INTERNATIONAL HYDROGRAPHIC ORGANIZATION

IHO GEOSPATIAL STANDARD
FOR MARINE PROTECTED AREAS

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Marine Protected Areas - Product Specification

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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

Content

1   Introduction

This document has been produced by the IHO Standardisation of Nautical Publications Working Group in response to a requirement to produce a data product that can be used as a Nautical Information Publication Overlay (NPIO) 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

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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.

4   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

5   Terms, definitions and abbreviations

5.1   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]

6 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 Area
MIO Marine Information Overlay
NPIO Nautical Publication 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

7 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;

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.

8 MPA Data Product Identification

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

Title: Nautical Information Overlay - Marine Protected Areas

Abstract:	Data product describing Marine Protected Areas that are of significance to mariners and others operating within the maritime domain.
Purpose:	A data product for encoding and transferring MPA information for use as an NIO, within electronic navigational systems such as ECDIS.
Topic category:	environment, oceans, boundaries (see 19115 MD_TopicCategoryCode)
Content:	A conformant data set contains features defined by the MPA Feature Catalogue and described in the application schema as shown in Figure 2.
Description:	An S-100 compliant rendering of MPA information.
Spatial Extent:	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 for navigational purposes.

Spatial representation type: vector

9   Data Content and Structure

The MPA product is based on the S-100 General Feature Model (GFM). A General Feature Model is a Metamodel of feature types. A feature may have properties that may be operations, attributes or associations. Any feature may have a number of attributes, some of which may be geometric and spatial. A feature is not defined in terms of a single geometry, but rather as a conceptually meaningful object within a particular domain of discourse, one or more of whose properties may be geometric. The 'Feature' is the fundamental unit of geospatial information, so the Feature Model is the fundamental meta-model used for developing an Application Schema.

This section contains the MPA Application Schema expressed in UML and an associated Feature Catalogue. The Feature Catalogue included at Annex A, provides a full description of each feature type including its attributes, attribute values and relationships in the data product.

MPAs are encoded as vector entities which are derived from the geometry element **GM_Object** as per S-100 Version 1.0.0 Figure 7-3.
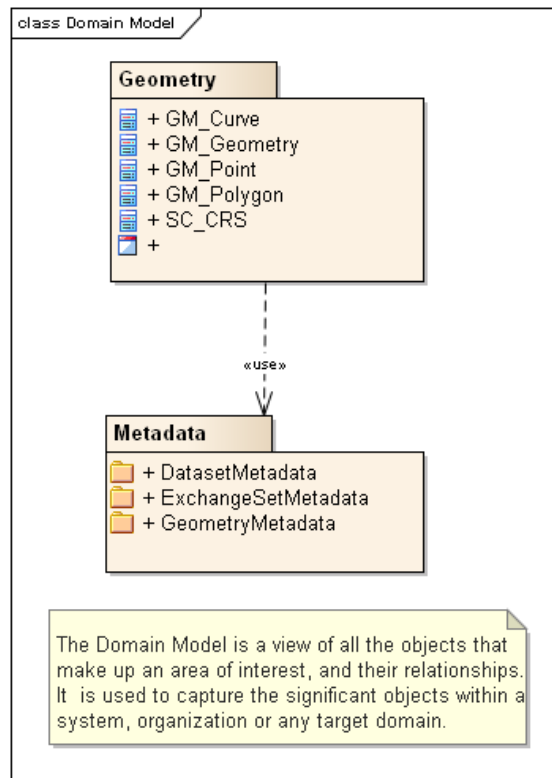
Figure 1 - Domain Model Overview

10 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 is provided below and the full description is 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.

An association is a relationship that links instances of one feature or information type with instances of the same or different feature and information types. 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 3.

Figure 2 – MPA Application Schema.

10.1 Feature Catalogue

The Feature Catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an MPA. The Feature Catalogue is available from the IHO website as an XML document which conforms to the S-100 XML Feature Catalogue Schema.

10.2 Reference Systems

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 as 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. Datasets conforming to this product specification are not projected.

Spatial reference system:	Horizontal coordinate reference system: WGS 84
Projection:	None
Vertical coordinate reference system:	WGS 84
Temporal reference system:	Gregorian calendar
Coordinate reference system registry:	EPSG Geodetic Parameter Registry

Date type (according to ISO 19115):   002 - publication

Responsible party: International Organisation of Oil and Gas Producers (OGP)

URL: http://www.ogp.org.uk/

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

Code space: OGP – OGP

11 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 geometries: GM_Point, GM_Curve, and GM_Polygon (GM_Surface).
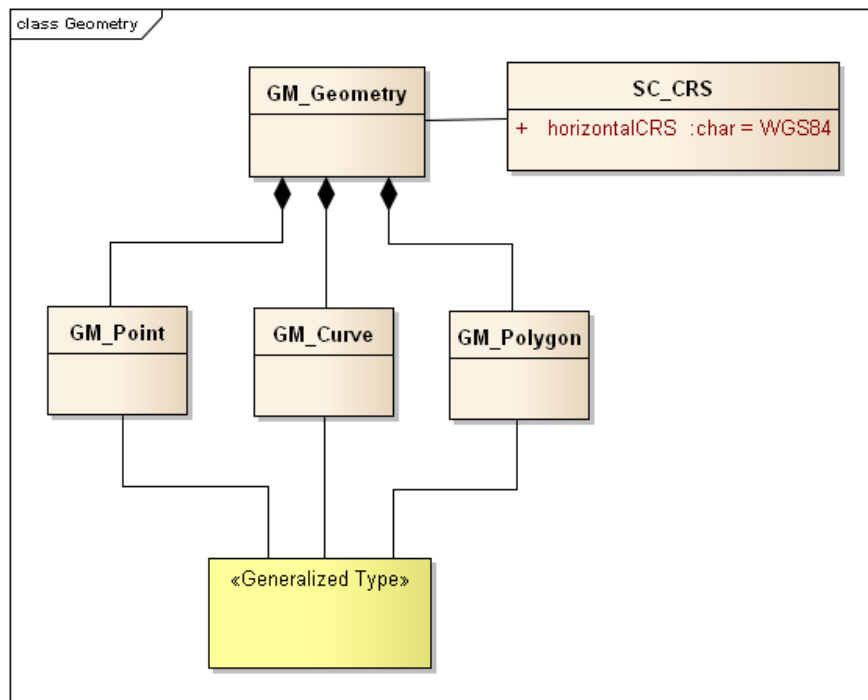
Figure 3 - Geometric Primitives

12 Quality

Spatial data quality
Completeness of information
How current the data is

13 Maintenance

Maintenance and Update Frequency: Datasets are maintained as needed and must include mechanisms for MPA updating.

Data Source: Data Producers must use applicable sources to maintain and update data and provide a brief description of the sources that were used to produce the dataset in the appropriate metadata field.

14 Data Encoding

The principal encoding will be the Open Geospatial Consortium (OGC), Geography Markup Language (GML) format. 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.

Note: ENC data cells are delivered in either the ISO 8211 format, or a proprietary internal System ENC (SENC) format. These are binary formats that are machine readable, but are not human readable. Although this product specification, specifies GML as the primary encoding format, it does not preclude the use of other encoding formats.

15 Data Product Delivery Information

This data product specification defines GML as the primary format in which MPA data product are to be delivered. Information concerning the delivery medium should also be included. If a data product is to be delivered in different formats, then the appropriate information for each shall be given.

The delivery format information should include the following items (from ISO/DIS 19131:2005 with some changes of obligation): format name, version, language, character set.

Delivery format information may also include (from ISO/DIS 19131:2005): specification, file structure. Delivery medium information may include (from ISO/DIS 19131:2005): units of delivery.

15.1 Data product delivery information.

Name	ISO 19131 Elements	Value
Format name	DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.formatName	GML
Version	DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.version	3.2.1
Specification description	DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.specification	See * below
Language	DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.language	English English
Character set	DPS_DeliveryInformation.deliveryFormat > DPS_DeliveryFormat.characterSet > MD_CharacterSetCode	004 – utf8

Table 1

* GML is an XML encoding for the transport and storage of geographic information, including both the geometry and the properties of geographic features, between distributed systems. The XML Schema for the GML application schema is provided in a single schema document MPA.xsd. (http://www.iho.int/schemas/MPA …). Feature instance shall validate against MPA.xsd and conform to all other requirements specified in this data product specification including all constraints not captured in the XML Schema document.

16 Exchange Set

An exchange set will consist of one or more MPA datasets. An exchange set may also include one or more support files containing supplementary information encoded in separate files. These are linked to

the MPA dataset features, using the attributes described below. Each exchange set will include a single (XML) catalogue file containing discovery metadata for each MPA data as well all support files that will be included in the exchange set. MPA attributes that reference external support files are listed below.

textualDescription (TXTDSC) (see complex attribute textualDescription)

nationalTextualDescription - NTXTDS (not included - is the a need to include national textual description?)

pictorialRepresentation (PICREP) (see abstract feature type)

16.1 Support Files

Support files contain ancillary textual or graphic information in separate (linked) files. Textual information may be encoded in an unstructured (TXT) or structured (XML / HTML 4) format.

Picture files must be encoded in one of the following W3C graphics formats;

Portable Network Graphics (PNG) [Edition 2.0] must be used for picture (raster) files and;

Scalable Vector Graphics (SVG) [Edition 1.1] must be used for vector diagrams.

PNG is an extensible file format designed for lossless, portable storage of raster images. It provides a patent-free replacement for the GIF format and also replicates many common uses of TIFF. The PNG edition 2 format has been adopted as an ISO standard, (ISO/IEC 15948:2003). SVG is a language for describing two-dimensional graphics in XML [XML10]. SVG allows for three types of graphic objects: vector graphic shapes (e.g., paths consisting of straight lines and curves), images and text.

16.2 Support File Naming

All support files will have unique world-wide file identifiers. The file identifier of support information should not be used to describe the physical content of the file. The support file metadata that accompanies the file will inform the user of the name and purpose of the file (i.e. new, replacement and deletion).

In this encoding the support files are named according to the specifications given below:

CCXXXXXXXX.E00

The main part forms an identifier where:
- the first two characters identify the issuing agency.
- the third to tenth characters can be used in any way by the producer to provide the unique file name. The following characters are allowed in the dataset name, A to Z, 0 to 9 and the special character _ (underscore).
- .E00 – support file extension.

17 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.
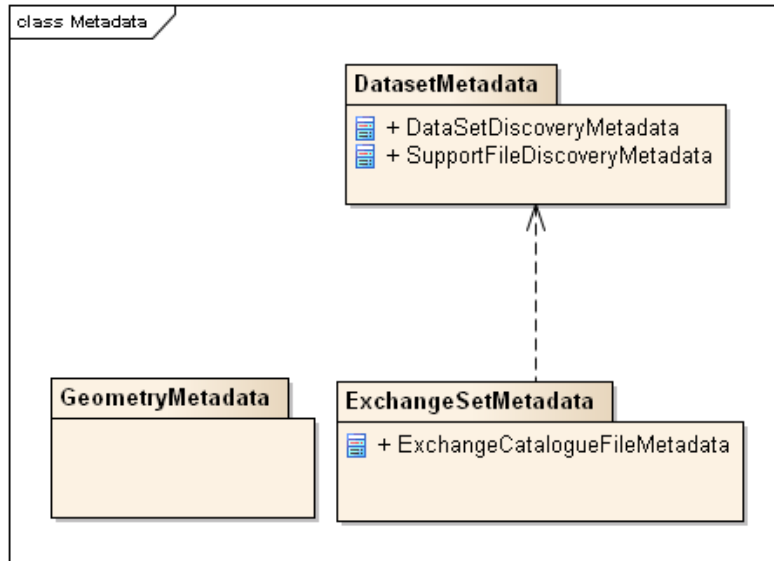
Figure 4 – Metadata

17.1 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.

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

Name	Cardinality	Value	Type	Remarks
DataSetDiscoveryMetadata				
metadataFileIdentifier	1		CharacterString	
metadataPointOfContact	1		CI_ResponsibleParty	Contact information for the vessel or authority
metadataDateStamp	1		Date	When the dataset was created
metadataLanguage	1	English, French	CharacterString	All data sets conforming to this PS must use English or French language
fileName	1		CharacterString	Dataset file name
filePath	1		CharacterString	Full path from the exchange set root directory
description	1		CharacterString	
				NATIONAL LANGUAGE enabled
dataProtection	1	{1} to {2}	CharacterString	1. Unencrypted 2. Unencrypted
purpose		{1} to {2}	CharacterString	1. New dataset 2. Update
specificUsage		{1} to {2}	Integer	1, Notices of Arrival: A dataset containing a new or updated notice of arrival as required by local or national regulations
				2. A new or updated request for making pilotage

				<mark>arrangements</mark>
editionNumber	1	{1}	Integer	The dataset edition. Required for s100 but not applicable to MPA, therefore it is set to 1 for all datasets.
updateNumber	1		CharacterString	Update number 0 is assigned to a new request or notice. Subsequent updates or supplements are assigned numbers 1, 2, 3…
issueDate	1		Date	Date on which the dataset was generated.
productSpecification	1	MPA version 1.0.0	S100_ProductSpecification	This must be encoded as MPA
producingAgency	1		CI_ResponsibleParty	Party responsible for generating the dataset.
horizontalDatum	1	WGS84	CharacterString	The datum for latitude/longitude. EPSG:4326
verticalDatum	1	{1} to {30}	Integer	Mean low water springs (29 other values)
soundingDatum	1	{1} to {30}	Integer	Mean low water springs (29 other values)
dataType	1	other	S-100_DataFormat	GML. Or other possible S-100 defined formats.
otherDataTypeDescription	0..1		CharacterString	
boundingBox	0..1		EX_GeographicBoundingBox	Either boundingBox or geographicDescription must be given.
boundingPolygon	0..*		EX_BoundingPolygon	
geographicDescription	0..1	Norway	EX_GeographicDescription	Descriotion of the location for notices or requests, in the form of the country of the national authority. Either boundingBox or geographicDescription must be given.
comment	0..1		CharacterString	Any additional Information
cyclicRedundancyCheck	1	NonNegative Integer		Check value for the dataset
layerId	1	{1}	integer	Identifies the relationship to other S100 information on a graphical display. 1.Scale Independent 2. Scale Independent

Table 2

Note: Types with CI_, EX_, and MD_ prefixes are from packages defined in ISO 19115 and adapted by S-100. Types with S100_ prefix are from packages defined in S-100.

17.2 Exchange Set Metadata

Frequently datasets are packaged and distributed as composite 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.
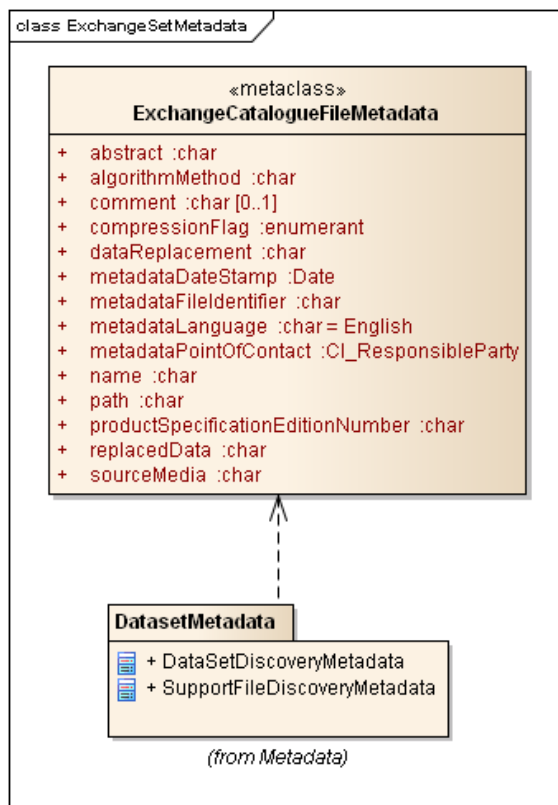
Figure 5 Exchange Set Metadata

17.2.1 Exchange Catalogue File Metadata.

All MPA Catalogue metadata files must contain at least the following metadata elements.

Name	Cardinality	Value	Type	Remarks
metadataFileIdentifier	1		CharacterString	
metadataPointOfContact	1		CI_ResponsibleParty	
metadataDateStamp	1		Date	
metadataLanguage	1	English	CharacterString	All data sets conforming to this PS must use English language. The catalogue file must be in English.
name	1	CATALOG.MPA	CharacterString	Catalogue filename
abstract	1	CharacterString		Description of what the exchange catalogue contains
productSpecification	1	e.g. 1.0.0		Product specification Version Number
comment	0..1	CharacterString		Any additional Information

Table 2

18 Portrayal

Needs to be completed – further information required.

See attribute category of restricted area CATREA enumerations: (i.e. offshore safety zone, nature reserve, bird sanctuary, game reserve, seal sanctuary ….)

Should we include the portrayal documentation provided by David here ?

ANNEX A – Feature Catalogue

This annex contains the geographic objects (feature types) and information objects (information types) in the feature catalogue.

A.1 Feature Types (Classes)

A.1.1 Geo Object Class: Marine Protected Area

Alpha code: **MPAREA**

Camel case: **MarineProtectedArea**   Abstract type: False

Definition: An area where restrictions apply to protect the environment. References: INT 1 (still to be defined)

Remarks: No remarks.   Spatial Objects: Point (GM_Point); Area (GM_Polygon)
Distinction: None.

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
C Information	cInformation	CINFOM	0..*	
C object name	cObjectName	COBNAM	1..*	
C Text Description	cTextualDescription	CTXDSC	1..*	
Category of restricted area	categoryOfRestrictedArea	CATRES	1..*	
Category of IUCN	categoryOfIUCN	CIUCNO	0..1	
Source indication	sourceIndication	SORIND	0..*	
Period start	periodStart	PERSTA	0..1	
Period end	periodEnd	PEREND	0..1	
Date start	dateStart	DATSTA	0..1	
Date end	dateEnd	DATEND	0..1	
Source date	sourceDate	SORDAT	0..*	
Jurisdiction	jurisdiction	JRSDTN	0..1	
Status	status	STATUS	0..*	
Scale minimum	scaleMinimum	SCAMAX	0..1	
Scale maximum	scaleMaximum	SCAMIN	0..1	
Restriction	restriction	RESTRN	1..*	
Pictorial Representation	pictorialRepresentation	PICREP	0..*	

A.2 Information Types

A.2.1 Applicability

Alpha code: **APPLIC**

Camel Case: **Applicability**   Abstract type: False

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.

References: Unspecified.

Remarks: No remarks.

Distinction: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	
Category of vessel	categoryOfVessel	CATVES	0..1	
Category of cargo	categoryOfCargo	CATCAR	0..1	
Category of dangerous or hazardous cargo	categoryOfDangerousOrHazardousCargo	CATDCO	0..1	
Category of relationship	categoryOfRelationship	CATREL	0..1	
category of vessel registry	categoryOfVesselRegistry	CATVSR	0..1	
Logical Connectives	logicalConnectives	LOGCON	0..1	
Thickness of ice Capability	thicknessOfIceCapability	ICETHK	0..1	
Vessel performance	vesselPerformance	VESPER	0..1	
Vessels measurements	vesselsMeasurements	VESMSR	0..*	

Relationships

Multiplicity	Association
0..*	Regulations .
0..*	Applicability .Applicability
0..*	Restrictions .
0..*	Applicability .Applicability
0..*	vesselsMeasurements .
0..*	Applicability .
0..*	NauticalInformation
0..*	Applicability .Applicability
0..*	ShipReport.managementAuthority
0..*	Applicability .Applicability

Multiplicity	Association
0..*	Recommendations .
0..*	Applicability .Applicability
	Applicability .
	InformationType.
0..1	underKeelClearance .
	Applicability .

Multiplicity	Association
0..*	Recommendations .
0..*	Applicability .Applicability

A.2.2 AUTORI

Camel Case: **Authority**   Abstract type: False

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

References: Unspecified.

Remarks: No remarks.

Distinctions: natinf; rcmdts; resdes;

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Start date	sourceIndication	SORIND	0..*	
End date	categoryOfAuthority	CATAUT	0..1	
Period start	periodStart	PERSTA	0..1	
Source date	sourceDate	SORDAT	0..*	
Recording date	dateStart	DATSTA	0..1	
Recording Indication	periodDateEnd	PEREND	0..1	
Source date	dateEnd	SATEND	0..1	
Source indication	recordingDate	RECDAT	0..1	
	recordingIndication	RECIND	0..1	
C Information	cInformation	CINFO	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	Authority.managementAuthority
0..*	ServiceHours .ServiceHours
0..*	Authority.issuingAuthority
0..*	ShipReport.shipReport
0..*	Authority.managementAuthority
0..*	ContactDetails .ContactDetails
0..*	MarineProtectedArea .
0..*	Authority.Authority
	Authority.
	InformationType.

A.2.3 Contact Details

Alpha code: **CONDET**

Camel Case: **ContactDetails**   Abstract type: False

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

References: Unspecified.

Remarks: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
source Indication	sourceIndication		0..*	
source Date	sourceDate		0..*	
period Start	periodStart		0..1	
periodDateEnd	periodDateEnd		0..1	
dateEnd	dateEnd		1,0	
dateStart	dateStart		0..1	
callSign	callSign		1	
callName	callName		0..1	
adminstrativeDivision	adminstrativeDivision		0..1	
cInformation	cInformation		0..*	
cTextualDescription	cTextualDescription		0..*	
cObjectName	cObjectName		0..*	
internetAddress	internetAddress		0..1	
cityName	cityName		0..1	
communicationChannel	communicationChannel		0..1	
country	country		0..1	
recordingDate	recordingDate		0..1	
recordingIndication	recordingIndication		0..1	
deliveryPoint	deliveryPoint		0..1	
maritimeMobileServiceIdentityCode	maritimeMobileServiceIdentityCode		0..1	
telephoneNumber	telephoneNumber		1	
emailAddress	emailAddress		1	
telephoneNumberOutsideWorkingHours	telephoneNumberOutsideWorkingHours		1	
faxNumber	faxNumber		1	
postalCode	postalCode		1	

Relationship

Multiplicity	Association
0..*	Authority.managementAuthority
0..*	ContactDetails .ContactDetails
	ContactDetails InformationType.

A.2.4 Nautical Information

Alpha code: **NATINF**

Camel Case: **NauticalInformation**   Abstract type: False

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: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	NauticalInformation .
0..*	Applicability .Applicability
0..*	MarineProtectedArea .
0..*	NauticalInformation .Information
	NauticalInformation . Information.

A.2.5 Non-standard working day

Alpha code: **NWKDAY**

Camel Case: **NonStdWkgDay** Abstract type: False

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: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Fixed date	fixedDate	FIXDAT	0..*	
Variable date	variableDate	VARDAT	0..*	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
	NonStandardWorkingDay. InformationType.
0..*	NonStandardWorkingDay.information
0..*	ServiceHours .informationFor

A.2.6 Recommendations

Alpha code: **RCMDTS**

Camel Case: **Recommendations** Abstract type: False

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: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	0..1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	MarineProtectedArea .
0..*	Recommendations .Recommendations
0..*	Recommendations .
0..*	Applicability .Applicability
	Recommendations .
	InformationType.

A.2.7 Regulations

Alpha code**: REGLTS**

Camel Case: Regulations   Abstract type: False

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: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	0..1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	Regulations .
0..*	Applicability .Applicability
0..*.	MarineProtectedArea .
0..*	Regulations .Regulations
	Regulations .
	InformationType.

A.2.8 Restrictions

Alpha code: **RESDES**

Camel Case: **Restrictions** Abstract type: False

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

Remarks: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	0..1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	Restrictions .
0..*	Applicability .Applicability
0..*.	MarineProtectedArea .
0..*	Restrictions .Restrictions
	Restrictions . InformationType.

A.2.9 Service hours

Alpha code: **SRVHRS**

Camel Case: **ServiceHours**   Abstract type: False

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

References:

Remarks: None.

Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Working schedule	workingSchedule	WRKSCH	1	
Notice time	noticeTime	NOTCTM	1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Multiplicity	Association
1..*	noticeTime . ServiceHours .
0..*	Authority.managementAuthority
0..*	ServiceHours .ServiceHours
1..*.	workingSchedule. ServiceHours .
0..*	NonStandardWorkingDay.information
0..*	ServiceHours .informationFor
	ServiceHours . InformationType.

A.2.10   IMO Ship Report

Alpha code: **SHPREP**

Camel Case: **ImoShipReport**   Abstract type: False

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.
Distinctions: None

Attribute	Camel Case Name	Alpha Code	Cardinality	Sequential
Category of ship report	categoryOfShipReport	CATREP	1	
IMO format for reporting	imoFormatForReporting	IMOREP	1	
Start date	dateStart	DATSTA	0..1	
End date	dateEnd	DATEND	0..1	
Period start	periodDateEnd	PEREND	0..1	
Period end	periodStart	PERSTA	0..1	
Recording date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
C Information	cInformation	CINFOM	0..*	
C Text description	cTextualDescription	CTXDSC	0..*	
C Object name	cObjectName	COBNAM	0..*	

Relationships

Multiplicity	Association
0..*	ShipReport.managementAuthority
0..*	Applicability .Applicability
0..*	Authority.issuingAuthority
0..*	ShipReport.shipReport
	ShipReport. InformationType.

A.3 Feature Attributes

A3.1   Date end

Alpha code: **DATEND**

Attribute type: Simple

Camel case: dateEnd Data   Type: Date

Definition: The attribute "date end" indicates the latest date on which an object (e.g. a buoy) will be present.

Constraints:

CCYYMMDD, consisting of 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601:1988.

A.3.2 Date start

Alpha code: **DATSTA**

Attribute type: Simple

Camel case: dateStart   Data Type: Date

Definition: The attribute "date, start" indicates the earliest date on which an object (e.g. a buoy) will be present.

Constraints:

CCYYMMDD, consisting of 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601:1988.

A.3.3 Periodic date start

Alpha code: **PERSTA**

Attribute type: Simple

Camel case: periodicDateStart   Data Type: Date

Definition: The start of the active period for a seasonal object (e.g. a buoy). See also "date start".

Constraints:

Structure objects: The value should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).   CCYYMMDD (full date); --MMDD (same day each year); --MM (same month each year). This conforms to ISO 8601:1988.

Other objects: If an object has either of its PERSTA/PEREND attribute values non-null, the other must also be non-null.

A.3.4 Periodic date end

Alpha code: **PEREND**

Attribute type: Simple

Camel case: periodicDateEnd   Data Type: Date

Definition: The end of the active period for a seasonal object (e.g. a buoy). See also "date end".

Constraints:

Structure objects: The value should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD).   CCYYMMDD (full date); --MMDD (same day each year); --MM (same month each year) This conforms to ISO 8601:1988.

Other objects: If an object has either of its PERSTA/PEREND attribute values non-null, the other must also be non-null.

A.3.5 Category of restricted area

Alpha code: **CATREA**

Attribute type: Simple

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

Definition: The official legal status of each kind of restricted area defines the kind of restriction(s), e.g., the restriction for a "game preserve" may be "entering prohibited", the restriction for an "anchoring prohibition area" is "anchoring prohibited".

Values:

Code	Name	Definition
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.
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)
20	research area	an area where marine research takes 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.

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.

A.3.6 IUCN* Categories

Alpha code: **IUCNCD**

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

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

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.

A.3.7 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	maritime	a national or regional authority charged with administration of maritime affairs.

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

Remarks: No remarks.

A.3.8 Status

Alpha code: **STATUS**

Attribute type: Simple

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

Definition: <mark>A state or condition with respect to prevailing circumstances.</mark> *(modified from Merriam-Webster dictionary).*

Values:

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)	

A.3.9 Category of IMO ship report

Alpha code: **CATREP**

Attribute type: Simple

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

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.

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.

A.3.10 Category of Cargo

Alpha code: CATCGO

Attribute type: Simple

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

Definition: Types of cargo that may need to be handled differently.

Values:

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

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

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

A.3.11 Category of dangerous or hazardous cargo, or ballast

Alpha code: <mark>CATDHC</mark>

Attribute type: Simple

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

Definition: Categories of cargo that are dangerous or hazardous to transport as defined by the International Maritime Dangerous Goods (IMDG) Code.

Values:

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
1	Class 1; Division 1.1	Explosives, Division 1: substances and articles which have a mass explosion hazard
2	Class 1; Division 1.2	Explosives, Division 2: substances and articles which have a projection hazard but not a mass explosion hazard
3	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
4	Class 1; Division 1.4	Explosives, Division 4: substances and articles which present no significant hazard
5	Class 1; Division 1.5	Explosives, Division 5: very insensitive substances which have a mass explosion hazard
6	Class 1; Division 1.6	Explosives, Division 6: extremely insensitive articles which do not have a mass explosion hazard
7	Class 2.1	Gases, flammable gases
8	Class 2.2	Gases, non-flammable, non-toxic gases
9	Class 2.3	Gases, toxic gases
10	Class 3	flammable liquids
11	Class 4.1	flammable solids, self-reactive substances and desensitized explosives
12	Class 4.2	substances liable to spontaneous combustion
13	Class 4.3	substances which, in contact with water, emit flammable gases
14	Class 5.1	oxidizing substances
15	Class 5.2	organic peroxides
16	Class 6.1	toxic substances
17	Class 6.2	infectious substances
18	Class 7	Radioactive material
19	Class 8	Corrosive substances
20	Class 9	Miscellaneous dangerous substances and articles
21	Harmful Substances in	Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods

	packaged form	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)

A.3.12   Category of Relationship

Alpha code: <mark>CATREL</mark>

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. *(FC definition: This attribute expresses the level of insistence for or against a course of action)*

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

Code	Name	Description
1	prohibited	use of facility (boarding place, etc.) by vessels satisfying the conditions is prohibited
2	not recommended	use of facility (boarding place, etc.) by vessels satisfying the conditions is not recommended
3	permitted	use of facility (boarding place, etc.) by vessels satisfying the conditions is permitted but not required
4	recommended	use of facility (boarding place, etc.) by vessels satisfying the conditions is recommended
5	required	use of facility (boarding place, etc.) by vessels satisfying the conditions is required
6	included	associated information object applies to vessels satisfying the conditions
7	excepted	associated information object does not apply to vessels satisfying the conditions

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.

A.3.13 Day of Week

Alpha code: DAYOWK

Attribute type: Simple

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

Definition: Sequential day of the week.

Values:

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

A.3.14 Jurisdiction

Alpha code: JRSDCN

Attribute type: Simple

Camel case: jurisdiction   Data Type: Enumeration

Definition: The power, right, or authority to interpret and apply the law. *(FC definition: "The jurisdiction applicable to an administrative area").*

Values:

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

A.3.15   Operation

Alpha code: OPERAT

Attribute type: Simple

Camel case: operation Data Type: Enumeration

Definition: Operations are constructs used to retrieve or set attributes. Needs to be checked

Values:

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
1	largest value	The largest value computed from the applicable attributes or sub-attributes
2	smallest value	The smallest value computed from the applicable attributes or sub-attributes

A.3.16 Restriction

Alpha code: <mark>RESTRN</mark>

Attribute type: Simple

Camel case: restrictionData Type: Enumeration

Definition: The official legal statute of each kind of restricted area.

<mark>*Alternative definition: 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'.*</mark>

Code	Name	Description
1	anchoring prohibited	an area within which anchoring is not permitted.
2	anchoring restricted	a specified area designated by appropriate authority, within which anchoring is restricted in accordance with certain specified conditions.
3	fishing prohibited	an area within which fishing is not permitted.
4	fishing restricted	a specified area designated by appropriate authority, within which fishing is restricted in accordance with certain specified conditions.
5	trawling prohibited	an area within which trawling is not permitted.
6	trawling restricted	a specified area designated by appropriate authority, within which trawling is restricted in accordance with certain specified conditions.
7	entry prohibited	an area within which navigation and/or anchoring is prohibited. (adapted from IHO Dictionary, S-32, 5th Edition, 4044)
8	entry restricted	a specified area designated by appropriate authority, within which navigation is restricted in accordance with certain specified conditions. (adapted from IHO Dictionary, S-32, 5th Edition, 4366)
9	dredging prohibited	an area within which dredging is not permitted.
10	dredging restricted	a specified area designated by appropriate authority, within which dredging is restricted in accordance with certain specified conditions.
11	diving prohibited	an area within which diving is not permitted.
12	diving restricted	a specified area designated by appropriate authority, within which diving is restricted in accordance with certain specified conditions.
13	no wake	mariners must adjust the speed of their vessels to reduce the wave or wash which may cause erosion or disturb moored vessels.
14	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)
15	Construction prohibited	the erection of permanent or temporary fixed structures or artificial islands is

		prohibited.
16	discharging prohibited	an area within which discharging or dumping is prohibited
17	discharging restricted	a specified area designated by an appropriate authority, within which discharging or dumping is restricted in accordance with specified conditions.
18	industrial or mineral exploration/development prohibited	an area within which industrial or mineral exploration and development are prohibited.
19	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.
20	drilling prohibited	an area within which excavating a hole on the sea-bottom with a drill is prohibited.
21	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.
22	removal of historical artifacts prohibited	an area within which the removal of historical artifacts is prohibited.
23	cargo transhipment (lightering) prohibited	an area in which cargo transhipment (lightering) is prohibited.
24	dragging prohibited	an area in which the dragging of anything along the bottom, e.g. bottom trawling, is prohibited.
25	stopping prohibited	an area in which a vessel is prohibited from stopping.
26	landing prohibited	an area in which landing is prohibited.
27	speed restricted	an area within which speed is restricted.

Remarks: 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'.

The complete information about the restriction(s), actually held in handbooks or other publications, may be encoded by the attribute 'TXTDSC'. A short explanation may be given by the use of the attribute   'INFORM'.

A.3.17 Logical Connectives

Alpha code: LOGCON

Attribute type: Simple

Camel case: logicalConnectives   Data Type: Enumeration

Definition: ????

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
1	logical conjunction	all the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true
2	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

A.3.18 Comparison Operator

Alpha code: COMPOP

Attribute type: Simple

Camel case: comparisonOperator Data Type: Enumeration

Definition: Comparison operators are standard constructs that are used to compare two values.

Code	Name	Description
1	greater than	The value of the left value is greater than that of the right.(http://en.wikipedia.org/wiki/Logical_connective)
2	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)
3	less than	The value of the left expression is less than that of the right. (http://en.wikipedia.org/wiki/Logical_connective)
4	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)
5	equal to	The two values are equivalent. (adapted http://en.wikipedia.org/wiki/Logical_connective)
6	not equal to	The two values are not equivalent. (adapted http://en.wikipedia.org/wiki/Logical_connective)

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

A.3.19 Category of Vessel Registry

Alpha code: **VESREG**

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.

Code	Name	Description
1	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.
2	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.

Remarks: No remarks.

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

Distinction: No   distinctions.

A.3.20 Category Of Vessel

Alpha code: **CATVES**

Attribute type: Simple

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

Definition: <mark>Types of vessels categorised according to their intended use.</mark> (Tony)

Code	Name	Description
1	general cargo vessel	a vessel designed to carry general cargo
2	container carrier	a vessel designed to carry ISO containers
3	tanker	a vessel designed to carry bulk liquid or gas, including LPG and LNG
4	bulk carrier	a vessel designed to carry bulk solid material
5	passenger vessel	a vessel designed to carry passengers; often a cruise ship
6	roll-on roll-off	a vessel designed to allow road vehicles to be driven on and off; often a ferry
7	refrigerated cargo vessel	a vessel designed to carry refrigerated cargo
8	fishing vessel	a vessel designed to catch or hunt fish
9	service	a vessel which provides a service such as a tug, anchor handler, survey or supply vessel
10	warship	a vessel designed for the conduct of military operations
11	towed or pushed composite unit	<mark>??? additional to FC</mark>
12	tug or tow	<mark>??? additional to FC</mark>

A.3.21 Vessels Characteristics

Alpha code: <mark>VESCAR</mark>

Attribute type: Simple

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

Definition: The value of a particular characteristic such as a dimension or tonnage of a vessel.

Name	Type	Notes
1	length overall	
2	length waterline	The ship's length measured at the waterline (L.W.L.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
3	breadth	The width or beam of the vessel. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
4	draught	The depth of water necessary to float a vessel fully loaded. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
5	height	The height of the highest point of a vessel's structure (e.g. radar aerial, funnel, cranes, masthead) above her waterline. (UKHO NP100/2009)
6	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)
7	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)
8	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)
9	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)
10	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)
11	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)
12	panama canal	Panama Canal / Universal measurement System net Tonnage
13	suez canal	Suez canal net tonnage system.

14	length at waterline	The ship's length measured at the waterline (L.W.L.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)

A.3.22 Time Reference

Alpha code: <mark>TMEREF</mark>

Attribute type: Simple

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

Definition:

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

A.4 Complex Attributes

A.4.1 Day of the Week Range

Alpha code: **DYOFWK**

Attribute type: Complex Attribute

Camel case: **dayOfWeekRange**

Definition: see Day of Week

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	

Relationships

Multiplicity	Association
0..1	dayOfWeekRange. workingSchedule

A.4.2 Information

Alpha code: ???

Attribute type: Complex Attribute

Camel case: **information**

Name	Type	Multiplicity	Association	Notes
information	characterstring	**0..***	information. InformationType.	
language	characterstring	**0..***	information. FeatureType.	ISO 639-2 value

Relationships

Multiplicity	Association
0..*	information. InformationType.
0..*	information. FeatureType.

A.4.3 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

A.4.4 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

A.4.5 Textual Description

Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **textualDescription**

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

Relationships

Multiplicity	Association
0..*.	textualDescription. FeatureType
0..* .	textualDescription. InformationType

A.4.6 Under Keel Clearance

Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **underKeelClearance**

Name	Type	Notes
operation	enumeration	
underKeelAllowanceFixed	real	

Relationships

Multiplicity	Association
0..1	UnderkeelAllowanceVariable. underKeelAllowance
0..1	underKeelAllowance Applicability

A.4.7 Vessels Measurements

Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **vesselsMeasurements**

Name	Type	Notes
comparisonOperator	enumeration	
vesselsCharacteristics	enumeration	
vesselsCharacteristicsUnit	enumeration	
vesselsCharacteristicsValue	real	

Relationship

Multiplicity	Association
0..*	vesselsMeasurements Applicability .

A.4.8 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

A.4.9 Working Schedule

Alpha code: **???**

Attribute type: **Complex Attribute**

Camel case: **workingSchedule**

Note: Duplicates or overlaps are not permitted

Name	Type	Notes
dayOfWeek	enumeration	Duplicates or overlaps are not permitted

Relationship

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