Paper for Consideration by [SNPWG]

Draft proposal for Harmonisation of data quality

Submitted by:	BSH / Jeppesen
Executive Summary:	Proposes updates and new attributes for the harmonisation of the S-101 data quality model with the model for S-122 and other nautical publications product specifications..
Related Documents:	(1) S-101 DCEG (April 2014 baseline)
Related Projects:	S-101; S-122, S-123 and other product specifications being developed by SNPWG.

Proposal Type

Type of Change Requested	Mark All that Apply
S-101 DCEG Change	x
New/Amended Feature	x
New/Amended Complex Attribute	x
New/Amended Simple Attribute	x
New/Amended Information Type	
New/Amended Association/Aggregation/Composition	
New/Amended Enumerate Value	x
New/Amended Code List	x

Justification and Impacts

Benefits:

- Generalisation of definitions so they can be re-used by different product specifications
- Harmonisation of data quality features and attributes across multiple IHO product specifications
- Improvements of the data quality model
- Improvement of the data handling for the modellers who have to serve different products

Required Resources:

- Email exchange
- no extra funding

Involved HSSC WG

- TSMAD
- SNPWG
- DQWG

Due date:

- DQWG: No later than DQWG 9 (3-7 November 2014) [feedback received]
- SNPWG: No later than SNPWG 18 (1-4 December 2014)
- TSMAD: No later than TSMAD 29 (tentatively 2-6 February 2015)

Priority:

- High

Impact on work:

- Completion of the S-122, S-123, and other product specifications, data classification and encoding guides, and sample datasets depends on the outcome of the discussion

Related activities:

- S-101 DCEG
- S-122, S-123, and other product specifications

Action Requested:

The SNPWG is invited to:

a. review and amend the proposal as appropriate considering comments by DQWG

b. coordinate with DQWG on preparing and submitting an updated proposal to TSMAD for consideration at TSMAD 29

c. discuss with DQWG and TSMAD a harmonised model of data quality for S-101, S-122, S-123 and other product specifications

ANNEX A:

Proposed change of the feature class Quality of Bathymetric Data

IHO Definition: **QUALITY OF BATHYMETRIC DATA**. An area within which a uniform assessment of the quality of the bathymetric data exists. (S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.216, November 2000).				
S-101 Metadata Feature: Quality of Bathymetric Data (M_QUAL)				
Primitives: Surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-101 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Category of temporal variation (label change)		1 : unassessed 2 : extreme event 3 : likely to change 5 : unlikely to change	EN	1,1
Meta-feature scope (added)			C	0,1
Level		1: attribute instance 2: attribute type 5: dataset 9: feature instance 10: feature type 16: tile 25: coverage other: [something]	E(CL)	1,1
Level description			C	0,1
Attributes			S(TE)	0,*
Features			S(TE)	0,*
Feature instances			S(TE)	0,*
Attribute instances			S(TE)	0,*
Dataset			S(TE)	0,1
Other scope description category			S(TE)	0,1
Source indication (added)			C	0,1
Source type			EN	0,1
Source			S(TE)	0,1
Reported date			S(DA)	0,1
Country			S(TE)	0,1
Category of authority			EN	0,1
Feature name (as defined as in S-101)		(source authority name)	C	0,*
Information (TBD – SNPWG is proposing changes to modeling of text information)			C	0,*
Textual description (TBD – SNPWG is proposing changes to modeling of text information)			C	0..*
(other attributes as defined in April 2014 S-101 baseline **Quality of Bathymetric Data as amended by DQWG9**)				

Feature associations

Role Type	Association Name	Role	Features	Multiplicity

Information associations

Role Type	Association Name	Role	Information types	Multiplicity

INT 1 Reference:

Add clauses describing how overlapping features are treated:

Quality of Bathymetric Data features whose intersection volume (the 3-D volume formed by intersection of the volumes defined by their spatial extents and depth ranges) is non-zero must have different scopes as determined by their **meta-feature scope** attributes (or the absence of a **meta-feature scope** attribute). Within the intersection volume of two or more intersecting "**Quality...**" features, the quality factor which applies to specific features or attributes shall be determined by applying the preference rules specified in clause XX.XX (the specification of **meta-feature scope**). The attribute **meta-feature scope** may be absent for at most one of the intersecting **Quality of Bathymetric Data** features.

Quality values at the boundary plane of two stacked Quality of Bathymetric Data features shall be determined...(how? This should be specified in S-101 too.)

Quality of bathymetric data features may overlap **Quality of non-bathymetric data** features.

Quality of bathymetric data and **Quality of non-bathymetric data** features must not name the same features classes in their **meta-feature scope** attributes.

Other information remains unchanged at this section

Proposed change of the feature class Quality of Nonbathymetric Data

IHO Definition: **QUALITY OF NON-BATHYMETRIC DATA**. An area within which the best estimate of the overall uncertainty of the data is uniform. The overall uncertainty takes into account for example the source accuracy, chart scale, digitising accuracy etc. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.208, November 2000).

S-101 Metadata Feature: Quality of Non-bathymetric Data (M_ACCY)

Primitives: Surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Category of temporal variation (Added; label change)		1 : unassessed 2 : extreme event 3 : likely to change 5 : unlikely to change	EN	1,1
Meta-feature scope (added)			C	0,1
Level		1: attribute instance 2: attribute type 5: dataset 7: nongeographic dataset 9: feature instance 10: feature type 16: tile 20: document 25: coverage	E(CL)	1,1

		other: [something]		
Level description			C	0,1
Attributes			S(TE)	0,*
Features			S(TE)	0,*
Feature instances			S(TE)	0,*
Attribute instances			S(TE)	0,*
Dataset			S(TE)	0,1
Other scope description category			S(TE)	0,1
Source indication (added)			C	0,1
Source type			EN	0,1
Source			S(TE)	0,1
Reported date			S(DA)	0,1
Country			S(TE)	0,1
Category of authority			EN	0,1
Feature name (as defined as in S-101)		(source authority name)	C	0,*
Information (TBD – SNPWG is proposing changes to modeling of text information)			C	0,*
Textual description (TBD – SNPWG is proposing changes to modeling of text information)			C	0..*
(other attributes as defined in April 2014 S-101 baseline **Quality of Non-bathymetric Data as amended by DQWG9**)				

Feature associations

Role Type	Association Name	Role	Features	Multiplicity

Information associations

Role Type	Association Name	Role	Information types	Multiplicity

INT 1 Reference:

Add clauses describing how overlapping features are treated:

Quality of Non-bathymetric Data features whose intersection (the surface formed by intersection of their individual surfaces) is non-zero must have different scopes as determined by their **meta-feature scope** attributes (or the absence of a **meta-feature scope** attribute). Within the intersection of two or more intersecting "**Quality...**" features, the quality factor which applies to specific features or attributes shall be determined by applying the preference rules specified in clause XX.XX (the specification of **meta-feature scope**). The attribute **meta-feature scope** may be absent for at most one of the intersecting **Quality of Non-bathymetric Data** features.

Quality values at the common boundary curve or point of two **Quality of Bathymetric Data** features shall be determined...(how? This should be specified in S-101 too.)

Quality of bathymetric data features may overlap **Quality of non-bathymetric data** features.

Quality of bathymetric data and **Quality of non-bathymetric data** features must not name the same features classes in their **meta-feature scope** attributes.

Other information remains unchanged at this section

New complex attributes supporting the proposed amendments

Attribute Name: Meta-feature scope

IHO Definition: The target resource and physical extent for which information is reported. (ISO 19115-1:2014).

Indication:

Sub-attributes:			
	Level	1..1	see clause X.X
	Level Description	0..1	see clause X.X

Remarks:

- This is an implementation of the MD_Scope datatype defined in ISO 19115-1:2014. The element *EX_Extent* which is also used in ISO 19115-1 is not included here because it would be (mostly) redundant, as IHO product specifications use spatial primitives and attributes for depth value ranges to demarcate spatial extent, and attributes for date start/end and periodic date start/end to demarcate temporal extent.
- If **metaFeatureScope.level** = 1 (attribute instance), 2 (attribute type), 9 (feature instance), or 10 (feature type) the corresponding sub-attribute of **level description** (respectively, **attribute instances**; **attributes**; **feature instances**; **features**) must be populated.
- If **metaFeatureScope.level** = 20 (document), the sub-attribute **other scope description category** may be populated with a document identifier (e.g., a support file path/file name).
- If **metaFeatureScope.level** = other: ..., the sub-attribute **other scope description category** may be populated with an additional description of the information denoted by the "other: ..." value.

Attribute Name: level description (Value Type: MD_ScopeDescription)

IHO Definition: description of the scope of information covered by the metadata. (ISO 19115-1:2014, adapted).

Indication:

Sub-attributes:			
	Attributes	0..*	see clause X.X
	Features	0..*	see clause X.X
	Feature instances	0..*	see clause X.X
	Attribute instances	0..*	see clause X.X
	Dataset	0..*	see clause X.X
	Other scope description category	0..*	see clause X.X

Remarks:

- This is the NPUBS implementation of the ISO 19115:2014 Union type MD_ScopeDescription.
- If this complex attribute is present, exactly one of the sub-attributes must be populated.
- The preference order used by overlapping meta-features is as follows (high to low): other scope description category; attribute instances; feature instances; attributes; features; dataset; features without a meta-feature scope attribute.
- If **metaFeatureScope.level** = 1 (attribute instance), 2 (attribute type), 9 (feature instance), or 10 (feature type) the corresponding sub-attribute of level description (respectively, **attribute instances**; **attributes**; **feature instances**; **features**) must be populated.
- If **metaFeatureScope.level** = 20 (document), the sub-attribute **other scope description category** may be populated with a document identifier (e.g., a support file path/file name).
- If **metaFeatureScope.level** = other: ..., the sub-attribute **other scope description category** may be populated with an additional description of the information denoted by the "other: ..." value.

Attribute Name: Source indication

IHO Definition: Information about the source.

Indication:

Sub-attributes:			
	Source Type	0..1	see clause X.X
	Source	0..1	see clause X.X
	Reported date	0..1	see clause X.X
	Country	0..1	see clause X.X
	Category of authority	0..1	see clause X.X
	Feature name	0..*	see clause X.X

Remarks:

- Content of sub-attribute feature name is the name of the authority which issued or published the material.

New Free Text Type Attributes relevant to the proposed complex attributes

Attribute Name: Attributes

IHO Definition: instances of attribute types to which the information applies (ISO 19115-1:2014). For S-100 purposes this is the camel case code of the attribute.

Indication: Use when the meta-feature applies to only the specified attributes of all features within its area.

Format: String

Example: The value "textContent" means the Quality feature applies to all **textContent** attributes, i.e., to all text encoded in a **textContent.text** sub-attribute and the content of all files named in a **textContent.fileReference** attribute.

Remarks:

Attribute Name: Features

IHO Definition: instances of feature types to which the information applies (ISO). For S-100 purposes this is the camel case code of the feature.

Indication: Use when the meta-feature applies to all instances of a specified feature class but not to other feature classes within its area.

Format: String

Example: MarineProtectedArea

Remarks:

Attribute Name: Feature instances

IHO Definition: feature instances to which the information applies (ISO). For S-100 purposes this is the identifier for a feature instance.

Indication: Use when the meta-feature applies to only the specified instance of a feature class.

Format: String

Example: (feature object ID) for example 12345678ABCD

Remarks: Format must be specified by product specification.

Attribute Name: Attribute instances

IHO Definition: Attribute instances to which the information applies (ISO). For S-100 purposes this is the identifier for attribute instance within a feature instance.

Indication:

Format: String

Example: (Combination of the feature object ID and attribute code.) E.g.: 123456789.textContent

Remarks: Format must be specified by product specification.

Attribute Name: Dataset

IHO Definition: dataset to which the information applies.

Indication:

Format: String

Example:

Remarks: This is the default.

Attribute Name: Other scope description category

IHO Definition: class of information that does not fall into the other scope description categories to which the information applies.

Indication:

Format: String

Example:

Remarks: Corresponds to the scope description element named "other" in ISO 19115:2014.

Attribute Name: Country

IHO Definition: The name of a nation. (Adapted from The American Heritage Dictionaries)

Indication:

Format: String

Example: Norway

Remarks:

No remarks.

Attribute Name: Source

IHO Definition: A firsthand document or primary reference work. (http://www.merriam-webster.com/dictionary/source 20.12.2012).

Indication:

Format: String

Example:

Remarks:

No remarks.

New Code List Type Attributes relevant to the proposed complex attributes

Attribute Name: level (Value Type: MD_ScopeCode)

IHO Definition: Class of information to which the referencing entity applies (ISO 19115:2014).

Indication:

Tagged Values:			
	Codelist Type	open enumeration	see clause X.X
	URI	n/a	see clause X.X
	encoding	other [something]	see clause X.X

1) Attribute instance

IHO Definition: information applies to the attribute value

2) Attribute type

IHO Definition: information applies to a characteristic of a feature

5) Dataset

IHO Definition: information applies to the dataset

6) Series

IHO Definition: information applies to a series

7) Non-geographic dataset

IHO Definition: information applies to non-geographic data such as a set containing only information types.

8) Dimension group

IHO Definition: information applies to a dimension group

9) Feature instance

IHO Definition: information applies to a feature instance

10) Feature type

IHO Definition: information applies to a feature class

11) Property type

IHO Definition: information applies to a property type

16) Tile

IHO Definition: information applies to a tile, a spatial subset of geographic data

17) Metadata

IHO Definition: information applies to metadata

20) Document

IHO Definition: information applies to a document

22) Aggregate

IHO Definition: information applies to an aggregate resource

23) Product

IHO Definition: metadata describing an ISO 19131 data product specification

24) Collection

IHO Definition: information applies to an unstructured set

25) Coverage

IHO Definition: information applies to a coverage

Remarks:

- Attribute type and attribute instance here mean thematic attributes, since spatial attributes have their

own data quality model. • Dimension groups are subsets of features with different dimensionality. For example, a multi-dimensional atmospheric coverage could include measurements or model results for parameters at multiple altitudes, a 3-dimensional dataset, as well as an average of the parameter over all altitudes, a 2-dimensional dataset. Three dimensional ocean models can also include reference datasets for the surface or the seafloor. • The default level is the dataset.

Proposed Amendment of an Attribute

Category of temporal variation: IHO Definition: An assessment of the likelihood of change within an area since last survey.

1) **Unassessed**

   IHO Definition: Temporal variation not assessed or cannot be determined.

2) **Extreme event**

   IHO Definition: No new survey conducted after an event (e.g. hurricane, earthquake, volcanic eruption, landslide, etc.), which is considered likely to have resulted in significant change.

3) **Likely to change**

   IHO Definition: Continuous or frequent change (e.g. river siltation, sand waves, seasonal storms, construction, etc.).

4) **Likely to change but significant shoaling unlikely**

   IHO Definition: Definition required.

5) **Unlikely to change**

   IHO Definition: Significant change is not expected.

Remarks:

- No remarks.

New Enumerations

Attribute: Source type

IHO Definition: The nature of the source of the encoded information.

1) **international law**
   IHO Definition: treaty, convention, or international agreement; or European Union law
2) **publication issued by an international organisation**
   IHO Definition: Publication issued by an international administration
3) **national law or regulation**
   IHO Definition: legislation by a national government
4) **publication issued by a national administration**
   IHO Definition: publication issued by a national administration
5) **local law or regulation**
   IHO Definition: law made by a national sub-division such as a state, province, or local government
6) **publication issued by local administration**
   IHO Definition: publication issued by a local administration, such as local government or port authority
7) **mariner report, confirmed**
   IHO Definition: reported by mariner(s) and confirmed by another source
8) **mariner report, not confirmed**
   IHO Definition: reported by mariner(s) but not confirmed
9) **industry publications and reports**
   IHO Definition: shipping and other industry publication, including graphics, charts and web sites
10) **remotely sensed images**
   IHO Definition: information obtained from satellite images
11) **photographs**
   IHO Definition: information obtained from photographs
12) **products issued by HO**
   IHO Definition: information obtained from products issued by Hydrographic Offices
13) **news media**
   IHO Definition: information derived from news media
14) **traffic data**
   IHO Definition: information obtained from the analysis of traffic data

Remarks:
- Additional encoding guidance relevant to the attribute.