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# International Hydrographic Organization Project S-121

Title: Report to S-100 Working Group

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## 1. Introduction

The IHO S-121 Project Team held a meeting on the 5<sup>th</sup> to 9<sup>th</sup> December 2016 in the offices of the UN Division for Ocean Affairs and the Law of the Sea (UN DOALOS). This report summarizes the meeting and describes the impact of the S-121 development on S-100. The draft minutes are available from the S-121PT1 page on the IHO Website.

## 2. S-121 Maritime Limits and Boundaries

The International Hydrographic Organisation has developed the S-100 Universal Hydrographic Data Model to support all marine application areas. The IHO S-100 standard primarily serves as the basis for the development of the Electronic Nautical Chart (ENC) and other complementary data product specifications to support “eNavigation”. It is built upon an attribute structure focused on navigation which has been well defined by long experience in nautical charting. S-100 has allowed IHO to develop a specific product specification for navigation that parallels the existing S-57 Electronic Nautical Chart standard and maintain the stability that is so necessary in a safety of navigation standard while still allowing for that addition of additional layers of information such as bathymetry as expressed using the S-102 standard. However, navigation is not the only information structure that S-100 can support.

In 2013 the IHO HSSC (Hydrographic Services and Standards Committee) defined a list of 22 potential S-100 based product specifications. Although most address navigational requirements, several including S-121, address other requirements. S-121 addresses the description of the legal aspects of Maritime Limits and Boundaries for the purpose of clearly describing a state’s extent under the United Nations Convention on the Law Of the Sea (UNCLOS). UNCLOS defines a number of specific areas or zones that have specific legal status and the limits that define those zones. These zones include the Territorial Sea, the Contiguous zone, the Exclusive Economic Zones, the Continental Shelf, the High Sea and the (open ocean) Area. One of the prime requirements is the ability of states to deposit Maritime Limits and Boundaries with the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) in a form that can be read without the need for specialized software tools. Formats such as XML, GML of ISO 8211 are not acceptable because they require specialized knowledge or tools to be able to read the format.

## 3. Relation to S-100

S-121 makes use of the structures defined in IHO S-100 and the underlying ISO TC211 standards upon which S-100 is based. S-121 has no impact on the S-100 standard. It only makes use of the standard and the S-100 support facilities.

S-121 defines a set of feature objects and attributes that can be registered in the S-100 object register. It also defined a set of information objects used to implement the Rights, Restrictions and Responsibility and Party structure derived from the ISO standard 19152 LADM. Within the context defined in the S-121 product specification these objects take on specific attributes and have relations with the defined information objects. However, the same objects, such as Territorial Sea Outer Limit, can be used in an S-101 or Additional Military Layers (AML) navigation data product. Different attributes will apply in the different context. This allows MLB objects to be used in other S-100 based products. In the S-121 defined legal context the attribution follows the structure established in the ISO 19152 Land Administrative Domain Model so that legal relations can be rigorously described.

#### 4. Deposit with UN DOALOS

One of the prime uses of IHO S-121 is the deposit of Maritime Limits and Boundaries with the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) by nations in a form that can be used in adjudicating legal claims; that is, in a form that can be read without the need for specialized software tools. In a legal environment the data must be directly readable by legal experts and appear in a similar tabular text based manner as is used in the printed versions of treaties or other legal documents. Therefore S-121 defines a new text based delimited encoding format that can be easily printed and read.

#### 5. Structure of S-121

Figure 1 shows the high level structure of the proposed S-121 product specification. The “S121\_FeatureUnit” and the “S121\_SpatialAttributeType” derive directly from the equivalent S-100 Feature and Attribute classes. The Administrative structure and the Source referencing are simple additions unique to S-121.

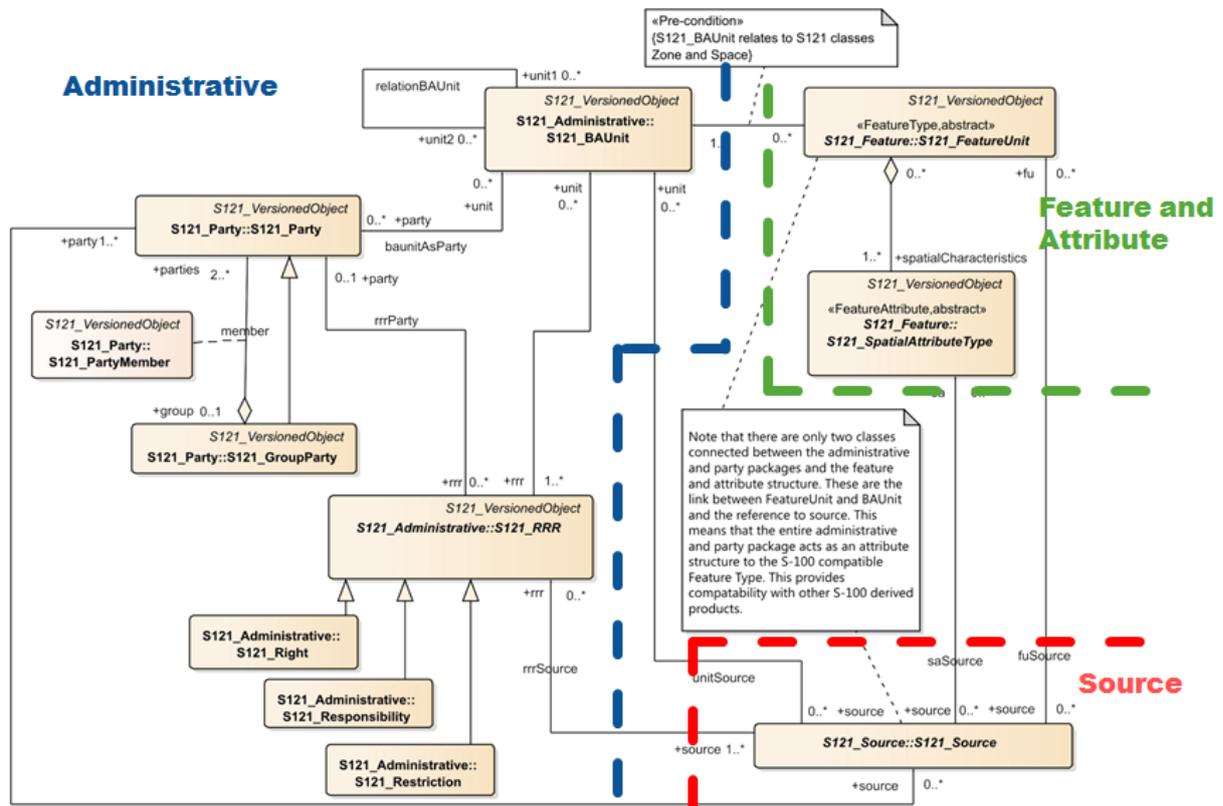


Figure 1 – S-121 Structure

The impact of S-121 on the S-100 Universal Hydrographic Model is minimal. S-121 simply uses the structures defined in S-100 and defined additional feature and information objects and attributes to be registered in the S-100 register. It is proposed that these objects and attributes be identified as “MLB” in the register.

The legal structure derived from the ISO 19152 LADM standard is implemented using information objects (as allowed by S-100). As such the legal structure is a separate and parallel structure to that used in other product specifications such as S-101 Electronic Nautical Chart and is completely non-interfering. That is, S-121 simply adds a legal structure following the rules in S-100. There is no impact on either S-100 or S-101 from this legal structure defined in S-121.

The additional textual tabular encoding format defined for S-121 also does not interfere with S-101 or any other S-100 based product specification. A GML or XML encoding format as used in other S-100 based products may be used for S-121 type data, but the textual encoding needs to be the primary encoding for deposit of Maritime Limit and Boundary information with DOALOS.

## **6. Status of the work on S-121**

The initial meeting of the S-121 project team was held in December 2016. An initial product specification for S-121 was distributed to the S-121 project team before the meeting.

Several comments were received and discussed in the meeting. As indicated in the minutes the meeting decided to restructure the S-121 product specification into several documents one of which is a streamlined product specification in align with the product specification template defined by S-100.

An overview document will be produced that gives the background for the standard. Separately a document will be defined that describes the Features and Attributes that the S-121 project team would like registered in the IHO registry. Since S-121 defines a different context from eNavigation it is proposed that these objects be identified as “MLB” rather than “Hydro”. In addition there will be several information objects to register.

The derivation of classes from the IHO and ISO models will be addressed in a separate technical document. This derivation of classes is voluminous and very detailed. It is only needed by standard developers in the S-121 Project Team and the S-100 WG to verify the model, and it is confusing to the user of the standard.

Encoding will be addressed in another separate document. There will be several encodings. One will be in XML / GML for exchange between hydrographic agencies; however, the primary encoding will be a textual encoding that is suitable for submission to DOALOS and for adjudicating the legal aspects of MLBs without the need for any special software.