S-100 – Part 2a

Concept Register

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2a-1 Scope

The IHO Geospatial Information (GI) Registry contains a number of Registers, some of which are based on the contents of the Concept Register (CR). The Concept Register specifies hydrographic core conceptual information (definitions, camelCase, etc) that may be used to describe geographic or meta data information. The use of a Register to store hydrographic definitions significantly improves the IHOs ability to manage and extend multiple products based on S-100 which can be made available for use in a relatively short timescale. As such, the Register supports wider use of registered items by making them publicly available; and increases their visibility to potential users. The Concept Register is the primary resource where all registered concepts are stored and managed as "stateless" concepts (that is, items are not assigned a type and there is no defined binding of concepts to other concepts within the Register). Each concept shall be included as a single instance in the Register and will be used as the common source from which Data Dictionary Register and Meta Data Register concepts are derived and used to model features, attributes etc. for use in S-100 based Product Specifications.

This Part describes the content of the Concept Register and specifies procedures to be followed in establishing, maintaining, and publishing a Register of unique, unambiguous and permanent identifiers that are assigned to items of geographic, hydrographic and metadata information. In order to accomplish this purpose, this Part specifies elements of information that are necessary to provide identification and definitions to the registered items.

2a-2 Normative references

The following referenced documents are required for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including amendments) applies.

ISO 19135:2005, *Geographic Information – Procedures for registration of items of geographic information*

ISO 19126:2009, *Geographic Information – Feature concept dictionaries and registers*

ISO 8601:2004, *Data elements and interchange formats - Information interchange - Representation of dates and times*

ISO/IEC 10646:2017, *Information Technology – Universal Coded Character Set (UCS)*

RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*. T. Berners-Lee, R. Fielding, L. Masinter. Internet Standard 66, IETF. URL: http://www.ietf.org/rfc/rfc3986.txt or http://www.rfc-editor.org/info/std66

RFC 2141, *URN Syntax*. R. Moats. IETF RFC 2141, May 1997. URL: https://www.ietf.org/rfc/rfc2141.txt

2a-3 General concepts

2a-3.1 Register

As described in Part 2, a Register is simply a managed list. It is easier to maintain than a fixed document, because new items can be added as needed to the Register, and existing items in the Register can be clarified, superseded or retired. Each Register item has one or more dates associated with it that indicate when changes in its status occurred. This means that a Product Specification, defined at a given date, may reference an item in the Register at that specific point in time.

2a-3.2 Concept Register

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This profile conforms to conformance class 2 of ISO 19106:2004. The following is a brief description of the specializations and generalizations where the profile differs from ISO 19126:2008.¶
A new class, S100_CD_InformationConcept is introduced.¶
New classes, S100_CD_FeatureBinding, S100_CD_InformationBinding and S100_FC_AttributeBinding are introduced.¶
A new class, S100_CD_AttributeConstraints is introduced.¶
The class FC_FeatureAttribute is specialized to be the abstract class S100_CD_Attribute.¶
New classes, S100_CD_SimpleAttributeConcept and S100_CD_ComplexAttributeConcept are introduced.¶
A new class, S100_CD_InformationRole is introduced. ¶
The classes CD_InheritanceRelation, CD_FeatureOperation CD_Binding, CD_Constraint and CD_BoundFeatureAttribute are not used.¶
¶

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The Concept Register specifies unique, independent sets of definitions of concepts that may be used to describe geographic, hydrographic, and metadata information. These concepts as registered in the Concept Register may then be used within the Data Dictionary Register to develop a Feature Catalogue; or the Meta Data Register. Unlike a Data Dictionary Register, a Concept Register does not make associations; or define type or bindings of concepts to other concepts. From this perspective, registered items within the Concept Register are essentially "stateless", which allows for flexibility of the use of the concepts for suitable data modelling to satisfy the requirements of Product Specifications.

Such Registers of geospatial information may serve as sources of reference for similar Registers established by other geographic information communities as part of a system of cross-referencing.

2a-4 IHO Concept Register

2a-4.1 Detail of registered items

The following are the details available in the IHO Concept Register to describe and manage hydrographic, marine-related and meta data information:

1) Item Name
2) Item Identifier
3) Item Status
4) Alias
5) Camel Case
6) Definition
7) Definition Source
8) Definition Reference
9) Similarity to Source
10) Remarks
11) Proposals Type
12) Successor
13) Predecessor
14) Submitting Organization
15) Date Proposed
16) Date Accepted
17) Proposed Change
18) Justification

These details are derived from the classes S100_RE_RegisterItem and S100_RE_managementInfo (see clause 2a-4.2 below and Part 2, clauses 2-8.3 and 2-8.8).

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A Feature Catalogue is a document that describes the content of a data product. It uses item types, for example, features and attributes, from one or more Feature Concept Dictionaries and binds them together. In addition, constraints, units of measurement and format description of attributes can be specified. Feature Catalogues are described in detail in S-100 Part 5.¶
¶

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Deleted: Feature Concept – abstraction of real world phenomena.

Deleted: Enumerated Value Concept – one of a set of mutually exclusive values constituting the domain of an attribute.

Deleted: Information Concept– an identifiable object that contains attributes, associations to other information concepts, but no spatial information.

Deleted: Codelist – an open enumeration, or the identifier of a vocabulary (mapping between codes, labels and definitions).

2a-4.2 Data model of the IHO Concept Register

2a-4.2.1 UML Model

The following Figure shows the information model of the IHO Concept Register:

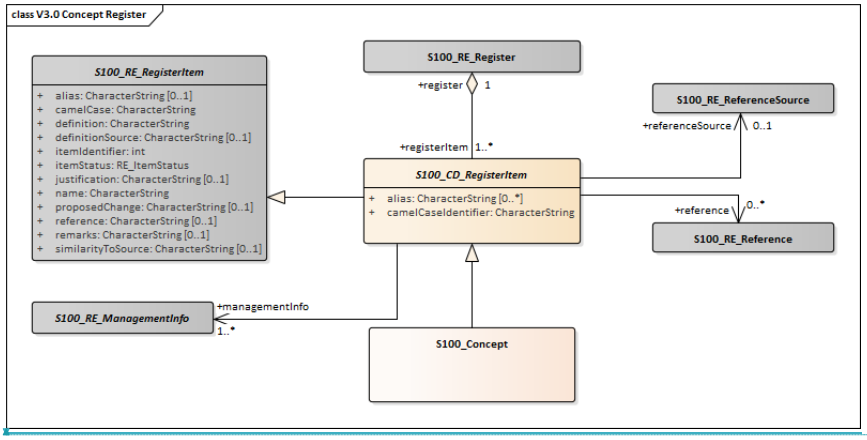

Figure 2a-1 – IHO Concept Register

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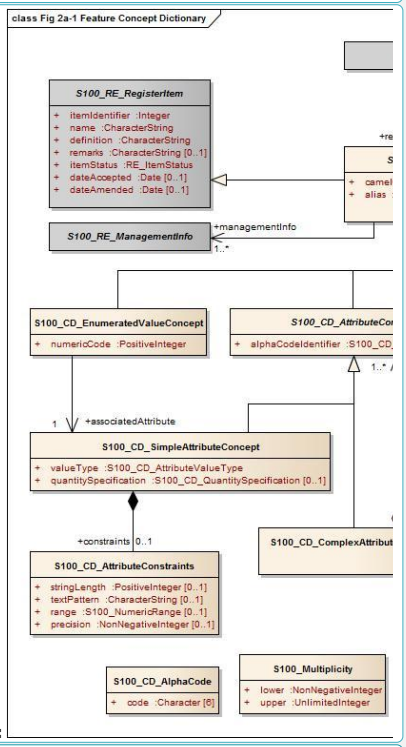

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2a-4.2.2 S100_RE_Register

The class S100_RE_Register models a Register in a Registry. Further details can be found in S-100 Part 2.

2a-4.2.3 S100_CD_RegisterItem

The class S100_CD_RegisterItem is a specialization of the class S100_RE_RegisterItem and carries the characteristics that are common to all types of registered items listed in clause 2a-4.1.

Role Name	Name	Description	Mult	Data Type	Remarks
Attribute	camelCaseIdentifier	Identifier of the item using camelCase notation.	1	CharacterString	See below
Attribute	alias	Equivalent name(s) used for the item	0..*	CharacterString	

The camelCaseIdentifier must:

1) Be compound words in which the words are joined without spaces and are capitalized within the compound.
2) Be unique within the Registry.
3) Conform to UTF-8 character encoding (refer ISO/IEC 10646) with uppercase characters A-Z, lowercase characters a-z and numbers 0-9.
4) Concepts must begin with lowercase a-z.

Example 1 beaconCardinal is the Camel Case identifier for the concept Beacon Cardinal

Example 2 categoryOfLandmark is the Camel Case identifier for the concept Category of Landmark

2a-4.2.4 S100_RE_RegisterItem

The class S100_RE_RegisterItem carries the characteristics that are common to all types of registered items.

Role Name	Name	Description	Mult	Data Type	Remarks
Class	S100_RE_RegisterItem		-	-	Class is abstract
Attribute	itemIdentifier	Each item has its own unique identifier in a Register	1	Integer	
Attribute	name	Succinct expression of the item concept it denotes	1	CharacterString	
Attribute	definition	Shall be a precise, unique statement of the nature, properties, scope, or essential qualities of the concept as realized by the item	1	CharacterString	

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Attributes and enumerated values

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Role Name	Name	Description	Mult	Data Type	Remarks
Attribute	remarks	Supplementary information	0..1	CharacterString	
Attribute	itemStatus	The state in which a registered item exists	1	RE_ItemStatus	
Attribute	dateAccepted	The date a registered item became valid	0..1	Date	
Attribute	dateAmended	The date a registered item is clarified, superseded or retired	0..1	Date	
Attribute	alias	Equivalent name(s) used for the item	0..1	CharacterString	
Attribute	camelCase	Identifier of the item using camelCase notation	1	CharacterString	
Attribute	definitionSource	The source of the definition	0..1	CharacterString	
Attribute	justification	Primary reason for the proposal including how it is proposed to be used	0..1	CharacterString	Inherited from S-100_RE_ManagementInfo
Attribute	proposedChange	The text of the proposed change	0..1	CharacterString	Inherited from S-100_RE_ManagementInfo
Attribute	reference	An identifier of the place in the definitionSource from which the definition is derived	0..1	CharacterString	
Attribute	similarityToSource	The type of change that has been made to a definition relative to the definition as it exists in the definition source	0..1	CharacterString	
Association	register	The Register that contains the item	1	S100_RE_Register	
Association	referenceSource	The source information the item definition was taken from.	0..1	S100_RE_ReferenceSource	
Association	reference	Reference to other relevant standards or documents	0..*	S100_RE_Reference	For example INT1 or M4
Association	managmentInfo	Sets of information describing the management of the item in the Register	1..*	S100_RE_ManagmentInfo	

2a-4.2.5 RE_ItemStatus

The enumeration RE_ItemStatus identifies the registration status of the S100_RE_RegisterItem. Further details can be found in S-100 Part 2.

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Deleted: The class RE_ItemStatus identifies the registration status of the S100_CD_RegisterItem. Further details can be found in S-100 Part 2.¶
S100_CD_FeatureConcept¶
This class is derived from S100_CD_RegisterItem. It defines the following additional properties:¶
¶
Role Name ...

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Be unique within the registry for all registered items that have an alpha code characteristic;¶
Be exactly six characters;¶
Conform to ISO 646 with uppercase characters A-Z, 0-9,"_", "$"; and lowercase characters a-z;¶
Begin with uppercase A-Z, lowercase a-z, or "$."¶
Example "PUBREF" is the Alpha Code designating a feature type item named "Publication Reference".¶

2a-4.2.6 S100_RE_ReferenceSource

Each item in a Feature Concept Dictionary has a definition. If the definition is taken from an external source, this class describes the reference(s) to the source document. Further details can be found in S-100 Part 2.

2a-4.2.7 S100_RE_Reference

This class defines the references to other documents where additional information regarding a registered item can be found. Further details can be found in S-100 Part 2.

2a-4.2.8 S100_RE_ManagementInfo

This class contains the management information of a register item. Further details can be found in S-100 Part 2.

2a-4.2.9 S100_Concept

The class S100_Concept identifies the required information for the Concept Register. Further details can be found in S-100 Part 2.

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Appendix 2a – A¶
Example of a complex attribute (informative)¶
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A light may have several sectors. All of them share the same light characteristic and sequence. Other common attributes are the height and the name.¶
All attributes describing one sector in a complex attribute are structured "Light sector".¶
A complex attribute for the "Rhythm of light" is also defined.¶
The simple attributes used in "lightSector" are:¶
sectorLimit1 (type Real)¶
sectorLimit2 (type Real)¶
colour (type Enumeration)¶
valueOfNominalRange (type Real)¶
Therefore the complex attribute is:¶
Characteristic ...

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Appendix 2a – A¶
Example of a complex attribute (informative)¶
¶
NOTE: The following example does not reflect the modelling of lights in any S-100 based Product Specification.¶
A light may have several sectors. All of them share the same light characteristic and sequence. Other common attributes are the height and the name.¶
All attributes describing one sector in a complex attribute are structured "Light sector".¶
A complex attribute for the "Rhythm of light" is also defined.¶
The simple attributes used in "lightSector" are:¶
sectorLimit1 (type Real)¶
sectorLimit2 (type Real)¶
colour (type Enumeration)¶
valueOfNominalRange (type Real)¶
Therefore the complex attribute is:¶
Characteristic ...