Input paper: [[1]](#footnote-1) ENAV22-8.1.4

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **□** ENG **□** PAP **□** Input

**■** ENAV **□** VTS **■** Information

Agenda item [[2]](#footnote-2) 8

Technical Domain / Task Number 2 Working Group 1(Harmonisation)

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Progress of research into SMART-NAVIGATION product specification

# Summary

The Republic of Korea decided to use SMART-Navigation as the name of the Korean e-navigation test bed project, which investigates exchange of data between ship and shore for SMART-Navigation services that adhere to the S-100 standard. The SMART-Navigation product specification is developed as message-level product standard rather than developing a product-specific product standard.

## Purpose of the document

e-navigation test beds are progressing all around the world with projects like STM Validation, Efficiensea 2, to name a few. These test beds are exchanging data between ships and shore based on the S-100 standard, with relevant outputs being introduced through related international bodies, include IALA.

Likewise, we wish to introduce how the Korean e-Navigation test bed utilize the S-100 standard, and we hope to have a chance for technical cooperation and exchange with other test-beds.

## Related documents

None

# Background

The SMART-Navigation project is organized and funded by Ministry of Oceans and Fisheries of the Republic of Korea to implement e-navigation services in its waters based on IMO’s e-Navigation concept adding special features: (1) services for non-SOLAS ships and (2) broadband communication using navigation-dedicated LTE networks (LTE-Maritime) for better connectivity between ship and shore.

This paper has been jointly produced by KR (Korean Register) and Marine Works whom have taken on the role of data standardization within the Development Group of SMART-Navigation for the establishment of specification for SMART-Navigation service made by service developer.

# Discussion

Refer to annex

# References

IHO S-100 Universal Hydrographic Data Model, Edition 3.0.0, April 2017.

# Action requested of the Committee

This paper is for information only and requires no action by the committee.

Annex 1. SMART-Navigation product specification draft version

SMART-Navigation Product Specification (Draft vERSION)

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# 1. Introduction

## 1.1 General

The SMART-Navigation product specification is the product specification developed to standardize the data exchange within the SMART-Navigation system.

The SMART-Navigation product specification is designed to assure a high quality of data exchanged between ship and shore (SMART-Navigation center).

The scope of the SMART-Navigation product specification is to unify the data interchange format and to enhance information comprehension in for the end users.

The specification adopts S-100 standards, in which information is generated in encoding format such as 8211, GML, HDF-5, LUA. This means that it can be implemented on different, and often disparate, IT systems. It is this methodology, including the concept of modularization, which may make the specification of interest to the other S-100 based product specifications or e-Navigation services.

## 1.2 BackGround

The SMART-Navigation project is organized and funded by Ministry of Oceans and Fisheries of the Republic of Korea to implement e-navigation services in its waters based on IMO’s e-Navigation concept adding special features: (1) services for non-SOLAS ships and (2) broadband communication using navigation-dedicated LTE networks (LTE-Maritime) for better connectivity between ship and shore.

The project is aiming to implement parts of MS 1-7, MS10-12 and MS14-15. Within these MS’s the project will implement six technical services: (1) Navigation Monitoring & Assistance Service (NAMAS), (2) Ship-borne System Monitoring Service (SBSMS), (3) Safe & Optimal Route Planning Service (SORPS), (4) Real-time Electronic Navigational Chart Distribution & Streaming Service (REDSS), (5) Pilot & Tub Assistance Service (PITAS) and (6) Maritime Environment and Safety Information Service (MESIS). Most of the services are designed for vulnerable ships which are ships with high-accident ratio or huge accident impact socially, environmentally or economically.

* ­NAMAS monitors navigation of vulnerable ships and gives alarm for navigation assistance to prevent collision and grounding. It uses positional information of ships and their route information when available. LTE-Maritime and VDES are being considered as physical communication links for NAMAS.
* ­SBSMS monitors on-board systems of passenger ships with Korean flag and other ships requesting the service to detect hazardous events within the ships such as flooding, fire and engine failure. LTE-Maritime and VDES are being considered as physical communication links for SBSMS but not limited to these. Other communication links available on-board of service requesting ship can be used as well.
* ­SORPS provides safe and optimal routes plan when requested. It can be used for voyage planning by merchant ships or for emergency route guidance for small vessels without navigation-aid systems such as radar and AIS. LTE-Maritime and VDES are being considered as physical communication links for SORPS but not limited to these. Other communication links available on-board of service requesting ship can be used as well.
* ­REDSS provides ENC of Korean waters for SOLAS and Non-SOLAS ships when requested. It supports streaming as well for small ships without on-board electronic chart system (ECS). Only LTE-Maritime is being considered as physical communication links for REDSS.
* ­PITAS supports pilotage by providing pilots and tugs with information needed for pilotage. Only LTE-Maritime is being considered as physical communication links for PITAS.
* ­MESIS provides maritime safety information (MSI) including navigational warning, weather information, hydrographic information and maritime environment information. LTE-Maritime and VDES are being considered as physical communication links for MESIS but not limited to these. Other communication links available on-board of service requesting ship can be used as well

## 1.3 Structure of this Document

The remainder of this document is organized as follows:

* Section 2 lists the exchange data and introduce structure of data package.
* Section 3 presents the exchange scenario for SMART-Navigation service such as list the using message model, introduction of service, data exchange cycle and situation.
* Section 4 drills down the details of the message model as service components

## 1.4 Terminology

|  |  |
| --- | --- |
| **SMART-Navigation** | Korean e-Navigation test-bed project with 6 service |
| **NAMAS** | As one of the smart navigation services, this service monitors the navigation of vulnerable vessels and provides navigational assistance alerts for collision and ground prevention. |
| **SBSMS** | As one of the smart navigation services, this service monitors on-board systems of passenger ships with Korean flag and other ships requesting the service to detect hazardous events within the ships such as flooding, fire and engine failure. |
| **SORPS** | As one of the smart navigation services, this service provides safe and optimal routes plan when requested |
| **REDSS** | As one of the smart navigation services, this service provides ENC of Korean waters for SOLAS and Non-SOLAS ships when requested and It supports streaming as well for small ships without on-board electronic chart system (ECS). |
| **PITAS** | As one of the smart navigation services, this service supports pilotage by providing pilots and tugs with information needed for pilotage. |
| **MESIS** | As one of the smart navigation services, this service provides maritime safety information (MSI) including navigational warning, weather information, hydrographic information and maritime environment information |
| **Message specification** | As a minimum unit module defined for smart navigation data exchange, which is an information unit exchanged when each event occurs. |

## 1.5 Acronyms

**IALA** International Association of Marine Aids to Navigation and lighthouse Authorities - AISM

**JSON** JavaScript Object Notation

**MCP** The Maritime Connectivity Platform (formerly the Maritime Cloud)

**MRN** Maritime Resource Name

**MS** Maritime Service Portfolio

**S-100** Universal Hydrographic Data Model (IHO)

**UML** Unified Modelling Language

**VTS** Vessel Traffic Services

**XML** Extensible Mark-up Language

**GML** Geography Markup Language

**HDF-5** Hierarchical Data Format version **5**

**MSI** Maritime Safety Information

**ENC** Electronic Navigation Chart

**VDES** VHF Data Exchange System

**ECS** VHF Data Exchange System

**AIS** Automatic Identification System

**ECS** Electronic Chart System

**WMTS** Web Map Tile Service

**DDS** Data Distribution Service

**MCC** Maritime Connectivity Platform

**MMS** Maritime Messaging Service

# 2. SMART-NAVIGATION Product Specification : System overview

## 2.1 Criteria

The SMART-Navigation product specification covers technical information and data structure for a service that wishes to adopt this specification.

The specification implements the S-100 standard, in which information is generated in formats such as GML, LUA, HDF-5, 8211. This means that it can be implemented on different, and often disparate, IT systems. This specification applies modularization concept to enhance development flexibility in consideration of interoperability and maintenance.

Data produced in accordance with S-100 is done so in a modular form, called a "Message specification", and is defined as the smallest self-contained data unit within the SMART-Navigation product specification.

As shown in Figure 1, the SMART-Navigation system is made of various entities, and has four main components: MCP Connector, DDS (Data Distribution Service), e-Navigation Service, and Database. Each system entity (a person or an organization) interface with the other services or manages data in SMART-Navigation system.

The data format for internal interface (interchanging data among components) is its own bespoke format, while the external interface (produced from SMART-Navigation service and provided by external systems) format is one of the S-100 encoding formats and the other format.

The role of the MCP Connector is to bridge internal and external interfaces to improve service efficiency. All service data based on S-100 encoding formats, that are applicable to the product are gathered and managed in the MCP Connector as shown in figure 1.

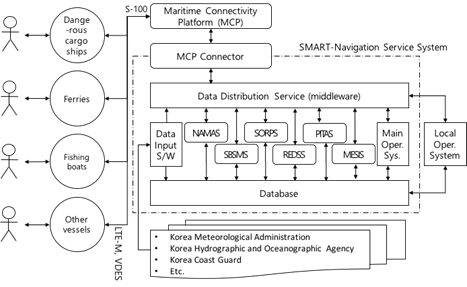


Figure 1 The Architecture of SMART-Navigation system

## 2.1.1 Example Data Flow Scenario

Figure 2 below presents an example of the data flow in a simple scenario. Consumers request the optimal safety route with the current location and destination in the smart navigation system. The request message is S-100 GML format. The request message is sent to the MCC via MCP, and the MCC converts the request message in its own bespoke format. The converted message is delivered to SORPS and the optimal route based on request information is generated in the service. The optimal route is delivered to the MCC, and the format is an internal format. The optimal route is converted from MCC to S-100 GML format, and is provided to consumers through MCP.



Figure 2 Data Flow Scenario for SORPS

## 2.2 Data Covered by SMART-Navigation

The SMART-Navigation system covers the exchange of the main information listed in table 1.

|  |  |  |
| --- | --- | --- |
| **Ship Information** | | |
| No. | Information | Type of data |
| 1 | Vessel Name | Text |
| 2 | IMO No. | Integer |
| 3 | Call Sign | Text |
| 4 | MMSI Code | Integer |
| 5 | Ship Yard | Text |
| 6 | Delivery date | Date Time |
| 7 | Vessel Type | Code List |
| 8 | Flag | Text |
| 9 | Registered port | Text |
| 10 | Class Society | Text |
| 11 | Ship Dimensions | Real |
| 12 | Engine Specification | Text |
| 13 | Position | Real |
| 14 | Speed | Real |
| 15 | Ship Motion | Real |
| 16 | Navigation Status | Enumeration |
| 17 | Navigation Equipment Type | Enumeration |
| 18 | Navigation Equipment alarm status | Bool |
| 19 | Engine room alarm type | Enumeration |
| 20 | Engine room alarm Status | Bool |
| 21 | Fire Door position | Text |
| 22 | Fire Door status | Bool |
| 23 | Fire Alarm Count | Integer |
| 24 | Fire Detection Position | Text |
| 25 | Fire Alarm status | Bool |
| 26 | Tank Type | Enumeration |
| 27 | Tank Capacity | Real |
| 28 | Tank Alarm status | Bool |
| 29 | Tank Level Gauge | Real |

|  |  |  |
| --- | --- | --- |
| **Accident Information** | | |
| No. | Information | Type of data |
| 1 | Collision Risk | Real |
| 2 | Grounding Risk | Real |
| 3 | Closest approach distance | Real |
| 4 | Remaining time to risk | Real |
| 5 | Degree of Risk | Real |
| 6 | Type of Accident | Enumeration |

|  |  |  |
| --- | --- | --- |
| **Support Information** | | |
| No. | Information | Type of data |
| 1 | ENC Category | Enumeration |
| 2 | ENC Zone | Enumeration |
| 3 | ENC Download | Text |
| 4 | MSI Service Identification Information | Text |
| 5 | Korea Sea Area | Enumeration |

|  |  |  |
| --- | --- | --- |
| **Route Information** | | |
| No. | Information | Type of data |
| 1 | Number of way Points | Real |
| 2 | Way point latitude | Real |
| 3 | Way point longitude | Real |
| 4 | Distance from waypoint to next waypoint | Real |
| 5 | Time to final destination | Real |
| 6 | Estimated arrival time | Real |
| 7 | Route type | Enumeration |

|  |  |  |
| --- | --- | --- |
| **Port Information** | | |
| No. | Information | Type of data |
| 1 | Port Name | Text |
| 2 | Navigation Section | Text |
| 3 | Navigation Rule | Text |
| 4 | Environmental Limit | Text |
| 5 | Tug Boat | Text |
| 6 | Pilot | Text |
| 7 | Pilot Service Area | Text |
| 8 | Pilot Card Image | Image |
| 9 | Berthing | Text |
| 10 | Density Zone | Real |
| 11 | Density Value | Real |
| 12 | Ship Count | integer |

## 2.3 Data Package

Information produced in accordance with S-100 standard is achieved in a modular form, called "Message specification", which is defined as the smallest data unit within a SMART-Navigation product model.

SMART-Navigation defines data package as containers for data exchange.

The data package is the collection of all the message specifications related to a given service in a given configuration.

As shown in Figure 3, a data package contains the following kind of information:

* An identification data with message specification identification information such as message type, size, name etc.
* A content data, which is different, depending on the service such as ship information, ship alarm etc.
* 
* Figure 3 Configuration of Data Package

The message specifications that SMART-Navigation product specification model makes use of are the following:

* Message Catalogue,
* Ship Information,
* Ship Dynamic,
* Accident Risk,
* Accident Vessel,
* Ship Alarm & Emergency,
* Ship Tank,
* ENC Property for Non-SOLAS,
* Streaming Support,
* Pilot Schedule,
* Port Guideline,
* Ship Density,
* Pilot Service Request,
* MSI Property.

## 2.4 Message specification

The message specification is the smallest data unit, and has related data classes, and purposes to reduce redundant information and to increase consistency. It has been developed to cater for several different types of services.

Each message specification involves purpose, scope, type of data, establishing the business rules for production and exchange. All message specifications adhere to the common basic structure which is defined in the S-100 standard.

Message standards can be divided into three categories according to usage characteristics;

* Message specification with identifying message purpose: Message catalogue
* Message specifications commonly used in multiple service: Ship information, Ship dynamic.
* Message specifications related to a specific service: Ship Alarm & Emergency, Ship Tank, ENC Property for Non-SOLAS, Streaming Support, Pilot Schedule, Port Guideline, Ship Density, Pilot Service Request, and MSI Property.

# 3. SMART-NAVIGATION Product Specification : Service

## 3.1 Navigation Monitoring & Assistance Service(NAMAS)

NAMAS provides a vessel in danger with identified risk scenario information such as collision and grounding risks based on AIS Information. NAMAS share information from vessel at risk, in real time, with relevant organizations for early response purposes in case of maritime accident

### **3.1.1 Exchange Scenario**



### **3.1.2 Ship-Shore Exchange Message**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | Accident Prediction | Unicasting(GML) | Shore→ Vessel | Provides vessel with possible collision scenarios (excluding wreck) between ship and object. |
| 2 | Accident Notification | Broadcasting(GML) | Shore → Vessel | Provide ship accident information to vessels sailing nearby. |

### **3.1.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| **Name** | Accident Prediction |
| **Description** | Provides vessel with possible collision or grounding scenarios (excluding wreck) between ship and object. |
| **Data** | Issue Date, Status, Accident Type, Ship MMSI, Ship Latitude, Ship Longitude, Ship Direction, Ship ID, Ship Speed, Navigation Situation, Collision Latitude (Prediction), Collision Longitude (Prediction), CPA Distance, CPA Time, Distance to the collision, Time to the collision, Collision Risk Level, Predicted Collision Area |
| **Communication** | LTE-M, VDES |
| **Frequency** | When Potential collision scenario identified in NAMAS |
| **Trigger Rule** | initial message and update message |
| **Message Specification** | Message Catalogue, Accident Risk, Ship Information, Ship Dynamic |
| **Name** | Accident Notification |
| **Description** | Provide ship accident information to vessels sailing nearby. |
| **Data** | Issue date, Accident time, Accident Type, MMSI of the Accident ship, Accident Ship ID, Accident ship Latitude, Accident ship Longitude |
| **Communication** | LTE-M, VDES |
| **Frequency** | when accident occurs |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, Accident Vessel, Ship Information |

### **3.1.5 NAMAS Data Mode**

### 

## 3.2 Ship-borne System Monitoring Service (SBSMS)

This service assesses abnormal symptoms from ship's sensor and makes/supplies recommendations of response. The purpose of this service is to prevent marine accidents and prevent secondary accidents.

### **3.2.1 Exchange Scenario**

### 

### **3.2.2 Ship-Shore Exchange Message**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | Ship alarm | Unicasting  (GML) | Vessel→Shore | Provides sensor information (fire alarm, equipment information) of a vessel navigating a specific sea area |
| 2 | Ship tank information | Unicasting  (GML) | Vessel→Shore | Provide tank loading status information for a vessel navigating a specific sea area. |
| 3 | Ship emergence information | Unicasting  (GML) | Shore→ Vessel | Provide guidance on risk situations based on vessel alert information |

### **3.2.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| **Name** | Ship alarm |
| **Description** | Define sensor-based alarm information installed on ship |
| **Data** | Navigation device (list, alarm, operating), main engine, generator, steering gear, No. of generator, fire door, file alarm |
| **Communication** | LTE-M, VDES |
| **Frequency** | When navigating to a specific sea area(Korean Coastal waters) |
| **Trigger Rule** | repeat at certain intervals |
| **Message Specification** | Message Catalogue, Ship Alarm & Emergency |
| **Name** | Ship tank information |
| **Description** | Information on tank type, capacity and number |
| **Data** | Tank type, tank capacity, No. of tank, tank alarm type, tank alarm status, tank gauge |
| **Communication** | LTE-M, VDES |
| **Frequency** | When navigating to a specific sea area |
| **Trigger Rule** | repeat at certain intervals |
| **Message Specification** | Message Catalogue, Ship Tank |
| **Name** | Ship emergence information |
| **Description** | Emergency and guidance codes information |
| **Data** | Emergency occurrence time, emergence type, emergence level, emergency guidance code |
| **Communication** | LTE-M, VDES |
| **Frequency** | When navigate a specific sea area |
| **Trigger Rule** | initial message and update message |
| **Message Specification** | Message Catalogue, Ship Alarm & Emergency |

### **3.2.5 SBSMS Data Model**

­

## 3.3 Safe & Optimal Route Planning Service(SORPS)

This service provides vulnerable vessel with optimal route information based on ship traffic, sea area environment, marine meteorology.

### **3.3.1 Exchange Scenario**

****

### **3.3.2 Ship-Shore Exchange Message**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | Route | Unicasting(GML) | Vessel → Shore,  Shore → Vessel | Provides a vessel with optimal safety routes from current location to destination. |

### **3.3.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| **Name** | Route |
| **Description** | Define information about the ship’s route |
| **Data** | ENC Version, Voyage No., No. of Waypoint, Waypoint of version, Position of Waypoint, Waypoint Area, safety [isobathymetric line](https://endic.naver.com/enkrEntry.nhn?entryId=3d4b1443a92f4354b32a7a9109972d7a&query=%EB%93%B1%EC%8B%AC%EC%84%A0), Safety Water Level, Distance to next waypoint, Annotation of ETA/ETD, Annotation of resolution target, Annotation of Route, Expected ETD, Recommended ETD, Expected ETA, Recommended ETA, COG, Voyage Name, Writer, Status of Voyage, Type of Voyage, Vessel Name, Ship MMSI, Ship IMO No., Vessel Capacity, Cargo, Wind, Ship Maximum Speed |
| **Communication** | LTE-M, VDES |
| **Frequency** | On request of ship's route, on response with ship's route |
| **Trigger Rule** | initial message and update message |
| **Message Specification** | Message Catalogue, S-421 |

### **3.3.5 SORPS Data Model**



## 3.4 Real-time Electronic Navigational Chart Distribution & Streaming Service (REDSS)

This service provide ENC download and update services to SOLAS vessels, and provide certified electronic streaming services to Non-SOLAS vessels through Mobil App.

**3.4.1 Exchange Scenario**



### **3.4.2 Ship-Shore Exchange Message**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | ENC Property for Non-SOLAS | Unicasting  (GML) | Vessel→Shore  Shore→Vessel | Provides requirements and related attribute information of vessel's electronic chart system requests and responses. |
| 2 | Streaming Identification | Unicasting  (GML) | Vessel→Shore  Shore→Vessel | Provides authentication keys for electronic chart streaming services. |

### **3.4.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| **Name** | ENC Property for Non-SOLAS |
| **Description** | Define ENC property information for request/response |
| **Data** | ENC type, device information(license, maker, serial, model), ship’s location, ENC zone, download route, file size, file download URL |
| **Communication** | LTE-M, VDES |
| **Frequency** | when requesting ENC data, when response with ENC data |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, ENC Property for Non-SOLAS |
| **Name** | Streaming certification |
| **Description** | Define authentication information for using streaming services. |
| **Data** | Certification Key, WMTS URL |
| **Communication** | LTE-M, VDES |
| **Frequency** | When the app is installed |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, Support for Streaming Authentication |

### **3.4.5 SBSMS Data Model**



## 3.5 Pilot & Tug Assistance Service (PITAS)

This Service provides necessary information for vessel departure/arrival in pilot area with information such as meteorological information and maritime traffic information. Tugs receive necessary information for berthing according to pilot's order.

### **3.5.1 Exchange Scenario**

### 

### **3.5.2 Ship-Shore Exchange Message**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | Pilot schedule | Unicasting  (GML) | Vessel→Shore  Shore→Vessel | Provide information on the request for the pilot. |
| 2 | Port density | Unicasting  (GML) | Shore→Vessel | Provides a ship density in specific areas of the port. |
| 3 | Ship behavior prediction | Unicasting  (GML) | Shore→Vessel | Provides a virtual navigation scenario for vessels in the port. |
| 4 | Port guideline | Unicasting  (GML) | Shore→Vessel | Provides ship in the pilot area with relevant safety information needed for departure and arrival. |

### **3.5.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| ­**Name** | Pilot schedule |
| **Description** | Define information to request a pilot |
| **Data** | Call sign, pilot request number, request status, request time, pilot information, pilot service area, target ship information pilot comment, towing information, pilot card information |
| **Communication** | LTE-M, VDES |
| **Frequency** | when requesting pilot schedule, when responding with pilot schedule |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, Pilot Schedule, Ship information, Ship dynamic |
| **Name** | Port Density |
| **Description** | Gives ship density within 5 km radius of target vessel |
| **Data** | Ship information (MMSI, location), density measuring area, density |
| **Communication** | LTE-M, VDES |
| **Frequency** | On Request |
| **Trigger Rule** | once |
| **Message Specification** | Message Catalogue, Port Density |
| **Name** | Ship behavior prediction |
| **Description** | Define the ship's navigation scenario |
| **Data** | Ship information, no. of prediction data, prediction data time interval, ship location |
| **Communication** | LTE-M, VDES |
| **Frequency** | On Request |
| **Trigger Rule** | On request |
| **Message Specification** | Message Catalogue, Ship Dynamic |
| **Name** | Port Guideline |
| **Description** | Define general information in a port |
| **Data** | Port name, cargo & size restrict information, passage information(navigation area, passage time), tugboat information |
| **Communication** | LTE-M, VDES |
| **Frequency** | On Request |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, Port Guideline |

### **3.5.5 PITAS Data Model**

## 

## 3.6 Maritime Environment and Safety Information Service (MESIS)

This service provides maritime safety information service (MS 5), navigation publication service (MS 12), marine weather service(MS 14), and dynamic waterway information service(MS 15).

### **3.6.1 Exchange Scenario**

### 

### **3.6.2 Ship-Shore Exchange Message**

­

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Message** | **Encoding** | **Status** | **Description** |
| 1 | Marine Information Object Service Support | Unicasting  (GML) | Vessel→Shore  Shore→Vessel | provides maritime safety information on the Korean coast. |

### **3.6.3 Ship-Shore Exchange Message Definition**

|  |  |
| --- | --- |
| **Name** | Marine Information Object Service Support |
| **Description** | Define property information for requesting/responding maritime safety information |
| **Data** | S-10x identification number, S-10x version, spatial information type, request location, range(meter), service request time, service end time, catalogue list |
| **Communication** | LTE-M, VDES |
| **Frequency** | On Request |
| **Trigger Rule** | Once |
| **Message Specification** | Message Catalogue, MIO Service Support Product Specification |

### **3.6.5 MESIS Data Model**



# 4. SMART-NAVIGATION Product SPECIFICATION: Message

Message Specification consist of the following 12 Product Models

* ­Message Catalogue : Information about message identification, such as sender and receiver
* Ship information : Information on ship specifications, including ship name, MMSI
* ­Ship dynamic : Ship dynamic information, including current location and status
* ­Accident risk : Information that includes possible collision scenarios between ships and objects except for collision into subsurface shipwrecks, that includes grounding scenario of a possible vessel.
* ­accident vessel : Location and other information of the accident involving the ship.
* Ship alarm : Information on the ship's alarm status and status-based guideline
* Ship tank : Information on loading status of the vessel tanks or alarms for the hazard level.
* ENC Property for Non-SOLAS : ENC Meta Information such as zone, Issue Date etc.
* Streaming Support : Authentification information for using streaming service such as identification Key
* Pilot service request : Model for requesting Pilot Service such as Pilot and tug schedule, Ship Information, Pilot Note, Tugboat Information, Pilot card Information, Ship Position Predict, Ship Density, Port Guideline
* ­­Pilot schedule : response model for Pilot Schedule requests through the PilotServiceRequest Model.
* ­Port guideline : Note the information provided to pilots in order to smoothly perform the pilotage.
* ­Ship density : Density of vessels in port.
* MIO Support : property information for requesting/responding maritime safety information.

## 4.1 Message Catalogue

### **4.1.1 Overview**

### **4.1.1.1 Introduction**

- TBD

### **4.1.1.2 References**

- TBD

### **4.1.1.3 Terms, definitions and abbreviations**

-TBD

### **4.1.1.4 General Data Product Description**

- TBD

### **4.1.1.5 Data product specification metadata**

- TBD

### **4.1.2 Specification Scopes**

- TBD

### **4.1.3 Dataset identification**

- TBD

### **4.1.4 Data Content and structure**

### **4.1.4.1 Introduction**

Message Catalogue is always included when messages are exchanged between SMART-Navigation systems. Only one Message Catalogue instance is included in one event. Messages are divided into three types: request, response, and alarm. Up to fourteen types of messages, including this one, are exchanged between Smart- navigation systems. MRN is used as an identifier for service providers and the service consumers.

**4.1.4.2 Application Schema**



### **4.1.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Message Catalogue data set.

­Feature Types

* Geographic
* Meta

Message Catalogue

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Exchange File | information related to data file exchanged between shore and Ship for smart-navigation | complex attribute | 1..1 | mandatory |  |
| Message Type | The type of message defined to recognize the purpose of the exchanged message | enumeration | 1..1 | mandatory |  |
| Information | Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text. | complex attribute | 1..1 | mandatory |  |

* Cartographic
* Theme

Feature Relationship

* None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | MessageCatalogue | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data**  **Type** | **Remarks** |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.(ISO 639-3) | text |  |
| Text | A non-formatted digital text string. | text |  |
| Name Of File | Name of file exchanged between shore and Ship for smart-navigation | text |  |
| Size Of File | Volume of file exchanged between shore and Ship for smart-navigation | real |  |
| typeOfFile | encoding format of exchangeable file | enumeration |  |
| Code Of Standard | Product Specification Code Number presented by IHO | text |  |
| Name Of Model | Name of data model exchanged between shore and Ship for smart-navigation | enumeration |  |
| Version Of Model | Version of data model exchanged between shore and Ship for smart-navigation. ( ex. 3.5.2 ) | text |  |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |
| Message Type | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[type Of File]- enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | GML | Geographic Markup Language |
| 2 | HDF5 | Hierarchical Data Format (HDF) is a set of file formats (HDF4, HDF5) designed to store and organize large amounts of data |
| 3 | ISO8211 | Digital Information Geographic Exchange Standard Format |
| 4 | LUA | Lua combines simple procedural syntax with powerful data description constructs based on associative arrays and extensible semantics. Lua is dynamically typed, runs by interpreting bytecode with a register-based virtual machine, and has automatic memory management with incremental garbage collection, making it ideal for configuration, scripting, and rapid prototyping. |
| 5 | XML | The Extensible Markup Language (XML) is a simple text-based format for representing structured information: documents, data, configuration, books, transactions, invoices, and much more. It was derived from an older standard format called SGML (ISO 8879), in order to be more suitable for Web use. |

[name Of Model] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | Ship Information | A model that contains unique property information of the ship. |
| 2 | Ship Dynamic | Information provided to monitor the condition of the ship, such as the position and attitude of the ship, which changes according to the state of navigation of the ship. Ship equipment status / sensor information excluded. |
| 3 | Ship Alarm | Model including sensor information of ship during voyage such as alarm occurrence, machine temperature, machine pressure etc. |
| 4 | Ship Tank | A model containing tank loading status information of the ship on the voyage. |
| 5 | Pilot Service Request | Model for requesting Pilot Service (Pilot and tug schedule, Ship Information, Pilot Note, Tugboat Information, Pilot card Information, Ship Position Predict, Ship Density, Port Guideline) |
| 6 | Pilot Schedule | Models that include information on requests and response for departure/arrival, such as weather information, traffic information, dynamic information, and safety information |
| 7 | Pilot Guide | Models that contain general information on ports, such as regulations and precautions |
| 8 | Ship Density | A model containing the density level of a ship operating in a specific zone based on the requested vessel location |
| 9 | Accident Risk | A model containing scenarios in which a ship accident such as collision or grounding |
| 10 | Accident Vessel | Model with information about the accident ship |
| 11 | ENC Property for Non SOLAS | Model with information needed for ENC request and respond |
| 12 | Support for Streaming Authentification | A model including authentication information request / response related property information for ENC streaming service |
| 13 | MIO Service Support | Model that contains the Attribute information required to request/respond to maritime safety information on the Korea Sea area |

[message Type] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | alarm | Messages from the Smart Navigation Center to the ship without request |
| 2 | request | Message requesting service from the ship to the Smart Navigation Center |
| 3 | response | Messages delivered to the ship from the Smart Navigation Center in response to a request |

* Complex Attributes

[information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.(ISO 639-3) | text | 0..1 | option |  |
| Text | A non-formatted digital text string. | text | 1..1 | mandatory |  |

[exchangeFile]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Type Of File | encoding format of exchangeable file | text | 0..1 | option |  |
| Size Of File | Volume of file exchanged between shore and Ship for smart-navigation | text | 1..1 | mandatory |  |
| Name Of File | Name of data model exchanged between shore and Ship for smart-navigation | text | 1..1 | mandatory |  |
| Exchange Model | data model information exchanged between shore and Ship for smart-navigation | complex attribute | 1..1 | mandatory |  |

[exchangeModel]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Code Of Standard | Product Specification Code Number presented by IHO | text | 0..1 | option |  |
| Name Of Model | Name of data model exchanged between shore and Ship for smart-navigation | enumeration | 1..1 | mandatory |  |
| Version Of Model | Version of data model exchanged between shore and Ship for smart-navigation. ( ex. 3.5.2 ) | text | 1..1 | mandatory |  |

### **4.1.4.4 Dataset Types**

- TBD

### **4.1.4.5 Dataset Loading and Unloading**

- TBD

### **4.1.4.6 Geometry**

- TBD

### **4.1.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.1.6 Data Quality**

- TBD

### **4.1.7 Data Capture and classification**

- TBD

### **4.1.8 maintenance**

- TBD

### **4.1.9 Portrayal**

- TBD

### **4.1.10 data product format(encoding)**

- TBD

### **4.1.11 data product delivery**

- TBD

### **4.1.12 meta data**

- TBD

## 4.2 Ship Information

### **4.2.1 Overview**

### **4.2.1.1 Introduction**

- TBD

### **4.2.1.2 References**

- TBD

### **4.2.1.3 Terms, definitions and abbreviations**

- TBD

### **4.2.1.4 General Data Product Description**

- TBD

### **4.2.1.5 Data product specification metadata**

- TBD

### **4.2.2 Specification Scopes**

- TBD

### **4.2.3 Dataset identification**

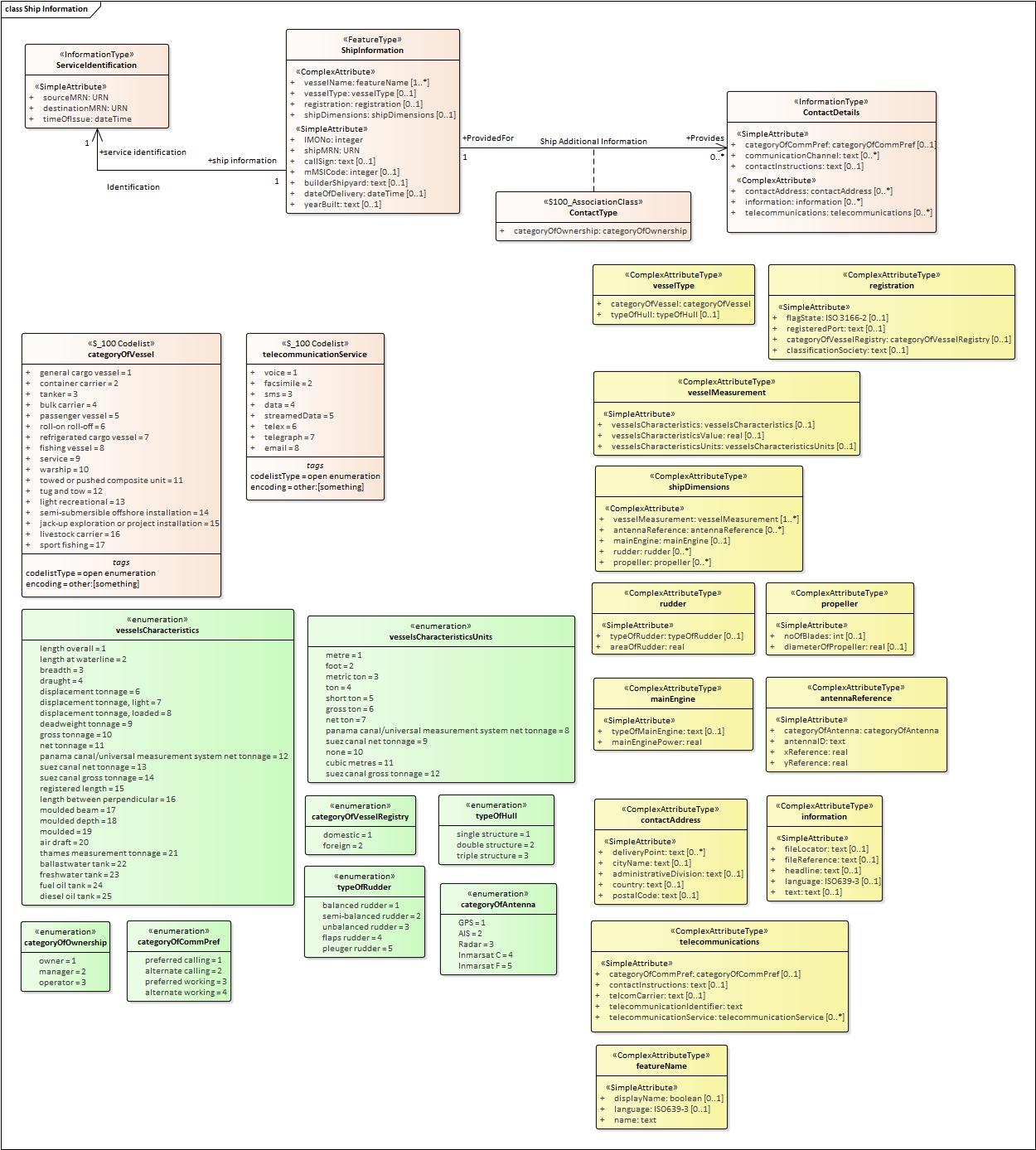
- TBD

### **4.2.4 Data Content and structure**

### **4.2.4.1 Introduction**

The name for identifying the ship, the calling information, and the information indicating the characteristics of the ship

### **4.2.4.2 Application Schema**



### **4.2.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Ship Information data set.

­Feature Types

* Geographic
* Meta

ShipInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessel Name |  | complex attribute | 1..\* | mandatory |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer | 1..1 | mandatory |  |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Call Sign | The designated call-sign of a radio station | text | 0..1 | option |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer | 0..1 | option |  |
| Vessel Type | - | complex attribute | 0..1 | option |  |
| Registration | - | complex attribute | 0..1 | option |  |
| Ship Dimensions | - | complex attribute | 0..1 | option |  |
| Builder Shipyard | The shipyard that built this ship | text | 0..1 | option |  |
| Date Of Delivery | Ship's delivery date | dateTime | 0..1 | option |  |

* Cartographic
* Theme

Feature Relationship

* None

­

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Ship Additional Information | Provides | ShipInformation | 0..\* |
| Association | Identification | service identification | ShipInformation | 1..1 |

Information Type

* ContactDetails

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Category Of Communication Preference | Classification of frequencies for communication based on preference. | eumeration | 0..1 | option |  |
| Communication Channel | - | text | 0..\* | option |  |
| Contact Address | - | complex attribute | 0..\* | option |  |
| Contact Instructions | supplemental instructions on how or when to contact the individual, organisation, or service | text | 0..1 | option |  |
| Information | - | complex attribute | 0..\* | option |  |
| Relecommunications | Information for contact by means of a telecommunications service.  Distinctions: email Address, internet Address, callName, callSign | complex attribute | 0..\* | option |  |

­

* ­ Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer |  |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| Call sign | The designated call-sign of a radio station | text |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer |  |
| Builder Shipyard | The shipyard that built this ship | text |  |
| Year Built |  | text |  |
| Date of Delivery | Ship's delivery date | dateTime |  |
| Category Of CommPref | Classification of frequencies for communication based on preference. | enumeration |  |
| Communication Channel |  | text |  |
| Contact Instructions | supplemental instructions on how or when to contact the individual, organisation, or service | text |  |
| Display Name | A statement expressing if a feature name is to be displayed in certain display settings or not. Indication: Boolean. A True value is an indication that the name is intended to be displayed. | boolean |  |
| Language | The language is encoded by a character code following ISO 639-3 | ISO 639-3 |  |
| Name | The individual name of a feature. | text |  |
| Category of Vessel | Classification of vessels by function or use. | S\_100 Codelist |  |
| Type of Hull | ship hull design and construction method where the bottom and sides of the ship | enumeration |  |
| Flag State | The flag state of a merchant vessel is the jurisdiction under whose laws the vessel is registered or licensed. | ISO 3166-2 |  |
| Registered Port | the port at which it is based, which may not be the same as its port of registry shown on its registration documents | text |  |
| Category of Vessel Registry | The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location. | enumeration |  |
| Classification Society | The name of the Classification to be verified to be designed, constructed and operated to operate the ship in accordance with internationally recognized safety standards. | text |  |
| Vessels Characteristics | characteristics of the vessels | enumeration |  |
| Vessels CharacteristicsValue | The value of a particular characteristic such as a dimension or tonnage of a vessel. | real |  |
| Vessels Characteristics Units | the unit used for vessel characteristics attribute | enumeration |  |
| Type of Main Engine | type of main engine installed on a ship | text |  |
| Main engine HP | maximum power that an engine can put out. unit: hp | real |  |
| Type of Rudder |  | enumeration |  |
| Area of Rudder | area of rudder blades | real |  |
| No of Blades | Number of propeller blades installed on the ship | integer |  |
| Diameter of Propeller | Diameter of Propeller in meters. | real |  |
| Delivery Point | Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box. | text |  |
| City Name | The name of a town or city. | text |  |
| Administrative Division | Administrative division is a generic term for an administrative region within a country at a level below that of the sovereign state. | text |  |
| Country | The name of a nation. (Adapted from The American Heritage Dictionaries) | text |  |
| Postal Code | 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. | text |  |
| File Locator | The string encodes the location of a fragment of text or other information in a support file. | text |  |
| File Reference | The string encodes the file name of a single external text file that contains the text. | text |  |
| Headline | Words set at the head of a passage or page to introduce or categorize | text |  |
| Language | ISO 639-3 value | ISO639-3 |  |
| Text | A non-formatted digital text string. | text |  |
| Category of Comm Pref |  | enumeration |  |
| Contact Instructions | instructions on how and when to contact an individual or organisation | text |  |
| Telcom Carrier | The name of provider or type of carrier for a telecommunications service | text |  |
| Telecommunication Identifier | Identifier used for contact by means of a telecommunications service, such as a telephone number | text |  |
| Telecommunication service | Methods to communicate between involved parties over a distance. | S\_100 Codelist |  |
| Category of Ownership | Classification of groups with ownership in relation to vessels | enumeration |  |
| destinationMRN | The MRN of the destination receiving the service data | URN |  |
| timeOfIssue | The issued date and time of the data | dateTime |  |
| messageType | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[vesselsCharacteristicsUnits] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | metre | - |
| 2 | foot | - |
| 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%. |
| 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/ft?(1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST). |
| 5 | short ton | 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 6pounds (50.80234544 kg) in the Imperial system (long or gross h7undredweight). |
| 6 | gross ton | Gr8oss tonnage (GT) is a function of the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity. Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship. |
| 7 | net ton | 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. |
| 8 | panama canal/universal measurement system net tonnage | - |
| 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. |
| 10 | none | - |
| 11 | cubic metres | - |
| 12 | suez canal gross tonnage | - |

[typeOfRudder] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | balanced rudder | - |
| 2 | semi-balanced rudder | - |
| 3 | unbalanced rudder | - |
| 4 | flaps rudder | - |
| 5 | pleuger rudder | - |

[categoryOfOwnership] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | owner | ship owners |
| 2 | manager | ship manager or ship management company |
| 3 | operator | ship operator or shipping company |

[categoryOfVessel] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | general cargo vessel | a vessel designed to carry general cargo |
| 2 | container carrier | a vessel designed to carry ISO containers |
| 3 | tanker | a vessel designed to carry bulk liquid or gas, including LPG and LNG |
| 4 | bulk carrier | a vessel designed to carry bulk solid material |
| 5 | passenger vessel | a vessel designed to carry passengers; often a cruise ship |
| 6 | roll-on roll-off | a vessel designed to allow road vehicles to be driven on and off; often a ferry |
| 7 | refrigerated cargo vessel | a vessel designed to carry refrigerated cargo |
| 8 | fishing vessel | a vessel designed to catch or hunt fish |
| 9 | service | a vessel which provides a service such as a tug, anchor handler, survey or supply vessel |
| 10 | warship | a vessel designed for the conduct of military operations |
| 11 | towed or pushed composite unit | either a tug and tow, or any combination of a tug providing propulsion to barges or vessels secured ahead or alongside |
| 12 | tug and tow | a combination of tug(s) and non-powered tow(s) |
| 13 | light recreational | A pleasure boat or watercraft, or an excursion vessel used for short cruises such as whale watching |
| 14 | semi-submersible offshore installation | An installation which is designed to float at all times and which is normally anchored in position when deployed in the offshore gas and oil industry. |
| 15 | jack-up exploration or project installation | An exploration or project installation with legs which can be raised and lowered. The legs are raised when the installation is repositioned. When stationary the legs are lowered to the sea floor and the working platform is raised clear of the sea surface |
| 16 | livestock carrier | A vessel designed to carry large quantities of live animals. |
| 17 | sport fishing | A vessel used in fishing for pleasure or competition. |

[telecommunicationService] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | voice | The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking |
| 2 | facsimile | a system of transmitting and reproducing graphic matter (as printing or still pictures) by means of signals sent over telephone lines |
| 3 | sms | Short Message Service, a form of text messaging communication on phones and mobile phones |
| 4 | data | facts or information used usually to calculate, analyze, or plan something |
| 5 | streamedData | Streamed data is data that that is constantly received by and presented to an end-user while being delivered by a provider. |
| 6 | telex | a system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter) |
| 7 | telegraph | an apparatus, system, or process for communication at a distance by electric transmission over wire |
| 8 | email | Messages and other data exchanged between individuals using computers in a network. |

* Complex Attributes

[FeatureName]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Display Name | A statement expressing if a feature name is to be displayed in certain display settings or not.  Indication: Boolean. A True value is an indication that the name is intended to be displayed. | boolean | 0..1 | option |  |
| Language | The language is encoded by a character code following ISO 639-3 | ISO 639-3 | 0..1 | mandatory |  |
| Name | The individual name of a feature. | text | 1..1 | mandatory |  |

[vesselType]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Category Of Vessel | Classification of vessels by function or use. | S\_100 Codelist | 1..1 | mandatory |  |
| Type Of Hull | ship hull design and construction method where the bottom and sides of the ship | enumeration | 0..1 | option |  |

[registration]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Flag State | The flag state of a merchant vessel is the jurisdiction under whose laws the vessel is registered or licensed. | ISO  3166-2 | 0..1 | option |  |
| Registered Port | the port at which it is based, which may not be the same as its port of registry shown on its registration documents | text | 0..1 | option |  |
| Category Of Vessel Registry | The locality of vessel registration or enrolment relative to the nationality of a port, territorial sea, administrative area, exclusive zone or other location. | enumeration | 0..1 | option |  |
| Classification Society | The name of the Classification to be verified to be designed, constructed and operated to operate the ship in accordance with internationally recognized safety standards. | text | 0..1 | option |  |

[shipDimensions]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessel Measurement | - | complex attribute | 1..\* | mandatory |  |
| Main Engine | - | complex attribute | 0..1 | option |  |
| Rudder | - | complex attribute | 0..\* | option |  |
| Propeller | - | complex attribute | 0..\* | option |  |

[contactAddress]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Delivery Point | Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box. | text | 0..\* | option |  |
| City Name | The name of a town or city. | text | 0..1 | option |  |
| Administrative Division | Administrative division is a generic term for an administrative region within a country at a level below that of the sovereign state. | text | 0..1 | option |  |
| Country | The name of a nation. (Adapted from The American Heritage Dictionaries) | text | 0..1 | option |  |
| Postal Code | 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. | text | 0..1 | option |  |

[information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| File Locator | The string encodes the location of a fragment of text or other information in a support file. | text | 0..1 | option |  |
| File Reference | The string encodes the file name of a single external text file that contains the text. | text | 0..1 | option |  |
| Headline | Words set at the head of a passage or page to introduce or categorize | text | 0..1 | option |  |
| Language | ISO 639-3 value | ISO 639-3 | 0..1 | option |  |
| Text | A non-formatted digital text string. | text | 0..1 | option |  |

[telecommunications]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Category Of Communication Preference | - | enumeration | 0..1 | option |  |
| Contact Instructions | instructions on how and when to contact an individual or organisation | text | 0..1 | option |  |
| Telcom Carrier | The name of provider or type of carrier for a telecommunications service | text | 0..1 | option |  |
| Ttelecommunication Identifier | Identifier used for contact by means of a telecommunications service, such as a telephone number | text | 1..1 | mandatory |  |
| Telecommunication Service | Methods to communicate between involved parties over a distance. | S\_100 Codelist | 0..\* | option |  |

[vesselMeasurement]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessels Characteristics | characteristics of the vessels | enumeration | 0..1 | option |  |
| Vessels Characteristics Value | The value of a particular characteristic such as a dimension or tonnage of a vessel. | real | 0..1 | option |  |
| Vessels Characteristics Units | the unit used for vessel characteristics attribute | enumeration | 0..1 | option |  |

[mainEngine]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Type Of Main Engine | type of main engine installed on a ship | text | 0..1 | option |  |
| Main Engine Power | maximum power that an engine can put out. unit: hp | real | 1..1 | mandatory |  |

[rudder]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Type Of Rudder | - | enumeration | 0..1 | option |  |
| Area Of Rudder | area of rudder blades | real | 1..1 | mandatory |  |

[propeller]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Number Of Blades | Number of propeller blades installed on the ship | integer | 0..1 | option |  |
| Diameter Of Propeller | Diameter of Propeller in meters. | real | 0..1 | option |  |

### **4.2.4.4 Dataset Types**

- TBD

### **4.2.4.5 Dataset Loading and Unloading**

- TBD

### **4.2.4.6 Geometry**

- TBD

### **4.2.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.2.6 Data Quality**

- TBD

### **4.2.7 Data Capture and classification**

- TBD

### **4.2.8 maintenance**

- TBD

### **4.2.9 Portrayal**

- TBD

### **4.2.10 data product format(encoding)**

- TBD

### **4.2.11 data product delivery**

- TBD

### **4.2.12 meta data**

- TBD

## 4.3 Ship dynamic

### **4.3.1 Overview**

### **4.3.1.1 Introduction**

- TBD

### **4.3.1.2 References**

- TBD

### **4.3.1.3 Terms, definitions and abbreviations**

- TBD

### **4.3.1.4 General Data Product Description**

- TBD

### **4.3.1.5 Data product specification metadata**

- TBD

### **4.3.2 Specification Scopes**

- TBD

### **4.3.3 Dataset identification**

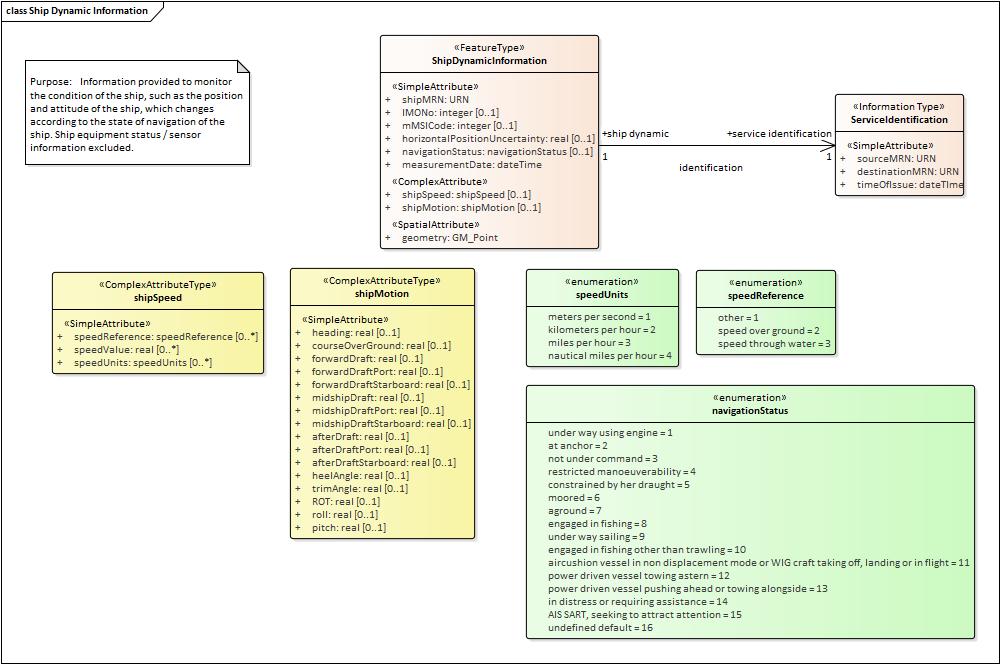
- TBD

### **4.3.4 Data Content and structure**

### **4.3.4.1 Introduction**

Information provided to monitor the condition of the ship, such as the position and attitude of the ship, which changes according to the state of navigation of the ship. Ship equipment status / sensor information excluded.

### **4.3.4.2 Application Schema**



### **4.3.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Ship Dynamic data set.

­Feature Types

* Geographic

ShipDynamicInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer | 0..1 | option |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer | 0..1 | option |  |
| Horizontal Position Uncertainty | The best estimate of the accuracy of a position. The expected input is the maximum of the two-dimensional error. The error is assumed to be positive and negative. The plus/minus character shall not be encoded. | real | 0..1 | option |  |
| Navigation Status | Ship's navigation status | enum | 0..1 | option |  |
| Measurement Date | Date & Time at which ship dynamic information was measure. | dateTime | 1..1 | mandatory |  |
| Position | - | GM\_Point | 1..1 | mandatory |  |
| Ship Speed | Ship's speed Information | complex attribute | 0..1 | option |  |
| Ship Motion | Information related to the movement of the ship, such as heading, draft of ship, rotational motions. | complex attribute | 0..1 | option |  |

* Meta
* Cartographic
* Theme

Feature Relationship

* None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | ShipDynamicInformation | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

­Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data**  **Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer |  |
| Horizontal Position Uncertainty | The best estimate of the accuracy of a position. The expected input is the maximum of the two-dimensional error. The error is assumed to be positive and negative. The plus/minus character shall not be encoded. | real |  |
| Navigation Status | Ship's navigation status | enumeration |  |
| Measurement Date | Date & Time at which ship dynamic information was measure. | dateTime |  |
| Speed Reference | Indicates the type of speed measurement | enumeration |  |
| Speed Value | speed value | real |  |
| Speed Units | The units for description of speed. | enumeration |  |
| Heading | Heading of the target in degrees. | real |  |
| Course Over Ground | Course over ground in degrees. | real |  |
| Forward Draft | Draft at the forward of the ship, Average value of right-to-left values | real |  |
| Forward Draft Port | Draft at the forward of the ship, at the port | real |  |
| Forward Draft Starboard | Draft at the forward of the ship, at the starboard | real |  |
| Midship Draft | Draft at the mid of the ship, Average value of right-to-left values | real |  |
| Midship Draft Port | Draft at the mid of the ship, at the port | real |  |
| Midship Draft Starboard | Draft at the mid of the ship, at the starboard | real |  |
| After Draft | Draft at the after of the ship, Average value of right-to-left values | real |  |
| After Draft Port | Draft at the after of the ship, at the port | real |  |
| After Draft Starboard | Draft at the after of the ship, at the starboard | real |  |
| Heel Angle | The amount a vessel is heeled from the upright | real |  |
| Trim Angle | The longitudinal draft at which the ship is subjected to external forces | real |  |
| ROT | Rate of turn in degrees per minute. | real |  |
| Roll | The tilting rotation of a vessel about its longitudinal/X (front-back or bow-stern) axis | real |  |
| Pitch | The up/down rotation of a vessel about its lateral/Y (side-to-side or port-starboard) axis | real |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |
| Message Type | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[SpeedUnits] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | meters per second | - |
| 2 | kilometers per hour | - |
| 3 | miles per hour | - |
| 4 | nautical miles per hour | - |

[speedReference] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | other | - |
| 2 | speed over ground | The vessel's actual speed, determined by dividing the distance between successive fixes by the time between the fixes |
| 3 | speed through water | The vessel's actual speed, determined by substracting the speed over ground by the current speed |

[navigationStatus] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | under way using engine | - |
| 2 | at anchor | - |
| 3 | not under command | - |
| 4 | restricted manoeuverability | - |
| 5 | constrained by her draught | - |
| 6 | moored | - |
| 7 | aground | - |
| 8 | engaged in fishing | - |
| 9 | under way sailing | - |
| 10 | engaged in fishing other than trawling | - |
| 11 | aircushion vessel in non displacement mode or WIG craft taking off, landing or in flight | - |
| 12 | power driven vessel towing astern | - |
| 13 | power driven vessel pushing ahead or towing alongside | - |
| 14 | in distress or requiring assistance | - |
| 15 | AIS SART, seeking to attract attention | - |
| 16 | undefined default | - |

* Complex Attributes

[shipSpeed]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Speed Reference | Indicates the type of speed measurement | enumeration | 0..\* | option |  |
| Speed Value | speed value | real | 0..\* | option |  |
| Speed Units | The units for description of speed. | enumeration | 0..\* | option |  |

[shipMotion]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Heading | Heading of the target in degrees. | real | 0..1 | option |  |
| Course Over Ground | Course over ground in degrees. | real | 0..1 | option |  |
| Forward Draft | Draft at the forward of the ship, Average value of right-to-left values | real | 0..1 | option |  |
| Forward Draft Port | Draft at the forward of the ship, Average value of right-to-left values | real | 0..1 | option |  |
| Forward Draft Starboard | Draft at the forward of the ship, at the starboard | real | 0..1 | option |  |
| Midship Draft | Draft at the mid of the ship, Average value of right-to-left values | real | 0..1 | option |  |
| Midship Draft Port | Draft at the mid of the ship, at the port | real | 0..1 | option |  |
| Midship Draft Starboard | Draft at the mid of the ship, at the starboard | real | 0..1 | option |  |
| After Draft | Draft at the after of the ship, Average value of right-to-left values | real | 0..1 | option |  |
| After Draft Port | Draft at the after of the ship, at the port | real | 0..1 | option |  |
| After Draft Starboard | Draft at the after of the ship, at the starboard | real | 0..1 | option |  |
| Heel Angle | The amount a vessel is heeled from the upright | real | 0..1 | option |  |
| Trim Angle | The longitudinal draft at which the ship is subjected to external forces | real | 0..1 | option |  |
| ROT | Rate of turn in degrees per minute. | real | 0..1 | option |  |
| Roll | The tilting rotation of a vessel about its longitudinal/X (front-back or bow-stern) axis | real | 0..1 | option |  |
| Pitch | The up/down rotation of a vessel about its lateral/Y (side-to-side or port-starboard) axis | real | 0..1 | option |  |

### **4.3.4.4 Dataset Types**

- TBD

### **4.3.4.5 Dataset Loading and Unloading**

- TBD

### **4.3.4.6 Geometry**

- TBD

### **4.3.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.3.6 Data Quality**

- TBD

### **4.3.7 Data Capture and classification**

- TBD

### **4.3.8 maintenance**

- TBD

### **4.3.9 Portrayal**

- TBD

### **4.3.10 data product format(encoding)**

- TBD

### **4.3.11 data product delivery**

- TBD

### **4.3.12 meta data**

- TBD

## 4.4 Accident Risk

### **4.4.1 Overview**

### **4.4.1.1 Introduction**

- TBD

### **4.4.1.2 References**

- TBD

### **4.4.1.3 Terms, definitions and abbreviations**

- TBD

### **4.4.1.4 General Data Product Description**

- TBD

### **4.4.1.5 Data product specification metadata**

- TBD

### **4.4.2 Specification Scopes**

- TBD

### **4.4.3 Dataset identification**

- TBD

### **4.4.4 Data Content and structure**

### **4.4.4.1 Introduction**

This service is only available to vessel with MRN identifier. SMART Navigation system monitors vessels with MRN identifier to the AIS information etc. Identify the risk of ship accidents on the Center. Send identified risk information to the vessel provided with service. The identified risk information includes only one risk situation information. The identified risk information is collision or grounding information. The crash risk information contains information from other vessels. The identified risk information includes the distance and time to the occurrence of the risk. The identified risk information is continuously sent at regular intervals.

Collision risk information portray the collision risk area. the grounding information portray grounding risk location. The accident risk information is focused on the own ship.

**4.4.4.2 Application Schema**



### **4.4.4.3 Feature Catalogue**

­General

The Accident Risk feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an Accident Risk data set.

­Feature Types

* Geographic

Accident Risk : Risk Information that could or could have occurred, such as collision, grounding

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Time Of Issue | Date and time of data creation | dateTime | 1..1 | mandatory |  |
| Time Of Next Issue | Estimated time of next data creation & transmission | dateTime | 1..1 | mandatory |  |
| Degree Of Risk | The value calculated as a percentage of accident risk | real | 1..1 | mandatory |  |
| Closest Approach Distance | The closest distance in case of an accident (collision , grounding) risk | complex attribute | 1..1 | mandatory |  |
| Remaining Time to Risk | The time remaining until the risk of an accident (second) | complex attribute | 1..1 | mandatory |  |

Collision Risk : Predictive information about collision risk

Grounding Risk : Predictive information about grounding risk

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Type of Grounding | a type of possibility of ship grounding | enumeration | 1..1 | mandatory |  |

Risk Vessel : Identified ship from accident risk

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Distance To Risk | Distance from the ship to the point of accident risk. | dateTime | 1..1 | mandatory |  |
| Ship MRN | Maritime Identifier (MRN) based identification information developed by IALA | URN | 1..1 | mandatory |  |

* Meta
* Cartographic
* Theme

Feature Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Own vessel risk | accident risk | RiskVessel | 1..1 |
| Association | Own vessel risk | own vessel | AccidentRisk | 1..1 |
| Association | Target Vessel Risk | collsion risk | RiskVessel | 1..1 |
| Association | Target Vessel Risk | target vessel | CollisionRisk | 1..1 |

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | AccidentRisk | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data**  **Type** | **Remarks** |
| Time Of Issue | Date and time of data creation | dateTime |  |
| Time Of Next Issue | Estimated time of next data creation & transmission | dateTime |  |
| Degree Of Risk | The value calculated as a percentage of accident risk | real |  |
| Ship MRN | Maritime Identifier (MRN) based identification information developed by IALA | URN |  |
| Type Of Grounding | Object to the risk of grounding | enumeration |  |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTIme |  |
| Distance | The value to present the distance between two specific point. | real |  |
| Distance Unit | The unit of distance value | enumeration |  |
| Time Count | The value to present the difference between two specific time. | real |  |
| Time Unit | The unit of time value | enumeration |  |

[time Unit] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | second | second as a unit of time |
| 2 | minute | minute as a unit of time |
| 3 | hour | hour as a unit of time |

[distance Unit] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | meter | meter as a unit of distance |
| 2 | kilometer | kilometer as a unit of distance |
| 3 | nautical mile | nautical mile as a unit of distance |

[type Of Grounding] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | shore line | The edge of the sea |
| 2 | object | Other objects those are not the ship in the sea. |
| 3 | rock | Rock that are dangerous for the voyage of ships in the sea |

[speed Reference] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | other | Other speed reference value unit |
| 2 | speed over ground | Vessel speed based on land |
| 3 | speed through water | Vessel speed under the influence of wind, current, etc. |

* Complex Attributes

[Distance To Risk]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Distance | The value to present the distance between two specific point. | real | 1..1 | mandatory |  |
| DistanceUnit | The unit of distance value | enumeration | 1..1 | mandatory |  |

[closest Approach Distance]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Distance | The value to present the distance between two specific point. | real | 1..1 | mandatory |  |
| Distance Unit | The value to present the distance between two specific point. | enumeration | 1..1 | mandatory |  |

[remaining Time To Risk]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Time Unit | The unit of time value | real | 0..1 | mandatory |  |
| Time Count | The value to present the difference between two specific time. | enumeration | 1..1 | mandatory |  |

### **4.4.4.4 Dataset Types**

- TBD

### **4.4.4.5 Dataset Loading and Unloading**

- TBD

### **4.4.4.6 Geometry**

- TBD

### **4.4.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.4.6 Data Quality**

- TBD

### **4.4.7 Data Capture and classification**

- TBD

### **4.4.8 maintenance**

- TBD

### **4.4.9 Portrayal**

- TBD

### **4.4.10 data product format(encoding)**

- TBD

### **4.4.11 data product delivery**

- TBD

### **4.4.12 meta data**

- TBD

## 4.5 Accident Vessel

### **4.5.1 Overview**

### **4.5.1.1 Introduction**

- TBD

### **4.5.1.2 References**

- TBD

### **4.5.1.3 Terms, definitions and abbreviations**

- TBD

### **4.5.1.4 General Data Product Description**

- TBD

### **4.5.1.5 Data product specification metadata**

- TBD

### **4.5.2 Specification Scopes**

- TBD

### **4.5.3 Dataset identification**

- TBD

### **4.5.4 Data Content and structure**

### **4.5.4.1 Introduction**

This service is only available to vessel with MRN identifier. SMART Navigation system monitors vessels with MRN identifier to the AIS information etc. VTS Center receives Accident vessel information, and deliver it to Smart-navigation center. Smart-navigation center identify the vessel sailing around accident area. Smart-navigation center provides the identified vessel with the accident vessel information. Accident vessel information is continuously provided to vessels near the accident from SMART Navigation system at regular interval. Update and Termination information is not provided separately. If the accident vessel is terminated, no more accident vessel information is provided.

**4.5.4.2 Application Schema**



### **4.5.4.3 Feature Catalogue**

­General

The Accident Vessel feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an Accident Vessel data set.

­Feature Types

* Geographic

Accident Vessel : A vessel with an accident situation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | Maritime Identifier (MRN) based identification information developed by IALA | URN | 1..1 | mandatory |  |
| Time Of Accident | Date and time of the Accident | dateTime | 1..1 | mandatory |  |
| Type Of Accident | Type of accident defined at a document (Institute Time Clauses-1/10/83) | enumeration | 1..1 | mandatory |  |

* Meta
* Cartographic
* Theme

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | AccidentVessel | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data**  **Type** | **Remarks** |
| Ship MRN | Maritime Identifier (MRN) based identification information developed by IALA | URN |  |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |
| Type Of Accident | Type of accident defined at a document (Institute Time Clauses-1/10/83) | enumeration |  |
| Time Of Accident | Date and time of the Accident | dateTime |  |

[typeOfAccident] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | collision | Collision between two vessels |
| 2 | grounding By Object | Status that ship is unable to leave somewhere because of an object. |
| 3 | grounding By Shore Line | Status that ship is unable to leave somewhere because of a shore line. |
| 4 | grounding By Rock | Status that ship is unable to leave somewhere because of a rock. |
| 5 | sunk | status that vessel go down below the surface of sea level. |
| 6 | fire | State that the ship is burned and can not be operated due to fire |
| 7 | explosion | State that the ship is burned and can not be operated due to explosion |
| 8 | contact | Status that ship is unable to operated because of hull damage caused by a contact with other object. |

* Complex Attributes

None

### **4.5.4.4 Dataset Types**

- TBD

### **4.5.4.5 Dataset Loading and Unloading**

- TBD

### **4.5.4.6 Geometry**

- TBD

### **4.5.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.5.6 Data Quality**

- TBD

### **4.5.7 Data Capture and classification**

- TBD

### **4.5.8 maintenance**

- TBD

### **4.5.9 Portrayal**

- TBD

### **4.5.10 data product format(encoding)**

Format Name:

Version:

Character Set:

Specification:

### **4.5.11 data product delivery**

- TBD

### **4.5.12 meta data**

- TBD

## 4.6 ENC Property for Non-SOLAS

### **4.6.1 Overview**

### **4.6.1.1 Introduction**

- TBD

### **4.6.1.2 References**

- TBD

### **4.6.1.3 Terms, definitions and abbreviations**

- TBD

### **4.6.1.4 General Data Product Description**

- TBD

### **4.6.1.5 Data product specification metadata**

- TBD

### **4.6.2 Specification Scopes**

- TBD

### **4.6.3 Dataset identification**

- TBD

### **4.6.4 Data Content and structure**

### **4.6.4.1 Introduction**

The ENCPropertyforNonSOLAS model is designed for ENC file exchange service between ship and land. The ship requests an ENC file to the Smart Navigation center. When requesting ENC files, send the area, chart type, current ship location, terminal information, etc. to the Smart Navigation center with additional information. The Smart Navigation center sends the ENC file with additional information. The additional information of the ENC is provided to the ship along with the file name, file path, and file format. The ENC-provided area is limited to the Korean sea area and divided into 12 areas. The electronic navigation chart is divided into the first provided file and the revised file.

**4.6.4.2 Application Schema**



### **4.6.4.3 Feature Catalogue**

­General

The ENC Property for Non SOLAS feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an ENC Property for Non SOLAS data set.

­Feature Types

* Geographic
* Meta

ENCPropertyForNonSOLAS : Attribute information required for Request-Response Transaction of ENC

Request: Properties information required for Request Transaction of ENC or Zone information

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Category Of ENC | Type of ENC to be requested or sent | enumeration | 1..1 | mandatory |  |
| Category Of Service | category of service | enumeration | 1..1 | mandatory |  |
| Device Property For ENC | Attribute information on workstation of the vessel requesting ENC | complex attribute | 1..1 | mandatory |  |
| ENC Request | Properties information required for Request Transaction of ENC | complex attribute | 0..1 | option |  |
| Vessel Position | Position information for vessel requesting ENC | complex attribute | 0..1 | option |  |

Response : Properties information provided for Request Transaction of ENC or Zone information

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Download Information | Information about the properties for the chart to be downloaded | complex attribute | 0..\* | option |  |
| Information | Textual information about the reason of un-reply from service. | complex attribute | 0..1 | option |  |
| Result | The result of reply to service request ( O, X ) | boolean | 1..1 | mandatory |  |
| Zone Information | Information about the properties for zone of ENC | complex attribute | 0..\* | option |  |

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | Service Identification | ENCPropertyForNonSOLAS | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data**  **Type** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTIme |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |
| Category Of ENC | Type of ENC to be requested or sent | enumeration |  |
| Category Of Service | category of service | enumeration |  |
| Result | The result of reply to service request ( O, X ) | boolean |  |
| Device License | a unique license number for a workstation | text |  |
| Device Maker | manufacturer name of workstation | text |  |
| Device Serial Number | serial number of Workstation | text |  |
| Device Model | version information of workstation | text |  |
| Hash Function Value | Hash Function Value | text |  |
| Zone Name | The name of ENC Zone | text |  |
| Zone Version | The version of ENC Zone | text |  |
| Encryption | Status of application of S-63 | boolean |  |
| Type Of ENC | Type of ENC to be exchanged | enumeration |  |
| Version Of ENC | Version information for the ENC to be exchanged | text |  |
| Release Date | Date and time of revision for ENC of target area | date |  |
| Download URL | URL address for downloading ENC | URL |  |
| File Name | Name of the ENC file to be downloaded | text |  |
| Destination Path | ENC download path | text |  |
| File Size | size of the file to be exchanged (kilobyte) | real |  |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way. | text |  |
| Text | A non-formatted digital text string. | text |  |
| North Latitude | Coordinates of northern boundary | real |  |
| South Latitude | Coordinates of southern boundary | real |  |
| East Longitude | Coordinates of eastern boundary | real |  |
| West Longitude | Coordinates of western boundary | real |  |
| Vessel Latitude | Position information for vessel requesting ENC (Latitude) | real |  |
| Vessel Longitude | Position information for vessel requesting ENC (Longitude) | real |  |

[category Of ENC] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | base collection | Collection of all ENC base and revision datasets at particular point in time. |
| 2 | Update collection | Update collection of all new ENC base and revision datasets since last request. |

[type Of ENC] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | S-101 | Next generation Electronic navigation chart |
| 2 | S-57 | Electronic navigation chart |

[category Of Service] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | ENC | ENC service |
| 2 | Zone Information | zone information |

* Complex Attributes

[download Information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Download Exchangeset | Attribute information for the ENC file to be exchanged | complex attribute | 0..1 | option |  |
| ENC Property | Information about properties for ENC | complex attribute | 0..1 | option |  |

[zone Of ENC]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Zone Name | The name of ENC Zone | text | 1..1 | mandatory |  |
| Zone Version | The version of ENC Zone | text | 1..1 | mandatory |  |
| Boundary | Location information for zone of ENC | complex attribute | 0..1 | option |  |

[ENCProperty]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Encryption | Status of application of S-63 | boolean | 1..1 | mandatory |  |
| Type Of ENC | Type of ENC to be exchanged | enumeration | 1..1 | mandatory |  |
| Version Of ENC | Version information for the ENC to be exchanged | text | 1..1 | mandatory |  |
| Release Date | Date and time of revision for ENC of target area | date | 1..1 | mandatory |  |

[download Exchange set]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Download URL | URL address for downloading ENC | URL | 1..1 | mandatory |  |
| File Name | Name of the ENC file to be downloaded | text | 1..1 | mandatory |  |
| Destination Path | ENC download path | text | 1..1 | mandatory |  |
| File Size | size of the file to be exchanged (kilobyte) | real | 1..1 | mandatory |  |

[information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way. | text | 0..1 | option |  |
| Text | A non-formatted digital text string. | text | 1..1 | mandatory |  |

[boundary]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| North Latitude | Coordinates of northern boundary | real | 1..1 | mandatory |  |
| South Latitude | Coordinates of southern boundary | real | 1..1 | mandatory |  |
| East Longitude | Coordinates of eastern boundary | real | 1..1 | mandatory |  |
| West Longitude | Coordinates of western boundary | real | 1..1 | mandatory |  |

[vessel Position]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessel Latitude | Position information for vessel requesting ENC (Latitude) | real | 1..1 | mandatory |  |
| Vessel Longitude | Position information for vessel requesting ENC (Longitude) | real | 1..1 | mandatory |  |

[zone Information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Zone Name | The name of ENC Zone | text | 1..1 | mandatory |  |
| Zone Version | The version of ENC Zone | text | 1..1 | mandatory |  |
| Boundary | Location information for zone of ENC | complex attribute | 0..1 | option |  |

### **4.6.4.4 Dataset Types**

- TBD

### **4.6.4.5 Dataset Loading and Unloading**

- TBD

### **4.6.4.6 Geometry**

- TBD

### **4.6.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.6.6 Data Quality**

- TBD

### **4.6.7 Data Capture and classification**

- TBD

### **4.6.8 maintenance**

- TBD

### **4.6.9 Portrayal**

- TBD

### **4.6.10 data product format(encoding)**

- TBD

### **4.6.11 data product delivery**

- TBD

### **4.6.12 meta data**

- TBD

## 4.7 support for streaming authentification

### **4.7.1 Overview**

### **4.7.1.1 Introduction**

- TBD

### **4.7.1.2 References**

- TBD

### **4.7.1.3 Terms, definitions and abbreviations**

- TBD

### **4.7.1.4 General Data Product Description**

- TBD

### **4.7.1.5 Data product specification metadata**

- TBD

### **4.7.2 Specification Scopes**

- TBD

### **4.7.3 Dataset identification**

- TBD

### **4.7.4 Data Content and structure**

### **4.7.4.1 Introduction**

When a user connects to the service for the first time after installing the Streaming Service App, the user authentication request is automatically generated. The user requests authentication information and URL address of Web Map Tile Service for using the streaming service of the Smart-navigation System. provide only the MRN address of the user on request. The streaming server provides authentication key and the WMTS URL address to the user who requested authentication. The data transmitted from the streaming server includes MRN, an authentication key(32-digit information), and URL.

### **4.7.4.2 Application Schema**



### **4.7.4.3 Feature Catalogue**

­General

The Support for streaming authentification feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an Support for streaming authentification data set.

­Feature Types

* Geographic
* Meta

Support For Streaming Authentification : Support information for server URL-based streaming authentication

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Certification Key | Authentication key granted to the target app to use the streaming service. | text | 1..1 | mandatory |  |
| WMT Address | URL address of GIS database to use Web Map Service | text | 1..1 | mandatory |  |

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | Service Identification | Support For Streaming Authentification | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Certification Key | Authentication key granted to the target app to use the streaming service. | text |  |
| WMT Address | URL address of GIS database to use Web Map Service | text |  |

* Complex Attributes

None

### **4.7.4.4 Dataset Types**

- TBD

### **4.7.4.5 Dataset Loading and Unloading**

- TBD

### **4.7.4.6 Geometry**

- TBD

### **4.7.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.7.6 Data Quality**

- TBD

### **4.7.7 Data Capture and classification**

- TBD

### **4.7.8 maintenance**

- TBD

### **4.7.9 Portrayal**

- TBD

### **4.7.10 data product format(encoding)**

- TBD

### **4.7.11 data product delivery**

- TBD

### **4.7.12 meta data**

- TBD

## 4.8 MIO Service Support

### **4.8.1 Overview**

### **4.8.1.1 Introduction**

- TBD

### **4.8.1.2 References**

- TBD

### **4.8.1.3 Terms, definitions and abbreviations**

- TBD

### **4.8.1.4 General Data Product Description**

- TBD

### **4.8.1.5 Data product specification metadata**

- TBD

### **4.8.2 Specification Scopes**

- TBD

### **4.8.3 Dataset identification**

- TBD

### **4.8.4 Data Content and structure**

### **4.8.4.1 Introduction**

This model includes identification information to request and provide marine safety information. The marine safety information is S-122, S-123, S-124, S-127, S-128, S-201 and S-412. The marine safety request information may be provided based on the designated area, or may be provided based on the location information designated by the user. User-define location information can be divided into points, lines, and faces. The request information allows the user to specify the target date and time. The response information is provided with the address of the server containing the target information

**4.8.4.2 Application Schema**



### **4.8.4.3 Feature Catalogue**

­General

The MIO Service Support feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in an MIO Service Support data set.

­Feature Types

* Geographic
* Meta

MIO Service Response : Information received as a result of requesting MIO service from SMART Navigation system.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| MIO Service Product | Detail information of product provided from MIO service. | complex attribute | 0..\* | option |  |
| Result Of Request | Information about service availability and error. | complex attribute | 1..1 | mandatory |  |

MIO Service Request : Information for requesting MIO service provided by SMART Navigation system.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| MIO Service Product | Detail information of product provided from MIO service. | complex attribute | 1..\* | mandatory |  |
| Periodic Time Range | The complex attribute describes the active period for MIO Service request, as the times between its sub-attributes. | complex attribute | 0..1 | option |  |
| Request Time | The time of service request start | boolean | 0..1 | option |  |

Request By User Define Area : Service request by using a area defined by user

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Count Of Coordinates | Total number of coordinate pairs used in service request | integer | 1..1 | mandatory |  |
| Coverage Distance | range information requested from specified coordinates | integer | 1..1 | mandatory |  |

Request By Service Define Area : Service request by using a area defined by service provider

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Korea Sea Area | segmentation of Korea Sea Area designated by service. | enumeration | 1..\* | mandatory |  |

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | MIOServiceResponse | 1..1 |
| Association | Identification | service identification | MIOServiceRequest | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTIme |  |
| Request Time | The time of service request start | dateTIme |  |
| Count Of Coordinates | Total number of coordinate pairs used in service request | integer |  |
| Coverage Distance | Range information requested from specified coordinates | integer |  |
| Time Start | The start of an active period | dateTime |  |
| Time End | The end of an active period | dateTime |  |
| Text | A non-formatted digital text string. | text |  |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way. | text |  |
| Code Of Standard | Product Specification Code Number presented by IHO | text |  |
| Download URL | URL information for downloading service product | URL |  |
| Version | version of product specification. (ex. 3.5.1) | text |  |
| Result Code | Code that defines the request reply and whether it is error or not. | enumeration |  |
| MIO Name | Product Specification Name presented by IHO | enumeration |  |
| Korea Sea Area | segmentation of Korea Sea Area designated by service. | enumeration |  |

[MIOName] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | Marine Protected Areas | Marine Service Product defined by IHO |
| 2 | Maritime Radio Services | Marine Service Product defined by IHO |
| 3 | Navigational Warnings | Marine Service Product defined by IHO |
| 4 | Marine Traffic Management | Marine Service Product defined by IHO |
| 5 | Catalogues of Nautical Products | Marine Service Product defined by IHO |
| 6 | Aid to Navigation Information | Marine Service Product defined by IALA |
| 7 | Weather Overlay | Marine Service Product defined by WMO |

[korea Sea Area] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | SEA001 | offing of Jeju |
| 2 | SEA002 | The west offing of the south |
| 3 | SEA003 | The south outsea of the west |
| 4 | SEA004 | The middle outsea of the west |
| 5 | SEA005 | The middle offing of the east |
| 6 | SEA006 | The south offing of the east |
| 7 | SEA007 | The east offing of the south |
| 8 | SEA008 | The middle offing of the west |
| 9 | SEA009 | The south offing of the west |
| 10 | SEA010 | off the east outsea of the south |
| 11 | SEA011 | off the west outsea of the south |
| 12 | SEA012 | The south outsea of Jeju |
| 13 | SEA013 | The east outsea of the south |
| 14 | SEA014 | The south outsea of the east |
| 15 | SEA015 | The middle outsea of the east |

[result Code] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | oooo | No error issue |
| 2 | 5000 | specs is null. |
| 3 | 5001 | Unsupport spec. : (request spec) |
| 4 | 5100 | sourceMrn is null. |
| 5 | 5200 | version is null. |
| 6 | 5201 | version is not support. Please check specs version. |
| 7 | 5300 | type is null. |
| 8 | 5301 | search type is not available. please, select this values of one(point,line,polygon). |
| 9 | 5400 | coordinate x range is (-180.0 ~ 180.0)., coordinate y range is (-90.0 ~ 90.0). |
| 10 | 5401 | valid coordinate is null. |
| 11 | 5402 | point coordinate must valid coordinate pair 1. |
| 12 | 5403 | line coordinate minimum valid coordinate pair 2. |
| 13 | 5404 | polygon coordinate must valid coordinate pair 2. |
| 14 | 5500 | buffer range from 1 to 2147483647 |
| 15 | 5999 | different specs's count and version's count. |

* Complex Attributes

[periodic Time Range]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Time Start | The start of an active period | dateTime | 1..1 | mandatory |  |
| Time End | The end of an active period | dateTime | 1..1 | mandatory |  |

[MIO Service Product]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Code Of Standard | Product Specification Code Number presented by IHO | text | 0..1 | option |  |
| Download URL | URL information for downloading service product | URL | 0..1 | option |  |
| Version | version of product specification. (ex. 3.5.1) | text | 1..1 | mandatory |  |
| MIO Name | Product Specification Name presented by IHO | enumeration | 0..\* | option |  |

[resultOfRequest]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Result Code | Code that defines the request reply and whether it is error or not. | enumeration | 1..1 | mandatory |  |
| Information | Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text. | complex attribute | 0..\* | option |  |

[information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Language | The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way. | text | 0..1 | option |  |
| Text | A non-formatted digital text string. | text | 1..1 | mandatory |  |

### **4.8.4.4 Dataset Types**

- TBD

### **4.8.4.5 Dataset Loading and Unloading**

- TBD

### **4.8.4.6 Geometry**

- TBD

### **4.8.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.8.6 Data Quality**

- TBD

### **4.8.7 Data Capture and classification**

- TBD

### **4.8.8 maintenance**

- TBD

### **4.8.9 Portrayal**

- TBD

### **4.8.10 data product format(encoding)**

- TBD

### **4.8.11 data product delivery**

- TBD

### **4.8.12 meta data**

- TBD

## 4.9 SHip alarm & emergency

### **4.9.1 Overview**

### **4.9.1.1 Introduction**

- TBD

### **4.9.1.2 References**

- TBD

### **4.9.1.3 Terms, definitions and abbreviations**

- TBD

### **4.9.1.4 General Data Product Description**

- TBD

### **4.9.1.5 Data product specification metadata**

- TBD

### **4.9.2 Specification Scopes**

- TBD

### **4.9.3 Dataset identification**

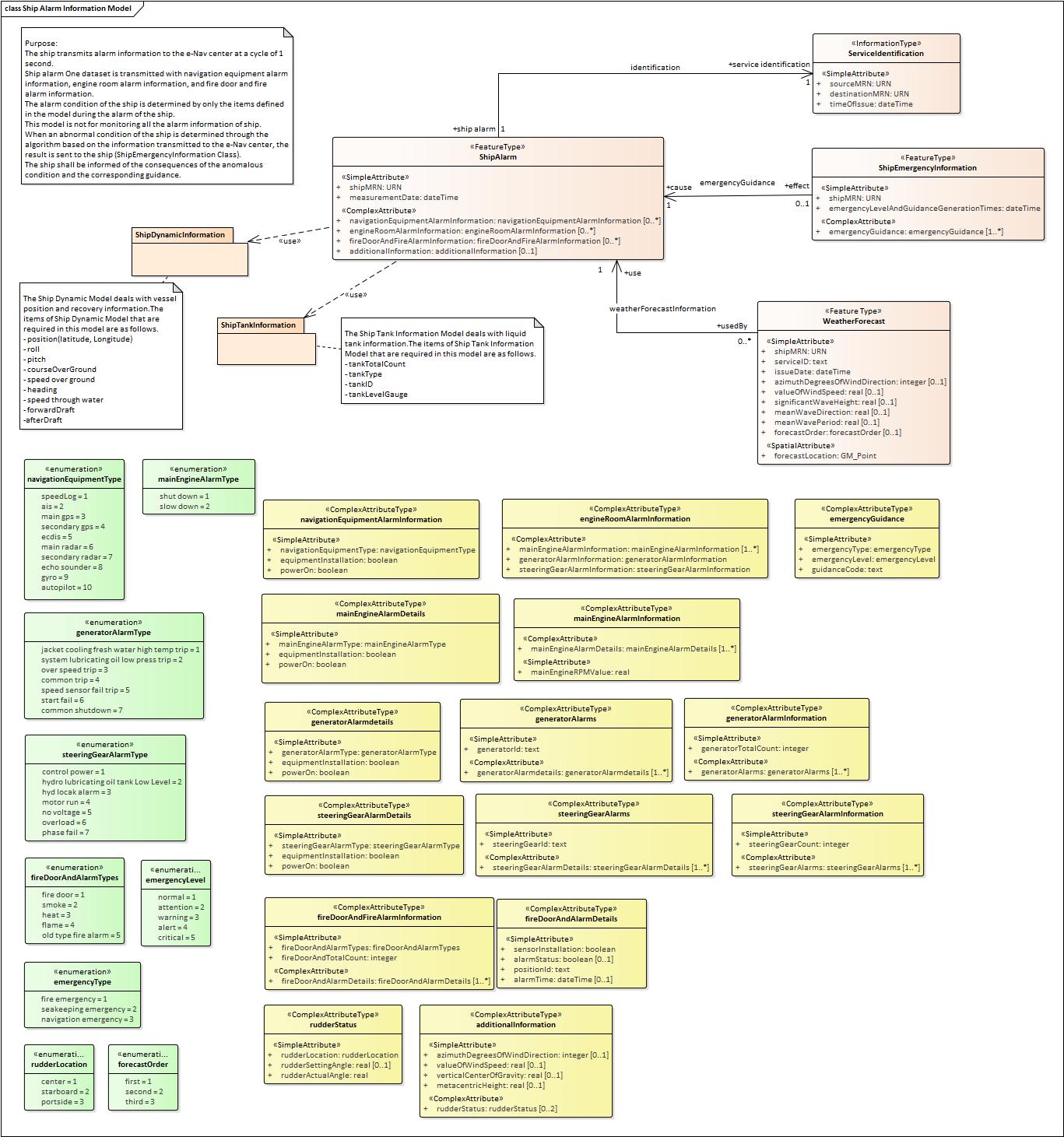
- TBD

### **4.9.4 Data Content and structure**

### **4.9.4.1 Introduction**

- TBD

### **4.9.4.2 Application Schema**



### **4.9.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Ship Alarm & Emergency data set.

­Feature Types

* Geographic
* Meta

ShipAlarm

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Measurement Date | Date & Time at which ship alarm was measure. | dateTime | 1..1 | mandatory |  |
| Navigation Equipment Alarm Information | Alarm information for navigational equipment installed on the bridge | complex attribute | 0..\* | option |  |
| Engine Room Alarm Information | Alarm information for major machinery equipment installed in the engine room | complex attribute | 0..\* | option |  |
| fireDoorAndFireAlarmInformation | Fire doors and fire alarm information | complex attribute | 0..\* | option |  |
| additionalInformation |  | complex attribute | 0..1 | option |  |

ShipEmergencyInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Emergency Level And Guidance Generation Times | Emergency Level and Guidance Generation Times | dateTime | 1..1 | mandatory |  |
| Emergency Guidance |  | complex Attribute | 1..\* | mandatory |  |

WeatherForecast

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | Source MRN of Vessel | URN | 1..1 | mandatory |  |
| Service ID |  | text | 1..1 | mandatory |  |
| issueDate |  | dateTime | 1..1 | mandatory |  |
| Forecast Location |  | GM\_Point | 1..1 | mandatory |  |
| Azimuth Degrees Of Wind Direction | The wind direction in degrees, from 000 to 360, from which the wind blows. | integer | 0..1 | option |  |
| Value Of Wind Speed | The ratio value of the distance covered by the air to the time taken to cover it. | real | 0..1 | option |  |
| Significant Wave Height |  | real | 0..1 | option |  |
| Mean Wave Direction |  | real | 0..1 | option |  |
| Mean Wave Period |  | real | 0..1 | option |  |
| Forecast Order |  | enumeration | 0..1 | option |  |

* Cartographic
* Theme

Feature Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | emergencyGuidance | cause | ShipEmergencyInformation | 1..1 |
| Association | emergencyGuidance | effect | ShipAlarm | 0..1 |
| Association | weatherForecastInformation | use | WeatherForecast | 1..1 |
| Association | weatherForecastInformation | usedBy | ShipAlarm | 0..\* |

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | ShipAlarm | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| Measurement Date | Date & Time at which ship alarm was measure. | dateTime |  |
| Navigation Equipment Type | Types of navigation equipment | enumeration |  |
| Equipment Installation | Whether or not the selected alarm device is installed | boolean |  |
| Power On | If the selected equipment is installed, whether the equipment is powered or not | boolean |  |
| Alarm Type | Types of alarm devices installed on the main engine | enumeration |  |
| Main Engine RPM Value | The current rpm of the main engine | real |  |
| Generator Total Count | Total number of generators installed on the ship | integer |  |
| Generator ID | ID for generator identification | text |  |
| Generator Alarm Type | Generator Alarm Type | enumeration |  |
| SteeringGear Total Count | Total number of steering Gear installed on the ship | integer |  |
| SteeringGear Alarm Type | Types of steering gear alarm devices | enumeration |  |
| Fire Door And Alarm Types | Types of fire alarms including fire doors | enumeration |  |
| Fire Door And Alarm Total Count | Number of data transferred by fire alarm type | integer |  |
| Sensor Installation | Whether sensor is installed | boolean |  |
| Alarm Status | The current operating status of the installed fire alarm or fire door. | boolean |  |
| Position ID | ID for location of fire alarm or fire door | text |  |
| Alarm Time | The time when a fire occurred and an alarm occurred. | dateTime |  |
| Azimuth Degrees of Wind Direction | The wind direction in degrees, from 000 to 360, from which the wind blows. | integer |  |
| Value of Wind Speed | The ratio value of the distance covered by the air to the time taken to cover it. | real |  |
| Rudder Location | It means the location where the rudder is installed on the ship. If one rudder is installed, select center, and if two rudder is installed, select the direction. | enumeration |  |
| Rudder Setting Angle | The angle of the Rudder you have set to change the direction of the ship. | real |  |
| Rudder Actual Angle | The angle at which the actual Rudder's blades are tilted according to the angle of the Rudder you have set to change the direction of the ship. | real |  |
| Emergency Level and Guidance Generation Times | Emergency Level and Guidance Generation Times | dateTime |  |
| Emergency Type | Types of risk situations | enumeration |  |
| Emergency Level | Level by type of risk. | enumeration |  |
| Guidance Code | Provided as a code value as a guideline on the ship in case of danger. | text |  |
| Service ID | Service ID | text |  |
| Issue Date | Issue Date | dateTime |  |
| Significant Wave Height | Significant Wave Height | real |  |
| Mean Wave Direction | Mean Wave Direction | real |  |
| Mean Wave Period | Mean Wave Period | real |  |
| Forecast Order | Forecast Order | enumeration |  |
| Steering Gear ID | Steering Gear ID | text |  |
| Vertical Center Of Gravity | Vertical Center Of Gravity | real |  |
| Metacentric Height | Metacentric Height | real |  |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |

[navigationEquipmentType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | speedLog | - |
| 2 | ais | - |
| 3 | main gps | - |
| 4 | secondary gps | - |
| 5 | ecdis | - |
| 6 | main radar | - |
| 7 | secondary radar | - |
| 8 | echo sounder | - |
| 9 | gyro | - |
| 10 | autopilot | - |

[mainEngineAlarmType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | shut down | - |
| 2 | slow down | - |

[generatorAlarmType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | jacket cooling fresh water high temp trip | - |
| 2 | system lubricating oil low press trip | - |
| 3 | over speed trip | - |
| 4 | common trip | - |
| 5 | speed sensor fail trip | - |
| 6 | start fail | - |
| 7 | common shutdown | - |

[steeringGearAlarmType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | steeringGearAlarmType | - |
| 2 | hydro lubricating oil tank Low Level | - |
| 3 | hyd locak alarm | - |
| 4 | motor run | -- |
| 5 | no voltage | - |
| 6 | overload | - |
| 7 | phase fail | - |

[fireDoorAndalarmTypes] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | fire door | - |
| 2 | smoke | - |
| 3 | heat | - |
| 4 | flame | - |
| 5 | old type fire alarm | - |

[emergencyType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | fire emergency | - |
| 2 | seakeeping emergency | - |
| 3 | navigation emergency | - |

[emergencyLevel] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | normal | - |
| 2 | attention | - |
| 3 | warning | - |
| 4 | alert | - |
| 5 | critical | - |

[rudderLocation] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | center | - |
| 2 | starboard | - |
| 3 | portside | - |

[forecastOrder] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | first | - |
| 2 | second | - |
| 3 | third | - |

* Complex Attributes

[emergencyGuidance]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Emergency Type | Types of risk situations | enumeration | 1..1 | mandatory |  |
| Emergency Level | Level by type of risk. | enumeration | 1..1 | mandatory |  |
| Guidance Code | Provided as a code value as a guideline on the ship in case of danger. | text | 0..\* | option |  |

[navigationEquipmentAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Navigation Equipment Type | Types of navigation equipment | enumeration | 1..1 | mandatory |  |
| Power On | If the selected equipment is installed, whether the equipment is powered or not | boolean | 1..1 | mandatory |  |
| Equipment Installation | Whether or not the selected alarm device is installed | boolean | 1..1 | mandatory |  |

[navigationEquipmentAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Main Engine Alarm Information | Main Engine Alarm Information | complex attribute | 1..\* | mandatory |  |
| Generator Alarm Information | Generator Alarm Information | complex attribute | 1..1 | mandatory |  |
| Steering Gear Alarm Information | Information of steering gear alarms | complex attribute | 1..1 | mandatory |  |

[mainEngineAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Main Engine RPM Value | The current rpm of the main engine | real | 1..1 | mandatory |  |
| Main Engine Alarm Details | Details of main engine alarm | complex attribute | 1..\* | mandatory |  |

[mainEngineAlarmDetails]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Main Engine Alarm Type | Types of alarm devices installed on the main engine | enumeration | 1..1 | mandatory |  |
| Equipment Installation | Whether or not the selected alarm device is installed | boolean | 1..1 | mandatory |  |
| Power On | If the selected equipment is installed, whether the equipment is powered or not | boolean | 1..1 | mandatory |  |

[generatorAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Generator Total Count | Total number of generators installed on the ship | integer | 1..1 | mandatory |  |
| Generator Alarms | Details of generator alarm | complex attribute | 1..\* | mandatory |  |

[generatorAlarms]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Generator ID | ID for generator identification | text | 1..1 | mandatory |  |
| Generator Alarm Details | Alarm details for individual generators | complex attribute | 1..\* | mandatory |  |

[generatorAlarmdetails]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Generator Alarm Type | Generator Alarm Type | enumeration | 1..1 | mandatory |  |
| Power On | If the selected equipment is installed, whether the equipment is powered or not | boolean | 1..1 | mandatory |  |
| Equipment Installation | Whether or not the selected alarm device is installed | boolean | 1..1 | mandatory |  |

[steeringGearAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Steering Gear Count | Total number of steering Gear installed on the ship | integer | 1..1 | mandatory |  |
| Steering Gear Alarms | steering Gear Alarm Details | complex attribute | 1..\* | mandatory |  |

[steeringGearAlarms]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Steering Gear ID | Steering Gear ID | text | 1..1 | mandatory |  |
| Steering Gear Alarm Details | Details of steering gear alarm | complex attribute | 1..\* | mandatory |  |

[steeringGearAlarmDetails]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Steering Gear Alarm Type | Types of steering gear alarm devices | enumeration | 1..1 | mandatory |  |
| Power On | If the selected equipment is installed, whether the equipment is powered or not | boolean | 1..1 | mandatory |  |
| Equipment Installation | Whether or not the selected alarm device is installed | boolean | 1..1 | mandatory |  |

[fireDoorAndFireAlarmInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Fire Door And Alarm Types | Types of fire alarms including fire doors | enumeration | 1..1 | mandatory |  |
| Fire Door And Total Count | Number of data transferred by fire alarm type | integer | 1..1 | mandatory |  |
| Fire Door And Alarm Details | Fire alarm details, including fire door information. | complex attribute | 1..\* | mandatory |  |

[fireDoorAndAlarmDetails]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Sensor Installation | Whether sensor is installed | boolean | 1..1 | mandatory |  |
| Alarm Status | The current operating status of the installed fire alarm or fire door. | boolean | 0..1 | option |  |
| Position ID | ID for location of fire alarm or fire door | text | 1..1 | mandatory |  |
| Alarm Time | The time when a fire occurred and an alarm occurred. | dateTime | 0..1 | option |  |

[additionalInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Azimuth Degrees Of Wind Direction | The wind direction in degrees, from 000 to 360, from which the wind blows. | integer | 0..1 | option |  |
| Value Of Wind Speed | The ratio value of the distance covered by the air to the time taken to cover it. | real | 0..1 | option |  |
| Vertical Center Of Gravity | Vertical Center Of Gravity | real | 0..1 | option |  |
| Metacentric Height | Metacentric Height | real | 0..1 | option |  |
| Rudder Status | Means the position and angle of the rudder installed on the ship. | complex attribute | 0..2 | option |  |

[rudderStatus]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Rudder Location | It means the location where the rudder is installed on the ship. If one rudder is installed, select Center, and if two rudder is installed, select the direction. | enumeration | 1..1 | mandatory |  |
| Rudder Setting Angle | The angle of the Rudder you have set to change the direction of the ship. | real | 0..1 | option |  |
| Rudder Actual Angle | The angle at which the actual Rudder's blades are tilted according to the angle of the Rudder you have set to change the direction of the ship. | real | 1..1 | mandatory |  |

### **4.9.4.4 Dataset Types**

- TBD

### **4.9.4.5 Dataset Loading and Unloading**

- TBD

### **4.9.4.6 Geometry**

- TBD

### **4.9.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.9.6 Data Quality**

- TBD

### **4.9.7 Data Capture and classification**

- TBD

### **4.9.8 maintenance**

- TBD

### **4.9.9 Portrayal**

- TBD

### **4.9.10 data product format(encoding)**

- TBD

### **4.9.11 data product delivery**

- TBD

### **4.9.12 meta data**

- TBD

## 4.10 SHip tank

### **4.10.1 Overview**

### **4.10.1.1 Introduction**

- TBD

### **4.10.1.2 References**

- TBD

### **4.10.1.3 Terms, definitions and abbreviations**

- TBD

### **4.10.1.4 General Data Product Description**

- TBD

### **4.10.1.5 Data product specification metadata**

- TBD

### **4.10.2 Specification Scopes**

- TBD

### **4.10.3 Dataset identification**

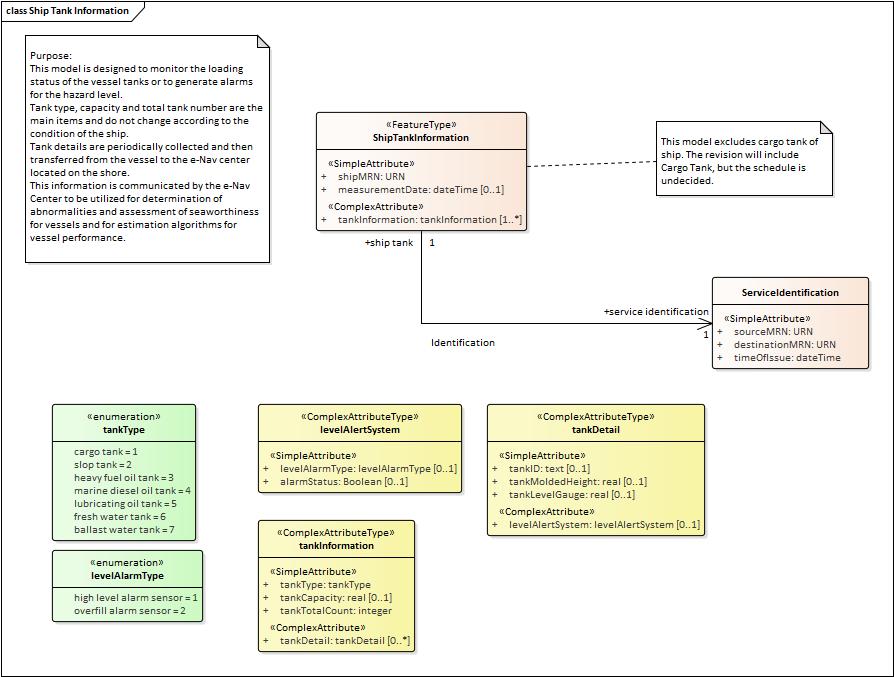
- TBD

### **4.10.4 Data Content and structure**

### **4.10.4.1 Introduction**

- TBD

### **4.10.4.2 Application Schema**



### **4.10.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Ship Tank data set.

­Feature Types

* Geographic
* Meta

ShipTankInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Measurement Date | Date & Time at which ship Tank information was measure. | dateTime | 0..1 | option |  |
| Tank Information | Specifications and status information for the loading of cargo, the number of ballast water for maintaining the safety of vessels, and the fuel oil for the propulsion of vessels | complex attribute | 1..\* | mandatory |  |

* Cartographic
* Theme

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | ShipTankInformation | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| Measurement Date | Date & Time at which ship Tank information was measure. | dateTime |  |
| Level Alarm Type | Alarm sensor for dangerous load of tank such as high level or overflow | enumeration |  |
| Alarm Status | An alarm is raised to indicate that the tank has a high load, so the crew is aware of the danger.  Notify that crews are in danger and follow-up by generating an alarm for overflow | boolean |  |
| Tank ID | ID for identifying individual tanks | text |  |
| Tank Size\_height | Maximum height of individual tank(molded height) | real |  |
| Tank Level Gauge | A gauge sensor for continuously measuring the amount of oil / water stored in the tank | real |  |
| Tank Type | Types of tanks installed on ships | enumeration |  |
| Tank Capacity | The total volume of the tank or the total amount that can be put into the tank | real |  |
| Tank Total Count | Total number of ships installed by tank type | integer |  |
| destinationMRN | The MRN of the destination receiving the service data | URN |  |
| timeOfIssue | The issued date and time of the data | dateTime |  |
| messageType | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[tankType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | cargo tank | Tanks for loading a cargo to be transported by the ship, such as a packaged items like chemicals, foods, furniture, machinery, container. |
| 2 | slop tank | Tanks for storing oil and water remaining in tank cleaning or various lubricating oils and other oils flowing out during ship operation |
| 3 | heavy fuel oil tank | Heavy fuel oil used in main engines, generators, storage tanks that store the fuel when it is first received, settling tanks that separate water and oil by gravity, and service tanks that are used directly in the engine after passing through the purifier. |
| 4 | marine diesel oil tank | Marine diesel oil used in generators, boilers, etc.,, storage tanks that store the fuel when it is first received, settling tanks that separate water and oil by gravity, and service tanks that are used directly in the engine after passing through the purifier. |
| 5 | lubricating oil tank | lubricant storage tank that stores lubricant used in main engines and auxiliary machinery. It includes storage tank, settling tank, service tank and daily service tank as well as fuel tank. |
| 6 | fresh water tank | Tanks for storing water used for washing, showering, and cooking on board |
| 7 | ballast water tank | A ballast tank is a compartment within a boat, ship or other floating structure that holds water, which is used as ballast to provide stability for a vessel |

[levelAlarmType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | high level alarm sensor | A sensor that gives an alarm when the tank is loaded with more than 95% liquid. |
| 2 | overfill alarm sensor | A sensor that gives an alarm when the tank is loaded with more than 98% liquid. |

* Complex Attributes

[tankInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Tank Type | Types of tanks installed on ships | enumeration | 1..1 | mandatory |  |
| Tank Capacity | The total volume of the tank or the total amount that can be put into the tank | real | 0..1 | option |  |
| Tank Total Count | Total number of ships installed by tank type | integer | 1..1 | mandatory |  |
| Tank Detail | Specifications and loading status information for individual tanks. | complex attribute | 0..\* | option |  |

[tankDetail]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Tank ID | ID for identifying individual tanks | text | 0..1 | option |  |
| Tank Molded Height | Maximum height of individual tank(molded height) | real | 0..1 | option |  |
| Tank Level Gauge | A gauge sensor for continuously measuring the amount of oil / water stored in the tank | real | 0..1 | option |  |
| Level Alert System | Alarm system to check dangerous level of tank installed on vessel. | complex attribute | 0..1 | option |  |

[levelAlertSystem]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Level Alarm Type | Alarm sensor for dangerous load of tank such as high level or overflow | enumeration | 0..1 | option |  |
| Alarm Status | An alarm is raised to indicate that the tank has a high load, so the crew is aware of the danger.  Notify that crews are in danger and follow-up by generating an alarm for overflow | boolean | 0..1 | option |  |

### **4.10.4.4 Dataset Types**

- TBD

### **4.10.4.5 Dataset Loading and Unloading**

- TBD

### **4.10.4.6 Geometry**

- TBD

### **4.10.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.10.6 Data Quality**

- TBD

### **4.10.7 Data Capture and classification**

- TBD

### **4.10.8 maintenance**

- TBD

### **4.10.9 Portrayal**

- TBD

### **4.10.10 data product format(encoding)**

- TBD

### **4.10.11 data product delivery**

- TBD

### **4.10.12 meta data**

- TBD

## 4.11 pilot shcedule

### **4.11.1 Overview**

### **4.11.1.1 Introduction**

- TBD

### **4.11.1.2 References**

- TBD

### **4.11.1.3 Terms, definitions and abbreviations**

- TBD

### **4.11.1.4 General Data Product Description**

- TBD

### **4.11.1.5 Data product specification metadata**

- TBD

### **4.11.2 Specification Scopes**

- TBD

### **4.11.3 Dataset identification**

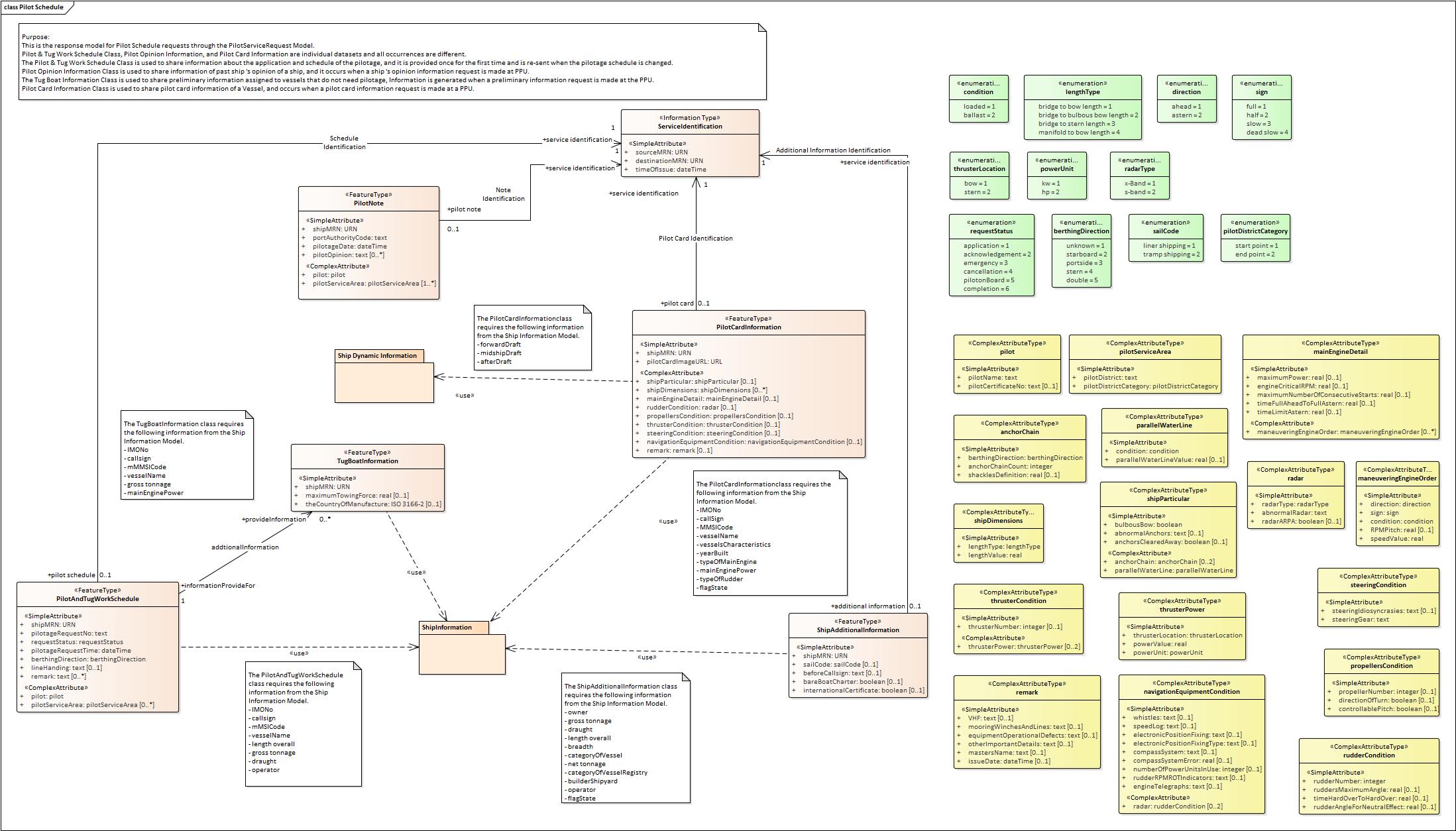
- TBD

### **4.11.4 Data Content and structure**

### **4.11.4.1 Introduction**

Provide the safety information necessary for entering and leaving the ship in the pilot area, The tugboat provides the necessary safety information so that the ship can safely berthing and un-berthing the ship in accordance with the orders of the pilot.

### **4.11.4.2 Application Schema**



### **4.11.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Pilot Schedule data set.

­Feature Types

* Geographic
* Meta

PilotAndTugWorkSchedule

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Pilotage Request No | Pilotage Request No | text | 1..1 | mandatory |  |
| Request Status | Pilotage Request Status | enumeration | 1..1 | mandatory |  |
| Pilotage Request Time | Pilotage Request Time | dateTime | 1..1 | mandatory |  |
| Line Handing | Name of the line Handing company | text | 0..1 | option |  |
| Remark | - | text | 0..\* | option |  |
| Pilot | - | complex attribute |  |  |  |
| Pilot Service Area | - | complex attribute | 0..\* | option |  |

TugBoatInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Maximum Towing Force | The maximum force that can be generated through the line between the Tug and Vessel, when the Tug is towing. | real | 0..1 | option |  |
| The Country Of Manufacture | Producer of tugboat | ISO  3166-2 | 0..1 | option |  |

PilotNote

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Port Authority Code | Port Authority Code | text | 1..1 | mandatory |  |
| Pilotage Date | - | dateTime | 1..1 | mandatory |  |
| Pilot Opinion | - | text | 0..\* | option |  |
| Pilot | - | complex attribute |  |  |  |
| Pilot Service Area | - | complex attribute | 0..\* | option |  |

PilotNote

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Port Authority Code | Port Authority Code | text | 1..1 | mandatory |  |
| Ship Particular | - | complex attribute | 0..1 | option |  |
| Ship Dimensions | - | complex attribute | 0..\* | option |  |
| Main Engine Detail | - | complex attribute | 0..1 | option |  |
| Rudder Condition | - | complex attribute | 0..1 | option |  |
| Propellers Condition | - | complex attribute | 0..1 | option |  |
| Steering Condition | - | complex attribute | 0..1 | option |  |
| Navigation Equipment Condition | - | complex attribute | 0..1 | option |  |
| Remark | - | complex attribute | 0..1 | option |  |

ShipAdditionInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| Sail Code |  | enumeration | 0..1 | option |  |
| Before Callsign | The designated call-sign of a radio station. | text | 0..1 | option |  |
| Bare Boat Charter |  | boolean | 0..1 | option |  |
| International Certificate |  | boolean | 0..1 | option |  |

* Cartographic
* Theme

Feature Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | additionalInformation | informationProvideFor | TugBoatInformation | 1..1 |
| Association | additionalInformation | provideInformation | PilotAndTugWorkSchedule | 0..\* |

­

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Schedule Identification | service identification | PilotAndTugWorkSchedule | 1..1 |
| Association | Note Identification | service identification | PilotNote | 1..1 |
| Association | Additional Information Identification | service identification | ShipAdditionalInformation | 1..1 |
| Association | Pilot Card Identification | service identification | PilotCardInformation | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| Pilotage Request No | Pilotage Request No | text |  |
| Request Status | Pilotage Request Status | enumeration |  |
| Pilotage Request Time | Pilotage Request Time | dateTime |  |
| Pilot Name | Pilot Name | text |  |
| Pilot Certificate No | Pilot Certificate No | text |  |
| Pilot District |  | text |  |
| Pilot District Category |  | enumeration |  |
| Berthing Direction | Direction of ship 's berthing. | enumeration |  |
| Line Handling | Name of the line Handing company | text |  |
| Remark |  | text |  |
| Port Authority Code | Port Authority Code | text |  |
| Pilotage Date |  | dateTime |  |
| Pilot Opinion |  | text |  |
| Sail Code |  | enumeration |  |
| before Callsign | The designated call-sign of a radio station. | text |  |
| Bare Boat Charter |  | boolean |  |
| International Certificate |  | boolean |  |
| Maximum Towing Force | The maximum force that can be generated through the line between the Tug and Vessel, when the Tug is towing. | real |  |
| The Country of Manufacture | Producer of tugboat | ISO 3166-2 |  |
| Pilot Card Image URL | Pilot Card Image URL | URL |  |
| Anchor Chain Count | Anchor Chain Count | integer |  |
| Shackles Definition | Shackles Definition | real |  |
| Bulbous Bow | Bulbous Bow | boolean |  |
| Abnormal Anchors | Abnormal Anchors | text |  |
| Anchors Cleared Away | Anchors Cleared Away | boolean |  |
| Condition | Condition | enumeration |  |
| Parallel Water Line Value | Parallel Water Line Value | real |  |
| Maximum Power | Maximum Power | real |  |
| Engine Critical RPM | Engine Critical RPM | real |  |
| Maximum Number Of Consecultive Starts | Maximum Number Of Consecultive Starts | real |  |
| Time Full Ahead To Full Astern | Time Full Ahead To Full Astern | real |  |
| Time Limit Astern | Time Limit Astern | real |  |
| Length Type | Length Type | enumeration |  |
| Length Value | Length Value | real |  |
| Thruster Number | Thruster Number | integer |  |
| Thruster Location | Thruster Location | enumeration |  |
| Power Value | Power Value | real |  |
| Power Unit | Power Unit | enumeration |  |
| Steering Idiosyncrasies | Steering Idiosyncrasies | text |  |
| Steering Gear | Steering Gear | text |  |
| Propeller Number | Propeller Number | integer |  |
| Direction Of Turn | Direction Of Turn | boolean |  |
| Controllable Pitch | Controllable Pitch | boolean |  |
| VHF | VHF | text |  |
| Mooring Winches And Lines | Mooring Winches And Lines | text |  |
| Equipment Operational Defects | Equipment Operational Defects | text |  |
| Other Important Details | Other Important Details | text |  |
| Masters Name | Masters Name | text |  |
| Issue Date | Issue Date | dateTime |  |
| Whistles | Whistles | text |  |
| Speed Log | Speed Log | text |  |
| Electronic Position Fixing | Electronic Position Fixing | text |  |
| Electronic Position Fixing Type | Electronic Position Fixing Type | text |  |
| Compass System | Compass System | text |  |
| Compass System Error | Compass System Error | real |  |
| Number Of Power Units In Use | Number Of Power Units In Use | integer |  |
| Rudder RPM ROT Indicators | Rudder RPM ROT Indicators | text |  |
| Engine Telegraphs | Engine Telegraphs | text |  |
| Radar Type | Radar Type | enumeration |  |
| Abnormal Radar | Abnormal Radar | text |  |
| Radar ARPA | Radar ARPA | boolean |  |
| Rudder Number | Rudder Number | integer |  |
| Rudders Maximum Angle | Rudders Maximum Angle | real |  |
| Time Hard Over To Hard Over | Time Hard Over To Hard Over | real |  |
| Rudder Angle For Neutral Effect | Rudder Angle For Neutral Effect | real |  |
| Direction | Direction | enumeration |  |
| Sign | Sign | enumeration |  |
| RPM Pitch | RPM Pitch | real |  |
| Speed Value | Speed Value | real |  |
| Source MRN | The MRN of the source producing the service data | URN |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |

[requestStatus] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | application | - |
| 2 | acknowledgement | - |
| 3 | emergency | - |
| 4 | cancellation | - |
| 5 | pilotonBoard | - |
| 6 | completion | - |

[berthingDirection] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | unknown | - |
| 2 | starboard | - |
| 3 | portside | - |
| 4 | stern | - |
| 5 | double | - |

[sailCode] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | liner shipping | - |
| 2 | tramp shipping | - |

[pilotDistrictCategory] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | start point | - |
| 2 | end point | - |

[condition] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | loaded | - |
| 2 | ballast | - |

[lengthType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | bridge to bow length | - |
| 2 | bridge to bulbous bow length | - |
| 3 | bridge to stern length | - |
| 4 | manifold to bow length | - |

[direction] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | ahead | - |
| 2 | astern | - |

[sign] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | full | - |
| 2 | half | - |
| 3 | slow | - |
| 4 | dead slow | - |

[thrusterLocation] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | bow | - |
| 2 | stern | - |

[powerUnit] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | Kw | - |
| 2 | hp | - |

[radarType] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | x-Band | - |
| 2 | s-Band | - |

* Complex Attributes

[pilot]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Pilot Name | Pilot Name | text | 1..1 | mandatory |  |
| Pilot Certificate No | Pilot Certificate No | text | 0..1 | option |  |

[pilotServiceArea]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Pilot District |  | text | 1..1 | mandatory |  |
| Pilot District Category |  | enumeration | 1..1 | mandatory |  |

[maneuveringEngineOrder]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Direction | Direction | enumeration | 1..1 | mandatory |  |
| Sign | Sign | enumeration | 1..1 | mandatory |  |
| Condition | Condition | enumeration | 1..1 | mandatory |  |
| RPM Pitch | RPM Pitch | real | 0..1 | Option |  |
| Speed Value | Speed Value | real | 1..1 | mandatory |  |

[anchorChain]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Berthing Direction | Direction of ship 's berthing. | enumeration | 1..1 | mandatory |  |
| Anchor Chain Count | Anchor Chain Count | integer | 1..1 | mandatory |  |
| Shackles Definition | Shackles Definition | real | 0..1 | option |  |

[parallelWaterLine]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Condition | Condition | enumeration | 1..1 | mandatory |  |
| Parallel Water | Parallel Water Line Value | real | 0..1 | option |  |

[shipParticular]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Bulbous Bow | Bulbous Bow | boolean | 1..1 | mandatory |  |
| Abnormal Anchors | Abnormal Anchors | text | 0..1 | option |  |
| Anchors Cleared Away | Anchors Cleared Away | boolean | 0..1 | option |  |
| Anchor Chain Count | Anchor Chain Count | integer | 0..2 | option |  |
| Parallel Water Line | Parallel Water Line Value | real | 1..1 | mandatory |  |

[mainEngineDetail]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Maximum Power | Maximum Power | real | 0..1 | option |  |
| Engine Critical RPM | Engine Critical RPM | real | 0..1 | option |  |
| Maximum Number  Of  Consecutive Starts | Maximum Number Of Consecultive Starts | real | 0..1 | option |  |
| Time Full Ahead To  Full Astern | Time Full Ahead To Full Astern | real | 0..1 | option |  |
| Time Limit Astern | Time Limit Astern | real | 0..1 | option |  |
| Maneuvering Engine  Order | Maneuvering Engine Order | Complex attribute | 0..\* | option |  |

[shipDimensions]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Length Type | Length Type | enumeration | 1..1 | mandatory |  |
| Length Value | Length Value | real | 1..1 | mandatory |  |

[thrusterCondition]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Thruster Number | Thruster Number | integer | 0..1 | option |  |
| Thruster Power | Thruster Power | Complex attribute | 0..2 | option |  |

[thrusterPower]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Thruster Location | Thruster Location | enumeration | 1..1 | mandatory |  |
| Power Value | Power Value | real | 1..1 | mandatory |  |
| Power Unit | Power Unit | enumeration | 1..1 | mandatory |  |

[steeringCondition]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Steering Idiosyncrasies | Steering Idiosyncrasies | text | 0..1 | option |  |
| Steering Gear | Steering Gear | text | 1..1 | mandatory |  |

[propellersCondition]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Propeller Number | Propeller Number | integer | 0..1 | option |  |
| Direction Of Turn | Direction Of Turn | boolean | 0..1 | option |  |
| Controllable Pitch | Controllable Pitch | boolean | 0..1 | option |  |

[remark]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| VHF | VHF | text | 0..1 | option |  |
| Mooring Winches  And Lines | Mooring Winches And Lines | text | 0..1 | option |  |
| Equipment  Operational Defects | Equipment Operational Defects | text | 0..1 | option |  |
| Other Important  Details | Other Important Details | text | 0..1 | option |  |
| Masters Name | Masters Name | text | 0..1 | option |  |
| Issue Date | Issue Date | dateTime | 0..1 | option |  |

[navigationEquipmentCondition]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Whistles | Whistles | text | 0..1 | option |  |
| Speed Log | Speed Log | text | 0..1 | option |  |
| Electronic  Position Fixing | Electronic Position Fixing | text | 0..1 | option |  |
| Electronic Position  Fixing Type | Electronic Position Fixing Type | text | 0..1 | option |  |
| Compass System | Compass System | text | 0..1 | option |  |
| Compass  System Error | Compass System Error | real | 0..1 | option |  |
| Number Of Power  Units In Use | Number Of Power Units In Use | integer | 0..1 | option |  |
| Rudder RPM ROT  Indicators | Rudder RPM ROT Indicators | text | 0..1 | option |  |
| Engine Telegraphs | Engine Telegraphs | text | 0..1 | option |  |

[radar]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Radar Type | Radar Type | enumeration | 1..1 | mandatory |  |
| Abnormal Radar | Abnormal Radar | text | 1..1 | mandatory |  |
| Radar ARPA | Radar ARPA | boolean | 0..1 | option |  |

[rudderCondition]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Rudder Number | Rudder Number | integer | 1..1 | mandatory |  |
| Rudder  Maximum Angle | Rudders Maximum Angle | real | 0..1 | option |  |
| Time Hard Over  To Hard Over | Time Hard Over To Hard Over | real | 0..1 | option |  |
| Rudder Angle For  Neutral Effect | Rudder Angle For Neutral Effect | real | 0..1 | option |  |

### **4.11.4.4 Dataset Types**

- TBD

### **4.11.4.5 Dataset Loading and Unloading**

- TBD

### **4.11.4.6 Geometry**

- TBD

### **4.11.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.11.6 Data Quality**

- TBD

### **4.11.7 Data Capture and classification**

- TBD

### **4.11.8 maintenance**

- TBD

### **4.11.9 Portrayal**

- TBD

### **4.11.10 data product format(encoding)**

- TBD

### **4.11.11 data product delivery**

- TBD

### **4.11.12 meta data**

- TBD

## 4.12 pilot service request

### **4.12.1 Overview**

### **4.12.1.1 Introduction**

- TBD

### **4.12.1.2 References**

- TBD

### **4.12.1.3 Terms, definitions and abbreviations**

- TBD

### **4.12.1.4 General Data Product Description**

- TBD

### **4.12.1.5 Data product specification metadata**

- TBD

### **4.12.2 Specification Scopes**

- TBD

### **4.12.3 Dataset identification**

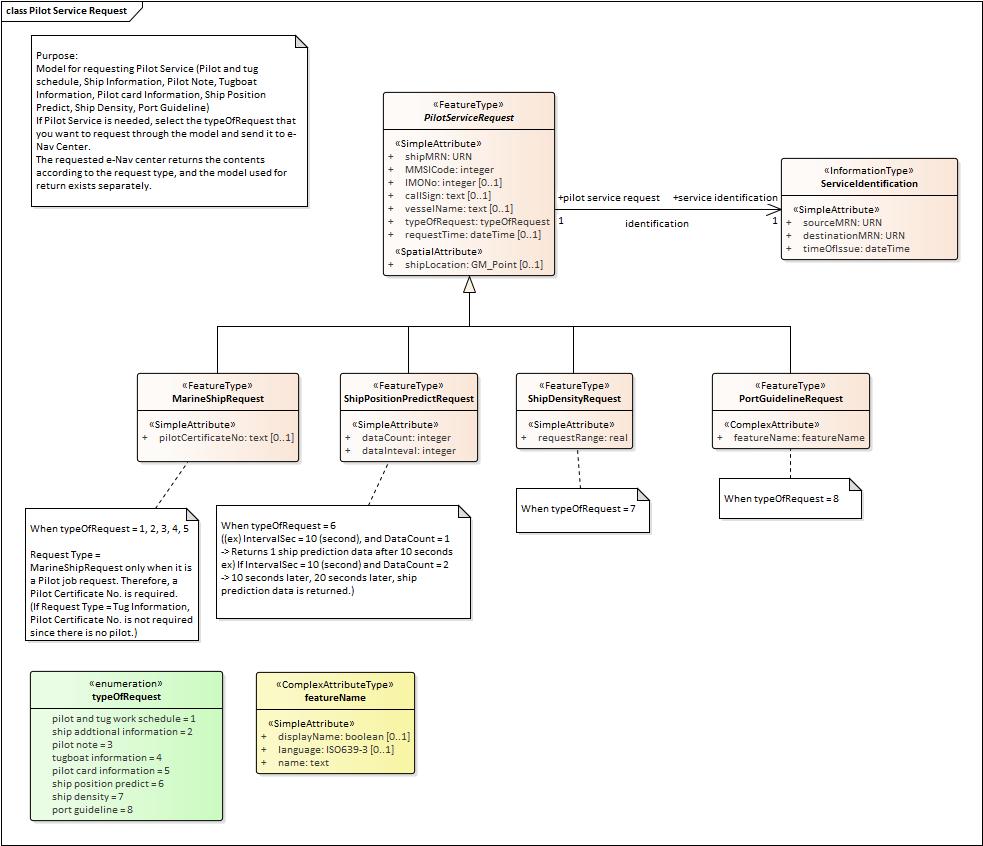
- TBD

### **4.12.4 Data Content and structure**

### **4.12.4.1 Introduction**

- TBD

### **4.12.4.2 Application Schema**



### **4.12.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Pilot Service Request data set.

­Feature Types

* Geographic
* Meta

PilotServiceRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer | 1..1 | mandatory |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer | 0..1 | option |  |
| Call Sign | The designated call-sign of a radio station. | text | 0..1 | option |  |
| Vessel Name | - | text | 0..1 | option |  |
| Type Of Request | Types of Pilot Service | enumeration | 1..1 | mandatory |  |
| Request Time | Time to request Pilot Service | dateTime | 0..1 | option |  |
| Ship Location | When typeOfRequest = [1,2,3,4,5], shipLocation allows null.  Otherwise, shipLocation does not allow null. | GM\_Point | 0..1 | option |  |

MarineShipRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Pilot Certificate No | Pilot Certificate No | text | 0..1 | option |  |

ShipPositionPredictRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Data Count | Number of data requests. | integer | 1..1 | mandatory |  |
| Data Inteval | Predicted data interval.  unit: sec | integer | 1..1 | mandatory |  |

ShipDensityRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Request Range | The radius of the area requesting information.  unit: km | real | 1..1 | mandatory |  |

PortGuidelineRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | A structure that contains the requested information along with the basic structure to request the Port Guideline. | complex attribute | 1..1 | mandatory |  |

* Cartographic
* Theme

Feature Relationship

None

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | PilotServiceRequest | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer |  |
| Call sign | The designated call-sign of a radio station. | text |  |
| Vessel Name |  | text |  |
| Request Type | Types of Pilot Service | enumeration |  |
| Request Time | Time to request Pilot Service | dateTime |  |
| Pilot Certificate No | Pilot Certificate No | text |  |
| Data Count | Number of data requests. | integer |  |
| Data Interval | Predicted data interval. | integer |  |
| Request Range | The radius of the area requesting information. | real |  |
| Display Name | A statement expressing if a feature name is to be displayed in certain display settings or not. Indication: Boolean. A True value is an indication that the name is intended to be displayed. Remarks: Where it is allowable to encode multiple instances of feature name for a single feature instance, only one feature name instance can indicate that the name is to be displayed (display name set to True). | boolean |  |
| Language | The language is encoded by a character code following ISO 639-3 | ISO639-3 |  |
| Name | The individual name of a feature. | text |  |
| destinationMRN | The MRN of the destination receiving the service data | URN |  |
| timeOfIssue | The issued date and time of the data | dateTime |  |
| messageType | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[typeOfRequest] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | pilot and tug work schedule | - |
| 2 | ship additional information | - |
| 3 | pilot note | - |
| 4 | tugboat information | - |
| 5 | pilot card information | - |
| 6 | ship position predict | - |
| 7 | ship density | - |
| 8 | port guideline | - |

* Complex Attributes

[featureName]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Display Name | A statement expressing if a feature name is to be displayed in certain display settings or not.  Indication: Boolean. A True value is an indication that the name is intended to be displayed.  Remarks:  Where it is allowable to encode multiple instances of feature name for a single feature instance, only one feature name instance can indicate that the name is to be displayed (display name set to True). | boolean | 0..1 | option |  |
| Language | The language is encoded by a character code following ISO 639-3 | ISO639-3 | 0..1 | option |  |
| Name | The individual name of a feature. | text | 1..1 | mandatory |  |

### **4.12.4.4 Dataset Types**

- TBD

### **4.12.4.5 Dataset Loading and Unloading**

- TBD

### **4.12.4.6 Geometry**

- TBD

### **4.12.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.12.6 Data Quality**

- TBD

### **4.12.7 Data Capture and classification**

- TBD

### **4.12.8 maintenance**

- TBD

### **4.12.9 Portrayal**

- TBD

### **4.12.10 data product format(encoding)**

- TBD

### **4.12.11 data product delivery**

- TBD

### **4.12.12 meta data**

- TBD

## 4.13 port guideline

### **4.13.1 Overview**

### **4.13.1.1 Introduction**

- TBD

### **4.13.1.2 References**

- TBD

### **4.13.1.3 Terms, definitions and abbreviations**

- TBD

### **4.13.1.4 General Data Product Description**

- TBD

### **4.13.1.5 Data product specification metadata**

- TBD

### **4.13.2 Specification Scopes**

- TBD

### **4.13.3 Dataset identification**

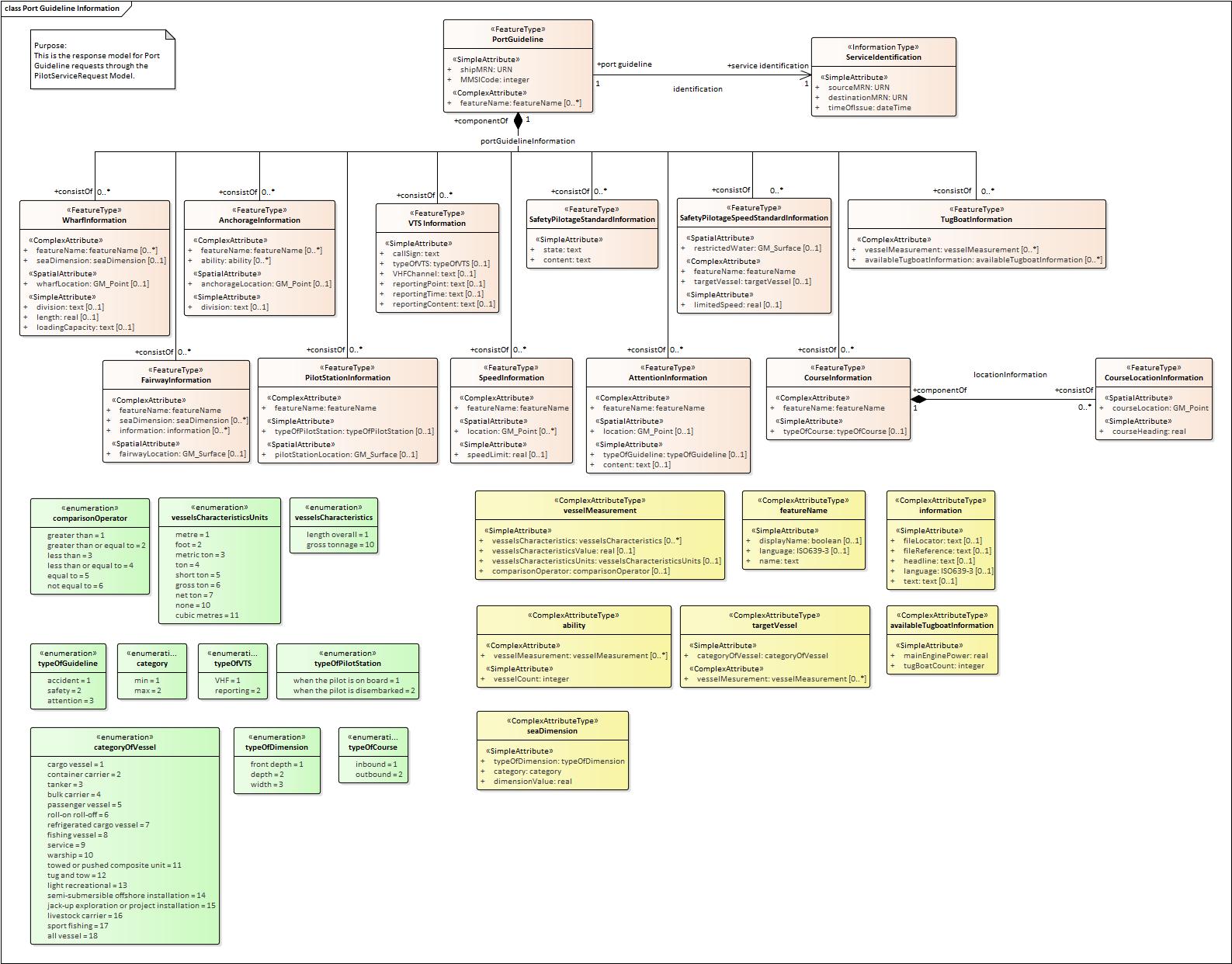
- TBD

### **4.13.4 Data Content and structure**

### **4.13.4.1 Introduction**

- TBD

### **4.13.4.2 Application Schema**



### **4.13.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Port Guideline data set.

­Feature Types

* Geographic

PortGuideline

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer | 1..1 | mandatory |  |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 0..\* | option |  |

WharfInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 0..\* | option |  |
| Sea Dimension |  | complex attribute | 0..1 | option |  |
| Wharf Location |  | GM\_Point | 0..1 | option |  |
| Division |  | text | 0..1 | option |  |
| Length |  | real | 0..1 | option |  |
| Loading Capacity |  | text | 0..1 | option |  |

AnchorageInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 0..\* | option |  |
| Ability |  | complex attribute | 0..\* | option |  |
| Anchorage Location |  | GM\_Point | 0..1 | option |  |
| Division |  | text | 0..1 | option |  |

VTSInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Call Sign | The designated call-sign of a radio station. | text | 1..1 | mandatory |  |
| Type Of VTS |  | enumeration | 0..1 | option |  |
| VHF Channel |  | text | 0..1 | option |  |
| Reporting Point |  | text | 0..1 | option |  |
| Reporting Time |  | text | 0..1 | option |  |
| Reporting Content |  | text | 0..1 | option |  |

SafetyPilotageStandardInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| State |  | text | 1..1 | mandatory |  |
| Content |  | text | 1..1 | mandatory |  |

SafetyPilotageSpeedStandardInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Restricted Water |  | GM\_Surface | 0..1 | option |  |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Target Vessel |  | complex attribute | 0..1 | option |  |
| Limited Speed |  | real | 0..1 | option |  |

TugBoatInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessel Mesurement | The dimension of the ship to which the guideline applies. | complex attribute | 0..\* | option |  |
| Available Tugboat  Information |  | complex attribute | 0..\* | option |  |

FairwayInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Sea Dimension |  | complex attribute | 0..\* | option |  |
| Information | Provides textual information that cannot be provided using other allowable attributes for the feature, in a defined language. The information may be provided as a string in sub-attribute text, or by encoding the file name of a single external text file that contains the text in sub-attribute file reference. | complex attribute | 0..\* | option |  |
| Fairway Location |  | GM\_Surface | 0..1 | option |  |

PilotStationInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Type Of Pilot Station |  | enumeration | 0..1 | option |  |
| Pilot Station Location |  | GM\_Surface | 0..1 | option |  |

SpeedInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Location |  | GM\_Point | 0..\* | option |  |
| Speed Limit |  | real | 0..1 | option |  |

AttentionInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Location |  | GM\_Point | 0..1 | option |  |
| TypeOfGuideline |  | enumeration | 0..1 | option |  |
| Content |  | text | 0..1 | option |  |

CourseInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Feature Name | The complex attribute provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings. | complex attribute | 1..1 | mandatory |  |
| Type Of Course |  | enumeration | 0..1 | option |  |

CourseLocationInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Course Location |  | GM\_Point | 1..1 | mandatory |  |
| Course Heading |  |  | 1..1 | mandatory |  |

* Meta
* Cartographic
* Theme

Feature Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Composition | portGuidelineInformation | componentOf | WharfInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | AnchorageInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | VTS Information | 1..1 |
| Composition | portGuidelineInformation | componentOf | SafetyPilotageStandardInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | SafetyPilotageSpeedStandardInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | TugBoatInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | FairwayInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | PilotStationInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | SpeedInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | AttentionInformation | 1..1 |
| Composition | portGuidelineInformation | componentOf | CourseInformation | 1..1 |
| Composition | portGuidelineInformation | consistOf | PortGuideline | 0..\* |
| Composition | portGuidelineInformation | componentOf | CourseLocationInformation | 1..1 |
| Composition | portGuidelineInformation | consistOf | CourseInformation | 0..\* |

­

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | PortGuideline | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | Mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | Mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | Mandatory |  |

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Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Ship MRN | Ship MRN | URN |  |
| MMSI Code | MMSI Code | text |  |
| Source MRN | Source MRN | URN |  |
| Destination MRN | Destination MRN | URN |  |
| Time Of Issue | Time Of Issue | dateTime |  |
| Division | Division | text |  |
| Length | Length | real |  |
| Loading Capacity | Loading Capacity | text |  |
| Call Sign | Call Sign | text |  |
| Type Of VTS | Type Of VTS | enumeration |  |
| VHF Channel | VHF Channel | text |  |
| Reporting Point | Reporting Point | text |  |
| Reporting Time | Reporting Time | text |  |
| Reporting Content | Reporting Content | text |  |
| State | State | text |  |
| Content | Content | text |  |
| Limited Speed | Limited Speed | real |  |
| Type Of Pilot Station | Type Of Pilot Station | enumeration |  |
| Speed Limit | Speed Limit | real |  |
| Type Of Guideline | Type Of Guideline | enumeration |  |
| Type Of Course | Type Of Course | enumeration |  |
| Course Heading | Course Heading | real |  |
| Vessels Characteristics | Vessels Characteristics | enumeration |  |
| Vessels Characteristics Value | Vessels Characteristics Value | real |  |
| Vessels Characteristics Unit | Vessels Characteristics Unit | enumeration |  |
| Comparison Operator | Comparison Operator | enumeration |  |
| DisplayName | DisplayName | boolean |  |
| Language | Language | text |  |
| Name | Name | text |  |
| File Locator | File Locator | text |  |
| FileReference | FileReference | text |  |
| Headline | Headline | text |  |
| Language | Language | text |  |
| Text | Text | text |  |
| Vessel Count | Vessel Count | int |  |
| Category Of Vessel | Category Of Vessel | enumeration |  |
| Main Engine Power | Main Engine Power | real |  |
| Tug Boat Count | Tug Boat Count | int |  |
| Type Of Dimension | Type Of Dimension | enumeration |  |
| Category | Category | enumeration |  |
| Dimension Value | Dimension Value | real |  |
| destinationMRN | The MRN of the destination receiving the service data | URN |  |
| timeOfIssue | The issued date and time of the data | dateTime |  |
| messageType | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

[typeOfVTS] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | VHF | VHF |
| 2 | reporting | reporting |

[typeOfPilotStation] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | when the pilot is on board | when the pilot is on board |
| 2 | when the pilot is disembarked | when the pilot is disembarked |

[typeOfGuideline] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | accident | accident |
| 2 | safety | safety |
| 3 | attention | attention |

[typeOfPilotStation] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | inbound | inbound |
| 2 | outbound | outbound |

[vesselsCharacteristics] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | length overall | length overall |
| 2 | gross tonnage | gross tonnage |
| 3 | metre | metre |
| 4 | foot | foot |
| 5 | metric ton | metric ton |
| 6 | ton | ton |
| 7 | short ton | short ton |
| 8 | gross tonnage | gross tonnage |
| 9 | net ton | net ton |
| 10 | none | none |
| 11 | cubic metres | cubic metres |

[comparisonOperator] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | greather than | greather than |
| 2 | greather than or equal to | greather than or equal to |
| 3 | less than | less than |
| 4 | less than or equal to | less than or equal to |
| 5 | equal to | equal to |
| 6 | not equal to | not equal to |

[categoryOfVessel] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | cargo vessel | cargo vessel |
| 2 | container carrier | container carrier |
| 3 | tanker | tanker |
| 4 | bulk carrier | bulk carrier |
| 5 | passenger vessel | passenger vessel |
| 6 | roll-on roll-off | roll-on roll-off |
| 7 | refrigerated cargo vessel | refrigerated cargo vessel |
| 8 | fishing vessel | fishing vessel |
| 9 | service | service |
| 10 | warship | warship |
| 11 | towed or pushed composite unit | towed or pushed composite unit |
| 12 | tug and tow | tug and tow |
| 13 | light recreational | light recreational |
| 14 | semi-submersible offshore installation | semi-submersible offshore installation |
| 15 | jack-up exploration or project installation | jack-up exploration or project installation |
| 16 | livestock carrier | livestock carrier |
| 17 | sport fishing | sport fishing |
| 18 | all vessel | all vessel |

[typeOfDimension] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | front depth | front depth |
| 2 | depth | depth |
| 3 | width | width |

[category] - enumeration

|  |  |  |
| --- | --- | --- |
| **Value** | **Label** | **Description** |
| 1 | min | min |
| 2 | max | max |

* Complex Attributes

[featureName]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Display Name | DisplayName | boolean | 0..1 | option |  |
| Language | Language | text | 0..1 | option |  |
| Name | Name | text | 1..1 | mandatory |  |

[vesselMeasurement]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessels Characteristics | Vessels Characteristics | enumeration | 0..\* | option |  |
| Vessels Characteristics  Value | Vessels Characteristics Value | real | 0..1 | option |  |
| Vessels Characteristics  Units | Vessels Characteristics Unit | enumeration | 0..1 | option |  |
| Comparison Operator | Comparison Operator | enumeration | 0..1 | option |  |

[information]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| File Locator | File Locator | text | 0..1 | option |  |
| File Reference | FileReference | text | 0..1 | option |  |
| Headline | Headline | text | 0..1 | option |  |
| Language | Language | text | 0..1 | option |  |
| Text | Text | text | 0..1 | option |  |

[ability]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Vessel Measurement | Vessel Measurement | complex attribute | 0..\* | option |  |
| Vessel Count | Vessel Count | int | 1..1 | mandatory |  |

[targetVessel]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Category Of Vessel | Category Of Vessel | enumeration | 1..1 | mandatory |  |
| Vessel Measurement | Vessel Measurement | complex attribute | 0..\* | option |  |

[availableTugboatInformation]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Main Engine Power | Main Engine Power | real | 1..1 | mandatory |  |
| Tug Boat Count | Tug Boat Count | int | 1..1 | mandatory |  |

[seaDimension]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Type Of Dimension | Type Of Dimension | enumeration | 1..1 | mandatory |  |
| Category | Category | enumeration | 1..1 | mandatory |  |
| Dimension Value | Dimension Value | real | 1..1 | mandatory |  |

### **4.13.4.4 Dataset Types**

- TBD

### **4.13.4.5 Dataset Loading and Unloading**

- TBD

### **4.13.4.6 Geometry**

- TBD

### **4.13.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.13.6 Data Quality**

- TBD

### **4.13.7 Data Capture and classification**

- TBD

### **4.13.8 maintenance**

- TBD

### **4.13.9 Portrayal**

- TBD

### **4.13.10 data product format(encoding)**

- TBD

### **4.13.11 data product delivery**

- TBD

### **4.13.12 meta data**

- TBD

## 4.14 ship density

### **4.14.1 Overview**

### **4.14.1.1 Introduction**

- TBD

### **4.14.1.2 References**

- TBD

### **4.14.1.3 Terms, definitions and abbreviations**

- TBD

### **4.14.1.4 General Data Product Description**

- TBD

### **4.14.1.5 Data product specification metadata**

- TBD

### **4.14.2 Specification Scopes**

- TBD

### **4.14.3 Dataset identification**

- TBD

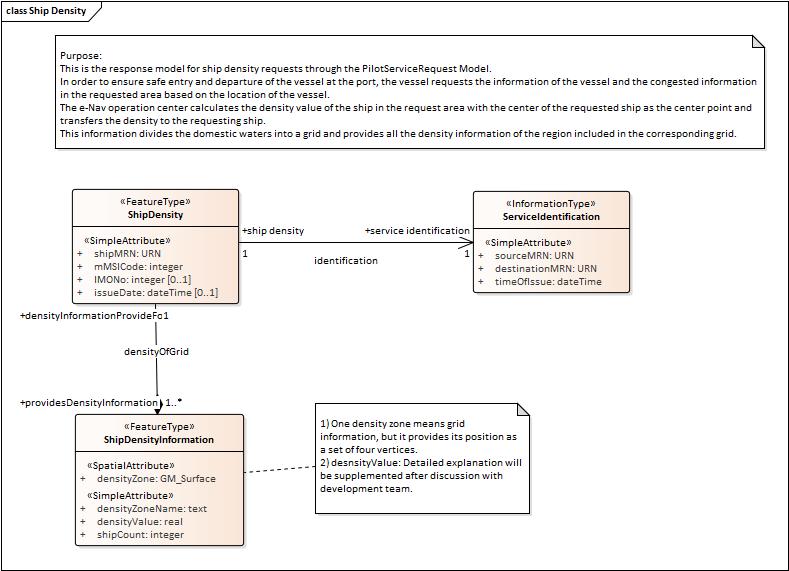
### **4.14.4 Data Content and structure**

### **4.14.4.1 Introduction**

The e-Nav operation center calculates the density value of the ship in the request area with the center of the requested ship as the center point and transfers the density to the requesting ship.

This information divides the domestic waters into a grid and provides all the density information of the region included in the corresponding grid.

### **4.14.4.2 Application Schema**



### **4.14.4.3 Feature Catalogue**

­General

The Message Catalogue feature catalogue describes the feature types, information types, attributes, attribute values, associations and roles which may be used in a Ship Density data set.

­Feature Types

* Geographic

ShipDensity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Ship MRN | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN | 1..1 | mandatory |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations) | integer | 1..1 | mandatory |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer | 0..1 | option |  |
| Issue Date | The production date & time of the source, e.g., the date of measurement. | dateTime | 0..1 | option |  |

ShipDensityInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Density Zone | Unique code assigned to each grid cell by dividing the sea area of Korea into a regular grid, and the size of one grid cell is 1km2 | GM\_Surface | 1..1 | mandatory |  |
| Density Zone Name | - | text | 1..1 | mandatory |  |
| Density Value | Vessel density within a specific area. | real | 1..1 | mandatory |  |
| Ship Count | Number of ships in the zone.  In this case, the vessel counting the number refers to the vessel registered on the e-Navi operation DB (the vessel recognized by the GICOMS system (V-Pass, AIS)). | integer | 1..1 | mandatory |  |

* Meta
* Cartographic
* Theme

Feature Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Composition | densityOfGrid | densityInformationProvideFor | ShipDensityInformation | 1..1 |
| Composition | densityOfGrid | providesDensityInformation | ShipDensity | 1..\* |

Information Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role Type** | **Association Name** | **Role** | **Feature** | **Multiplicity** |
| Association | Identification | service identification | ShipDensity | 1..1 |

Information Type

* Service Identification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **Description** | **Data**  **Type** | **Multiplicity** | **Implementation** | **Remarks** |
| Source MRN | The MRN of the source producing the service data | URN | 1..1 | mandatory |  |
| Destination MRN | The MRN of the destination receiving the service data | URN | 1..1 | mandatory |  |
| Time Of Issue | The issued date and time of the data | dateTime | 1..1 | mandatory |  |

­

­

Attributes

* Simple Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Data Type** | **Remarks** |
| Source MRN of Vessel | MRN is a naming scheme that can uniquely identify any maritime resource on a global scale.  shipMRN is the unique value given to the ship. | URN |  |
| MMSI Code | 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. (Adapted from Appendix 43 of the International Telecommunications Union Radio Regulations). | integer |  |
| IMO No | The seven-digit number assigned to the vessel, the vessel management company, and the ship documents company under the SOLAS rules. | integer |  |
| Issue date | The production date & time of the source, e.g., the date of measurement. | dateTime |  |
| Density Value | Vessel density within a specific area. | real |  |
| Ship Count | Number of ships in the zone. | integer |  |
| Density Zone Name | Density Zone Name | text |  |
| Destination MRN | The MRN of the destination receiving the service data | URN |  |
| Time Of Issue | The issued date and time of the data | dateTime |  |
| Message Type | The type of message defined to recognize the purpose of the exchanged message | enumeration |  |

* Complex Attributes

None

### **4.14.4.4 Dataset Types**

- TBD

### **4.14.4.5 Dataset Loading and Unloading**

- TBD

### **4.14.4.6 Geometry**

- TBD

### **4.14.5 Coordinate Reference Systems(CRS)**

- TBD

### **4.14.6 Data Quality**

- TBD

### **4.14.7 Data Capture and classification**

- TBD

### **4.14.8 maintenance**

- TBD

### **4.14.9 Portrayal**

- TBD

### **4.14.10 data product format(encoding)**

- TBD

### **4.14.11 data product delivery**

- TBD

### **4.14.12 meta data**

- TBD

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)