Product Specification
Digital Routeing Guide Information

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DOCUMENT STATUS

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Document history

Revision	Date	Organization	Initials	Revised pages	Short description of changes
Draft 1	2011-02-14	Jeppesen	RMM		Initial Discussion Draft
Draft 2	2011-03-25	Jeppesen	RMM		updated after review by partners
Draft 3	2011-05-06	Jeppesen	RMM		minor clarifications and typographic errors
Draft 4	2011-11-28	Jeppesen	RMM		updated feature catalogue to latest SNPWG definitions
Version 1.0.0	2012-09-04	Jeppesen	RMM		Metadata and data format descriptions added; updates to several clauses according to developments in S-1xx product specifications; corrections and reformatting of feature catalogue. Use of BLAST Project template. Final version for BLAST project.

BLAST

Bringing Land and Sea Together

The Interreg IVB North Sea Region Programme

Investing in the future by working together for a sustainable and competitive region

THE UNITED KINGDOM HYDROGRAPHIC OFFICE

AALBORG UNIVERSITY

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Danish Ministry of the Environment — National Survey and Cadastre

BSH — BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

TUDelft — Delft University of Technology

MÄLARDALEN UNIVERSITY SWEDEN

SeaZone

NORWEGIAN MAPPING AUTHORITY — HYDROGRAPHIC SERVICE

JEPPESEN — A BOEING COMPANY

KYSTVERKET — NORWEGIAN COASTAL ADMINISTRATION

Kystdirektoratet — Danish Coastal Authority

NATURAL ENVIRONMENT RESEARCH COUNCIL

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KL

DTU Space — National Space Institute

Norwegian Hydrographic Service • Aalborg University, Denmark • Agency for Maritime and Coastal Services, Belgium • Danish Coastal Authority • Federal Maritime & Hydrographic Agency, Germany • Hjørring Municipality, Denmark • Jeppesen GmbH, Germany • Local Government, Denmark • Mälardalen University, Sweden • National Space Institute, Denmark • National Survey and Cadastre, Denmark • Natural Environment Research Council, United Kingdom • Norwegian Coastal Administration • Seazone Solutions Limited, United Kingdom •T-Kartor AB, Sweden • TU Delft, the Netherlands • UK Hydrographic Office

Contents

1. Overview

1.1. Introduction

The BLAST Digital Routeing Guide is a web-based prototype mariners' routeing guide that covers routeing systems and other marine traffic information in a localised part of the North Sea. The prototype is intended as a demonstration of the use of harmonised S-100 compliant information provided by Norway, Denmark, and the Federal Republic of Germany.

1.2. References

[ISO8601]   Data elements and interchange formats — Information interchange — Representation of dates and times, ISO 8501:2004. International Standards Organisation, 2004.

[ISO19115] Geographic information – Metadata. International Standards Organisation, ISO 19115:2003, 2003.

[ISO 19136] Geographic information – Geography Markup Language (GML), ISO 19136:2007. International Standards Organisation. Also OpenGIS Geography Markup Language (GML) Encoding Standard, Open Geospatial Consortium, OGC 07-036, 2007.

[ISO19139] Geographic information – Metadata – XML schema implementation, ISO/TS 19138:2007. International Standards Organisation, 2007:

[S-49]   Standardization of Mariners' Routeing Guides. Special Publication No. S-49, Edition 2.0. April 2010. International Hydrographic Bureau, Monaco.

[S-57]   IHO Transfer Standard for Digital Hydrographic Data, Special Publication No. S-57, Edition 3.1, November 2000 (as updated by Supplement 2). International Hydrographic Bureau, Monaco.

[S-100]   Universal Hydrographic Data Model. IHO Special Publication No. S-100, Edition 1.0.0, January 2010. International Hydrographic Bureau, Monaco.

[S-100U1]   Draft update to Universal Hydrographic Data Model, IHO Special Publication No. S-100. (Under development, January 2011.)

[S-101]   Electronic Navigational Chart Product Specification. IHO Special Publication No. 101, (Draft), International Hydrographic Bureau, Monaco. Under preparation.

[SW]   Mediawiki maintained by Capt. Schröder-Fürstenberg for Standardization of Nautical Publications Working Group discussions, URL: http://www.fuerstenberg-dhg.de/mediawki/index.php

[W3CXML]   XML Schema: Part 1: Structures, and Part 2: Datatypes. World Wide Web Consortium, W3C Recommendations, 2nd edition, 2004. URL: http://www.w3.org/standards/techs/xmlschema Retrieved 25 July 2012.

1.3. Terms, Definitions and Abbreviations

1.3.1. Use of Language

In this document:
- "Must" or "shall" indicates a mandatory requirement.
- "Should" indicates an optional requirement that is recommended but not mandatory
- "May" means "allowed" or "could possibly" and is not mandatory.

1.3.2. Terms and Definitions

The terms and definitions in S-100 V. 1.0.0 § 1-3 and Annex 1 apply to this document. The following additional terms are used.

cardinality	The number of values of an attribute of an object.
cell	A cell is a geographical area containing DRG data.
dataset	An identifiable collection of data
ENC	The dataset, standardized as to content, structure and format, issued for use with ECDIS by or on the authority of a Government authorized Hydrographic Office or other relevant

government institution, and conform to IHO standards. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart which may be considered necessary for safe navigation.

1.3.3. Abbreviations

The abbreviations defined in S-100 V. 0.0.3 § 0-2 are used in this document. The following abbreviations are also used:

BLAST	Bringing Land and Sea Together (an EU INTERREG IVB project)
DRG	Digital Routeing Guide
ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigation Chart
GML	Geography Markup Language
IHO	International Hydrographic Organisation
IMO	International Maritime Organisation
SNPWG	Standardization of Nautical Publications Working Group
TSMAD	Transfer Standard Maintenance and Application Development Working Group

1.4. General Data Product Description

Title: Digital Routeing Guide Information

Abstract: Digital Routeing Guide Information (DRGI) is an XML product produced for the BLAST project. Its primary function is for use in a routeing guide for the North Sea to be produced as a Web site. The DRGI contains an extract of real world information necessary for displaying information about routeing systems and passage planning within the area of coverage.

Content: A conformant data set may contain features associated with the information on routeing systems, traffic separation schemes, regulations, major navigation aids, vessel traffic services, ship reporting, communications, and safety information. The specific content is defined by the DRGI Feature Catalogue and the DRGI Application Schema.

Spatial Extent:

> **Description:** Areas where DRG information for passage planning is applicable.
> **East Bounding Longitude:** 180
> **West Bounding Longitude:** -180
> **North Bounding Latitude:** 90
> **South Bounding Latitude** -90

Specific Purpose: This document describes data that establish requirements and procedures imposed by routeing measures, reporting systems, traffic separation schemes and regulations concerning maritime navigation and port entry. It includes information on major navigation aids, natural conditions, environmental conditions, significant hazards, pilot services, broadcast services and navigation safety information, and other information needed for passage planning.

1.5. Digital Routeing Guide Information Product Specification Metadata

Title: Digital Routeing Guide Information Product Specification

Version: 1.0.0

Date:	4 September 2012
Language:	English
Classification:	Unclassified
Contact:	Jeppesen GmbH, Attn: Marine Industry Relations
	Frankfurter Strasse 233, 63263, Neu-Isenberg, Germany.
	Telephone: + 49 6102 7395
URL:	www.jeppesen.com
Identifier:	DRGIPS
Maintenance:	Changes to this product specification are coordinated by Jeppesen in the context of the BLAST project and shall be made available via the BLAST web site: http://www.blast-project.eu. As the BLAST project ends in September 2012, changes to this product specification within the scope of the BLAST project are not anticipated. Jeppesen, IHO working groups, or other marine standards bodies might be working on successor versions, possibly using a different title or identifier. Contact Jeppesen for more information.

1.5.1. Product specification maintenance

1.5.1.1. Introduction

As the BLAST project ends in Spetember 2012, changes to this product specification within the scope of the BLAST project are not anticipated. Jeppesen or other entities may be working on derivatives of this product specification, perhaps using a different title and identifier. Contact Jeppesen at the address above for more information.

1.5.1.2. New edition

New Editions of DRGIPS introduce significant changes. *New Editions* enable new concepts, such as the ability to support new functions or applications, or the introduction of new constructs or data types. *New Editions* are likely to have a significant impact on either existing users or future users of DRGIPS.

1.5.1.3. Revisions

Revisions are defined as substantive semantic changes to DRGIPS. Typically, revisions will change DRGIPS to correct factual errors; introduce necessary changes that have become evident as a result of practical experience or changing circumstances. A *revision* must not be classified as a clarification. *Revisions* could have an impact on either existing users or future users of DRGIPS. All cumulative *clarifications* must be included with the release of approved corrections revisions.

Changes in a revision are minor and ensure backward compatibility with the previous versions within the same Edition. Newer revisions, for example, introduce new features and attributes. Within the same Edition, a dataset of one version could always be processed with a later version of the feature and portrayal catalogues.

In most cases a new feature or portrayal catalogue will result in a revision of DRGIPS.

1.5.1.4. Clarification

Clarifications are non-substantive changes to DRGIPS. Typically, clarifications: remove ambiguity; correct grammatical and spelling errors; amend or update cross references; insert improved graphics in spelling, punctuation and grammar. A clarification must not cause any substantive semantic change to DRGIPS.

Changes in a clarification are minor and ensure backward compatibility with the previous versions within the same Edition. Within the same Edition, a dataset of one clarification version could always be processed with a later version of the feature and portrayal catalogues, and a portrayal catalogue can always rely on earlier versions of the feature catalogues.

Changes in a clarification are minor and ensure backward compatibility with the previous versions

1.5.1.5. Version numbers

The associated version control numbering to identify changes (n) to DRGIPS must be as follows:

New Editions denoted as **n**.0.0

Revisions denoted as n.**n**.0

Clarifications denoted as n.n.**n**

2. Specification Scopes

Digital routeing guide data products are homogeneous (have common properties) and do not vary for different parts of the data. i.e. The DRGIPS describes one data product and requires only one scope which is described below:

Scope ID:	Root scope
Level:	Dataset
Level name:	Digital routeing guide dataset
Level description:	information applies to the dataset
Extent:	Global, marine areas only

3. Data Set Identification

A data set that conforms to this product specification will be identifiable by the discovery metadata that supports it.

Title:	Digital Routeing Guide Information Product Specification
Alternative Title:	DRGIPS
Abstract:	Datasets for digital mariners' routeing guides (DRG) must be in accordance with the rules defined in the DRGI product specification. DRGIPS details specifications intended to enable Hydrographic Offices to produce a consistent DRG, and manufacturers to use that data efficiently in a web display.
Topic Category:	Transportation
Geographic Description:	Areas where routeing guide information for marine navigation is applicable.
Spatial Resolution:	The Display Scale range[1] is 1:5000 to 1:50000000.
Purpose:	The data shall be collected for the purpose of displaying routeing information to a user via a web display.
Language:	English, with additional languages optional.
Classification:	Unclassified
Spatial Representation Type:	Vector
Point of Contact:	Producing Agency
Use Limitations:	Not certified for use in navigation

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[1] Discrete values of display scales (i.e., scale banding) were not used for the prototype but should be considered for a 'production' version.

4. Data Content and Structure

4.1. Introduction

A DRGIPS product is a feature-based product with features and properties defined in the IHO standard S-57, the IHO feature concept dictionary for S-101 and the SNPWG Nautical publications dictionary under development by IHO SNPWG [SW]. Spatial objects are encoded as vector entities which are derived from the geometry element **GM_Object** (from the ISO S-100 framework standard and ISO 19107). Spatial objects can be of type Point, Curve (line) or surface (area). Figure 1 provides an overview[2] of the domain model. It consists of four main packages, containing definitions of the spatial objects (package "Geometry"), generic S-100 feature and information types (in package "S100 Generic Types"), metadata (package "Metadata"), and domain-specific feature and information type classes, attributes, and enumerations, in package "DMRG Features". The domain-specific model in package "DMRG Features" is logically divided into sub-packages HYDRO and NPUB corresponding to the ENC and nautical publications domains, containing the definitions for the publications (package NPUB) and ENC (package HYDRO) classes, attributes, and enumerations. Generic types common to both sub-domains are part of the containing "DMRG Features" package.
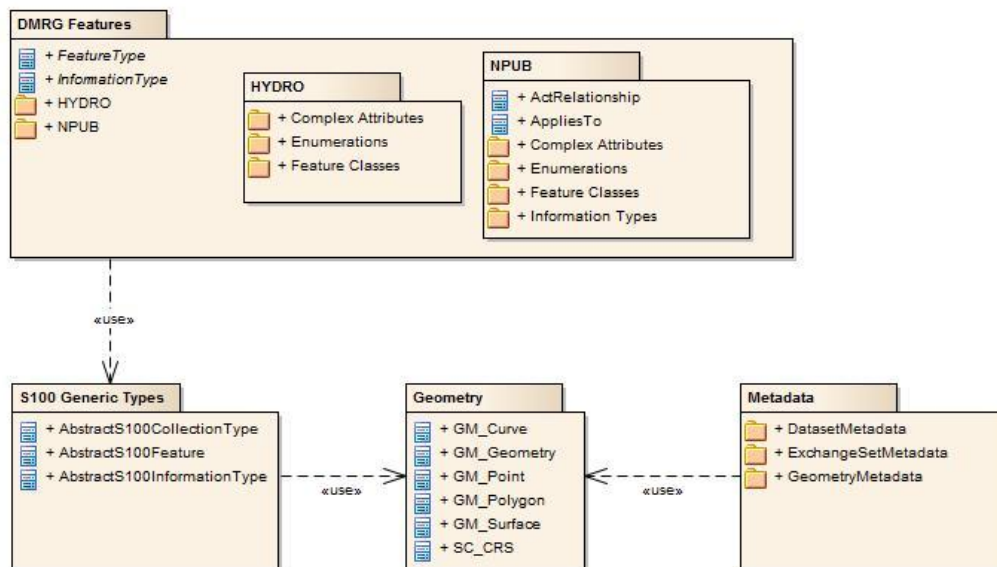
Figure 1. Overview of data model

The rest of this section contains the application schema expressed in UML and an associated feature catalogue. The feature catalogue provides a full description of each object type including its attributes, attribute values and relationships in the data product. Features which do not differ from their S-57 equivalents are listed in this feature catalogue with references to S-57 instead of being duplicated in full.

4.2. Application Schema

DRGIPS is based on the S-100 General Feature Model (GFM) as updated in January 2011 [S100U1]. The UML diagrams for the application schema for this specification are given below. The feature catalogue is in Section 4.3 and Annexes A-C.

The figures below for the application schema contain only those classes and relationships considered to be of special interest to an understanding of the application schema. Given the large number of classes and attributes involved in routeing guides, a comprehensive diagram containing all classes cannot be reproduced on an ordinary-sized page.

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[2] Refer to Section 4.3.1 for the full lists of objects, and attributes in each package.

The basic concepts of the application schema are summarized in Figure 2 below. Geographic features in the model may be individual ENC features such as **Harbour Area** (which corresponds to the S-57 feature of the same name), aggregation or collection features such as **TrafficSeparationSchemePart** (which is a collection of ENC features pertaining to recommended routes, traffic separation schemes, etc.), and geographic features defined by SNPWG in the Nautical Publications model, such as **MarineProtectedArea**. Since these geographic features have common attributes and are all associated with spatial objects, they are specializations (subclasses) of a generalized **FeatureType** class. A feature is an abstraction of real world phenomena. **FeatureType** is a metaclass that is instantiated as classes that represent individual feature types.

An information type is an identifiable object that can be associated with features in order to carry information pertaining to the associated features. **InformationType** is the class intended as a generalization of 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.

Information can be linked to specific geographic features (or other information features) by means of associations as permitted by the application schema. The complete specifications about which information types can be associated with which feature or information types are contained in the feature catalogue provided later in this document (in the "Associated Information Types" tables accompanying the definition of the feature type).

An example is provided below. The figure below shows two information types **ContactDetails** (contact details for a person, or organization) and **Authority** (governmental body or maritime or legal authority). Instances of the **Authority** class can be associated with instances of the geographic feature **MarineProtectedArea** and/or instances of **ContactDetails**. The interpretation of an **Authority/MarineProtectedArea** link is that the specified authority defined (or manages) the specified protected area; the interpretation of the **Authority/ContactDetails** links is the obvious that the contact details object contains the contact information for the specified authority.

This product specification provides *only the data model* for digital routing guide information. It provides only general guidelines for portrayal; detailed layout and interaction requirements are left to the software requirements specification documents for specific implementations.
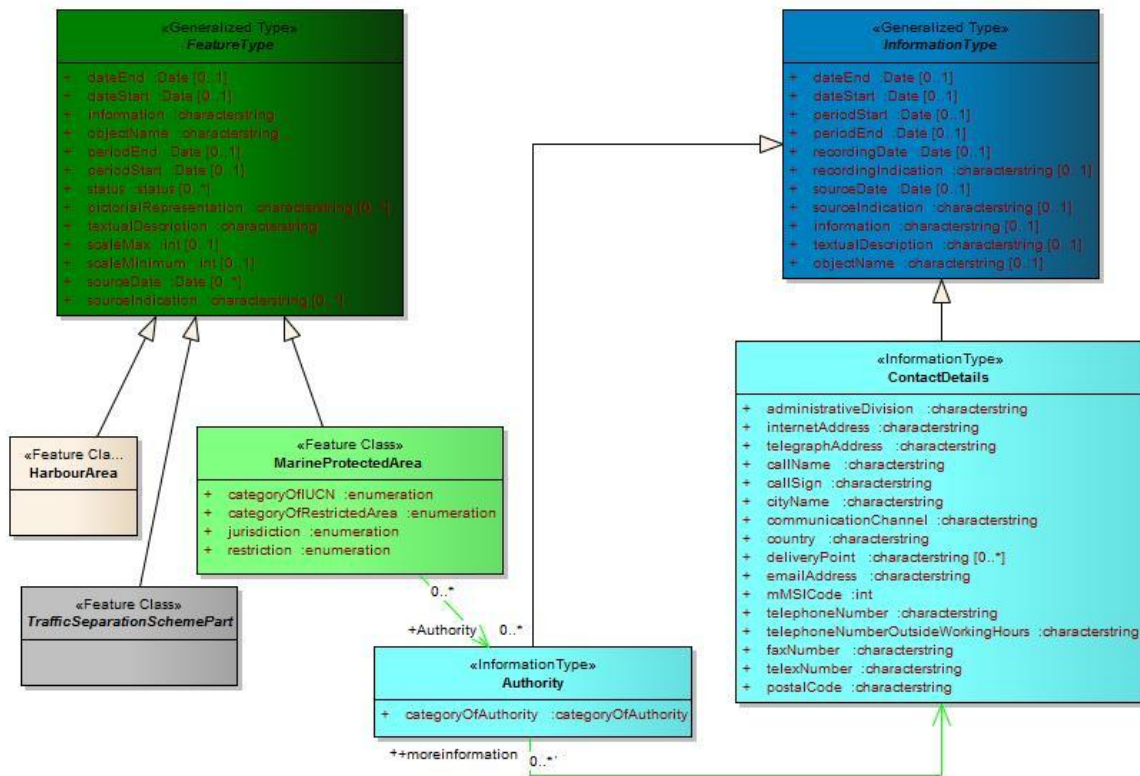
Figure 2. General concepts of DRG application schema

4.2.1. Traffic separation schemes

Since the representation of traffic separation schemes plays a large role in a routeing guide, and since there will be different pieces of information associated with different locations of the routeing scheme, this product specification defines an aggregation object for parts of traffic separation schemes. The relevant part of the application schema is given in Figure 3. This part of the model is basically an aggregation of the relevant ENC objects which together depict the scheme into the collection **TrafficSeparationSchemePart** which makes a convenient target for associating different types of information.
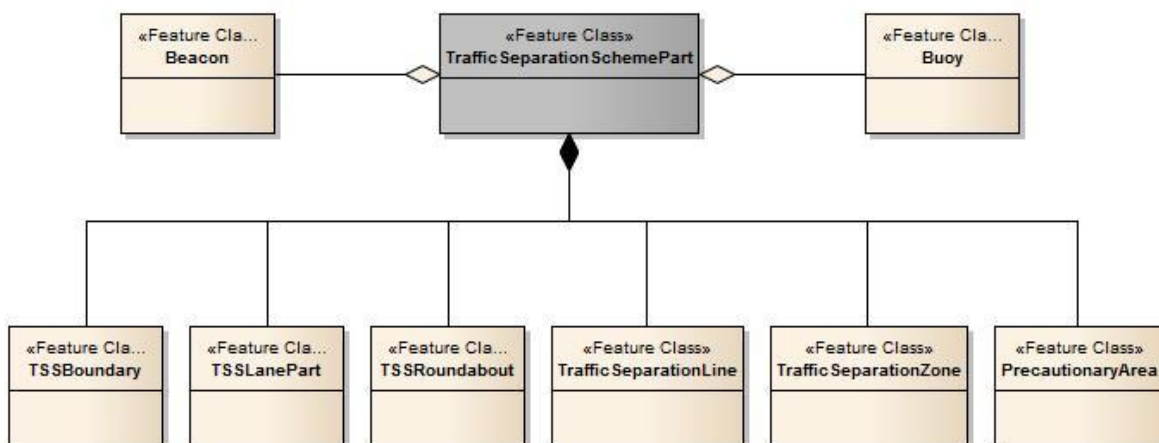
Figure 3. Traffic Separation Scheme model

4.2.2. Regulations and similar information

The SNPWG model contains different classes for **Regulations**, **Restrictions**, **Recommendations**, and general **Nautical Information**. These have the same attributes and can be associated with many different geographic and information features. The application schema treats these four classes as specializations of a generalized type (**AbstractRXNClass**) which in turn is a specialization of a generalized **InformationType** class. The figure below shows the attributes of the generalized classes. Since specializations inherit the attributes and associations of their parents, the four classes **Recommendations**, **Restrictions**, **Regulations**, and **NauticalInformation** do not have attributes listed in their own boxes since they have only the attributes they inherit from **AbstractRXNClass** and **InformationType**.
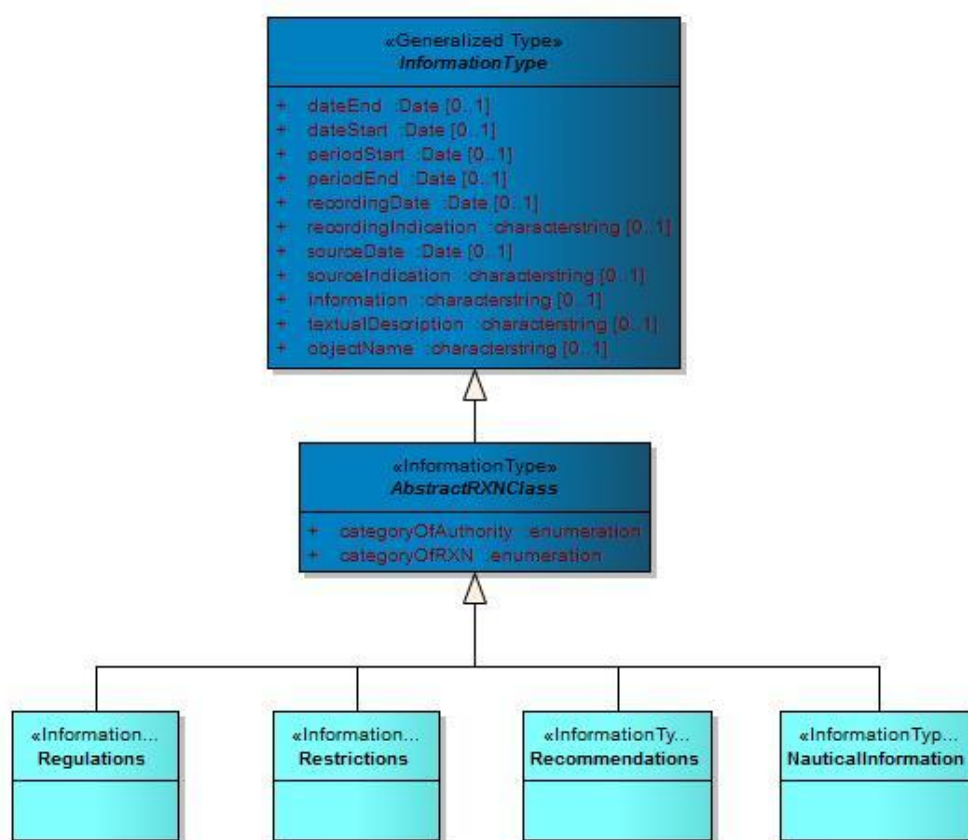
Figure 4. Regulations, Rescrictions, Recommendations, and nautical Information

4.2.3. Specifying applicability to different classes of vessels

Often the applicability of a regulation, or whether a vessel is allowed to carry out certain activities, or pass through an area, or is subject to special requirements, etc., is governed by the dimensions of the vessel, the type of cargo it carries, and other features of the vessel or its equipment. This is modeled as shown in Figure 5 below. The central idea of this part of the model is to describe the set of vessels to which the information (rule, recommendation, restriction, etc.) applies by means of an **Applicability** object, whose attributes describe various vessel characteristics. The association between each such subset of vessels and a regulation (for example) is defined by the value of attribute **membership** of the association class **AppliesTo**. The allowed values of **membership** ("included" and "excepted") state whether the vessels described by the **Applicability** object are covered or exempt from the regulation.

The same principle applies to relationships between subsets of vessels and facilities or areas, except that here it is necessary to state whether passage through or use of the area (or facility) is required, forbidden, etc., for the subset of vessels described by the **Applicability** object. The association class used in this case is **ActRelationship** and the attribute which encodes the relationship is **categoryOfRelationship**.

Examples of use:

The hypothetical regulation "Vessels of less than 300 tonnes are exempt from reporting" would be represented by:
- (i) encoding the tonnage requirement ("less than 300 tonnes") in an **Applicability** object (using the **vesselMeasurements** complex attribute);
- (ii) encoding "reporting required" in a Regulations object;
- (iii) giving the membership attribute of the corresponding **AppliesTo** association object the value of "exempt".

The hypothetical regulation "Tankers carrying chemicals are forbidden to navigate through the Marine Protected Area" would be represented by:
- (i) encoding the cargo and vessel type requirements ("chemical tankers") in an **Applicability** object using the **categoryOfVessel** and **categoryOfCargo** / **catgegoryOfDangerousOrHazardousCargo** attributes;
- (ii) encoding the protected area using a **MarineProtectedArea** object;
- (iii) giving the **categoryRelationship** attribute of the **ActRelationship** association object the value of "prohibited".
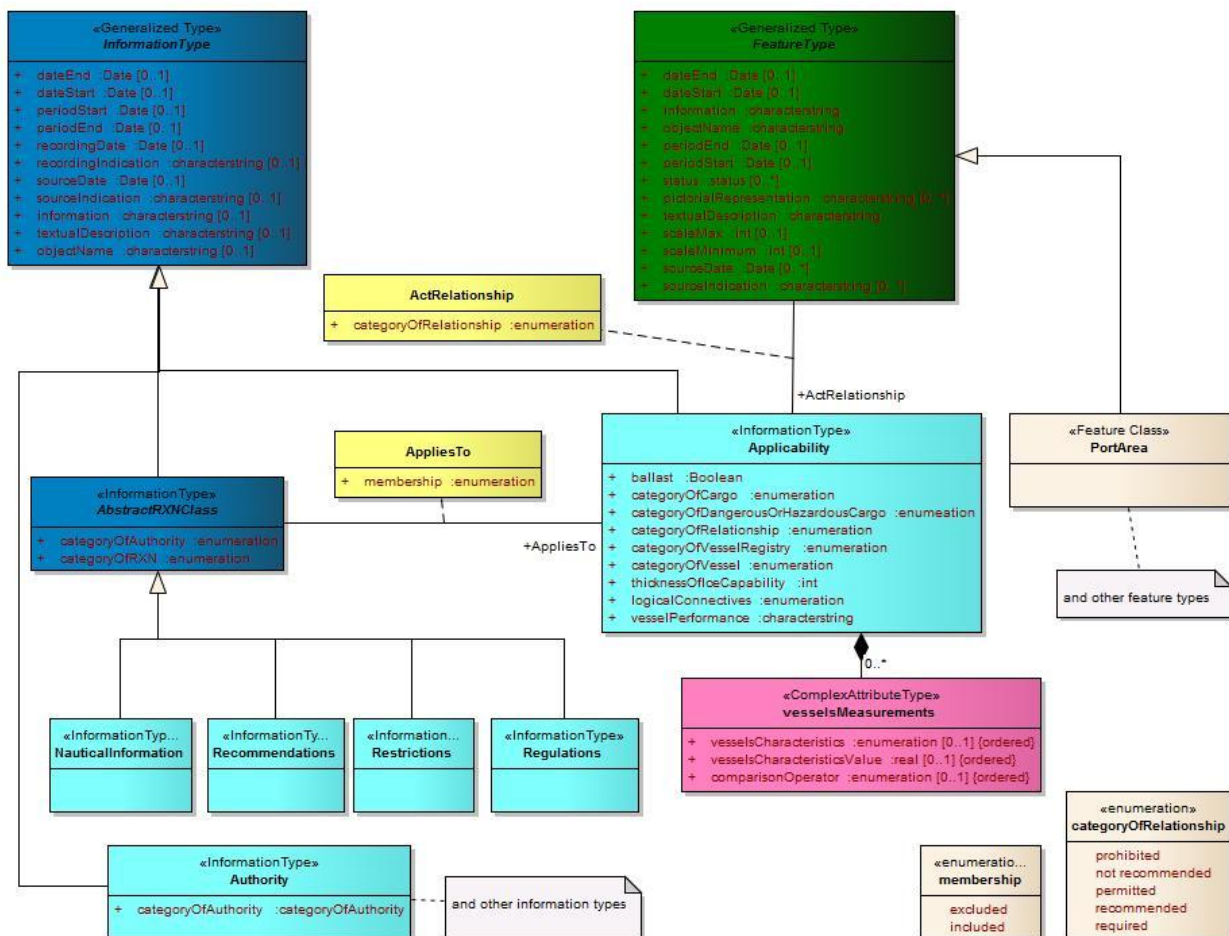
Figure 5. Feature and information relationships

4.3. Feature Catalogue

The feature catalogue shall be available in electronic form (e.g. XML).

Name: Digital Routeing Guide Information Feature Catalogue
Scope: Catalogue containing objects associated with routeing guide information.
Field of application: Marine navigation
Version Number: 0.1
Version Date: 04 March 2011
Producer: Jeppesen

Note: The initial version of the DRGIPS was prepared before a suitable feature catalogue XML schema was available. Progress has since been made on an XML schema and scripts for generating HTML for printing and viewing, and anyone adapting this feature catalogue or making similar catalogues is should contact Jeppesen or the IHO for recent information on tools for machine-readable feature catalogues.

4.3.1. Summary of Types

Register Dictionary	Index	Alpha code	Name	Version Date[3]
NPUB	Feature	AISATN	Automatic Identification System (AIS) as an aid to navigation	2011-09-30
HYDRO	Feature	ACHARE	Anchorage Area	2000-11-01
HYDRO	Feature	ADMARE	Administration Area	2000-11-01
NPUB	Information	APPLIC	Applicability	2011-09-30
HYDRO	Feature	ARCSLN	Archipelagic Sea Lane	2000-11-01
HYDRO	Feature	ASLXIS	Archipelagic Sea Lane Axis	2000-11-01
NPUB	Feature	AUTORI	Authority	2011-09-30
HYDRO	Feature	BCNCAR	Beacon, cardinal	2000-11-01
HYDRO	Feature	BCNISD	Beacon, isolated danger	2000-11-01
HYDRO	Feature	BCNLAT	Beacon, lateral	2000-11-01
HYDRO	Feature	BCNSAW	Beacon, safe water	2000-11-01
HYDRO	Feature	BCNSPP	Beacon, special purpose/general	2000-11-01
HYDRO	Feature	BERTHS	Berths	2000-11-01
HYDRO	Feature	BOYCAR	Buoy, cardinal	2000-11-01
HYDRO	Feature	BOYISD	Buoy, isolated danger	2000-11-01
HYDRO	Feature	BOYINB	Buoy, installation	2000-11-01
HYDRO	Feature	BOYLAT	Buoy, lateral	2000-11-01
HYDRO	Feature	BOYSAW	Buoy, safe water	2000-11-01
HYDRO	Feature	BOYSPP	Buoy, special purpose/general	2000-11-01
HYDRO	Feature	CBLARE	Cable area	2000-11-01
HYDRO	Feature	CBLOHD	Cable, overhead	2000-11-01
HYDRO	Feature	CBLSUB	Cable, submarine	2000-11-01
HYDRO	Feature	CANALS	Canal	2000-11-01
HYDRO	Feature	CTSARE	Cargo Transhipment Area	2000-11-01
HYDRO	Feature	CTNARE	Caution Area	2000-11-01
HYDRO	Feature	CGUSTA	Coastguard Station	2000-11-01
HYDRO	Feature	COALNE	Coastline	2000-11-01
NPUB	Feature	CONSHA	Concentration of shipping hazard area	2011-09-30
NPUB	Information	CONDET	Contact Details	2009-06-19
HYDRO	Feature	DAYMAR	Daymark	2000-11-01

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[3] Dates of 2000-11-01 indicate an object or attribute defined in the S-57 v. 3.1 standard. The version date for NPUB types represents the date the definition was "frozen" for the purposes of the BLAST prototype; the definition may have been updated since then.

Register Dictionary	Index	Alpha code	Name	Version Date[3]
HYDRO	Feature	DWRTCL	Deep water route centerline	2000-11-01
HYDRO	Feature	DWRTPT	Deep water route part	2000-11-01
HYDRO	Feature	DEPARE	Depth Area	2000-11-01
HYDRO	Feature	DEPCNT	Depth contour	2000-11-01
HYDRO	Feature	DRGARE	Dredged area	2000-11-01
HYDRO	Feature	DOCARE	Dock area	2000-11-01
HYDRO	Feature	DRYDOC	Dry dock	2000-11-01
HYDRO	Feature	DMPGRD	Dumping ground	2000-11-01
HYDRO	Feature	EXEZNE	Exclusive economic zone	2000-11-01
HYDRO	Feature	FAIRWY	Fairway	2000-11-01
HYDRO	Feature	FERYRT	Ferry route	2000-11-01
HYDRO	Feature	FSHZNE	Fishery zone	2000-11-01
HYDRO	Feature	FSHFAC	Fishing facility	2000-11-01
HYDRO	Feature	FSHGRD	Fishing ground	2000-11-01
HYDRO	Feature	FLODOC	Floating dock	2000-11-01
HYDRO	Feature	FOGSIG	Fog signal	2000-11-01
HYDRO	Feature	GATCON	Gate	2000-11-01
HYDRO	Feature	HRBARE	Harbour Area (administrative)	2000-11-01
HYDRO	Feature	HRBFAC	Harbour facility	2000-11-01
HYDRO	Feature	HULKES	Hulk	2000-11-01
HYDRO	Feature	ICEARE	Ice area	2000-11-01
HYDRO	Feature	ISTZNE	Inshore traffic zone	2000-11-01
HYDRO	Feature	LNDARE	Land area	2000-11-01
HYDRO	Feature	LNDRGN	Land region	2000-11-01
HYDRO	Feature	LNDMRK	Landmark	2000-11-01
HYDRO	Feature	LOKBSN	Lock basin	2000-11-01
HYDRO	Feature	LIGHTS	Light	2000-11-01
HYDRO	Feature	LITFLT	Light float	2000-11-01
HYDRO	Feature	LITVES	Light vessel	2000-11-01
NPUB	Feature	BERAST	Manoeuvring and berthing assistance	2011-09-30
HYDRO	Feature	MARCUL	Marine culture	2000-11-01
HYDRO	Feature	MIPARE	Military practice area	2000-11-01
NPUB	Feature	MPAARE	Marine Protected area	2011-09-30
NPUB	Feature	MRNSRV	Marine service	2011-09-30
HYDRO	Feature	MORFAC	Mooring facility	2000-11-01
NPUB	Feature	NATCND	Natural conditions	2011-09-30
NPUB	Information	NATINF	Nautical Information	2011-09-30
NPUB	Feature	NAVARE	NAVAREA/METAREA	2011-09-30
HYDRO	Feature	NAVLNE	Navigation Line	2000-11-01
NPUB	Feature	NAVTEX	NAVTEX area	2011-09-30
NPUB	Information	NWKDAY	Nonstandard-working day	2011-09-30
HYDRO	Feature	OBSTRN	Obstruction	2000-11-01
HYDRO	Feature	OFSPLT	Offshore platform	2000-11-01
HYDRO	Feature	OSPARE	Offshore production area	2000-11-01
HYDRO	Feature	PILBOP	Pilot Boarding Place	2000-11-01
HYDRO	Feature	PIPARE	Pipeline Area	2000-11-01
HYDRO	Feature	PIPOHD	Pipeline, overhead	2000-11-01
HYDRO	Feature	PIPSOL	Pipeline, submarine/on land	2000-11-01
NPUB	Feature	PIRARE	Piracy risk area	2011-09-30
NPUB	Feature	PLTSRV	Pilot Service	2009-06-19
HYDRO	Feature	PONTON	Pontoon	2000-11-01
HYDRO	Feature	PRCARE	Precautionary area	2000-11-01

Register Dictionary	Index	Alpha code	Name	Version Date[3]
HYDRO	Feature	PRDARE	Production/storage area	2000-11-01
NPUB	Feature	PRTARE	Port Area	2011-09-30
HYDRO	Feature	RADLNE	Radar line	2000-11-01
HYDRO	Feature	RADRNG	Radar range	2000-11-01
HYDRO	Feature	RTPBCN	Radar transponder beacon	2000-11-01
HYDRO	Feature	RDOCAL	Radio calling-in point	2000-11-01
NPUB	Feature	RDOSVC	Radio service area	2011-09-30
NPUB	Feature	RDOSTA	Radio station	2011-09-30
NPUB	Information	RCMDTS	Recommendations	2011-09-30
HYDRO	Feature	RCRTCL	Recommended route centerline	2000-11-01
HYDRO	Feature	RECTRC	Recommended track	2000-11-01
HYDRO	Feature	RCTLPT	Recommended traffic lane part	2000-11-01
NPUB	Information	REGLTS	Regulations	2011-09-30
NPUB	Information	RESDES	Restrictions	2011-09-30
HYDRO	Feature	RSCSTA	Rescue station	2000-11-01
HYDRO	Feature	RESARE	Restricted area	2000-11-01
HYDRO	Feature	SNDWAV	Sand waves	2000-11-01
HYDRO	Feature	SEAARE	Sea Area	2000-11-01
NPUB	Feature	SECLVL	Security level according to ISPS Code	2011-09-30
NPUB	Information	SHPREP	Ship report	2011-09-30
HYDRO	Feature	SLCONS	Shoreline construction	2000-11-01
HYDRO	Feature	SISTAT	Signal station, traffic	2000-11-01
HYDRO	Feature	SISTAW	Signal station, warning	2000-11-01
HYDRO	Feature	SMCFAC	Small craft facility	2000-11-01
HYDRO	Feature	STSLNE	Straight territorial sea baseline	2000-11-01
NPUB	Feature	SUPPLY	Supplies	2011-09-30
HYDRO	Feature	SUBTLN	Submarine transit lane	2000-11-01
HYDRO	Feature	SWPARE	Swept area	2000-11-01
HYDRO	Feature	TESARE	Territorial sea area	2000-11-01
HYDRO	Feature	TOPMAR	Topmark	2000-11-01
HYDRO	Feature	TSELNE	Traffic separation line	2000-11-01
HYDRO	Feature	TSSBND	Traffic separation scheme boundary	2000-11-01
HYDRO	Feature	TSSCRS	Traffic separation scheme crossing	2000-11-01
HYDRO	Feature	TSSLPT	Traffic separation scheme lane part	2000-11-01
HYDRO	Feature	TSSRON	Traffic separation scheme roundabout	2000-11-01
HYDRO	Feature	TSEZNE	Traffic separation zone	2000-11-01
HYDRO	Feature	TWRTPT	Two-way route part	2000-11-01
HYDRO	Feature	UWTROC	Underwater/awash rock	2000-11-01
HYDRO	Feature	UNSARE	Unsurveyed area	2000-11-01
NPUB	Feature	WASDIS	Waste disposal	2011-09-30
HYDRO	Feature	WATTUR	Water turbulence	2000-11-01
NPUB	Feature	WATARE	Waterway area	2011-09-30
NPUB	Feature	WETFCA	Weather forecast and warning area	2011-09-30
HYDRO	Feature	WRECKS	Wreck	2000-11-01
NPUB	Information	SRVHRS	Service Hours	2009-06-19
NPUB	Attribute	ACTION	Action	2011-09-30
NPUB	Attribute	ADMDIV	Administrative division	2009-06-19
NPUB	Attribute	BALAST	Ballast	2009-06-19
NPUB	Attribute	CALNAM	Call Name	2009-06-19
HYDRO	Attribute	CALSGN	Call Sign	2000-11-01
NPUB	Attribute	CATAUT	Category of Authority	2009-06-19
NPUB	Attribute	CATBRC	Category of broadcast/communication	2011-09-30

Register Dictionary	Index	Alpha code	Name	Version Date[3]
NPUB	Attribute	CATFRP	Category of channel or frequency preference	2011-09-30
NPUB	Attribute	CATSHA	Category of concentration of shipping hazard area	2011-09-30
NPUB	Attribute	CATCGO	Category of Cargo	2009-06-19
NPUB	Attribute	CATDHC	Category of dangerous or hazardous cargo or ballast	2009-06-19
NPUB	Attribute	CATIUC	Category of IUCN (International Union for Conservation of Nature and Natural Resources)	2011-09-30
NPUB	Attribute	CATREP	Category of IMO Ship Report	2009-06-19
HYDRO	Attribute	CATLIT	Category of Light	2000-11-01
NPUB	Attribute	CATMAB	Category of maritime broadcast	2011-09-30
NPUB	Attribute	CATPLT	Category of Pilot	2000-06-19
HYDRO	Attribute	CATPIL	Category of Pilot Boarding Place	2000-11-01
NPUB	Attribute	CATRMT	Category of radio methods	2011-09-30
NPUB	Attribute	CATRXN	Category of Regulation / Restriction / Recommendation	2009-06-19
NPUB	Attribute	CATREL	Category of relationship	2011-09-30
NPUB	Attribute	CATVSL	Category of Vessel	2009-06-19
NPUB	Attribute	CATRGY	Category of Vessel Registry	2009-06-19
NPUB	Attribute	CITYNM	City Name	2009-06-19
HYDRO	Attribute	COMCHA	Communication Channel	2000-11-01
HYDRO	Attribute	COLOUR	Colour	2000-11-01
NPUB	Attribute	COMPOP	Comparison operator	2011-09-30
NPUB	Attribute	CONTRY	Country	2009-06-19
HYDRO	Attribute	DATEND	Date end	2000-11-01
HYDRO	Attribute	DATSTA	Date start	2000-11-01
NPUB	Attribute	DYOFWK	Day of the week	2009-06-19
NPUB	Attribute	DYWKRN	Day of the week range	2009-06-19
NPUB	Attribute	DWTTON	Deadweight tonnage	2011-09-30
NPUB	Attribute	DELPNT	Delivery Point	2009-06-19
HYDRO	Attribute	DRVAL1	Depth range value 1	2000-11-01
HYDRO	Attribute	DRVAL2	Depth range value 2	2000-11-01
NPUB	Attribute	DSTNTN	Destination	2009-06-19
NPUB	Attribute	EMAILS	Email Address	2009-06-19
HYDRO	Attribute	EXCLIT	Exhibition condition of light	2000-11-01
NPUB	Attribute	NUMFAX	Fax number	2009-06-19
NPUB	Attribute	SRVFBG	Firefighting service	2011-09-30
NPUB	Attribute	FRQPAR	Frequency pair	2011-09-30
NPUB	Attribute	FRQRXV	Frequency shore station receives	2011-09-30
NPUB	Attribute	FRQTXM	Frequency shore station transmits	2011-09-30
NPUB	Attribute	HEADNG	Heading	2011-09-30
HYDRO	Attribute	HEIGHT	Height	2000-11-01
NPUB	Attribute	IMOREP	IMO format for reporting	2011-09-30
HYDRO	Attribute	INFORM	Information	2000-11-01
NPUB	Attribute	ADRNET	Internet address	2009-06-19
HYDRO	Attribute	JRSDTN	Jurisdiction	2000-11-01
HYDRO	Attribute	LANGGE	Language	2009-06-19
HYDRO	Attribute	LITCHR	Light characteristic	2000-11-01
HYDRO	Attribute	LITVIS	Light visibility	2000-11-01

Register Dictionary	Index	Alpha code	Name	Version Date[3]
NPUB	Attribute	LCNDES	Location designation	2009-06-19
NPUB	Attribute	MBRSHP	Membership	2011-09-30
NPUB	Attribute	MMSICO	Maritime Mobile Service Identity (MMSI) Code	2009-06-19
NPUB	Attribute	MNTALL	Minute past every hour	2011-09-30
NPUB	Attribute	MNTEVN	Minute past even hour	2011-09-30
NPUB	Attribute	MNTODD	Minute past odd hour	2011-09-30
HYDRO	Attribute	MLTYLT	Multiplicity of light	2000-11-01
HYDRO	Attribute	NATION	Nationality	2000-11-01
NPUB	Attribute	NTIDCH	NAVTEX transmitter identification character	2011-09-30
NPUB	Attribute	NTCTIM	Notice Time	2009-06-19
NPUB	Attribute	NTCHRS	Notice Time in Hours	2009-06-19
NPUB	Attribute	NTCTXT	Notice Time Text	2009-06-19
NPUB	Attribute	NUMPAX	Number of passengers	2011-09-30
NPUB	Attribute	NUMTOR	Number Telex over Radio (TOR)	2011-09-30
NPUB	Attribute	NUMVES	Number of Vessels	2011-09-30
HYDRO	Attribute	OBJNAM	Object Name	2000-11-01
NPUB	Attribute	OBSTIM	Observation Time	2011-09-30
HYDRO	Attribute	ORIENT	Orientation	2000-11-01
NPUB	Attribute	PRFMNC	Performance	2009-06-19
NPUB	Attribute	PRFPIL	Preference of Pilot Boarding Place	2009-06-19
HYDRO	Attribute	PEREND	Periodic Date End	2000-11-01
HYDRO	Attribute	PERSTA	Periodic Date Start	2000-11-01
HYDRO	Attribute	PICREP	Pictorial Representation	2000-11-01
HYDRO	Attribute	PILDST	Pilot District	2000-11-01
NPUB	Attribute	PLTMOV	Pilot Movement	2000-11-01
NPUB	Attribute	PLTQFC	Pilot Qualification	2009-06-19
NPUB	Attribute	PLTRQS	Pilot Request	2009-06-19
NPUB	Attribute	PLTVSL	Pilot Vessel	2009-06-19
NPUB	Attribute	POPLTN	Population	2011-09-30
NPUB	Attribute	POPNBR	Population in the vicinity of the port	2011-09-30
NPUB	Attribute	POSCOD	Postal Code	2009-06-19
HYDRO	Attribute	RESTRN	Restriction	2000-11-01
NPUB	Attribute	RXNCOD	Regulation / restriction / recommendation code	2009-06-19
NPUB	Attribute	RMTPLT	Remote Pilot	2009-06-19
NPUB	Attribute	RMLTWT	Requirements for maintenance of listening watch	2011-09-30
HYDRO	Attribute	SCAMAX	Scale maximum	2000-11-01
HYDRO	Attribute	SCAMIN	Scale minimum	2000-11-01
HYDRO	Attribute	SECTR1	Sector limit one	2000-11-01
HYDRO	Attribute	SECTR2	Sector limit two	2000-11-01
NPUB	Attribute	SVAPRC	Service Access Procedure	2009-06-19
NPUB	Attribute	SSCCRT	Ship Sanitation control	2011-09-30
HYDRO	Attribute	SIGGRP	Signal group	2000-11-01
HYDRO	Attribute	SIGPER	Signal period	2000-11-01
HYDRO	Attribute	SIGSEQ	Signal sequence	2000-11-01
NPUB	Attribute	SILTAT	Siltation	2011-09-30
HYDRO	Attribute	SORDAT	Source Date	2000-11-01
HYDRO	Attribute	SORIND	Source Indication	2000-11-01
HYDRO	Attribute	STATUS	Status	2000-11-01

Register Dictionary	Index	Alpha code	Name	Version Date[3]
NPUB	Attribute	SUBJCT	Subject	2011-09-30
NPUB	Attribute	SRVTEC	Technical Port Service	2011-09-30
NPUB	Attribute	ADRTLG	Telegraph Address	2009-06-19
NPUB	Attribute	NUMTEL	Telephone Number	2009-06-19
NPUB	Attribute	NUMTLX	Telex number	2011-09-30
NPUB	Attribute	NMTLOW	Telephone Number Outside Working Hours	2009-06-19
NPUB	Attribute	TIMOBS	Time of observation	2011-09-30
NPUB	Attribute	TIMTRM	Time of transmission	2011-09-30
HYDRO	Attribute	TRAFIC	Traffic flow	2000-11-01
NPUB	Attribute	TRMTIM	Transmission time	2011-09-30
NPUB	Attribute	TRIDCA	Transmitter identification character	2011-09-30
NPUB	Attribute	TRMCTN	Transmission content (other than MSI)	2011-09-30
NPUB	Attribute	TRMREG	Transmission regularity	2011-09-30
NPUB	Attribute	TRMTFC	Transmission of traffic list	2011-09-30
HYDRO	Attribute	TXTDSC	Textual Description	2000-11-01
NPUB	Attribute	ICECAP	Thickness of Ice Capability	2009-06-19
NPUB	Attribute	TIMENW	Time of End of Work	2009-06-19
NPUB	Attribute	TIMOBS	Time of Observation	2011-09-30
NPUB	Attribute	TIMSTW	Time of Start of Work	2009-06-19
NPUB	Attribute	TIMREF	Times Reference	2009-06-19
NPUB	Attribute	TIMTRM	Time of Transmission	2011-09-30
NPUB	Attribute	TRMTIM	Transmission time	2011-09-30
NPUB	Attribute	TRPTFC	Transportation Infrastructure	2011-09-30
NPUB	Attribute	TRMCTN	Transmission content (other than MSI)	2011-09-30
NPUB	Attribute	TRMTFC	Transmission of traffic list	2011-09-30
NPUB	Attribute	TRMREG	Transmission regularity	2011-09-30
NPUB	Attribute	TRIDCA	Transmitter identification character	2011-09-30
NPUB	Attribute	UKALNS	Underkeel allowance	2011-09-30
NPUB	Attribute	UKAFIX	Underkeel allowance fixed	2011-09-30
NPUB	Attribute	UKAVAR	Underkeel allowance variable	2011-09-30
NPUB	Attribute	UKAVBB	Underkeel allowance variable beam based	2011-09-30
NPUB	Attribute	UKAVDB	Underkeel allowance variable draught based	2011-09-30
HYDRO	Attribute	VALDCO	Value of Depth Contour	2000-11-01
HYDRO	Attribute	VALNMR	Value of nominal range	2000-11-01
HYDRO	Attribute	VERACC	Vertical accuracy	2000-11-01
HYDRO	Attribute	VERDAT	Vertical datum	2000-11-01
NPUB	Attribute	VSLMSM	Vessel's measurements	2011-09-30
NPUB	Attribute	VSLVAL	Vessel characteristics value	2011-09-30
NPUB	Attribute	VSLUNT	Vessel units	2011-09-30
NPUB	Attribute	VSLCAR	Vessel's characteristics	2011-09-30
NPUB	Attribute	VOLTRF	Volume of traffic	2011-09-30
NPUB	Attribute	WEARSK	Weather risk	2011-09-30
NPUB	Attribute	WKSHED	Working Schedule	2009-06-19
NPUB	Attribute	WKHRDY	Working Hours of Day	2009-06-19
NPUB	Attribute	YERDWT	Year of deadweight tonnage	2011-09-30
NPUB	Attribute	YERPAX	Year of number of passengers	2011-09-30
NPUB	Attribute	YERPOP	Year of population	2011-09-30
NPUB	Attribute	YERPOP	Year of number of vessels	2011-09-30

Register Dictionary	Index	Alpha code	Name	Version Date[3]
NPUB	Association class	APPLTO	Applies To	2011-09-30
NPUB	Association class	ACTREL	Act relationship	2011-09-30

4.3.2. Definition Sources

IMDG	International Maritime Dangerous Goods (IMDG) Code
IMO 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. IMO Resolution A 851(20) adopted 27 November 1997
INT 1	Symbols, Abbreviations, Terms used on Charts. IHO
ISO 639-1	Codes for the representation of names of languages - Part 1: Alpha-2 code. International Standards Organisation, 2002. http://www.infoterm.info/standardization/iso_639_1_2002.php retrieved 13 July 2009.
ISO 639-2	Codes for the representation of names of languages - Part 2: Alpha-3 code. International Standards Organisation, 1998. URL: http://www.loc.gov/standards/iso639-2/ retrieved 13 July 2009
ISO 3166-1	Codes for the representation of names countries and their subdivisions - Part 1: Country codes. International Standards Organisation.
M-3	Resolutions of the International Hydrographic Organisation. IHO Publication M-3, July 2007.
M-4	Regulations of the IHO for international charts and chart specifications of the IHO. IHO Publication M-4, Edition 3.006, April 2009.
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, modified by Protocol of 1978. http://www.imo.org/
S-52 A.2	Colour and Symbol specifications for ECDIS, IHO S-52, App. 2, ed. 4.3, 2008, IHO.

4.4. Feature Types

4.4.1. Abstract feature types

Abstract feature types define classes which are used as generalizations of feature classes. Abstract types cannot have instances. The feature types derived from an abstract type inherit the properties of their parents unless explicitly overridden

4.4.2. Meta Feature Types

Meta features contain information about other features within a data set. Information defined by meta features override the default metadata values defined by the data set descriptive records.

4.4.3. Geographic Feature Types

DRGIPS is designed to provide both spatial and non-geospatial information. The spatial information provided by routeing guides is limited to overviews of relatively large areas or stretches of the coastline, depicting the location and spatial relationships of major hazards, major navigation aids, routeing measures and traffic schemes. Non-spatial information includes text summaries of general material about areas, navigation regulations, hazards, pilotage, and ship reporting and ship routeing. This information may be associated with relatively large areas or large stretches of the coast, different administrative jurisdictions, or smaller areas or points of special interest such as ports or congested waters.

4.4.4. Aggregated Feature Types

Feature with a use type of aggregated can have multiple associations to other feature types. No aggregations are specified in DRGPIS.

4.5. Time Varying Features

ENC may contain temporal geographic features such as tides. S-101 provides detail on temporal geographic features. The geographic features used in this product specification may change over time, but they are not temporal geographic features.

An important distinction: although the geo objects used in pilotage are static features, the information objects associated to them are rich in time-varying content. Please refer to Information Types, below.

4.6. Information Types

Information types are identifiable pieces of information in a cell that can be shared between other features. They have attributes like all feature types but have no geometry of their own. Information types may reference other information types and may reference feature types, as is the case in S-101.

4.6.1. Abstract information types

Abstract information types are generalizations of different information types. Abstract types cannot have instances. The information types derived from an abstract type inherit the properties of their parents unless explicitly overridden.

4.6.2. Conditional Information and Sequences of Instructions

Pilotage and most other nautical information topics are characterized by highly conditional information (e.g., "pilot boards at location X, except in poor weather pilot may board at location Y or Z") and step-wise sequences of instructions. In DRGIPS, diligence has been given to supporting the encoding of interrelated, conditional statement, sequences of instructions, and time-varying information. However, it must be understood that there are limits in the ability of encoded, discrete data to communicate conditional information such as pilotage instructions to the mariner. There are many situations in pilotage content where the most effective solution is to present the information textually.

4.7. Feature integrity

4.7.1. Feature level CRC values

Feature level CRC values are not used in this version of DRGIPS.

4.8. Geometry

DRGIPS datasets use S-100 Level 3a geometry which supports 0-, 1-, and 2-dimensional objects (points, curves, and surfaces). The use of coordinates is restricted to two dimensions except in case of soundings.

4.9. Attributes

4.9.1. Simple Attributes

DRGIPS uses the following types of simple attributes, conforming to the S-100 attribute types. The representation of values depends on the encoding.

Enumeration	A fixed list of valid identifiers of named literal values.
Integer	An integer number.
Real	A floating point number.
Boolean	A type having two values, corresponding to True and False.
CharacterString	An arbitrary-length sequence of characters including accents and special characters from

	a repertoire of one of the adopted character sets
Date	A date in the Gregorian calendar.
Time	Time is given by hour, minute, and second.
DateTime	A combination of date and time types.

4.9.2. Complex Attributes

DRGIPS conforms to the S-100 definition of complex attributes. Complex attributes are aggregations of other attributes that are either simple or complex attributes.

4.9.3. Text Formatting and Portrayal

Effective communication of information in routeing guides requires an ability to format and layout text content that is beyond the guidelines found in S-100 at this time.

The rules specified in S-52 for portrayal of text and graphics are generally inapplicable to routeing guides because of the very different use scenarios for ECDIS and digital routeing guides.

4.9.4. Mandatory Attribute Values

All mandatory attributes are identified in the feature catalogue. Note that attributes defined as mandatory in S-57, S-101, and the nautical publications feature dictionary may not be mandatory for a routeing guide.

4.9.5. Unknown Mandatory Attribute Values

Unknown mandatory attribute values are encoded as nulls.

4.10. Associations

An association is used to describe a relationship between two feature types that involves connections between their instances. DRGIPS allows associations between information objects and between information objects and geographic objects.

4.11. Unique Universal Identifier

Each instance of feature and information types in a dataset must have a unique universal identifier (UUID). The UUID may be used to identify multiple instances of the same feature. For example, the same feature may appear in different display scales, or a feature may be split by the cell structure. In these circumstances each instance of this feature may have the same identifier. UUIDs must not be reused even when a feature has been deleted.

5. Coordinate Reference Systems

Spatial Reference System   WGS84

6. Data Quality

DRGI is intended for a demonstration prototype and is not an official product certified for navigation. Data quality requirements for this prototype are limited to acceptance by the participating Hydrographic offices as suitable for a demonstration prototype.

7. Data Capture and Classification

The digital routeing guide (DRG) is intended to be used in conjunction with nautical charts and other nautical publications for passage planning and providing information needed for safe navigation.

The DRG is intended to indicate the locations and boundaries of routeing and traffic systems, and vessel traffic service controlled areas, and clarify procedures pertaining to ship reporting requirements and maritime services available in the area. It is also intended to call the attention of the planner or navigator to general or

specific regulations, unusual or significant natural conditions, significant hazards, major navigation aids, or significant special circumstances or factors affecting navigation, both generally and at locations which are of special importance or frequented by large amounts of traffic.

The DRG is not intended as a substitute for paper charts or ENCs and therefore will not show all navigation aids, obstructions, hazards, landmarks, or other geographic features, nor will it necessarily provide complete details of those features which are depicted. One consequence of this is that not all feature types in an ENC will be included in a DRG data set. A second consequence is that of the types belonging in a DRGIPS data set, only those instances considered necessary to the functionality of a routeing guide will be included. This means that, for example, only major navigation aids may be included, instead of all the aids in the corresponding ENCs.

The data capture guidelines and production processes in this product specification are driven by the above considerations. The data capture and classification guide does not cover each and every concept that can be expressed using the objects, attributes, and roles in the feature catalogue, since the descriptions in the feature catalogue suffice for the simpler concepts.

Data source	Hydrographic Offices
Production Process	Separate processes for ENC-sourced information (i.e., geographic features) and nautical publications-sourced information, followed by merger and integration. The processes are described below.

7.1. ENC-sourced information

In general only a subset of the features in any specific ENC will be included in the DRG product. The criteria for selection are whether the features contain information necessary for a routeing guide. Of the selected features only a subset of attributes may be included. IHO publication [S-49] describes the information which should be included or excluded from a paper routeing guide.

Object category	Included in DRGI product
Navigation aids, and landmarks	Only major navigation aids and landmarks are included.
Coastlines, land, and sea areas	Minor islets, etc. are not included
Traffic separation schemes, deepwater routes	Included
Recommended tracks	Included on a case-by-case basis
Pilot boarding places	Included

7.2. Nautical publications-sourced information

As for charted information, only a subset of nautical publications information will be included.

7.2.1. Information associated with features

Information applicable to an area are encoded as one or more information types of the appropriate class or classes and linked to the feature object by means of an information association. Attributes INFORM or TXTDSC of the information type may be used to supplement the data encoded in the other attributes of the information type if needed. The information association between the two is encoded as details of how this link is specified in the encoding – for example, an encoding based on XML may require an "xlink" giving the XML ID of the fragment encoding the information object.

Geo Object: Marine Service (MRNSRV)
Attributes:
categoryOfMarineService = 1 (VTS)
requirementsForMaintenanceOfListeningWatch =all vessels on VHF channels
objectName = VTS Centre Wilhelmshaven
informationAssociation=<link to record with ID ABCD1234, in a format specified by the encoding>

Information Object: Contact Details (CONDET)

Record ID=ABCD1234
Attributes:
callName = Jade Traffic
communicationChannel = 16,20
telephoneNumber=+49 ...
faxNumber=+49 ...
emailAddress=vts.jade@...

7.2.2. Regulations applying only to selected vessels

Regulations applying only to selected vessels are encoded by attaching a APPLIC (**Applicability**) object to the REGLTS object by means of an association class (APPLTO or ACTREL) instead of the ordinary information described in § 7.2.1. The appropriate attribute (*membership* (MBRSHP) or *categoryOfRelationship* (CATREL)) is used to describe the nature of the connection. Association class ACTREL (**ActRelationship**) is used for associations between APPLIC and a geographic feature, while association class **AppliesTo** (APPLTO) is used for associations between APPLIC and one of **Regulations**, **Restrictions**, **Recommendations**, and **Nautical Information**. The distinction between **AppliesTo** and **ActRelationship**, and their attributes *membership* and *categoryOfRelationship* is in the distinction between regulation as applied to a geographic location vs. a regulation pertaining to a class of vessels.

DATSTA/DATEND and PERSTA/PEREND may be used to specify the dates or period respectively during which the limitation applies.

Note also that APPLIC may not be able to express all combinations of limitations that might exist. In this case use INFOML or TXTDSC to describe the limitation in words.

Information Object: Applicability (APPLIC)
Attributes
CATCGO, CATDHC, CATVES, ICECAP specify vessel or cargo characteristics
DATSTA, DATEND, PERSTA, PEREND specify the dates or period when the regulation applies

Vessel measurements are specified using the complex attribute VSLMSM

Complex attribute VSLMSM	
Sub-attribute	Values
VSLCAR	type of characteristic (length, beam, etc)
VSLVAL	a numeric value
VSLUNT	units of measurement
COMPOP	an operator specifying whether the regulation applies to vessels less than or greater than the value in VSLVAL

APPLIC and VSLMSM may be repeated as necessary to encode complex conditions.

Similar encoding instructions apply to recommendations, restrictions, and nautical information.

8. Data Product Format

8.1. Introduction

This clause specifies the encoding for DRGI datasets.

Format Name: BLAST DMRG XML
Version: 1.0.0
Character Set: ISO 10646 Base Multilingual Plane
Specification: BLAST DMRG profile of ISO 19136

8.2. Encoding of latitude and longitude

Coordinates are stored as integer values or decimal degrees. Integer values of latitude and longitude use the multiplication factors given by the Data Set Structure Information field under CMFX and CMFY.

Default coordinate multiplication factors are 10000000 (10^7) for all datasets

EXAMPLE   A longitude = 42.0000 is converted into X = longitude * CMFX = 42.0000 * 10000000 = 420000000.

8.3. Encoding of depths

Depths are converted from decimal metres to integers by means of the CMFZ.

8.4. Numeric attribute encoding

Floating point or integer attribute values must not be padded by non-significant zeroes.

8.5. Text attribute values

Character strings must be encoded using the character set defined in ISO 10646-1, in Unicode Transformation Format-8 (UTF-8). A BOM (byte order mark) must not be used

8.6. Mandatory attribute values

All mandatory attributes are identified in the Feature Catalogue.

8.7. Missing attribute values

In a base data set, when an attribute code is present but the attribute value is missing, it means that the producer wishes to indicate that this attribute value is unknown.

In an update data set, when an attribute code is present but the attribute value is missing it means:

- that the value of this attribute is to be replaced by an unknown value if it was present in the original data set,
- that an unknown value is to be inserted if the attribute was not present in the original data set.

8.8. Data format specification

The DMRG XML schemas specify the structure and format of DMRG datasets. The schemas are derived from the GML 3.2.1 schemas provided by the Opengeospatial Consortium (OGC)[4]. Feature types are derived from a parent abstract type **S100AbstractFeatureType** which is in turn derived from a type **AbstractFeatureType** defined in GML. Figure 6 shows its structure. **S100AbstractFeatureType** adds a container for spatial objects (**spatialref**) and provides for S100 feature and information associations (**featureAssociation** and **informationAssociation**). It also provides standard attributes used by all features (**AttributeGroupB** and **AttributeGroupC**). All geographic features are derived from this abstract type.

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[4] This has the effect of introducing the whole set of GML structure definitions and options, many of which are not applicable to S100. This was considered acceptable for a prototype like BLAST DMRG but should be changed for a production version of the encoding.
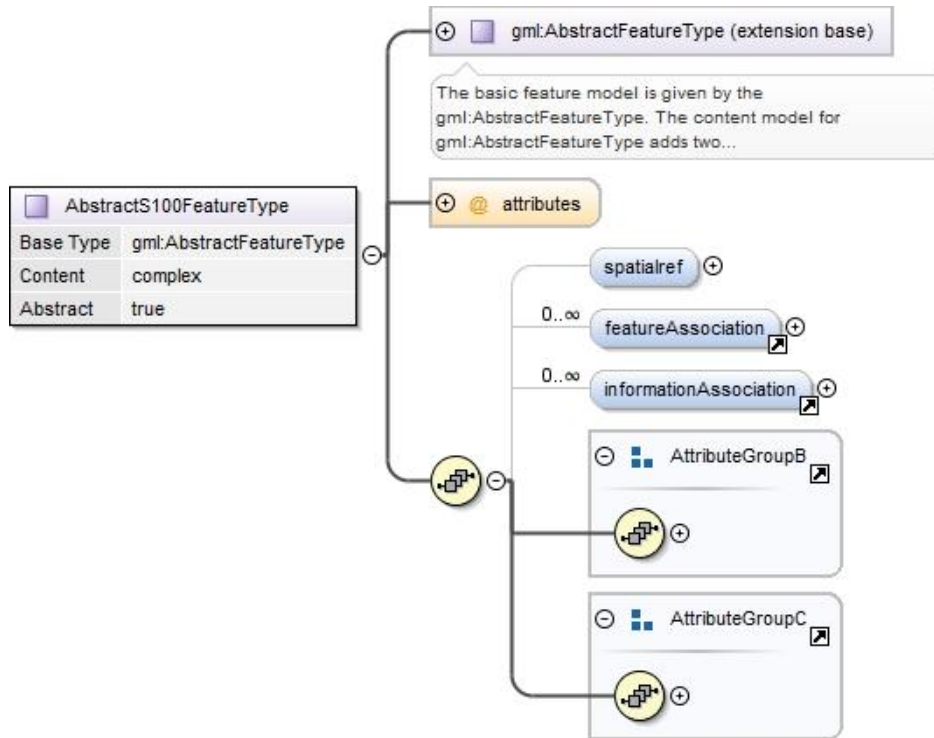
Figure 6. Abstract Feature Type

The parent abstract type for information classes is **S100AbstractInformationType** shown in Figure 7. It is similar to the abstract type for features but lacks the spatial reference and feature associations in conformance with the definition of information classes in the S-100 standard.
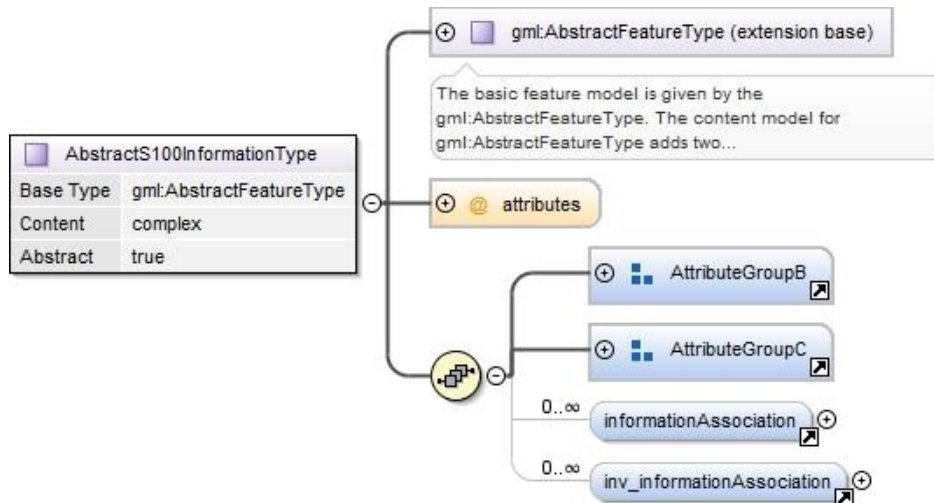
Figure 7. Abstract Information Type

DMRG geographic features and information types are extensions of the abstract types above. Figure 8 shows an example of a geographic feature and Figure 9 an information type. Both extend their respective base types with the appropriate attributes – for example, the feature **PilotService** in Figure 8 extends the S100 abstract feature type with feature-specific attributes **categoryOfPilot**, **pilotDistrict**, etc., while the information type **Regulations** in Figure 9 extends the S100 abstract information type with attributes **categoryOfAuthority**, etc. The "Substitution Group" in the figures is a standard GML mechanism which provides better modularity for feature and collection definitions in XML.
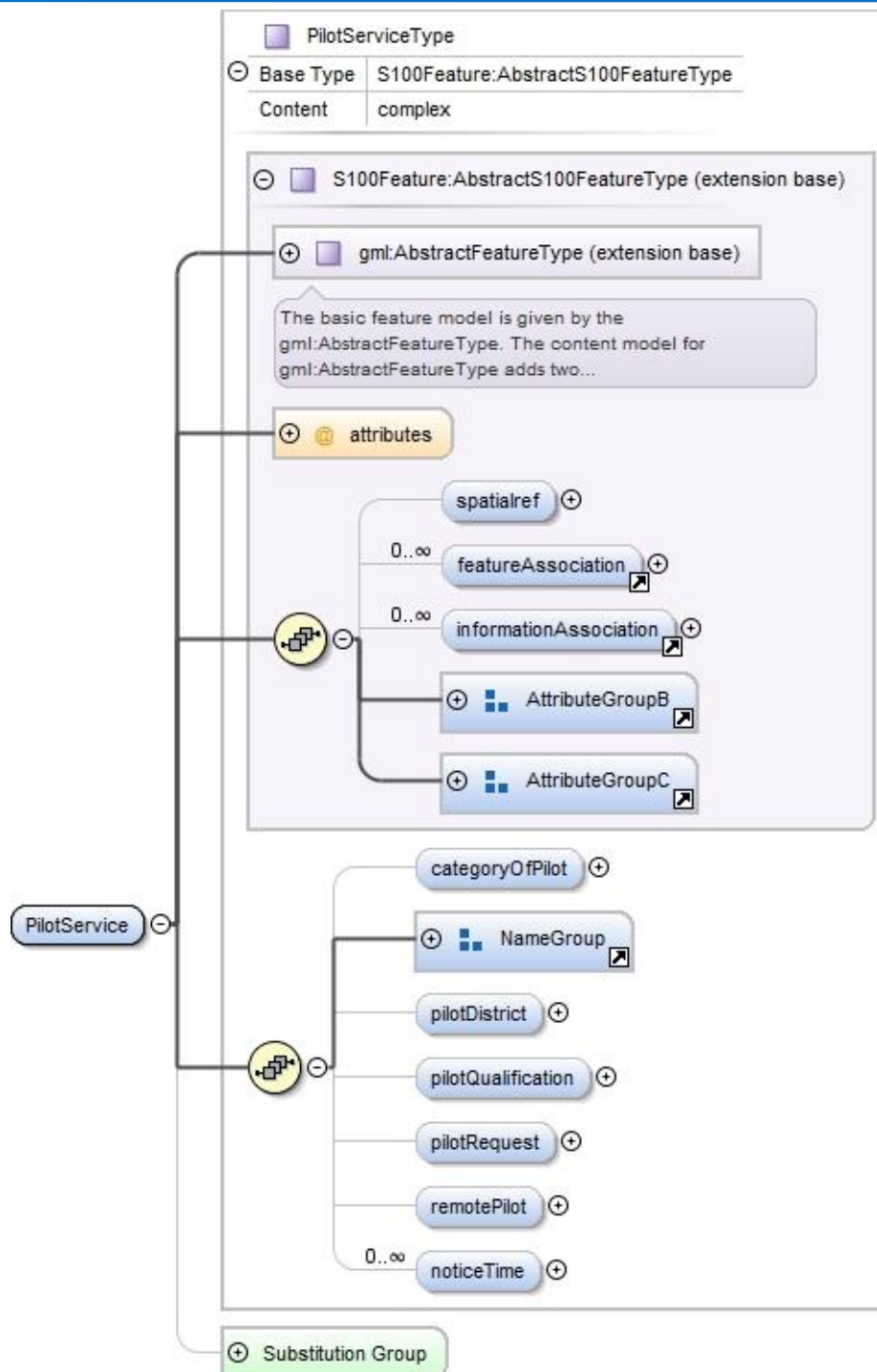
Figure 8. XML encoding for geographic feature type Pilot Service
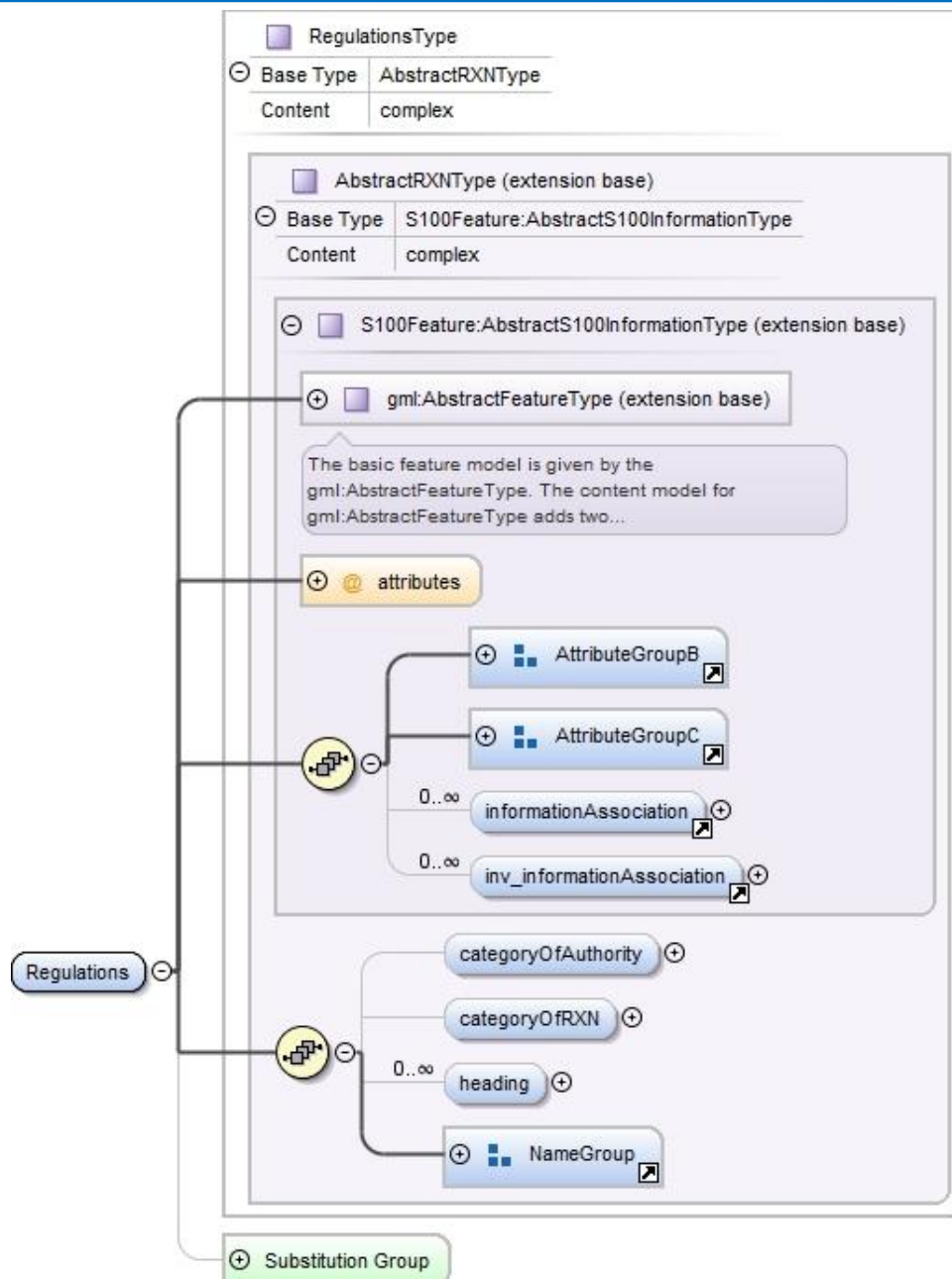
Figure 9. XML encoding for information type Regulations

Datasets are XML files with a collection of features. The type is derived from GML
AbstractFeatureCollectionType and the structure of DMRG datasets is shown in Figure 10.
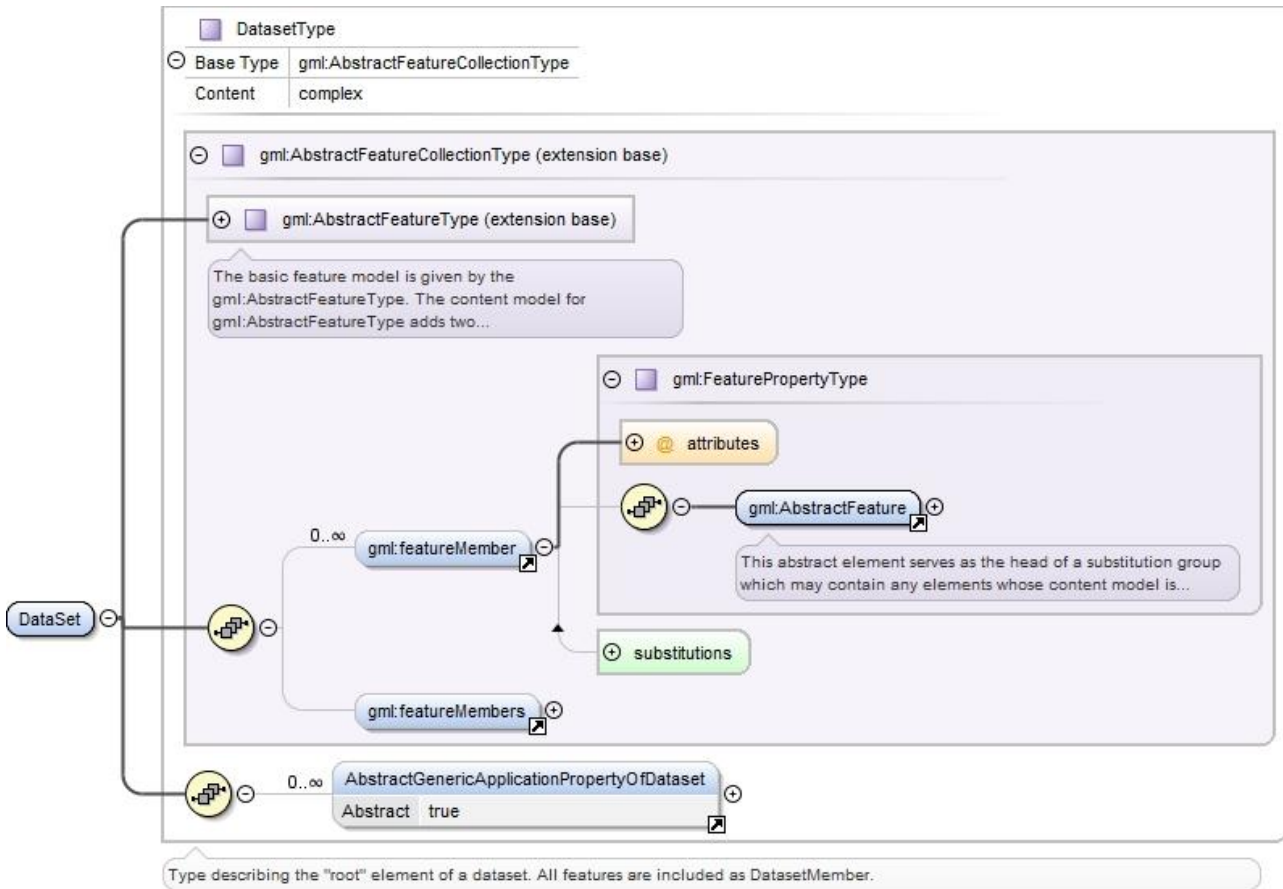
Figure 10. XML dataset

The schemas are available separately at the BLAST Web site or from the Product Specification point of contact.

9. Data Product Delivery

9.1. Introduction

This clause specifies the encoding and delivery mechanisms for DRGI data. Data which conforms to this product specification must be delivered by means of an exchange set.

DRGI products consist of an exchange set which consists of one or more data sets plus accompanying metadata. The diagram below shows the components of an exchange set.
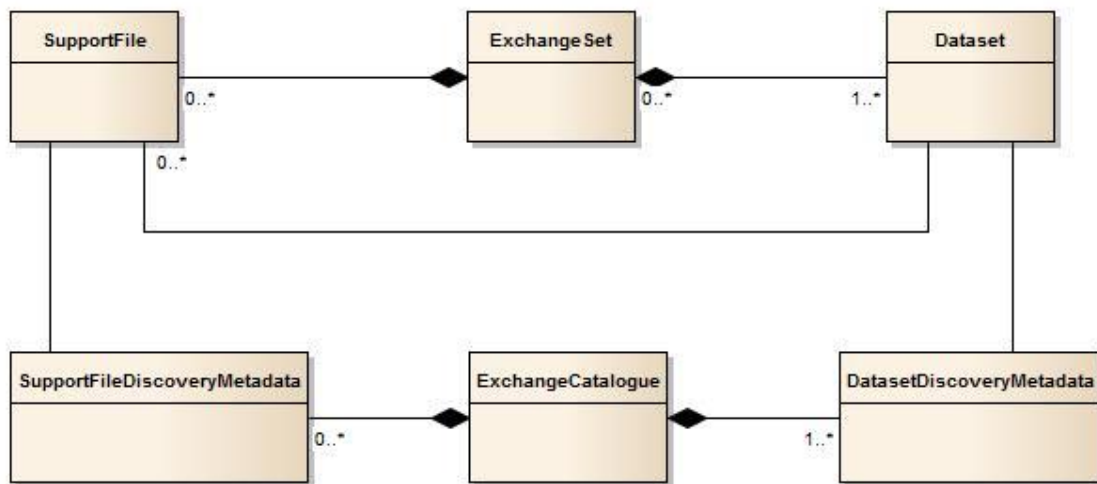
Figure 11. Exchange set structure

9.2. Exchange set

DRGI datasets will be grouped into exchange sets. Each exchange set will consist of one or more datasets with associated support files and a single Exchange Catalogue XML file containing metadata.

Units of Delivery: Exchange Set
Transfer Size: Unlimited
Medium Name: Digital data delivery
Other Delivery Information:

Each exchange set has a single exchange catalogue which contains the discovery metadata for each data set and support files.

An exchange set is encapsulated into a form suitable for transmission either on hard or soft media by a mapping called an encoding. An encoding translates each of the elements of the exchange set into a logical form suitable for writing to media and for transmission online. An encoding may also define other elements in addition to the exchange set contents (i.e., media identification, data extents etc.) and also may define commercial constructs such as encryption and compression methods.

This product specification defines a single example encoding for exchange sets which is described in clause 8. This encoding provides a file based encoding for an exchange set with no encrypted or compressed contents.

The encoding encapsulates exchange set elements as follows:

Mandatory elements

- DRGI datasets – XML encoding of features/attributes and their associated geometry and metadata. Defined further in the DRGI XML schemas.

- Exchange Catalogue – the XML encoded representation of exchange set catalogue features (discovery metadata).

Optional elements:

- Support files – These are contained within the exchange set as files and the map from the name included within the dataset and the physical location on the media is defined within the Exchange Catalogue

9.3. Dataset

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

The following kinds of data set may be contained within an exchange set:

- New dataset and new edition of a dataset: Information which has not been previously distributed by updates. Each new edition of a data set must have the same name as the data set that it replaces.

- Update of a dataset: Changes information in an existing dataset.

- Re-issue of a dataset: Includes all the updates applied to the original data set up to the date of the reissue. A re-issue does not contain any new information additional to that previously issued by updates

Datasets shall not exceed 10MB.

Datasets may contain references to other datasets.

The data features must be contained within the **boundingBox**. An update data set must not change the limit of data coverage for the base dataset. Where the limit of data coverage for a base dataset is to be changed, this should be done by issuing a new edition of the dataset.

Datasets must not cross the 180° meridian, this includes the features as well as the **boundingBox**.

DRGIPS dataset files are names according to the specifications below:

<filename>.<extension>, where <filename> represents the name part CCXXXXXXXX and <extension> the extension "xml": The first part <filename> is further subdivided into a 2-character <issuer> component followed by a <rest> component, i.e., CCXXXXXXXX.xml

- The two characters of <issuer> (represented by CC) identify the issuer of the dataset.

- The <rest> component must be at least 1 and no more than 8 characters.

- The final two characters of the <rest> component must give the update number starting with 00 for new editions or re-issues.

- The extension must be "XML".

9.4. Support files

Data set support files offer supplementary information that can be included in an ENC exchange set.
- Text files must contain only general text as defined by this standard. (Extensible mark-up language (XML) supports UTF-8 character encoding). **(TXT), (XML), (HTM)**
- Picture files must be in TIFF 6.0 specification **(TIFF) or JPEG format (JPG). Applications may convert to other formats for display purposes.**

File Types	Extensions	
Text	TXT	
	HTM	
	XML	
Picture	TIF	Baseline TIFF 6.0
	JPG	

9.4.1. 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.EEE

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).

.EEE – support file extension as in the table above.

9.4.2. Support file management

When a support file is created or a subsequent version is issued it must carry an issue date and a CRC value calculated on the content. These values are contained in the Support File Metadata as defined in clause 12.3 and must not change while the file is still current.

9.5. Exchange catalogue

The exchange catalogue acts as the table of contents for the exchange set. The catalogue file of the exchange set must be named CATLGDRG.XML. No other file in the exchange set may be named CATLGDRG.XML. The contents of the exchange catalogue are described in Clause 12.4.

9.6. Data integrity

9.6.1. Data integrity measures

Data integrity shall be assured by means of Cyclic Redundancy Check (CRC) values computed for every file in the exchange set. The algorithm shall be the CRC-32 algorithm (a 32-bit Cyclic Redundancy Check algorithm) defined in ANSI/IEEE Standard 802.3.

Note: Data integrity measures are not applied to the prototype XML datasets used in the BLAST project.

10. Data Maintenance

Maintenance and update frequency	As needed
Data source	Jeppesen, BSH, KMS, NHS
Production process – ENC information component	Notices to mariners and updates to ENCs pertaining to the area covered by the routeing guide shall be reviewed monthly for any updates to routeing guide data. Updates to data used in the routeing guide may be applied using any appropriate editor or procedure. Only features already present in the routeing guide (or new major features) shall be updated.
Production process – nautical publications information component	Notices to mariners and updates to publications pertaining to the area covered by the routeing guide shall be reviewed monthly for any updates to routeing guide data. Any updates to information used in the routeing guide may be applied manually using any appropriate editor or procedure.. Only information already present in the routeing guide (or new

11. Portrayal

Portrayal library citation	Colour and Symbol specifications for ECDIS, IHO S-52, App. 2, ed. 4.3, 2008. (to be updated for S-100 and nautical publications).

Portrayal rules for digital routeing guides are guided by the criteria given in [S-49] concerning the information considered useful for a routeing guide. S-49 states that the design of digital routeing guides is out of its scope and does not specify text formatting and portrayal guidelines. However it is still useful as a source of general principles for presentation of routeing guide information. Since a digital version can display or hide layers of information dynamically and interactively, which is not possible for a paper version, it is possible to include additional kinds of information compared to a static, non-interactive, "paper" guide.

The following general guidelines apply to digital routeing guides:
1. The symbol shapes used for major navigation aids, routeing schemes, traffic separation schemes, should be similar to either the standard or simplified shapes described in IHO S-52 App 2.
2. Line styles should be similar to the line styles described in IHO S-52 App 2 but may be simplified as required by the constraints of a digital display.
3. Colours may differ from the colours prescribed for ECDIS or paper charts.
4. Font weights and sizes need not conform to the weights and sizes prescribed for ECDIS but should be such as to be readable in daylight or ordinary office lighting conditions and screen viewing distances on middle-sized screens, defined as a 15" diagonal 1680X1050 LCD screen, e.g., a mid-size laptop computer). Optimal viewing conditions may be designed for a larger monitor size.
5. Dusk and night mode palettes are not required.
6. The size of text information panels may be as large as needed to accommodate the relatively larger chunks of text on a routeing guide compared to an ECDIS.
7. Displayed text may be immovable, movable, displayed in a popup or hover box, on another tab, or use other means of display, as required by the contents of the text, the user interaction model of the DRG, and the relationship of the text information to geographic information.
8. Except for feature labels and light characteristics, text that appears on a geographic display should be in movable or transient boxes or panels wherever possible. Immovable text panels that are displayed on a geographic display screen of the DRG should not hide important information (such as major navigation aids, recommended tracks), or other text panels. Immovable text may be placed so as to overlap the edges of routeing schemes, recommended routes, reporting areas, etc., or be contained in such features where such positioning does not obscure information important to the viewer.

12. Metadata

The metadata definition is based on the S-100 metadata definition, which is a profile of the ISO 19115 standard. Metadata is provided in an XML file or files which are part of the exchange set. The format of the metadata is given by the metadata XML schema file which is one of the files in the XML schema package.

12.1. Exchange set metadata

Exchange set metadata contains information about the exchange set, the party responsible for creating the exchange set, and the specifications governing it. Exchange set metadata is provided in the exchange catalogue file.

Name	Multiplicity	Value	Type	Remarks
ExchangeSetMetadata	-		-	Class. Derived from S-100 1.0.0 Minimum metadata for geographic datasets and other resources

metadataFileIdentifier	1		CharacterString	name of the metadata file
metadataCharacterSet	0..1	utf8	MD_CharacterSetCode	
metadataLanguage	0..1	English	CharacterString	All data sets conforming to this PS must use English language
metadataPointOfContact	0..1		CI_ResponsibleParty	Point of contact for the exchange set if different from the producer of the exchange set
metadataDateStamp	1		Date	Date metadata created
resourceTitle	1		CharacterString	Title of the exchange set
resourceReferenceDate	1		Date	Reference date for the exchange set
resourceReferenceDateType	1		Date	1. creation 2. publication 3. revision
abstract	1		CharacterString	Abstract describing the exchange set
productSpecification	1		S100_ProductSpecification	This must be refer to DRGI product specification
producingAgency	1		CI_ResponsibleParty	Agency producing the exchange set
boundingBox	0..1		EX_GeographicBoundingBox	At least one of boundingBox or description must be provided
boundingPolygon	0..*		EX_BoundingPolygon	If different from the bounding box
description	0..1		CharacterString	Geographic description, place name or verbal description of the location.
comment	0..1		CharacterString	Any other information

12.2. Dataset metadata

Dataset metadata contains information about the contents of a dataset, the party responsible for the dataset (normally the creator of the dataset), and the specifications governing it. Dataset metadata may be provided as a separate file or as part of the exchange catalogue file.

Name	Multiplicity	Value	Type	Remarks
S100_DataSetDiscoveryMetadata	-		-	Class.
fileName	1		CharacterString	Dataset file name
filePath	1		CharacterString	Path from the exchange set root directory
description	1		CharacterString	Geographic description, place name or verbal description of the location.
dataProtection	1	{1} to {2}	CharacterString	1. Encrypted 2. Unencrypted
purpose	1		CharacterString	new update reissue new edition
specificUsage	1		CharacterString	Voyage planning

Name	Multiplicity	Value	Type	Remarks
editionNumber	1	{1}	Integer	The dataset edition.
updateNumber	1		CharacterString	Update number 0 is assigned to a edition. Subsequent updates are assigned numbers 1, 2, 3…
updateApplicationDate	0..1		Date	date updated
issueDate	1		Date	Date on which the dataset was issued.
productSpecification	1		S100_ProductSpecification	This must be encoded as the DRGIPS
producingAgency	1		CI_ResponsibleParty	Party responsible for generating the dataset.
optimumDisplayScale	1	1 to 50000000	integer	The denominator of the scale. E.g., 5000 for a scale of 1:5000
minimumDisplayScale	1	1 to 50000000	integer	The minimum scale at which the data is displayed
maximumDisplayScale	1	1 to 50000000	integer	The maximum scale at which the data is displayed
horizontalDatum	1	EPSG 4326	CharacterString	The datum for latitude/longitude. EPSG:4326
verticalDatum	1	{1} to {30}	Integer	1. Mean low water springs (29 other values – refer S101 draft)
soundingDatum	1	{1} to {30}	Integer	1. Mean low water springs (29 other values – see S101 draft)
dataType	1		S100_DataFormat	ISO8211 ASCII ISO/IEC 8211 BINARY GML Other
otherDataTypeDescription	0..1		CharacterString	Description of other datatype format
dataTypeVersion	0..*		CharacterString	The version number of the datatype
boundingBox	1		EX_GeographicBoundingBox	Either boundingBox or description must be given.
boundingPolygon	0..*		EX_BoundingPolygon	
comment	0..1		CharacterString	Any additional Information
checksum	1		CharacterString	Check value for the dataset

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

12.3. Support file metadata

Support file metadata contains information about a support file, the party responsible for the file (normally the creator of the dataset), and the specifications governing it. Support file metadata may be provided as a separate file or as part of the exchange catalogue file.

Name	Multiplicity	Value	Type	Remarks

Name	Multiplicity	Value	Type	Remarks
S100_SupportFileDiscovery Metadata	-		-	Class
fileName	1		CharacterString	Dataset file name
filePath	1		CharacterString	Full path from the exchange set root directory
purpose	1	{1} to {3}	S100_SupportFilePur pose	1. new 2. update 3. deletion
editionNumber	1		CharacterString	The dataset edition.
issueDate	1		Date	Date on which the dataset was generated.
productSpecification	1		S100_ProductSpecifi cation	This must be encoded as the DRGIPS
dataType	1	{1} to {7}	S100_SupportFileFor mat	1. Text 2. JPEG 2000 3. HTML 4. XML 5. XSLT 6. Video 7. Other
otherDataTypeDescription	0..1		CharacterString	Description of other datatype format
dataTypeVersion	0..1		CharacterString	The version number of the datatype
comment	0..1		CharacterString	Any additional Information
checksum	1		NonNegativeInteger	Check value for the dataset

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

12.4. Exchange catalogue file metadata

The catalogue file is defined in an XML schema and encoded in XML. The metadata pertaining to that file is documented below.

Name	Multiplicity	Value	Type	Remarks
identifier	1		S100_MDIdentifier	identifier for the catalogue
editionNumber	1		CharacterString	The edition number of this exchange catalogue
contact	1		S100_CataloguePoin tofContact	Contact for the catalogue
date	1		Date	Creation date of the exchange catalogue
exchangeCatalogueName	1	CATLGDRG .XML	CharacterString	Catalogue filename
exchangeCatalogueDescripti on	1		CharacterString	Description of what the exchange catalogue contains
productSpecification	1		S100_ProductSpecifi cation	Must identify the DRGI PS

Name	Multiplicity	Value	Type	Remarks
compressionFlag	1	{1} to {2}	CharacterString	1. Yes 2. No
algorithmMethod	0..1	{1} to {2}	CharacterString	1. ZIP 2. RAR
sourceMedia	1		CharacterString	Source media from ISO 19115
replacedData	1		CharacterString	If a data file is cancelled, is it replaced by another data file
dataReplacement	0..1		CharacterString	Dataset identifier

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.

Annex A. Named Types

Geo Object Class: Automatic Identification System (AIS) as an aid to navigation   Alpha code: AISATN

Camel case: AisAsAidToNavigation   Abstract type: False

Super type: Abstract Feature Type

Definition: Automatic Identification Systems (AISs) are designed to be capable of providing a predefined set of information about ships to other ships and to coastal authorities automatically. AIS equipment becomes an aid to navigation when it is placed on a navigational mark. In particular it can provide the identity of the mark, its position, and, if required, special messages. (Adapted from IMO website and expanded.

References: INT 1: S17.1 and S17.2 M3: M-4: B - 480

Remarks: The body carrying the AIS is a separate object.

Spatial Objects: Area (GM_Point)

Distinction: No distinctions

Attribute	Camel case	Alpha code	Cardinality	Sequential
Maritime Mobile Service Identity (MMSI) Code	mMSICode	MMSICO	1	
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Status	status	STATUS	0..1	
Value of maximum range	valueMaximumRange	VALMXR	0..1	
Textual description	textualDescription	TXTDSC	0..*	False
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Nautical information	NauticalInformation	NATINF	0..*

Geo Object Class: Administration Area (Named)   Alpha code: ADMARE

Camel case: AdministrationArea   Abstract type: False

Supertype: Abstract Feature Type

Definition: A defined (and possibly named) administrative area.

References: INT 1: not specified; M-4: not specified;

Remarks: No remarks.

Spatial Objects: Area (GM_Polygon)

Distinction: land region; contiguous zone; continental shelf area; exclusive economic zone; Fishery zone; territorial sea area;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Jurisdiction	jurisdiction	JRSDTN	1	
Nationality	nationality	NATION	0..1	
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*
Recommendations	Recommendations	RCMDTS	0..*
Nautical information	NauticalInformation	NAUTINF	0..*
IMO ship report	ImoShipReport	SHPREP	0..*

Geo Object Class: Concentration of shipping hazard area

Alpha code: CONSHA

Camel case: ConcentrationOfShippingHazardArea

Abstract type: False

Super type: Abstract Feature Type

Definition: An area where hazards, caused by concentrations of shipping, may occur. Hazards are risks to shipping, which stem from sources other than shoal water or obstructions.

References: M-3: Chapter C Section 2.28;

Remarks: No remarks.　　　　　　　　Spatial Objects: Point (GM_Point); Area (GM_Polygon)

Distinction: Caution Area

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of concentration of shipping hazard area	categoryOfConcentrationOfShippingHazardArea	CATSHA	1	n/a
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Status	status	STATUS	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Manoeuvring and berthing assistance   Alpha code: BERAST

Camel case: ManoeuvringAndBerthingAssistance   Abstract type: False

Super type: Abstract Feature Type

Definition: The type of physical assistance available for any kind of manoeuvring and berthing operations.

References: --

Remarks: No remarks.   Spatial Objects: Point (GM_Point); Area (GM_Polygon)

Distinction: None

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of concentration of shipping hazard area	categoryOfManoeuvringAndBerthngAssistance	CATBAS	1	n/a
Notice Time	noticeTime	NTCTIM	0..*	True
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Marine protected area

Alpha code: MPAARE

Camel case: MarineProtectedArea

Abstract type: False

Super type: Abstract FeatureType

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.)

References:
INT 1:   IN 22;
M-4:   437.3;437.6

Remarks:

Distinction: Caution area; marine farm/culture; military practice area; restricted area

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of IUCN (International Union for Conservation of Nature and Natural Resources)	categoryOfIUCN	CATIUC	1	
Category of restricted area	categoryOfRestrictedArea	CATREA	1	
Jurisdiction	jurisdiction	JRSDTN	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Status	status	STATUS	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Authority	Authority	AUTORI	0..1
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Marine service

Alpha code: MRNSRV

Camel case: MarineService

Abstract type: False

Super type: Abstract FeatureType

Definition: A service implemented by a relevant authority for shipping, e.g. traffic control, information, assistance.

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

Remarks: The area geometry presents where the service is provided.

Distinction: Pilot service

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of marine service	categoryOfMarineService	CATMSV	1	
Requirements for maintenance of listening watch	requirementsForMaintenanceOfListeningWatch	RMLTWT	0..1	
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Service access procedure	serviceAccessProcedure	SVAPRC	0..1	
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	false
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Authority	Authority	AUTORI	0..1
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Natural conditions   Alpha code: NATCND

Camel case: NaturalConditions   Abstract type: False

Super type: Abstract FeatureType

Definition: An area in which climatic, reported, actual or forecast and warning information is provided on natural conditions.

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

Remarks: This feature class is provided for summary information or general statements. Detailed information, for example for current or height of tide, is provided using feature classes specifically designed for the purpose.

Distinction: Current velocity; orientation

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of natural conditions	categoryOfNaturalConditions	CATNTC	1	n/a
Category of time domain	categoryOfTimeDomain	CATTIM	0..1	n/a
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Information	information	INFORM	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Authority	Authority	AUTORI	0..1
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: NAVAREA/METAREA   Alpha code: NAVARE

Camel case: NavigationalMeterologicalArea   Abstract type: False

Super type: Abstract FeatureType

Definition: The geographic areas in which various governments are responsible for navigation and weather warnings.

References: INT 1: unspecified; M-3: Chapter E Section 2; M-4: unspecified

Remarks: The roman number of NAV/METAREA is to be coded by using OBJNAM.
NAVTEX transmitting station identification characters are allocated within the same areas.

Distinction: NAVTEX area

Attribute	Camel case	Alpha code	Cardinality	Sequential
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Information	information	INFORM	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Geo Object Class: NAVTEX Station area

Alpha code: NAVTEX

Camel case: NavtexStationArea

Abstract type: False

Super type: Abstract Feature Type

Definition: The geographic areas in which radio stations are responsible for broadcast navigation and weather warnings.

References: INT 1: unspecified; M-3: Chapter E Section 2; M-4: unspecified

Remarks: The range of the broadcast may cover more than the area described but the responsibility is strictly limited by international agreed borders.

Distinction: NAVAREA/METAREA

Attribute	Camel case	Alpha code	Cardinality	Sequential
NAVTEX transmitter identification character	navtexTransmitterIdentificationCharacter	NTIDCH	1	n/a
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Information	information	INFORM	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Geo Object Class: Pilot boarding place   Alpha code: PILBOP

Camel case: PilotBoardingPlace   Abstract type: False

Supertype: Abstract Feature type

Definition: The meeting place to which the pilot comes out. (IHO Chart Specs, M-4)

References: INT 1: IT 1.1-4; M-3: not specified; M-4: 491.1 2;

Remarks: No remarks.   Spatial Objects: Point (GM_Point); Area (GM_Polygon)

Distinction: No distinctions.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Call Sign	callSign	CALSGN	0..1	
Category of pilot boarding place	categoryOfPilotBoardingPlace	CATPIL	1	
Category of vessel	categoryOfVessel	CATVSL	0..*	False
Communication Channel	communicationChannel	COMCHA	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Destination	destination	DSTNTN	0..*	False
Notice Time	noticeTime	NTCTIM	0..*	True
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Pilot district	pilotDistrict	PILDST	0..*	False
Pilot movement	pilotMovement	PLTMOV	0..*	False
Pilot request	pilotRequest	PLTRQS	0,,*	True
Pilot vessel	pilotVessel	PLTVSL	0..1	
Preference of pilot boarding place	preferenceOfPilotBoardingPlace	PRFPIL	1	
Status	status	STATUS	0..*	False
Service access procedure	serviceAccessProcedure	SVAPRC	0..*	False
Information	information	INFORM	0..*	False
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Service hours	ServiceHours	SRVHRS	0..*
Applicability	Applicability	APPLIC	0..*

Geo Object Class: Piracy and armed robbery risk area   Alpha code: PIRARE

Camel case: PiracyRiskArea   Abstract type: False

Super type: Abstract Feature Type

Definition: An area where there is a raised risk of piracy or armed robbery.
Piracy consists of any of the following acts:
(a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:
(i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or air-craft;
(ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;
(b) any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;
(c) any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b).
(United Nations Convention on the Law of the Sea – Article 101)
Armed robbery takes place within the jurisdiction of a State.

References: UNCLOS Part V11;   M-3: Chapter C Section 2.2;

Remarks: The Regular bulletins come from the IMB Piracy Reporting Centre – Kuala Lumpur.

Spatial Objects: Area (GM_Polygon)

Distinction: Caution area

Attribute	Camel case	Alpha code	Cardinality	Sequential
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Information	information	INFORM	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Pilot service

Alpha code: PLTSRV

Camel case: PilotService

Abstract type: False

Supertype: Abstract Feature Type

Definition: The area where pilotage services are available. Pilotage is a service provided by a person who directs the movements of a vessel through pilot waters, usually a person who has demonstrated extensive knowledge of channels, aids to navigation, dangers to navigation, etc., in a particular area and is licensed for that area. (adapted from IHO Dictionary, S-32, 5th Edition, 3843)

References: INT 1: not specified; M-3: Chapter C Section C 2.8; M-4: not specified;

Remarks: The name of this object may be the same as the Pilot District of the associated PILBOPs.

Spatial Objects: Area (GM_Polygon)

Distinction: No distinctions.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of pilot	categoryOfPilot	CATPLT	1..*	False
Notice Time	noticeTime	NTCTIM	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Pilot district	pilotDistrict	PILDST	0..*	False
Pilot qualification	pilotQualification	PLTQFC	0..1	
Pilot request	pilotRequest	PLTRQS	0..1	
Remote pilot	remotePilot	RMTPLT	0..1	
Service access procedure	serviceAccessProcedure	SVAPRC	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Information feature	Camel case	Alpha code	Cardinality
Contact details	ContactDetails	CONDET	0..*
Service hours	ServiceHours	SRVHRS	0..*
Ship report	ShipReport	SHPREP	0..*
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Port area

Alpha code: PRTARE

Camel case: PortArea

Abstract type: False

Supertype: Abstract Feature Type

Definition: The port and surrounding sea and land areas in which there are services, designated areas and facilities, such as pilotage, outer anchorages, storages yards and warehousing, all associated with shipping.

References: INT 1: IN 49; M-3: Chapter C Section C 2.8 M-4: 430.1;

Remarks: The name of this object may be the same as the Pilot District of the associated PILBOPs.

Spatial Objects: Area (GM_Polygon)

Distinction: dock area; harbour area (administrative);

Attribute	Camel case	Alpha code	Cardinality	Sequential
Development	development	DVLPMT	0..1	
Object Name	objectName	SRVFBG	0..1	
Status	status	STATUS	0..*	false
Volume of traffic	volumeOfTraffic	VOLTRF	0..1	
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Radio calling-in point　　　　　　　　　　　　Alpha code: RDOCAL

Camel case: RadioCallingInPoint　　　　　　　　　　　　　　　Abstract type: False

Supertype: Abstract Feature Type

Definition: Also called radio reporting points, they have been established in certain busy waterways and port approaches to assist traffic control. On passing these points or crossing a defined line **defined types of** vessels or vessels **carrying specified cargoes** are required to report on VHF to a Traffic Control Centre. (adapted from IHO Chart Specifications, M-4)

References: INT 1: IM 40; M-4: 488;

Remarks: The attribute "orientation" (ORIENT) encodes the orientation of the traffic flow at that point.

Distinction: radio station; pilot boarding place;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of cargo	categoryOfCargo	CATCGO	0..*	
Category of cargo	categoryOfVessel	CATVSL	0..*	
Communication channel	communicationChannel	COMCHA	0..*	
Date end	dateEnd	DATEND	0..1	
Date start	dateStart	DATSTA	0..1	
Information	information	INFORM	0..*	False
Object Name	objectName	SRVFBG	0..1	
Orientation	orientation	ORIENT	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Pictorial representation	pictorialRepresentation	PICREP	0..*	
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	
Status	status	STATUS	0..*	false
Traffic flow	trafficFlow	TRAFIC	0..1	
Textual description	textualDescription	TXTDSC	0..*	False

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Radio Service area   Alpha code: RDOSVC

Camel case: RadioServiceArea   Abstract type: false

Supertype: Abstract Feature Type

Definition: The area where a radio service can be obtained and the characteristics of the radio transmission.

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

Remarks: The objects **RDOSTA**; **RADSTA** are used to encode the point of transmission of the signal.

Distinction: radio calling in point; radar station;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Call sign	callSign	CALSGN	0..1	
Communication channel	communicationChannel	COMCHA	0..*	false
Object Name	objectName	OBJNAM	0..1	
Signal Frequency	signalFrequency	SIGFRQ	0..1	
Status	status	STATUS	0..*	false
Category of broadcast/communication	categoryOfBroadcastAndOrCommunication	CATBRC	0..1	
Category of channel or frequency preference	categoryOfChannelOrFrequencyPreference	CATFRP	0..1	
Category of maritime broadcast	categoryOfMaritimeBroadcast	CATMAB	0..*	false
Category of radio methods	categoryOfRadioMethods	CATRMT	0..1	
Date end	dateEnd	DATEND	0..1	
Date start	dateStart	DATSTA	0..1	
Frequency pair	frequencyPair	FRQPAR	0..1	
Information	information	INFORM	0..*	False
Number Telex over Radio (TOR)	numberTelexOverRadio	NUMTOR	0..1	
Time of observation	timeOfObservation	TIMOBS	0..*	true
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Time of transmission	timesOfTransmission	TIMTRM	0..1	
Transmitter identification character	transmitterIdentificationCharacter	TRIDCA	0..1	
Transmission content (other than MSI)	transmissionContent	TRMCTN	0..1	
Transmission regularity	transmissionRegularity	TRMREG	0..*	false
Transmission of traffic list	transmissionOfTrafficList	TRMTFC	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Geographic feature	Camel case	Alpha code	Cardinality
Radio station	RadioStation	RDOSTA	0..*
Radar station	RadarStation	RADSTA	0..*

Information feature	Camel case	Alpha code	Cardinality
Contact details	ContactDetails	CONDET	0..*
Service hours	ServiceHours	SRVHRS	0..*

Geo Object Class: Radio Station   Alpha code: RDOSTA

Camel case: RadioStation   Abstract type: false

Supertype: Abstract Feature Type

Definition: A place equipped to transmit radio waves. Such a station may be either stationary or mobile, and may also be provided with a radio receiver. In British terminology, also called w/t station.

References: INT 1: IS 10-16; M-4: 480.1-3, 482, 483, 484; S-32: 4191

Remarks: The transmission of a radio station may serve to provide mariners with a line of position (IHO Chart Specifications, M-4). The radio station may also broadcast information in many different methods to vessels or receive information from vessels. The object "radio station" is used to encode the point of transmission of the signal. The area in which the radio service can be obtained is described by a RDOSVC object.

Distinction: radio calling in point; radar station;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of maritime broadcast	categoryOfMaritimeBroadcast	CATMAB	1..*	false
Object Name	objectName	OBJNAM	0..1	
Date end	dateEnd	DATEND	0..1	
Date start	dateStart	DATSTA	0..1	
Information	information	INFORM	0..*	False
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Geographic feature	Camel case	Alpha code	Cardinality
Radio service area	RadioServiceArea	RDOSVC	0..*

Information feature	Camel case	Alpha code	Cardinality
Contact details	ContactDetails	CONDET	0..*
Service hours	ServiceHours	SRVHRS	0..*

Geo Object Class: Sea area

Alpha code: SEAARE

Camel case: SeaArea

Abstract type: False

Supertype: Abstract Feature Type

Definition: A geographically defined part of the sea or other navigable waters. It may be specified within its limits by its proper name.

References: none

Remarks: Every sea area is defined independent of any other. Smaller sea areas may be located within larger sea areas.
The S-57 attribute category of sea area (**CATSEA**) is not used in DMRG datasets.

Spatial Objects: Point (GM_Point); Area (GM_Polygon)

Distinction: depth area; seabed area

Attribute	Camel case	Alpha code	Cardinality	Sequential
Location designation	locationName	LOCNAM	0..1	
Object Name	objectName	OBJNAM	0..1	
Information	information	INFORM	0..*	False
scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	False
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Security level according to ISPS Code   Alpha code: SECLVL

Camel case: IspsSecurityLevel   Abstract type: False

Supertype: Abstract Feature Type

Definition: The area to which an International Ship and Port Facility Security (ISPS) level applies. The ISPS Code is a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. Definition of the levels are given in ispslv. (Extract from IMO Website.).

References: none

Remarks: none.

Spatial Objects: Point (GM_Point); Area (GM_Polygon)

Distinction: none

Attribute	Camel case	Alpha code	Cardinality	Sequential
ISPS Level	ispsLevel	ISPSLV	0..1	
Object Name	objectName	OBJNAM	0..1	
Information	information	INFORM	0..*	False
scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	False
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Supplies   Alpha Code: SUPPLY

Camel case: Supplies   Abstract type: false

Supertype: Abstract Feature type

Definition: Information about ships supplies that are available

References: none;

Remarks: Contact details have been left out her as supplies are managed by the ship's agent

Distinction: Small craft facilities

Spatial Object: Point (GM_Point); Area (GM_Polygon)

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of supply	categoryOfSupply	CATSUP	0..*	false
Transport details	transportDetails	TRADET	0..*	false
Object Name	objectName	OBJNAM	0..1	
Information	information	INFORM	0..*	False
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*
Service hours	ServiceHours	SRVHRS	0..1

Geo Object Class: Waste disposal

Alpha Code: WASDIS

Camel case: WasteDisposal

Abstract type: false

Supertype: Abstract Feature type

Definition: A description of the waste disposal facilities that are available.

References: none;

Remarks: No remarks

Distinction: No distinctions

Spatial Object: Point (GM_Point); Area (GM_Polygon)

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of waste	categoryOfWaste	CATWAS	0..*	false
Transport details	transportDetails	TRADET	0..*	false
Object Name	objectName	OBJNAM	0..1	
Information	information	INFORM	0..*	False
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Scale maximum	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	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	

Information feature	Camel case	Alpha code	Cardinality
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*
Service hours	ServiceHours	SRVHRS	0..1

Geo Object Class: Waterway area

Alpha Code: WATARE

Camel case: WaterwayArea

Abstract type: false

Supertype: Abstract Feature type

Definition: A line of water (river, channel, etc) which can be utilized for communication or transport (IHO Dictionary, S-32, 5th Edition, 5881)

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

Remarks: No remarks

Distinction: FAIRWAY; SEAARE; DRGARE; DEPARE

Spatial Object: Area (GM_Polygon)

Attribute	Camel case	Alpha code	Cardinality	Sequential
Object Name	objectName	OBJNAM	0..1	
Date end	dateEnd	DATEND	0..1	
Date start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	PERSTA	0..1	
Siltation	siltation	SILTAT	0..1	
Information	information	INFORM	0..*	False
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality
Applicability	Applicability	APPLIC	0..*
Nautical Information	NauticalInformation	NATINF	0..*
Recommendations	Recommendations	RCMDTS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Geo Object Class: Weather forecast area

Alpha code: WETFCA

Camel case: WeatherForecastWarningAreas

Abstract type: false

Supertype: Abstract Feature Type

Definition: An area for which weather forecasts and warnings are provided for specified periods. (Adapted IHO Dictionary, S-32, 5th Edition, 5954)

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

Remarks: PERSTA and PEREND are used to encode the periods when seasonal forecasts and warnings are provided.

Distinction: --

Spatial object: GM_Polygon

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of weather and ice forecast and warning area	categoryOfWeatherAndIceForecastAndWarningArea	CATFCA	0..1	
Date end	dateEnd	DATEND	0..1	
Date start	dateStart	DATSTA	0..1	
Object Name	objectName	OBJNAM	0..1	
Information	information	INFORM	0..*	False
Scale max	scaleMaximum	SCAMAX	0..1	
Scale minimum	scaleMinimum	SCAMIN	0..1	
Textual description	textualDescription	TXTDSC	0..*	false
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

The following feature classes have the definitions and attributes already defined in S-57 Edition 3.1 and their definitions are omitted from this document in the interest of brevity.

Geo Object Class: Anchorage Area
Geo Object Class: Archipelagic Sea Lane
Geo Object Class: Archipelagic Sea Lane Axis
Geo Object Class: Beacon, Cardinal
Geo Object Class: Beacon, Isolated Danger
Geo Object Class: Beacon, Lateral
Geo Object Class: Beacon, safe water
Geo Object Class: Beacon, Special Purpose/general
Geo Object Class: Berth
Geo Object Class: Buoy, Cardinal
Geo Object Class: Buoy, Isolated/danger
Geo Object Class: Buoy, Installation
Geo Object Class: Buoy, Lateral
Geo Object Class: Buoy, safe water
Geo Object Class: Buoy, special purpose/general
Geo Object Class: Cable area
Geo Object Class: Cable, overhead
Geo Object Class: Cable, submarine
Geo Object Class: Cargo transhipment area
Geo Object Class: Coastguard station
Geo Object Class: Coastline
Geo Object Class: Daymark
Geo Object Class: Deepwater route centreline
Geo Object Class: Deepwater route part
Geo Object Class: Depth area
Geo Object Class: Depth Contour
Geo Object Class: Dredged area
Geo Object Class: Dock area
Geo Object Class: Dry dock
Geo Object Class: Dumping ground
Geo Object Class: Exclusive economic zone
Geo Object Class: Fairway
Geo Object Class: Fishery zone
Geo Object Class: Ferry route
Geo Object Class: Fishing facility
Geo Object Class: Fishing ground
Geo Object Class: Floating dock
Geo Object Class: Fog signal
Geo Object Class: Gate
Geo Object Class: Harbour Area (administrative)
Geo Object Class: Harbour facility
Geo Object Class: Hulk
Geo Object Class: Ice area
Geo Object Class: Inshore traffic zone
Geo Object Class: Land area
Geo Object Class: Land region
Geo Object Class: Landmark
Geo Object Class: Lock basin
Geo Object Class: Light
Geo Object Class: Light Float
Geo Object Class: Light vessel
Geo Object Class: Marine culture
Geo Object Class: Military practice area
Geo Object Class: Mooring facility

Geo Object Class: Navigation Line
Geo Object Class: Obstruction
Geo Object Class: Offshore Platform
Geo Object Class: Offshore production area
Geo Object Class: Pipeline area
Geo Object Class: Pipeline, overhead
Geo Object Class: Pipeline, submarine/on land
Geo Object Class: Pontoon
Geo Object Class: Precautionary area
Geo Object Class: Production/storage area
Geo Object Class: Radar Line
Geo Object Class: Radar Range
Geo Object Class: Radar Transponder beacon
Geo Object Class: Recommended route centreline
Geo Object Class: Recommended track
Geo Object Class: Recommended traffic lane part
Geo Object Class: Rescue station
Geo Object Class: Restricted area
Geo Object Class: Sand waves
Geo Object Class: Shoreline construction
Geo Object Class: Signal station, traffic
Geo Object Class: Signal station, warning
Geo Object Class: Small craft facility
Geo Object Class: Swept area
Geo Object Class: Submarine transit lane
Geo Object Class: Straight territorial sea baseline
Geo Object Class: Territorial sea area
Geo Object Class: Topmark
Geo Object Class: Traffic separation line
Geo Object Class: Traffic separation scheme boundary
Geo Object Class: Traffic separation scheme crossing
Geo Object Class: Traffic separation scheme lane part
Geo Object Class: Traffic separation scheme roundabout
Geo Object Class: Traffic separation zone
Geo Object Class: Two-way route part
Geo Object Class: Underwater/awash rock
Geo Object Class: Unsurveyed area
Geo Object Class: Water turbulence
Geo Object Class: Wreck

Camel Case: Applicability   Abstract type: False

Supertype: Abstract information Type

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: INT 1: unspecified; M-3: Chapter C, Section C 3.3 M-4: unspecified;

Remarks: Vessel characteristics are specified as follows:
BALAST, CATCGO, CATDHC, CATRGY, CATVSL, ICECAP, PERFMC;: The vessel or its cargo are in the condition, or of the type described by this attribute.
VSLMSM: The vessel or cargo matches the condition described by the attribute value (for multi-valued attributes).
Absent attributes or null values are ignored.
LOGCON states whether "all" or "at least one" of the specifications must be met.

Distinction: No distinctions.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Ballast	ballast	BALAST	0..1	
Category of cargo	categoryOfCargo	CATCGO	0..*	False
Category of dangerous or hazardous cargo or ballast	categoryOfDangerousOrHazardousCargo	CATDHC	0..1	
Category of vessel registry	categoryOfRegistry	CATRGY	0..1	
Category of vessel	categoryOfVessel	CATVSL	0..*	False
Thickness of ice capability	thicknessOfIceCapability	ICECAP	0..1	
Logical connective	logicalConnective	LOGCON	0..1	
Object Name	objectName	OBJNAM	0..*	False
Performance	performance	PRFMNC	0..1	
Information	information	INFORM	0..*	False
Vessel measurement	vesselMeasurement	VSLMSM	0..*	false
Under-keel allowance	underkeelAllowance	UKALNS	0..1	
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality	Association Class
Regulations	Regulations	REGLTS	0..*	AppliesTo
Recommendation	Recommendations	RCMDTS	0..*	AppliesTo
Restrictions	Restrictions	RESDES	0..*	AppliesTo
nautical Information	NauticalInformation	NATINF	0..*	AppliesTo
Ship Report	ShipReport	SHPREP	0..*	--

Information Type: Authority   Alpha code: AUTORI

Camel Case: Authority   Abstract type: False

Super type: Abstract information type

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

References:

Remarks: No remarks.

Distinctions: natinf; rcmdts; resdes;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality
Contact details	ContactDetails	CONDET	0..1
Ship report	IMOShipReport	SHPREP	0..*
Service hours	ServiceHours	SRVHRS	0..*
Regulations	Regulations	REGLTS	0..*
Restrictions	Restrictions	RESDES	0..*

Information Object Class: Contact Details   Alpha code: CONDET

Camel Case: ContactDetails   Abstract type: False

Super type: Abstract information type

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.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Call name	callName	CALNAM	0..1	
Call sign	callSign	CALSGN	1	
Communication channel	communicationChannel	COMCHA	1..*	False
Object Name	objectName	OBJNAM	0..*	False
Delivery point	deliveryPoint	DELPNT	0..*	False
City name	cityName	CITYNM	0..1	
Administrative division	administrativeDivision	ADMDIV	0..1	
Postal code	postalCode	POSCOD	0..1	
Country	country	CONTRY	0..1	
Email address	emailAddress	EMAILS	0..1	
Telephone number	telephoneNumber	NUMTEL	0..1	
Telephone number outside working hours	telephoneNumberOutsideWorkingHours	NMTLOW	0..1	
Fax number	faxNumber	NUMFAX	0..1	
Telex number	telexNumber	NUMTLX	0..1	
Internet address	internetAddress	ADRNET	0..1	
Telegraph address	telegraphAddress	ADRTLG	0..1	
Maritime Mobile Service Identity (MMSI) Code	maritimeMobileServiceIdentityCode	MMSICO	0..1	
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information Object Class: Nautical Information

Alpha code: NATINF

Camel Case: NauticalInformation

Abstract type: False

Supertype: Abstract RXN Type

Definition: Nautical information about a related area or facility.

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

Remarks: No remarks.

Distinctions: REGLTS; RCMDTS; RESDES;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Category of Regulation / Restriction / Recommendation / Nautical Information	categoryOfRxN	CATRXN	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality	Association Type
Applicability	Applicability	APPLIC	0..*	AppliesTo

Information Object Class: Non-standard working day

Alpha code: NWKDAY

Camel Case: NonStandardWorkingDay

Abstract type: False

Super type: Abstract Information type

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: M-3:

Remarks: Populate either FIXDAT or VARDAT.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Fixed date	fixedDate	FIXDAT	0..*	false
Object Name	objectName	OBJNAM	0..*	False
Variable date	variableDate	VARDAT	0..*	false
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Camel Case: Recommendations

Abstract type: False

Supertype: Abstract RXN Type

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: No remarks.

Distinctions: natinf; reglts; resdes;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Category of Regulation / Restriction / Recommendation / Nautical Information	categoryOfRxN	CATRXN	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality	Association Type
Applicability	Applicability	APPLIC	0..*	AppliesTo

Information Object Class: Regulations   Alpha code: REGLTS

Camel Case: Regulations   Abstract type: False

Supertype: Abstract RXN Type

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.

Distinctions: natinf; rcmdts; resdes;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Category of Regulation / Restriction / Recommendation / Nautical Information	categoryOfRxN	CATRXN	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality	Association Type
Applicability	Applicability	APPLIC	0..*	AppliesTo

Camel Case: Restrictions

Abstract type: False

Supertype: Abstract RXN Type

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: No remarks.

Distinctions: natinf; rcmdts; reglts;

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of authority	categoryOfAuthority	CATAUT	1	
Category of Regulation / Restriction / Recommendation / Nautical Information	categoryOfRxN	CATRXN	0..*	False
Object Name	objectName	OBJNAM	0..*	False
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information feature	Camel case	Alpha code	Cardinality	Association Type
Applicability	Applicability	APPLIC	0..*	AppliesTo

Information Object Class: Service hours

Alpha code: SRVHRS

Camel Case: ServiceHours

Abstract type: False

Super type: Abstract Information type

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

References: M-3:

Remarks: No remarks.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Object Name	objectName	OBJNAM	0..*	False
Work schedule	workSchedule	WKSHED	0..1	
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Date, end	dateEnd	DATEND	0..1	
Date, start	dateStart	DATSTA	0..1	
Periodic date end	periodicDateEnd	PEREND	0..1	
Periodic date start	periodicDateStart	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	

Information Object Class: Ship report

Alpha code: SHPREP

Camel Case: ShipReport

Abstract type: False

Supertype: Abstract Information Type

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

Super type: Abstract information type

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

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of IMO ship report	categoryOfShipReport	CATREP	1	
Notice Time	noticeTime	NTCTIM	0..*	False
IMO format for reporting	imoFormatForReporting	IMOREP	0..1	
Information	information	INFORM	0..*	False
Textual description	textualDescription	TXTDSC	0..*	False
Recording Date	recordingDate	RECDAT	0..1	
Recording Indication	recordingIndication	RECIND	0..1	
Source date	sourceDate	SORDAT	0..1	
Source indication	sourceIndication	SORIND	0..1	

Information feature	Camel case	Alpha code	Cardinality	Association Type
Applicability	Applicability	APPLIC	0..*	ActRelation

Annex B. Property Types

Attribute: Action   **Alpha code: ACTION**
Attribute type: Simple
Camel case: action   Data Type: enumeration

Values:

Code	Name	Definition
1	pilotage	carrying a qualified pilot as part of the vessel navigation team
2	passage	navigating a vessel along a route or through a narrow gap, such as under a bridge or through a lock
3	overtaking	Passing a vessel going in the same direction
4	anchorage	attaching a vessel to the seabed by means of an anchor and cable
5	fishing	Hunting or catching fish
6	port entry	Navigating a vessel into a port.
7	port departure	Navigating a vessel out of a port
8	landing	Placing crew or passengers on shore
9	diving	Swimming below the sea surface with an air supply
10	working cargo	Loading or unloading cargo
11	Overboard discharge	Releasing anything into the sea
12	berthing	The action of mooring a ship
13	reporting	To describe as being in a specified state

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

Remarks: No remarks.

Attribute: Administrative division   **Alpha code: ADMDIV**
Attribute type: Simple
Camel case: administrativeDivision   Data type: text

Definition: Administrative division is a generic term for an administrative region within a country at a level below that of the sovereign state.

Remarks: admdiv is used in the context of contact details.
Distinction: ADMARE

Attribute: Ballast   **Alpha code: BALAST**
Attribute type: Simple
Camel case: ballast   Data Type: Boolean

Definition: True: Vessel is predominantly empty of cargo and stabilised with the use of ballast water
False: Vessel is carrying cargo and is not ballasted.

Remarks: No remarks.

Attribute: Call name   **Alpha code: CALNAM**
Attribute type: Simple
Camel case: callName   Data Type: text

Definition: 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".
Distinction: CALSGN - The designated call-sign of a radio station i.e. "WWVB" for Fort Collins, Colorado.

References: INT 1: not specified; M-3: M-4: not specified;

Remarks: No remarks.

Attribute: Call sign   **Alpha code: CALSGN**
Attribute type: Simple
Camel case: callSign   Data Type: text

Definition: The designated call-sign of a radio station.

References: INT 1: not specified; M-4: not specified;

Remarks: No remarks.

Attribute: Category of authority   **Alpha code: CATAUT**
Attribute type: Simple
Camel case: categoryOfAuthority   Data Type: Enumeration

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 law; normally the authority with responsibility for search and rescue.
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: Category of berthing and manouuvring assistance   **Alpha Code: CATBAS**
Attribute type: simple
Camel case: categoryOfBerthingAndManoeuvringAssistance   Data type: Enumeration

Values:

Code	Name	Definition
1	icebreaker	A ship equipped to make and maintain a channel through ice
2	harbor tug	A strongly built powerful boat used for towing and pushing vessels in the harbour area.
3	mooring boat	A boat which assists berthing a vessel with ropes or anchor.
4	mule	A service available for limited and pre-defined customers
5	towing launch	boat, used in harbours for the towage of lighters and other small vessels

References: unspecified

Remarks: No remarks

Attribute: Category of broadcast/communication   **Alpha Code: CATBRC**
Attribute type: simple
Camel case: categoryOfBroadcastAndOrCommunication   Data type: Enumeration

Values:

Code	Name	Definition
1	commercial	A service operated with the intention of earning money
2	non-commercial	A service without any financial interest
3	public	A service available for the general community
4	non-public	A service available for limited and pre-defined customers

References: unspecified

Remarks: No remarks

Attribute: Category of cargo   **Alpha code: CATCGO**
Attribute type: Simple
Camel case: categoryOfCargo   Data Type: Enumeration

Values:

Code	Name	Definition
1	bulk	Normally dry cargo which is transported to and from the vessel on conveyors
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;

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

Attribute: Category of concentration of shipping hazard area   **Alpha code: CATSHA**
Attribute type: Simple
Camel case: categoryOfConcentrationOfShippingHazardArea   Data type: Enumeration

Values:

Code	Name	Definition
1	concentration of merchant shipping	concentration of vessels whose primary purpose is to engage in commerce, including ferries.
2	concentration of recreational vessels	concentration of powered or sailing vessels principally engaged in recreation, leisure, or sporting competition
3	concentration of fishing vessels	concentration of vessels whose primary purpose is to hunt, trap or process fish. The concentration could be on the fishing ground, in transit or in the approaches to home bases or fish markets.
4	concentration of military vessels	concentration of vessels principally engaged in military activities. This includes activities based on mandate of international organisations (e.g. UN). The concentration is in areas others than military excercise areas.

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

Remarks: No remarks

Attribute: Category of dangerous or hazardous cargo or ballast   **Alpha code: CATDHC**
Attribute type: Simple
Camel case: categoryOfDangerousOrHazardousCargo   Data type: Enumeration

Values:

Code	Name	Definition
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 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)

References: International Maritime Dangerous Goods (IMDG) Code

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).

Attribute: Category of channel or frequency preference　　　　**Alpha code: CATFRP**
Attribute type: simple
Camel case: categoryOfChannelOrFrequencyPreference　　　　　　Data type: Enumeration

Values:

Code	Name	Definition
1	preferred calling	the first choice channel or frequency to be used when calling a radio station
2	alternate calling	a channel or frequency to be used for calling a radio station when the preferred channel or frequency is busy or is suffering from interference
3	preferred working	the first choice channel or frequency to be used when working with a radio station
4	alternate working	a channel or frequency to be used for working with a radio station when the preferred working channel or frequency is busy or is suffering from interference

Remarks: No remarks.

Attribute: Category of IMO ship report　　　　　　　　　**Alpha code: CATREP**
Attribute type: Simple
Camel case: categoryOfImoShipReport　　　　　　　　　　　Data type: Enumeration

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

BLAST

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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 Light   **Alpha Code: CATLIT**
Attribute type: simple
CamelCase: categoryOfLight   Data type: Enumeration

[Ref. S-57 3.1]

Attribute: Category of IUCN (International Union for Conservation of Nature and Natural Resources)
        Alpha code: CATIUC
Attribute type: simple
Camel case: categoryOfIUCN   Data Type: Enumeration

Values:

Code	Name	Definition
1	category 1a	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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
2	category 1b	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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
3	category	National Park: protected area managed mainly for ecosystem protection and recreation

	II	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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
4	category III	Natural Monument: protected area managed mainly for conservation of specific natural features 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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
5	category 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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
6	category 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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)
7	category 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. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Remarks: No remarks.

Attribute: Category of marine service   **Alpha code: CATMSV**
Attribute type: Simple
Camel case: categoryOfMarineService   Data Type: Enumeration

Values:

Code	Name	Definition
1	vessel traffic service	A service implemented by a relevant authority primarily designed to improve safety and efficiency of traffic flow and the protection of the environment (International Hydrographic Dictionary, S32)
3	port service	A service provided for the control and operation of a place with terminal and transfer facilities for loading and discharging cargo or passengers (adapted from International Hydrographic Dictionary S32/ port)
4	ship reporting service	A service established by a relevant authority consisting of one or more reporting points or lines at which ships are required to report their identity, course, speed and

		other data to the monitoring authority
5	broadcast service	A service consisting of a radio transmission to provide relevant information to the mariner, e.g. natural conditions, safety, traffic information

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

Remarks: No remarks.

Attribute: Category of maritime broadcast　　　　　　　　　　　　　**Alpha code: CATMAB**
Attribute type: simple
Camel case: categoryOfMaritimeBroadcast　　　　　　　　　　　　　Data type: enumeration

Values:

Code	Name	Definition
1	Navigational warning	message containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended (Maritime Safety Information Manual 2009 [Identical])
2	Meteorological warning	warning of adverse weather conditions
3	Ice report	report of the ice situation and restrictions to shipping
4	SAR information	broadcast message with information about an ongoing SAR operation
5	Pirate attack warning	warning of possible attack by pirates
6	Meteorological forecast	broadcast message containing meteorological forecast
7	Pilot service message	broadcast message about pilot service
8	AIS information	broadcast message about AIS information
9	LORAN message	broadcast message about the LORAN service
10	SATNAV message	broadcast message about Satellite Navigation service
11	Gale warning	warning of winds of Beaufort force 8 or 9
12	Storm warning	warning of winds of Beaufort force 10 or over
13	Tropical revolving storm warning	warning of hurricanes in the North Atlantic and eastern North Pacific, typhoons in the Western Pacific, cyclones in the Indian Ocean and cyclones of similar nature in other regions
14	NAVAREA warning	navigational warning or in-force bulletin promulgated as part of a numbered series by a NAVAREA coordinator (Maritime Safety Information Manual 2009 [Identical])
15	Coastal warning	navigational warning promulgated as part of a numbered series by a National coordinator (Maritime Safety Information Manual 2009 [Identical])
16	Local warning	warning which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority (Maritime Safety Information Manual 2009 [Identical])
17	Low water level warning/Negative tidal surge	warning of actual or expected low water level
18	Icing warning	warning of accretion of ice on ships
19	Tsunami warning	warning of the approach of a tsunami

Remarks: If transmission cannot be described by catmab, populate trmctn. Definitions may be amended by IMO Nav 54 and IMO Nav 55

Attribute: Category of natural conditions　　　　　　　　　　　　**Alpha code: CATNTC**
Attribute type: Simple
Camel case: categoryOfNaturalConditions　　　　　　　　　　　　　Data Type: Enumeration

Values:

Code	Name	Definition
1	wind	Moving air, especially a natural and perceptible movement of air, parallel to or along the earth's surface.
2	swell	The wave motion of the sea surface caused by a meteorological disturbance, which persists after the disturbance has died down or moved away. (The Mariner's Handbook)
3	current	The non-tidal horizontal movement of the sea which may be in the upper, lower or in all layers. In some areas this movement may be nearly constant in rate and direction while in others it may vary seasonally of fluctuate with changes in meterorological conditions. The term is often used improperly to denote tidal streams. (The Mariner's Handbook)
4	tidal stream	The alternating horizontal movement of water associated with the rise and fall of the tide. (The Mariner's Handbook)
5	overfalls	Also known as tide-rips. Turbulence associated with the flow of strong tidal streams over abrupt changes in depth, or with the meeting of tidal streams flowing from different directions. (The Mariner's Handbook
6	tide	The alternate rising and falling of the sea due to the attraction of the moon and the sun. (Concise Oxford English Dictionary).
7	sea level	Information about variations in sea level due to surges, winds, barometric pressure and other non-tidal causes; and warning services or special signals if in operation.
8	magnetic variation	The angle which the magnetic meridian makes with the true meridian. Called "magnetic declination" by physicists. (The Mariner's Handbook)
9	magnetic anomaly	An effect, permanently superimposed on the Earth's normal magnetic field and characterised by abnormal values of the elements of compass variation, dip, and geomagnetic force. (The Mariner's Handbook)
10	ice information	The seasons and dates when navigation is restricted by ice; areas where icebergs may be encountered.
11	sea water characteristics	The general nature of seawater including salinity, density, surface temperature, colour and transparency, and bioluminescence.
12	visibility	The greatest distance under given weather conditions to which it is possible to see without instrumental assistance. (www.answers.com)
13	precipitation	Rain, snow, sleet, or hail that falls to or condenses on the ground. (OED)

Remarks: No remarks.

Attribute: Category of pilot   **Alpha code: CATPLT**
Attribute type: Simple
Camel case: categoryOfPilot   Data Type: Enumeration

Values:

Code	Name	Definition
1	pilot	pilot licenced to conduct vessels during approach from sea to a specified place which may be a handover place, an anchorage or alongside
2	deep sea	pilot licenced to conduct vessels over extensive sea areas
3	harbour	pilot who is licenced to conduct vessels from a specified place, such as a handover area or anchorage into a harbour
4	bar	pilot licensed to conduct vessels over a bar to or from a handover with a river pilot (for example as used in USA)
5	river	pilot licensed to conduct vessels from and to specified places, along the course of a river (for example as used in Rio Amazonas and Rio de La Plata)

6	channel	pilot licensed to conduct vessels from and to specified places, along the course of a channel. (for example as used in Rio Amazonas and Rio de La Plata)
7	lake	pilot licensed to conduct vessels from and to specified places on a great lake. (for example as used in the Lago de Maracaibo in Venezuela)

Remarks: No remarks.

Attribute: Category of pilot boarding place   **Alpha code: CATPIL**
Attribute type: Simple
Camel case: categoryOfPilotBoardingPlace   Data Type: Enumeration

Values:

Code	Name	Definition	References
1	boarding by pilot-cruising vessel	pilot boards from a cruising vessel	INT 1: IT 1.1-3; M-4: 491.1
2	boarding by helicopter	pilot boards by helicopter which comes out from the shore	INT 1: IT 1.4; M-4: 491.2
3	pilot comes out from shore	pilot boards from a vessel which comes out from the shore on request	INT 1: IT 1.1-3; M-4: 491.1

References: not specified

Remarks: No remarks

Attribute: Category of radio methods   **Alpha code: CATRMT**
Attribute type: Simple
Camel case: categoryOfRadioMethods   Data Type: Enumeration

Values:

Code	Name	Definition
1	Low Frequency (LF) voice traffic	Frequency in a frequency range between 30 and 300 kHz used for voice traffic
2	Medium Frequency (MF) voice traffic	Frequency in a frequency range between 300 and 3 000kHz used for voice traffic
3	High Frequency (HF) voice traffic	Frequency in a frequency range between 3 and 30 MHz used for voice traffic
4	Very High Frequency (VHF) voice traffic	Frequency in a frequency range between 30 and 300 MHz used for voice traffic
5	High Frequency Narrow Band Direct Printing	High Frequency Narrow Band Direct Printing
6	NAVTEX	Narrow-band direct-printing telegraphy system for transmission of maritime safety information. (IHO Dictionary, S-32, 5th Edition, 3412
7	SafetyNET	SafetyNET is an international automatic direct-printing satellite-based service for the promulgation of navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages - maritime safety information (MSI) - to ships. (International SafetyNET Manual, 2003 Edition, IMO Publication Number IA908E)
8	TELEX on Radio	A communications system consisting of teletypewriters connected to a

		telephonic network to send and receive wireless signals. (Adapted American Heritage Dictionary
9	Facsimile	A method or device for transmitting documents, drawings, photographs, or the like, by means of radio or telephone for exact reproduction elsewhere. (Dictionary.com Unabridged (v 1.1) 18.01.2008)
10	NAVIP	A Russian system transmitting navigational information, send by radio and containing information relevant to coastal waters of foreign countries and high seas. (Central Marine Research & Design Institute, St.-Petersburg, Russia)
11	Low Frequency (LF) digital traffic	Frequency in a frequency range between 30 and 300 kHz used for digital traffic
12	Medium Frequency (LF) digital traffic	Frequency in a frequency range between 300 and 3000kHz used for digital traffic
13	High Frequency (HF) digital traffic	Frequency in a frequency range between 3 and 30 MHz used for digital traffic
14	Ultra High Frequency (UHF) digital traffic	Frequency in a frequency range between 30 and 300 MHz used for digital traffic
15	Low Frequency (LF) telegraph traffic	Frequency in a frequency range between 30 and 300 kHz used for telegraph traffic
16	Medium Frequency (MF) telegraph traffic	Frequency in a frequency range between 300 and 3 000kHz used for telegraph traffic
17	High Frequency (HF) telegraph traffic	Frequency in a frequency range between 3 and 30 MHz used for telegraph traffic

References: not specified

Remarks: No remarks

Attribute: Category of regulation / restriction / recommendation   **Alpha code: CATRXN**
Attribute type: Simple
Camel Case: categoryOfRxN   Data Type: Enumeration

Values:

Code	Name	Definition
1	Navigation	Regulation/restriction/recommendation/nautical information pertaining to navigation
2	communication	Regulation/restriction/recommendation/nautical information pertaining to communication
3	Environmental protection	Regulation/restriction/recommendation/nautical information pertaining to use of environmental protection
4	Wildlife protection	Regulation/restriction/recommendation/nautical information pertaining wildlife protection
5	security	Regulation/restriction/recommendation/nautical information pertaining security
6	customs	Regulation/restriction/recommendation/nautical information pertaining to customs
7	Cargo operation	Regulation/restriction/recommendation/nautical information pertaining cargo operation
8	safety	Regulation/restriction/recommendation/nautical information pertaining to a

		place of safety or refuge
9	health	Regulation/restriction/recommendation pertaining health
10	Natural resources or exploitation	Regulation/restriction/recommendation/nautical information pertaining to natural resources or exploitation

References: M-3 Chapters C 2.2, C 2.8; BSH new-format Sailing Directions; US Coast Pilot Chapter 2, Navigation Regulations (multiple volumes)

Attribute: Category of relationship   **Alpha code: CATREL**
Attribute type: Simple
Camel case: categoryOfRelationship   Data Type: Enumeration

Definition: This attribute expresses the level of insistence for or against a course of action.

Values:

Code	Name	Definition
1	prohibited	use of facility, waterway, or service is forbidden
2	not recommended	use of facility, waterway, or service is not recommended
3	permitted	use of facility, waterway, or service is permitted by not required
4	recommended	use of facility, waterway, or service is recommended
5	required	use of facility, waterway, or service is required

Remarks: If CategoryOfRelationship is bound to APPLICABILTY, it expresses the relationship to another feature. For example, it expresses how Regulations control Masters of vessels with reference to characteristics of vessels like the vessel's tonnage, length or Registry.

Attribute: Category of restricted area   **Alpha code: CATREA**
Attribute type: Simple
Camel case: **categoryOfRestrictedArea**   Data Type: Enumeration

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 may 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.
29	coral sanctuary	a place where coral is protected

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.

Attribute: Category of supply   **Alpha code: CATSUP**
Attribute type: Simple
Camel case: categoryOfSupply   Data Type: Enumeration

Values:

Code	Name	Definition
1	fuel	A material used to produce heat or power by burning
2	lubricants	A substance capable of reducing friction, heat, and wear when introduced as a film between solid surface
3	potable water	water to drink
4	provisions	food, victuals, catering, and domestic supplies
5	supply of electric energy	Usable power as electricity from ashore
6	telephone connection	a connection to the telephone system by land line
7	wireless internet connection	a technology to connect to the Internet via a radio protocol

References: none

Remarks: none

Attribute: Category of time domain   **Alpha code: CATTIM**
Attribute type: Simple
Camel case: categoryOfTimeDomain   Data Type: Enumeration

Definition: This attribute expresses the level of insistence for or against a course of action.

Values:

Code	Name	Definition
1	climatic	Information obtained by the systematic and continuous recording of natural conditions, such as temperature, atmospheric pressure, visibility, wind direction and strength, etc., and averaging the records for the same period over many years
2	reported	The natural condition (temperature, atmospheric pressure, visibility, wind direction and strength, etc.,) that is reported at particular times daily, such as 0000LT and 1200LT
3	actual	The natural condition (temperature, atmospheric pressure, visibility, wind direction and strength, etc.,) that is being observed at the present time.
4	forecast	A prediction of future natural conditions for a specific locality and time period

Remarks: No remarks.

Attribute: Category of transport facilities   **Alpha code: CATTRA**

Attribute type: Simple
Camel case: categoryOfTransportFacilities   Data Type: Enumeration

Values:

Code	Name	Definition
1	road vehicle	vehicle such as a car, van, or truck
2	boat	small vessel for travelling over water powered by oars, sails or engine
3	tank road vehicle	vehicle with a large receptacle for holding, transporting, or storing liquids
4	tank boat	boat fitted with tanks for carrying liquid in bulk
5	collecting tank	tank for collecting liquids
6	shore pipeline	pipeline which transports liquid, gas or occasionally solids in suspension
7	shore pipeline with special connector	pipeline, with special connectors, to transport liquid, gas or occasionally solids in suspension, to or from shore tanks
8	suction station	station, which is able to remove air from an enclosed space, so that a substance to be transported is moved by suction
9	suction pump vehicle	vehicle, which is able to remove air from an enclosed space, so that a substance to be transported can be sucked into the vehicle
10	purifier installation	installation which removes the dirty or unwanted parts from something
11	container	container of standard dimensions, that can be used for storage or transport
12	skip	large transportable open-topped container normally transported by road vehicle
13	drum	cylindrical container, often with a capacity of about 40 gallons or 200 litres
14	rubbish bin	man portable container with a removable lid normally used to collect rubbish for disposal

References: none

Remarks: none

Attribute: Category of vessel   **Alpha code: CATVSL**
Attribute type: Simple
Camel case: categoryOfVessel   Data Type: Enumeration

Values:

Code	Name	Definition
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

References: none

Remarks: none

Attribute: Category of vessel registry   **Alpha code: CATRGY**

Attribute type: Simple

Camel case: categoryOfVesselRegistry   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.

Values:

Code	Name	Definition
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 which the object that possesses this attribute applies or is located.

Attribute: Category of waste   **Alpha code: CATWAS**

Attribute type: Simple

Camel case: categoryOfWaste   Data Type: Enumeration

Values:

Code	Name	Definition
1	Marpol I dirty ballast water	Dirty ballast is created when seawater is pumped into empty fuel tanks for the purpose of increasing ship stability. The seawater mixes with residual fuel producing "dirty" ballast. Pollutants in dirty ballast may include residual fuel, fuel additives (e.g., biocides), oil and grease, petroleum hydrocarbons, and metals (e.g., copper, nickel, silver, and zinc).
2	Marpol I tank washing (slops)	When switching cargoes, tankers are often required to clean their cargo tanks of residue left over from previous cargo. The remaining oil and water left over from a tank washing is typically stored in one or more slop tanks. Various lubrication and other oils spilled during ship operations may also be stored in the slop tanks
3	Marpol I oily mixtures containing chemicals	Any mix of oils additionally contaminated by one or more chemicals
4	Marpol I scale and sludge from tanker cleaning	The solid and semi-liquid deposits removed from the walls and floor of tanks during tanker cleaning
5	Marpol I oily bilge water	Water contaminated by oil that builds up in the bottom of a ship's bilge
6	Marpol I sludge from fuel oil purifier	semi-liquid deposits removed from fuel oil purifier
7	Marpol II Category X	Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment;
8	Marpol II	Noxious Liquid Substances which, if discharged into the sea from tank cleaning

	Category Y	or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment;
9	Marpol II Category Z	Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment
10	Marpol II Other substances	Substances which have been evaluated and found to fall outside Category X, Y or Z because they are considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning of deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing these substances are not subject to any requirements of MARPOL Annex II;
11	Marpol IV sewage 1	drainage and other wastes from any form of toilets and urinals
12	Marpol IV sewage 2	drainage from medical premises (dispensary, sick bay, etc) via wash basins, wash tubs and scuppers located in such premises
13	Marpol IV sewage 3	drainage from spaces containing living animals
14	Marpol IV sewage 4	other waste waters when mixed with the drainages defined above
15	Marpol V garbage	Garbage means all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present MARPOL Convention.

References: none

Remarks: none

Attribute: Category of weather and ice forecast and warning area   **Alpha code: CATFCA**
Attribute type: simple
Camel case: categoryOfWeatherAndIceForecastAndWarningArea   Data type: enumeration

Values:

Code	Name	Definition
1	World Meteorological Organization (WMO)	The forecast and warning area defined by WMO
2	National high seas	The forecast and warning area defined by national authorities covering High Seas
3	National offshore	The forecast and warning area defined by national authorities covering offshore waters
4	National coastal	The forecast and warning area defined by national authorities covering coastal waters.
5	National inshore	The forecast and warning area defined by national authorities covering inshore waters
6	National local	The forecast and warning area defined by national authorities covering local waters
7	Ice	The ice forecast area defined by international or national authorities

Attribute: City name   **Alpha code: CITYNM**
Attribute type: Simple
Camel case: cityName   Data Type: text

Definition: The name of a town or city

Remarks: No remarks

Attribute: Communication channel   **Alpha code: COMCHA**
Attribute type: Simple
Camel case: communicationChannel   Data Type: text

Definition: A channel number assigned to a specific radio frequency, frequencies or frequency band.

Constraints:

Length	4
Structure	Each VHF-channel should be indicated by 2 digits and up to 2 characters (A-Z)

References: INT 1: IM 40; M-4: 488;

Remarks: The attribute "communication channel" encodes the various VHF-channels used for communication. The indication of several VHF-channels is possible through use of multiplicity > 1.

Attribute: Colour   **Alpha Code: COLOUR**
Attribute Type: simple
Camel case: colour   Data type: Enumeration

[Ref. S-57 v. 3.1]

Attribute: Comparison operator   **Alpha code: COMPOP**
Attribute Type: simple
Camel case: comparisonOperator   Data type: Enumeration

Values:

Code	Label	Description
1	greater than	The value of the left value is greater than that of the right
2	greater than or equal to	The value of the left expression is greater than or equal to that of the right
3	less than	The value of the left expression is less than that of the right
4	less than or equal to	The value of the left expression is less than or equal to that of the right
5	equal to	The two values are equivalent
6	not equal to	The two values are not equivalent

Remarks: Compares the ship's measurements to a value specified by a rule, etc.

Attribute: Country   **Alpha code: CONTRY**
Attribute type: Simple
Camel case: country   Data Type: text

Definition: The name of a nation

References: Adapted from The American Heritage Dictionaries

Remarks: Keep a standard for country names under review.

Attribute: 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:

Other	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

References: not specified

Remarks: This attribute is to be used to indicate the removal or cancellation of an object at a specific date in the future. See also "periodic date end". Example: 19961007 for 07 October 1996 as ending date.

Attribute: 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:

Other	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

References: not specified

Remarks: This attribute is to be used to indicate the deployment or implementation of an object at a specific date in the future. See also "periodic date start". Example: 19960822 for 22 August 1996 as starting date.

Attribute: Day of the week   **Alpha code: DYOFWK**
Attribute type: Simple
Camel case: dayOfWeek   Data Type: Enumeration

Definition: The day of the week.

Values:

Code	Label	Definition
1	Monday	the day of the week before Tuesday and following Sunday
2	Tuesday	the day of the week before Wednesday and following Monday
3	Wednesday	the day of the week before Thursday and following Tuesday
4	Thursday	the day of the week before Friday and following Wednesday
5	Friday	the day of the week before Saturday and following Thursday
6	Saturday	the day of the week before Sunday and following Friday (together with Sunday forming part of the weekend)
7	Sunday	the day of the week before Monday and following Saturday (together with Saturday forms part of the weekend)

Remarks: No remarks.

Attribute: Day of Week Range   **Alpha code: DYWKRN**
Attribute type: Complex
Camel case: dayOfWeekRange   Data Type: Complex

SubAttributes:

Name	Alpha code	Camel case	Cardinality	sequential
Day of the week	dyofwk	dayOfWeek	2	True

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 the definition permits a range of days of the week to cross the week boundaries (e.g., it is possible to specify a range as "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.

Attribute: Deadweight tonnage   **Alpha code: DWTTON**
Attribute type: simple
Camel case: deadweightTonnage   Data type: integer

Definition: The total annual deadweight tonnage of cargo handled by the port, provided by a responsible authority.

Units: None
Resolution: 1

Remarks: Example: 420000 for 420000 tons of cargo handled in a year

Attribute: Delivery point   **Alpha code: DELPNT**
Attribute type: Simple
Camel case: deliveryPoint   Data Type: text

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

References: none

Remarks: This could be repeated if there is more than one address item required in addition to the city name.

Attribute: Depth Range Value 1   **Alpha Code: DRVAL1**
Attribute Type: simple
Camel case: depthRangeValue1   Data type: Float

[Ref. S-57 v. 3.1]

Attribute: Depth Range Value 2　　　　　　　　　　　　　　　**Alpha Code: DRVAL2**
Attribute Type: simple
Camel case: depthRangeValue2　　　　　　　　　　　　　　　Data type: Float

[Ref. S-57 v. 3.1]

Attribute: Destination　　　　　　　　　　　　　　　　　**Alpha code: DSTNTN**
Attribute type: Simple
Camel case: destination　　　　　　　　　　　　　　　　　Data Type: text

Definition: The place or general direction to which a vessel is going or directed.

References: none

Remarks: In addition to a placename of a port, harbour area or terminal, the place could include generalities such as "The north-west", or "upriver".

Attribute: Development　　　　　　　　　　　　　　　　　**Alpha code: DVLPMT**
Attribute type: Simple
Camel case: development　　　　　　　　　　　　　　　　　Data Type: text

Definition: A description of the development that is planned or the work in progress in the port.

References: M-4: B-329

Remarks: Planned work should not be mentioned unless it is about to start. Future phases of a current or impending project may be included.

Attribute: Drum speed　　　　　　　　　　　　　　　　　**Alpha code: DRMSPD**
Attribute type: Simple
Camel case: drumSpeed　　　　　　　　　　　　　　　　　Data Type: integer

Definition: The drum speed in revolutions per minute

References: --

Remarks: The drum speed should be encoded using three digits for the speed including a leading zero if necessary.

Attribute: Email address　　　　　　　　　　　　　　　　**Alpha code: EMAILS**
Attribute type: Simple
Camel case: emailAddress　　　　　　　　　　　　　　　　Data Type: text

Definition: An address assigned to an organisation or person to send or receive electronic mail. Example: steven.smith@domain.com

References: --

Remarks: No remarks.

Attribute: Exhibition Condition of Light　　　　　　　　　　**Alpha Code: EXCLIT**
Attribute Type: simple
Camel case: exhibitionConditionOfLight　　　　　　　　　　　Data type: Enumeration

---

Attribute: Facsimile drum speed   **Alpha code:**
FAXSSP
Attribute type: Complex
Camel case: facsimileDrumSpeed   Data Type: Complex

SubAttributes:

Name	Alpha code	Camel case	Multiplkcity	sequential
Drum speed	DRMSPD	drumSpeed	1	n/a
Index of cooperation	INDCOP	indexOfCooperation	1	n/a

Remarks:

Attribute: Fax number   **Alpha code: NUMFAX**
Attribute type: Simple
Camel case: faxNumber   Data Type: text

Definition: A number assigned to a fax machine. Example: + 49 381 4563769

References: not specified

Remarks: The telephone number should be written according to the ITU Recommendation ITU-T E.123.
Only spaces should be used to visually separate groups of numbers in international notation.

Attribute: Fixed date   **Alpha code: FIXDAT**
Attribute type: Simple
Camel case: fixedDate   Data Type: Date

Definition: The date when an event, such as a festival or national holiday recurs on the same day each year
in the Gregorian calendar

References: not specified

Remarks: No remarks

Attribute: Fire-fighting service   **Alpha code: SRVFBG**
Attribute type: simple
Camel case: fireFightingService   Data Type: enumeration

Values:

Code	Name	Definition
1	shore fire brigade	A shore based organised body of people trained to extinguish fires.
2	fire-fighting boat	A boat fitted with fire pumps and other fire-fighting apparatus for assisting vessels and protecting warehouses and piers against damage by fire. (adapted from International Maritime Dictionary, Second edition 1961)
3	specialists for fire-fighting aboard vessels or offshore installations	An organised body of people specialised to extinguish fires on vessels and offshore installations.

Remarks: No remarks.

Attribute: Frequency pair   **Alpha code: FRQPAR**
Attribute type: Complex
Camel case: frequencyPair   Data Type: Complex

Definition: A pair of frequencies for transmitting and receiving radio signals. The shore station transmits and receives on the frequencies indicated.

Sub-Attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Frequency shore station receives	FRQTXM	frequencyShoreStationTransmits	0..*	True
Frequency shore station receives	FRQRXV	frequencyShoreStationReceives	0..*	True
Working hours of day	TXTDSC	textualDescription	0..*	True

Remarks: An "empty" frequency must be represented by an empty or null-valued sub-attribute and not by an absent sub-attribute. Footnotes and asterisks assigned to particular frequencies or frequency pairs must be put into the TXTDSC.

Attribute: Frequency shore station receives   **Alpha code: FRQRXV**
Attribute type: simple
Camel case: frequencyShoreStationReceives   Data Type: integer

Definition: A pair of frequencies for transmitting and receiving radio signals. The shore station transmits and receives on the frequencies indicated.

Units: kHz
Resolution: 0.1

Remarks: Examples: 4379.1 kHz becomes 043791
13162.8 kHz becomes 131628

Attribute: Frequency shore station transmits   **Alpha code: FRQTXM**
Attribute type: simple
Camel case: frequencyShoreStationTransmits   Data Type: integer

Definition: The shore station transmitter frequency expressed in kHz to one decimal place.

Units: kHz
Resolution: 0.1

Remarks: Examples: 4379.1 kHz becomes 043791
13162.8 kHz becomes 131628

Attribute: Heading   **Alpha code: HEADNG**
Attribute type: Simple
Camel case: heading   Data Type: text

Definition: The title or header of a section or other sub-division of text

References: --

Remarks: No remarks.

Attribute: Height   **Alpha Code: HEIGHT**
Attribute Type: simple
Camel case: height   Data type: Float

[Ref. S-57 v. 3.1]

Attribute: IMO format for reporting   **Alpha code: IMOREP**
Attribute type: Simple
Camel case: imoFormatForReporting   Data Type: Boolean

Definition: True: Reports are required in formats according to standard IMO ship reporting system
False: Reports are required in specified formats which are not according standard IMO ship reporting system

References: --

Remarks: No remarks

Attribute: Index of cooperation   **Alpha code: INDCOP**
Attribute type: Simple
Camel case: indexOfCooperation   Data Type: Integer

Definition: The index of cooperation is generally 576, although 288 with alternate line scanning is sometimes used.

References: --

Remarks: No remarks

Attribute: Information   **Alpha code: INFORM**
Attribute type: Simple
Camel case: information   Data type: text

Definition: Textual information about the object in a single language.

References: INT 1: IA 16; M-4: 242.3-5;

Remarks: The language is expected to be specified in an accompanying attribute (see INFOML, LANGGE).
This attribute should be used, for example, to hold the information that is shown on paper charts by cautionary and explanatory notes.
No formatting of text is possible within INFORM. If formatted text is required, then the attribute TXTDSC must be used.
[Multi-lingual attributes are being defined by TSMAD.]

Attribute: ISPS level   **Alpha code: ISPSLV**
Attribute type: simple
Camel case: ispsLevel   Data type: Enumeration

Values:

Code	Name	Definition
1	ISPS security level 1	The level for which minimum appropriate protective security measures shall be maintained at all times.
2	ISPS security level 2	The level for which appropriate additional protective security measures shall be maintained for a period of time as a result of heightened risk of a security incident
3	ISPS security level 3	The level for which further specific protective security measures shall be maintained for a limited period of time when a security incident is probable or imminent, although it may not be possible to identify the specific target.

Remarks: IMO ISPS Code 2003 Edition is the source.

Attribute: Internet address   **Alpha code: ADRNET**
Attribute type: Simple
Camel case: internetAddress   Data Type: text

Definition: 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).

References: The American Heritage Dictionaries

Remarks: The address could be a website or an ftp site.

Attribute: Jurisdiction   **Alpha code: JRSDTN**
Attribute type: Simple
Camel case: jurisdiction   Data Type: Enumeration

Definition: The jurisdiction applicable to an administrative area.

Values:

Code	Name	Definition
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.

References: --

Remarks: No remarks.

Attribute: Language   **Alpha code: LANGGE**
Attribute type: Simple
Camel case: language   Data Type: text

Definition: The name of a natural language.

Remarks: The value of this attribute must be one of the Alpha-2 codes specified in ISO 639-2:1998.
Distinction: Language information (LNGINF);

Attribute: Light Characteristic   **Alpha code: LITCHR**
Attribute type: Simple
Camel case: lightCharacteristic   Data type: Enumeration

Attribute: Light Visibility   **Alpha code: LITVIS**
Attribute type: Simple
Camel case: lightVisibility   Data type: Enumeration

[Ref. S-57 ver. 3.1]

Attribute: Location name   **Alpha code: LOCNAM**
Attribute type: Simple
Camel case: locationName   Data Type: text

Definition: A verbal designation or description of the location of a feature.

References: GML 3.2

Remarks: This attribute is derived from the "locationName" element in GML. It is intended for designating locations in language a human reader can understand, for designating imprecise locations, or for designating locations which may not have corresponding spatial objects defined in the data set.
This attribute must not be used for encoding the official name of a feature.
Examples: "on a line between X and Y"; "1 mile E of Sandy Hook Light"; "North mole bearing 211° ", "offshore".

Distinction: OBJNAM

Attribute: Maritime Mobile Service Identity (MMSI) Code   **Alpha code: MMSICO**
Attribute type: Simple
Camel case: maritimeMobileServiceIdentityCode   Data Type: Integer

Definition: The Maritime Mobile Service Identity (MMSI) Code is formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations, and group calls. These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network principally to call ships automatically.

Constraints:

length	9

References: Adapted from USCG which in turn adapted it from Appendix 43 of the International Telecommunications Union Radio Regulations

Unit of measure: None

Remarks: Format: XXXXXXXXX   Example: 366777490

Attribute: Medical service   **Alpha code: SRVMED**
Attribute type: simple
Camel case: medicalService   Data Type: enumeration

Values:

Code	Name	Definition
1	crew vaccination	crew vaccination service is available

Remarks: No remarks.

Attribute: Membership   **Alpha code: MBRSHP**
Attribute type: Simple
Camel case: membership   Data Type: Enumeration

Definition: Defines whether a vessel of the specified characteristics is a member of the group for which the recommendation, regulation, restriction, or nautical information item applies.

Values:

Code	Name	Definition
1	included	associated information object applies to vessels satisfying the conditions
2	excepted	associated information object does not apply to vessels satisfying the conditions

Attribute: Minute past even hours   **Alpha code: MNTEVN**
Attribute type: simple
Camel case: minutePastEvenHours   Data type: integer

Definition: The minute past even hours when a routine transmission starts.

Units: Minute of time
Resolution: 1

References: not specified

Remarks: No remarks.

Attribute: Minute past every hour   **Alpha code: MNTALL**
Attribute type: simple
Camel case: minutePastEveryHour   Data type: integer

Definition: The minute past every hour when a routine transmission starts.

Units: Minute of time
Resolution: 1

References: not specified

Remarks: Transmissions more than once every hour can be indicated by repeating the attribute.

Attribute: Minute past odd hours   **Alpha code: MNTODD**
Attribute type: simple
Camel case: minutePastOddHours   Data type: integer

Definition: The minute past odd hours when a routine transmission starts.

Units: Minute of time
Resolution: 1

References: not specified

Remarks: No remarks.

Attribute: Multiplicity of Light   **Alpha code: MLTYLT**
Attribute type: Simple
Camel case: multiplicityOfLight   Data type: Enumeration

[Ref. S-57 ver. 3.1]

Attribute: Nationality   **Alpha code: NATION**
Attribute type: Simple
Camel case: nationality   Data Type: text

Definition: The attribute "nationality" indicates the nationality of the specific object.

Constraints:

Length	2
Structure	The value must conform to ISO 3166

References: ISO 3166

Remarks: No remarks.

Attribute: NAVTEX transmitter identification character   **Alpha code: NTIDCH**
Attribute type: Simple
Camel case: navtexTransmitterIdentificationCharacter   Data Type: text

Definition: The transmitter identification character of a station transmitting NAVTEX for a specified area.

References:

Remarks: Sometimes called "slot"..

Attribute: Notice time   **Alpha code: NTCTIM**
Attribute type: Complex
Camel case: noticeTime   Data Type: Complex

Definition: Span of time, prior to the time the service is needed, for preparations to be made to fulfill the requirement.

References: --

Sub-Attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Notice time in hours	NTCHRS	noticeTimeHours	0..*	n/a
Notice time text	NTCTXT	noticeTimeText	0..1	n/a
Operation	OPERAT	operation	0..1	n/a

Remarks: The absence of OPERAT or a null value for OPERAT means NTCTXT qualifies or explains NTCTIM. In this case NTCHRS and NTCTXT must be read or displayed together.
This enables constructions like:

"Notice of ETA at pilot boarding position should be sent 48, 24 and 6 hours in advance or on departure from the last port if within 48 hours of ETA."
A further instance could be:
"Confirmation is required 2 hours before arriving at xx position."
Product specifications which allow multiplicity > 1 for this attribute should state whether the order of values has any significance and should explain the significance.

Attribute: Notice time in hours   **Alpha code: NTCHRS**
Attribute type: Simple
Camel case: noticeTimeHours   Data Type: real

Definition: The time duration, prior to the time the service is needed, when notice must be provided to the service provider.

References:

Unit of measure: Hours
Quantity: duration

Remarks: See also NTCTIM and NTCTXT

Attribute: Notice time text   **Alpha code: NTCTXT**
Attribute type: Simple
Camel case: noticeTimeText   Data Type: text

Definition: Text string qualifying the notice time specified in ntchrs. This may explain the time specification in ntchrs (e.g., "3 working days" for a ntchrs value of "72") or consist of other language qualifying the time, e.g., "on leaving previous port" or "on passing reporting line XY").

Remarks: See also NTCTIM and NTCHRS.

Attribute: Number of passengers   **Alpha code: NUMPAX**
Attribute type: simple
Camel case: numberOfPassengers   Data type: integer

Definition: The annual number of passengers handled by the port, provided by a responsible authority.

Units: None
Resolution: 1

Remarks: Example: 615000 for 615000 passenger transits through the port in a year

Attribute: Number telex over radio (TOR)   **Alpha code: NUMTOR**
Attribute type: simple
Camel case: numberTelexOverRadio   Data type: Integer

Definition: A special number to contact a radio station via wireless telex

Units: None
Resolution: 1

Remarks:
No remarks.

Attribute: Number of vessels   **Alpha code: NUMVES**
Attribute type: simple
Camel case: numberOfVessels   Data type: integer

Definition: The annual number of ship visits provided by a responsible authority.

Units: None
Resolution: 1

Remarks: Example: 12451 for 12451 ship visits in a year

Attribute: Object name   **Alpha code: OBJNAM**
Attribute type: Simple
Camel case: objectName   Data Type: text

Definition: The individual name of an object.

References: INT 1: ID 7, IF 19, IN 12.2-3; M-4: 371; 323.1-2; 431.2-3; 431.5;

Remarks: no remarks

Attribute: Observation time   **Alpha code: OBSTIM**
Attribute type: simple
Camel case: observationTime   Data type: Time

Definition: The time on each day when observations are made.

References: ISO 8601: 1988.

Remarks: No remarks.

Attribute: Operation   **Alpha code: OPERAT**
Attribute type: Simple
Camel case: operation   Data Type: Enumeration

Values:

Code	Name	Definition
1	largest value	The numerically largest value computed from the applicable attributes or sub-attributes.
2	smallest value	The numerically smallest value computed from the applicable attributes or sub-attributes.

References: unspecified;

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

Attribute: Orientation   **Alpha code: ORIENT**
Attribute type: Simple
Camel case: orientation   Data type: Enumeration

[Ref. S-57 ver. 3.1]

Attribute: Performance   **Alpha code: PRFMNC**
Attribute type: Simple
Camel case: performance   Data Type: text

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

References: unspecified

Remarks: No remarks

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

References: ISO 8601:1988

Remarks: Example: `--1015` for an ending date of 15 October each year

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

References: ISO 8601:1988

Remarks: Example: `--04` for an operation starting in April each year

Attribute: Pictorial representation   **Alpha code: PICREP**
Attribute type: Simple
Camel case: pictorialRepresentation   Data Type: text

Definition: Indicates whether a pictorial representation of the object is available. The string encodes the file name of an external graphic file (pixel/vector) as permitted in the list of allowed support formats.

References: INT 1: IE 3.1-2; M-4: 456.5; 457.3;

Remarks: The "pictorial representation" could be a drawing or a photo.

Attribute: Pilot district   **Alpha code: PILDST**
Attribute type: Simple
Camel case: pilotDistrict   Data Type: text

Definition: The name assigned to the area within which a particular pilotage service operates.

References: INT 1: IT 1.2; M-4: 491.1-2;

Remarks: No remarks.

Attribute: Pilot movement   **Alpha code: PLTMOV**
Attribute type: Simple
Camel case: pilotMovement   Data Type: Enumeration

Definition: The embarkation or disembarkation activity of a pilot. This attribute specifies whether pilots embark and/or leave the vessel.

Values:

Code	Name	Definition
1	embarkation	The place where vessels not being navigated according to a pilot's instructions pick up a pilot while in transit from sea to a port or restricted waters for future navigation under pilot instructions.
2	disembarkation	The place where vessels being navigated under a pilot's instructions in transit from sea to a port or constricted waters drop the pilot and proceed without being subject to pilot instructions.
3	pilot change	The place where vessels being navigated under a pilot's instructions drop off the pilot and pick up a different pilot for future navigation under pilot's instructions.

References: unspecified;

Remarks: If the Pilot boarding place is used at a port for embarkation and disembarkation, this attribute is not used.

Attribute: Pilot qualification   **Alpha code: PLTQFC**
Attribute type: Simple
Camel Case: pilotQualification   Data Type: Enumeration

Definition: --

Values:

Code	Name	Definition
1	government pilot	A pilot service carried out by government pilots.
2	pilot approved by government	A pilot service carried out by pilots who are approved by government.
3	state pilot	A pilot that is licensed by the State (USA) and/or their respective pilot association, required for all foreign vessels and all American vessels under registry, bound for a port with compulsory State pilotage. A federal licence is not sufficient to pilot such vessels into the port
4	federal pilot	A pilot who carries a Federal endorsement, offering services to vessels that are not required to obtain compulsory State pilotage. Services are usually contracted for in advance
5	company pilot	A pilot provided by a commercial company
6	local pilot	A pilot with local knowledge but who does not hold a qualification as a pilot
7	citizen with sufficient local knowledge	A pilot service carried out by a citizen with sufficient local knowledge
8	citizen with doubtful local knowledge	A pilot service carried out by a citizen whose local knowledge is uncertain

Remarks: No remarks.

Attribute: Pilot request   **Alpha code: PLTRQS**
Attribute type: Simple
Camel case: pilotRequest   Data Type: text

Definition: Description of the pilot request procedure.

References: unspecified;

Remarks: No remarks.

Attribute: Pilot vessel   **Alpha code: PLTVSL**
Attribute type: Simple
Camel case: pilotVessel   Data Type: text

Definition: Description of the pilot vessel. The pilot vessel is a small vessel used by a pilot to go to or from a vessel employing the pilot's services. (adapted from Science and Technology Dictionary)

References: unspecified;

Remarks: No remarks.

Attribute: Population   **Alpha code: POPLTN**
Attribute type: Simple
Camel case: population   Data Type: integer

Definition: The reported number of people living in the port being described.

Unit: none;
Resolution: 1

References: unspecified;

Remarks: Example: 25000 for a population of 25000.

Attribute: Population in the vicinity of the port   **Alpha code: POPNBR**
Attribute type: Complex
Camel case: populationInVicinityOfPort   Data type: Complex

Definition: The population in the vicinity of the port and the year for which the population is provided.

Sub-attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Population	POPLTN	population	1	n/a
Action	YERPOP	yearOfPopulation	0..1	n/a

Remarks: No remarks.

Attribute: Postal code   **Alpha code: POSCOD**
Attribute type: Simple
Camel case: postalCode   Data Type: text

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

References: unspecified;

Remarks: No remarks.

Attribute: Preference of pilot boarding place   **Alpha code: PRFPIL**
Attribute type: Simple
Camel case: preferenceOfPilotBoardingPlace   Data Type: Enumeration

Definition: This attribute allows for boarding places to be designated as primary or alternate boarding places.

Values:

Code	Name	Definition
1	Primary	The preferred and published pilot boarding place which is used in normal weather conditions.
2	Alternate	The pilot boarding place which is used if the primary boarding place is unsuitable, for example because of weather or sea state

Remarks: No remarks.

Attribute: Quantity limit   **Alpha code: QTYLIM**
Attribute type: Simple
Camel case: quantityLimit   Data Type: text

Definition: The largest amount, by mass, volume, etc., of something which can be supplied or taken away.

References: unspecified;

Remarks: No remarks

Attribute: Restriction

Attribute type: Simple

Camel case: restriction

Alpha code: RESTRN

Data type: Enumeration

[Ref. S-57 ver. 3.1]

Attribute: Regulation / restriction / recommendation / nautical information code   Alpha code: RXNCOD

Attribute type: Complex

Camel Case: regRestRecNautInfCode

Definition: A summary of the impact of the most common types of regulation, restriction, recommendation and nautical information on a vessel.

Sub-attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Subject	SUBJCT	subject	1	n/a
Action	ACTION	action	1	n/a

Remarks: This attribute can be repeated if there are a number of regulations, etc., affecting the vessel.

Attribute: Remote pilot

Attribute type: Simple

Camel case: remotePilot

Alpha code: RMTPLT

Data Type: Boolean

Definition: Whether remote pilotage is available.

True	Remote pilot is available	Pilotage is available remotely from shore or other location remote from the vessel requiring pilotage
False	Remote pilot is not available	Remote pilotage is not available

References: unspecified;

Remarks: No remarks.

Attribute: Requirements for maintenance of listening watch

Attribute type: Simple

Camel case: requirementsForMaintenanceOfListeningWatch

Alpha code: RMLTWT

Data Type: text

Definition: Description of continuous listening watch requirements. .

References: unspecified;

Remarks: no remarks

Attribute: Scale maximum

Attribute type: Simple

Camel case: scaleMaximum

Alpha code: SCAMAX

Data Type: Integer

Definition: The maximum scale at which the object may be used e.g. for ECDIS presentation. The modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit of measure: None
Resolution: 1

Constraints:

range	$[1, \infty)$

References: unspecified;

Remarks: Example: If a particular maximum scale is specified as 1:25 000 (encoded as 25000), an example of a larger scale would be 1:20 000 (encoded as 20000).

Attribute: Scale minimum   **Alpha code: SCAMIN**
Attribute type: Simple
Camel case: scaleMinimum   Data Type: Integer

Definition: The minimum scale at which the object may be used e.g. for ECDIS presentation. The modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit of measure: None
Resolution: 1

Constraints:

range	$[1, \infty)$

References: unspecified;

Remarks: Example: If a particular maximum scale is specified as 1:25 000 (encoded as 25000), an example of a larger scale would be 1:20 000 (encoded as 20000).

Attribute: Service access procedure   **Alpha code: SVAPRC**
Attribute type: Simple
Camel case: serviceAccessProcedure   Data Type: text

Definition: A description of the procedure to access the marine service.

References: unspecified;

Remarks: None.

Attribute: Sector Limit 1   **Alpha code: SECTR1**
Attribute type: Simple
Camel case: sectorLimit1   Data type: real

[Ref. S-57 ver. 3.1]

Attribute: Sector Limit 2   **Alpha code: SECTR2**
Attribute type: Simple

Camel case: sectorLimit2   Data type: real

[Ref. S-57 ver. 3.1]

Attribute: Repair service   **Alpha code: SRVREP**
Attribute type: simple
Camel case: repairService   Data Type: enumeration

Values:

Code	Name	Definition
1	engine and engine part repair service	A service for repair of an engine or machine parts
2	navigational and electronic equipment service	A service for repair of navigational and electronic equipment
3	underwater repair service	A service for underwater repair
4	hull repair service	A service for repair of the hull and superstructure

Remarks: No remarks.

Attribute: Ship sanitation control   **Alpha code: SSCCRT**
Attribute type: simple
Camel case: shipSanitationControl   Data Type: enumeration

Values:

Code	Name	Definition
1	ship sanitation control	The authority can complete ship sanitation control measures but is unable to issue a certificate
2	SSCC	The authority can issue a Ship Sanitation Control Certificate after satifactorily completing or supervising the completion of ship sanitation control measures. (World Health Organization International Health Regulations (2005))
3	SSCEC	The authority is able to issue Ship Sanitation Control Exemption Certificate after checking that no evidence of a public health risk is found on board. (World Health Organization International Health Regulations (2005))

Remarks: No remarks.

Attribute: Signal Group   **Alpha code: SIGGRP**
Attribute type: Simple
Camel case: signalGroup   Data type: text

[Ref. S-57 ver. 3.1]

Attribute: Signal period   **Alpha code: SIGPER**
Attribute type: Simple
Camel case: signalPeriod   Data type: real

[Ref. S-57 ver. 3.1]

Attribute: Signal Sequence
Attribute type: Simple
Camel case: lightCharacteristic

Alpha code: SIGSEG

Data type: text

[Ref. S-57 ver. 3.1]

Attribute: Siltation
Attribute type: Simple
Camel case: siltationRate

Alpha code: SILTAT

Data Type: text

Definition: The A description of the rate at which the depth in an area decreases. .

References: --

Remarks: No remarks.

Attribute: Source date
Attribute type: Simple
Camel case: sourceDate

Alpha code: SORDAT

Data Type: Date

Definition: The production date of the source, e.g. the date of measurement.

Constraints:
Format CCYYMMDD. The source date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the months (MM) and 2 digits for the Day (DD), according to ISO 8601: 1988.

References: ISO 8601: 1988

Remarks: No remarks.

Attribute: Source indication
Attribute type: Simple
Camel case: sourceIndication

Alpha code: SORIND

Data Type: string

Definition: Information about the source of the object.

Constraints: format c2,c2,c5,c… in the sequence country (2-letter code from ISO 3166), authority (refer Annex A to S-57 Appendix A), source ("graph" or "reprt"), and ID code of source (e.g., code of paper chart)

References: S-57 3.1 Appendix. A chapter 2; ISO 3166

Remarks: --

Attribute: Status
Attribute type: Simple
Camel case: status

Alpha code: STATUS

Data Type: Enumeration

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)	
18	existence doubtful	an object that has been reported but has not been definitely determined to exist	

.

References: --

Remarks: No remarks

Attribute: Subject   **Alpha code: SUBJCT**
Attribute type: Simple
Camel case: subject   Data Type: text

Definition: The subject matter of a regulation, restriction, recommendation or nautical information.

Example: Fishing

Remarks: No remarks.

Attribute: Technical port service   **Alpha code: SRVTEC**
Attribute type: simple
Camel case: technicalPortService   Data Type: enumeration

Values:

Code	Name	Definition
1	degaussing	A service to remove or neutralize the magnetic field of a ship (Websters online Dictionary 2006/02/20).
2	adjustment of magnetic compass	A service to check and adjust the magnetic compass

Remarks: No remarks.

Attribute: Telegraph address   **Alpha code: ADRTLG**
Attribute type: Simple
Camel case: telegraphAddress   Data Type: text

Definition: The telegraphic address assigned to an organisation.

Remarks: No remarks.

Attribute: Telephone number   **Alpha code: NUMTEL**
Attribute type: Simple
Camel case: telephoneNumber   Data Type: text

Definition: A number assigned to a telephone.

References: unspecified;

Remarks: The telephone number should be written according to the ITU Recommendation ITU-T E.123. Only spaces should be used to visually separate groups of numbers in international notation. The letters "int." are used to indicate internal number extensions. Example: + 49 381 4563764 int.254

Attribute: Telephone number outside working hours   **Alpha code: NMTLOW**
Attribute type: Simple
Camel case: telephoneNumberOutsideWorkingHours   Data Type: text

Definition: A number assigned to a service for use outside working hours.

References: unspecified;

Remarks: The telephone number should be written according to the ITU Recommendation ITU-T E.123. Only spaces should be used to visually separate groups of numbers in international notation. The letters "int." are used to indicate internal number extensions. Example: + 49 172 4019079 int.123

Attribute: Telex number   **Alpha code: NUMTLX**
Attribute type: Simple
Camel case: telexNumber   Data Type: text

Definition: Numbers assigned to a telex machine as a unique identifier.

References: unspecified;

Remarks: No remarks.

Attribute: Textual description   **Alpha code: TXTDSC**
Attribute type: Simple
Camel case: textualDescription   Data Type: text

Definition: The file name of an external text file that contains the text.

Remarks: The attribute "textual description" indicates that a file containing text extracted from relevant pilot books or navigational publications is available.

Attribute: Thickness of ice capability   **Alpha code: ICECAP**
Attribute type: Simple
Camel case: thicknessOfIceCapability   Data Type: Integer

Definition: The thickness of ice that the ship can safely transit.

Unit of measure: centimetres
Quantity: length

Constraints:

range	$[1, \infty)$

References: unspecified;

Remarks: Example: 080 for ice which has a thickness of 80 cm

Attribute: Time of end of work   **Alpha code: TIMENW**
Attribute type: Simple
Camel case: timeOfEndOfWork   Data Type: time

Definition: The time of the end of the working day.

References: ISO 8601:1988

Remarks: none

Attribute: Time of observation   **Alpha code: TIMOBS**
Attribute type: Complex
Camel case: timeOfObservation   Data type: complex

Definition:
The time in the day when a weather or ice observation is made, expressed in UTC or local time. The time of observation normally amplifies the time of transmission of radio-facsimile weather maps or ice charts.

Sub-attributes:

Sub-attribute	CamelCode Identifier	Multiplicity	sequential
TIMREF	methodOfExpressingTime	1	n/a
OBSTIM	observationTime	1	n/a

Remarks: No remarks.

Attribute: Time of start of work   **Alpha code: TIMSTW**
Attribute type: Simple

Camel case: timeOfStartOfWork   Data Type: time

Definition: The time of the start of the working day.

References: ISO 8601:1988

Remarks: No remarks

Attribute: Time reference   **Alpha code: TIMREF**
Attribute type: Simple
Camel case: timeReference   Data Type: Enumeration

Values:

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

References: unspecified;

Remarks: No remarks.

Attribute: Times of transmission   **Alpha code: TIMTRM**
Attribute type: complex
Camel case: timesOfTransmission   Data type: Complex

Definition: One or more times in the day when the radio station starts a routine transmission, normally expressed in UTC or local time.

Sub-attribute	CamelCode Identifier	multiplicity	sequential
TIMREF	timeReference	1	n/a
TRMTIM	transmisssion time	0..*	true
MNTALL	minutePastEveryHour	0..1	n/a
MNTEVN	minutePastEvenHour	0..1	n/a
MNTODD	minutePastOddHour	0..1	n/a

Remarks: TIMREF is mandatory if TRMTIM is populated.

Attribute: Traffic flow   **Alpha code: TRAFIC**
Attribute type: simple
Camel case: trafficFlow   Data Type: enumeration
References: INT-1: IM-40; M-4: 488
Values:

Code	Name	Definition
1	inbound	traffic flow in a general direction toward a port or similar destination
2	outbound	traffic flow in a general direction away from a port or similar point of origin
3	one-way	traffic flow in a one general direction only
4	two-way	traffic flow in a two generally opposite directions

Remarks: No remarks.

Attribute: Transport details　　　　　　　　　　　　　　　　**Alpha code: TRADET**
Attribute type: Complex
Camel case: transportDetails　　　　　　　　　　　　　　　　　Data Type: Complex

Definition: Details of the transport for supplies or waste

Sub-Attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Category of transport facilities	CATTRA	categoryOfTransportFacilities	0..*	true
Notice time	NTCTIM	noticeTime	0..*	true
Quantity limit	QTYLIM	quantityLimit	0..*	true

Remarks: No remarks.

Attribute: Transmission time　　　　　　　　　　　　　　　　**Alpha code: TRMTIM**
Attribute type: simple
Camel case: transmissionTime　　　　　　　　　　　　　　　　　Data type: Time

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

References: ISO 8601: 1988.

Remarks: No remarks.

Attribute: Transportation infrastructure　　　　　　　　　　**Alpha code: TRPTFC**
Attribute type: Simple
Camel case: transportationInfrastructure　　　　　　　　　　　Data Type: text

Definition: A brief description of the transportation options to or from the port by road, rail, air or inland waterway.

References: none

Remarks: Examples:

1. "International airport 20km distant. Road and rail connections with all other parts of the country and other nations in southern Africa."

2. "The port is connected to the Trans-Siberian Railway system. There is a hydrofoil service with Nakhodka."

Attribute: Transmission content (other than MSI)　　　　　**Alpha code: TRMCTN**
Attribute type: simple
Camel case: transmissionContent　　　　　　　　　　　　　　　Data type: text

Definition: Content of transmission.

Remarks: Not to be used if CATMAB is populated.

Attribute: Transmission of traffic list　　　　　　　　　　　**Alpha code: TRMTFC**
Attribute type: simple

Camel case: transmissionOfTrafficList

Data type: Boolean

Values:

| True | traffic list | The radio station transmits traffic lists |
| False | no traffic list | The radio station does not transmit traffic lists |

References: --

Remarks: No remarks.

Attribute: Transmission regularity   **Alpha code: TRMREG**

Attribute type: simple

Camel case: transmissionRegularity   Data type: enumeration

Values:

Code	Name	Definition
1	continuous	transmission is made continuously
2	regular	transmission is made regularly according to a schedule
3	on receipt	transmission is made when warning or information is received from another authority
4	as required	transmission is made under specified conditions or when needed
5	on request	transmission is made when requested by a user

Remarks:
No remarks.

Attribute: Transmitter identification character   **Alpha code: TRIDCA**

Attribute type: simple

Camel case: transmitterIdentificationCharacter   Data type: text

Definition: The NAVTEX transmitter identification character is a single unique letter, which is allocated to each transmitter. It is used to identify the broadcasts, which are to be accepted by the receiver, those which are to be rejected, and the time slot for the transmission.

References: INT 1: M-3: UKHO ALRS Volume 5 Chapter 15 (NAVTEX)

Remarks: The transmitter identification character should be indicated by a single character (A-Z)

Attribute: Underkeel allowance   **Alpha code: UKALNS**

Attribute type: Complex

Camel case: underkeelAllowance   Data type: complex

Definition:
A fixed figure, or a figure derived by calculation, which is added to draught in order to maintain the minimum underkeel clearance taking into account the vessel's static and dynamic characteristics, sea state and weather forecasthe reliability of the chart and variance from predicted height of tide or water level.

Reference:
Decision SNPWG 13.

Sub-attribute	Camel Code Identifier	Multiplicity	Sequential

UKAFIX	underkeelAllowanceFixed	0..1	n/a
UKAVAR	underkeelAllowanceVariable	0..1	n/a
OPERAT	operation	0..1	n/a

Remarks:
Underkeel allowance is either a fixed allowance in feet or metres or a variable allowance calculated from a percentage of the vessel's draught or beam.

Attribute: Underkeel allowance fixed   **Alpha code: UKAFIX**
Attribute type: Simple
Camel case: underkeelAllowanceFixed   Data type: Real

Definitions: A fixed value given by an authority which is added to draught in order to maintain a minimum underkeel clearance.

References: Adapted --

Attribute: Underkeel allowance variable   **Alpha code: UKAVAR**
Attribute type: Complex
Camel case: underkeelAllowanceVariable   Data type: complex

Definition: A variable allowance given by an authority which is added to draught in order to maintain a minimum underkeel clearance.

Sub-attribute	Camel Code Identifier	Multiplicity	Sequential
UKAVBB	underkeelAllowanceVariableBeamBased	0..1	n/a
UKAVDB	underkeelAllowanceVariableDraughtBased	0..1	n/a

References: --

Remarks: UKAVAR is based either on beam or draught.

Attribute: Underkeel allowance variable beam based   **Alpha code: UKAVBB**
Attribute type: Simple
Camel case: underkeelAllowanceVariableBeamBased   Data type: Real

Definition: A percentage value given by an authority which is applied to ship's beam to calculate underkeel allowance.

References: --

Remark: Example: 1.5 for a minimum underkeel allowance of 1.5% of ship's beam.

Attribute: Underkeel allowance variable draught based   **Alpha code: UKAVDB**
Attribute type: Simple
Camel case: underkeelAllowanceVariableDraughtBased   Data type: Real

Definition: A percentage value, given by an authority, which is applied to ship's draught to calculate underkeel allowance.

References: --

Remark: Example: 10 for a minimum underkeel clearance of 10% of ship's draught.

Attribute: Variable date   **Alpha code: VARDAT**
Attribute type: Simple
Camel case: fixeddate   Data Type: Date

Definition: A day which is not fixed in the Gregorian calendar.

References: not specified

Remarks: No remarks

Attribute: Vessel's measurements   **Alpha code: VSLMSM**
Camel case: vesselsMeasurements
Attribute type: Complex   Data type: complex

Definition: Multitude of terms and definitions specifically related to vessels. (http://en.wikipedia.org; 24 July 2010)

Sub-attribute	Camel Code Identifier	Multiplicity	Sequential
VSLCAR	vesselsCharacteristics	1	n/a
VSLVAL	vesselsCharacteristicsValue	1	n/a
VSLUNT	vesselsCharacteristicsUnit	1	n/a
COMPOP	ComparisonOperator	1	n/a

Attribute: Vessel's characteristics   **Alpha code: VSLCAR**
Attribute type: simple
Camel case: vesselsCharacteristics   Data type: Enumeration

Values:

Code	Name	Description
1	length overall	The maximum length of the vessel (L.O.A.).
2	length at waterline	The vessel's length measured at the waterline (L.W.L.).
3	breadth	The width or beam of the vessel.
4	draught	The depth of the keel below the waterline at any point along the hull. (UKHO NP100/2009)
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). 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. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
7	displacement tonnage, light	The weight of the vessel excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
8	displacement tonnage, loaded	The weight of the vessel 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. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
9	deadweight tonnage	Deadweight tonnage (also known as deadweight and "payload", abbreviated to DWT, D.W.T., d.w.t., or dwt) is a measure of how much weight a vessel is carrying or can safely carry. It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew. The term is often used to specify a vessel's maximum permissible deadweight, the DWT when the vessel is fully loaded so that its Plimsoll line is at the point of submersion, although it may also denote the actual DWT of a vessel not loaded to capacity. Deadweight tonnage was historically expressed in long tons but is now usually given internationally in tonnes. Deadweight tonnage is not a measure of the vessel's displacement and should not be confused with gross tonnage or net tonnage (or their more archaic forms gross register tonnage or net register tonnage). http://en.wikipedia.org/wiki/Deadweight_tonnage; 5 October 2010. The difference between displacement, light and displacement, loaded. A measure of the vessel's total carrying capacity. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
10	gross tonnage	The entire internal cubic capacity of the vessel 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. This characteristic is not a unit of weight. (Adapted from 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. This characteristic is not a unit of weight. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010).
12	Panama Canal/Universal Measurement System net tonnage	The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
13	Suez Canal net tonnage	The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)

Attribute: Vessel characteristic value   **Alpha code: VSLVAL**
Attribute type: Simple
Camel case: vesselsCharacteristicsValue   Data type: Real

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

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

Unit: defined by VSLUNT

Remarks:

Attribute: Vessel units   **Alpha code: VSLUNT**
Attribute type: simple
Camel case: vesselUnits   Data type: Enumeration

Values:

Code	Name	Description
1	metre	The metre (or meter) is the base unit of length in the International System of Units (SI). It is defined as the distance travelled by light in vacuum in 1⁄299,792,458 of a second. (Adapted from http://en.wikipedia.org/wiki/Metre 4 Oct 2010)
2	foot	A foot (plural: feet) is a non-SI unit of length in a number of different systems including English units, Imperial units, and United States customary units. The most commonly used foot today is the international foot. There are three feet in a yard and 12 inches in a foot. (Adapted from http://en.wikipedia.org/wiki/Feet_(unit) 4 Oct 2010)
3	metric ton	The tonne or metric ton (U.S.), often redundantly referred to as a metric tonne, is a unit of mass equal to 1,000 kg (2,205 lb) or approximately the mass of one cubic metre of water at four degrees Celsius. It is sometimes abbreviated as mt in the United States, but this conflicts with other SI symbols. The tonne is not a unit in the International System of Units (SI), but is accepted for use with the SI. In SI units and prefixes, the tonne is a megagram (Mg). The Imperial and US customary units comparable to the tonne are both spelled ton in English, though they differ in mass. Pronunciation of tonne (the word used in the UK) and ton is usually identical, but is not too confusing unless accuracy is important as the tonne and UK long ton differ by only 1.6%. (Adapted from http://en.wikipedia.org/wiki/Tonne 4 Oct 2010)
4	ton	Long ton (weight ton or imperial ton) is the name for the unit called the "ton" in the avoirdupois or Imperial system of measurements, as used in the United Kingdom and several other Commonwealth countries. It has been mostly replaced by the tonne, and in the United States by the short ton. One long ton is equal to 2,240 pounds (1,016 kg) or 35 cubic feet (0.9911 m3) of salt water with a density of 64 lb/ft³ (1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty—for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST). (Adapted from http://en.wikipedia.org/wiki/Long_ton 4 Oct 2010)
5	short ton	The short ton is a unit of weight equal to 2,000 pounds (907.18474 kg). In the United States it is often called simply ton without distinguishing it from the metric ton (tonne, 1,000 kilograms) or the long ton (2,240 pounds / 1,016.0469088 kilograms); rather, the other two are specifically noted. There are, however, some U.S. applications for which unspecified tons normally means long tons (for example, Navy ships) or metric tons (world grain production figures). Both the long and short ton are defined as 20 hundredweights, but a hundredweight is 100 pounds (45.359237 kg) in the U.S. system (short or net hundredweight) and 112 pounds (50.80234544 kg) in the Imperial system (long or gross hundredweight). (Adapted from http://en.wikipedia.org/wiki/Short_ton 4 Oct 2010)
6	gross ton	Gross tonnage (GT) is a function of the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory

		requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity. Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
7	net ton	Net tonnage (NT) is based on a calculation of the volume of all cargo spaces of the ship. It indicates a vessel's earning space and is a function of the moulded volume of all cargo spaces of the ship. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
8	Panama Canal/Universal Measurement System net tonnage	The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
9	Suez Canal net tonnage	The Suez Canal Net Tonnage (SCNT) is derived with a number of modifications from the former net register tonnage of the Moorsom System and was established by the International Commission of Constantinople in its Protocol of 18 December 1873. It is still in use, as amended by the Rules of Navigation of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
10	none	Can be used for net and gross tonnages, including Panama Canal/Universal Measurement System net tonnage and The Suez Canal Net Tonnage

Attribute: Volume of Traffic   **Alpha code: VOLTRF**

Attribute type: complex
Camel case: volumeOfTraffic   Data type: complex

Definition: The annual volume of traffic expressed as number of vessels, deadweight tonnage, number of passengers handled by a port, and the year of each report.

Sub-attribute	Camel Code Identifier	Multiplicity	Sequential
NUMVES	numberOfVessels	0..1	n/a
YERVES	yearOfNumberOfVessels	0..1	n/a
DWTTON	deadweightTonnage	0..1	n/a
YERDWT	yearOfDeadweightTonnage	0..1	n/a
NUMPAX	numberOfPassengers	0..1	n/a
YERPAX	yearOfNumberOfPassengers	0..1	n/a

Attribute: Weather risk   **Alpha code: WEARSK**

Attribute type: Simple
Camel case: weatherRisk   Data type: text

Definition: A description of local weather and sea state which may impede ship operations, such as entry or berthing, or which could affect the vessel remaining safely moored or anchored.

References: INT 1: not specified; M-4: not specified;

Remarks: No remarks.

Attribute: Working hours of day　　　　　　　　　　　　　　　　　　**Alpha code: WKHRDY**
Attribute type: Complex
Camel case: workingHoursOfDay　　　　　　　　　　　　　　　　　　Data Type: Complex

Definition: The working hours of the day for the port or service.

Sub-Attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Time reference	TIMREF	timeReference	1	n/a
Time of start of work	TIMSTW	timeOfStartOfWork	1..*	True
Time of end of work	TIMENW	timeOfEndOfWork	1..*	True

Constraints:

Other	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

Remarks: No remarks.

Attribute: Working schedule　　　　　　　　　　　　　　　　　　**Alpha code: WKSHED**
Attribute type: Complex
Camel case: workingSchedule　　　　　　　　　　　　　　　　　　Data Type: Complex

Definition: The working days of the week.

Sub-Attributes:

Name	Alpha code	Camel case	Cardinality	sequential
Day of week	DYOFWK	dayOfWeek	0..7	True
Day of week range	DYWKRN	dayOfWeekRange	0..1	True
Working hours of day	WKHRDY	workingHoursOfDay	0..1	True

Constraints:

Other	Duplicates or overlaps are not permitted.

Remarks: No remarks.

Attribute: Year of deadweight tonnage　　　　　　　　　　　　　　**Alpha code: YERDWT**
Attribute type: Simple
Camel case: yearOfDeadweightTonnage　　　　　　　　　　　　　　Data Type: Date

Definition: The year the deadweight tonnage report.

References: ISO 8601:1988

Remarks: YERDWT is mandatory if DWTTON is populated
Example: 2007 for 2007 as year of report of deadweight tonnage

Attribute: Year of population   **Alpha code: YERPOP**
Attribute type: Simple
Camel case: yearOfPopulation   Data Type: Date

Definition: The year the population was recorded.

References: ISO 8601:1988

Remarks: No remarks

Attribute: Year of number of passengers   **Alpha code: YERPAX**
Attribute type: Simple
Camel case: yearOfNumberOfPassengers   Data Type: Date

Definition: The year the number of passengers report.

References: ISO 8601:1988

Remarks: YERPAX is mandatory if NUMPAX is populated
Example: 2007 for 2007 as year of report of number of passengers

Attribute: Year of number of vessels   **Alpha code: YERVES**
Attribute type: Simple
Camel case: yearOfNumberOfVessels   Data Type: Date

Definition: The year of the number of vessels report.

References: ISO 8601:1988

Remarks: YERVES is mandatory if NUMVES is populated
Example: 2007 for 2007 as year of report of number of vessels.

Annex C. Association classes

Association Class: Applies to

Alpha code: **APPLTO**

Camel Case: **AppliesTo**

Abstract type: False

Definition: An association class for the relationship between Applicability and regulations, restrictions, recommendations, and nautical information.

References: M-3:

Remarks: No remarks.

Attribute	Camel case	Alpha code	Cardinality	Sequential
membership	membership	MBRSHP	0..1	

Association Class: Act relationship

Alpha code: **ACTREL**

Camel Case: **ActRelationship**

Abstract type: False

Definition: An association class for the relationship between Applicability and places, facilities, or services, this association describes whether the relationship is allowed, forbidden, discouraged, etc.

References: M-3:

Remarks: No remarks.

Attribute	Camel case	Alpha code	Cardinality	Sequential
Category of relationship	categoryOfRelationship	CATREL	0..1	