

## Paper for Consideration by S-100WG4

## Outcomes of using the Feature Catalogue Builder to create the S-127 feature catalogue

<b>Submitted by:</b>	NIPWG
<b>Executive Summary:</b>	Report on findings from attempting to create S-127 feature catalogue using the Feature Catalogue Builder.
<b>Related Documents:</b>	S-127
<b>Related Projects:</b>	S-127; IHO GI registry; Feature catalogue builder

**Introduction / Background**

At TSM6 it was requested that NIPWG utilize the IHO Infrastructure to create feature catalogues when developing S-100 product specifications. The S-127 development team tested the Feature Catalogue Builder (FCB) based on S-127 version 0.2 and attempted to create a S-127 feature catalogue. This paper reports on the results of this test.

**Analysis/Discussion**

Based on HSSC endorsement, the development of S-127 (Marine Traffic Management) was contracted out. The work on the first edition is scheduled to be completed by December 2018. This first edition is based on three NIPWG reviews.

The development team has created a feature catalogue manually, and this was the starting point for testing the FCB. The S-127 v0.2 feature catalogue was loaded into S-100 FCB 1.0.1 and updated with the content from the IHO GI Registry and content created using the sandbox function. The FC metadata was also updated using the FCB. The resulting feature catalogue was saved and a human readable version was created using a style sheet. The human readable version was reviewed for accuracy. The issues discovered are summarized in the following list.

- The FCB is current with S-100 Edition 3.0.0, which means the feature catalogue metadata model is also S-100 Edition 3.0.0. This is an issue since S-127 is built on S-100 Edition 4.0.0 and there are significant metadata model changes between the editions.
- Errors in enumeration numbering have been inherited from the Registry, and impose unwanted inconsistencies on S-127.
- There are numerous cases of missing spaces between words in definitions, which are propagated from the Registry, and impose unwanted inconsistencies on S-127.
- The FCB has some issues with some of the character sets used in the Registry. These issues result in odd characters in the FC that may cause some issues for machine readability. Investigation showed that there are variations of character sets within the same data field in the Registry. It seems the FCB has issues processing these.
- The Registry has implemented 'S100\_TruncatedDate' data type label incorrectly as 'truncateddate', which is permeated through the FCB, and imposes unwanted inconsistencies on S-127. It also produces an invalid feature catalogue (i.e., a file that fails to validate with the S-100 XML schema for feature catalogues). S-100 specifies the allowed attribute value data types in the enumeration S100\_CD\_AttributeValueType (S-100 4.0.0 2a-4.2.10).
- Unit of measure, quantity specification and constraints are not captured in the Registry for various attributes. This information is used for several attributes in S-127, and utilizing the FCB therefore imposes unwanted omissions on S-127.
- The data type URL is implemented in the FCB as uRL, and imposes unwanted inconsistencies on S-127. (See the earlier bullet for the data type S100\_TruncatedDate).
- The camelCase for the attribute "underkeel allowance variable draught based" is captured in the Registry as 'underkeelAllowanceVariableDraughtBased<' and propagated through the FCB into the feature

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

catalogue. The '<' character is not allowed in camel case codes. While this originated as a Registry data entry error, the Registry should not permit disallowed characters, and neither should the FCB.

- The permitted values of enumerated attributes do sometimes include listed values that are missing (not defined) in the Registry, but which were defined by NIPWG and are present in the input S-127 FC. Similar issues are conceptually possible when going from one version of the FC till the next, and should be noted in the FCB as a report to the user or some other form of notification.
- Related to the previous point, discrepancies in certain aspects of listed values (in particular, in labels and numeric codes) require inspection and update of previously defined GML data formats (Part 10b) and datasets, because the labels and/or codes must be encoded in XML schema enumerations and dictionary files. The same would apply to validation checks. As a consequence of this cascade, implementations would potentially also be affected.
- FCB does not have a function for adding attribute bindings to associations. S-127 has two such associations and these are therefore not implementable via the FCB.
- When loading a pre-existing FC which has instances of information types with isAbstract=true, the tag is somehow changed to false. Investigation seems to indicate that this effect apply to all abstract information types, while it seems this tag is un-altered for feature types.
- Multiplicities have been altered when loading into, and saved from the FCB. In some cases what was 0..1 in original, is for some reason changed to 0..0. Investigation seems to indicate this mainly affecting the upper range.
- If there are multiple valid versions of an attribute defined in the registry, the FCB appears to pick the most recent version even though it may be in a different domain. The FCB replaced the complex attribute 'graphic' from the "IHO Hydro" domain with a later and different version from the "WMO Weather" domain with a different sub-attribute.

### Conclusions

The S-127 development team thinks that the multiplicity issue can likely be resolved by creating the feature catalogue from scratch in the FCB, but the inability to add association attributes, invalid data types, propagation of Registry inconsistencies, and inability to use units of measure, quantity specifications, and constraints all remain. To correct these, the team would have to manually edit a feature catalogue created by the FCB, which negates the whole point of making the FC fully using IHO tools. Therefore, it is considered that a handcrafted S-127 FC is the better starting point for the first Edition of S-127 since this can be made to conform to the S-100 feature catalogue schemas, can include more complete feature catalogue entries, and is easier to create from the previous versions.

### Recommendations

The issues which were discovered in the process of creating the S-127 feature catalogue utilizing the FCB indicate the existence of both critical and non-critical errors in both the FCB and the GI registry, and consideration should be given to the possibility of resolving these.

### Action Required of S-100WG

The S-100WG is invited to:

- a. Note this paper,
- b. take any appropriate actions.

**Commented [JS-F1]:** Is don't understand that.

I mean I understand the English but not the sense. Which values are in the "input S-127 FC"? Should we not have added them to the registry?

**Commented [rmm2R1]:** Code 2 (information) for onlineFunction  
Code 1 (customs) for categoryOfAuthority (registry has it as code 16 instead there is no valid code 1, though there appears to be a pending proposal for something with code 1, I cannot see what)  
Code 5 (height) for vesselsCharacteristics  
Code 14 (Suez Canal gross tonnage) for vesselsCharacteristics  
Codes 1, 2, 8, 10, 11, 12 for vesselsCharacteristicsUnit

I think they had problems during registry data entry or approval due to names (labels) being similar to those of listed values in other enumerations.

The next-generation (or the third-generation?) registry should not have this problem, but the issue is what to do now for S-127 1.0.0. The labels and numeric codes in the S-127 0.2 draft conform to the NIPWG Wiki and appear in multiple places (UML model, DCEG, FC, schemas).

The best solution would be to make the registry conform to NIPWG's codes and labels for now, and leave any adjustments for the registry overhaul in 2019.