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MARINE RADIO SERVICES PRODUCT SPECIFICATION

IHO Publication S-123

Appendix B
Application Schema Documentation

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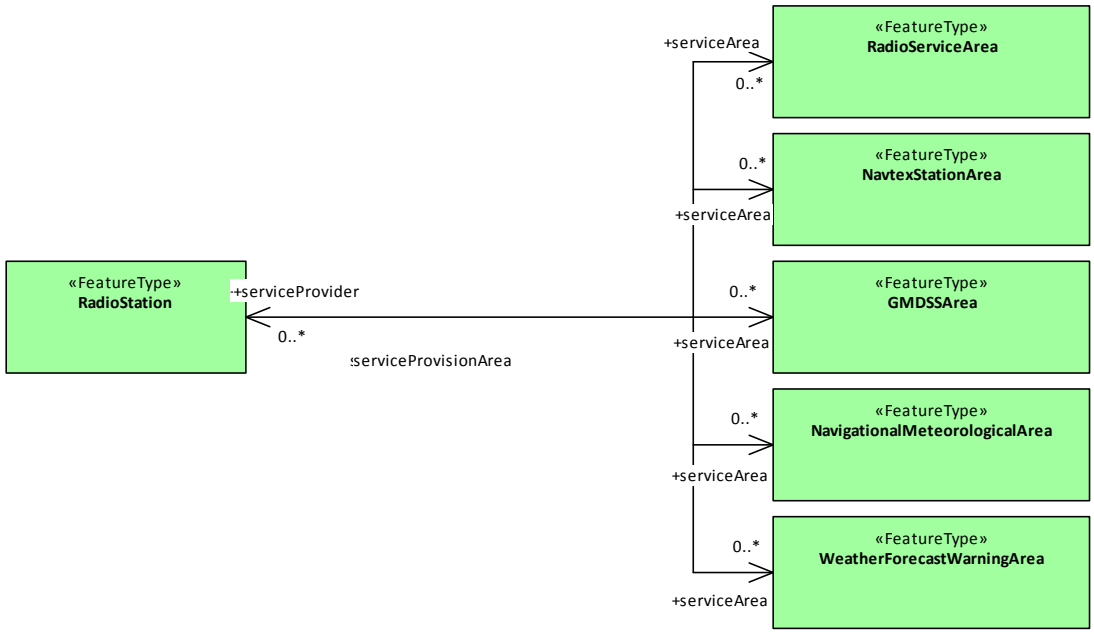

Figure 1 S-123 Service Providers and Areas

Diagram Notes:

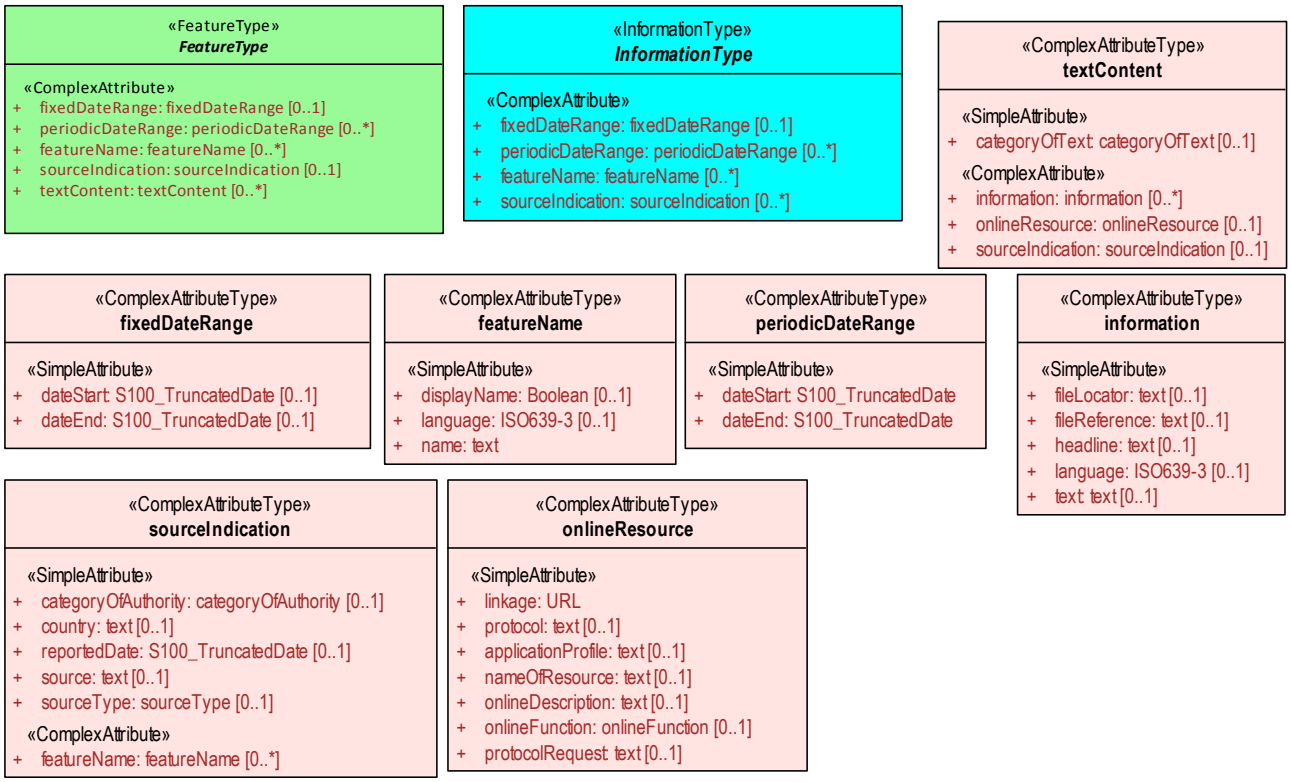

Figure 2 S-123 Root Classes

Diagram Notes:

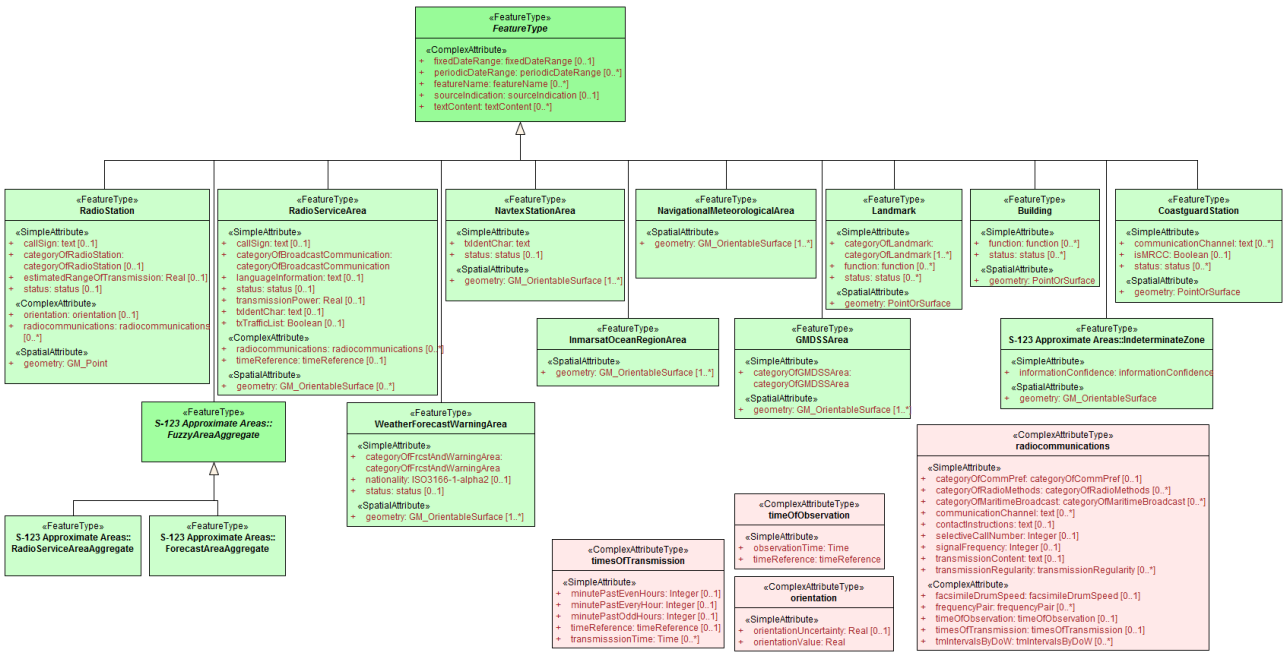

Figure 3 S123 FeatureTypes

Diagram Notes:

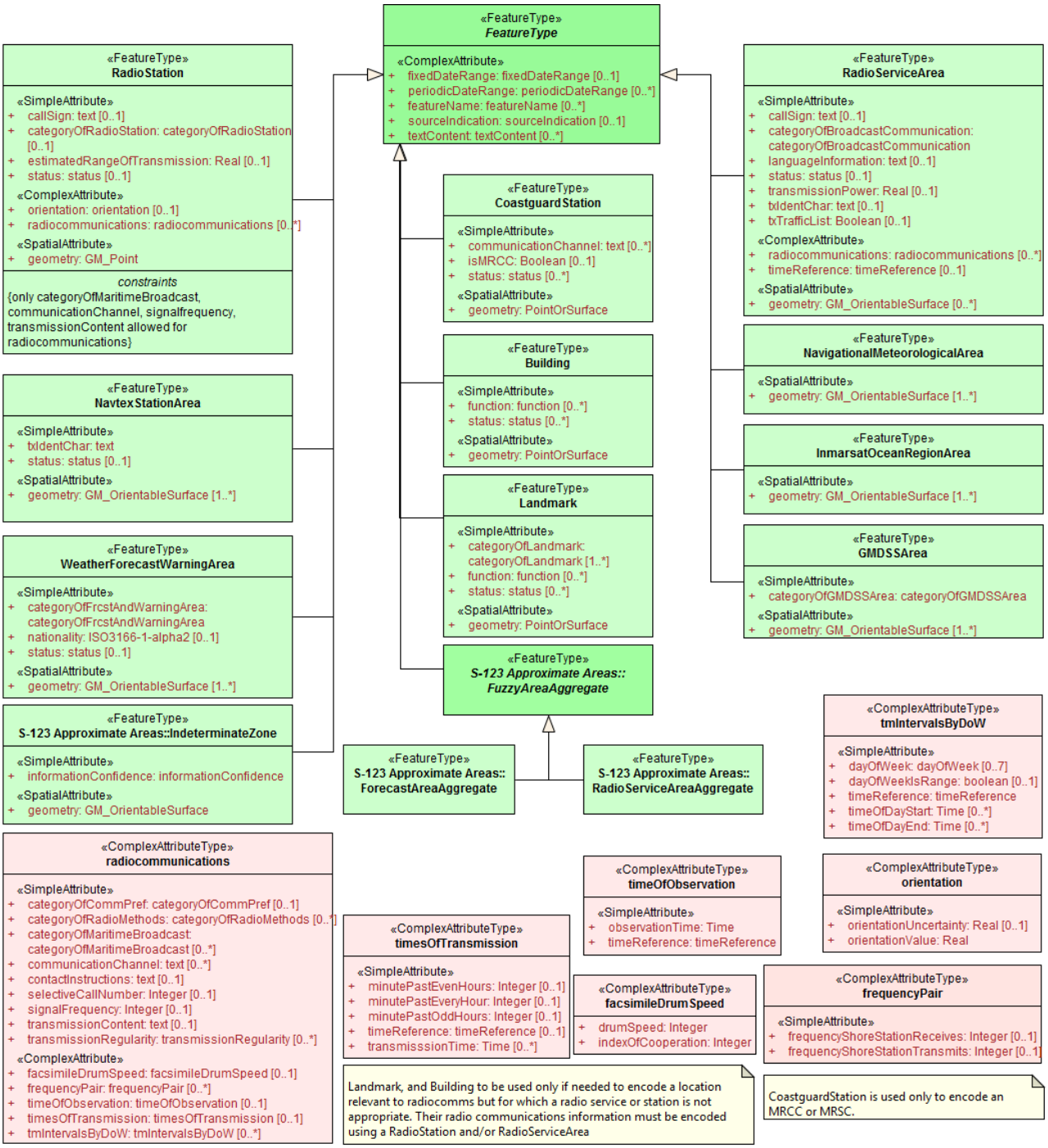

Figure 4 S123 FeatureTypes Vertical Layout

Diagram Notes:

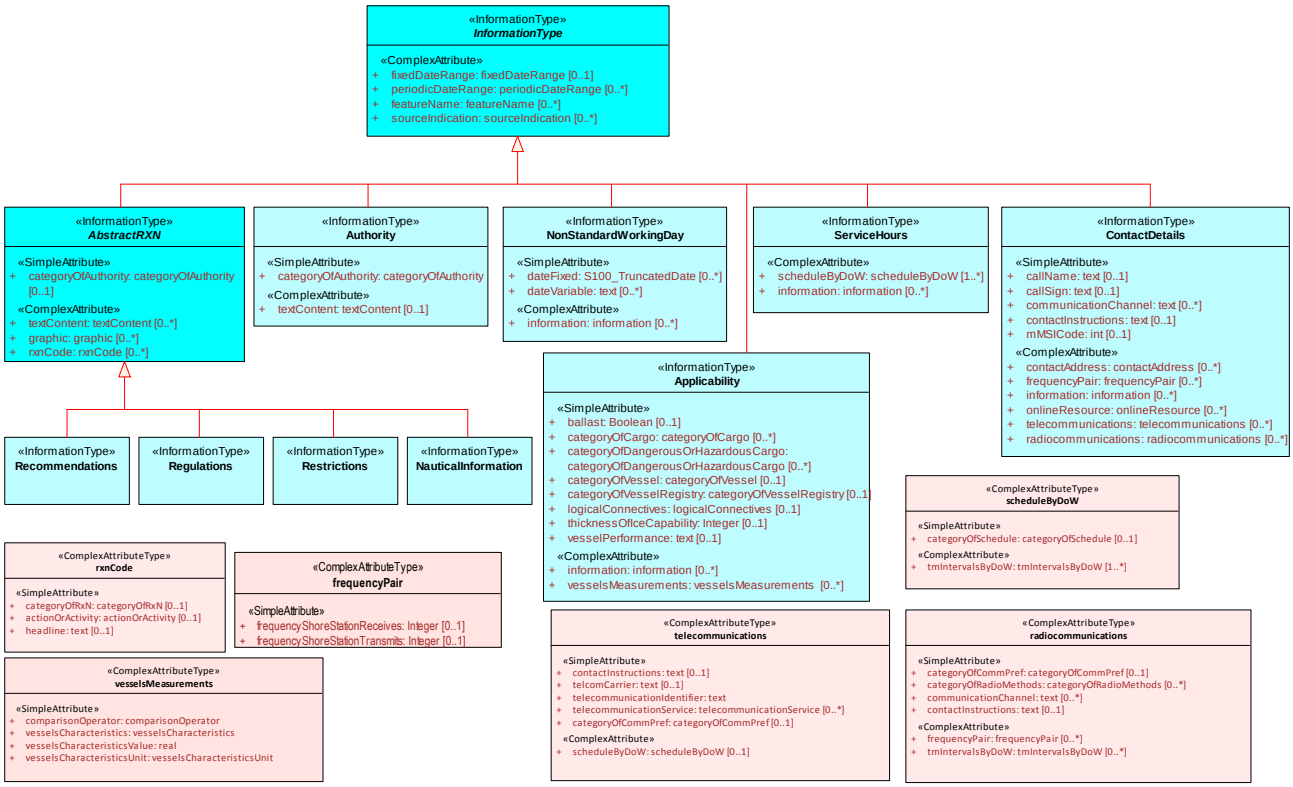

Figure 5 S123 InfoTypes

Diagram Notes: Note - Ship Report is not included in S-123

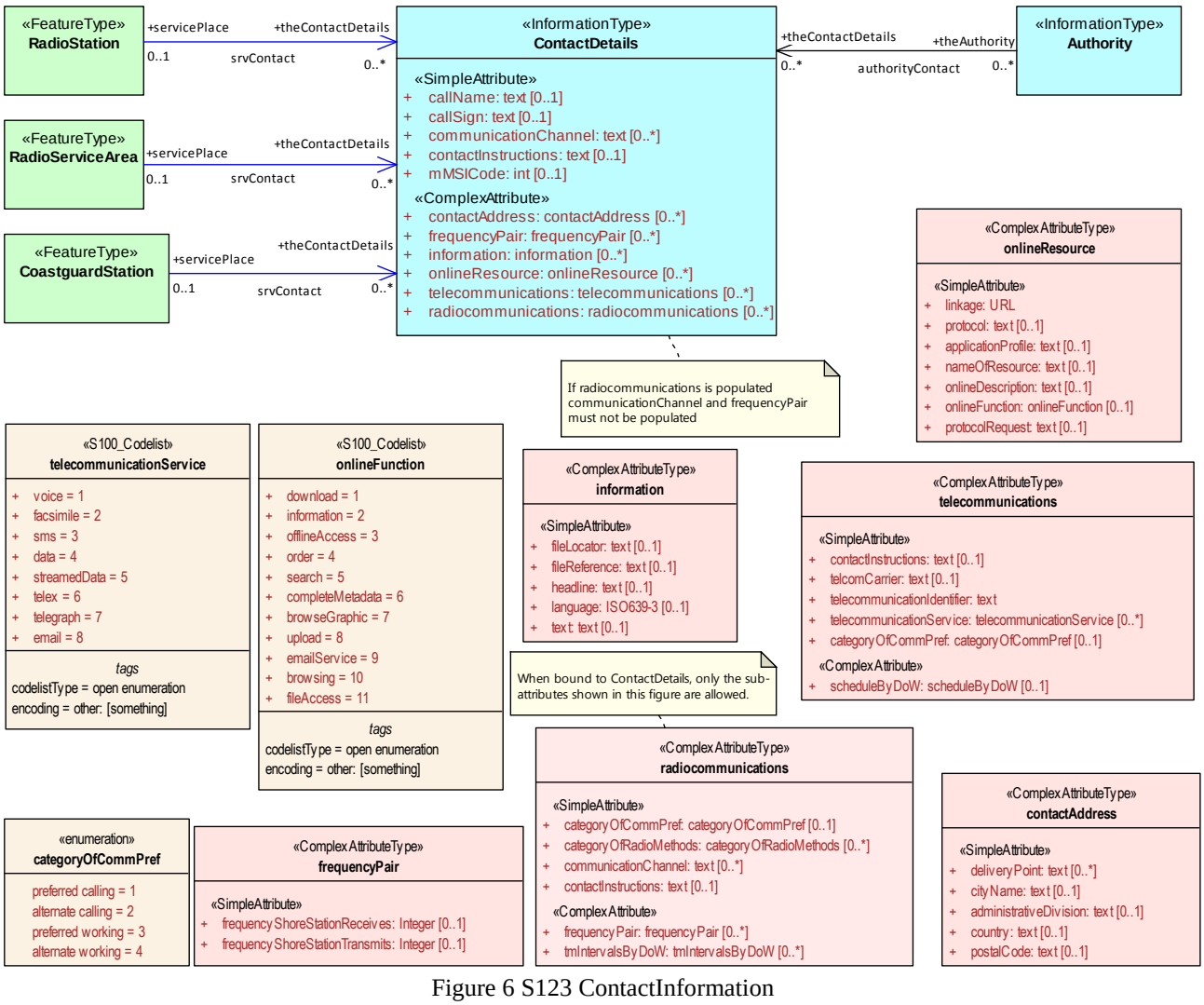

Figure 6 S123 ContactInformation

Diagram Notes: Overlaps the "Radio Service Features..." diagram, only this one focuses on Contact Details and the other on the radio service features.

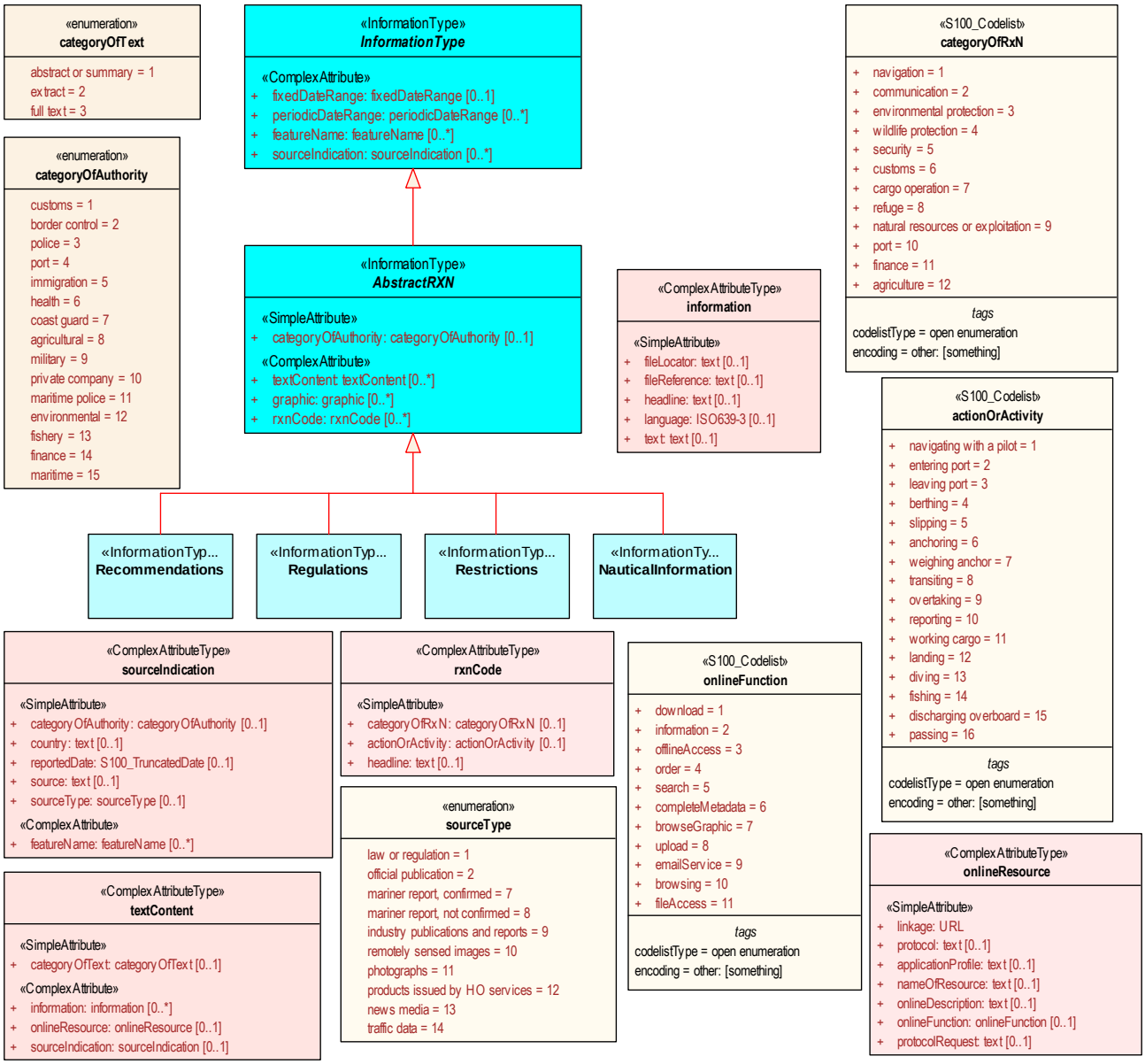

Figure 7 S123 RXNTypes

Diagram Notes:

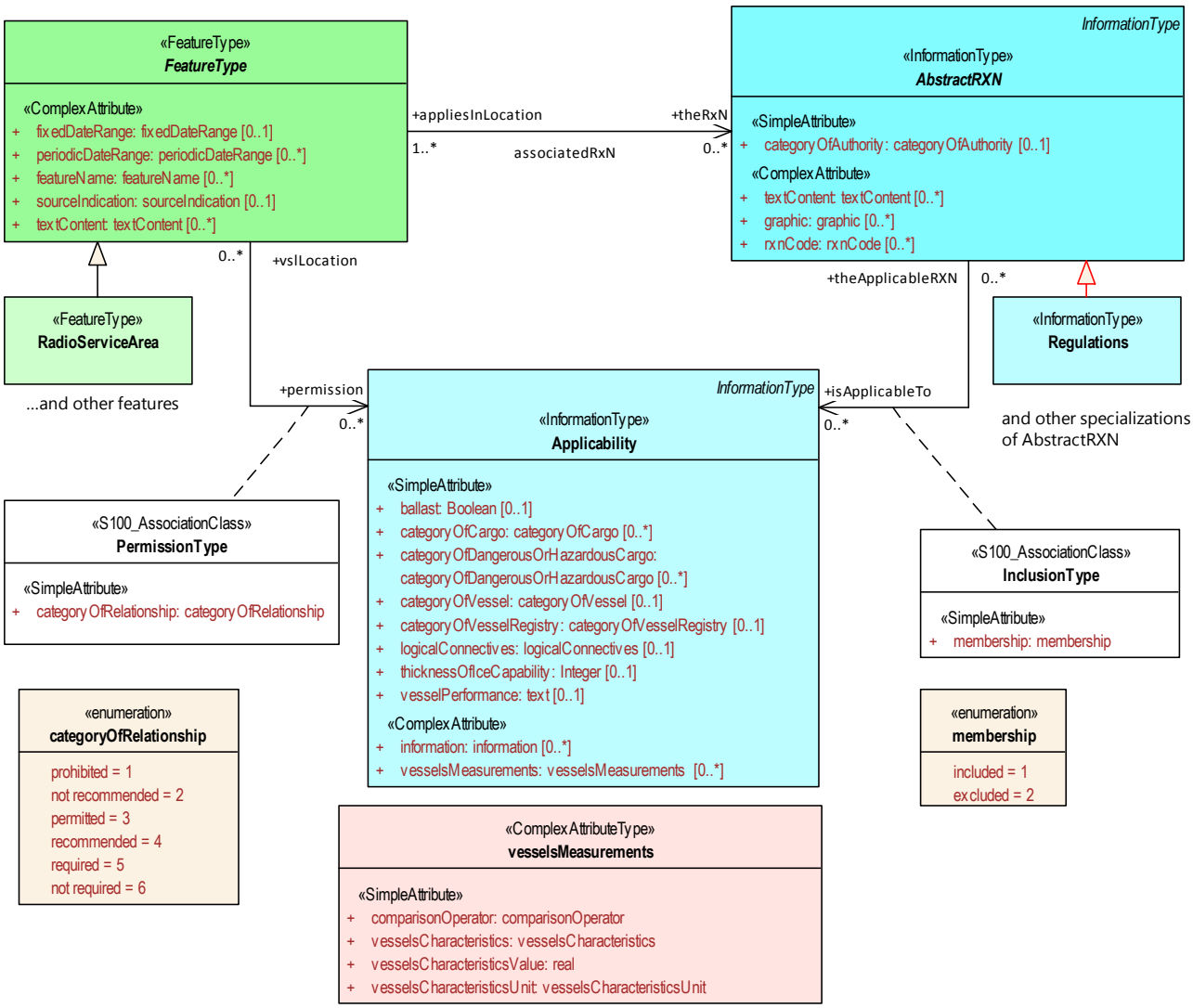

Figure 8 S123 ApplicabilityAssociations

Diagram Notes:

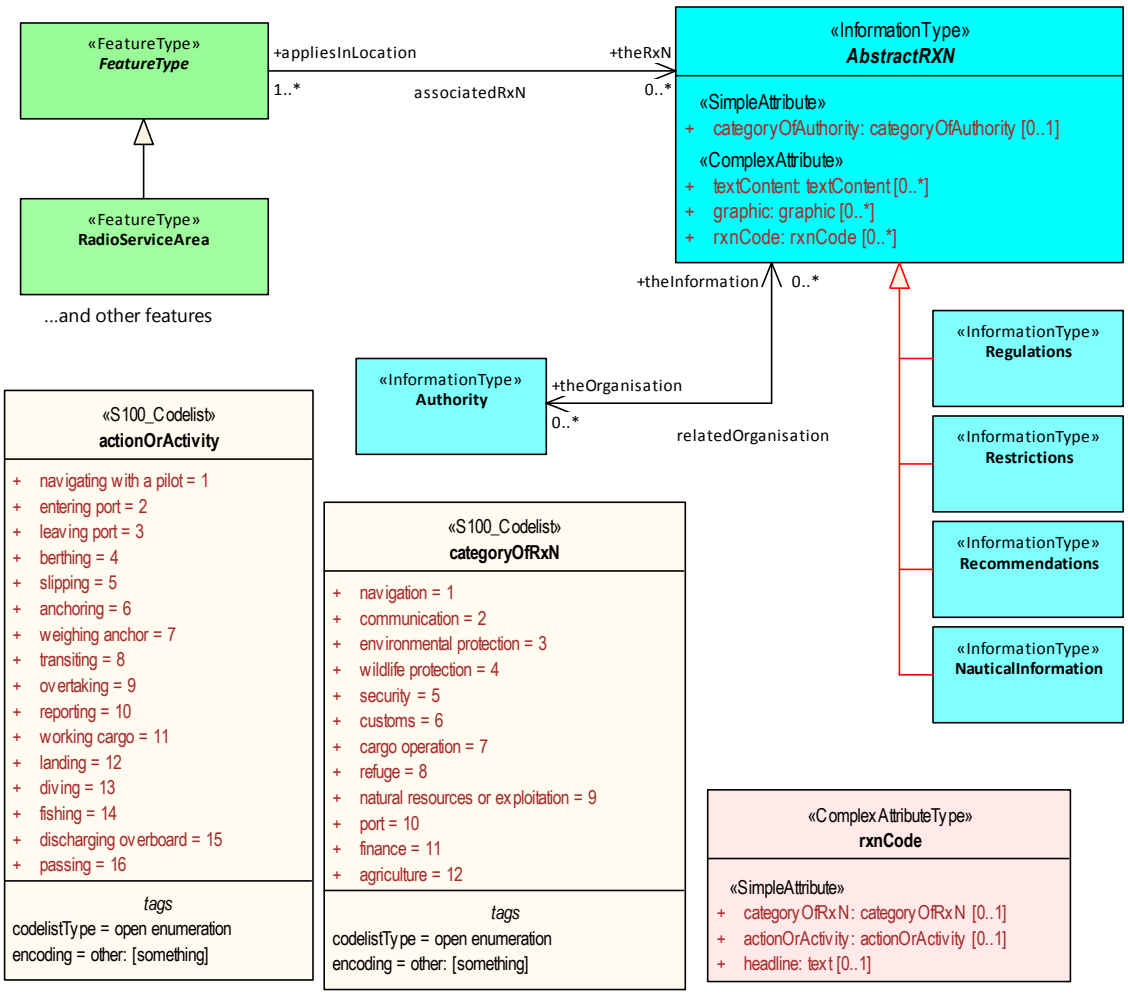

Figure 9 S123 RulesForFeatures

Diagram Notes:

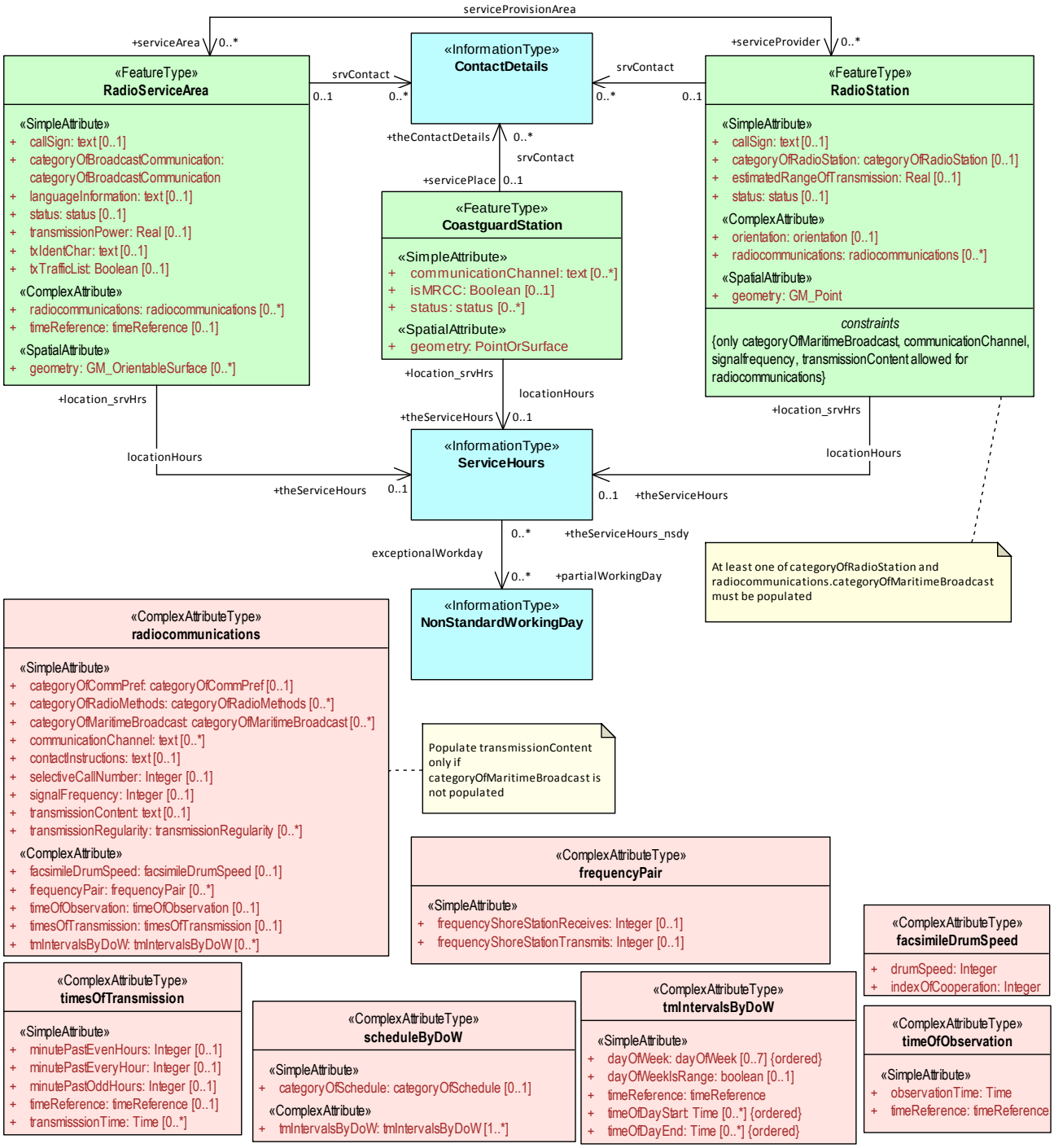

Figure 10 S123 Radio service features with contact information and service hours

Diagram Notes: Association
locationHours: {RadioStation, CoastguardStation, RadioServiceArea} -> ServiceHours
is XOR only when there is an aggregation/association which includes two or more of these geo feature classes

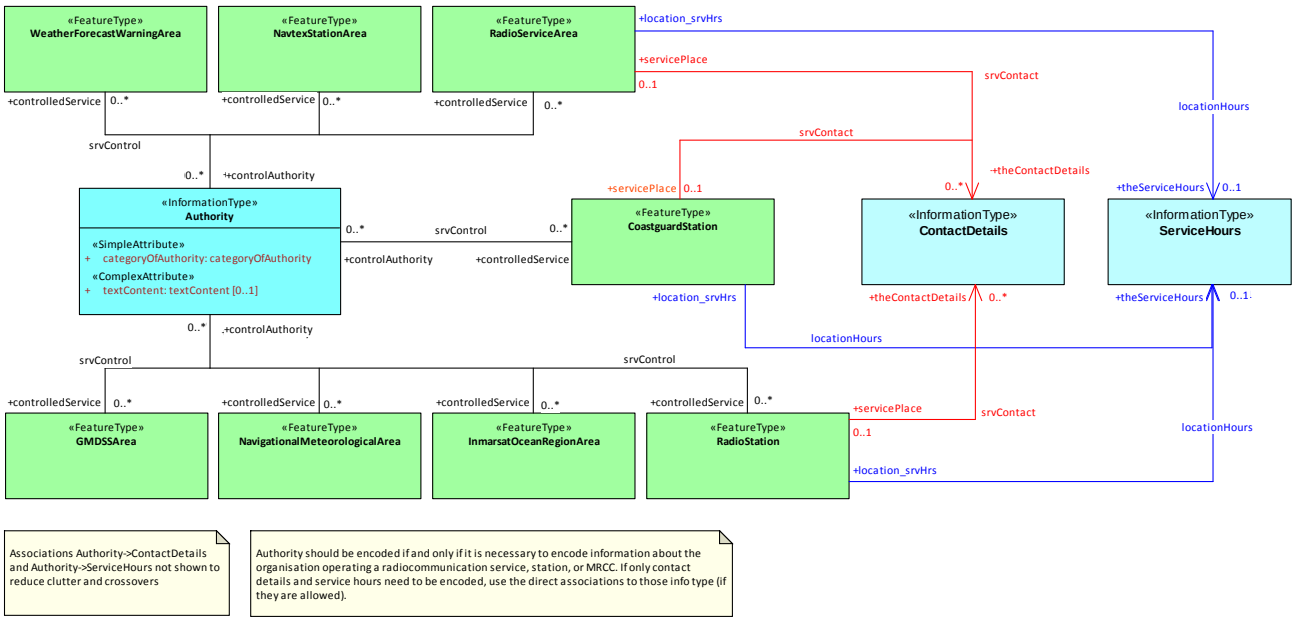

Figure 11 S-123 Service Authorities

Diagram Notes: Colors of associations are significant only for distinguishing between crossing links.

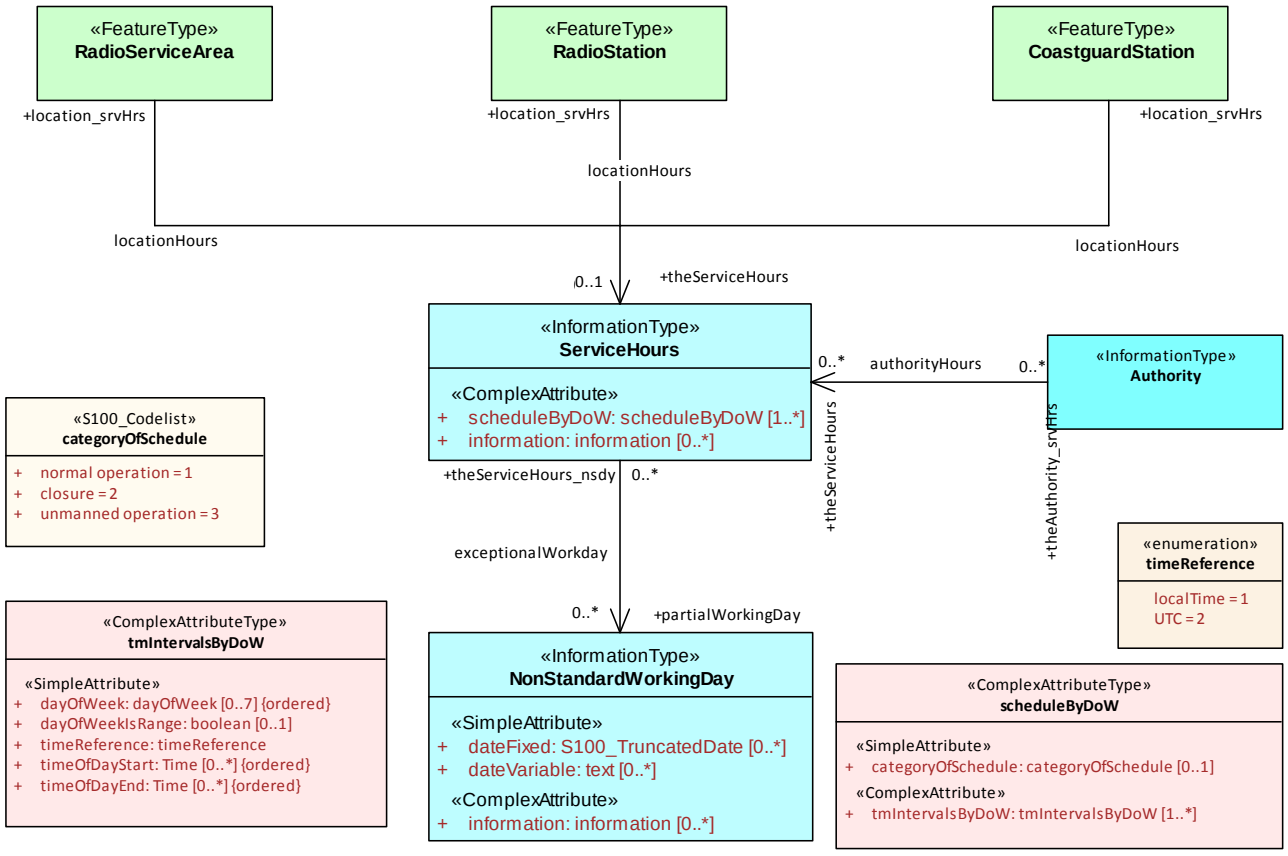

Figure 12 S123 ServiceWorkingTimes

Diagram Notes: Association
locationHours: {RadioStation, CoastguardStation, RadioServiceArea} -> ServiceHours
is XOR only when there is an aggregation/association which includes two or more of these geo feature classes

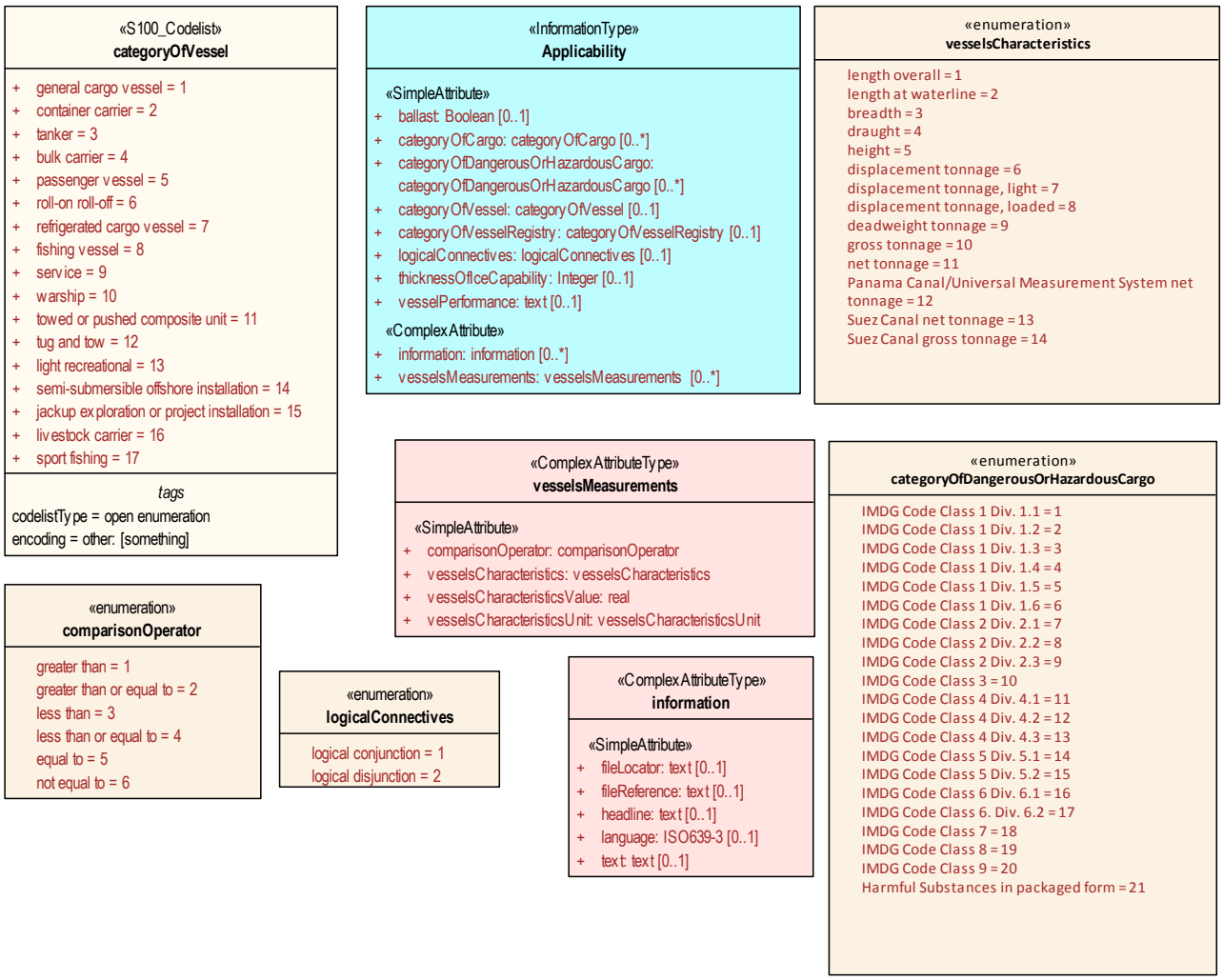

Figure 13 S123 ShipCharacteristicSubsets

Diagram Notes:

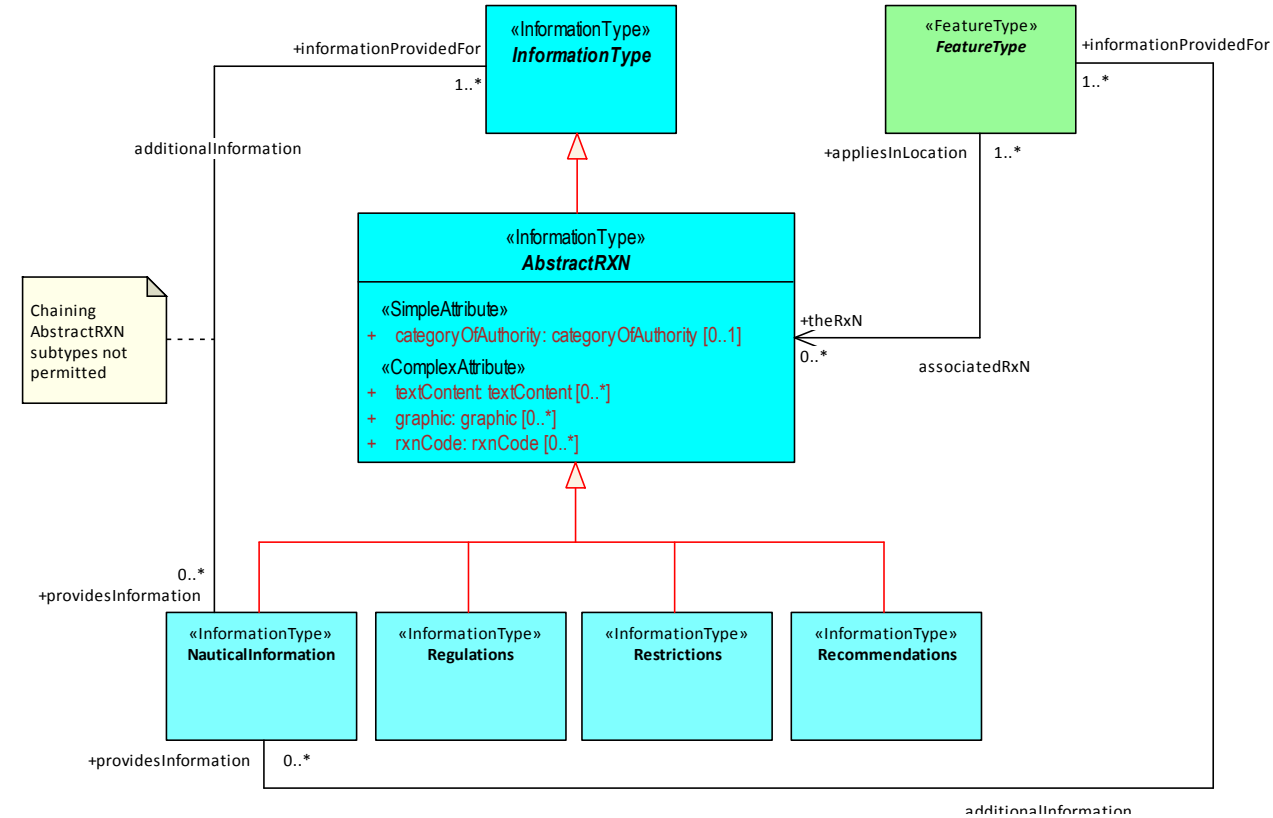

Figure 14 S-123 SupplementaryInformation

Diagram Notes:

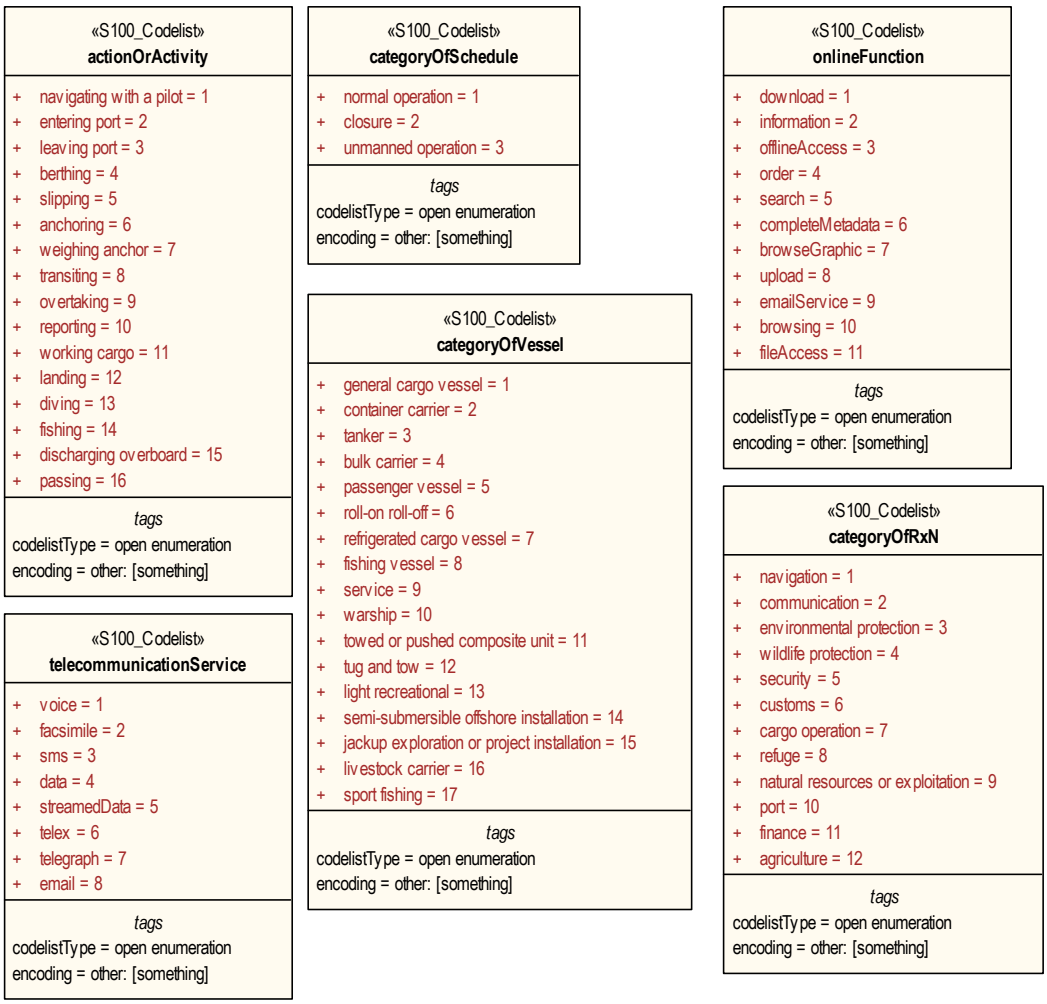

Figure 15 S-123 Codelists

Diagram Notes:

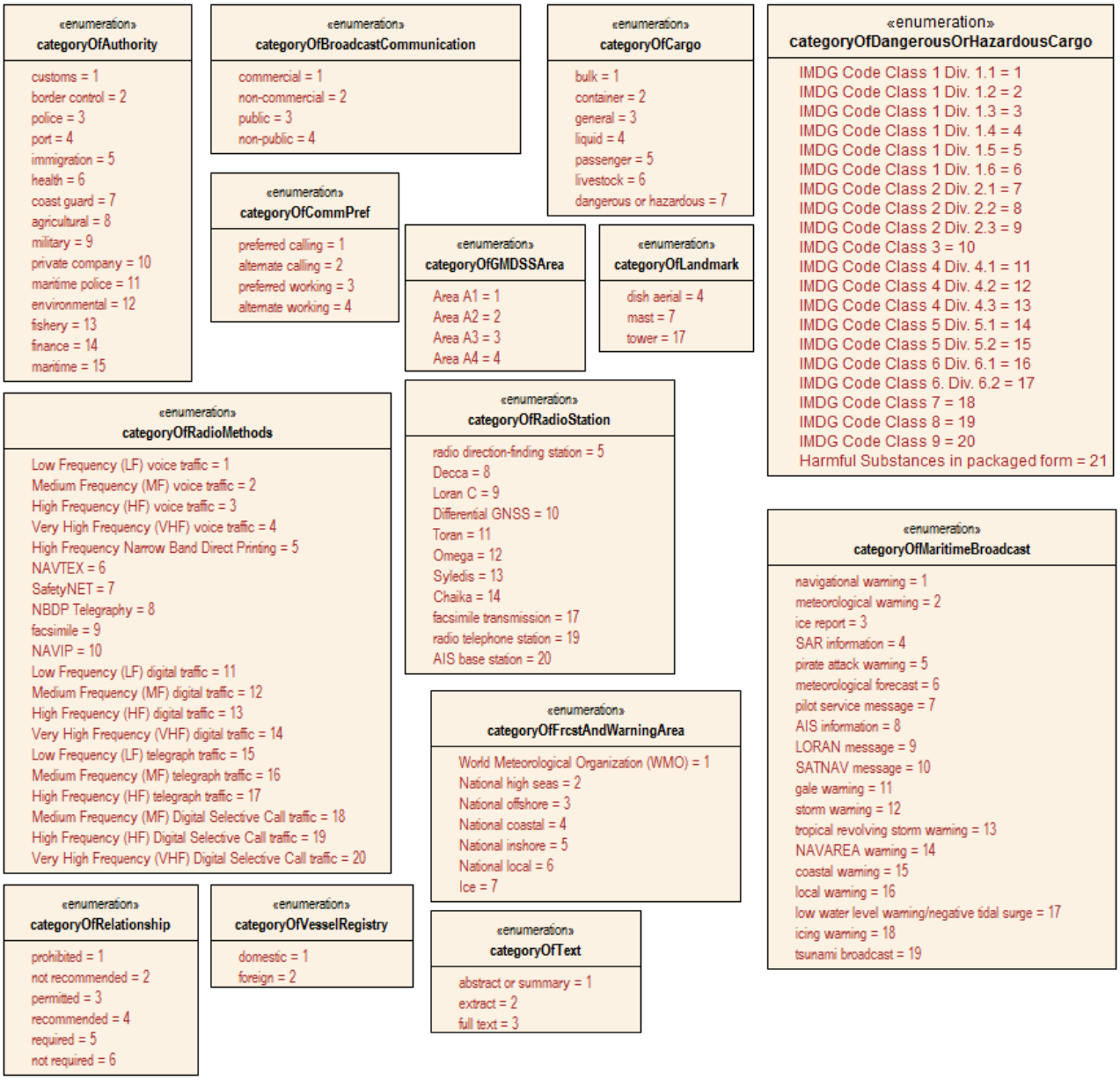

Figure 16 S123 Enumerations - Categories

Diagram Notes:

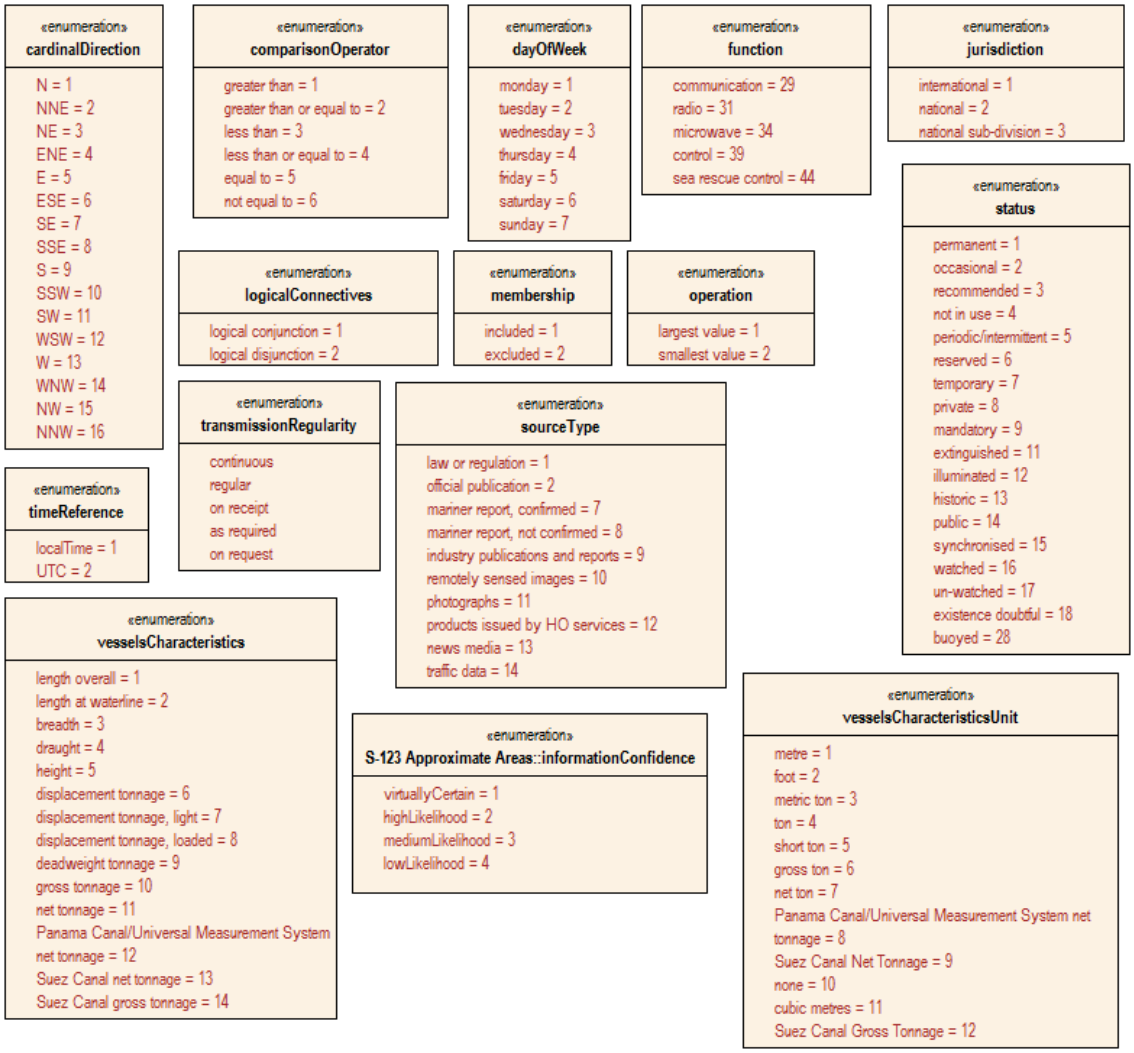

Figure 17 S123 Other Enumerations

Diagram Notes:

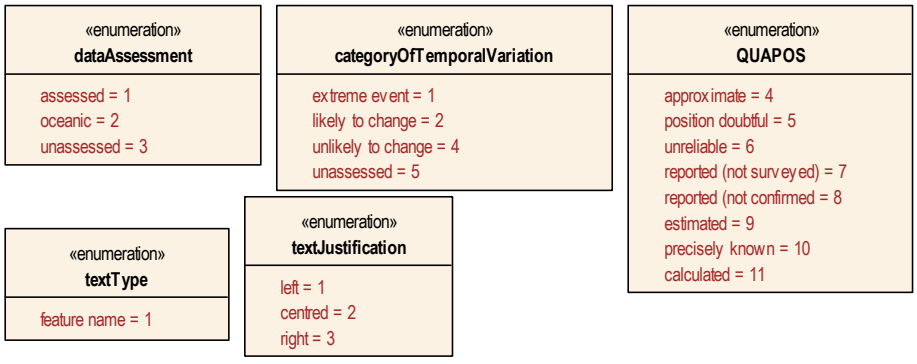

Figure 18 S-123 Carto and Meta Enumerations

Diagram Notes:

1.1 Features

1.1.1 FeatureType

Geographic feature **Super-type:**

Generalized feature type which carry all the common attributes

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.1.2 Inherited Attributes

1.1.1.3 Associations

Association name	*Source*	*Target*	*Notes*
associatedRxN *Association*	*Label:* FeatureType *Role:* appliesInLocation *Multiplicity:* 1..* Ordered: 0	*Label:* AbstractRXN *Role:* theRxN *Multiplicity:* 0..* Ordered: 0	
textAssociation *Association*	*Label:* FeatureType *Role:* identifies *Multiplicity:* 0..1 Ordered: 0	*Label:* TextPlacement *Role:* positions *Multiplicity:* 0..1 Ordered: 0	A feature association for the binding between a geo feature and the cartographically positioned location for text.
additionalInformation *Association*	*Label:* FeatureType *Role:* informationProvidedFor *Multiplicity:* 1..* Ordered: 0	*Label:* NauticalInformation *Role:* providesInformation *Multiplicity:* 0..* Ordered: 0	
PermissionType *AssociationClass*	*Label:* FeatureType *Role:* vslLocation *Multiplicity:* 0..* Ordered: 0	*Label:* Applicability *Role:* permission *Multiplicity:* 0..* Ordered: 0	

1.1.2 Building

Geographic feature **Super-type: FeatureType**

A free-standing self-supporting construction that is roofed, usually walled, and is intended for human occupancy (for example: a place of work or recreation) and/or habitation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010)
S-123 Note: Only buildings with functions relevant to radiocommunications are encoded in S-123 datasets.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.2.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	function	[0..*]	function	29: communication 31: radio 34: microwave 39: control 44: sea rescue control
Attribute	status	[0..*]	status	
Spatial Attribute	geometry	[1]	PointOrSurface	

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*

1.1.2.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.2.3 Associations

1.1.3 CoastguardStation

Geographic feature **Super-type: FeatureType**

A station at which a visual/radio/radar marine watch is kept either continuously or at certain times only.
S-123 Note: Only those instances concerned to radio communications are encoded in S-123 datasets.

Constraint: MRCC information/text = "Maritime Rescue and Coordination Centre"

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.3.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	communicationChannel	[0..*]	text	
Attribute	isMRCC	[0..1]	Boolean	In S-123 datasets, only MRCC or MRSC coastguard stations are encoded, so the value of this attribute should be TRUE for all instances in an S-123 dataset.
Attribute	status	[0..*]	status	1: permanent 4: not in use 5: periodic/intermittent 16: watched 17: un-watched
Spatial Attribute	geometry	[1]	PointOrSurface	

1.1.3.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.3.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* CoastguardStation *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it

Association name	*Source*	*Target*	*Notes*
srvContact *Association*	*Label:* CoastguardStation *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	
locationHours *Association*	*Label:* CoastguardStation *Role:* location_srvHrs *Multiplicity:* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..1 Ordered: 0	

1.1.4 GMDSSArea

Geographic feature **Super-type: FeatureType**

An area defined for a global communications service based upon automated systems, both satellite based and terrestrial, to provide distress alerting and promulgation of maritime safety information for mariners. (Adapted IHO Dictionary, S-32, 5th Edition, 2048)

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.4.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfGMDSSArea	[1]	categoryOfGMDSSArea	
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	

1.1.4.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.4.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* GMDSSArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* GMDSSArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	

1.1.5 InmarsatOceanRegionArea

Geographic feature **Super-type: FeatureType**

The ocean region of the earth's surface, within which a station can obtain line-of-sight communication, with an Inmarsat satellite.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.5.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	

1.1.5.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.5.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* InmarsatOceanRegionArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it

1.1.6 Landmark

Geographic feature **Super-type: FeatureType**

Any prominent object on land which can be used in determining a location or a direction. (IHO Dictionary – S-32).
S-123 Note: Only features relevant to radio communications are encoded e.g., radio towers or radio masts. If the feature can be encoded as a radio station at the same location, a coincident Landmark must not be encoded.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.6.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfLandmark	[1..*]	categoryOfLandmark	
Attribute	function	[0..*]	function	
Attribute	status	[0..*]	status	
Spatial Attribute	geometry	[1]	PointOrSurface	

1.1.6.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.6.3 Associations

1.1.7 NavigationalMeteorologicalArea

Geographic feature **Super-type: FeatureType**

The geographic areas in which various governments are responsible for navigation and weather warnings.
Remarks: The roman number of NAV/METAREA is to be coded by using the feature name attribute. NAVTEX transmitting station identification characters are allocated within the same areas.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.7.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	

1.1.7.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.7.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* NavigationalMeteorologicalArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* NavigationalMeteorologicalArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	

1.1.8 NavtexStationArea

Geographic feature **Super-type: FeatureType**

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

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.8.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	txIdentChar	[1]	text	The NAVTEX transmitter identification character is a single unique letter, which is allocated to each transmitter. It is used to identify the broadcasts, which are to be accepted by the receiver, those which are to be rejected, and the time slot for the transmission. Remarks: The transmitter identification character should be indicated by a single character (A-Z)

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	status	[0..1]	status	
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	

1.1.8.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.8.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* NavtexStationArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* NavtexStationArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	Association linking the location from which a service is provided and the area(s) served.

1.1.9 RadioServiceArea

Geographic feature **Super-type: FeatureType**

The area where a radio service can be obtained and the characteristics of the radio transmission.
Remarks: The objects RDOSTA; RADSTA are used to encode the point of transmission of the signal.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.9.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	callSign	[0..1]	text	
Attribute	categoryOfBroadcastCommunication	[1]	categoryOfBroadcastCommunication	
Attribute	languageInformation	[0..1]	text	A description of the languages, alphabets and scripts in use.
Complex Attribute	radiocommunications	[0..*]	radiocommunications	
Attribute	status	[0..1]	status	
Complex Attribute	timeReference	[0..1]	timeReference	
Attribute	transmissionPower	[0..1]	Real	The maximum power the radio service uses (or is authorized to use) for radio transmission. Remark: The calculation of the power depends on the type of signal. The value encoded must be the actual transmission power, if this is known to

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
				be different from the authorized transmission power. Unit: watt; Resolution: 0.1 Reference: 47 CFR 80.215 (19 April 2017), adapted.
Attribute	txIdentChar	[0..1]	text	The NAVTEX transmitter identification character is a single unique letter, which is allocated to each transmitter. It is used to identify the broadcasts, which are to be accepted by the receiver, those which are to be rejected, and the time slot for the transmission. Remarks: The transmitter identification character should be indicated by a single character (A-Z)
Attribute	txTrafficList	[0..1]	Boolean	Describes whether a station transmits traffic lists. Remarks: • True: The radio station transmits traffic lists. • False: The radio station does not transmit traffic lists.
Spatial Attribute	geometry	[0..*]	GM_OrientableSurface	

1.1.9.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.9.3 Associations

Association name	*Source*	*Target*	*Notes*
locationHours *Association*	*Label:* RadioServiceArea *Role:* location_srvHrs *Multiplicity:* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..1 Ordered: 0	Service hours for a physical facility, area, or location-based service
srvControl *Association*	*Label:* RadioServiceArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvContact *Association*	*Label:* RadioServiceArea *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	Contact details for a service or facility
coreAggregation *Aggregation*	*Label:* RadioServiceArea *Role:* consistsOf *Multiplicity:* Ordered: 0	*Label:* RadioServiceAreaAggregate *Role:* componentOf *Multiplicity:* 0..1	A feature association for the binding between an aggregation feature that describes areas of varying

Association name	*Source*	*Target*	*Notes*
		Ordered: 0	uncertainty about a service or phenomenon and a geographic feature describing the service or phenomenon. (IHO).
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* RadioServiceArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	Association linking the location from which a service is provided and the area(s) served. Remark: This is a feature association linking a provider described by a geographic feature with the area served (another geographic feature). Contrast to srvControl, which is an information association linking the area served to an information object describing the provider.

1.1.10 RadioStation

Geographic feature **Super-type: FeatureType**

A place equipped to transmit radio waves.
Remarks: Such a station may be either stationary or mobile, and may also be provided with a radio receiver. In British terminology, also called 'w/t station'. The transmission of a radio station may serve to provide mariners with a line of position (IHO Chart Specifications, M-4). The object 'radio station' is used to encode the point of transmission of the signal.
S-123 remarks: (1) The area in which the radio service can be obtained is described by an RDOSVC object. (2) The S-123 definition differs from the 2016 S-101 definition by omitting the optional attribute **communicationChannel** (bound to the NPUBs domain complex attribute **radioStationCommunicationDescription** instead). The NPUBs domain feature also binds attribute **orientation** to RadioStation.

Constraint: only categoryOfMaritimeBroadcast, communicationChannel, signalfrequency, transmissionContent allowed for radiocommunications

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.10.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	callSign	[0..1]	text	
Attribute	categoryOfRadioStation	[0..1]	categoryOfRadioStation	
Attribute	estimatedRangeOfTransmission	[0..1]	Real	The estimated range of a non-optical electromagnetic transmission.
Complex Attribute	orientation	[0..1]	orientation	
Complex Attribute	radiocommunications	[0..*]	radiocommunications	Only sub-attributes categoryOfMaritimeBroadcast, signalFrequency, communicationChannel, transmissionContent allowed when bound to RadioStation
Spatial Attribute	geometry	[1]	GM_Point	

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	status	[0..1]	status	

1.1.10.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.10.3 Associations

Association name	*Source*	*Target*	*Notes*
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* NavigationalMeteorologicalArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* WeatherForecastWarningArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	
locationHours *Association*	*Label:* RadioStation *Role:* location_srvHrs *Multiplicity:* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..1 Ordered: 0	
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* RadioServiceArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	Association linking the location from which a service is provided and the area(s) served. Remark: This is a feature association linking a provider described by a geographic feature with the area served (another geographic feature). Contrast to srvControl, which is an information association linking the area served to an information object describing the provider.
srvControl *Association*	*Label:* RadioStation *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvContact *Association*	*Label:* RadioStation *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	Contact details for a service or facility

Association name	*Source*	*Target*	*Notes*
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* GMDSSArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider *Multiplicity:* 0..* Ordered: 0	*Label:* NavtexStationArea *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	Association linking the location from which a service is provided and the area(s) served.

1.1.11 WeatherForecastWarningArea

Geographic feature **Super-type: FeatureType**

An area for which weather forecasts and warnings are provided for specified periods.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

1.1.11.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfFrcstAndWarningArea	[1]	categoryOfFrcstAndWarningArea	
Attribute	nationality	[0..1]	ISO3166-1-alpha2	
Attribute	status	[0..1]	status	
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	

1.1.11.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

1.1.11.3 Associations

Association name	*Source*	*Target*	*Notes*
srvControl *Association*	*Label:* WeatherForecastWarningArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
coreAggregation *Aggregation*	*Label:* WeatherForecastWarningArea *Role:* consistsOf *Multiplicity:* Ordered: 0	*Label:* ForecastAreaAggregate *Role:* componentOf *Multiplicity:* 0..1 Ordered: 0	A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and a geographic feature describing the service or phenomenon. (IHO).
serviceProvisionArea *Association*	*Label:* RadioStation *Role:* serviceProvider	*Label:* WeatherForecastWarningAre	

Association name	*Source*	*Target*	*Notes*
	Multiplicity: 0..* Ordered: 0	a *Role:* serviceArea *Multiplicity:* 0..* Ordered: 0	

1.2 Information Types

1.2.1 InformationType

Information Type **Super-type:**

Generalized information type which carry all the common attributes

1.2.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.1.2 Inherited Attributes

1.2.1.3 Associations

Association name	*Source*	*Target*	*Notes*
additionalInformation *Association*	*Label:* InformationType *Role:* informationProvidedFor *Multiplicity:* 1..* Ordered: 0	*Label:* NauticalInformation *Role:* providesInformation *Multiplicity:* 0..* Ordered: 0	

1.2.2 AbstractRXN

Information Type **Super-type: InformationType**

An abstract superclass for information types that encode rules, recommendations, and general information in text or graphic form.
Remark: Subtypes of AbstractRxN carry the same attributes, but differ in the nature of information they encode. There are currently four such subtypes: Regulations, Restrictions, Recommendations, and NauticalInformation.

1.2.2.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Complex Attribute	textContent	[0..*]	textContent	
Complex Attribute	graphic	[0..*]	graphic	
Complex Attribute	rxnCode	[0..*]	rxnCode	

1.2.2.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.2.3 Associations

Association name	*Source*	*Target*	*Notes*
InclusionType *AssociationClass*	*Label:* AbstractRXN *Role:* theApplicableRXN *Multiplicity:* 0..* Ordered: 0	*Label:* Applicability *Role:* isApplicableTo *Multiplicity:* 0..* Ordered: 0	
relatedOrganisation *Association*	*Label:* Authority *Role:* theOrganisation *Multiplicity:* 0..* Ordered: 0	*Label:* AbstractRXN *Role:* theInformation *Multiplicity:* 0..* Ordered: 0	
associatedRxN *Association*	*Label:* FeatureType *Role:* appliesInLocation *Multiplicity:* 1..* Ordered: 0	*Label:* AbstractRXN *Role:* theRxN *Multiplicity:* 0..* Ordered: 0	

1.2.3 Applicability

Information Type **Super-type: InformationType**

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

1.2.3.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	ballast	[0..1]	Boolean	Whether the vessel is in ballast. Remarks: True: Vessel is predominantly empty of cargo and stabilised with the use of ballast water False: Vessel is carrying cargo and is not ballasted.
Attribute	categoryOfCargo	[0..*]	categoryOfCargo	
Attribute	categoryOfDangerousOrHazardousCargo	[0..*]	categoryOfDangerousOrHazardousCargo	
Attribute	categoryOfVessel	[0..1]	categoryOfVessel	
Attribute	categoryOfVesselRegistry	[0..1]	categoryOfVesselRegistry	
Attribute	logicalConnectives	[0..1]	logicalConnectives	
Attribute	thicknessOfIceCapability	[0..1]	Integer	The thickness of ice that the ship can safely transit Unit: centimetres Resolution: 1 Format: xxx Example: 080 for ice which has a thickness of 80 cm

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	information	[0..*]	information	
Attribute	vesselPerformance	[0..1]	text	A description of the required handling characteristics of a vessel including hull design, main and auxilliary machinery, cargo handling equipment, navigation equipment and manoeuvring behaviour.
Complex Attribute	vesselsMeasurements	[0..*]	vesselsMeasurements	

1.2.3.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.3.3 Associations

Association name	*Source*	*Target*	*Notes*
InclusionType *AssociationClass*	*Label:* AbstractRXN *Role:* theApplicableRXN *Multiplicity:* 0..* Ordered: 0	*Label:* Applicability *Role:* isApplicableTo *Multiplicity:* 0..* Ordered: 0	
reportReqmt *Association*	*Label:* ShipReport *Role:* theShipReport *Multiplicity:* 0..* Ordered: 0	*Label:* Applicability *Role:* mustBeFiledBy *Multiplicity:* 0..* Ordered: 0	
PermissionType *AssociationClass*	*Label:* FeatureType *Role:* vslLocation *Multiplicity:* 0..* Ordered: 0	*Label:* Applicability *Role:* permission *Multiplicity:* 0..* Ordered: 0	

1.2.4 Authority

Information Type **Super-type: InformationType**

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

1.2.4.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[1]	categoryOfAuthority	
Complex Attribute	textContent	[0..1]	textContent	

1.2.4.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.4.3 Associations

Association name	*Source*	*Target*	*Notes*
authorityHours *Association*	*Label:* Authority *Role:* theAuthority_srvHrs *Multiplicity:* 0..* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..* Ordered: 0	Service hours for an authority
relatedOrganisation *Association*	*Label:* Authority *Role:* theOrganisation *Multiplicity:* 0..* Ordered: 0	*Label:* AbstractRXN *Role:* theInformation *Multiplicity:* 0..* Ordered: 0	
authorityContact *Association*	*Label:* Authority *Role:* theAuthority *Multiplicity:* 0..* Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	
srvControl *Association*	*Label:* RadioServiceArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* CoastguardStation *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* NavigationalMeteorologicalArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* WeatherForecastWarningArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* NavtexStationArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* RadioStation *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* GMDSSArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it
srvControl *Association*	*Label:* InmarsatOceanRegionArea *Role:* controlledService *Multiplicity:* 0..* Ordered: 0	*Label:* Authority *Role:* controlAuthority *Multiplicity:* 0..* Ordered: 0	Association between a geographically located service and the organisation that controls it

Association name	*Source*	*Target*	*Notes*

1.2.5 ContactDetails

Information Type **Super-type: InformationType**

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

1.2.5.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	callName	[0..1]	text	The designated call name of a station, e.g. radio station, radar station, pilot. This is the name used when calling a radio station by radio i.e. "Singapore Pilots".
Attribute	callSign	[0..1]	text	The designated call-sign of a radio station.
Attribute	communicationChannel	[0..*]	text	
Complex Attribute	contactAddress	[0..*]	contactAddress	
Complex Attribute	frequencyPair	[0..*]	frequencyPair	
Attribute	contactInstructions	[0..1]	text	supplemental instructions on how or when to contact the individual, organisation, or service
Complex Attribute	information	[0..*]	information	
Attribute	mMSICode	[0..1]	int	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.
Complex Attribute	onlineResource	[0..*]	onlineResource	Information about online sources from which a resource or data can be obtained (ISO 19115, adapted)
Complex Attribute	telecommunications	[0..*]	telecommunications	information for contact by means of a telecommunications service. Distinctions: emailAddress, internetAddress, callName, callSign, COMCHA
Complex Attribute	radiocommunications	[0..*]	radiocommunications	When bound to ContactDetails, only the listed sub-attributes may be used: • communicationChannel • contactinstructions • frequencypair • categoryOfChannelOrFrequencyPr

Role Name	Name	Multiplicity	Data type	Description / Remarks
				eference • categoryOfRadioMethods • tmIntervalsByDoW

1.2.5.2 Inherited Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.5.3 Associations

Association name	Source	Target	Notes
srvContact *Association*	*Label:* CoastguardStation *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	
srvContact *Association*	*Label:* RadioServiceArea *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	Contact details for a service or facility
srvContact *Association*	*Label:* RadioStation *Role:* servicePlace *Multiplicity:* 0..1 Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	Contact details for a service or facility
authorityContact *Association*	*Label:* Authority *Role:* theAuthority *Multiplicity:* 0..* Ordered: 0	*Label:* ContactDetails *Role:* theContactDetails *Multiplicity:* 0..* Ordered: 0	

1.2.6 NauticalInformation

Information Type **Super-type: AbstractRXN**

Nautical information about a related area or facility.
Constraint: If **Regulations.textContent** is populated, there cannot be **textualDescription** or **information** attributes directly bound to the **Regulations**.. A similar constraint applies to the information types **Recommendations**, **Restrictions**, and **NauticalInformation**.

1.2.6.1 Attributes

1.2.6.2 Inherited Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Complex Attribute	graphic	[0..*]	graphic	
Complex Attribute	rxnCode	[0..*]	rxnCode	
Complex Attribute	textContent	[0..*]	textContent	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.6.3 Associations

Association name	*Source*	*Target*	*Notes*
additionalInformation *Association*	*Label:* InformationType *Role:* informationProvidedFor *Multiplicity:* 1..* Ordered: 0	*Label:* NauticalInformation *Role:* providesInformation *Multiplicity:* 0..* Ordered: 0	
additionalInformation *Association*	*Label:* FeatureType *Role:* informationProvidedFor *Multiplicity:* 1..* Ordered: 0	*Label:* NauticalInformation *Role:* providesInformation *Multiplicity:* 0..* Ordered: 0	

1.2.7 NonStandardWorkingDay

Information Type **Super-type: InformationType**

Days when many services are not available. Often days of festivity or recreation when normal working hours are limited, esp. a national or religious festival, etc.

1.2.7.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	dateFixed	[0..*]	S100_TruncatedDate	The date when a festival or national holiday recurs on the same day each year in the Gregorian calendar.
Attribute	dateVariable	[0..*]	text	A day which is not fixed in the Gregorian calendar. Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday.
Complex Attribute	information	[0..*]	information	

1.2.7.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.7.3 Associations

Association name	*Source*	*Target*	*Notes*
exceptionalWorkday *Association*	*Label:* ServiceHours *Role:* theServiceHours_nsdy *Multiplicity:* 0..* Ordered: 0	*Label:* NonStandardWorkingDay *Role:* partialWorkingDay *Multiplicity:* 0..* Ordered: 0	

1.2.8 Recommendations

Information Type **Super-type: AbstractRXN**

Recommendations for a related area or facility.
Constraint: If **Regulations.textContent** is populated, there cannot be **textualDescription** or **information** attributes directly bound to the **Regulations**.. A similar constraint applies to the information types **Recommendations**, **Restrictions**, and **NauticalInformation**.

1.2.8.1 Attributes

1.2.8.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Complex Attribute	graphic	[0..*]	graphic	
Complex Attribute	rxnCode	[0..*]	rxnCode	
Complex Attribute	textContent	[0..*]	textContent	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.8.3 Associations

1.2.9 Regulations

Information Type **Super-type: AbstractRXN**

Regulations for a related area or facility.
Constraint: If **Regulations.textContent** is populated, there cannot be **textualDescription** or **information** attributes directly bound to the **Regulations**.. A similar constraint applies to the information types **Recommendations**, **Restrictions**, and **NauticalInformation**.

1.2.9.1 Attributes

1.2.9.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Complex Attribute	graphic	[0..*]	graphic	
Complex Attribute	rxnCode	[0..*]	rxnCode	
Complex Attribute	textContent	[0..*]	textContent	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.9.3 Associations

1.2.10 Restrictions

Information Type **Super-type: AbstractRXN**

Restrictions for a related area or facility.
Constraint: If **Regulations.textContent** is populated, there cannot be **textualDescription** or **information** attributes directly bound to the **Regulations**.. A similar constraint applies to the information types **Recommendations**, **Restrictions**, and **NauticalInformation**.

1.2.10.1 Attributes

1.2.10.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Complex Attribute	graphic	[0..*]	graphic	
Complex Attribute	rxnCode	[0..*]	rxnCode	
Complex Attribute	textContent	[0..*]	textContent	
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.10.3 Associations

1.2.11 ServiceHours

Information Type **Super-type: InformationType**

The time when a service is available and known exceptions.

1.2.11.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	scheduleByDoW	[1..*]	scheduleByDoW	
Complex Attribute	information	[0..*]	information	

1.2.11.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..*]	sourceIndication	

1.2.11.3 Associations

Association name	*Source*	*Target*	*Notes*
exceptionalWorkday *Association*	*Label:* ServiceHours *Role:* theServiceHours_nsdy *Multiplicity:* 0..* Ordered: 0	*Label:* NonStandardWorkingDay *Role:* partialWorkingDay *Multiplicity:* 0..* Ordered: 0	
locationHours *Association*	*Label:* RadioServiceArea *Role:* location_srvHrs *Multiplicity:* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..1 Ordered: 0	Service hours for a physical facility, area, or location-based service
authorityHours *Association*	*Label:* Authority *Role:* theAuthority_srvHrs *Multiplicity:* 0..* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..* Ordered: 0	Service hours for an authority
locationHours *Association*	*Label:* RadioStation *Role:* location_srvHrs	*Label:* ServiceHours *Role:* theServiceHours	

Association name	*Source*	*Target*	*Notes*
	Multiplicity: Ordered: 0	*Multiplicity:* 0..1 Ordered: 0	
locationHours *Association*	*Label:* CoastguardStation *Role:* location_srvHrs *Multiplicity:* Ordered: 0	*Label:* ServiceHours *Role:* theServiceHours *Multiplicity:* 0..1 Ordered: 0	

1.3 Association Classes

1.3.1 InclusionType

Association Class **Super-type:**

Association class specifying the relationship between the subset of vessels described by an APPLIC data object and a regulation (restriction, recommendation, or nautical information).

1.3.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	membership	[1]	membership	Indicates whether a vessel is included or excluded from the regulation / restriction / recommendation / nautical information.

1.3.1.2 Inherited Attributes

1.3.1.3 Associations

1.3.2 PermissionType

Association Class **Super-type:**

Association class for associations describing whether the subsets of vessels determined by the ship characteristics specified in APPLIC may (or must, etc.) transit, enter, or use a feature.

1.3.2.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfRelationship	[1]	categoryOfRelationship	This attribute expresses the level of insistence for or against an action or activity by a vessel of the subset described by the APPLIC object at one end in relation to the feature at the other end of the association.

1.3.2.2 Inherited Attributes

1.3.2.3 Associations

1.4 Complex Attributes

1.4.1 bearingInformation

Complex Attribute **Super-type:**

A bearing is the direction one object is from another object.
At least one of the sub-attributes must be present.

Constraint: count(sectorBearing) = 0 or 2

1.4.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	cardinalDirection	[0..1]	cardinalDirection	
Attribute	distance	[0..1]	Real	
Complex Attribute	information	[0..*]	information	
Complex Attribute	orientation	[0..1]	orientation	
Attribute	sectorBearing	[0..2]	Real	

1.4.2 contactAddress

Complex Attribute **Super-type:**

Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it. (Oxford English Dictionary, 2nd Ed., adapted).

1.4.2.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	deliveryPoint	[0..*]	text	Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.
Attribute	cityName	[0..1]	text	The name of a town or city.
Attribute	administrativeDivision	[0..1]	text	Administrative division is a generic term for an administrative region within a country at a level below that of the sovereign state.
Attribute	country	[0..1]	text	The name of a nation. (Adapted from The American Heritage Dictionaries)
Attribute	postalCode	[0..1]	text	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.

1.4.3 facsimileDrumSpeed

Complex Attribute **Super-type:**

The drum speed and index of co-operation of a facsimile machine.

1.4.3.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
	drumSpeed	[1]	Integer	The drum speed in revolutions per minute.

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
				The drum speed should be encoded using three digits for the speed including a leading zero if necessary. Resolution: 1
	indexOfCooperation	[1]	Integer	A factor governing the image resolution of radiofax transmissions. Remarks: • The Index of Cooperation must be known to decode the transmission. • The Index of Co-operation is generally 576, although 288 with alternate line scanning is sometimes used.

1.4.4 featureName

Complex Attribute **Super-type:**

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.

1.4.4.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	displayName	[0..1]	Boolean	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*).
Attribute	language	[0..1]	ISO639-3	The language is encoded by a character code following ISO 639-3
Attribute	name	[1]	text	The individual name of a feature.

1.4.5 fixedDateRange

Complex Attribute **Super-type:**

Describes a single fixed period, as the date range between its sub-attributes.

Remarks: Sub-attributes date end and date start must have the calendar year encoded using 4 digits for the calendar year (CCYY). Month (MM) and day (DD) are optional.
(This definition merges the planned S-100 temporal model with the current S-101 DCEG definition of fixed date range.)

1.4.5.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	dateStart	[0..1]	S100_TruncatedD	The start date or time of the interval.

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
			ate	
Attribute	dateEnd	[0..1]	S100_TruncatedDate	The end date or time of the interval.

1.4.6 frequencyPair

Complex Attribute **Super-type:**

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

1.4.6.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	frequencyShoreStationReceives	[0..1]	Integer	The shore station receiver frequency expressed in kHz to one decimal place. Units: kHz, Resolution: 0.1, Format: XXXXXX Examples: 4379.1 kHz becomes 043791 13162.8 kHz becomes 131628
Attribute	frequencyShoreStationTransmits	[0..1]	Integer	The shore station transmitter frequency expressed in kHz to one decimal place. Units: kHZ, Resolution: 0.1, Format: XXXXXX Examples: 4379.1 kHz becomes 043791 13162.8 kHz becomes 131628

1.4.7 graphic

Complex Attribute **Super-type:**

Pictorial information such as a photograph, sketch, or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.

1.4.7.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	pictorialRepresentation	[1..*]	text	
Attribute	pictureCaption	[0..1]	text	Short description of the purpose of the image.
Attribute	sourceDate	[0..1]	Date	
Attribute	pictureInformation	[0..1]	text	A set of information to provide credits to picture creator, copyright owner etc.
Complex Attribute	bearingInformation	[0..1]	bearingInformation	

1.4.8 information

Complex Attribute **Super-type:**

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**.
Remarks:

- The sub-attribute **text** should be used, for example, to hold the information that is shown on paper charts by cautionary and explanatory notes. No formatting of text is possible within the sub-attribute **text**. If formatted text is required then an associated text file referenced by the sub-attribute **file reference** must be used.
- The sub-attribute **file reference** is generally used for long text strings or those that require formatting, however there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute **file reference**.

Constraint: count(text + fileReference) > 0

1.4.8.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	fileLocator	[0..1]	text	The string encodes the location of a fragment of text or other information in a support file. Remarks: • Application schemas must describe how the associated file is identified. The associated file will commonly be named in a **file reference** co-attribute of the same complex attribute. • Each DCEG must specify requirements for the format of the associated file and the semantics of **file locator**. For example, the value of **file locator** may be an HTML ID in an HTML file, line number in a text file) or a bookmark in a PDF file.
Attribute	fileReference	[0..1]	text	The string encodes the file name of a single external text file that contains the text. Remarks: The attribute **file reference** is generally used for long text strings or those that require formatting, however there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute **file reference**.
Attribute	headline	[0..1]	text	Words set at the head of a passage or page to introduce or categorize
Attribute	language	[0..1]	ISO639-3	ISO 639-3 value
Attribute	text	[0..1]	text	A non-formatted digital text string. Remarks: The attribute should be used, for example, to hold the information that is shown on paper charts by short cautionary and explanatory notes. Therefore text populated in text must not exceed 300 characters. Text may be in English or in a national language defined by the attribute **language**. No formatting of text is possible within

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
				the sub-attribute **text**. If formatted text, or text strings exceeding 300 characters, is required, then the attribute **file reference** must be used.

1.4.9 noticeTime

Complex Attribute **Super-type:**

1.4.9.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	noticeTimeHours	[0..*]	Real	
Attribute	noticeTimeText	[0..1]	text	
Attribute	operation	[0..1]	operation	

1.4.10 onlineResource

Complex Attribute **Super-type:**

Information about online sources from which a resource or data can be obtained (ISO 19115, adapted).

1.4.10.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	linkage	[1]	URL	location (address) for on-line access using a URL/URI address or similar addressing scheme. (Adapted from ISO 19115:2014.)
Attribute	protocol	[0..1]	text	connection protocol to be used. Example: ftp, http get KVP, http POST, etc. (ISO 19115)
Attribute	applicationProfile	[0..1]	text	name of an application profile that can be used with the online resource (ISO 19115)
Attribute	nameOfResource	[0..1]	text	name of the online resource (ISO 19115, adapted)
Attribute	onlineDescription	[0..1]	text	detailed text description of what the online resource is/does (ISO 19115)
Attribute	onlineFunction	[0..1]	onlineFunction	code for function performed by the online resource (ISO 19115)
Attribute	protocolRequest	[0..1]	text	Request used to access the resource. Structure and content depend on the protocol and standard used by the online resource, such as Web Feature Service standard. (ISO 19115, adapted)

1.4.11 orientation

Complex Attribute **Super-type:**

The angular distance measured from true north to the major axis of the feature.

1.4.11.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	orientationUncertainty	[0..1]	Real	
Attribute	orientationValue	[1]	Real	

1.4.12 periodicDateRange

Complex Attribute **Super-type:**

This complex attribute describes the active period for a seasonal feature or information type.

1.4.12.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	dateStart	[1]	S100_TruncatedDate	The start date or time of the interval.
Attribute	dateEnd	[1]	S100_TruncatedDate	The end date or time of the interval.

1.4.13 radiocommunications

Complex Attribute **Super-type:**

Detailed radiocommunications description with channels, frequencies, preferences and time schedules

1.4.13.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfCommPref	[0..1]	categoryOfCommPref	
Attribute	categoryOfRadioMethods	[0..*]	categoryOfRadioMethods	
Attribute	categoryOfMaritimeBroadcast	[0..*]	categoryOfMaritimeBroadcast	
Attribute	communicationChannel	[0..*]	text	
Attribute	contactInstructions	[0..1]	text	supplemental instructions on how or when to contact the individual, organisation, or service
Complex Attribute	facsimileDrumSpeed	[0..1]	facsimileDrumSpeed	
Complex Attribute	frequencyPair	[0..*]	frequencyPair	
Attribute	selectiveCallNumber	[0..1]	Integer	When stations of the maritime mobile service (direct printing telegraphy) use selective calling devices, their Selective Call numbers (SELCAL) are formed of four digits (coast stations). (Adapted: Radio Regulations (ITU))

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	signalFrequency	[0..1]	Integer	
Complex Attribute	timeOfObservation	[0..1]	timeOfObservation	
Complex Attribute	timesOfTransmission	[0..1]	timesOfTransmission	
Attribute	transmissionContent	[0..1]	text	Content of transmission. Remarks: Not to be used if CATMAB is populated
Complex Attribute	tmIntervalsByDoW	[0..*]	tmIntervalsByDoW	
Attribute	transmissionRegularity	[0..*]	transmissionRegularity	Classification of regularity or conditions for transmission

1.4.14 rxnCode

Complex Attribute **Super-type:**

A summary of the impact of the most common types of regulation, restriction, recommendation and nautical information on a vessel.
Remark: This attribute converts the subject, topic, and effects of regulations, etc., from plain text or natural language into a set of categories.

1.4.14.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfRxN	[0..1]	categoryOfRxN	
Attribute	actionOrActivity	[0..1]	actionOrActivity	
Attribute	headline	[0..1]	text	Words set at the head of a passage or page to introduce or categorize

1.4.15 scheduleByDoW

Complex Attribute **Super-type:**

Describes the nature and timings of a daily schedule by days of the week.
Alternative: 'Describes the nature and timings of a daily schedule'

1.4.15.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfSchedule	[0..1]	categoryOfSchedule	Describes the type of schedule, e.g., opening, closure, etc.
Complex Attribute	tmIntervalsByDoW	[1..*]	tmIntervalsByDoW	

1.4.16 sourceIndication

Complex Attribute **Super-type:**

Proposed definition: Information about the source document, publication, or reference from which object data or textual material included or referenced in a dataset are derived. (S-57 SORIND, adapted.)

Remarks:

- sourceIndication is intended for encoding meta-information that helps the end-user evaluate the reliability or importance of object data or textual material. Its use should be limited to situations where end users may need to evaluate reliability or importance themselves.
- The content of the featureName sub-attribute, if populated, must be the name of the authority or organization which published or distributed the source document.

1.4.16.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfAuthority	[0..1]	categoryOfAuthority	
Attribute	country	[0..1]	text	
Complex Attribute	featureName	[0..*]	featureName	
Attribute	reportedDate	[0..1]	S100_TruncatedDate	
Attribute	source	[0..1]	text	The publication, document, or reference work from which information comes or is acquired.
Attribute	sourceType	[0..1]	sourceType	Type of source

1.4.17 telecommunications

Complex Attribute **Super-type:**

Proposed definition: A means or channel of communication at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting. (OED, adapted)

1.4.17.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	contactInstructions	[0..1]	text	supplemental instructions on how or when to contact the individual, organisation, or service
Attribute	telcomCarrier	[0..1]	text	The name of provider or type of carrier for a telecommunications service
Attribute	telecommunicationIdentifier	[1]	text	Identifier used for contact by means of a telecommunications service, such as a telephone number
Attribute	telecommunicationService	[0..*]	telecommunicationService	Type of telecommunications service
Attribute	categoryOfCommPref	[0..1]	categoryOfCommPref	
Complex Attribute	scheduleByDoW	[0..1]	scheduleByDoW	

1.4.18 textContent

Complex Attribute **Super-type:**

Proposed definition: Textual material, or a pointer to a resource providing textual material. May be accompanied by basic information about its source and relationship to the source.

Remarks:

- **textContent** is intended to allow text passages from other publications to be included in, or referenced by, instances of feature or information types.
- Exactly one of sub-attributes **onlineResource** or **information** must be completed in one instance of **textContent**.
- Product specifications may restrict the use or content of **onlineResource** for security. For example, a product specification may forbid populating **onlineResource**.
- Product specification authors must consider whether applications using the data product may be prevented from accessing off-system resources by security policies.

Constraint: count(information + onlineresource) > 0

1.4.18.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfText	[0..1]	categoryOfText	
Complex Attribute	information	[0..*]	information	
Complex Attribute	onlineResource	[0..1]	onlineResource	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	

1.4.19 tmIntervalsByDoW

Complex Attribute **Super-type:**

Proposed definition, constraints and remarks:
Time intervals by days of the week.
Remarks:

- The sub-attribute dayOfWeekIsRange indicates whether an instance of this complex attribute encodes a range of days or discrete days. The days or day-range(s) are encoded in sub-attribute dayOfWeek. An indeterminate range may be indicated with a null value at the appropriate position.
- Multiple ranges or multiple days are allowed in one instance of this complex attribute, but mixing range with discrete days(s) is not allowed (encode another instance of this attribute instead).
- Product specifications may need to allow repetition of this complex attribute in order to allow encoding of schedules which vary for different days of the week.
- Ranges may 'wrap'; for example, the range 7-2 (meaning Sunday through Tuesday, inclusive) is permitted.
- To encode multiple intervals during the day, repeat TIMSTW and TIMENW as necessary.

Constraints: Duplicates or overlaps are not permitted.

Examples:

1. To encode “Monday through Friday” use the sequence: dayOfWeek=1, dayOfWeek=5 and set dayOfWeekIsRange=TRUE.
2. To encode the days Monday, Wednesday, Friday, use the sequence dayOfWeek=1, dayOfWeek=3, dayOfWeek=5 and set dayOfWeekIsRange=FALSE.
3. The sequence dayOfWeek=1, dayOfWeek=3, dayOfWeek=5 to indicate Mon-Wed and Thursday is not allowed. Encode the Mon-Wed and Thursday schedules in different instances of this complex attribute.
4. To encode times that are the same through the US/European work week (Monday through Friday) but different on weekends (Saturday/Sunday), encode two instances of the complex attribute tmIntervalsByDoW bound to the same object.
5. Office hours from 0800-1200 and 1300-1700 from Monday through Friday are encoded using one instance of tmIntervalsByDoW with TIMSTW=0800, TIMENW = 1200, and TIMSTW=1300, TIMENW=1700 (and dayOfWeek and DayOfWeekIsRange as in example 1 above).

Old remarks:
Remarks:
The sub-attribute *dayOfWeekIsRanges* indicates whether an instance of this attribute encodes a range of days or discrete days. The days or day-range(s) are encoded in sub-attribute *dayOfWeek*. Multiple ranges are allowed but mixing range with discrete days(s) is not allowed (encode another instance of this attribute instead).
An indeterminate range may be indicated with a null value at the appropriate position in the sequence.

Examples:

- To code the range "Monday through Friday" use the sequence: *dayOfWeek*=1, *dayOfWeek*=5 and set *dayOfWeekIsRanges*=TRUE.
- To encode the days Monday, Wednesday, Friday, use the sequence *dayOfWeek*=1, *dayOfWeek*=3, *dayOfWeek*=5 and set *dayOfWeekIsRanges*=FALSE.
- The sequence *dayOfWeek*=1, *dayOfWeek*=3, *dayOfWeek*=5 to indicate Mon-Wed and Thursday is not allowed. Encode the Mon-Wed and Thursday schedules in different instances of this complex attribute.

Product specifications may need to allow this attribute to be repeated in order to allow encoding of schedules which vary for different days of the week.

1.4.19.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	dayOfWeek	[0..7]	dayOfWeek	Encodes either range(s) of days or discrete days.
Attribute	dayOfWeekIsRange	[0..1]	boolean	Indicates whether the values in dayOfWeek indicate a range of days (true) or discrete days (false). Mandatory if co-attribute dayOfWeek has cardinality > 1..
Attribute	timeReference	[1]	timeReference	Indicates whether the time co-attributes are encoded in UTC or local time (LT).
Attribute	timeOfDayStart	[0..*]	Time	Starting time of day, possibly for a period within the day. Distinction: Time start (TIMSTA) (S-101) which has a format YYYYMMDD**T**hhmmss **(mandatory)** in the baseline S-101 DCEG as of October 2015.
Attribute	timeOfDayEnd	[0..*]	Time	Ending time of day, possibly for a period within the day. Distinction: Time end (TIMEND) (S-101) which has a format YYYYMMDD**T**hhmmss **(mandatory)** in the baseline S-101 DCEG as of October 2015.

1.4.20 timeOfObservation

Complex Attribute **Super-type:**

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

1.4.20.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	observationTime	[1]	Time	The time on each day when observations are made
Attribute	timeReference	[1]	timeReference	

1.4.21 timesOfTransmission

Complex Attribute **Super-type:**

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

Constraint: TIMREF is mandatory if TRMTIM is populated -- todo OCL
Constraint: At least one of TRMTIM, MNTALL, MNTEVN, MNTODD must be populated -- to do: OCL

1.4.21.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	minutePastEvenHours	[0..1]	Integer	The minute past even hours when a routine transmission starts. Unit: Minute of time Resolution: 1 Format: XX Example: 25 for 25 minutes past even hours.
Attribute	minutePastEveryHour	[0..1]	Integer	The minute past every hour when a routine transmission starts
Attribute	minutePastOddHours	[0..1]	Integer	The minute past odd hours when a routine transmission starts. Unit: Minute of time Resolution: 1 Format: XX Example: 25 for 25 minutes past odd hours.
Attribute	timeReference	[0..1]	timeReference	
Attribute	transmisssionTime	[0..*]	Time	The time in the day when scheduled transmissions start.

1.4.22 vesselsMeasurements

Complex Attribute **Super-type:**

1.4.22.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	comparisonOperator	[1]	comparisonOperator	
Attribute	vesselsCharacteristics	[1]	vesselsCharacteristics	
Attribute	vesselsCharacteristicsValue	[1]	real	
Attribute	vesselsCharacteristicsUnit	[1]	vesselsCharacteristicsUnit	

1.5 Codelists

1.5.1 actionOrActivity

S100_Codelist

Codelist type: open enumeration
Notes: The action or activity of a vessel

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	navigating with a pilot	1	Carrying a qualified pilot as part of the vessel navigation team.
Literal	entering port	2	navigating a vessel into a port
Literal	leaving port	3	Navigating a vessel out of a port.
Literal	berthing	4	Attaching a vessel to a wharf or jetty.
Literal	slipping	5	Detaching a vessel from a wharf or jetty.
Literal	anchoring	6	Attaching a vessel to the seabed by means of an anchor and cable.
Literal	weighing anchor	7	Detaching a vessel from the seabed by recovering an anchor and cable.
Literal	transiting	8	Navigating a vessel along a route or through a narrow gap, such as under a bridge or through a lock.
Literal	overtaking	9	Navigating a vessel past another traveling broadly in the same direction.
Literal	reporting	10	Providing details such as the name, location or intentions of a vessel
Literal	working cargo	11	Loading or unloading cargo
Literal	landing	12	Placing crew or passengers on shore.
Literal	diving	13	Placing a swimmer with an air supply below the sea surface.
Literal	fishing	14	Hunting or catching fish.
Literal	discharging overboard	15	Releasing anything into the sea; often ballast water; or spoil from dredging elsewhere.
Literal	passing	16	Navigating a vessel past another traveling broadly in the opposite direction.

1.5.2 categoryOfVessel

S100_Codelist

Codelist type: open enumeration

Notes: Classification of vessels by function or use.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	general cargo vessel	1	a vessel designed to carry general cargo
Literal	container carrier	2	a vessel designed to carry ISO containers
Literal	tanker	3	a vessel designed to carry bulk liquid or gas, including LPG and LNG
Literal	bulk carrier	4	a vessel designed to carry bulk solid material
Literal	passenger vessel	5	a vessel designed to carry passengers; often a cruise ship
Literal	roll-on roll-off	6	a vessel designed to allow road vehicles to be driven on and off; often a ferry
Literal	refrigerated cargo vessel	7	a vessel designed to carry refrigerated cargo
Literal	fishing vessel	8	a vessel designed to catch or hunt fish
Literal	service	9	a vessel which provides a service such as a tug, anchor handler, survey or supply vessel
Literal	warship	10	a vessel designed for the conduct of military operations
Literal	towed or pushed composite unit	11	either a tug and tow, or any combination of a tug providing propulsion to barges or vessels secured ahead or alongside
Literal	tug and tow	12	a combination of tug(s) and non-powered tow(s)
Literal	light recreational	13	A pleasure boat or watercraft, or an excursion vessel used for short cruises such as whale watching
Literal	semi-submersible offshore installation	14	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.
Literal	jackup exploration or project installation	15	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

Role Name	*Name*	*Code*	*Description / Remarks*
			surface
Literal	livestock carrier	16	A vessel designed to carry large quantities of live animals.
Literal	sport fishing	17	A vessel used in fishing for pleasure or competition.

1.5.3 categoryOfRxN

S100_Codelist
Codelist type: open enumeration

Notes: The principal subject matter of regulations, restrictions, recommendations or nautical information

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	navigation	1	Pertaining to navigation
Literal	communication	2	Pertaining to communications
Literal	environmental protection	3	Pertaining to environmental protection
Literal	wildlife protection	4	Pertaining to wildlife protection
Literal	security	5	Pertaining to security
Literal	customs	6	Pertaining to customs
Literal	cargo operation	7	Pertaining to cargo operations
Literal	refuge	8	Pertaining to a place of safety or refuge
Literal	natural resources or exploitation	9	Pertaining to natural resources or exploitation
Literal	port	10	Pertaining to a port
Literal	finance	11	Pertaining to finance
Literal	agriculture	12	Pertaining to agriculture

1.5.4 categoryOfSchedule

S100_Codelist

Codelist type: open enumeration
Notes: Describes the type of schedule, e.g., opening, closure, etc.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	normal operation	1	The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.
Literal	closure	2	The service, office, or area is closed.
Literal	unmanned operation	3	The service is available but not manned.

1.5.5 onlineFunction

S100_Codelist

Codelist type: open enumeration
Notes: code for function performed by the online resource (ISO 19115)

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	download	1	online instructions for transferring data from one storage device or system to another. (ISO 19115:2014)
Literal	information	2	online information about the resource (ISO 19115:2014)
Literal	offlineAccess	3	online instructions for requesting the resource from the provider (ISO 19115:2014)
Literal	order	4	online order process for obtaining the resource (ISO 19115:2014).
Literal	search	5	online search interface for seeking out information about the resource (ISO 19115:2014).

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	completeMetadata	6	complete metadata provided (ISO 19115:2014).
Literal	browseGraphic	7	browse graphic provided (ISO 19115:2014).
Literal	upload	8	online resource upload capability provided (ISO 19115:2014).
Literal	emailService	9	online email service provided (ISO 19115:2014)
Literal	browsing	10	online browsing provided (ISO 19115:2014)
Literal	fileAccess	11	online file access provided (ISO 19115:2014).

1.5.6 telecommunicationService

S100_Codelist

Codelist type: open enumeration
Notes: Classification of methods of communication over a distance by electrical or electromagnetic means.

Listed Values

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

1.6 Enumerations

1.6.1 cardinalDirection

Enumeration

Notes: Principal and intermediate compass points.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	N	1	North
Literal	NNE	2	Northnortheast
Literal	NE	3	Northeast
Literal	ENE	4	Eastnortheast
Literal	E	5	East
Literal	ESE	6	Eastsoutheast
Literal	SE	7	Southeast
Literal	SSE	8	Southsoutheast
Literal	S	9	South
Literal	SSW	10	Southsouthwest
Literal	SW	11	Southwest
Literal	WSW	12	Westsouthwest

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	W	13	West
Literal	WNW	14	Westnorthwest
Literal	NW	15	Northwest
Literal	NNW	16	Northnorthwest

1.6.2 categoryOfAuthority

Enumeration

Notes: The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.

Listed Values

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

1.6.3 categoryOfBroadcastCommunication

Enumeration

Notes: Classification of broadcast or communications based on public availability and commercial/non-commercial nature.

Listed Values

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

1.6.4 categoryOfCargo

Enumeration

Notes: The different types of cargo that a ship may be carrying
proposed revision: Classification of the different types of cargo that a ship may be carrying
Remarks:
If item 7 is used, the nature of dangerous or hazardous cargoes can be amplified with category of dangerous or hazardous cargo.

Listed Values

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

1.6.5 categoryOfCommPref

Enumeration

Notes: Classification of frequencies, VHF channels, telephone numbers, or other means of communication based on preference.

Listed Values

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

1.6.6 categoryOfDangerousOrHazardousCargo

Enumeration

Notes: Classification of dangerous goods or hazardous materials based on the International Maritime Dangerous Goods Code (IMDG Code).

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	IMDG Code Class 1 Div. 1.1	1	Explosives, Division 1: substances and articles which have a mass explosion hazard
Literal	IMDG Code Class 1 Div. 1.2	2	Explosives, Division 2: substances and articles which have a projection hazard but not a mass explosion hazard
Literal	IMDG Code Class 1 Div. 1.3	3	Explosives, Division 3: substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
Literal	IMDG Code Class 1 Div. 1.4	4	Explosives, Division 4: substances and articles which present no significant hazard
Literal	IMDG Code Class 1 Div. 1.5	5	Explosives, Division 5: very insensitive substances which have a mass explosion hazard
Literal	IMDG Code Class 1 Div. 1.6	6	Explosives, Division 6: extremely insensitive articles which do not have a mass explosion hazard
Literal	IMDG Code Class 2 Div. 2.1	7	Gases, flammable gases
Literal	IMDG Code Class 2 Div. 2.2	8	Gases, non-flammable, non-toxic gases
Literal	IMDG Code Class 2 Div. 2.3	9	Gases, toxic gases
Literal	IMDG Code Class 3	10	flammable liquids
Literal	IMDG Code Class 4 Div. 4.1	11	flammable solids, self-reactive substances and desensitized explosives
Literal	IMDG Code Class 4 Div. 4.2	12	substances liable to spontaneous combustion
Literal	IMDG Code Class 4 Div. 4.3	13	substances which, in contact with water, emit flammable gases
Literal	IMDG Code Class 5 Div. 5.1	14	oxidizing substances
Literal	IMDG Code Class 5 Div. 5.2	15	organic peroxides
Literal	IMDG Code Class 6 Div. 6.1	16	toxic substances
Literal	IMDG Code Class 6. Div. 6.2	17	infectious substances
Literal	IMDG Code Class 7	18	Radioactive material
Literal	IMDG Code Class 8	19	Corrosive substances
Literal	IMDG Code Class 9	20	Miscellaneous dangerous substances and articles
Literal	Harmful Substances in packaged form	21	Harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). Packaged form is defined as the forms of containment specified for harmful substances in the IMDG Code. (MARPOL (73/78) Annex III)

1.6.7 categoryOfFrcstAndWarningArea

Enumeration

Notes: Classification of weather forecast and weather warning areas based on source of warnings and forecasts.

Listed Values

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

1.6.8 categoryOfGMDSSArea

Enumeration

Notes: Classification of GMDSS areas based on availability of GMDSS services and GMDSS equipment requirements.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	Area A1	1	Within range of VHF coast stations with continuous DSC alerting available (about 20 – 30 miles)
Literal	Area A2	2	Beyond area A1, but within range of MF coastal stations with continuous DSC alerting available (about l00 miles)
Literal	Area A3	3	Beyond the first two areas, but within coverage of geostationary maritime communication satellites (in practice this means Inmarsat). This covers the area between roughly 70 deg N and 70 deg S.
Literal	Area A4	4	The remaining sea areas. The most important of these is the sea around the North Pole (the area around the South Pole is mostly land). Geostationary satellites, which are positioned above the equator, cannot reach this far.

1.6.9 categoryOfLandmark

Enumeration

Notes: Classification of prominent cultural and natural features in the landscape.
S-123 Note: Only landmarks of relevance to radiocommunications are encoded in S-123 datasets, e.g., radio masts used for marine broadcasts if their location needs to be shown

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	dish aerial	4	A parabolic aerial for the receipt and transmission of high frequency radio signals. (IHO Dictionary – S-32).
Literal	mast	7	A relatively tall structure usually held vertical by guy lines. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.45, November 2000).
Literal	tower	17	A relatively tall, narrow structure that may either stand alone or may form part of another structure. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

1.6.10 categoryOfMaritimeBroadcast

Enumeration

Notes: Classification of maritime broadcast based on the nature of information conveyed.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	navigational warning	1	message containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended
Literal	meteorological warning	2	warning of adverse weather conditions
Literal	ice report	3	report of the ice situation and restrictions to shipping
Literal	SAR information	4	broadcast message with information about an ongoing SAR operation
Literal	pirate attack warning	5	warning of possible attack by pirates
Literal	meteorological forecast	6	broadcast message containing meteorological forecast
Literal	pilot service message	7	broadcast message about pilot service
Literal	AIS information	8	broadcast message about AIS information
Literal	LORAN message	9	broadcast message about the LORAN service

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	SATNAV message	10	broadcast message about Satellite Navigation service
Literal	gale warning	11	warning of winds of Beaufort force 8 or 9
Literal	storm warning	12	warning of winds of Beaufort force 10 or over
Literal	tropical revolving storm warning	13	warning of hurricanes in the North Atlantic and eastern North Pacific, typhoons in the Western Pacific, cyclones in the Indian Ocean and cyclones of similar nature in other regions
Literal	NAVAREA warning	14	navigational warning or in-force bulletin promulgated as part of a numbered series by a NAVAREA coordinator (Maritime Safety Information Manual 2009)
Literal	coastal warning	15	navigational warning promulgated as part of a numbered series by a National coordinator (Maritime Safety Information Manual 2009)
Literal	local warning	16	warning which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority (Maritime Safety Information Manual 2009)
Literal	low water level warning/negative tidal surge	17	warning of actual or expected low water level
Literal	icing warning	18	warning of accretion of ice on ships
Literal	tsunami broadcast	19	broadcasts about tsunamis, including watches, advisories, and other types of messages relating to tsunamis or potential tsunamis

1.6.11 categoryOfRadioMethods

Enumeration

Notes: Categories of radiocommunications based on frequency band and radio traffic method.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	Low Frequency (LF) voice traffic	1	Frequency in a frequency range between 30 and 300 kHz used for voice traffic
Literal	Medium Frequency (MF) voice traffic	2	Frequency in a frequency range between 300 and 3 000kHz used for voice traffic
Literal	High Frequency (HF) voice traffic	3	Frequency in a frequency range between 3 and 30 MHz used for voice traffic
Literal	Very High Frequency (VHF) voice traffic	4	Frequency in a frequency range between 30 and 300 MHz used for voice traffic
Literal	High Frequency Narrow Band Direct Printing	5	High Frequency Narrow Band Direct Printing
Literal	NAVTEX	6	Narrow-band direct-printing telegraphy system for transmission of maritime safety information.
Literal	SafetyNET	7	SafetyNET is an international automatic direct-printing satellite-based service for the promulgation of navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages - maritime safety information (MSI) - to ships.
Literal	NBDP Telegraphy	8	Narrow Band Direct Printing Telegraphy. A communications system consisting of teletypewriters connected to a telephonic network to send and receive wireless signals.
Literal	facsimile	9	A method or device for transmitting documents, drawings, photographs, or the like, by means of radio or telephone for exact reproduction elsewhere.
Literal	NAVIP	10	A Russian system transmitting navigational information, send by radio and containing information relevant to coastal waters of foreign countries and high seas.
Literal	Low Frequency (LF) digital traffic	11	Frequency in a frequency range between 30 and 300 kHz used for digital traffic
Literal	Medium Frequency (MF) digital traffic	12	Frequency in a frequency range between 300 and 3000kHz used for digital traffic
Literal	High Frequency (HF) digital	13	Frequency in a frequency range between 3 and 30 MHz used

Role Name	*Name*	*Code*	*Description / Remarks*
	traffic		for digital traffic
Literal	Very High Frequency (VHF) digital traffic	14	Frequency in a frequency range between 30 and 300 MHz used for digital traffic
Literal	Low Frequency (LF) telegraph traffic	15	Frequency in a frequency range between 30 and 300 kHz used for telegraph traffic
Literal	Medium Frequency (MF) telegraph traffic	16	Frequency in a frequency range between 300 and 3 000kHz used for telegraph traffic
Literal	High Frequency (HF) telegraph traffic	17	Frequency in a frequency range between 3 and 30 MHz used for telegraph traffic
Literal	Medium Frequency (MF) Digital Selective Call traffic	18	Frequency in a frequency range between 300 and 3000kHz used for Digital Selective Call traffic
Literal	High Frequency (HF) Digital Selective Call traffic	19	Frequency in a frequency range between 3 and 30 MHz used for Digital Selective Call traffic
Literal	Very High Frequency (VHF) Digital Selective Call traffic	20	Frequency in a frequency range between 30 and 300 MHz used for Digital Selective Call traffic

1.6.12 categoryOfRadioStation

Enumeration

Notes: Classification of radio services offered by a radio station.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	radio direction-finding station	5	A radio station intended only to determine the direction of other stations by means of transmission from the latter.
Literal	Decca	8	The Decca Navigator System is a high-accuracy, short to medium range radio navigation aid intended for coastal and landfall navigation.
Literal	Loran C	9	A low frequency electronic position fixing system using pulsed transmissions at 100 Khz.
Literal	Differential GNSS	10	A radiobeacon transmitting DGPS correction signals.
Literal	Toran	11	An electronic position fixing system used mainly by aircraft.
Literal	Omega	12	A long-range radio navigational aid which operates within the VLF frequency band. The system comprises eight land based stations.
Literal	Syledis	13	A ranging position fixing system operating at 420-450MHz over a range of up to 400 Km.
Literal	Chaika	14	A low frequency electronic position fixing system using pulsed transmissions at 100 Khz.
Literal	facsimile transmission	17	facsimile transmission (IHO HYDRO register, 2010-11-14)
Literal	radio telephone station	19	The equipment needed at one station to carry on two way voice communication by radio waves only.
Literal	AIS base station	20	Remark: Not defined in GI Registry (2017-04-20).

1.6.13 categoryOfRelationship

Enumeration

Notes: Expresses constraints or requirements on vessel actions or activities in relation to a geographic feature, facility, or service.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	prohibited	1	use of facility, waterway or service is forbidden
Literal	not recommended	2	use of facility, waterway or service is not recommended
Literal	permitted	3	use of facility, waterway, or service is permitted but not required
Literal	recommended	4	use of facility, waterway, or service is recommended

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	required	5	use of facility, waterway, or service is required
Literal	not required	6	use of facility, waterway or service is not required

1.6.14 categoryOfText

Enumeration

Notes: Classification of completeness of textual information in relation to the source.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	abstract or summary	1	A statement summarizing the important points of a text.
Literal	extract	2	An excerpt or excerpts from a text.
Literal	full text	3	The whole text

1.6.15 categoryOfVesselRegistry

Enumeration

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

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	domestic	1	The vessel is registered or enrolled under the same national flag as the port, harbour, territorial sea, exclusive economic zone, or administrative area in which the object that possesses this attribute applies or is located.
Literal	foreign	2	The vessel is registered or enrolled under a national flag different from the port, harbour, territorial sea, exclusive economic zone, or other administrative area in which the object that possesses this attribute applies or is located.

1.6.16 comparisonOperator

Enumeration

Notes: Numerical comparison.
Remarks: The definition of COMPOP provides the relation between the value given in the model and the real ship's value.

Listed Values

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

1.6.17 dayOfWeek

Enumeration

Notes: The days of the week.
Remarks: This is an ordered enumeration.

Listed Values

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

1.6.18 function

Enumeration

Notes: A specific role that describes a feature

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	communication	29	Transmitting and/or receiving electronic communication signals. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Literal	radio	31	Transmitting and/or receiving radio-frequency electromagnetic waves as a means of communication. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Literal	microwave	34	Broadcasting and receiving signals using microwaves. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.133, November 2000).
Literal	control	39	Used to control the flow of traffic within a specified range of an installation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).
Literal	sea rescue control	44	A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).

1.6.19 jurisdiction

Enumeration

Notes: The jurisdiction applicable to an administrative area.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	international	1	involving more than one country; covering more than one

Role Name	*Name*	*Code*	*Description / Remarks*
			national area.
Literal	national	2	an area administered or controlled by a single nation.
Literal	national sub-division	3	an area smaller than the nation in which it lies.

1.6.20 logicalConnectives

Enumeration

Notes: Expresses whether all the constraints described by its co-attributes must be satisfied, or only one such constraint need be satisfied.
Remarks:

- This attribute is intended to be used with co-attributes that encode limits on vessel dimensions, type of cargo, and other characteristics.
- The combination of constraints described by logicalConnective and its co-attributes defines a subset of vessels to which information described by a feature or information type instance applies (or does not apply, is required, recommended, etc.).
- The relationship between the vessel subset and the information is indicated by an association - see PermissionType and InclusionType).
- The two listed values of logicalConnective are two of the basic operations of Boolean logic. The third basic operation (not) is not used.

Example:
An Applicability object with attributes as below:
logicalConnectives=1
vesselsMeasurements [vesselsCharacteristics=10/vesselsCharacteristicsValue=50.0/ComparisonOperator=1]
vesselsMeasurements [vesselsCharacteristics=6/vesselsCharacteristicsValue=10.0/ComparisonOperator=1]
implies the limitation applies only when LOA (code 10) is greater than 50.0 and draught (code 6) is greater than 10.0

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	logical conjunction	1	all the conditions described by the other attributes of the object, or sub-attributes of the same complex attribute, are true
Literal	logical disjunction	2	at least one of the conditions described by the other attributes of the object, or sub-attributes of the same complex attributes, is true

1.6.21 membership

Enumeration

Notes: Indicates whether a vessel is included or excluded from the regulation / restriction / recommendation / nautical information

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	included	1	Vessels with these characteristics are included in the regulation/restriction/recommendation/nautical information.
Literal	excluded	2	Vessels with these characteristics are excluded from the regulation/restriction/recommendation/nautical information.

1.6.22 operation

Enumeration

Notes: Suggested definition: Indicates whether the minimum or maximum value should be used to describe a condition or in application processing.
Remarks:

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

- Null attributes are ignored.

Example: Complex attribute underkeelAllowance with UKCFIX=2.5, UKCVAR=10.00, operation=1 indicates that the under-keel allowance required is the greater of 2.5 metres or 10% of the ship's draught.

Remarks: OPERAT is intended to be used in conjunction with other attributes (or sub-attributes of a complex attribute) to indicate how their values must be combined in order to describe a condition. Null attributes are ignored.
Example: Complex attribute underkeelAllowance with UKCFIX=2.5, UKCVAR=10.00, OPERAT=1 inicates that the under-keel allowance required is the greater of 2.5 metres or 10% of the ship's draught.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	largest value	1	The numerically largest value computed from the applicable attributes or sub-attributes
Literal	smallest value	2	The numerically smallest value computed from the applicable attributes or sub-attributes

1.6.23 sourceType

Enumeration

Notes: The type of source.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	law or regulation	1	treaty, convention, or international agreement; law or regulation issued by a national or other authority
Literal	official publication	2	publication not having the force of law, issued by an international organisation or a national or local administration
Literal	mariner report, confirmed	7	Reported by mariner(s) and confirmed by another source
Literal	mariner report, not confirmed	8	reported by mariner(s) but not confirmed
Literal	industry publications and reports	9	shipping and other industry publication, including graphics, charts and web sites
Literal	remotely sensed images	10	information obtained from satellite images
Literal	photographs	11	information obtained from photographs
Literal	products issued by HO services	12	information obtained from products issued by Hydropgrahic Offices
Literal	news media	13	information obtained from news media
Literal	traffic data	14	information obtained from the analysis of traffic data

1.6.24 status

Enumeration

Notes: The condition of an object at a given instant in time

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	permanent	1	Intended to last or function indefinitely
Literal	occasional	2	Acting on special occasions; happening irregularly
Literal	recommended	3	Presented as worthy of confidence, acceptance, use, etc.
Literal	not in use	4	Use has ceased, but the facility still exists intact; disused.
Literal	periodic/intermittent	5	Recurring at intervals
Literal	reserved	6	Set apart for some specific use
Literal	temporary	7	Meant to last only for a time
Literal	private	8	Administered by an individual or corporation, rather than a State or a public body.
Literal	mandatory	9	Compulsory; enforced.

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	extinguished	11	No longer lit
Literal	illuminated	12	Lit by floodlights, strip lights, etc.
Literal	historic	13	Famous in history; of historical interest
Literal	public	14	Belonging to, available to, used or shared by, the community as a whole and not restricted to private use.
Literal	synchronised	15	Occur at a time, coincide in point of time, be contemporary or simultaneous
Literal	watched	16	Looked at or observed over a period of time especially so as to be aware of any movement or change.
Literal	un-watched	17	Usually automatic in operation, without any permanently-stationed personnel to superintend it.
Literal	existence doubtful	18	A feature that has been reported but has not been definitely determined to exist.
Literal	buoyed	28	Marked by buoys

1.6.25 timeReference

Enumeration

Notes: Indicates whether a time value is local time or Coordinated Universal Time.
Remark: Local time is the local civil time after daylight savings time (if any) has been applied. For example 0800 local time in New York is the same instant as 1300 UTC on December 1, when DST is **not** in effect in New York, and 1200 UTC on June 1, when DST **is** in effect in New York.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	localTime	1	Local time
Literal	UTC	2	Coordinated Universal time

1.6.26 transmissionRegularity

Enumeration

Notes:

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	continuous		transmission is made continuously
Literal	regular		transmission is made regularly according to a schedule
Literal	on receipt		transmission is made when warning or information is received from another authority
Literal	as required		transmission is made under specified conditions or when needed
Literal	on request		transmission is made when requested by a user

1.6.27 vesselsCharacteristics

Enumeration

Notes: Characteristics of vessels.
Remarks:
This is an enumeration of different properties of vessels which are often used in specifying whether they are subject to rules or restrictions.
The properties covered by this attribute are those of the vessel itself, such as dimensional and tonnage properties. The type of vessel and the cargo carried by a vessel are characterized by different attributes (see categoryOfVessel, categoryOfCargo, categoryOfDangerousOrHazardousCargo).

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	length overall	1	The maximum length of the ship (L.O.A.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	length at waterline	2	The ship's length measured at the waterline (L.W.L.). (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	breadth	3	The width or beam of the vessel. (Adapted from http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	draught	4	The depth of water necessary to float a vessel fully loaded. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	height	5	The height of the highest point of a vessel's structure (e.g. radar aerial, funnel, cranes, masthead) above her waterline. (UKHO NP100/2009)
Literal	displacement tonnage	6	A measurement of the weight of the vessel, usually used for warships. (Merchant ships are usually measured based on the volume of cargo space; see tonnage). Displacement is expressed either in long tons of 2,240 pounds or metric tonnes of 1,000 kg. Since the two units are very close in size (2,240 pounds = 1,016 kg and 1,000 kg = 2,205 pounds), it is common not to distinguish between them. To preserve secrecy, nations sometimes misstate a warship's displacement. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	displacement tonnage, light	7	The weight of the ship excluding cargo, fuel, ballast, stores, passengers, and crew, but with water in the boilers to steaming level. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	displacement tonnage, loaded	8	The weight of the ship including cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage, which brings the vessel down to her load draft. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	deadweight tonnage	9	The difference between displacement, light and displacement, loaded. A measure of the ship's total carrying capacity. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	gross tonnage	10	The entire internal cubic capacity of the ship expressed in tons of 100 cubic feet to the ton, except certain spaces with are exempted such as: peak and other tanks for water ballast, open forecastle bridge and poop, access of hatchways, certain light and air spaces, domes of skylights, condenser, anchor gear, steering gear, wheel house, galley and cabin for passengers. (http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	net tonnage	11	Obtained from the gross tonnage by deducting crew and navigating spaces and allowances for propulsion machinery.(http://en.wikipedia.org/wiki/Ship_measurements; 24 July 2010)
Literal	Panama Canal/Universal Measurement System net tonnage	12	the Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
Literal	Suez Canal net tonnage	13	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

Role Name	*Name*	*Code*	*Description / Remarks*
			of the Suez Canal Authority, and is registered in the Suez Canal Tonnage Certificate. (Adapted from http://en.wikipedia.org/wiki/Tonnage 4 Oct 2010)
Literal	Suez Canal gross tonnage	14	Suez Canal Gross Tonnage (SCGT) 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.

1.6.28 vesselsCharacteristicsUnit

Enumeration

Notes: the unit used for vessel characteristics attribute

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	metre	1	The metre (or meter) is the base unit of length in the International System of Units (SI). It is defined as the distance travelled by light in vacuum in 1/299,792,458 of a second.
Literal	foot	2	A foot (plural: feet) is a non-SI unit of length in a number of different systems including English units, Imperial units, and United States customary units. The most commonly used foot today is the international foot. There are three feet in a yard and 12 inches in a foot.
Literal	metric ton	3	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%.
Literal	ton	4	Long ton (weight ton or imperial ton) is the name for the unit called the "ton" in the avoirdupois or Imperial system of measurements, as used in the United Kingdom and several other Commonwealth countries. It has been mostly replaced by the tonne, and in the United States by the short ton. One long ton is equal to 2,240 pounds (1,016 kg) or 35 cubic feet (0.9911 m3) of salt water with a density of 64 lb/ft³ (1.025 g/ml). It has some limited use in the United States, most commonly in measuring the displacement of ships, and was the unit prescribed for warships by the Washington Naval Treaty—for example battleships were limited to a mass of 35,000 long tons (36,000 t; 39,000 ST).
Literal	short ton	5	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).

Role Name	*Name*	*Code*	*Description / Remarks*
			Both the long and short ton are defined as 20 hundredweights, but a hundredweight is 100 pounds (45.359237 kg) in the U.S. system (short or net hundredweight) and 112 pounds (50.80234544 kg) in the Imperial system (long or gross hundredweight).
Literal	gross ton	6	Gross tonnage (GT) is a function of the volume of all ship's enclosed spaces (from keel to funnel) measured to the outside of the hull framing. There is a sliding scale factor. So GT is a kind of capacity-derived index that is used to rank a ship for purposes of determining manning, safety and other statutory requirements and is expressed simply as GT, which is a unitless entity, even though its derivation is tied to the cubic meter unit of volumetric capacity. Tonnage measurements are now governed by an IMO Convention (International Convention on Tonnage Measurement of Ships, 1969 (London-Rules)), which applies to all ships built after July 1982. In accordance with the Convention, the correct term to use now is GT, which is a function of the moulded volume of all enclosed spaces of the ship.
Literal	net ton	7	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.
Literal	Panama Canal/Universal Measurement System net tonnage	8	The Panama Canal/Universal Measurement System (PC/UMS) is based on net tonnage, modified for Panama Canal purposes. PC/UMS is based on a mathematical formula to calculate a vessel's total volume; a PC/UMS net ton is equivalent to 100 cubic feet of capacity.
Literal	Suez Canal Net Tonnage	9	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.
Literal	none	10	Can be used for net and gross tonnages, including Panama Canal/Universal Measurement System net tonnage and The Suez Canal Net Tonnage.
Literal	cubic metres	11	cubic metres
Literal	Suez Canal Gross Tonnage	12	The Suez Canal Gross Tonnage (SCGT) 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.

2 S-123 Meta Features (package)

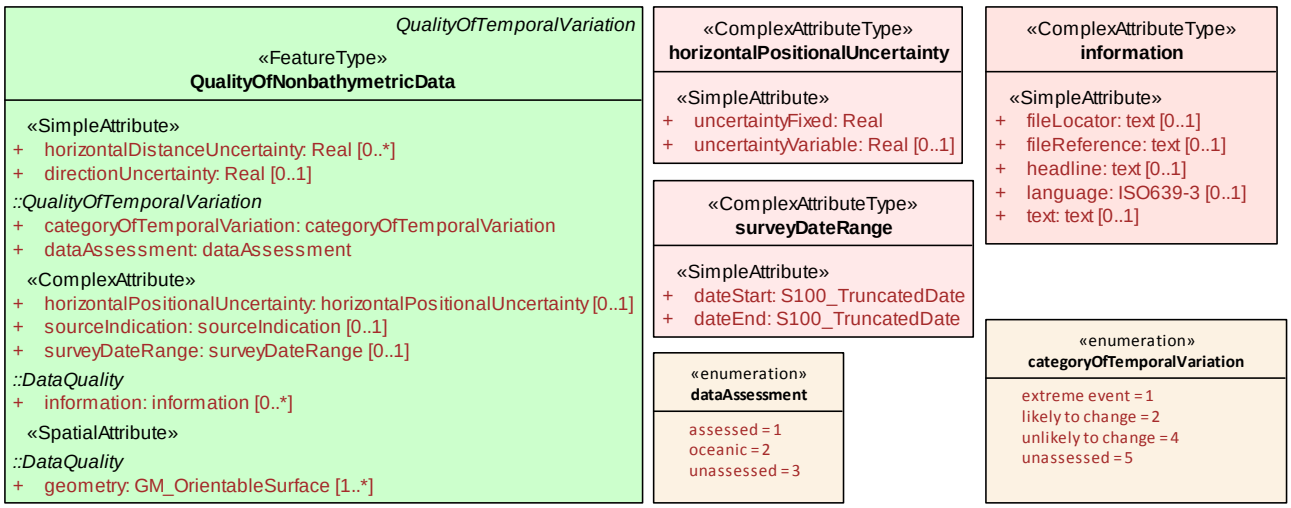

Figure 19 S-123 Q of NonBathy data

Diagram Notes:

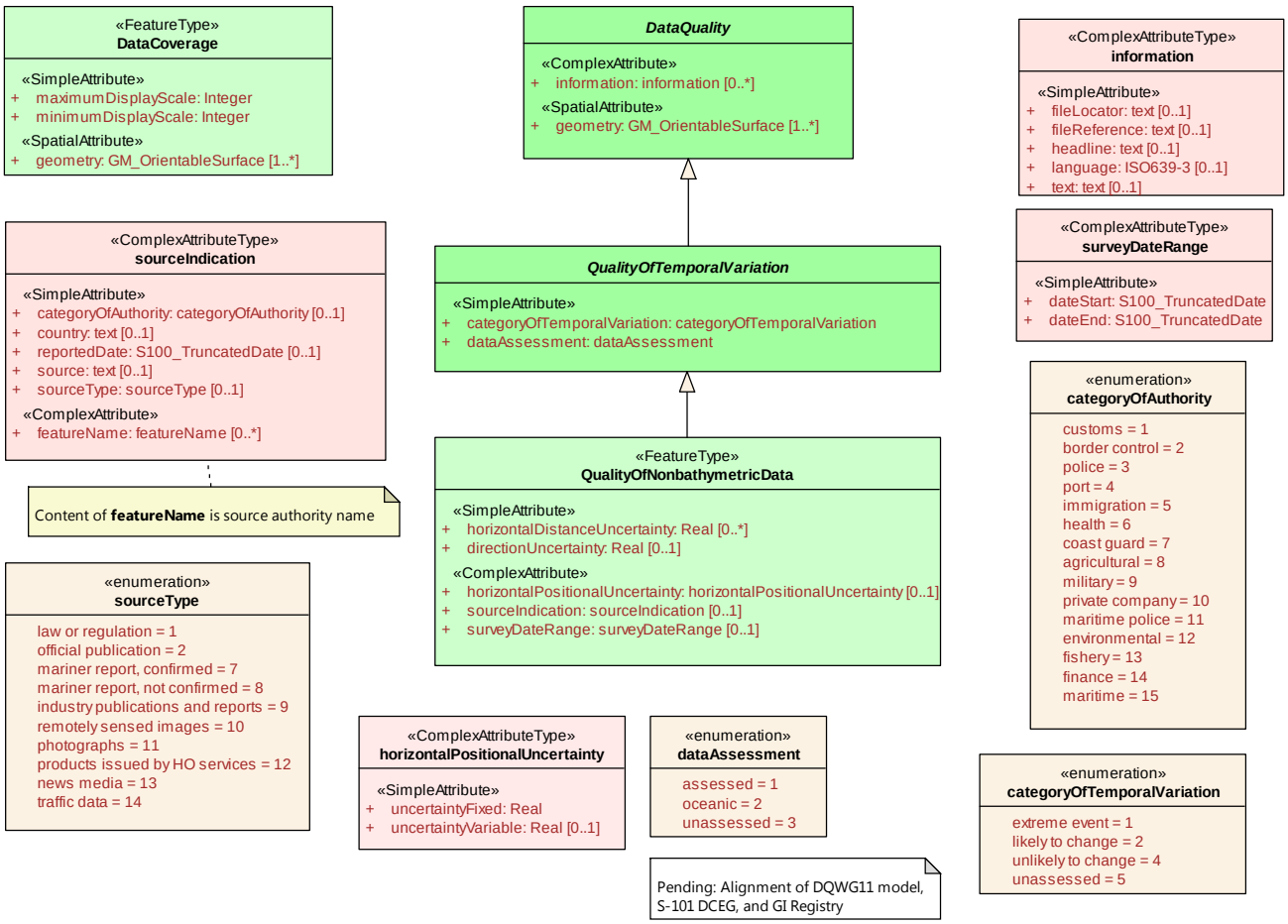

Figure 20 S-123 Meta Features

Diagram Notes: Classes for meta- feature types and complex attributes used by them.
Remarks:
The NPUBS model of meta-features extends the S-101 model by adding attributes for **information**, **source indication**, and **metaFeatureScope**. The latter describes the scope of applicability of meta-features quality of Bathymetric and non-bathymetric features.

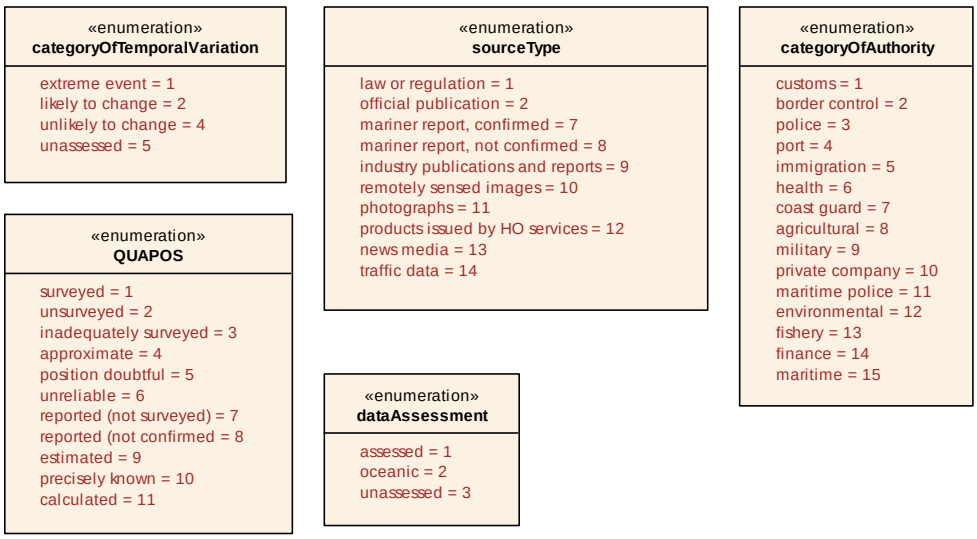

Figure 21 S-123 Meta FeatureEnums

Diagram Notes: Enumerations used by meta-features.

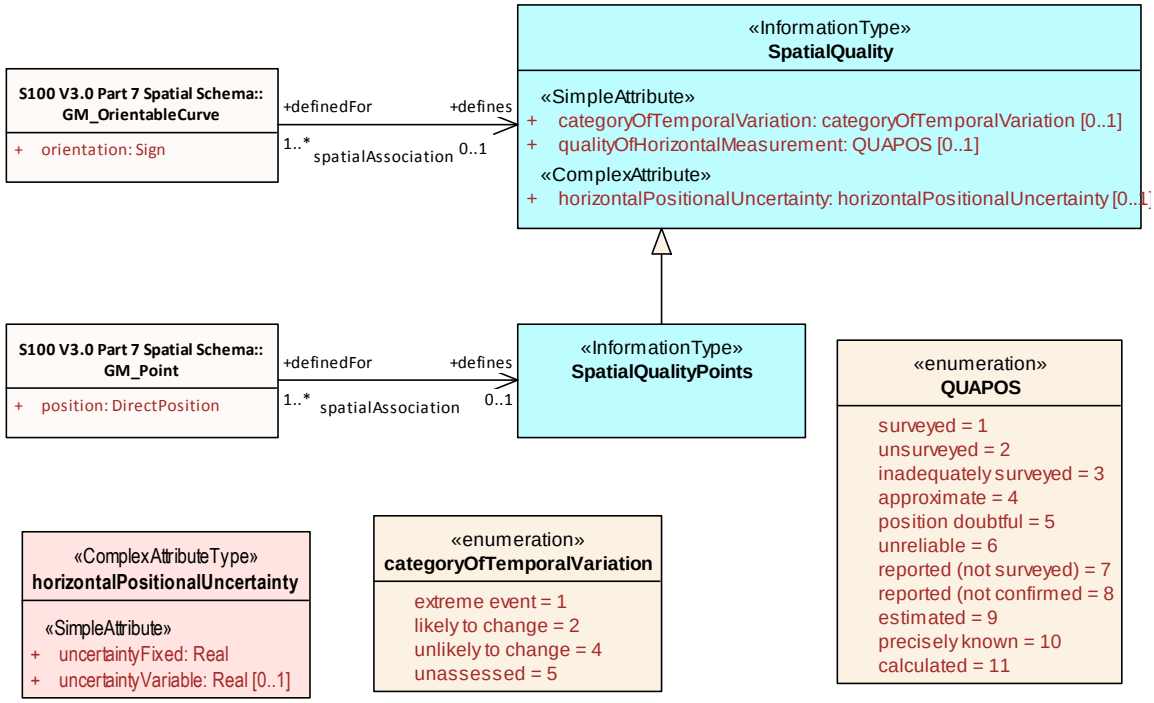

Figure 22 S-123 SpatialQuality

Diagram Notes: Application schema fragment describing the quality of location, depth, or height for an individual feature instance

2.1 Features

2.1.1 DataQuality

Class Super-type:

Abstract feature type for data quality meta-features

2.1.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	information	[0..*]	information	Use of attribute **information** is discouraged for nautical publications data quality meta-features.

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	Permitted spatial primitives

2.1.1.2 Inherited Attributes

2.1.1.3 Associations

2.1.2 QualityOfTemporalVariation

Class Super-type: DataQuality

Abstract type for meta-feature which can describe temporal variation.

2.1.2.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfTemporalVariation	[1]	categoryOfTemporalVariation	(1, 2, 3, 5)
Attribute	dataAssessment	[1]	dataAssessment	The categorisation of the assessment level of bathymetric data for an area.

2.1.2.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	Permitted spatial primitives
Complex Attribute	information	[0..*]	information	Use of attribute **information** is discouraged for nautical publications data quality meta-features.

2.1.2.3 Associations

Association name	*Source*	*Target*	*Notes*
Surveys *Association*	*Label:* QualityOfSurvey *Role:* specificClassification *Multiplicity:* 0..* Ordered: 0	*Label:* QualityOfTemporalVariation *Role:* overallClassification *Multiplicity:* Ordered: 0	UNDEFINED

2.1.3 DataCoverage

Geographic feature Super-type:

A geographical area that describes the coverage and extent of spatial objects.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

2.1.3.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	maximumDisplayScale	[1]	Integer	maximumDisplayScale < minimumDisplayScale (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)
Attribute	minimumDisplayScale	[1]	Integer	minimumDisplayScale >

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
				maximumDisplayScale (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	Permitted spatial primitives

2.1.3.2 Inherited Attributes

2.1.3.3 Associations

2.1.4 QualityOfNonbathymetricData

Geographic feature **Super-type: QualityOfTemporalVariation**

An area within which a uniform assessment of the quality of the non-bathymetric data exists.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

2.1.4.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	horizontalDistanceUncertainty	[0..*]	Real	The best estimate of the horizontal accuracy of horizontal clearances and distances.
Complex Attribute	horizontalPositionalUncertainty	[0..1]	horizontalPositionalUncertainty	The best estimate of the accuracy of a position.
Attribute	directionUncertainty	[0..1]	Real	The best estimate of the accuracy of a bearing
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	surveyDateRange	[0..1]	surveyDateRange	

2.1.4.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfTemporalVariation	[1]	categoryOfTemporalVariation	
Attribute	dataAssessment	[1]	dataAssessment	The categorisation of the assessment level of bathymetric data for an area.
Spatial Attribute	geometry	[1..*]	GM_OrientableSurface	Permitted spatial primitives
Complex Attribute	information	[0..*]	information	Use of attribute **information** is discouraged for nautical publications data quality meta-features.

2.1.4.3 Associations

2.2 Information types

2.2.1 SpatialQuality

Information Type **Super-type:**

2.2.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfTemporalVariation	[0..1]	categoryOfTemporalVariation	(1, 2, 3, 5)
Complex Attribute	horizontalPositionalUncertainty	[0..1]	horizontalPositionalUncertainty	
Attribute	qualityOfHorizontalMeasurement	[0..1]	QUAPOS	

2.2.1.2 Inherited Attributes

2.2.1.3 Associations

Association name	*Source*	*Target*	*Notes*
spatialAssociation *Association*	*Label:* GM_OrientableCurve *Role:* definedFor *Multiplicity:* 1..* Ordered: 0	*Label:* SpatialQuality *Role:* defines *Multiplicity:* 0..1 Ordered: 0	

2.2.2 SpatialQualityPoints

Information Type **Super-type: SpatialQuality**

Definition required

2.2.2.1 Attributes

2.2.2.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	categoryOfTemporalVariation	[0..1]	categoryOfTemporalVariation	
Complex Attribute	horizontalPositionalUncertainty	[0..1]	horizontalPositionalUncertainty	
Attribute	qualityOfHorizontalMeasurement	[0..1]	QUAPOS	

2.2.2.3 Associations

Association name	*Source*	*Target*	*Notes*
spatialAssociation *Association*	*Label:* GM_Point *Role:* definedFor *Multiplicity:* 1..* Ordered: 0	*Label:* SpatialQualityPoints *Role:* defines *Multiplicity:* 0..1 Ordered: 0	

2.3 Complex attributes

2.3.1 horizontalPositionalUncertainty

Complex Attribute **Super-type:**

Definition required

2.3.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	uncertaintyFixed	[1]	Real	The best estimate of the fixed vertical accuracy component for depths,

Role Name	Name	Multiplicity	Data type	Description / Remarks
				heights, vertical distances and vertical clearances. N**ote: Definition may need to be updated if it is used for horizontal measurements.**
Attribute	uncertaintyVariable	[0..1]	Real	The best estimate of the variable accuracy component for depths, heights, vertical distances and vertical clearances. N**ote: Definition may need to be updated if it is used for horizontal measurements.**

2.3.2 surveyDateRange

Complex Attribute **Super-type:**

The complex attribute describes the period of the hydrographic survey, as the time between its sub-attributes.

2.3.2.1 Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	dateStart	[1]	S100_TruncatedDate	The start date or time of the interval.
Attribute	dateEnd	[1]	S100_TruncatedDate	The end date or time of the interval.

2.4 Enumerations

2.4.1 dataAssessment

Enumeration

Notes: The categorisation of the assessment level of bathymetric data for an area.

Listed Values

Role Name	Name	Code	Description / Remarks
Literal	assessed	1	The quality of the bathymetric data has been assessed.
Literal	oceanic	2	The quality of oceanic bathymetric data has been assessed or is not required.
Literal	unassessed	3	The quality of the bathymetric data has yet to be assessed.

2.4.2 QUAPOS

Enumeration

Notes: Definition required

Listed Values

Role Name	Name	Code	Description / Remarks
Literal	surveyed	1	The position(s) was(were) determined by the operation of making measurements for determining the relative position of points on, above, or beneath the earth's surface. Survey implies a regular, controlled, survey of any date.
Literal	unsurveyed	2	Survey data does not exist or is very poor
Literal	inadequately surveyed	3	Position data is of very poor quality
Literal	approximate	4	A position that is considered to be less than third-order

Role Name	*Name*	*Code*	*Description / Remarks*
			accuracy, but is generally considered to be within 30.5 meters of its correct geographic location. Also, may apply to a feature whose position does not remain fixed.
Literal	position doubtful	5	A feature whose position has been reported but which is considered to be doubtful
Literal	unreliable	6	A feature's position obtained from questionable or unreliable data.
Literal	reported (not surveyed)	7	A feature whose position has been reported and its position confirmed by some means other than a formal survey such as an independent report of the same feature.
Literal	reported (not confirmed	8	A feature whose position has been reported and its position has not been confirmed.
Literal	estimated	9	The most probable position of a feature determined from incomplete data or data of questionable accuracy.
Literal	precisely known	10	A position that is of a known value, such as the position of an anchor berth or other defined feature.
Literal	calculated	11	A position that is computed from data.

2.4.3 categoryOfTemporalVariation

Enumeration

Notes: An assessment of the likelihood of change within an area since last survey.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	extreme event	1	NIPWG: No new hydrographic survey conducted after an event (e.g., hurricane, earthquake, volcanic eruption, landslide, etc.) which is considered likely to have resulted in significant change at the location. In GI Registry Definition: No new hydrographic survey conducted after an event (e.g. hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor significantly.
Literal	likely to change	2	NIPWG: Continuous or frequent change (e.g., river siltation, sand waves, seasonal storms, construction, etc.) GI Registry: Continuous or frequent change (e.g. river siltation, sand waves, seasonal storms, ice bergs, etc).
Literal	unlikely to change	4	NIPWG: Significant change at the location is not expected. GI Registry: Significant change to the seafloor is not expected.
Literal	unassessed	5	Temporal variation not assessed or cannot be determined

3 S-123 Cartographic Features (package)

3.1 Features

3.1.1 TextPlacement

Geographic feature **Super-type:**

The Text Placement feature is used in association with the Feature
Name attribute or a light description to optimise text positioning in ECDIS.

Remarks:

- The **Text Placement** feature is used by the ECDIS to position the associated text, which has been populated using an attribute(s) for the related feature. This attribute is identified by populating the attribute **text type**. Alternatively, the text to be displayed may be encoded using the attribute **text**.
- Only one of the attributes **text** or **text type** are allowable for each instance of **Text Placement**.
- **Text Placement** should only be associated with features of type point, and used in areas where it is important that text clear navigationally relevant areas, e.g. shipping channels and dredged areas.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

3.1.1.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	flipBearing	[0..1]	Real	The bearing at which text is re-located to the opposite side of a feature when screen display is oriented away from true north.
Attribute	scaleMinimum	[0..1]	Integer	
Attribute	textJustification	[1]	textJustification	The anchor point of a text string.
Attribute	text	[0..1]	text	A non-formatted digital text string. Remarks: The attribute should be used, for example, to hold the information that is shown on paper charts by short cautionary and explanatory notes. Therefore text populated in text must not exceed 300 characters. Text may be in English or in a national language defined by the attribute **language**. No formatting of text is possible within the sub-attribute **text**. If formatted text, or text strings exceeding 300 characters, is required, then the attribute **file reference** must be used.
Attribute	textType	[0..1]	textType	
Spatial Attribute	geometry	[1..*]	GM_Point	

3.1.1.2 Inherited Attributes

3.1.1.3 Associations

Association name	*Source*	*Target*	*Notes*
textAssociation *Association*	*Label:* FeatureType *Role:* identifies *Multiplicity:* 0..1 Ordered: 0	*Label:* TextPlacement *Role:* positions *Multiplicity:* 0..1 Ordered: 0	A feature association for the binding between a geo feature and the cartographically positioned location for text.

3.2 Enumerations

3.2.1 textJustification

Enumeration

Notes: The anchor point of a text string.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	left	1	The anchor point is at the start of the text string.
Literal	centred	2	The anchor point is at the centre of the text string.
Literal	right	3	The anchor point is at the end of the text string.

3.2.2 textType

Enumeration

Notes: The attribute from which a text string is derived.
(S-122) Remark: S-122 does not include light features and therefore listed value '2: light characteristic' is omitted from the S-122 application schema.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	feature name	1	The type of attribute that will be passed via the text string

4 S-123 Approximate Areas (package)

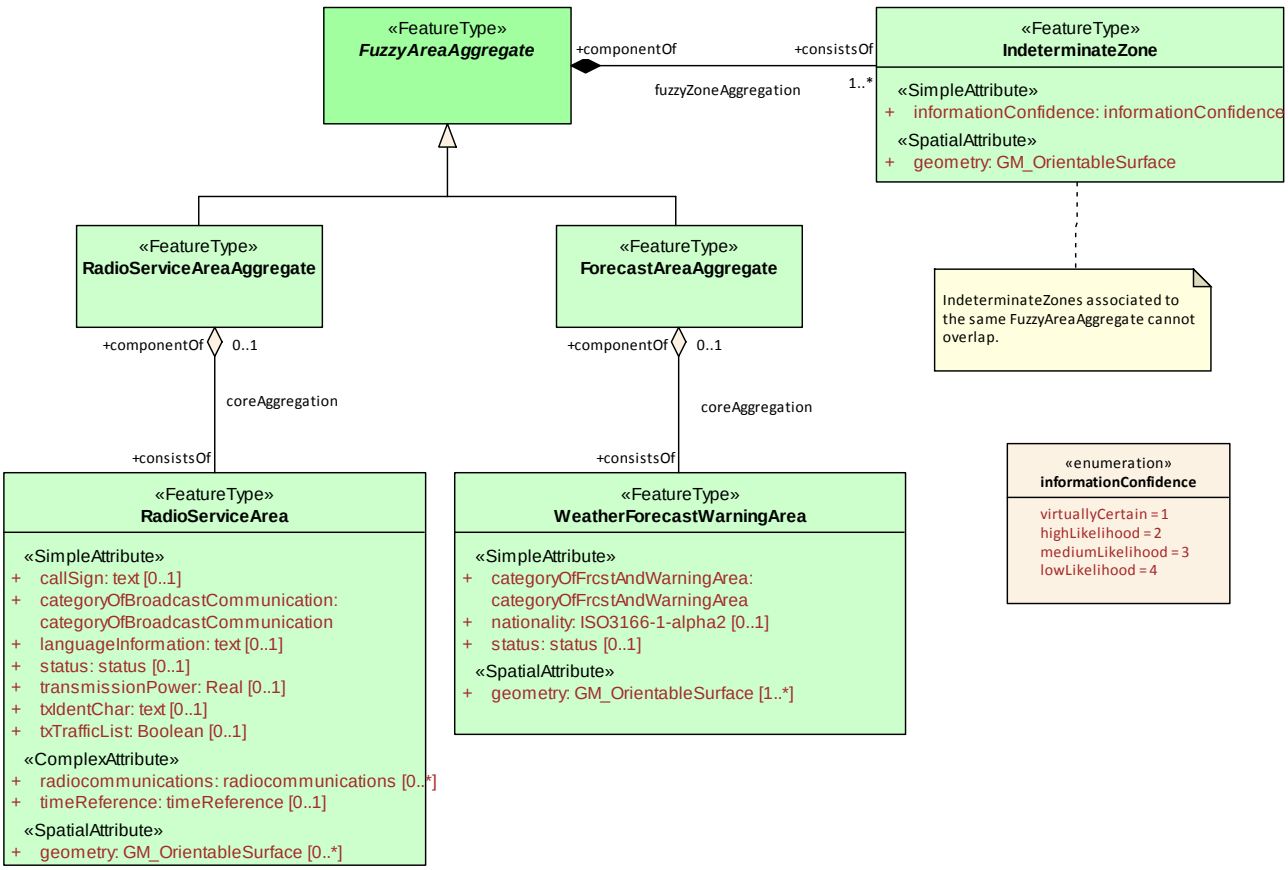

Figure 23 S-123 Fuzzy areas

4.1 Features

4.1.1 ForecastAreaAggregate

Geographic feature **Super-type: FuzzyAreaAggregate**

Aggregation of areas where forecasts and warnings broadcasted for a **Weather forecast and warning area** may be available with differing levels of reliability.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

4.1.1.1 Attributes

4.1.1.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

4.1.1.3 Associations

Association name	*Source*	*Target*	*Notes*
coreAggregation *Aggregation*	*Label:* WeatherForecastWarningArea *Role:* consistsOf *Multiplicity:* Ordered: 0	*Label:* ForecastAreaAggregate *Role:* componentOf *Multiplicity:* 0..1 Ordered: 0	A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and a geographic feature describing the service or phenomenon. (IHO).

4.1.2 RadioServiceAreaAggregate

Geographic feature **Super-type: FuzzyAreaAggregate**

Aggregation of areas where radio services from a single radio service are available to different levels of reliability

Description: Create a named complex type (property type) that requires the instance to be encoded inline

4.1.2.1 Attributes

4.1.2.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

4.1.2.3 Associations

Association name	*Source*	*Target*	*Notes*
coreAggregation *Aggregation*	*Label:* RadioServiceArea *Role:* consistsOf	*Label:* RadioServiceAreaAggregate	A feature association for the binding between an

Association name	*Source*	*Target*	*Notes*
	Multiplicity: Ordered: 0	*Role:* componentOf *Multiplicity:* 0..1 Ordered: 0	aggregation feature that describes areas of varying uncertainty about a service or phenomenon and a geographic feature describing the service or phenomenon. (IHO).

4.1.3 FuzzyAreaAggregate

Geographic feature **Super-type: FeatureType**

Aggregation of a geographic feature describing a service or phenomenon with zones of different confidence about the availability of the service, occurrence of the phenomenon, or applicability of the information described by the geographic feature.

Description: Create a named complex type (property type) that requires the instance to be encoded inline

4.1.3.1 Attributes

4.1.3.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

4.1.3.3 Associations

Association name	*Source*	*Target*	*Notes*
fuzzyZoneAggregation *Aggregation*	*Label:* IndeterminateZone *Role:* consistsOf *Multiplicity:* 1..* Ordered: 0	*Label:* FuzzyAreaAggregate *Role:* componentOf *Multiplicity:* Ordered: 0	A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and zones of uncertainty about the service or phenomenon. (IHO).

4.1.4 IndeterminateZone

Geographic feature **Super-type: FeatureType**

A region in which the perception of a phenomenon or the availability of a service is known only to a specified level of confidence.
Remark: **IndeterminateZone** features associated to the same fuzzy area aggregate must not overlap.

Constraint: 0 < fuzzyPercentage < 100

Description: Create a named complex type (property type) that requires the instance to be encoded inline

4.1.4.1 Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Attribute	informationConfidence	[1]	informationConfidence	

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Spatial Attribute	geometry	[1]	GM_OrientableSurface	Fuzzy region spatial attribute

4.1.4.2 Inherited Attributes

Role Name	*Name*	*Multiplicity*	*Data type*	*Description / Remarks*
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	
Complex Attribute	textContent	[0..*]	textContent	

4.1.4.3 Associations

Association name	*Source*	*Target*	*Notes*
fuzzyZoneAggregation *Aggregation*	*Label:* IndeterminateZone *Role:* consistsOf *Multiplicity:* 1..* Ordered: 0	*Label:* FuzzyAreaAggregate *Role:* componentOf *Multiplicity:* Ordered: 0	A feature association for the binding between an aggregation feature that describes areas of varying uncertainty about a service or phenomenon and zones of uncertainty about the service or phenomenon. (IHO).

4.2 Enumerations

4.2.1 informationConfidence

Enumeration

Notes: The likelihood that a vessel will experience the phenomenon described by a feature, or that the service described by the feature will be available.

Listed Values

Role Name	*Name*	*Code*	*Description / Remarks*
Literal	virtuallyCertain	1	Virtually certain to be experienced by (or available to) an individual vessel; will be experienced by nearly all vessels. (FAA, adapted.)
Literal	highLikelihood	2	Frequently experienced by (or available to) an individual vessel; experienced by a majority of vessels. (FAA, adapted.)
Literal	mediumLikelihood	3	Occasionally experienced by (or available to) an individual vessel; experienced by (or available to) about half of all vessels. (FAA, adapted.)
Literal	lowLikelihood	4	Unlikely, but sometimes (rarely) experienced by (or available to) an individual vessel; experienced by (or available to) a minority of vessels). (FAA, adapted.)

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