**IHO GEOSPATIAL INFORMATION (GI) REGISTRY STRUCTURE AND CONTENT**

**QUESTIONS AND ISSUES**

**Introductory Notes and References**

Namespaces: Refer paper “Maritime Resource Name – IALA” presented at the 17th e-Navigation Technical Committee; and website <https://www.iala-aism.org/technical/data-modelling/mrn/>. Note: IHO has been assigned the Marine Resource Name (MRN) Organization ID ***urn:mrn:iho***. Refer also to S-100 Edition 4.0.0 – clause 3-10.

**Questions**

1. **Namespaces: Can the IALA assigned URN *urn:mrn:iho* be utilized in the Registry as the basis for the implementation of namespaces?**

Example: In the Concept Register, the registered item “Wreck” would be assigned similar to urn:mrn:iho:registry:wreck. Similarly, the registered item “ValueOfSounding” would be assigned urn:mrn:iho:registry:valueofsounding. When ValueOfSounding is bound to Wreck in the Data Dictionary Register as a simple attribute, this would be assigned as urn:mrn:iho:registry:wreck:valueofsounding. Simarly, when ValueOfSounding is bound to a registered concept “Obstruction” in the Data Dictionary Register as a simple attribute, this would be assigned as urn:mrn:iho:registry:obstruction:valueofsounding.

Discussion:

**Outcome:**

1. **Namespaces: If the above is not required for the Registry, will a simple hierarchical use of the registered concept names suffice for the application of namespaces?**

Example: Using the above example, when ValueOfSounding is bound to Wreck in the Data Dictionary Register as a simple attribute, this would be assigned as Wreck:valueOfSounding. Simarly, when ValueOfSounding is bound to the registered concept “Obstruction” in the Data Dictionary Register as a simple attribute, this would be assigned as Obstruction:valueOfSounding.

In the Codelist/Enumerate Register, the attribute “Light Characteristic” would have the first assigned value “Fixed” assigned as lightCharacteristic:1:fixed; then lightCharacteristic:2:flashing ….

Discussion:

**Outcome:**

1. **camelCase and Namespaces: What is the relationship between camelCase and Namespaces (uniqueness; between Registers; are both required)?**

Discussion:

**Outcome:**

1. **Flexibility in the Registry: Is it a viable option, so as to allow flexibility across different user communities and Domains within the Registry, to specify that concepts registered in the Concept Register be as generic as possible, with specializations derived from the Concept Register (and possibly the Codelist Register?) defined within the Domains of the Data Dictionary Register?**

Example: In the Concept Register, a generic item “Berthing” is registered with a very generic definition, for instance: “The process of bringing a vessel into a berth” (this could also serve, if required, as the Hydrographic Dictionary definition). In the Data Dictionary Register, this may be used in its generic form, or as a specialization, for instance as a categoryOfBerthing attribute (definition: “Classification of berthing protocols” (link back to generic concept definition in the Concept Register)). In the Codelist Register, the concept may be registered as specialized enumerate values. For instance, actionOrActivity:4:berthing; and categoryOfSignalStationTraffic:4:berthing. Both with definitions that are either equivalent to the generic or derived from the generic (the former could adopt the generic and the latter derive the definition “A signal station for the control of vessels when berthing”).

Discussion:

**Outcome:**

1. **Concept Register – Definition: Can a single registered item in the Concept Register have multiple definitions?**

Example: The term “reed” has 2 discrete definitions that may be considered to be relevant to hydrography. [NOTE: These definitions have been taken from the 2 separately registered enumerate values in the “current” FCD Register.]

1. Any of various water or marsh plants with a firm stem. (categoryOfVegetation = 11)

2. A reed uses compressed air and emits a weak, high pitched sound. (categoryOfFogSignal = 5)

In terms of application in the Data Dictionary Register, only one of the definitions can be implemented. Therefore, for categoryOfVegetation:11:reed, the definition would be definition (1); and for categoryofFogSignal:5:reed, the definition would be definition (2).

Discussion: TSSO: Consider that this should be allowable.

**Outcome:**

1. **Concept Register – camelCase: What is going to be the convention for camelCase to be used in the Concept Register?**

Discussion: The use of camelCase is based on principles inherited from ISO 19103 and defined in S-100 clause 2a-4.2.3. The issue with the GI Registry is the necessary introduction of a true Concept Register, which does not assign a Type (feature, attribute, …) at the concept level. S-100 (Ed. 4.0.0) specifies that feature and information types must begin with upper case, while attribute and enumerate (and codelist) value types must begin with lower case. If Type is not defined in the Concept Register, what convention should be adopted? Taking this a step further – once a convention is agreed on this will mean that the syntax of the camelCase will need to be “changed” when the concept is utilized in the Data Dictionary Register dependent on assignment of Type and the agreed convention applied in the Concept Register. Will this cause problems? It is assumed here that in the Data Dictionary Register the camelCase structure as currently defined in S-100 clause 2a-4.2.3 will be retained to be consistent with ISO.

NOTE: The initial draft Registry Conventions and Guidelines document specifies lower case for the first letter of the camelCase in the Concept Register. This has been arbitrarily chosen only because the majority of concepts in the Register will be used as attributes or enumerates (statistics from the “current” Registry); and it is assumed that the structure of the camelCase in the Codelist Register will be aligned to the current convention (that is, parent attribute and enumerate values with lower case first letter). If this convention is adopted, this will mean that the syntax of the camelCase for concepts assigned as feature or information types in the Data Dictionary Register will need to “change”.

**Outcome:**

1. **Concept Register – link to the Hydrographic Dictionary database: How can this be implemented?**

Discussion: It is intended that items/terms that are defined both in the IHO GI Registry and the IHO Hydrographic Dictionary are only “managed” once. This requires a link between the IHO GI Registry and the Hydrographic Dictionary database, and a mechanism to identify those items in the Registry that are also defined in the Hydrographic Dictionary. This would then effectively make the Concept Register Domain Control Body (consisting of subject matter experts across all fields related to hydrography) act in the role of adjudicating proposals for the Hydrographic Dictionary on behalf of the HDWG (or in fact comprising the HDWG) where definitions are impacted.

Such a link could be as simple as a Boolean attribute in the item metadata to flag that the item is also defined in the Dictionary. It would be a task of the HDWG representative to the Domain Control Body to flag those items that have been added or changed in the Concept Register for submission to the HSSC(?) for endorsement to go to Member States for adoption(?).

Not sure if this would need to be extended to the Codelist Register?

**Outcome:**

1. **Codelist Register - camelCase: For “classification codes”; lists that are graded numerical values or ranges; or fractions/percentages, can a number (0..9) be used as the first character in the camelCase identifier (or perhaps the whole camelCase identifier)?**

Examples: Saffir Simpson categories (WMO Weather): Code values are 1 to 5. Options: Simply have the numbers (1;2;3;4;5); spell out code values (one; two; three; four; five); prefix with category name (saffirSimpsonCategory1; ….).

Fractions: 1/10 = 1\_10; oneTenth.

Range: 0-50 = 0\_50; zeroToFifty. [Note no distinction in camelCase syntax between the numerical examples here for fraction (1\_10) and range (0\_50) – will this cause problems?]

Percentage: 50% = 50; 50Percent; fifty; fiftyPercent.

Discussion: Is there an ISO or other convention that prohibits this? S-100 clause 2a-4.2.3 allows the characters 0-9 to be used in camelCase identifiers, however research done seems to indicate that as a general rule only alpha characters (A-Z, a-z) are allowed (note also that S-100 allows the underscore (\_) character to be used in camelCase identifiers). There needs to be a more concise convention developed (not sure if this should be done at the S-100 main document level (expand on Part 2a, clause 2a-4.2.3 or in the “Conventions and Guidelines”).

This discussion can be taken out to a much broader discussion regarding the general format/syntax for all camelCase in the Registry. A key factor in this discussion is whether camelCase has to be unique across the Registry for defined items; or at the Register level; or at the Register Domain level?

**Outcome:**

1. **Codelist Register: Is it a requirement to have the coded numeric value as the defining field of enumerated/codelist values, or could the camelCase be used?**

Discussion: Not sure of the international convention on this. The INSPIRE Registry appears to utilize the camelCase. If the camelCase were to be used, the numeric values need only be retained for legacy/backward compatibility reasons.

**Outcome:**

1. **Enumerate Register: The INSPIRE Registry has implemented an Enumerate Register in addition to the Codelist Register. Should a similar step be taken with the IHO GI Registry?**

Discussion: Do not think that this will be required. Enumerated lists derived from the full Codelist included in the Codelist Register (effectively these will be “sub-types” of the Codelist in the Codelist Register) will be registered within the Domains of the Data Dictionary Register; and should be searchable.

**Outcome:**

1. **Complex Attribute Register: To take the above question a step further, should there be a “Complex Attribute Register” to manage the full list of allowable sub-attributes for any complex, with “sub-types” of the complex type derived in the Data Dictionary Register?**

Discussion: Not sure about this one. The key question here is the ability to manage the complex attributes once they are modelled as such in Application Schema and registered in the Data Dictionary Register. Would it be considered to be sufficient for any user group/community to add/exclude any sub-attribute as they see fit? How will this impact on interoperability?

**Outcome:**

1. **Complex Attributes: Is it required to manage complex attributes similar to the requirement for Codelists/Enumerations?**

Example: The complex attribute onlineResource has 8 sub-attributes as it is registered in the “current” FCD Register. It is assumed that all these sub-attributes are required together or in different combinations in different Product Specifications (for example Nautical Publications related PSs). However, for S-101 only 3 of the registered sub-attributes are required.

Discussion: Complex attributes have listed sub-attributes. For enumerated lists and Codelists there is a requirement, for interoperability and backward compatibility purposes, to manage the coded values of the list so that different Product Specifications do not use the same attribute but having different codes for the enumerated/codelist values – hence the Codelist Register. Is simply having the ability to return instances of a search in the Data Dictionary Register where a concept has been modelled as a complex attribute (and their sub-attributes) sufficient to ensure consistent modelling in S-100 based Product Specifications of complex attributes? Using the example of the onlineResource complex above, should all the “allowable” sub-attributes be defined, either in a separate Register similar to the Codelist Register; or perhaps in the Codelist Register (therefore requiring a rename of the Codelist Register?)?

**Outcome:**