Title: GML clarifications

S-100 Maintenance - Change Proposal Form

Organisation	Raphael Malyankar	**Date**	8/25/2017
Contact	Raphael Malyankar	**Email**	raphaelm@portolansciences.com

Change Proposal Type *(Select only one option)*

1.Clarification	2.Correction	3.Extension
		X

Location (*Identify all change proposal locations)*

S-100 Version No.	Part No.	Section No.	Proposal Summary
3.0.0	10b	8.5.2	Modify language of introductory paragraph to take into account the fact that blended curve interpolation proposed in the bSplines concept is an extension to the curve interpolation types defined in GML 3.2.1. Add the 4 curve interpolation types in the bSplines proposal.
		8.7	Update compliance level 2 to include splines and blended curves in Level 2.
		9.5.2	Correct the example to use RecommendedTrack for the second feature instance.
		9.6.1	Add table describing Dataset Identification Header elements.
		9.6.2	Add table describing Dataset Structure Information elements.
		14	New section describing conventions for GML datasets
		15	New section with informative hints for developers

Change Proposal

Please see the Annex for the detailed change proposals.

Change Proposal Justification

The additions to curve interpolation are needed for encoding splines and blended curves as as added in a separate proposal.

Dataset Structure and Identification header tables define the elements in the figures for reference by product specifications defining GML data formats.

The new sections on conventions for GML datasets and hints for developers are clarifications requested by developers.

What parts of the S-100 Infrastructure will this proposal affect?

- ☐ S-100 Feature Concept Dictionary Interface or Database
- ☐ S-100 Portrayal Register
- ☐ S-100 Feature Catalogue Builder
- ☐ S-100 Portrayal Catalogue Builder
- ☐ S-100 UML Models

Please send completed forms and supporting documentation to the secretary S-100WG.

Annex – Updates in Detail

10b-8.5.2 Curve Interpolation

The list of allowable values consists of a subset of the values allowed by ISO 19136 plus extensions for spline and interpolated curve segments (the forthcoming new edition of ISO 19107 clarifies that the list of interpolations in the standard is not exhaustive):

(No change for first 7 interpolation types. Add the four types below.)

8) **Polynomial (polynomialSpline)** – the control points are ordered as in a line-string, but they are spanned by a polynomial function. Normally, the degree of continuity is determined by the degree of the polynomials chosen.

9) **Bézier Spline (bezierSpline)** – the data are ordered as in a line string, but they are spanned by a polynomial or spline function defined using the Bézier basis. Normally, the degree of continuity is determined by the degree of the polynomials chosen.

10) **B-spline (bSpline)** – the control points are ordered as in a line string, but they are spanned by a polynomial or rational (quotient of polynomials) spline function defined using the B-spline basis functions (which are piecewise polynomials). The use of a rational function is determined by the Boolean flag "isRational." If isRational is TRUE then all the DirectPositions associated with the control points are in homogeneous form. Normally, the degree of continuity is determined by the degree of the polynomials chosen.

11) **Blended parabolic (blendedParabolic)** – the control points are ordered as in a line-string, but are spanned by a function that blends segments of parabolic curves defined by triplet sequences of successive data points. Each triplet includes the final two points of its predecessor. Further details of the semantics are provided in Part 7 clause 7-4.2.2.2.

10b-8.7 Compliance levels

Expand the definition of Level 2 to include splines.

2	All features of Level 1, plus circle and arc by center point geometry, splines, and blended interpolations

10b-9.5.2 Correct the second instance in the example:

```
<RecommendedTrack gml:id=”US890321”>
  <navLine xlink:href=”#US123098”
        xlink:arcrole=”urn:iho:s101:1.0:52.1” title=”RangeSystem”/>
  ...
</RecommendedTrack>
```

10b-9.6.1 Dataset Identification

Insert the table below:

Dataset identification information is defined by the complex type *DatasetIdentificationType*. The fields are shown in the table and figure below.

Table 10b-2. Dataset identification header elements

Field	XML Tag	Value	Mult.	Type	Description
Encoding specification	encodingSpecification	‘S-100 Part 10b’	1	CharacterString	Encoding specification that defines the encoding
Encoding specification edition	encodingSpecification Edition	“1.0”	1	CharacterString	Edition of the encoding specification
Product identifier	productIdentifier		1	CharacterString	Unique identifier for the data product

Product edition	productEdition		1	CharacterString	Edition of the product specification
Application profile	applicationProfile		1	CharacterString	“1” – base datasets “2” – update datasets
Dataset file identifier	datasetFileIdentifier		1	CharacterString	The file name including the extension but excluding any path information
Dataset title	datasetTitle		1	CharacterString	The title of the dataset
Dataset reference date	datasetReferenceDate		1	date	The issue date of the dataset. Format: YYYY-MM-DD
Dataset language	datasetLanguage	“EN”	1	ISO 639-1	The (primary) language used in this dataset
Dataset abstract	datasetAbstract		0..1	CharacterString	The abstract of the dataset
Dataset topic category	datasetTopicCategory	{14}{18}	1..*	MD_TopicCategoryCode (ISO 19115)	A set of topic category codes from the MD_TopicCategoryCode list in ISO 19115

10b-9.6.2 Dataset structure information

Table 10b-3. Dataset structure header elements

Subfield name	XML Tag	Default Value	Mult.	Type	Description
Dataset Coordinate Origin X	datasetCoordOriginX	0.0	0..1	Real	Shift used to adjust x-coordinate before encoding. Set to 0.0 if no shift is used.
Dataset Coordinate Origin Y	datasetCoordOriginY	0.0	0..1	Real	Shift used to adjust y-coordinate before encoding. Set to 0.0 if no shift is used.
Dataset Coordinate Origin Z	datasetCoordOriginZ	0.0	0..1	Real	Shift used to adjust z-coordinate before encoding.
Coordinate multiplication factor for x-coordinate	coordMultFactorX	1	0..1	Positive Integer	Floating point to integer multiplication factor for the x-coordinate or longitude.
Coordinate multiplication factor for y-coordinate	coordMultFactorY	1	0..1	Positive Integer	Floating point to integer multiplication factor for the x-coordinate or longitude.
Coordinate multiplication factor for z-coordinate	coordMultFactorZ	1	0..1	Positive Integer	Floating point to integer multiplication factor for the z-coordinate or depths or height.
Number of Information Type records	nInfoRec		0..1	Integer ≥ 0	Number of information records in the dataset.
Number of Point records	nPointRec		0..1	Integer ≥ 0	Number of point records in the dataset.
Number of Multi Point records	nMultiPointRec		0..1	Integer ≥ 0	Number of multi point records in the dataset.
Number of Curve records	nCurveRec		0..1	Integer ≥ 0	Number of curve records in the dataset.
Number of Composite Curve records	nCompositeCurveRec		0..1	Integer ≥ 0	Number of composite curve records in the dataset.
Number of Surface records	nSurfaceRec		0..1	Integer ≥ 0	Number of surface records in the dataset.
Number of Feature Type records	nFeatureRec		0..1	Integer ≥ 0	Number of feature records in the dataset

10b-14 Conventions for S-100 GML data formats

Data formats must use the camel case codes of features, information types, and attributes as specified in feature catalogues as the 'local name' in element tags for GML features, objects, or attributes.

EXAMPLE: Given a feature catalogue that defines a feature named "Marine Protected Area" with code "MarineProtectedArea" the corresponding feature in the dataset must use "MarineProtectedArea" as the local name – e.g., `<S122:MarineProtectedArea ...` or `<MarineProtectedArea ...` .

For S-100 Enumeration or S-100 Codelist attributes, datasets must use the code, label, or alias field of the listed value as encoded in the feature catalogue. Dataset header information must specify which is used in the *attributeEncoding* field of header metadata.

Spatial objects that are encoded independently of features (i.e., not embedded in a feature) must be encoded with tags whose local name components are the spatial object elements in the S-100 GML profile (e.g., S100:Point).

Feature and information associations must encode at least one of the *role* or *arcrole* attributes of the reference.

The following tags are reserved and may not be used in GML data formats as local names of elements:

- member
- imember
- geometry
- location

GML data formats for S-100 datasets must follow the GML rules as described in the GML specification (ISO 19136/OGC 07-036), as modified by the S-100 GML profile and this Part.

10b-15 Processing of GML datasets (informative)

Implementations, including applications and production tools, may use any suitable method for processing GML datasets. While GML datasets must conform to the GML application schemas defined in product specifications, processors are not required to use the GML application schemas for processing datasets. However, the combination of the GML specification, this Part, and the S-100 GML profile result in the following commonalities:

1) Each dataset has a single root element ("ROOTELEMENT"). GML datasets are XML documents and this is an XML requirement.
2) The tags "member" and "imember" are reserved for use as wrapper tags for feature and information types. Use of these wrapper tags is optional in S-100 GML application schemas.
3) Given the path /ROOTELEMENT/member/X1/X2 then X1 is a feature and X2 is an attribute or association role. Similarly given /ROOTELEMENT/imember/X1/X2 X1 is an information type and X2 one of its attributes or associations.
4) If X2 has XML attributes xlink:href and xlink:role and/or xlink:arcrole it is an association role.
5) If X2 has element content it is a complex or spatial attribute.
6) A spatial attribute or object will have one of the allowed spatial properties as its content.
7) If X2 is empty and nilled, or has text or numeric content, it is a simple attribute.

8) Applications must allow for the presence or absence of namespaces, e.g. X1 might be of the form S122:FeatureA, etc. Namespaces in XML precede a ':' so it is possible for applications to distinguish the namespace part of the tag from the ‘local name’ part.