SCUFN32-08.1A

Paper for Consideration by SCUFN

Update on the progress made by the Undersea Feature Names Project Team since SCUFN31

Submitted by:	Canada and the Undersea Feature Names Project Team
Executive Summary:	This document reports on the progress made by the Undersea Feature Names Project Team (UFNPT) since SCUFN-31.
Related Documents:	SCUFN31-08.1A, HSSC11-07.1D, B-6, TOR of UFNPT
Related Projects:	Undersea Feature Discovery Project by Canada

Introduction / Background

The Objectives of the Undersea Feature Names Project Team (UFNPT) are:

a. Consider the development of an S-100 Product Specification for Undersea Feature Names and Register SCUFN terms in the IHO GI Registry
b. Establish procedures for the management and registration of undersea feature names approved by SCUFN and the management of proposals made to SCUFN
c. Provide recommendations to SCUFN on the management of undersea feature names and the use of registers to record the proposals made to SCUFN and the names approved by the Sub-committee.

During SCUFN31 the UFNPT presented the results of a preliminary test case of the current S-101 data model applied to UFN. The next step was to share the resulting data model with HSSC11 and request a specification number, under which to continue the development, with an increase level of interaction with the S-100 working group.

Analysis/Discussion

This is the status of the Work Plan of the UFNPT for 2018-2019

Action Items (SCUFN 31)	Tasking Lead	Target Completion Date	Status
Explore within existing product specifications in S-100, the expansion of textual description to include - Associated Features - Reason for choice of name - Discovery facts - Survey Data information	Canada and UFNPT	January 2018	Pending
Explore the steps necessary to develop a product specification for UFN	Canada	January 2019	Completed
Prepare and information paper for HSSC 11, with the status of work of the UFNPT and the work plan for the year 2019.	Canada	February 2017	Completed
Hold a video conference call for UFNPT, to discuss if the creation of a product specification is necessary for UFN	Canada and UFNPT	March 2019	Completed
If necessary, hold a Face to Face meeting of the UFNPT or Online workshop, to discuss initial steps to develop the product specification	Canada, UFNPT and Generic Terms WG	June 2019	Deferred to after SCUFN32
Re-evaluate work plan	Canada, UFNPT	August 2019	Completed
Prepare documentation to report progress to SCUFN	Canada, UFNPT	September 2019	Completed

Table 1 – Work Plan 2018-2019

The proposed data model for an S-100 compliant UFN was discussed during a video call of the UFNPT, organized by Canada in February 2019. Since Korea was, and still is, active in S-100WG activities, they volunteered to develop the draft of the schema (Annex 1). The milestones in that document, follow the S-97 PS Guidebook.

The Schema was shared with the UFNPT, in March 2019, the only comment received was a question regarding the coding of the text fields such as, Associated Features, Reason for choice of name, Discovery facts and Survey Data information. This question is still pending and has been included in the Work Plan of the UFNPT for 2019-2020

The Schema for UFN Specification, was submitted to the Chair of SCUFN, who sent it to HSSC11.

HSSC11 did not grant us a specification number under which to develop the standard for UFN, and asked us to assess the practical consequences of the implementation of an S-100 compatible specification for UFN. This task has been included in the Work Plan for 2019-2020 (Table 2).

Also, in February of 2019, a member of the Generic Term Working Group, Roberta Ivaldi, was invited to a presentation of the team at the Canadian Hydrographic Service, that is working on the discovery of unnamed undersea features. It was a good opportunity to discuss the impact that the generic, and sometimes vague, definitions of B-6 cause when analyzing a dataset, with the intention of discovering undersea features, based on the definitions of B-6. For example when the numeric criteria for identifying a feature that is “steep”, “circular” or “elongated”, is assumed by the analyst (because it isn’t clear in the definition in B-6), then the result of the analysis might not be accurate. It is worth improving the understanding of these definitions to avoid that different analysts will be making different assumptions.

The efficiencies that could result from automating the discovery of undersea features would, as well, be a very strong base for the development of a S-100 compatible UFN standard, where each generic term would have specific metrics and could not be confused with any other generic term.

At SCUFN 31, Belgium shared with the UFNPT, an extract of the metrics for each undersea feature listed in GEBCO (Annex 2). This was a good first step towards researching the metrics of existing named undersea features, from which to draw parameters to improve the definitions in B-6.

The Undersea Feature Discovery Project that is ongoing in Canada, is thoroughly explained in Information Paper SCUFN32-08.2A.

Recommendations

That the Generic Terms Working Group and UFNPT, continue to discuss the definitions in B-6 as it relates to standardizing the metrics of each generic term, and it relates to the efficiencies of automatic the discovery of unnamed features.

Justification and Impacts

There is a potential for automating the discovery of an undersea feature, through a script, where the output is a digital SCUFN form that has been populated, except for the name. Once the name is given, the would be seamlessly fed into the tool developed by Korea, to facilitate the approval of names and incorporation into the GEBCO database.

Task	Work Item (SCUFN 32)	Priority H-High M-Medium L-Low	Start Date	End Date	Status P-Planned O-Ongoing C-Completed	Contact Person (s) • Indicates leader
1	Hold an online workshop, to discuss the steps to continue the development of the product specification. - Assign a Minute Taker - As per the recommendation of HSSC11, we need to assess the practical consequences of the implementation of an S-100 compatible specification for UFN. - Consider, with the Generic Term Working Group, the progress of the Undersea Feature Discovery Project, presented by Canada, and its applicability for interoperability and standardizing UFN - Explore within existing product specifications in S-100, the expansion of textual description to include - Associated Features - Reason for choice of name - Discovery facts - Survey Data information - Set project milestones and project plan	H	November 2020	November 2020	Not started	UFNPT and Chair of Generic Terms WG
2	Prepare minutes of the online meeting and send them to the participants for approval	M	January 2020	January 2020	Not started	Minute Taker
3	Proceed with the project according to the plan discussed during the online workshop	H	February 2020	February 2020	Not started	UFNPT and Chair of Generic Terms WG
4	As per the recommendation of HSSC11, we need to consolidate into one report for HSSC12 (May 2020), the status of work of the UFNPT, including the results of the online meeting, the approved work plan for the year 2019-20 (this table), and a new request for a product specification number that should include the new project milestones and project plan.	M	March 2020	March 2020		UFNPT
5	Prepare update report and presentation for SCUFN33	M	August 2020	August 2020		Canada, UFNPT and Generic Terms WG

Table 2 – Proposed Work Plan 2019-2020

Membership of SCUFN's UFNPT

These are the members of the UFNPT as of July 8th, 2019.

Membership of SCUFN's UFNPT			
Member State	**Name of Delegate**	**email**	**Organization**
Australia	Michael Clarke	michael.clarke10@defence.gov.au	AHS
Belgium	Paula Oset Garcia	Paula.oset.garcia@vliz.be	Marine Regions
Canada (chair)	Anna Hendi	Anna.hendi@dfo-mpo.gc.ca	CHS
China	Xing Zhe	Xz_nmdis@163.com	NMDIS
Italy	TBD		
Korea	Peter Hak	peterhak@korea.kr	KHOA
SCUFN Experts	Members of the SCUFN Generic Term Sub-Group: Yasuhiko Ohara Hyun-Chul Han Trent.Palmer Roberta Ivaldi Kevin MacKay	 Yasuhiko.ohara@gmail.com han@kigam.re.kr Trent.C.Palmer@nga.mil roberta_ivaldi@marina.difesa.it Kevin.Mackay@niwa.co.nz	 JHOD KIGAM NGA Marina Difesa NIWA

Table 3 – Membership of the Undersea Feature Naming Project Team

Action required of SCUFN

SCUFN 32 is invited to note the report and approve the proposed work plan for 2019-2020 of the SCUFN UFN PT, and take any other actions that SCUFN would deem necessary to advance the UFNPT work plan

Annex 1

IHO S-100 Product Specification Development Process

And UFN Application Schema (draft)

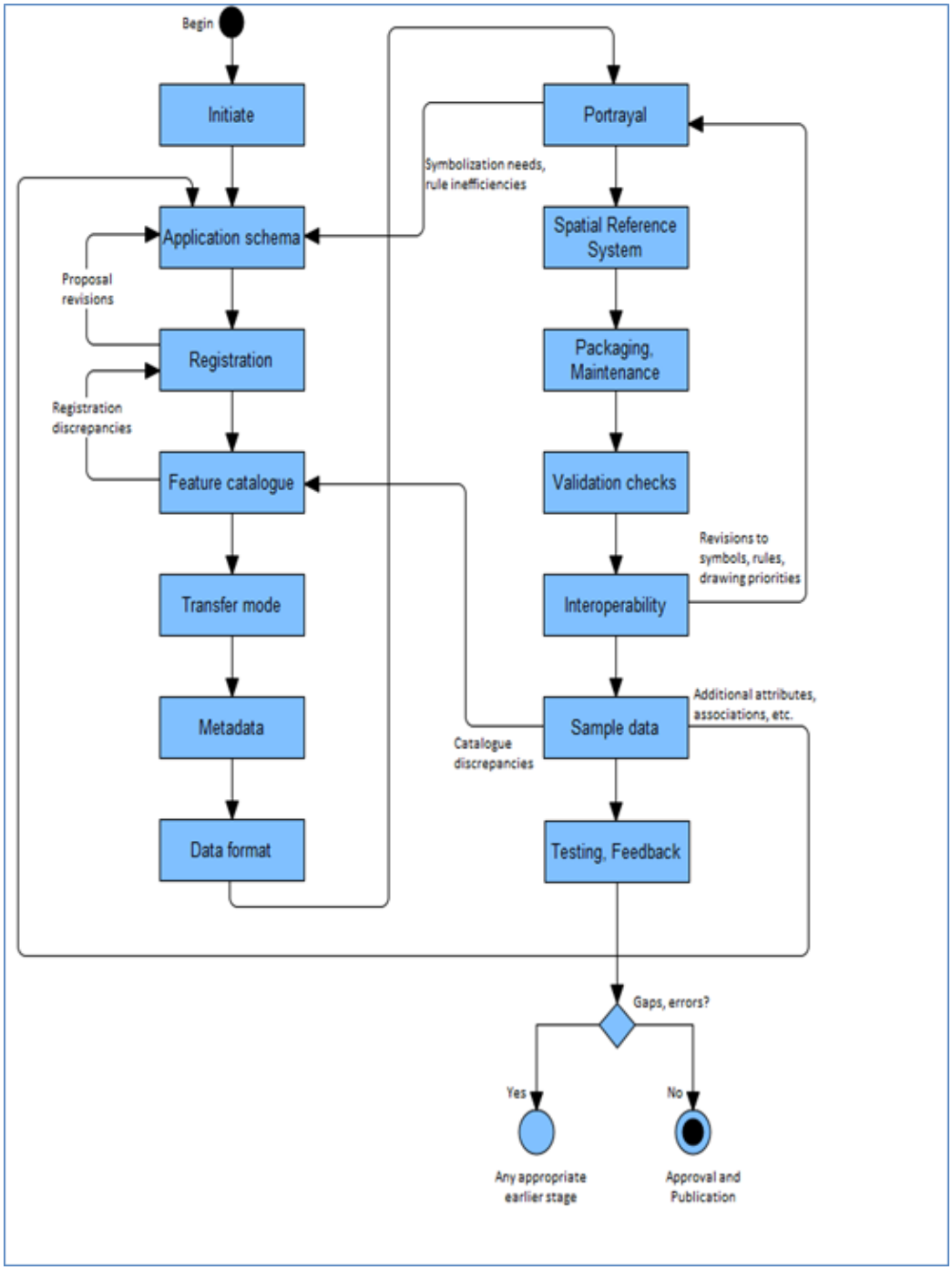
11 February 2019

1) IHO S-100 Product Specification Development Process

- S-100 extends the scope of the existing S-57 *Hydrographic Transfer Standard for Digital Hydrographic Data*. Unlike S-57, S-100 is inherently more flexible and makes provision for such things as the use of imagery and gridded data types, enhanced metadata and multiple encoding formats. It also provides a more flexible and dynamic maintenance regime via a dedicated on-line registry.
- S-100 provides the data framework for the development of the next generation of ENC products, as well as other related digital products required by the hydrographic, maritime and GIS communities.
- S-100 consists of 13 elements that are required for standard producers to construct the hydrographic field product specification.
- Each standard element is composed of items to be included in the product specification, electronic format, quality of the data, symbol representation method on the map and the metadata used on services.
- The guideline consists of two main parts.
- Part A provides an in-depth description of the various components of an S-100-based product specif

ication, and Part B describes the typical steps and activities involved in creating an S-100 based prod uct specification (Doc. S-100WG3-5.3.1, 5.3.2).

(https://www.iho.int/mtg_docs/com_wg/S-100WG/S-100WG3/S-100WG3_Docs.htm.)

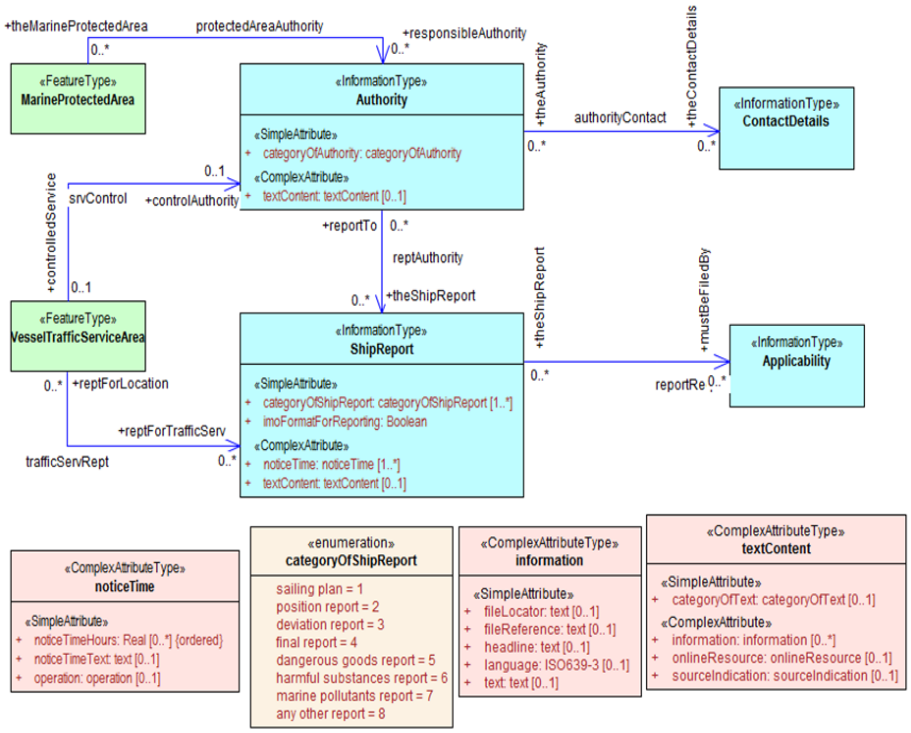


❍ Initiation

- First, we need to identify a need for data products to develop the product specification, and we need to make sure that existing product specification can be extended.
- If you want to develop a new product specification, it is necessary to define the product requirements, scope, and constraints.

❍ Application Schema

- The application schema as defined in S-100 is usually synonymous with “domain model” as the latter term is used in information modelling. It is a specification of the classes, attributes, and relationships relevant to the data product.
- When designing the application schema for a product specification, first determine whether the data product is coverage or vector data, and identify the concepts in the application domain.
- The application domain is a field that is appropriate for a given data product in a variety of fields. After the application domain is identified, search for existing concepts (classes, attributes, and relationships) in the registry which can be re-used.
- If re-use is not possible, the feature type, information type, and attribute and relationship to be included in the data product should be defined through sufficient discussion with stakeholder groups.
- S-100 refers to the ISO 19100 series for converting real-world information into a geographical data model and uses the conceptual diagram language UML (Unified Modelling Language).



❍ Registration

- The IHO is operating the IHO GI Registry that can store various registries of related hydrographic information such as feature data dictionary, data type, and metadata.
- S-100 is managed by registering items such as feature type and information type included in the designed data model into the S-100 GI registry.
- It is recommended that at least one member of the project team or working group be a submitting organization.
- If existing classes and attributes need to be modified, submitting organizations propose changes and additions to the contents of Registers. If you register new classes and attributes, use the IHO Registry interface to add new classes and attributes should be proposed.
- Procedures for registration are explained in S-99.

❍ Feature Catalogue

- The feature catalogue should be documented by a text-based documentation of their contents, which organize features and attributes that conceptually classify real-world feature.
- The creation of feature catalogue is done by domain experts in the field in which the product specification is to be developed.
- The domain experts can create feature catalogues based on the feature catalogue data model and the feature catalogue XML schema of S-100.

❍ Transfer Mode

- Determine whether data products are to be delivered as data files contained in transfer (exchange) sets by web services (and if so, identify or outline a service protocol) or e-mail and determine whether data is to be delivered in real or near real-time.
- Identify constraints and requirements arising from delivery mechanisms and communication constraints such as message size, bandwidth limitations, availability of communications to customers, licensing and payments, encryption, etc.

❍ Metadata

- When producing and supplying S-100, you need to configure the exchange set of the folder structure and create XML formatted metadata describing each file (such as GML, XML, catalog, additional image) constituting the exchange set.
- The minimum metadata requirements are set forth in Part 4 of S-100 (Appendix 4a-D for vector data, Parts 4b/8 for coverage data).
- Product specification developers should consider whether the metadata elements listed in S-100 are relevant to the data product and which of them are appropriate for its allowed packaging and delivery methods.

- If additional metadata elements are needed they should be documented in the product specification Metadata section and extensions to the standard metadata schemas developed using the standard ISO extension mechanism.
- IHO metadata XML schemas for exchange catalogues and discovery metadata have been developed and are available at the IHO software distribution site (https://github.com/IHO-S100WG).

❍ Data Format

- The encoding format should be defined for product delivery and provision and should be selected based on the type of product and other requirements, including production and processing.
- The characteristics of the three standard data formats included in S-100 Edition 3.0.0 are summarized below for convenience.
- GML format will require definition of XSD files encapsulating the S-100 application schema as XSD files conforming to the GML specification (ISO 19136 and S-100 Part 10b).

	ISO 8211	**GML**	**HDF5**
Type of product to which suited	**Nautical charts and feature-heavy vector data**	**Nautical publications and information-heavy vector data; discrete weather information; small datasets such as marine safety information; data delivered via messages and web services**	**Coverage-based data**

Generic data format	**Yes**	**Yes**	**Yes**
Data production complexity	**Requires custom tools**	**Can be produced with a range of tools from text editors to custom apps and database SQL queries**	**Custom apps that use off-the-shelf libraries**
Processing complexity	**High**	**Low**	**High**
Supporting off-the-shelf software	**Not much**	**Off-the-shelf viewers and server software; can be viewed with ordinary text editors**	**Off-the-shelf viewer**
Data volumes	**High**	**Low**	**High**
Type of data	**Vector**	**Vector; coverage schemas are defined in the GML specification but not used in S-100**	**Gridded**
Supporting artifacts needed in product specifications	**Feature catalogue**	**XML schemas for data validation; datasets can be processed by apps without XML schemas; self-documented format (tags indicate objects and attributes); Feature catalogue optional**	**Embedded object and attribute tags; feature catalogue optional**

❍ Portrayal

- Determining rules for creating a display from symbols and data products to be used for rendering for features generated through the data model, and creating a description catalogue.
- It should be defined for pictorial representations of symbols and colors, including recommendations and specifications for the use of symbols.

❍ Spatial Reference System

- This part defines the conceptual schema for the description of spatial referencing by coordinates. It describes the minimum data required to define a one, two and three dimensional spatial coordinate reference.
- All the elements necessary to fully define spatial referencing by means of coordinate systems and datums are contained in this section.
- It also describes the information required to change coordinates from one coordinate reference system to another and all the elements necessary to describe the parameters and methods of coordinate operations. Coordinate operations include projections and datum transformations.

❍ Packaging / Maintenance

- This part defines the content and structure of delivery packages, updating of data, and any auxiliary content delivered either with or as an adjunct to data.
- The exchange set structure shall use the structural diagrams of the S-100 or define the limits of the allowed components or extend the individual components and, if there is an internal structure of the exchange set, it should include the specifications for the required layout and naming conventions.

❍ Validation Checks

- At least two types of validation checks are needed:
- First step is dataset validation checks for individual datasets. These checks operate on individual objects in datasets and on individual datasets as a whole. They should check the integrity of individual objects in the dataset (spatial, feature, and information types), associations between objects in the dataset, any embedded metadata or header information in the dataset, and support files referenced in the dataset.
- Second step is package validation checks for verifying the structure and content of packages (e.g. exchange sets) and accompanying metadata.
- Given that some features, information types, and application schema constructs are used in multiple products, there will be validation checks in common with existing product specifications and any such related product specifications should be consulted for validation checks

❍ Interoperability

- Jointly with the IHO Interoperability Catalogue maintenance team, determine if any product groups in interoperability catalogues are supplemented or enhanced by the data product.
- Determine whether and how the IHO interoperability catalogue will be affected by the new product, including updates to display priorities, interleaving, predefined combinations, and other interoperability rules and operations.

❍ Sample Data

- Prepare sample data conforming to the data format and feature catalogue for testbeds and create enough sample data to verify the key characteristics of the data product.

❍ Testing / Feedback

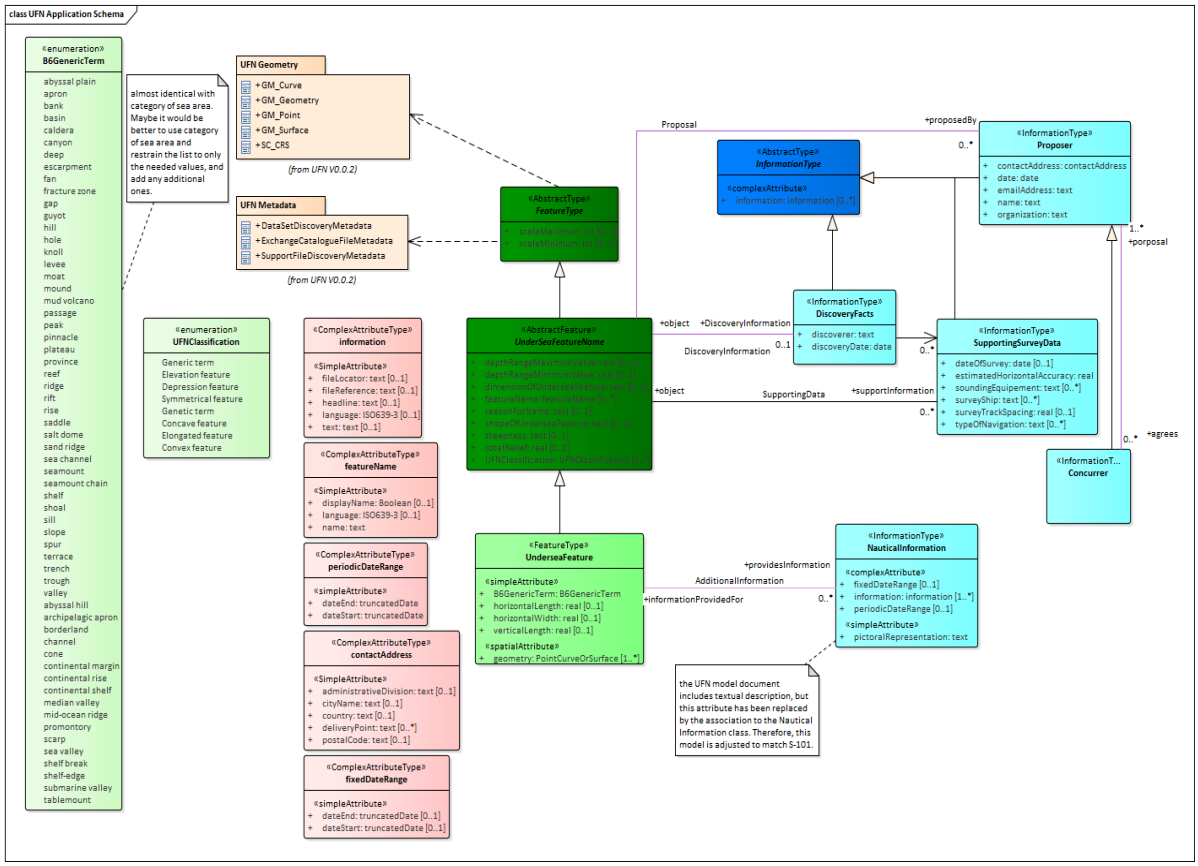
- Carry out tests of data production and use of sample data in selected applications to validate the correctness, completeness, consistency, and utility of the product specification, including related artifacts such as the feature catalogue and XML schemas.
- The development of data product specifications will undergo repeated refinement according to user feedback and test results, and development will be completed by passing the final test.

❍ S-100 development process described above can be summarized as follows.

- Firstly, to develop S-100 product specification, user requirements are determined for the scope and user survey is conducted.
- User requirements survey helps identify which parts of S-100 are used and required for product requirements.
- When user requirements and scope have been established, the data model (Application Schema) will be designed through sufficient discussion with stakeholder groups.
- Standardization items such as feature type and information type included in the designed data model are inputted into the S-100 GI registry to produce the feature catalogue and the portrayal catalogue.
- When the results of the data model design are agreed between the stakeholder groups, we will start to create the product specification document and the object input document.
- At the same time, create a test dataset for the product specification to apply the test dataset and feature / portrayal catalogue to the S-100 software, and finally review the development results.
- The development of data product specifications will undergo repeated refinement according to user feedback and test results, and development will be completed by passing the final test.

2) UFN Application Schema (draft)

❍ The following is a designed undersea feature name data model draft.



❍ Based on the new data model proposed by the UFN project team, KHOA designed the data model to store B-8 and B-6 information by defining the morphological characteristics of the undersea feature as the primary classification criteria.

❍ Data model defines UnderseaFeature class for undersea feature name management information, SupportingSurveyData and DiscoveryFact class which can store numerical data and exploration information of undersea feature, and set the relationship.

❍ UnderseaFeature class inherits the abstract classes called UnderseaFeatureName and FeatureType. This class inherits all attributes and relationships from its super class, and can store attribute information to describe the height, size, and topological features of the undersea feature .

❍ B6GenericTerm refers to the list of B-6 terminology. UFNClassification consists of attributes for classifying subdivision undersea features such as generic name, genetic name, elevation terr

ain, depression terrain, concave and convex terrain.

- Both attribute types are defined as codelist types so that they can be added in the future.
- Finally, Proposer and Concurrer classes are defined to store proposer and concurrer informati on.

Annex 2

SCUFN Generic terms metrics.xlsx