S-100 Product Description: Maritime Safety Information / Notice to Mariners Service

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Executive Summary

There are many similarities and few differences between Maritime Safety Information messages and Notices to Mariners T&P. The main difference is the speed and ways of promulgation and thereby the possibility and time for quality assurance. The content is on the other hand more or less the same. A common concept for the two is therefore obvious.

This document describes a combined MSI-NM T&P model and interchange format in terms of an IHO S-100 product specification. It is intended as an input paper for the forthcoming S-124 NW specification.

Whereas S-100 Product Specifications usually target ENC and are based on IHO feature registers tied closely to ENC and S-57, the scope of the MSI-NM data model is more general and the main purpose is to define a format that is usable for all sorts of clients, ranging from ECDIS to websites, apps, Twitter, and so forth.

As the combined MSI-NM model is only a proposal at this stage, it has been assigned its own domain, “MSINM”, and no central feature register has been updated.

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Contents

1 Introduction

1.1 Overview

The most important information for vessels is safety-related information, including Maritime Safety Information, Notices to Mariners and chart corrections. These three information types, along with nautical charts and position updates, form the basis for safe navigation at sea.

Maritime Safety Information (MSI) is navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages.

Notices to Mariners (NMs) are promulgated in order to keep paper nautical charts and publications, as far as possible, up to date. Temporary and Preliminary NMs (T) and (P) advise mariners of important matters affecting navigational safety, including new hydrographic information (in advance of new editions or chart updates), changes to routing measures and aids to navigation, and other important categories of data. Not all ENCs include T&P information currently.

Chart corrections are corrections to paper and digital nautical charts which makes it possible for the Mariner to keep the vessel's charts up to date.

Chart corrections and the way they are promulgated have evolved tremendously the past 10 years, and are in many ways very different from traditional MSI and NM T&P today. Chart corrections are georeferenced and portrayable by nature. MSI and NM T&P are often georeferenced but not necessarily portrayable with text and symbols.

The main differences between MSI and NM today are the way of promulgation and speed of handling and thereby quality assurance. The content of the two message types are on the other hand more or less the same and they solve the same user need.

MSI is today promulgated in text or voice via SafetyNET, NAVTEX, coastal radio stations and is in some countries accessible on the Internet. NM T&P's are promulgated on paper weekly, fortnightly or monthly and are often accessible on the internet in pdf format. In addition Hydrographic Offices are encouraged to include as many NM T&P's in their ENC updates as possible. There are obvious benefits in this but also disadvantages and pitfalls.

As part of the ACCSEAS project, a combined model for MSI and NM T&P was devised and a web application[1] was developed in order to effectively test the combined model, the portrayal and promulgation of the messages. The MSI-NM System include features such as:

- An editor for MSI and NM T&P messages.
- Multi-language message support and features such as rich-text descriptions, attachments, etc.
- Management of message life cycles and base data such as categories, areas, charts, etc.

[1] The MSI-NM test bench can be accessed at https://msinm-test.e-navigation.net

- Promulgation via web services, mailing lists, Maritime Cloud Messaging Service (MMS)[2], NAVTEX, Twitter, etc.
- Web interface and API's for searching and filtering MSI-NM T&P messages.
- Map-based portrayal of MSI-NM T&P messages.

Furthermore, a navigational display test application, the e-Navigation Prototype Display (EPD)[3], was updated to integrate with the MSI-NM System.

The purpose of this paper is to extend the scope of the combined MSI-NM T&P model by proposing a common internationally agreed standard for interchanging MSI-NM T&P messages, making it possible to transfer and share information between stakeholders.

1.2 References

[S-4]	Regulations of the IHO for International Charts and Chart Specifications of the IHO. Edition 4.3.0, August 2012, International Hydrographic Bureau, Monaco.
[S-53]	Manual on Maritime Safety Information (MSI). Special Publication No. 53, July 2009 Edition. International Hydrographic Bureau, Monaco.
[S-100]	Universal Hydrographic Data Model. IHO Special Publication No. S-100, Edition 1.0.0, January 2010. International Hydrographic Bureau, Monaco.
[S-101]	Electronic Navigational Chart Product Specification. IHO Special Publication No. S-101, (Draft), International Hydrographic Bureau, Monaco.
[IMO-243]	SN.1/Circ.243/Rev.1 – Amended Guidelines for the Presentation of Navigational-Related Symbols, Terms and Abbreviations.
[IEC-62288]	Maritime navigation and radio communication equipment and systems - Presentation of navigation-related information on ship borne navigational displays - General requirements, methods of testing and required test results.

1.3 Terms and definitions

The terms and definitions in S-100 apply to this document.

1.4 Abbreviations

DMA	Danish Maritime Authority
ECDIS	Electronic Chart Display Information Systems
ENC	Electronic Navigational Chart
EPD	e-Navigation Prototype Display
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IHO	International Hydrographic Organisation
JSON	JavaScript Object Notation
MSI	Maritime Safety Information
NM	Notices to Mariners

[2] The Maritime Cloud is documented at http://maritimecloud.net
[3] The EPD is available at http://www.e-navigation.net/index.php?page=software-and-services

XML	Extensible Markup Language
XSD	XML Schema Definition

1.5 General Data Product Description

Title	MSI-NM T&P Product Specification	
Abstract	This product specification defines a combined MSI-NM T&P message model. MSI and NM share communalities that allow them to be modelled as one product.	
Content	This Product Specification is a complete description of all the appropriate features, attributes and their relationships necessary to exchange MSI-NM T&P Messages. The precise content is documented within the Feature Catalogue and the relationships defined in the Application Schema.	
Spatial Extent	Description	Global, marine areas only
	East Bounding Longitude	180
	West Bounding Longitude	-180
	North Bounding Latitude	90
	South Bounding Latitude	-90
Specific Purpose	The product specification describes data that can be exchanged between maritime stakeholders such as shore authorities and ships.	

1.6 Data product specification metadata

Title	MSI-NM T&P Product Specification
Version	0.0.1
Date	December 10th 2014
Language	English
Classification	Unclassified
Contact	e-Navigation Team Danish Maritime Authority Carl Jacobsens Vej 31 DK-2500 København K Telephone: +45 9137 6000 Email: dma@dma.dk
URL	https://msinm-test.e-navigation.net
Identifier	MSINM
Maintenance	Changes to this product specification are coordinated by the Danish Maritime Authority in the scope of the ACCSEAS project.

1.7 Product specification maintenance

1.7.1 Introduction

As the ACCSEAS project ends in February 2015, changes to this product specification within the scope of the ACCSEAS project are not anticipated. The Danish Maritime Authority or other entities may be working on derivatives of this product specification, perhaps using a different title and identifier. Contact Danish Maritime Authority at the address above for more information.

1.7.2 New edition

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

1.7.3 Revisions

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

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

1.7.4 Clarification

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

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

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

1.7.5 Version numbers

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

New Editions denoted as **n**.0.0

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

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

2 Specification scope

The MSINM product specification requires only one scope.

Scope identification	General Scope
Level	General Scope
Level name	General Scope

3 Data product identification

Title	MSI-NM T&P Product Specification
Alternate title	MSINM
Abstract	Data containing Maritime Safety Information and Notices to Mariners T&P.
Topic category	TRANSPORTATION
Geographic description	Marine areas
Spatial resolution	Display scale
Purpose	Promulgation of MSI and NM T&P using a combined model.
Language	Any configurable number of languages and English. The language code is part of the model.
Classification	Unclassified
Spatial representation type	Vector
Point of contact	Producing competent national authority

4 Data content and structure

4.1 Introduction

The combined MSI-NM model needs to cater for the IHO-IMO-WMO S-53 standard on MSI and the IHO S-4 standard which covers NM T&P.

The overarching idea for the design of the model has been to generalize the constituent parts and fields of MSI and NM T&P messages, and make the format both backwards compatible and future-proof by e.g. adding support for:

- Multi-language support. All messages must be localizable to any number of languages.
- Rich text support. NM's in particular, can contain a rich layout features such as tables, links, embedded pictograms, etc. By supporting HTML descriptions this can be accommodated.
- Support for attachments. Attachments can be binary files, such as a picture or a PDF, and optionally they may be embedded in the rich text descriptions as links or nested images.
- New identifier format. In a system containing both NM and MSI, possibly from several authorities, the existing NM and MSI identifier format is not adequate. A new more complete identifier format is proposed and used in the MSI-NM model.
- Base data. Part of a combined MSI-NM model is to define a relationship between messages and base data such as charts, categories and areas. Previous proposals have opted for rigid solutions with a fixed number of area and category levels, and with enumerated category values.
  This approach has been discarded as too inflexible. Rather, categories and areas have been defined as hierarchical base data of named localized categories and areas respectively, and it is left as an administrative task to fill out the specific data in each implementing system (i.e. for each country). Example categories, areas and charts:

Sample Categories

- Aids to Navigation
  - Floating Aids to Navigation
    - Buoy
      - Buoy established
      - Buoy missing
      - Buoy off station
      - Buoy withdrawn
    - Light buoy
      - Light buoy established
      - Light buoy missing
      - Light buoy off station
      - Light buoy unlit
      - Light buoy unreliable
      - Light buoy withdrawn
  - Light
    - Light damaged
    - Light unlit
    - Light unreliable
- Drifting object
  - Buoy adrift
  - Object adrift
- Firing Exercises
- Obstruction
  - Cable operations
  - Diving operations
  - Grenade
  - Hydrographic survey
  - light destroyed

Sample Areas

- Denmark
  - Baltic
    - ES D 140 Bornholm W.
    - ES D 138 Bornholm N.
    - ES D 139 Bornholm E.
    - EK D 395 Raghammer
    - EK D 396 Hullebaek
    - EK D 371 Marstal Bugt
  - The Sound
  - Waters south of Sealand
  - Great Belt
  - Waters south of Funen
  - Little Belt
  - Kattegat
  - Liimfiord
  - Skagerak
  - North Sea
- Greenland
  - West coast
  - East coast
- Sweden
- Norway

Sample Charts

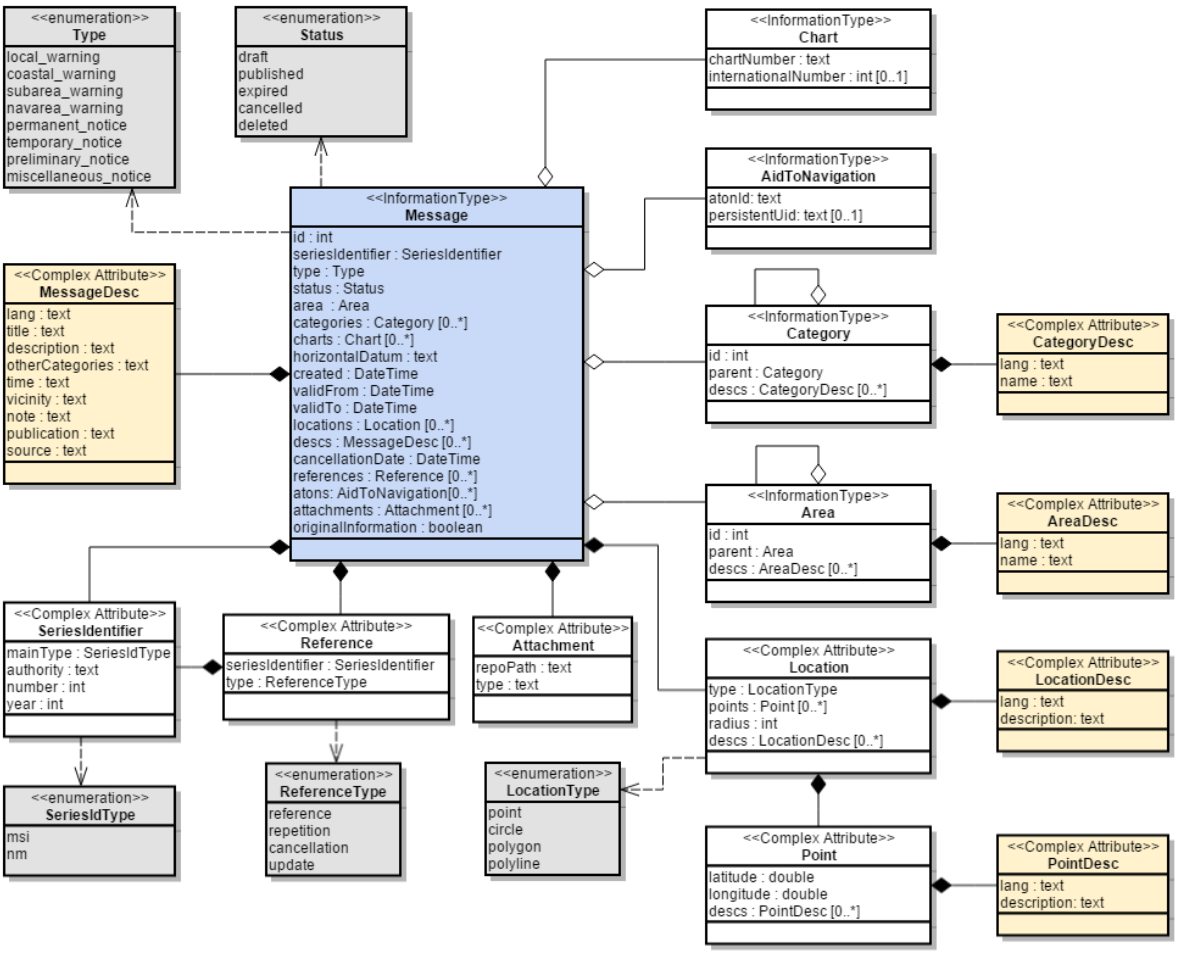
Chart Number	Int. Number	Name	Scale
D		Danmark med søgrænser	1:850,000
C		Danmark med omgivende farvande	1:850,000
198		Østersøen, Fakse Bugt og Hjelm Bugt	1:75,000
197		Østersøen, Gedser Rev og Kadetrenden	1:75,000
196		Femer Bælt	1:75,000
195		Østersøen, Vestlige del	1:75,000
190		Fakse Bugt	1:50,000
189	1336	Bornholmsgat	1:100,000
188		Østersøen, Gedser Rev – Christiansø	1:250,000
172		Rudkøbing Løb	1:15,000
171		Svendborg Sund	1:10,000
164		Karrebæk Fjord	1:16,000
163		Guldborg Sund	1:30,000
162		Smålandsfarvandet, Sydøstlige del, Grønsund	1:30,000
161		Smålandsfarvandet, Nordøstlige del, Bøgestrømmen	1:30,000
160		Smålandsfarvandet, Vestlige del	1:75,000
159	1374	Åbenrå Fjord	1:25,000
158	1376	Snævringen og Kolding Fjord	1:25,000
157		Vejle Fjord	1:25,000
155		Als Sund og Sønderborg Bugt	1:20,000

An important aspect of the combined MSI-NM model is that it defines the base structured data of a message. For backwards compatibility reasons, an MSI warning may e.g. be broadcast via NAVTEX, and hence, a NAVTEX description must be created on the basis of the structured MSI-NM model data, but the MSI-NM interchange format does *not* actually contain the NAVTEX description. This applies to other message promulgation types, such as Navdat, mailing lists, Twitter, etc.

Instead, the implementing MSI-NM system may e.g. extend its underlying message *system model* with an associated list of *publications*. A NAVTEX publication stores the NAVTEX description along with the priority and target transmitters, whereas a Twitter publication stores the associated tweet, and so forth. Furthermore, a template system can be introduced in order to semi-automate the creation of publications in a way that adhere to standards and conventions (particularly for NAVTEX). This is in fact to solution adopted by the test bench MSI-NM system developed for the ACCSEAS project.

4.2 Application Schema

The proposed model for the MSI-NM interchange format is given by the following UML representation:



Since none of the entities directly represents real-world phenomena, they are classified as *information types* and *Complex Attributes.*

Since it has not been the purpose of this specification to represent the MSI-NM model in terms of GML, neither to target ENC in particular, spatial objects are not derived from GML objects. Instead, the intention is to keep the MSI-NM model as general as possible, and to

ensure that it can be transformed to GML, and more specifically, to the forthcoming S-124 NW model. All classes belongs to the same MSINM package.

The remainder of this section will explain various aspects of the model.

4.2.1 Localization

All objects that have localizable textual attributes will be represented by two classes in the model: a core object class (e.g. *Message*) and a descriptor class with a "Desc" suffix (e.g. *MessageDesc*), which contains all the localizable attributes of the object. The core object class will have a "descs" attribute that contains a list of these descriptors, which in turn always have a "lang" attribute to indicate the language iso code.

On top of this, the implementing MSI-NM system may apply a set of conventions, such as:

- If the list of descriptors contains more than one element, the first element (language) has highest priority.
- If data is not available in a language requested by a client, an alternative language descriptor is returned. Clients should thus check the "lang" attribute of the descriptors, and take appropriate actions.

4.2.2 Message Identifiers

To accommodate a system that contains MSI as well as NM messages, the following identifier format has been devised:

- Format: *Type-Authority-Number-Year*

Where *Type* is either "MSI" or "NM", *Authority* is the issuing authority, such as "DK" in Denmark, *Year* is the calendar year and *Number* is a sequential number. The number sequence is unique for each combination of type, authority and year.

Examples:

- "MSI-DK-001-14": Danish MSI number 1 in year 2014.
- "NM-SE-213-14": Swedish NM number 213 in year 2014.

4.2.3 References

Each message can be assigned a list of *references* that is used to define the relationship to other messages. A reference consists of a message series identifier of the referenced message and a reference type, which may take the value "Reference", "Repetition", "Cancellation" or "Update".

Since references are *loose* (they include message series identifiers rather than the referenced message itself), they can be used to connect messages across MSI-NM systems. For instance, a Danish MSI pertaining to the Baltic Sea may refer to a Swedish NM, and so forth.

Similarly, the references can be used to chain those messages together that in effect constitutes the life cycle of a single hazard.

4.2.4 Time

NM's in particular, will often define rather complex time intervals. Three real world examples of Danish NM time interval definitions:

- End of May until mid-June 2014
- Until further notice
- a) Until 11 October 2014.
  b) 23 May - 7 June 2014, hours 0500 - 2200.
  16 June - 31 July 2014, hours 0500 - 2200.
  2 October - 11 October 2014, hours 0500 - 2200.
  c) 8 June - 15 June 2014, hours 0500 - 2200.
  1 August - 1 October 2014, hours 0500 - 2200.

It would be quite complex to provide a time model that caters fully with these types of time interval definitions. Instead, a more pragmatic solution has been chosen.

Each message has a valid-from and a valid-to date (datetimes, actually) used for defining the initial and (optionally) the last date of the time interval.

Additionally, messages can be assigned a localized time description, which may be used for a more elaborate textual description of the time interval within the valid-from and valid–to date interval, as per the NM examples above.

4.2.5 Rich-Text Message Descriptions

Existing NM's, which are mostly written in text processing applications such as Word, often include quite elaborate descriptions with itemized or table-based lists, advanced layout and typography, pictograms, etc.

The MSI-NM model solves this by mandating HTML as the format of the main localized description field. MSI-NM systems must thus implement rich text editors for this field and MSI-NM clients must be able to display HTML, or transform the HTML into plain text.

Links and images, embedded in the HTML description, are particularly useful in conjunction with message attachments (see next section), whereby you can insert attached images directly into the message description, or provide a direct link to, say, an attached chart update PDF file.

4.2.6 Attachments

Messages can be assigned a list of *attachments*. An attachment can be any binary file, such as a picture or a PDF.

As described above, attachments can furthermore be embedded in the message description in the form of links or nested images.

In this version of the MSI-NM specification, an attachment will be defined by its fully qualified repository path (URL) on the originating MSI-NM system.

In future versions of the specification, provisions will be made for optionally including the binary contents of attachments in the interchange format, thus severing the ties to the originating MSI-NM repository completely. Whereas this would be trivial for the attachment list itself, it may entail rewriting of the rich text description field (which may embed attached images or have links to the attachments), possibly along the lines of multipart mime messages.

4.2.7 Hierarchical Base Data

As described earlier, messages can be assigned various types of base data, such as charts, areas and categories.

Areas are defined as hierarchical data. If a message is associated with a certain area, say Kattegat, by implication, is will also be associated with all parent areas (Denmark in this example). In the MSI-NM interchange format, this is modelled by letting the message point to the area it is directly assigned to, and then in turn, letting this area point to its parent area (and so forth). This structure lends itself nicely to operations such as filtering and sorting at the MSI-NM client side.

The same concept applies to categories, which is also modelled as a hierarchical data structure.

4.2.8 Message Locations

Each message can be assigned a list of geographical *locations*. A location may be either a point, a circle, a polyline or a polygon.

Locations, and the individual positions of a location, can all be assigned a localized description.

4.3 Feature Catalogue

This feature catalogue defines the features and attributes permitted in this product. As mentioned in the previous chapter it has not been the purpose of this specification to represent the MSI-NM model in terms of GML, neither to target ENC in particular. Instead, the intention is to keep the MSI-NM model as general as possible, and to ensure that it can be transformed to GML, and more specifically, to the forthcoming S-124 NW model. All classes belongs to the same MSINM package.

Name	MSI-NM T&P Feature Catalogue
Scope	Contains objects associated with MSI-NM T&P messages
Field of application	Marine navigation
Version Number	0.0.1
Version Date	December 10th 2014
Producer	Danish Maritime Authority

4.3.1 Summary of Types

The table below lists all objects and attributes used in this product specification. If an attribute is complex, this is flagged with an asterisk (“*”).

Register	Index	Alpha code	Name	Version date
MSINM	Information	MESSAG	MSI-NM T&P Message Class	2014-12-10
MSINM	Information	SCHART	Sea Chart Class	2014-12-10
MSINM	Information	AIDTON	Aid to Navigation Class	2014-12-10
MSINM	Information	CATEGO	Category Class	2014-12-10
MSINM	Information	AREACL	Area Class	2014-12-10
MSINM	Attribute	MSAIID	System-Specific Message ID Attribute	2014-12-10
MSINM	Attribute*	MSASID	Message Series Identifier Attribute	2014-12-10

MSINM	Enumeration	MSATYP	Message Type Attribute	2014-12-10
MSINM	Enumeration	MSASTA	Message Status Attribute	2014-12-10
MSINM	Attribute	MSAARE	Message Area Attribute	2014-12-10
MSINM	Attribute	MSACAT	Message Categories Attribute	2014-12-10
MSINM	Attribute	MSACHA	Message Charts Attribute	2014-12-10
MSINM	Attribute	MSAHDA	Message Horizontal Datum Attribute	2014-12-10
MSINM	Attribute	MSACRE	Message Created Date Attribute	2014-12-10
MSINM	Attribute	MSAVFR	Message Valid-From Attribute	2014-12-10
MSINM	Attribute	MSAVTO	Message Valid-To Attribute	2014-12-10
MSINM	Attribute*	MSALOC	Message Locations Attribute	2014-12-10
MSINM	Attribute*	MSADSC	Message Descriptors Attribute	2014-12-10
MSINM	Attribute	MSACAN	Message Cancellation Date Attribute	2014-12-10
MSINM	Attribute*	MSAREF	Message References Attribute	2014-12-10
MSINM	Attribute	MSAATN	Message AtoNs Attribute	2014-12-10
MSINM	Attribute*	MSAATT	Message Attachments Attribute	2014-12-10
MSINM	Attribute	MSAORG	Message Original Information Attribute	2014-12-10
MSINM	Attribute	MDSLAN	Message Descriptor Language Attribute	2014-12-10
MSINM	Attribute	MDSTIT	Message Descriptor Title Attribute	2014-12-10
MSINM	Attribute	MDSDSC	Message Descriptor Description Attribute	2014-12-10
MSINM	Attribute	MDSOCA	Message Descriptor Other Categories Attribute	2014-12-10
MSINM	Attribute	MDSTIM	Message Descriptor Time Attribute	2014-12-10
MSINM	Attribute	MDSVIC	Message Descriptor Vicinity Attribute	2014-12-10
MSINM	Attribute	MDSNOT	Message Descriptor Note Attribute	2014-12-10
MSINM	Attribute	MDSPUB	Message Descriptor Publication Attribute	2014-12-10
MSINM	Attribute	MDSSRC	Message Descriptor Source Attribute	2014-12-10
MSINM	Enumeration	SERTYP	Series Identifier Main-Type Attribute	2014-12-10
MSINM	Attribute	SERAUT	Series Identifier Authority Attribute	2014-12-10
MSINM	Attribute	SERNUM	Series Identifier Number Attribute	2014-12-10
MSINM	Attribute	SERYEA	Series Identifier Year Attribute	2014-12-10
MSINM	Attribute	REFSID	Reference Series Identifier Attribute	2014-12-10
MSINM	Enumeration	REFTYP	Reference Type Attribute	2014-12-10
MSINM	Attribute	ATTPAT	Attachment Repository Path Attribute	2014-12-10
MSINM	Attribute	ATTTYP	Attachment Type Attribute	2014-12-10
MSINM	Attribute	CHANUM	Chart Number Attribute	2014-12-10
MSINM	Attribute	CHAINM	Chart International Number Attribute	2014-12-10
MSINM	Attribute	ATNIDA	AtoN ID Attribute	2014-12-10
MSINM	Attribute	ATNPUN	AtoN Persistent Unique ID Attribute	2014-12-10
MSINM	Attribute	CATIDA	Category ID Attribute	2014-12-10
MSINM	Attribute	CATPAT	Category Parent Attribute	2014-12-10
MSINM	Attribute*	CATDSA	Category Descriptors Attribute	2014-12-10
MSINM	Attribute	CADLAN	Category Descriptor Language Attribute	2014-12-10
MSINM	Attribute	CADNAM	Category Descriptor Name Attribute	2014-12-10
MSINM	Attribute	AREIDA	Area ID Attribute	2014-12-10
MSINM	Attribute	AREPAT	Area Parent Attribute	2014-12-10
MSINM	Attribute*	AREDSA	Area Descriptors Attribute	2014-12-10
MSINM	Attribute	ARELAN	Area Descriptor Language Attribute	2014-12-10
MSINM	Attribute	ARENAM	Area Descriptor Name Attribute	2014-12-10
MSINM	Enumeration	LOCTYP	Location Type Attribute	2014-12-10
MSINM	Attribute*	LOCPTS	Location Points Attribute	2014-12-10
MSINM	Attribute	LOCRAD	Location Radius Attribute	2014-12-10
MSINM	Attribute*	LOCDSC	Location Descriptors Attribute	2014-12-10
MSINM	Attribute	LODLAN	Location Descriptor Language Attribute	2014-12-10
MSINM	Attribute	LODNAM	Location Descriptor Description Attribute	2014-12-10
MSINM	Attribute	PTSLAT	Point Latitude Attribute	2014-12-10
MSINM	Attribute	PTSLON	Point Longitude Attribute	2014-12-10
MSINM	Attribute*	PTSDCS	Point Descriptors Attribute	2014-12-10

MSINM	Attribute	PTDLAN	Point Descriptor Language Attribute	2014-12-10
MSINM	Attribute	PTDNAM	Point Descriptor Description Attribute	2014-12-10

4.3.2 Feature Types

Since an MSI-NM does not represent a real world phenomena, there are no feature types in the MSI-NM model. Instead, entities have been mapped to information types and complex attributes.

4.3.3 Information Types

Inf. Object Class	MSI-NM T&P Message Class	Alpha code	**MESSAG**
Camel case	**Message**	Abstract type	False
Definition	The class used for MSI and NM T&P messages		
References			
Remarks	No remarks		
Distinction	No distinction		

Attribute	**Camel case**	**Alpha code**	**Cardinality**
System-Specific Message ID Attribute	id	MSAIID	1
Message Series Identifier Attribute	seriesId	MSASID	1
Message Type Attribute	type	MSATYP	1
Message Status Attribute	status	MSASTA	1
Message Area Attribute	area	MSAARE	1
Message Categories Attribute	categories	MSACAT	0..*
Message Charts Attribute	charts	MSACHA	0..*
Message Horizontal Datum Attribute	horizontalDatum	MSAHDA	0..1
Message Created Date Attribute	created	MSACRE	1
Message Valid-From Attribute	validFrom	MSAVFR	1
Message Valid-To Attribute	validTo	MSAVTO	0..1
Message Locations Attribute	locations	MSALOC	0..*
Message Descriptors Attribute	descs	MSADSC	0..*
Message Cancellation Date Attribute	cancellationDate	MSACAN	0..1
Message References Attribute	references	MSAREF	0..*
Message AtoNs Attribute	atons	MSAATN	0..*
Message Attachments Attribute	attachments	MSAATT	0..*
Message Original Information Attribute	originalInformation	MSAORG	1

Inf. Object Class	Sea Charts	Alpha code	**SCHART**
Camel case	**Chart**	Abstract type	False
Definition	The class used to represent a sea chart associated with a message		
References			
Remarks	No remarks		
Distinction	No distinction		

Attribute	Camel case	Alpha code	Cardinality
Chart Number Attribute	chartNumber	CHANUM	1
Chart International Number Attribute	internationalNumber	CHAINM	0..1

Inf. Object Class	Aid To Navigation	Alpha code	**AIDTON**
Camel case	**AidToNavigation**	Abstract type	False
Definition	The class used to represent an AtoN associated with a message		
References			
Remarks	No remarks		
Distinction	No distinction		
Attribute	**Camel case**	**Alpha code**	**Cardinality**
AtoN ID Attribute	atonId	ATNIDA	1
AtoN Persistent Unique ID Attribute	persistentUid	ATNPUN	0..1

Inf. Object Class	Category	Alpha code	**CATEGO**
Camel case	**Category**	Abstract type	False
Definition	The class used to represent a category associated with a message		
References			
Remarks	No remarks		
Distinction	No distinction		
Attribute	**Camel case**	**Alpha code**	**Cardinality**
Category ID Attribute	id	CATIDA	1
Category Parent Attribute	parent	CATPAT	0..1
Category Descriptors Attribute	descs	CATDSA	0..*

Inf. Object Class	Area	Alpha code	**AREACL**
Camel case	**Area**	Abstract type	False
Definition	The class used to represent an area associated with a message		
References			
Remarks	No remarks		
Distinction	No distinction		
Attribute	**Camel case**	**Alpha code**	**Cardinality**
Area ID Attribute	id	AREIDA	1
Area Parent Attribute	parent	AREPAT	0..1
Area Descriptors Attribute	descs	AREDSA	0..*

4.3.4 Property Types

Attribute	Unique id	Alpha code	MSAIID
Attribute type	simple	Data type	String
Camel case	id		
Definition	System-Specific message ID attribute. This is the underlying ID of the message defined by the originating MSI-NM System.		

Attribute	Unique id	Alpha code	MSASID
Attribute type	Complex	Data type	Complex
Camel case	seriesIdentifier		
Definition	The unique persistent message series identifier defined for the message.		

Sub-Attribute	Camel case	Alpha code	Cardinality
Series Identifier Main-Type Attribute	mainType	SERTYP	1
Series Identifier Authority Attribute	authority	SERAUT	1
Series Identifier Number Attribute	number	SERNUM	0..1
Series Identifier Year Attribute	year	SERYEA	1

Attribute	Unique id	Alpha code	MSATYP
Attribute type	simple	Data type	Enumeration
Camel case	type		
Definition	The message type. A constraint for this attribute is that the main type (MSI, NM) implicitly defined by this attribute should match the mainType attribute of the message series identifier.		

Value	Definition
LOCAL_WARNING	An MSI local navigation warning
COASTAL_WARNING	An MSI coastal navigation warning
NAVAREA_WARNING	An MSI NAVAREA warning
PERMANENT_NOTICE	An NM permanent notice (chart update)
TEMPORARY_NOTICE	An NM temporary notice
PRELIMINARY_NOTICE	An NM preliminary notice
MISCELLANEOUS_NOTICE	An NM miscellaneous notice

Attribute	Unique id	Alpha code	MSASTA
Attribute type	simple	Data type	Enumeration
Camel case	status		
Definition	The message status. The implementing MSI-NM System managing the ife cycle of the message should enforce rules, such as: • Messages are created as drafts. • A draft message can be deleted or published. • A published message can either be cancelled manually or expired by the system if the valid-to date has passed.		

Value	Definition
DRAFT	Indicates a draft message
PUBLISHED	Indicates a published message
EXPIRED	Indicates an expired message
CANCELLED	Indicates a cancelled message
DELETED	Indicates a deleted draft message

Attribute	**Unique id**	**Alpha code**	**MSAARE**
Attribute type	simple	Data type	Area
Camel case	area		
Definition	Defines the area that the message belongs to.		

Attribute	**Unique id**	**Alpha code**	**MSACAT**
Attribute type	simple	Data type	Category
Camel case	categories		
Definition	Defines the categories that the message belongs to.		

Attribute	**Unique id**	**Alpha code**	**MSACHA**
Attribute type	simple	Data type	Chart
Camel case	charts		
Definition	Defines the charts that the message belongs to.		

Attribute	**Unique id**	**Alpha code**	**MSAHDA**
Attribute type	simple	Data type	Text
Camel case	horizontalDatum		
Definition	Defines the horizontal datum of the message, if not WGS-84		

Attribute	**Unique id**	**Alpha code**	**MSACRE**
Attribute type	simple	Data type	DateTime
Camel case	created		
Definition	The date when the message was created.		

Attribute	**Unique id**	**Alpha code**	**MSAVFR**
Attribute type	simple	Data type	DateTime
Camel case	validFrom		
Definition	The initial date (and time) for which the subject of the message is valid.		

Attribute	**Unique id**	**Alpha code**	**MSAVTO**
Attribute type	simple	Data type	DateTime
Camel case	validTo		

Definition	The last date (and time) for which the subject of the message is valid.

Attribute	**Unique id**	**Alpha code**	**MSALOC**
Attribute type	complex	Data type	Complex
Camel case	locations		
Definition	Defines the locations associated with the message.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Location Type Attribute	type	LOCTYP	1
Location Points Attribute	points	LOCPTS	1..*
Location Radius Attribute	radius	LOCRAD	0..1
Location Descriptors Attribute	descs	LOCDSC	0..*

Attribute	**Unique id**	**Alpha code**	**MSADSC**
Attribute type	complex	Data type	Complex
Camel case	descs		
Definition	Defines the localizable message descriptor fields for a specific language.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Message Descriptor Language Attribute	lang	MDSLAN	1
Message Descriptor Title Attribute	title	MDSTIT	0..1
Message Descriptor Description Attribute	description	MDSDSC	0..1
Message Descriptor Other Categories Attribute	otherCategories	MDSOCA	0..1
Message Descriptor Time Attribute	time	MDSTIM	0..1
Message Descriptor Vicinity Attribute	vicinity	MDSVIC	0..1
Message Descriptor Note Attribute	note	MDSNOT	0..1
Message Descriptor Publication Attribute	publication	MDSPUB	0..1
Message Descriptor Source Attribute	source	MDSSRC	0..1

Attribute	**Unique id**	**Alpha code**	**MSACAN**
Attribute type	simple	Data type	DateTime
Camel case	cancellationDate		
Definition	The date a message was cancelled.		

Attribute	**Unique id**	**Alpha code**	**MSAREF**
Attribute type	complex	Data type	Complex
Camel case	references		
Definition	Defines the loose, typed references from a message to other messages.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Reference Series Identifier Attribute	seriesIdentifier	REFSID	1
Reference Type Attribute	type	REFTYP	1

Attribute	**Unique id**	**Alpha code**	**MSAATN**
Attribute type	simple	Data type	AidToNavigation
Camel case	atons		
Definition	Defines a list of AtoN's associated with the message.		

Attribute	**Unique id**	**Alpha code**	**MSAATT**
Attribute type	complex	Data type	Complex
Camel case	attachments		
Definition	Defines a list of attachments belonging to the message.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Attachment Repository Path Attribute	repoPath	`ATTPAT`	1
Attachment Type Attribute	type	`ATTTYP`	1

Attribute	**Unique id**	**Alpha code**	**MSAORG**
Attribute type	simple	Data type	Boolean
Camel case	originalInformation		
Definition	A flag that indicates if the message information is based on original information.		

Attribute	**Unique id**	**Alpha code**	**MSDLAN**
Attribute type	simple	Data type	Text
Camel case	lang		
Definition	Defines the message descriptor language		

Attribute	**Unique id**	**Alpha code**	**MSDTIT**
Attribute type	simple	Data type	Text
Camel case	title		
Definition	Defines the localized message title		

Attribute	**Unique id**	**Alpha code**	**MSDDSC**
Attribute type	simple	Data type	Text (HTML)
Camel case	description		
Definition	Defines the localized message description. The format of the description is HTML, in order to provide support for rich text features.		

Attribute	**Unique id**	**Alpha code**	**MSDOCA**
Attribute type	simple	Data type	Text
Camel case	otherCategories		
Definition	Defines the localized message category. Messages are assigned a list of categories (see information type), based on a		

	hierarchical category-tree defined administratively in the MSI-NM System. The otherCategories attribute can be used to assign a localized category to the message that is not part of the category-tree base data.

Attribute	**Unique id**	**Alpha code**	**MSDTIM**
Attribute type	simple	Data type	Text
Camel case	time		
Definition	Defines the localized message time description. This can be used to elaborate the validFrom – validTo date interval defined for the message in a localized manner.		

Attribute	**Unique id**	**Alpha code**	**MSDVIC**
Attribute type	simple	Data type	Text
Camel case	vicinity		
Definition	Defines the localized message vicinity. Messages are assigned an Area (see information type), based on a hierarchical area-tree defined administratively in the MSI-NM System. The vicinity attribute can be used to assign a localized area to the message that is not part of the area-tree base data.		

Attribute	**Unique id**	**Alpha code**	**MSDNOT**
Attribute type	simple	Data type	Text
Camel case	note		
Definition	Defines the localized message note, which may be used to supplement the message description.		

Attribute	**Unique id**	**Alpha code**	**MSDPUB**
Attribute type	simple	Data type	Text
Camel case	publication		
Definition	Defines the localized message publication, i.e. the publication containing the information that the message pertains to.		

Attribute	**Unique id**	**Alpha code**	**MSDSRC**
Attribute type	simple	Data type	Text
Camel case	source		
Definition	Defines the localized message source, i.e. the provider of the original information.		

Attribute	**Unique id**	**Alpha code**	**SERTYP**
Attribute type	simple	Data type	Enumeration
Camel case	mainType		
Definition	The main type of a message series identifier.		

Value	Definition
MSI	MSI warning
NM	NM notice

Attribute	Unique id	Alpha code	SERAUT
Attribute type	simple	Data type	Text
Camel case	authority		
Definition	The authority of a message series identifier, e.g. “DK” for Danish messages.		

Attribute	Unique id	Alpha code	SERNUM
Attribute type	simple	Data type	int
Camel case	number		
Definition	The message series identifier sequence number. The number is instantiated from a number sequence by the MSI-NM System when the message is published. The number sequence is unique for each combination of type, authority and year.		
Attribute	**Unique id**	**Alpha code**	**SERYEA**
Attribute type	simple	Data type	int
Camel case	year		
Definition	The year of a message series identifier, e.g. 2014.		

Attribute	Unique id	Alpha code	REFSID
Attribute type	Complex	Data type	Complex
Camel case	seriesIdentifier		
Definition	The unique persistent message series identifier defined for the reference.		

Sub-Attribute	Camel case	Alpha code	Cardinality
Series Identifier Main-Type Attribute	mainType	`SERTYP`	1
Series Identifier Authority Attribute	authority	`SERAUT`	1
Series Identifier Number Attribute	number	`SERNUM`	0..1
Series Identifier Year Attribute	year	`SERYEA`	1

Attribute	Unique id	Alpha code	REFTYP
Attribute type	simple	Data type	Enumeration
Camel case	type		
Definition	The type of the message reference.		

Value	Definition
REFERENCE	A generic reference to another message
REPETITION	Indicates a repetition of a message
CANCELLATION	Indicates a cancellation of a message
UPDATE	Indicates an updated message

Attribute	**Unique id**	**Alpha code**	**ATTPAT**
Attribute type	simple	Data type	Text (URL)
Camel case	repoPath		
Definition	The fully qualified path to the attachment file in the originating MSI-NM repository.		

Attribute	**Unique id**	**Alpha code**	**ATTTYP**
Attribute type	simple	Data type	Text
Camel case	type		
Definition	The attachment file mime type.		

Attribute	**Unique id**	**Alpha code**	**CHANUM**
Attribute type	simple	Data type	Text
Camel case	chartNumber		
Definition	A local or regional chart number for the chart.		

Attribute	**Unique id**	**Alpha code**	**CHAINM**
Attribute type	simple	Data type	int
Camel case	internationalNumber		
Definition	The international number of the sea chart.		

Attribute	**Unique id**	**Alpha code**	**ATNIDA**
Attribute type	simple	Data type	Text
Camel case	atonId		
Definition	A local or regional ID of an associated AtoN, such as a light list number.		

Attribute	**Unique id**	**Alpha code**	**ATNPUN**
Attribute type	simple	Data type	Text
Camel case	persistentUid		
Definition	A Persistent Unique Identifiers of the AtoN, as proposed by IHO SNPWG to HSSC. Hint, hint, IHO!		

Attribute	**Unique id**	**Alpha code**	**CATIDA**
Attribute type	simple	Data type	int
Camel case	id		
Definition	An MSI-NM System-specific identifier of a category.		

Attribute	**Unique id**	**Alpha code**	**CATPAT**
Attribute type	simple	Data type	Category
Camel case	parent		

Definition	A parent category of a non-root category.

Attribute	**Unique id**	**Alpha code**	**CATDSA**
Attribute type	complex	Data type	Complex
Camel case	descs		
Definition	Defines the localizable category descriptor fields for a specific language.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Category Descriptor Language Attribute	lang	`CADLAN`	1
Category Descriptor Name Attribute	name	`CADNAM`	0..1

Attribute	**Unique id**	**Alpha code**	**CADLAN**
Attribute type	simple	Data type	Text
Camel case	lang		
Definition	Defines the category descriptor language		

Attribute	**Unique id**	**Alpha code**	**CADNAM**
Attribute type	simple	Data type	Text
Camel case	name		
Definition	Defines the localized name of the category		

Attribute	**Unique id**	**Alpha code**	**AREIDA**
Attribute type	simple	Data type	int
Camel case	id		
Definition	An MSI-NM System-specific identifier of an area.		

Attribute	**Unique id**	**Alpha code**	**AREPAT**
Attribute type	simple	Data type	Area
Camel case	parent		
Definition	A parent area of a non-root area.		

Attribute	**Unique id**	**Alpha code**	**AREDSA**
Attribute type	complex	Data type	Complex
Camel case	descs		
Definition	Defines the localizable area descriptor fields for a specific language.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Area Descriptor Language Attribute	lang	`ARELAN`	1
Area Descriptor Name Attribute	name	`ARENAM`	0..1

Attribute	**Unique id**	**Alpha code**	**ARELAN**

Attribute type	simple	Data type	Text
Camel case	lang		
Definition	Defines the area descriptor language		

Attribute	**Unique id**	**Alpha code**	**ARENAM**
Attribute type	simple	Data type	Text
Camel case	name		
Definition	Defines the localized name of the area		

Attribute	**Unique id**	**Alpha code**	**LOCTYP**
Attribute type	simple	Data type	Enumeration
Camel case	type		
Definition	The type of the location.		

Value	**Definition**
POINT	Indicates a single position
CIRCLE	Indicates a circle, i.e. a closed path with equal distance to a position.
POLYGON	Indicates an area defined by a closed path
POLYLINE	Indicates an open path

Attribute	**Unique id**	**Alpha code**	**LOCPTS**
Attribute type	Complex	Data type	Complex
Camel case	points		
Definition	The positions of the location.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Point Latitude Attribute	latitude	`PTSLAT`	1
Point Longitude Attribute	longitude	`PTSLON`	1
Point Descriptors Attribute	descs	`PTSDCS`	0..1

Attribute	**Unique id**	**Alpha code**	**LOCRAD**
Attribute type	simple	Data type	int
Camel case	radius		
Definition	The radius of a circle location.		

Attribute	**Unique id**	**Alpha code**	**LOCDCS**
Attribute type	complex	Data type	Complex
Camel case	descs		
Definition	Defines the localizable location descriptor fields for a specific language.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Location Descriptor Language Attribute	lang	`LODLAN`	1

Location Descriptor Description Attribute	description	LODNAM	0..1

Attribute	**Unique id**	**Alpha code**	**LODLAN**
Attribute type	simple	Data type	Text
Camel case	lang		
Definition	Defines the location descriptor language		

Attribute	**Unique id**	**Alpha code**	**LODNAM**
Attribute type	simple	Data type	Text
Camel case	name		
Definition	Defines the localized description of the location		

Attribute	**Unique id**	**Alpha code**	**PTSLAT**
Attribute type	simple	Data type	double
Camel case	latitude		
Definition	Defines the latitude of a position		

Attribute	**Unique id**	**Alpha code**	**PTSLON**
Attribute type	simple	Data type	double
Camel case	longitude		
Definition	Defines the longitude of a position		

Attribute	**Unique id**	**Alpha code**	**PTSDCS**
Attribute type	complex	Data type	Complex
Camel case	descs		
Definition	Defines the localizable point descriptor fields for a specific language.		

Sub-Attribute	**Camel case**	**Alpha code**	**Cardinality**
Point Descriptor Language Attribute	lang	PTDLAN	1
Point Descriptor Description Attribute	description	PTDNAM	0..1

Attribute	**Unique id**	**Alpha code**	**PTDLAN**
Attribute type	simple	Data type	Text
Camel case	lang		
Definition	Defines the position descriptor language		

Attribute	**Unique id**	**Alpha code**	**PTDNAM**
Attribute type	simple	Data type	Text
Camel case	name		
Definition	Defines the localized description of the position		

5 Coordinate Reference System

The spatial data associated with a message via its *locations* field is always given in WGS-84.

However, the message description field may include a textual description of the hazard, including coordinates that may be stated in a different horizontal datum. This is likely to be the horizontal datum of the highest resolution sea chart associated with the message. The message contains a *horizontalDatum* attribute that can be used to indicate that a horizontal datum other than WGS-84 is being used in the textual description of the message.

6 Data Quality

MSI-NM is intended for a exploring a combined MSI-NM T&P format and is not an official product certified for navigation. Data quality is considered a function of the implementing MSI-NM system, not the format.

7 Data Product Format

This specification does not mandate one specific data format and encoding of the MSI-NM model. The scope of the model is more general and the main purpose is to define an underlying model that is usable for all sorts of clients and encodings, ranging from ECDIS to websites, apps, Twitter, and so forth.

7.1 XSD

The current MSI-NM implementing system mainly supports JSON[4] and XML. The XML (and thus indirectly the JSON) of a message conforms to the XSD[5] defined at:

- https://github.com/dma-dk/MsiNm/blob/master/docs/msi-nm-1.0.xsd

The XSD is reproduced in Annex A. The following rules applies to the format

- The character encoding is UTF-8, no BOM.
- Latitude and longitude are encoded as signed decimal degrees.
- Mandatory elements are identified in the feature catalogue.
- In general, if a message attribute is blank or undefined, the corresponding XML element is excluded from the data.

7.2 MSDL

The current MSI-NM System also promulgates MSI-NM messages via the *Maritime Cloud*.

The Maritime Cloud is a digital Information Technology framework consisting of standards, infrastructure and governance that facilitates secure interoperable information exchange between stakeholders in the maritime community using the principles of Service Oriented Architectures (SOA). For a detailed description of the Maritime Cloud, please refer to http://maritimecloud.net.

The MSDL definition of the MSI-NM model is defined at:

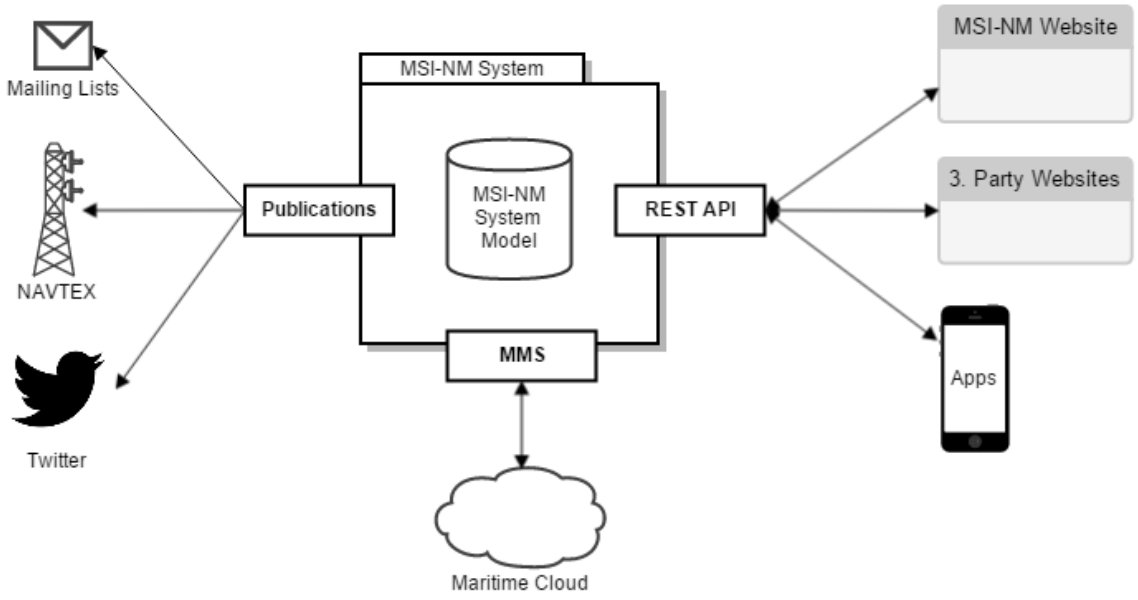
- https://github.com/dma-dk/MsiNm/blob/master/msinm-publish/src/main/msdl/dma/msinm/msinm-model.msdl

The MSDL model is reproduced in Annex B.

[4] Read about JSON at http://en.wikipedia.org/wiki/JSON
[5] Read about XSD at http://en.wikipedia.org/wiki/XML_Schema_%28W3C%29

8 Date Product Delivery

As with the data format, this specification does not stipulate a specific means of data product delivery. Instead, a varied range of mechanisms is anticipated, such as the ones currently supported by the MSI-NM System:



8.1 MSI-NM REST API

By far, the most extensive data product delivery mechanism, supported by the MSI-NM System is a set of REST API's. REST (REpresentational State Transfer[6]) is an intrinsically simple protocol, or set of conventions, built on top of standard HTTP. The REST protocol is used to define an API for creating, modifying and fetching messages, and indeed all other types of base data used in MSI-NM, such as users, areas, categories, etc. The format of the messages is JSON and conforms to the format described in the previous section.

Much of the functionality exposed via REST is protected and subject to authorization checks. However, the main function for searching all MSI-NM messages is public and may be enacted by any client, such as a website or a smartphone app. This particular REST-call will be documented in part below. For the remaining REST API, please refer to the REST endpoints defined in the msinm-web project.

8.1.1 REST Search Function

The REST endpoint for searching messages is: `/rest/messages/search`

Example URL that returns all published MSI and NM messages in English:

https://msinm-test.e-navigation.net/rest/messages/search?lang=en&status=PUBLISHED

Some of the parameters accepted by the search REST function are:

Parameter	Description

[6] REST is described on http://en.wikipedia.org/wiki/Representational_state_transfer

lang	The language code for the returned message data. If not defined, all language variants will be returned. Example: “en” will return the messages in English.
q	A general free-text query parameter. The format of the query string is similar to the one used by e.g. Google. All fields of a message are searched for a match, i.e. the message description, title, areas, categories, charts, etc. Examples: • “light buoy”: Search for messages containing either “light” or “buoy”. • “+light -buoy”: Search for messages containing “light” but not “buoy”. • “’light buoy’”: Search for messages containing the specific term “light buoy”. • “copenha*”: Search for messages containing terms starting with “copenha”.
status	Restrict the search result to messages with a specific status, i.e. PUBLISHED (default value), EXPIRED and CANCELLED. Additionally, authorized users may search for the statuses DRAFT and DELETED.
type	Can be a comma-separated list of matching message types. Either a main type, “MSI” or “NM”, or one of the subtypes, “PERMANENT_NOTICE”, “TEMPORARY_NOTICE”, “PRELIMINARY_NOTICE”, “MISCELLANEOUS_NOTICE”, “COASTAL_WARNING”, “SUBAREA_WARNING”, “NAVAREA_WARNING” or “LOCAL_WARNING”.
maxHits	The maximum number of messages to return, e.g. 100.
startIndex	The index of the first message to return, e.g. 0. Used in conjunction with the “maxHits” parameter to provide support for paged search results.
sortBy	The field to sort the messages by, one of “DATE”, “ID” or “AREA”. Date sorting applies to the creation date, ID sorting sorts the messages by their series identifier and area sorting sorts the messages by their associated area.
sortOrder	Whether to sort in ascending order, “ASC”, or descending order, “DESC”.

Additionally, there are REST parameters to filter by category, area, location, and chart and date interval. Please refer to the MessageRestService class of the msinm-web project.

8.2 Maritime Cloud API

A service for polling for published MSI-NM messages via the Maritime Cloud is defined at:

- https://github.com/dma-dk/MsiNm/blob/master/msinm-publish/src/main/msdl/dma/msinm/msinm-service.msdl

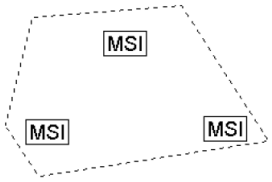
The MSDL service is reproduced in Annex B.

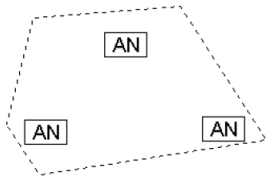
9 Data Maintenance

Maintenance and update frequency	As needed
Data Source	The Danish Maritime Authority

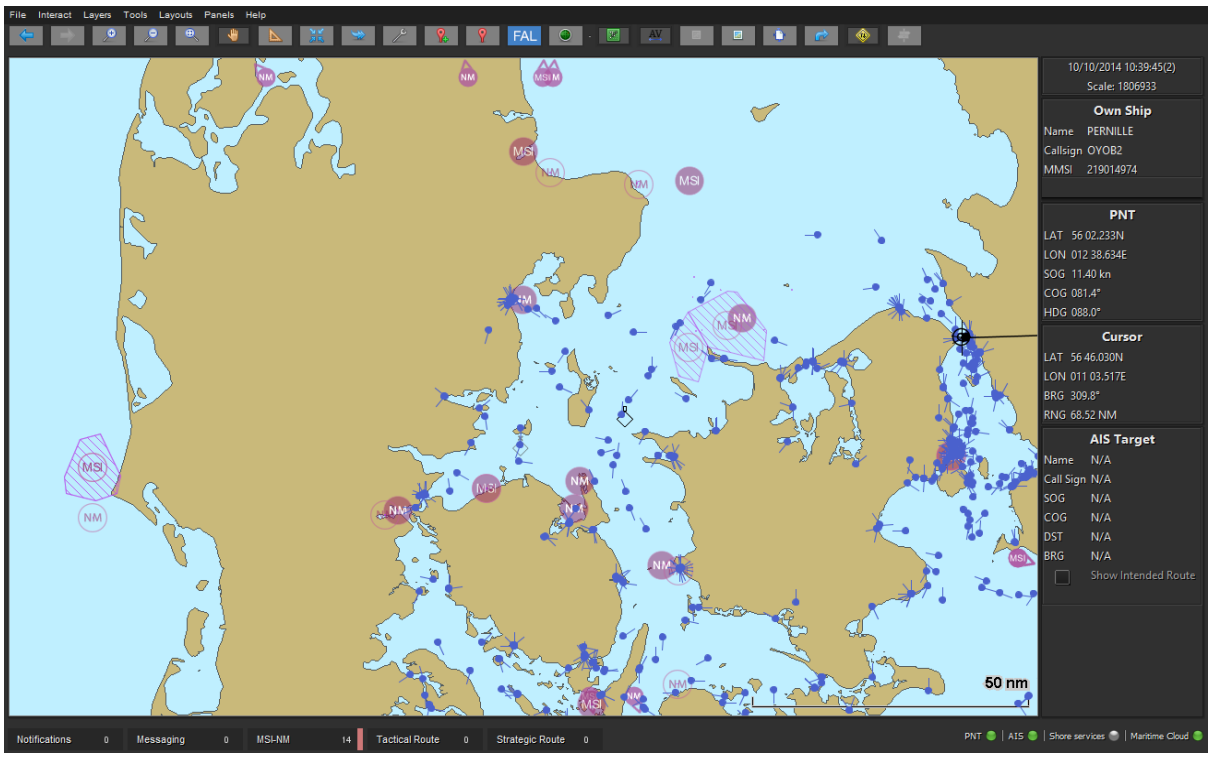
10 Portrayal

No portrayal guidance for MSI and NM is provided by IMO in the [IMO-243] circular on navigation related symbols.
Meanwhile the IEC, in their [IEC-62288] standard, has a proposed portrayal and symbols for MSI. Additionally, the standard defines a more general *Area Notice*. Both are reproduced below:

	Description	Symbol(s)
5.4	**Maritime Safety Information, MSI** MSI point symbol shall be presented as box with the "MSI" inscribed inside it. The box shall be centred at the position derived from MSI message. The box shall not be more than 6 mm in height, drawn using a thick solid line style. MSI area symbol shall be presented as a series of lines bounding a geographic area designated as "caution" to navigation. Connecting lines shall be drawn using thin dashed line style and using same basic colour as the symbol itself. The area shall be filled with a sparse pattern of MSI point symbols separated by 50 mm. MSI symbols shall be in a separate user selectable layer or group, removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if MSI notices are available in the area currently displayed, but the MSI layer is not automatically selected for display. MSI symbols may be connected to a date range and in such case each MSI notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an MSI symbol for further details. When presentation of MSI point and area symbols are provided as overlay on chart or radar, then means shall be provided for cursor pick of the symbol to provide further information in the user dialog area of the display. Note that the source of MSI maybe NAVTEX, AIS ASM function identifier 22 or 23 (SN.1/Circ. 289), etc.	Example of point symbol MSI Example of area symbol 

	Description	Symbol(s)
5.11	**Area notice** Area notice point symbol shall be presented as box with the "AN" inscribed inside it. The box shall be centred at the position derived from Area notice message. The box shall not be more than 6 mm in height, drawn using a thick solid line style and shall be the same basic colour as the AIS AtoN symbol. Area notice area symbol shall be presented as a series of lines bounding a geographic area. Connecting lines shall be drawn using the thin dashed line style and using the same basic colour as the symbol itself. The area shall be filled with a sparse pattern of Area notice point symbols separated by 50 mm. Drawing priority of Area notice symbol is below Maritime Safety Information MSI, see symbol 5.4. Area notice symbols shall be in a separate user selectable layer, which is removable by single operator action. The removal may be connected to generic removal functionality of non-chart object layers. The user dialog area shall have an indication if area notices are available in the area currently displayed, but the area notice layer is not selected for display. Area notice symbols may be connected to a date range and in such case each area notice symbol shall be displayed only when user selected date is within data range. It shall be possible to cursor pick an Area notice symbol for further details. Note that the source of the area notice may be AIS ASM function identifier 22 or 23 (SN.1/Circ. 289), etc.	Example of point symbol AN Example of area symbol 

However, this portrayal has not incorporated the portrayal guidelines recommended by the EfficienSea project, where the integration of MSI in navigational charts was explored in detail. The portrayal devised in the EfficienSea project has been usability tested and seem better suited for MSI and NM portrayal than the IEC standard.
Hence, the portrayal specified in this document will be based on – and further develop - the portrayal stipulated in the EfficienSea project.



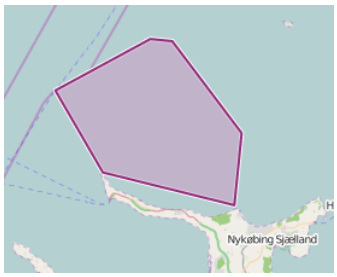
Also, this specification will opt to provide guidelines, not dictate the final appearance and size of, say, individual icons. The reason for this is that the specification is not tied to a single target platform, such as an ECDIS. It is assumed that there will be many client types to the format, and a specific size of an MSI icon on an ECDIS may not be optimal for a website.

10.1 MSI-NM Symbols and Outlines

The magenta MSI symbol devised in the EfficienSea project has been supplemented with an analogous NM symbol. Also, a cluster symbol has been chosen to represent a cluster of MSI and NM messages and may be used in order to avoid clutter in maps:

Symbols for MSI, NM and clustered messages

When the message location is given by a polygon, a polyline or a circle, the actual geographical shape will be used for portraying the message. The main outline should be in magenta, and for closed location shapes (circles and polygons), the interior of the shape should be marked using magenta stripes (ECDIS) or a semi-transparent solid colour (web). Example:



10.2 Acknowledged MSI-NM Portrayal

On certain clients, such as an ECDIS, an MSI-NM message will have a flag to indicate if it has been acknowledged by the mariner or not. When a new MSI or NM T&P message is received, the full coloured symbol is shown on the ENC. When the navigator has read and acknowledged the message, the corresponding MSI-NM symbol changes to an inverted variant which is not as conspicuous:

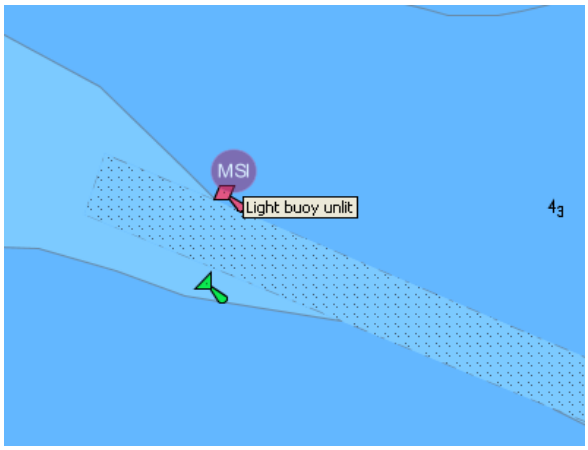


Figure 1: New MSI message

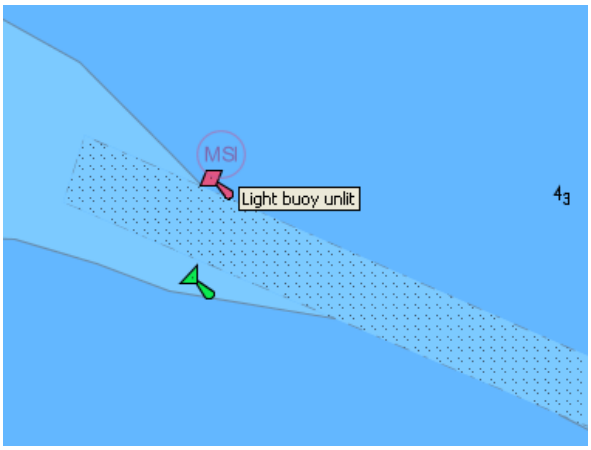


Figure 2: Acknowledged MSI message

10.3 MSI-NM Tooltips

Whenever an MSI-NM message is displayed on a map (e.g. on an ECDIS or on the Web), hovering the mouse pointer over the corresponding symbol or location outline should result in a tooltip being displayed. See previous screenshots.

The contents of the tooltip should be the title of the message. If the message has been localized to multiple languages, the title in the currently selected language of the client should take precedence.

10.4 MSI-NM Message Details

The full details of a message must be directly accessible from the corresponding symbol or outline displayed on a map, either by (double-)clicking the symbol or from a context sensitive menu. Examples:

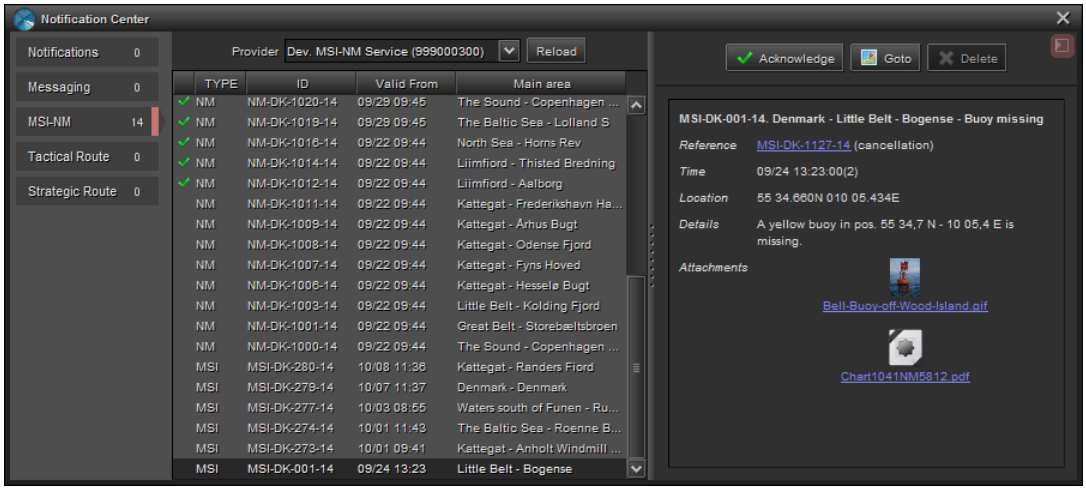


Figure 3: MSI-NM Message details in an ECDIS-like notification center

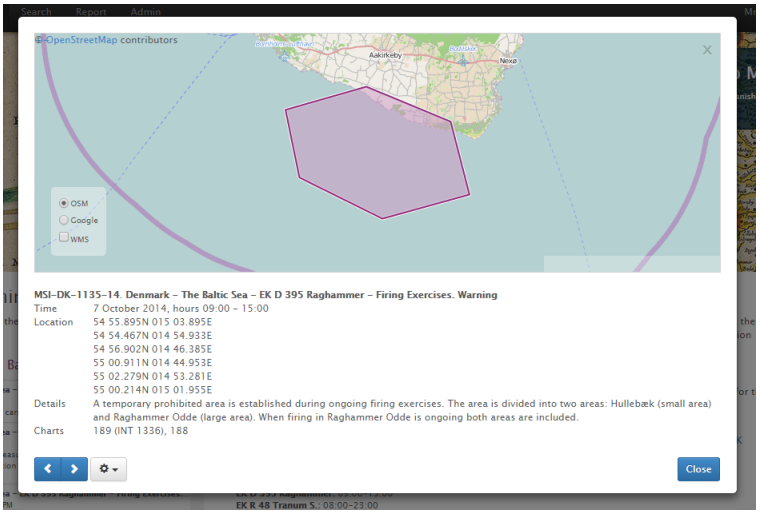


Figure 4: Message Details Dialog on an MSI-NM Website

10.5 MSI-NM Message Lists

Since not all messages have a geographical extent, and can thus not be displayed on a map, it is important that clients (ECDIS, Web, Apps, etc.) used for navigational purposes also make the full list of MSI-NM messages available as a list.

The message details screenshot above also depicts how a full list of MSI-NM messages could be made available in an ECDIS Notification Center. The example below, shows how the list could be made available on a website:

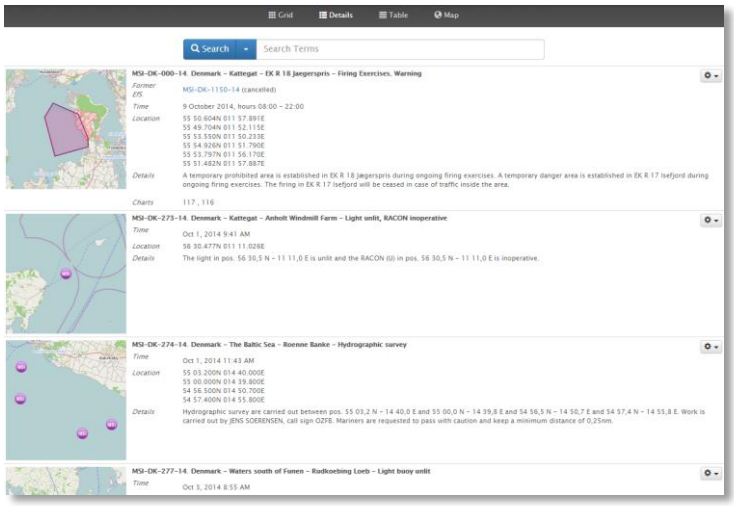


Figure 5: MSI-NM message list in textual form

10.6 MSI-NM Filtering

As documented in the EfficienSea project, it is important for clients, such as an ECDIS, to support *relevance filtering* of MSI warnings. Based on the EfficienSea experiences, this specification will extend the concept to include NM T&P messages and recommend that navigational clients support the following filtering criteria:

- Time-based criteria: When the filter is turned on, only MSI-NM messages where today is within the valid-from/-to date interval are displayed.
- Range-based criteria: When the filter is turned on, only MSI-NM messages that are within a configurable distance of the own-ship or intended routes are displayed.

10.7 MSI-NM Portrayal for Large Areas

On navigational clients, such as an ECDIS, it poses several problems to portray MSI and NM messages whose affected locations cover large areas (or analogously, if very high resolution ENC presentation is used).

If a chart window bounding box is completely within an MSI-NM area, as depicted below, the area portrayal becomes very intrusive. The proposed mitigation is to not display the magenta stripes of the area once the message has been acknowledged. Instead, thick magenta border lines should be displayed along the border of the chart window to signal that the bounding box is completely within an MSI-NM area.

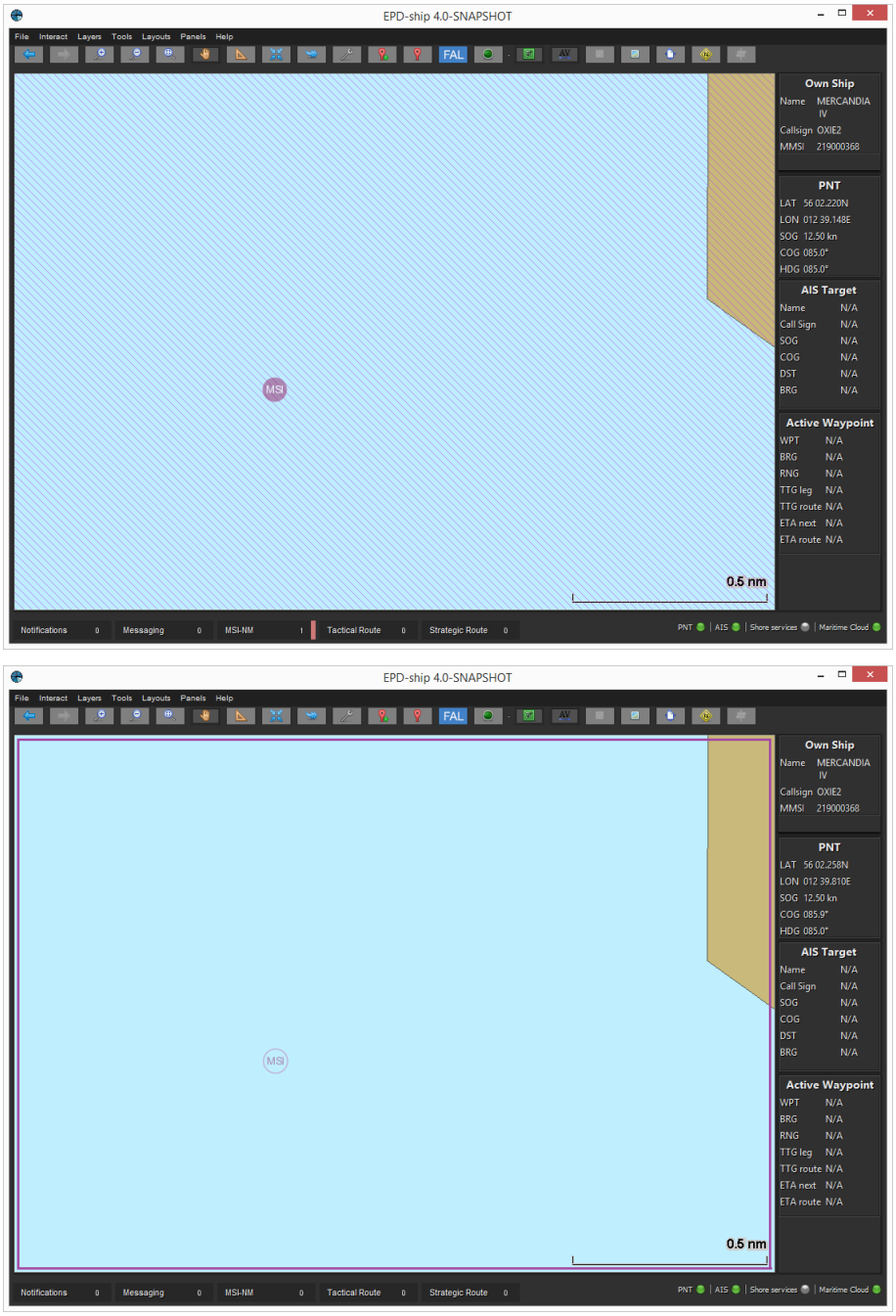


Figure 6: MSI with area larger than chart window, unacknowledged and acknowledged.

An MSI/NM icon is generally displayed in the centre of the associated area. However, if the own-ship is within an MSI-NM area, the icon should instead be re-positioned just behind the vessel symbol. This ensures that the MSI-NM icon does not shade important ENC featured in front of the own-ship, and furthermore, it ensures that the navigator can get access to the message details (by e.g. right-clicking the MSI-NM icon), even when the affected area extends beyond the chart window.

See example below:

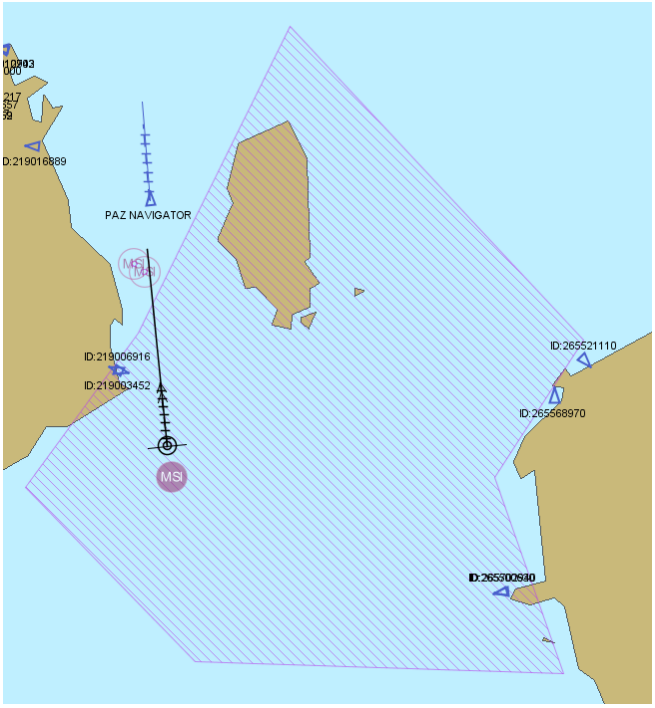


Figure 7: When the own-ship is within an MSI/NM area, the icon is re-positioned after the ship.

Annex A MSI-NM Message XSD

The XSD for an MSI-NM message, at the time of writing, is reproduced below:

```
<xs:schema version="1.0" xmlns:xs="http://www.w3.org/2001/XMLSchema">

  <xs:element name="message" type="message"></xs:element>

  <!-- ********************** -->
  <!-- ** Message          ** -->
  <!-- ********************** -->

  <xs:complexType name="message">
    <xs:annotation>
      <xs:documentation>message</xs:documentation>
      <xs:documentation>Represents an MSI or NM T&amp;amp;P message.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="seriesIdentifier" type="seriesIdentifier"/>
      <xs:element name="type" type="type"/>
      <xs:element name="status" type="status"/>
      <xs:element name="area" type="area"/>
      <xs:element name="categories" type="category" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="charts" type="chart" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="horizontalDatum" type="xs:string" minOccurs="0"/>
      <xs:element name="validFrom" type="xs:dateTime" minOccurs="0"/>
      <xs:element name="validTo" type="xs:dateTime" minOccurs="0"/>
      <xs:element name="locations" type="location" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="descs" type="messageDesc" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="cancellationDate" type="xs:dateTime" minOccurs="0"/>
      <xs:element name="references" type="reference" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="lightListNumbers" type="xs:string" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="originalInformation" type="xs:boolean" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="id" type="xs:int" use="required"/>
    <xs:attribute name="version" type="xs:int" use="required"/>
    <xs:attribute name="created" type="xs:dateTime" use="required"/>
    <xs:attribute name="updated" type="xs:dateTime"/>
  </xs:complexType>

  <xs:complexType name="messageDesc">
    <xs:annotation>
      <xs:documentation>Message Descriptor</xs:documentation>
      <xs:documentation>Contains the language specific textual attributes of a
message.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="lang" type="xs:string"/>
      <xs:element name="title" type="xs:string" minOccurs="0"/>
      <xs:element name="description" type="xs:string" minOccurs="0"/>
      <xs:element name="otherCategories" type="xs:string" minOccurs="0"/>
      <xs:element name="time" type="xs:string" minOccurs="0"/>
      <xs:element name="vicinity" type="xs:string" minOccurs="0"/>
      <xs:element name="note" type="xs:string" minOccurs="0"/>
      <xs:element name="publication" type="xs:string" minOccurs="0"/>
      <xs:element name="source" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="type">
    <xs:annotation>
      <xs:documentation>Message Type</xs:documentation>
      <xs:documentation>The type of a message, i.e. navarea, subarea, coastal or local MSI
warnings, or
          temporary, preliminary, permanent or miscellaneous NM notice.</xs:documentation>
    </xs:annotation>
```

```
    <xs:restriction base="xs:string">
      <xs:enumeration value="NAVAREA_WARNING"/>
      <xs:enumeration value="SUBAREA_WARNING"/>
      <xs:enumeration value="COASTAL_WARNING"/>
      <xs:enumeration value="LOCAL_WARNING"/>
      <xs:enumeration value="TEMPORARY_NOTICE"/>
      <xs:enumeration value="PRELIMINARY_NOTICE"/>
      <xs:enumeration value="PERMANENT_NOTICE"/>
      <xs:enumeration value="MISCELLANEOUS_NOTICE"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="status">
    <xs:annotation>
      <xs:documentation>Message Status</xs:documentation>
      <xs:documentation>The current status of the message, i.e. draft, published, expired,
cancelled or deleted (draft).</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="DRAFT"/>
      <xs:enumeration value="PUBLISHED"/>
      <xs:enumeration value="EXPIRED"/>
      <xs:enumeration value="CANCELLED"/>
      <xs:enumeration value="DELETED"/>
    </xs:restriction>
  </xs:simpleType>

  <!-- ************************ -->
  <!-- ** SeriesIdentifier  ** -->
  <!-- ************************ -->

  <xs:complexType name="seriesIdentifier">
    <xs:annotation>
      <xs:documentation>Message Series Identifier</xs:documentation>
      <xs:documentation>A series identifier, which uniquely defines a message. The number will
be undefined
          until the message has been published.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="mainType" type="seriesIdType"/>
      <xs:element name="authority" type="xs:string"/>
      <xs:element name="number" type="xs:int" minOccurs="0"/>
      <xs:element name="year" type="xs:int"/>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="seriesIdType">
    <xs:annotation>
      <xs:documentation>Message Series Identifier Type</xs:documentation>
      <xs:documentation>The type of a message series identifier, i.e. msi or
nm.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="MSI"/>
      <xs:enumeration value="NM"/>
    </xs:restriction>
  </xs:simpleType>

  <!-- ************************ -->
  <!-- ** Reference          ** -->
  <!-- ************************ -->

  <xs:complexType name="reference">
    <xs:annotation>
      <xs:documentation>Reference</xs:documentation>
      <xs:documentation>A reference consists of a message series identifier
          and a reference type.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="seriesIdentifier" type="seriesIdentifier"/>
      <xs:element name="type" type="referenceType"/>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="referenceType">
    <xs:annotation>
```

```
      <xs:documentation>Reference Type</xs:documentation>
      <xs:documentation>The type of a reference, i.e. reference, repetition, cancellation or
update.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="REFERENCE"/>
      <xs:enumeration value="REPETITION"/>
      <xs:enumeration value="CANCELLATION"/>
      <xs:enumeration value="UPDATE"/>
    </xs:restriction>
  </xs:simpleType>

  <!-- ********************** -->
  <!-- ** Chart            ** -->
  <!-- ********************** -->

  <xs:complexType name="chart">
    <xs:annotation>
      <xs:documentation>Chart</xs:documentation>
      <xs:documentation>Defines a chart via its national chart number and optionally an
international number.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="chartNumber" type="xs:string"/>
      <xs:element name="internationalNumber" type="xs:int" minOccurs="0"/>
      <xs:element name="horizontalDatum" type="xs:string" minOccurs="0"/>
      <xs:element name="scale" type="xs:int" minOccurs="0"/>
      <xs:element name="name" type="xs:string" minOccurs="0"/>
      <xs:element name="lowerLeftLatitude" type="xs:double" minOccurs="0"/>
      <xs:element name="lowerLeftLongitude" type="xs:double" minOccurs="0"/>
      <xs:element name="upperRightLatitude" type="xs:double" minOccurs="0"/>
      <xs:element name="upperRightLongitude" type="xs:double" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="id" type="xs:int" use="required"/>
  </xs:complexType>

  <!-- ********************** -->
  <!-- ** Category         ** -->
  <!-- ********************** -->

  <xs:complexType name="category">
    <xs:annotation>
      <xs:documentation>Category</xs:documentation>
      <xs:documentation>Defines a category by its localized names and parent
category.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="descs" type="categoryDesc" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="parent" type="category" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="id" type="xs:int" use="required"/>
  </xs:complexType>

  <xs:complexType name="categoryDesc">
    <xs:annotation>
      <xs:documentation>Category Descriptor</xs:documentation>
      <xs:documentation>Contains the language specific name of a category.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="lang" type="xs:string"/>
      <xs:element name="name" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <!-- ********************** -->
  <!-- ** Area             ** -->
  <!-- ********************** -->

  <xs:complexType name="area">
    <xs:annotation>
      <xs:documentation>Area</xs:documentation>
      <xs:documentation>Defines an area by its localized names, locations and parent
area.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
```

```
      <xs:element name="descs" type="areaDesc" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="parent" type="area" minOccurs="0"/>
      <xs:element name="locations" type="location" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="id" type="xs:int" use="required"/>
  </xs:complexType>

  <xs:complexType name="areaDesc">
    <xs:annotation>
      <xs:documentation>Area Descriptor</xs:documentation>
      <xs:documentation>Contains the language specific name of an area.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="lang" type="xs:string"/>
      <xs:element name="name" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <!-- ********************** -->
  <!-- ** Location          ** -->
  <!-- ********************** -->

  <xs:complexType name="location">
    <xs:annotation>
      <xs:documentation>Location</xs:documentation>
      <xs:documentation>Defines a location by its localized descriptions, type, radius and
list of points.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="type" type="locationType"/>
      <xs:element name="points" type="point" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="radius" type="xs:int" minOccurs="0"/>
      <xs:element name="descs" type="locationDesc" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="locationType">
    <xs:annotation>
      <xs:documentation>Location Type</xs:documentation>
      <xs:documentation>The type of a location, i.e. point, circle, polygon or
polyline.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="POINT"/>
      <xs:enumeration value="CIRCLE"/>
      <xs:enumeration value="POLYGON"/>
      <xs:enumeration value="POLYLINE"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="locationDesc">
    <xs:annotation>
      <xs:documentation>Location Descriptor</xs:documentation>
      <xs:documentation>Contains the language specific description of a
location.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="lang" type="xs:string"/>
      <xs:element name="description" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <!-- ********************** -->
  <!-- ** Point             ** -->
  <!-- ********************** -->

  <xs:complexType name="point">
    <xs:annotation>
      <xs:documentation>Point</xs:documentation>
      <xs:documentation>Defines a point by its position and localized
descriptions.</xs:documentation>
    </xs:annotation>
```

```
    <xs:sequence>
      <xs:element name="latitude" type="xs:double"/>
      <xs:element name="longitude" type="xs:double"/>
      <xs:element name="descs" type="pointDesc" nillable="true" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="pointDesc">
    <xs:annotation>
      <xs:documentation>Point Descriptor</xs:documentation>
      <xs:documentation>Contains the language specific description of a
Point.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="lang" type="xs:string"/>
      <xs:element name="description" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

</xs:schema>
```

Annex B MSI-NM Message and Service MSDL

The Maritime Cloud MSDL format for an MSI-NM message, at the time of writing, is reproduced below:

```
namespace dma.msinm;

/**
 * Defines the message status
 */
enum MCStatus {

    DRAFT = 1;
    PUBLISHED = 2;
    EXPIRED = 3;
    CANCELLED = 4;
    DELETED = 5;
}

/**
 * Message type for message series identifier
 */
enum MCType {

    // NtM types
    PERMANENT_NOTICE        = 1;
    TEMPORARY_NOTICE        = 2;
    PRELIMINARY_NOTICE      = 3;
    MISCELLANEOUS_NOTICE    = 4;

    // MSI types
    COASTAL_WARNING         = 5;
    SUBAREA_WARNING         = 6;
    NAVAREA_WARNING         = 7;
    LOCAL_WARNING           = 8;
}

/**
 * The type of the message series identifier
 */
enum MCSeriesIdType {

    MSI = 1;
    NM = 2;
}

/**
 * A unique identifier for an MSI or NtM message
 */
message MCSeriesIdentifier {

    1: MCSeriesIdType mainType;
    2: text authority;
    3: int number;
    4: int year;
}

//**************************
//** Location
//**************************

/**
 * Defines the localizable attributes of MCPoint
 */
message MCPointDesc {

    1: text lang;
    2: text description;
}

/**
```

```
 * Defines a point.
 */
message MCPoint {

    1: double lat;
    2: double lon;
    3: int index;
    4: list<MCPointDesc> descs;
}

/**
 * Defines a location type
 */
enum MCLocationType {

    POINT       = 1;
    CIRCLE      = 2;
    POLYGON     = 3;
    POLYLINE    = 4;
}

/**
 * Defines the localizable attributes of MCLocation
 */
message MCLocationDesc {

    1: text lang;
    2: text description;
}

/**
 * Defines a location as either a point, a circle, a polygon or a polyline.
 */
message MCLocation {

    1: MCLocationType type;
    2: int radius;
    3: list<MCPoint> points;
    4: list<MCLocationDesc> descs;
}

//**************************
//** Area
//**************************

/**
 * Defines the localizable attributes of MCArea
 */
message MCAreaDesc {

    1: text lang;
    2: text name;
}

/**
 * Defines an area
 */
message MCArea {

    1: MCArea parent;
    3: list<MCAreaDesc> descs;
}

//**************************
//** Category
//**************************

/**
 * Defines the localizable attributes of MCCategory
 */
message MCCategoryDesc {

    1: text lang;
    2: text name;
}
```

```
/**
 * Defines a category
 */
message MCCategory {

    1: MCCategory parent;
    2: list<MCCategoryDesc> descs;
}

//***************************
//** Chart
//***************************

/**
 * Defines a chart
 */
message MCChart {

    1: text chartNumber;
    2: int internationalNumber;
}

//***************************
//** Reference
//***************************

/**
 * The type of a message reference
 */
enum MCReferenceType {
    REFERENCE       = 1;
    REPETITION      = 2;
    CANCELLATION    = 3;
    UPDATE          = 4;
}

/**
 * Encapsulates a message reference
 */
message MCReference {

    1: MCSeriesIdentifier seriesIdentifier;
    2: MCReferenceType type;
}

//***************************
//** Attachment
//***************************

/**
 * Defines an attachment
 */
message MCAttachment {

    1: text name;
    2: text path;
    3: text thumbnail;
}


//***************************
//** Message
//***************************

message MCMessageDesc {

    1: text title;
    2: text description;
    3: text otherCategories;
    4: text time;
    5: text vicinity;
    6: text note;
    7: text publication;
    8: text source;
}
```

```
/**
 * Encapsulates the message MSI-NM entity
 */
message MCMessage {

    1:  int id;
    2:  int version;
    3:  timestamp created;
    4:  timestamp updated;
    5:  MCSeriesIdentifier seriesIdentifier;
    6:  MCType type;
    7:  MCStatus status;
    8:  MCArea area;
    9:  list<MCCategory> categories;
    10: list<MCLocation> locations;
    11: list<MCChart> charts;
    12: text horizontalDatum;
    13: timestamp validFrom;
    14: timestamp validTo;
    15: list<MCReference> references;
    16: list<text> lightsListNumbers;
    17: boolean originalInformation;
    18: list<MCMessageDesc> descs;
    19: list<MCAttachment> attachments;
}
```

The MSDL for a specific MSI-NM System service that can be used to poll all published MSI and NM messages is reproduced below:

```
namespace dma.msinm;

import "dma/msinm/msinm-model.msdl";

/**
 * Service that broadcasts message updates
 */
broadcast MCMsiNmUpdatesBroadcast {

   1: MCMessage msg;
}

/**
 * Encapsulates a search result
 */
message MCSearchResult {
    1: list<MCMessage> messages;
    2: timestamp searchTime;
    3: timestamp lastUpdate;
    4: boolean unchanged;
    5: text error;
}

/**
 * Interface for querying MSI-NM messages
 */
endpoint MCMsiNmService {

    /**
     * Returns the list of active messages
     * @param lang the language
     * @return the list of active messages
     */
    MCSearchResult activeMessages(
        1: text lang
    );

    /**
     * Returns the list of active messages if there are any updates after the given timestamp
     * @param lang the language
     * @param date the threshold timestamp
     * @return the list of active messages or null if no updates after the given timestamp
```

```
     */
    MCSearchResult activeMessagesIfUpdates(
        1: text lang,
        2: timestamp date
    );


}
```