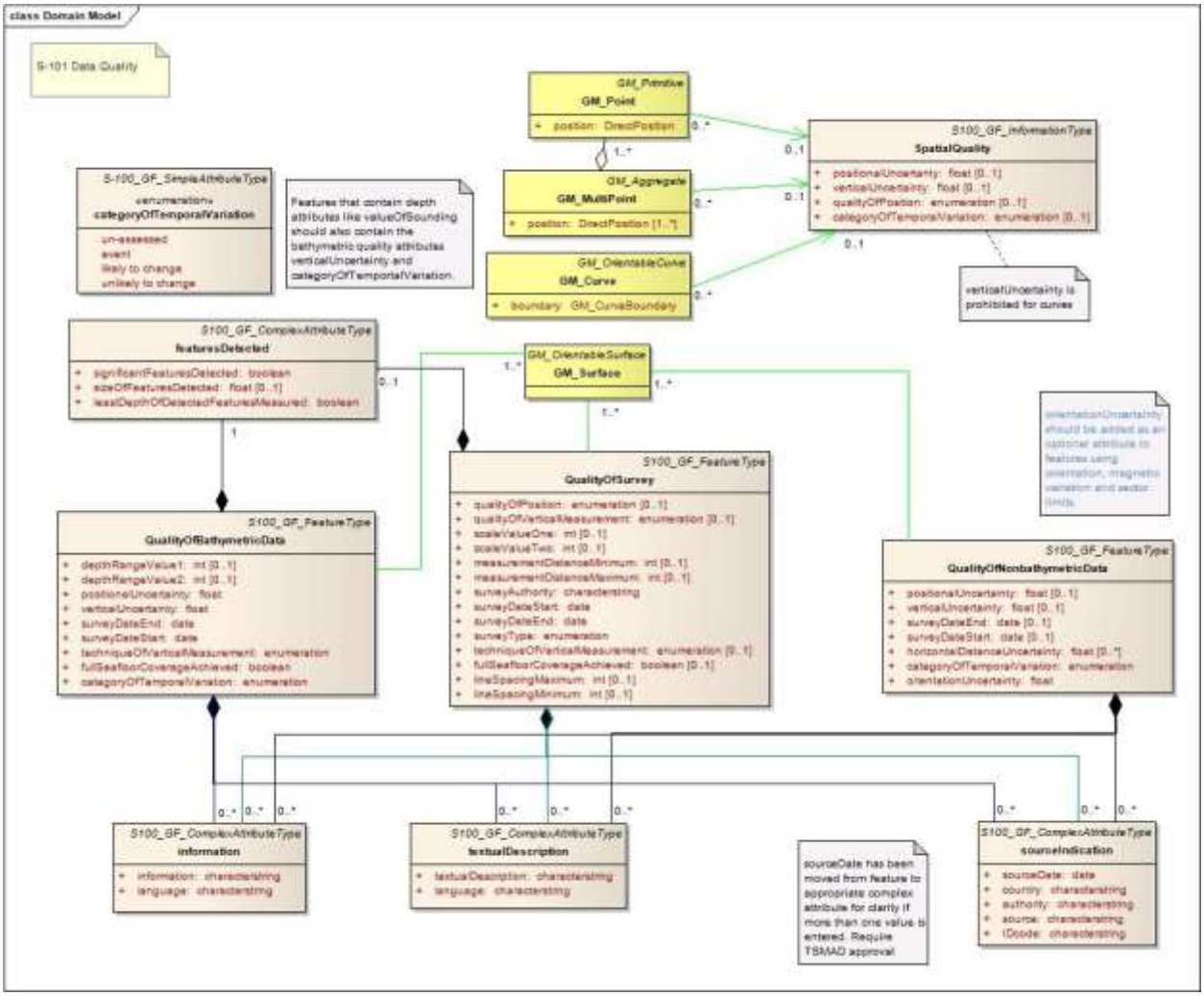
Annex B - Proposal for Data Quality additions to the Hydro Register

At the recent DQWG5 meeting a good portion of the meeting was dedicated to discussing the data model that should support S-101's ability to sufficiently capture data quality. The model below gives the draft as proposed by DQWG and this document list the changes and additions needed in the register.



Proposal for a new feature type: Quality Of Bathymetric Data

Register: Hydro FDD

Name: Quality Of Bathymetric Data

camelCase: QualityOfBathymetricData

Alphacode: M_QOBD

Attribute	Type	Cardinality		Infinity	Sequential
		Lower	Upper		
featuresDetected	Complex	1	1	No	No
deathRangeValue1	Integer	0	1	No	No
deathRangeValue2	Integer	0	1	No	No
positionalUncertainty	Real	1	1	No	No
verticalUncertainty	Real	1	1	No	No
surveyDateEnd	Date	1	1	No	No
surveyDateStart	Date	1	1	No	No
techniqueOfVerticalMeasurement	Enumerate	1	1	No	No
fullSeafloorCoverageAchieved	Boolean	1	1	No	No
categoryOfTemporalVariation	Enumerate	1	1	No	No
information	Complex	0	*	Yes	No
textualDescription	Complex	0	*	Yes	No
sourceIndication	Complex	0	*	Yes	No

Definition

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

Remarks:

Nil

Proposed Change:

Add this new feature type and retire M_QUAL which this proposal will supersede.

Justification:

M_QUAL definition alludes to an all-encompassing data quality meta feature, but its use is virtually limited to bathymetric data. The new feature is clearer in its use. Furthermore the new feature type is constructed in a way that enables the retirement of CATZOC as a single ambiguous attribute.

Proposal for a new complex attribute type: Features detected

Register: Hydro FDD

Name: Features detected

camelCase: featuresDetected

Alphacode: FEADET

Sub attribute	Type	Cardinality		Infinity	Sequential
		Lower	Upper		
significantFeaturesDetected	Boolean	1	1	No	No
sizeOfFeaturesDetected	Real	0	1	No	No
leastDepthOfDetectedFeaturesMeasured	Boolean	1	1	No	No

Definition

The uniform assessment of detected features

Remarks:

A feature in this context is meant to be any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation. (Ref. IHO document S44). featuresDetected does not describe if features were actually detected during a survey, but whether the survey had the capacity to detect features.

Proposed Change:

Add this new complex attribute type

Justification:

featuresDetected forms part of the replacement of CATZOC and is used to describe if significant features have likely been detected, the size of these and if the least depth of these features have been measured.

Proposal for a new simple attribute type: Significant Features Detected

Register: Hydro FDD

Name: Significant Features Detected

camelCase: significantFeaturesDetected

Alphacode: SIFEDE

Attribute type: Boolean

Definition

A statement expressing if significant features have or have not been detected in the course of a survey

Remarks:

A feature in this context is meant to be any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation. (Ref. IHO document S44) significantFeaturesDetected does not describe if significant features were actually detected during a survey, but whether the survey had the capacity to detect significant features. The word significant should be understood in the context of the feature detection requirements of IHO document S44.

Proposed Change:

Add this new simple attribute type which is a sub-attribute of the featuresDetected complex attribute

Justification:

significantFeaturesDetected forms part of the replacement of CATZOC and is used to express if significant features have likely been detected in an area.

Proposal for a new simple attribute type: Size OF Features Detected

Register: Hydro FDD

Name: Size OF Features Detected

camelCase: sizeOfFeaturesDetected

Alphacode: SIZOFD

Attribute type: Real

Definition

The size of detected features in an area.

Remarks:

A feature in this context is meant to be any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation. (Ref. IHO document S44) sizeOfFeaturesDetected does not describe the size of features that were actually detected during a survey, but the size of the smallest feature that the survey was able to detect with a high probability.

Proposed Change:

Add this new simple attribute type which is a sub-attribute of the featuresDetected complex attribute

Justification:

sizeOfFeaturesDetected forms part of the replacement of CATZOC and is used to state the likely size of detected features in an area if significant features have been detected in that area.

Proposal for a new simple attribute type: Least Depth Of Detected Features Measured

Register: Hydro FDD

Name: Least Depth Of Detected Features Measured

camelCase: leastDepthOfDetectedFeaturesMeasured

Alphacode: LDODFM

Attribute type: Boolean

Definition

Expression stating if the least depth of detected features in an area was measured

Remarks:

A feature in this context is meant to be any object, whether manmade or not, projecting above the sea floor, which may be a danger for surface navigation. (Ref. IHO document S44) leastDepthOfFeaturesDetected does not describe the least depth of features that were actually detected during a survey, but the ability of the survey to detect the least depth of features with an uncertainty as given by IHO document S44 or better.

Proposed Change:

Add this new simple attribute type which is a sub-attribute of the featuresDetected complex attribute

Justification:

leastDepthOfDetectedFeaturesMeasured forms part of the replacement of CATZOC and is used to express if the least depth of detected features in an area was measured.

Proposal for a new simple attribute type: Positional Uncertainty

Register: Hydro FDD

Name: Positional Uncertainty

camelCase: positionalUncertainty

Alphacode: POSUNC

Attribute type: Real

Definition

The best estimate of the uncertainty of a position in the horizontal plane.

Remarks:

Positional uncertainty is distinguished from other types of horizontal uncertainty, such as horizontal distance uncertainty and orientation uncertainty.

Proposed Change:

Add this new simple attribute type to supersede POSACC

Justification:

Change of name and definition to express uncertainty as opposed to accuracy.

Proposal for a new simple attribute type: Vertical Uncertainty

Register: Hydro FDD

Name: Vertical Uncertainty

camelCase: verticalUncertainty

Alphacode: VERUNC

Attribute type: Real

Definition

The best estimate of the uncertainty of a vertical measurement.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede SOUACC

Justification:

Change of name and definition to express uncertainty as opposed to the accuracy, and to allow expression of uncertainty of all vertical measurements as opposed to only for soundings.

Proposal for change to simple attribute type: Survey Date End

Register: Hydro FDD

Name: Survey Date End

camelCase: surveyDateEnd

Alphacode: SUREND

Attribute type: Date

Definition

The end date of the survey or group of surveys

Remarks:

Nil

Proposed Change:

Change the definition of and supersede SUREND

Justification:

Definition change needed to enable the attribute to express the end date of a grouping of surveys

Proposal for change to simple attribute type: Survey Date Start

Register: Hydro FDD

Name: Survey Date Start

camelCase: surveyDateStart

Alphacode: SURSTA

Attribute type: Date

Definition

The start date of the survey or group of surveys

Remarks:

Nil

Proposed Change:

Change the definition of and supersede SURSTA

Justification:

Definition change needed to enable the attribute to express the start date of a grouping of surveys

Proposal for a new simple attribute type: Technique Of Vertical Measurement

Register: Hydro FDD

Name: Technique Of Vertical Measurement

camelCase: techniqueOfVerticalMeasurement

Alphacode: TECVEM

Attribute type: Enumerate

Definition

Technique used to make a vertical measurement

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede TECSOU. List of TECSOU enumerates to be copied for techniqueOfVerticalMeasurement, potentially with changes.

Justification:

Change of name and definition to extend the usefulness of the attribute to all vertical measurements, as opposed to only sounding measurements.

Proposal for a new simple attribute type: Full Seafloor Coverage Achieved

Register: Hydro FDD

Name: Full Seafloor Coverage Achieved

camelCase: fullSeafloorCoverageAchieved

Alphacode: FSECOA

Attribute type: Boolean

Definition

Expression stating if full seafloor coverage has been achieved in an area

Remarks:

fullSeaFloorCoverageAchieved applies both to the spatial completeness of feature detection and to the spatial completeness of the measurement of the regular sea floor. The former is further specified in featuresDetected, the latter in measurementDistanceMinimum and measurementDistanceMaximum. Note that, in spite of the representation of a depth measurement with a single position, it actually represents an area with a certain footprint on the sea floor.

Proposed Change:

Add this new simple attribute type

Justification:

fullSeafloorCoverageAchieved forms part of the replacement of CATZOC and is used to express if full seafloor coverage has been achieved in an area.

Proposal for a new simple attribute type: Category Of Temporal Variation

Register: Hydro FDD

Name: Category Of Temporal Variation

camelCase: categoryOfTemporalVariation

Alphacode: CATTVA

Attribute type: Enumeration

Definition

An assessment of the likelihood of change within an area since last survey	
Enumeration	Definition
Un-assessed	Temporal variation not assessed.
Event	No new survey conducted after an event (e.g. hurricane, earthquake, volcanic eruption, landslide, etc), which is considered likely to have changed the seafloor significantly.
Likely to change	Continuous or frequent change (e.g. river siltation, sand waves, seasonal storms, ice bergs, etc).
Unlikely to change	Significant change to the seafloor is not expected.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type

Justification:

The attribute is needed to reduce the need for caution area or use of text in information or textual description attributes regarding the expected change in an area. Furthermore, this attribute enables data producers to express their uniform expectation of change in an area.

Proposal for a new feature type: Quality Of Survey

Register: Hydro FDD

Name: Quality Of Survey

camelCase: QualityOfSurvey

Alphacode: M_QOSY

Attribute	Type	Cardinality		Infinity	Sequential
		Lower	Upper		
featuresDetected	Complex	0	1	No	No
qualityOfPosition	Enumerate	0	1	No	No
qualityOfVerticalMeasurement	Enumerate	0	1	No	No
scaleValueOne	Integer	0	1	No	No
scaleValueTwo	Integer	0	1	No	No
measurementDistanceMinimum	Integer	0	1	No	No
measurementDistanceMaximum	Integer	0	1	No	No
surveyAuthority	Text	1	1	No	No
surveyDateEnd	Date	1	1	No	No
surveyDateStart	Date	1	1	No	No
surveyType	Enumerate	1	1	No	No
techniqueOfVerticalMeasurement	Enumerate	0	1	No	No
fullSeafloorCoverageAchieved	Boolean	0	1	No	No
lineSpacingMinimum	Integer	0	1	No	No
lineSpacingMaximum	Integer	0	1	No	No
information	Complex	0	*	Yes	No
textualDescription	Complex	0	*	Yes	No
sourceIndication	Complex	0	*	Yes	No

Definition

An area within which a uniform assessment of the quality of source survey information exists.

Remarks:

QualityOfSurvey could apply to a bathymetric survey, a nonbathymetric survey, or a combined survey of bathymetry and nonbathymetry.

Proposed Change:

Add this new feature type and retire M_SREL which this proposal will supersede.

Justification:

The name survey reliability was considered inappropriate for the function of this feature. Furthermore, the sole function for the proposed feature will be to express survey quality.

Proposal for a new simple attribute type: Quality Of Vertical Measurement

Register: Hydro FDD

Name: Quality Of Vertical Measurement

camelCase: qualityOfVerticalMeasurement

Alphacode: QUAVEM

Attribute type: Enumerate

Definition

Quality of a vertical measurement

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede QUASOU. List of QUASOU enumerates to be copied for qualityOfVerticalMeasurement, potentially with changes.

Justification:

Change of name and definition to extend the usefulness of the attribute to all vertical measurements, as opposed to only sounding measurements.

Proposal for a new simple attribute type: Measurement Distance - Minimum

Register: Hydro FDD

Name: Measurement Distance - Minimum

camelCase: measurementDistanceMinimum

Alphacode: MDISMN

Attribute type: Real

Definition

The minimum spacing of the individual measurements of a survey.

Remarks:

In case measurementDistanceMinimum equals zero for the full area of the survey, fullSeaFloorCoverageAchieved should be set to 'yes'. Note that, in spite of the representation of a depth measurement with a single position, it actually represents an area with a certain footprint on the sea floor. measurementDistanceMinimum should not be larger than measurementDistanceMaximum.

Proposed Change:

Add this new simple attribute type.

Justification:

measurementDistanceMinimum forms part of the replacement of CATZOC and is used to express if full seafloor coverage has been achieved in an area.

Proposal for a new simple attribute type: Measurement Distance - Maximum

Register: Hydro FDD

Name: Measurement Distance - Maximum

camelCase: measurementDistanceMaximum

Alphacode: MDISMX

Attribute type: Real

Definition

The maximum spacing of the principal measurement lines of a survey.

Remarks:

In case measurementDistanceMaximum equals zero for the full area of the survey, fullSeaFloorCoverageAchieved should be set to 'yes'. Note that, in spite of the representation of a depth measurement with a single position, it actually represents an area with a certain footprint on the sea floor. measurementDistanceMaximum should not be smaller than measurementDistanceMinimum.

Proposed Change:

Add this new simple attribute type.

Justification:

measurementDistanceMaximum forms part of the replacement of CATZOC and is used to express if full seafloor coverage has been achieved in an area.

Proposal for changes to simple attribute type: Survey Type

Register: Hydro FDD

Name: Survey Type

camelCase: surveyType

Alphacode: SURTYP

Attribute type: Enumerate

Definition

Types of survey used to obtain measurements	
Enumeration	Definition
Full coverage survey	Full coverage is defined as 100% coverage using systematic controlled surveys providing full sea floor coverage or full coverage to a defined depth and an investigation of all contacts. See also: Controlled survey, Examination Survey, Acoustically Swept survey, Mechanically Swept survey
Systematic survey	Systematic is defined as a controlled survey but full coverage may not have been achieved. See also controlled survey.
Non-systematic survey	Surveys other than the two defined above. Examples: Reconnaissance, Sketch, Track, Passage, Remotely sensed and Spot-sounding surveys. See below for definitions of these types. Consider using inadequately surveyed if the depths and types of navigation in the area pose a potential risk of vessel grounding.
Inadequately surveyed	Surveys that are not to modern standards, or which, due to their age, their scale or the positional or vertical uncertainties are not suitable to the type of navigation expected in the area.
Reconnaissance survey	A hasty preliminary survey of a region made to provide some advance information regarding the area which may be useful, pending the execution of more complete surveys. Also called preliminary survey. Also - a survey made to a lower degree of accuracy and detail than the chosen scale would normally indicate (as defined in the previous version of SURTYP).
Sketch survey	Hydrographic Survey made (due to lack of time or facilities) to a lower degree of accuracy and detail than the chosen scale would normally indicate.
Passage survey	Survey where soundings are acquired by vessels on passage. Also - Track survey.
Spot-soundings survey	Survey that uses a regular (e.g. grid) or irregular pattern of soundings obtained one at a time, and normally with very wide spacing.
Remotely sensed	Survey where features have been positioned and delimited using remote sensing techniques.

Controlled survey	Thorough survey usually conducted with reference to guidelines.
Examination survey	Survey principally aimed at the investigation of underwater obstructions and dangers.
Acoustically swept survey	Controlled, systematic survey to standard accuracy; using modern survey echosounder with sonar sweep
Mechanically swept survey	Swept areas where the clearance depth is accurately known but the actual seabed depth is not accurately known.

Remarks:

Nil

Proposed Change:

Revise list of allowed enumerates as above?

Justification:

Implement changes to enable encoders to better capture type of survey used to obtain data.

Proposal for a new simple attribute type: Line Spacing - Minimum

Register: Hydro FDD

Name: Line Spacing - Minimum

camelCase: measurementDistance Minimum

Alphacode: LNSPMN

Attribute type: Real

Definition

The minimum distance between survey lines.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede SDISMN.

Justification:

Add this attribute to enable the capture of minimum distance between survey lines in a single survey.

Proposal for a new simple attribute type: Line Spacing - Maximum

Register: Hydro FDD

Name: Line Spacing - Maximum

camelCase: measurementDistanceMaximum

Alphacode: LNSPMX

Attribute type: Real

Definition

The maximum distance between survey lines.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede SDISMX.

Justification:

Add this attribute to enable the capture of maximum distance between survey lines in a single survey.

Proposal for a new feature type: Quality Of Nonbathymetric Data

Register: Hydro FDD

Name: Quality Of Nonbathymetric Data

camelCase: QualityOfNonbathymetricData

Alphacode: M_QOND

Attribute	Type	Cardinality		Infinity	Sequential
		Lower	Upper		
positionalUncertainty	Real	0	1	No	No
verticalUncertainty	Real	0	1	No	No
surveyDateEnd	Date	0	1	No	No
surveyDateStart	Date	0	1	No	No
horizontalDistanceUncertainty	Real	0	1	No	No
categoryOfTemporalVariation	Enumerate	1	1	No	No
orinetationalUncertainty	Real	0	1	No	No
information	Complex	0	*	Yes	No
textualDescription	Complex	0	*	Yes	No
sourceIndication	Complex	0	*	Yes	No

Definition

An area within which a uniform assessment of the quality of the nonbathymetric data exists.

Remarks:

Nil

Proposed Change:

Add this new feature type

Justification:

QualityOfNonbathymetricData fulfill a gap in the ability to provide a uniform assessment of data quality for nonbathymetric features.

Proposal for a new simple attribute type: Horizontal Distance Uncertainty

Register: Hydro FDD

Name: Horizontal Distance Uncertainty

camelCase: horizontalDistanceUncertainty

Alphacode: HRDUNC

Attribute type: Real

Definition

The best estimate of the horizontal uncertainty of horizontal clearance and distances.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type to supersede HORACC.

Justification:

Change of name and definition to express uncertainty as opposed to the accuracy.

Proposal for a new simple attribute type: Orientation Uncertainty

Register: Hydro FDD

Name: Orientation Uncertainty

camelCase: OrientationUncertainty

Alphacode: ORIUNC

Attribute type: Real

Definition

The best estimate of the uncertainty in angular measurements made relative to true north.

Remarks:

Nil

Proposed Change:

Add this new simple attribute type.

Justification:

Attribute needed to enable expression of uncertainty in angular measurements.