Paper for Consideration by S-100TSM7

Establishment of a Codelist Register in the IHO GI Registry

Submitted by:	IHO GI Registry Manager
Executive Summary:	Experience with the current structure of the IHO GI (Beta) Registry, supported by research with other established Registries, indicates that the IHO GI Registry will benefit from the establishment of a "Codelist" Register.
Related Documents:	S-100WG2-09.3 – *Proposed Extension to the IHO Registry*
	S-100WG3-06.2.2 Rev1 – *Proposed Structure of the IHO Geospatial Information (GI) Registry*
	REGWS1-03.2A – *Registry Structure and Roles ("new")*
	Summary of discussions at IHO GI Registry Workshop (in conjunction with S-100WG4).
Related Projects:	IHO GI Registry Development

Introduction / Background

1. The introduction of a "Concept Register" in the "Beta" Registry structure is intended to allow for variations in modelling of hydrographically related concepts in a multi-domain environment, based on the requirements of S-100 based Product Specifications. While the removal of the assignment of "type" (feature, attribute, enumerate, etc.) at the concept level provides the required flexibility for variations in modelling in a multi-domain environment, a disadvantage of this implementation is the removal of the implicit binding of enumeration (and Codelist) values to their binding attribute at a fundamental level. Such definition is an important aspect of maintaining interoperability at the attribution level between S-100 based datasets. This paper formerly proposes the implementation of a "Codelist Register" within the "Beta" Registry structure, in order to provide a single repository for all enumeration and Codelist type attribute lists for use in S-100 based Product Specifications.

Discussion

2. The notion of the introduction of a "Codelist Register" in the IHO Geospatial Information (GI) Registry structure is not new. It was first introduced to the S-100WG at the S-100WG3 meeting in 2018 (paper S-100WG3-06.2.2 Rev1 refers). Investigations of other Registries by the IHO GI Registry Manager in the process of developing the revised structure of the IHO GI Registry, in particular the European Union INSPIRE Registry (http://inspire.ec.europa.eu/registry), provided the motivation for this inclusion:

3. At the IHO GI Registry Workshop held in conjunction with the S-100WG4 meeting (25 February – 01 March 2019 in Aalborg, Denmark), the question of the introduction of a Codelist Register within the Registry infrastructure was discussed at length. A number of advantages of the inclusion of such a Register were reported by the IHO GI Registry Manager, based on experience with working with the current structure and contents of the Registry (FCD Register). However, due to no formal proposal having been submitted, the Workshop agreed that all items are to be registered in the new Concept Register of the "Beta" Registry, pending submission of a formal proposal to the S-100TSM for more formal discussion.

4. The current version of the schematic of the proposed IHO GI Registry structure, as presented by the IHO GI Registry Manager at the GI Registry Workshop, is shown below. The "Codelist" Register, located at the bottom of the schematic, is highlighted by a blue oval.
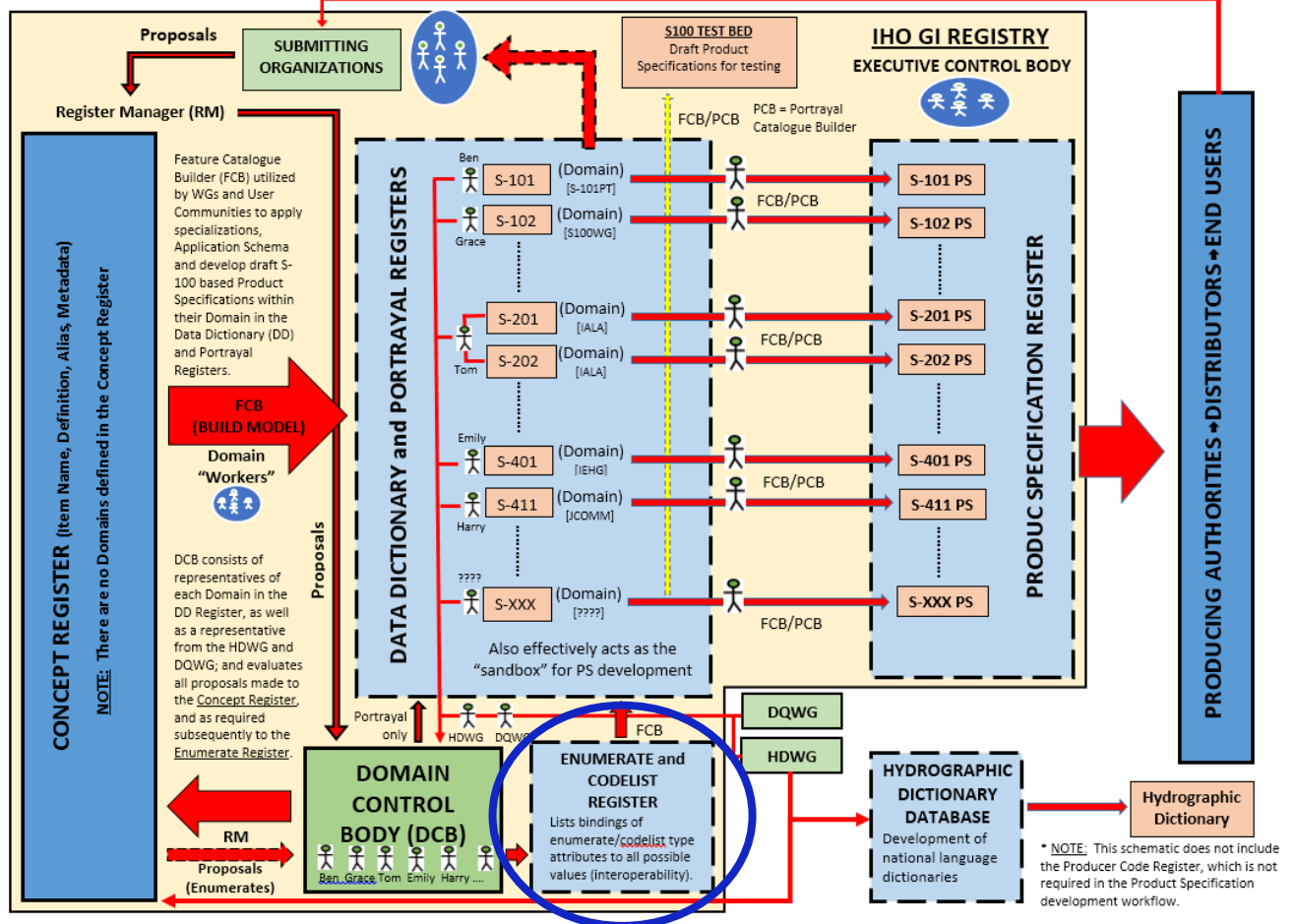
5. The processes of the management and workflow of the proposed Codelist Register within the Registry structure will not be discussed in great detail in this Paper, which will focus on the reasoning and perceived advantages of the inclusion of the Register based on the experience of the Registry Manager. The following sub-paragraphs list the main points:

5.1. Rationalized Concept Register content: The current FCD Register contains over 5500 registered items, comprising all allowable types including enumerate and codelist values, which themselves constitute approximately 75% of these registered items. At the IHO GI Registry Workshop, it was agreed that, in the absence of a Codelist Register, all items would be required to be registered in the Concept Register. A major concern with this is the registration of "coded lists" of enumerate/codelist values, which the Workshop concluded could be managed through registering hierarchically (thematically) with the binding attribute, for instance categoryOfMarineProtectedArea::iUCNCategoryIa. There are many such coded lists already registered, and it is anticipated that there will be many more in the future. An extract of a spreadsheet maintained by the IHO GI Registry Manager to track progress of the FCD Register item review is included below to show an example of currently registered list items. As a result of the increasing number of coded lists that will be required to be registered in the Concept Register, the content in regard to pure concepts may be considered to be diluted by a comparatively large number of entries that are in themselves not concepts, but characteristics or characterizations of concepts.

Item	Domain (FCD)	Type	Issue	Comments	Decision	Addressed	Item Name	CamelCase	Use Type	Definition	Definition Source
(A.1a) closed area, but small craft boats without engine permitted (only RheinSchPV and Binnenvaatpolitiere glement)	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.1a"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.2) no overtaking	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.2"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.3) no overtaking of convoys by convoys	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.3"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.4) no passing or overtaking	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.4"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.5) no berthing (i.e. no anchoring or making fast to the bank)	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.5"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.5.1) no berthing within the breadth indicated in meters(measured from the sign)	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.5.1"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.6) no anchoring or trailing of anchors, cables or chains	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.6"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.7) no making fast to the bank	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.7"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.8) no turning	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.8"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.9) do not create wash	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values of "Category of Notice Mark", in addition to the "meaning"(?) of the code being included. Needs to be discussed.	TSSO: Suggest Item Name be amended to "Prohibition Mark A.9"			Refer to issue	OK	NA	Almost repeat of the name.	Missing
(A.10) no passing on	Inland ENC	Enumerate	There appears to be a "code" value included at the start of the Item Name for all registered values	TSSO: Suggest Item Name be							

Enumerates | Codelists | Codelist Value | **Combined**

5.2. <u>Repository of hierarchically linked codelist/enumeration "code" values:</u> Enumerated and Codelist lists are characterized by assigned "coded" values specific to the binding enumerated/codelist attribute:

visually conspicuous	(CONVIS)	1 : visually conspicuous 2 : not visually conspicuous 3 : prominent	EN	0,1

Within the Concept Register, there are currently no fields in which these coded values and the binding attribute are recorded/managed, which would require a change to the Concept Register. Further, such a change would result in an inconsistency within the Concept Register in that such fields would only be required for enumeration and Codelist types; and more fundamentally introduces the realization of a type at the concept level, which we are trying to avoid. Without a Codelist Register, the alternative to introducing a coded list value field at the concept level would be to assign such values at the Feature Data Dictionary Register level, which has potential to impact on interoperability (see paragraph 5.4 below).

5.3. <u>Consolidated complete codelist repository:</u> One of the principle advantages of establishing a Codelist Register will be a repository for an unambiguous, complete list of all enumerations and codelists and all possible allowable values for use in S-100 based Product Specifications. In the current structure of the Beta Registry, this is not the case; Product Specification developers wishing to implement already registered enumerate and Codelist type attributes will need to interrogate implementations within the Domains of the Feature Data Dictionary Register, from which there may be instances where no implementation includes the complete allowable list.

5.4. <u>Promotes interoperability:</u> As stated in paragraph 5.2 above, unless a mechanism exists to define the binding attribute and code value at the Concept Register level, Product Specification developers will be free to build their own enumerate and Codelist type attributes as they like within their Domain of the Feature Data Dictionary Register. This clearly will not contribute to harmonization between S-100 based Product Specifications. Issues that may occur under this structure include:
- Same/similar lists built having different code value meanings;
- Variations of different lists having essentially the same meaning;
- New values being added to or removed from lists without any consultative (DCB) process.

5.5. <u>Structured implementation of "scopes" (specializations):</u> The use of scopes or specializations within the IHO GI Registry is a relatively new concept. The introduction of a Codelist Register within the IHO GI Registry structure will provide greater flexibility in using scopes or specializations in that it will introduce a formal mechanism within which these can be established and managed. For example, at the concept level, "seaArea" may be registered; within the Codelist Register, the codelist "seaArea::categoryOf" is registered as a scope of the concept "seaArea", with all the allowable values registered against this (for example "seaArea::categoryOf::seamount", although the relationship of values to attributes is implicit due to the hierarchical structure of the Register). Such a structure will allow for true concepts to be registered at the Codelist Register level, with characteristics of the concept (such as "category of") only required to be registered at the Codelist Register level. Another example is the registration of the concept "reed" at the Concept Register level with two distinct definitions; the specializations of these distinct definitions is

described at the Codelist Register level with the enumerate value "fogSignal::categoryOfFogSignal::reed" having one definition and "vegetation::categoryOfVegetation::reed" the other.

6.   In terms of the management of Codelist Register content, it is suggested that proposals to add new Codelists or Codelist values follow the same proposal and approval process as that for proposals to the Concept Register, including evaluation by the Domain Control Body, as indicated in the first figure in this paper. It is considered that attributes registered in the Codelist Register will not themselves be required to be registered at the Concept Register level (see paragraph 5.5 above), although concepts at the Concept Register level may be used. Codelist values may be registered at the Concept level (for instance "seamount" as mentioned in paragraph 5.5 may also be registered as a concept), but "coded list" values should only be registered at the Codelist Register level. This may require some further discussion and refinement once experience is gained; and such guidance of the use of the Codelist Register will be required to be included in S-99.

7.   If the inclusion of a Codelist Register is accepted, further consideration may be given as to whether there is a requirement to also include a Complex Attribute Register, as many of the same arguments used above for Codelists also apply to complex attributes.

Conclusions

8.   The inclusion of a Codelist Register in order to more formerly and consistently manage enumerations and Codelists is considered by the IHO GI Registry Manager to be a critical component of the Registry structure. Without such a Register, as such relying solely on the inclusion of all items required to be used in S-100 based Product Specifications at the Concept Register Level, will likely result in a Concept Register inflated by items which are not genuine concepts; confusion for Product Specification developers in interrogating the Registry; potential issues with product interoperability; and a reduction in the flexibility of the Registry.

Recommendations

9.   It is recommended that a Codelist Register is introduced into the IHO GI Registry structure at the earliest opportunity, and no later than preparations for the migration of the current FCD Register content to the Beta Registry have been completed (expected to be in the first quarter of 2020). It is further recommended that discussion and consideration be given to a requirement for the similar establishment of a Complex Attributes Register.

Action Requested of the TSM

10.   The TSM meeting is invited to:
1) **Discuss** the implications of the establishment of a Codelist Register as outlined in this paper.
2) **Endorse** the establishment of the Codelist Register into the IHO GI Registry structure during the first half of 2020.
3) **Consider**, based on the outcomes of the Codelist Register discussion, the possible requirement for a Complex Attributes Register.