMPOP=1, APPLIC/VSLMSM/VSLCAR/LOGCON=1

Implies the limitation applies only when LOA > 50.0 and draught > 10.0

| Code | Name | Notes |
|---|---|---|
| | logical conjunction | all the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true |
| | logical disjunction | at least one of the conditions described by the other attributes of the object, or sub-attributes of the same complex attributes, is true |

Attribute: **Comparison Operator** **Alpha code:** ???

Attribute type: Simple

Camel case: **comparisonOperator** Data Type: Enumeration

The definition of COMPOP provides the relation between the value given in the model and the real ship's value.

| Code | Name | Description |
|---|---|---|
| | greater than | The value of the left value is greater than that of the right.(http://en.wikipedia.org/wiki/Logical_connective) |
| | greater than or equal to | The value of the left expression is greater than or equal to that of the right. (http://en.wikipedia.org/wiki/Logical_connective) |
| | less than | The value of the left expression is less than that of the right. (http://en.wikipedia.org/wiki/Logical_connective) |
| | less than or equal to | The value of the left expression is less than or equal to that of the right. (http://en.wikipedia.org/wiki/Logical_connective) |
| | equal to | The two values are equivalent. (adapted http://en.wikipedia.org/wiki/Logical_connective) |
| | not equal to | The two values are not equivalent. (adapted http://en.wikipedia.org/wiki/Logical_connective) |

Attribute: **categoryOfVesselRegistry** Alpha code: **???**

Attribute type: Simple

Camel case: **categoryOfVesselRegistr** Data Type: **Enumeration**

Definition: The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location.

Remarks: No remarks.

Comment: This attribute is proposed to be bound to APPLIC.

Distinction: No distinctions.

| Code | Name | Description |
|---|---|---|
| | domestic | The vessel is registered or enrolled under the same national flag as the port, harbour, territorial sea, exclusive economic zone, or administrative area in which the object that possesses this attribute applies or is located. |
| | foreign | The vessel is registered or enrolled under a national flag different from the port, harbour, territorial sea, exclusive economic zone, or other administrative area in which the object that possesses this attribute applies or is located. |

Attribute: **categoryOfVessel** Alpha code: **???**

Attribute type: Simple

Camel case: **categoryOfVessel** Data Type: **Enumeration**

| Code | Name | Description |
|---|---|---|
| | general cargo vessel | a vessel designed to carry general cargo |
| | container carrier | a vessel designed to carry ISO containers |
| | tanker | a vessel designed to carry bulk liquid or gas, including LPG and LNG |
| | bulk carrier | a vessel designed to carry bulk solid material |
| | passenger vessel | a vessel designed to carry passengers; often a cruise ship |
| | roll-on roll-off | a vessel designed to allow road vehicles to be driven on and off; often a ferry |
| | refrigerated cargo vessel | a vessel designed to carry refrigerated cargo |
| | fishing vessel | a vessel designed to catch or hunt fish |
| | service | a vessel which provides a service such as a tug, anchor handler, survey or supply vessel |
| | warship | a vessel designed for the conduct of military operations |

Attribute: **Vessels Characteristics** Alpha code: **???**

Attribute type: Simple

Camel case: **vesselsCharacteristics** Data Type: **Enumeration**

| Name | Type | Notes |
|---|---|---|
| | breadth | The width or beam of the vessel. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | displacement tonnage | A measurement of the weight of the vessel, usually used for warships. (Merchant ships are usually measured based on the volume of cargo space; see tonnage). Displacement is expressed either in long tons of 2,240 pounds or metric tonnes of 1,000 kg. Since the two units are very close in size (2,240 pounds = 1,016 kg and 1,000 kg = 2,205 pounds), it is common not to distinguish between them. To preserve secrecy, nations sometimes misstate a warship's displacement. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | displacement light | The weight of the ship excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | displacement loaded | The weight of the ship including cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage, which brings the vessel down to her load draft. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | draught | The depth of water necessary to float a vessel fully loaded. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | deadweight tonnage | The difference between displacement, light and displacement, loaded. A measure of the ship's total carrying capacity. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | gross tonnage | The entire internal cubic capacity of the ship expressed in tons of 100 cubic feet to the ton, except certain spaces with are exempted such as: peak and other tanks for water ballast, open forecastle bridge and poop, access of hatchways, certain light and air spaces, domes of skylights, condenser, anchor gear, steering gear, wheel house, galley and cabin for passengers. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | net tonnage | Obtained from the gross tonnage by deducting crew and navigating spaces and allowances for propulsion machinery. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | height | The height of the highest point of a vessel's structure (e.g. radar aerial, funnel, cranes, masthead) above her waterline.<br>(UKHO NP100/2009) |
| | length overall | The maximum length of the ship (L.O.A.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |
| | length at waterline | The ship's length measured at the waterline (L.W.L.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010) |

Attribute: **Time Reference** Alpha code: **???**

Attribute type: Simple

Camel case: **timeReference** Data Type: **Enumeration**

| Code | Name | Description |
|---|---|---|
| | UTC | UTC: Co-ordinated Universal Time |
| | LT | LT: Local time |

## Annex D

## COMPLEX ATTRIBUTES

**Day of the Week Range** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **dayOfWeekRange**

Remarks:

A range of days of the week, expressed as a complex type whose sub-attributes are the days of the week that begin and end the range. There is only 1 sub-attribute, which gives the day of the week. The multiplicity of this attribute must be exactly 2. The first instance gives the beginning day of the range and the second the ending day (both are included in the range).

Though a range of days of the week that cross the week boundaries is possible (e.g., “Thursday to Monday”) the use of ranges that cross week boundaries is discouraged.

Example:
To code the range “Monday through Friday” use the sequence: DYOFWK=1, DYOFWK=5.

| Name | Type | Notes |
|---|---|---|
| dayOfWeek | enumeration | |

Relationship

| Multiplicity / Association |
|---|
| **0..1** dayOfWeekRange.<br>workingSchedule. |

**Information** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **information**

| Name | Type | Notes |
|---|---|---|
| language | characterstring | ISO 639-2 value |
| textValue | characterstring | |

Relationship

| Multiplicity / Association |
|---|
| **0..* /** information. FeatureType. |
| **0..* /** information. InformationType. |

**Notice Time** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **noticeTime**

| Name | Type | Notes |
|---|---|---|
| noticeTimeHours | real | |
| noticeTimeText | characterstring | |
| operation | enumeration | |

Relationships

| Multiplicity / Association |
|---|
| **1..*** noticeTime . ServiceHours |

**Object Name** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **objectName**

| Name | Type | Notes |
|---|---|---|
| language | characterstring | ISO 639-2 value |
| textValue | characterstring | |

Relationship

| Multiplicity / Association |
|---|
| **0..*** objectName. InformationType. |
| **0..*** objectName. FeatureType. |

**Textual Description** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **textualDescription**

| Name | Type | Notes |
|---|---|---|
| language | characterstring | ISO 639-2 value |
| textValue | characterstring | links to external file |

Relationships

| Multiplicity / Association | |
|---|---|
| **0..*** textualDescription. | FeatureType. |
| **0..*** textualDescription. | InformationType. |

**Under Keel Clearance** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **underKeelClearance**

| Name | Type | Notes |
|---|---|---|
| operation | enumeration | |
| underKeelClearanceFixed | real | |
| underKeelClearanceVariable | real | |

Relationships

| Multiplicity / Association |
|---|
| **0..1 /** underKeelClearance . Applicability . |

**Vessels Measurements** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **vesselsMeasurements**

| Name | Type | Notes |
|---|---|---|
| comparisonOperator | enumeration | |
| vesselsCharacteristics | enumeration | |
| vesselsCharacteristicsValue | real | |

Relationship

| Multiplicity / Association |
|---|
| **0..* /** vesselsMeasurements . Applicability . |

**Working Hours Of Day** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **workingHoursOfDay**

Comment: If there are a number of working time periods in a day Sub-attributes TIMSTW and TIMENW must be repeated and be in mutual correspondence.

For example, Work time: 0800-1200, 1400-2000 must be encoded as:

TIMSTW=0800 TIMSTW=1400 and TIMENW=1200 TIMENW=2000

| Name | Type | Notes |
|---|---|---|
| timeOfEndOfWork | time | |
| timeOfStartOfWork | time | |
| timeReference | enumeration | |

Relationship

| Multiplicity / Association |
|---|
| **0..1 /** workingHoursOfDay. workingSchedule. |

**Working Schedule** Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **workingSchedule**

Note: Duplicates or overlaps are not permitted

| Name | Type | Notes |
|---|---|---|
| dayOfWeek | enumeration | |

Relationship

| Multiplicity / Association |
|---|
| **0..1 /** dayOfWeekRange. workingSchedule. |
| **0..1 /** workingHoursOfDay. workingSchedule. |
| **1..* /** workingSchedule.ServiceHours . |