SCUFN28-06B

Paper for Consideration by SCUFN

Development of an S-100 Product Specification for Undersea Feature Names and Registering SCUFN terms in the IHO GI Registry

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Executive Summary:	At the joint TSCOM/SCRUM meeting that took place in December 2014, the Chair of the GGC proposed that GEBCO products and services should aim to serve the needs of their user communities. This paper proposes that the model used for the undersea features GIS web map service and the underlying data structure, should be extended to better accommodate user requirements. It also proposes that the SCUFN definitions for undersea features should be adopted as the authoritative reference for these concepts, and included in the IHO GI Registry.
Related Documents:	S-100, S-99 and S-57 standards.
Related Projects:	GEBCO Technical Sub-Committee on Ocean Mapping (TSCOM) and Sub-Committee on Regional Undersea Mapping (SCRUM)

Introduction / Background

The GEBCO Sub Committee on Undersea Feature Names (SCUFN) has converted the content of the gazetteer of undersea feature names (UFN) from a spreadsheet format into a GIS database. This has been used to create an online web map service - available at http://www.ngdc.noaa.gov/gazetteer/. As part of this process, SCUFN formalized the feature type definitions for describing undersea features. SCUFN has also produced an online dictionary containing these definitions (see http://www.kosbidb2.co.kr:8080/recommend/). The IHO has also produced definitions for undersea features and these are listed in the IHO Registry Feature Concept Dictionary (FCD) and the S-57 feature catalogue. The definitions are also referenced in the IHO hydrographic dictionary; publications S-32. In many instances, the definitions are the same but in those cases where they are not, it is proposed that they should be harmonized. As the competent authority for undersea features, it is proposed that SCUFN should be invited to review the two lists of definitions and propose changes as required.

The transformation of the SCUFN gazetteer into a GIS dataset/database is a positive development. The Chair of the GGC, in his opening address to the joint TSCOM/SCRUM meeting stated that GEBCO should endeavour to develop products and services that are relevant and respond to the needs of the user community. The undersea features database and web service go a long way to doing this, however it is proposed that there are several additional steps that need to be considered that would further enhance the UFN product and services. These are discussed below.

Improving the USFN Model

Currently neither the IHO S-57 nor the UFN models make provision for describing the unique physical characteristics of undersea features. In the case of S-57, only one feature type "*Sea Area (SEAARE)*" has been defined. The characterisation of different types of undersea features (e.g. Sea Mountains, Fracture Zones, Reefs, Fans, Troughs etc …) is defined by an attribute *CATSEA "Category of sea area.*" This attribute is populated by one value from an enumeration list of values (e.g. bank, deep, trench, reef, abyssal plain, plateau, spur etc …).

The SCUFN undersea feature names model is similar to that of S-57. There is a single feature class (undersea feature) and the *"Type"* attribute is used to differentiate between features types. Other attributes such as Minimum Depth (m), Maximum Depth (m), Total Relief (m) make provision for a very generic description of the feature characteristics.

The problem with these "*flat*" structures is that they do not make provision for describing the unique physical characteristics of different "real word" undersea features. For example the unique characteristics of a Seamount (height from base, volcanically active, minimum depth …) are very different from the characteristics required to describe an Abyssal Plain.

A common modelling practice is to group real world features that have common characteristics into feature classes. For example, features that rise up from the sea seabed, such as Seamounts, Guyots, Knolls, Peaks etc… have similar physical characteristics and might be modelled as an "*Undersea elevation*" feature class. Such a feature class would have attributes that describe its common characteristics; e.g. "height" (from the base of the seabed), "minimum depth", "volcanic" (Y/N/U) etc … Feature classes could be created for other undersea features that have similar characteristics, and this would constitute the basis for the development of a feature catalogue, and a formal description of the model within a product specification.

Portrayal of Undersea Features

The gazetteer of undersea features names currently displays all features as simple (un-symbolised) point, line or area objects. There are no standard symbol definitions for undersea features and the current model inhibits the development of a dynamic portrayal mechanism. It is therefore proposed that SCUFN should consider undertaking the development of a standard set of symbols for the portrayal of real world undersea features. This would enhance the user experience.

Standardised symbols have been used on nautical charts for many decades. This has enabled mariners, irrespective of their native language, to understand all features displayed on the chart. The IHO has a long history of developing standardised symbols and has a Working Group that would be able to assist the SCUFN to develop symbolised point, area and line symbols for undersea features.

The following example is based on the "*Undersea elevation*" model proposed above. It attempts to illustrate how seamounts might be displayed.

Feature Class - Undersea Elevation		
Attribute		
	type	enumerated values: seamount, guyot, knoll, peak …
	volcanicState	enumerated values: active, dormant, unknown
	minDepth	Value (depth below surface – in metres)
	baseHeight	Height from seabed
	others …	

Example symbol presentations for Seamounts based on attribute settings.

Seamount symbol	Attribute values	Comment
	**type**: seaMount, **volcanicState**: unknown, **minDepth:** unknown , **others:** …	not known to be volcanically active or significant for surface vessels
	**type:** seaMount, **volcanicState:** active, **minDepth:** 300, others: …	Volcanically significant – but not navigationally significant.
	**type:** seaMount, **volcanicState:** active, **minDepth:** 30, **others: …**	Volcanically and navigationally significant.

Recommendation

It is proposed that;

- SCUFN should review the definitions of undersea features definitions used in different IHO publications and submit a harmonized list in to the S-100 Working Group for inclusion in the IHO S-100 GI Registry Feature Concept Dictionary. This will enable other communities building S-100 based products to use them;
- SCUFN should consider enhancing the current data model for undersea feature names;
- SCUFN should consider (in cooperation with the IHO NCWG[1]), the development of symbols and an appropriate portrayal mechanism for undersea features;
- SCUFN should formalise the property (attribute) types used in the UFN database, and register these in the IHO Registry (This task should take account of similar attribute definitions already in the Registry and should include "type" definitions e.g. integer, real, string etc …);
- SCUFN should consider describing the UFN database in terms of an S-100 product specification, in liaison with the appropriate HSSC Working Groups;

[1] Nautical Cartography Working Group

- SCUFN and the GEBCO Guiding Committee should consider whether the undersea feature definitions should be included with one of the existing domains (e.g. HYDRO), or whether the establishment of a domain specific to GEBCO should be considered – taking into account the guidance in S-99 and S-100 and the management implications.