

Paper for Consideration by HSSC16**Status of S-121 testing and proposed next steps**

Submitted by:	S121 Project Team Chair
Executive Summary:	The report provides an update on the progress of testing S121 and related developments in ISO 19152 Land Administration Domain Model and recommends the Project Team recommences meetings to consider the outcomes of testing with the objective of developing a new version of the standard.

Introduction / Background

Development of S121 has its origins in the United Nations annual General Assembly resolution on the Oceans and Law of the Sea paragraph 6 initiated in 2004 [A/RES/59/24](#).and renewed annually where the General assembly

Requests the Secretary-General to improve the existing Geographic Information System for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, submitted in compliance with the Convention, and to give due publicity thereto, in particular by implementing, in cooperation with relevant international organizations, such as the International Hydrographic Organization, the technical standards for the collection, storage and dissemination of the information deposited, in order to ensure compatibility among the Geographic Information System, electronic nautical charts and other systems developed by these organizations;

Initial development within the IHO commenced in collaboration with the United Nations Division on Oceans and Law of the Sea with the first proposal S1xx being presented in 2009. Development of this proposal did not progress until the establishment and first meeting of the S121 Project Team in 2016 with the following objectives.

To develop the S-121 Maritime Limits and Boundaries Product Specification the product specification should take into account the following:

- *Defining a proposed data model*
- *Create an S-100 conformant product specification for Maritime Limits and Boundaries to support Law of the Sea Submissions.*
- *Determine if S-100 needs to be extended to support Law of the Sea issues.*

Development of the standard proceeded between 2016 and 2019, when version 1 of the Standard was adopted for testing and evaluation. An important innovation of version 1 of S121 is the adoption of principles inherited from ISO 19152, the Land Administration Model which allows it to form the foundation of a marine cadastre and the seamless administration of land and water rights.

Since 2019, extensive testing of the standard has been undertaken, most visibly through an Open Geospatial Consortium [Pilot](#). National testing being undertaken by a number of States.

This testing has received limited visibility due to sensitivities sharing digital maritime boundary information, especially where States do not already publish this information.

Although this testing has received limited visibility, national testing has taken the following forms.

- Testing the completeness of the model
- The development of a comprehensive and legally authoritative digital marine cadastre
- The development of a national S121 database for a States United Nations Convention on the law of the Sea (UNCLOS) maritime limits and boundaries
- The development of a simplified implementation of S121 with open source tools to reduce the barriers to States adopting the standard.
- The development of formats suitable for making deposits to the Secretary General of the United Nations as provided for under various provisions of UNCLOS, including GeoJSON and web services.

This testing has been undertaken by at least 3 Developed States, one Regional Organisation using development funding provided by one of the Developed States and 6 Pacific Island Countries.

An important outcome of the development of S121 is its influence on the development of ISO- 109152 which had commenced a Stage 0 review in 2019. Most significantly, ISO19152 now contains a part 3 Marine Georegulation, which is the generic case of S121. This part allows the extension of S-121 principles to all marine sectors and could facilitate the development of an integrated marine cadastre and seamless integration between land and marine cadastres in national jurisdictions.

Analysis/Discussion

S121 has posed particular challenges in its development within the S100 framework. It has required the consideration land administration principles and how they can be applied in the marine space in concert with the framework established under UNCLOS. It has tried to achieve this in a manner that would allow legally certain deposits of maritime boundaries in a natively digital form while being uncertain how this could ultimately link with hydrographic charting and the core mandates of the IHO. These complex objectives have on some occasions caused controversy.

The present draft standard has attempted to provide a balance between competing views. Some members of the Project Team have are concerned that reopening discussion on the standard provides an unnecessary risk of reopening sensitive discussions, while others also point out that having identified issues, we should work to resolve them. Noting these concerns, any work on a revised version of the standard should be undertaken respecting the compromises required to adopt version 1 of the standard.

Shortly after the standard was adopted as version 1, a revised version 1.1 had been drafted taking into account decisions made at the meeting that adopted the standard but not captured in version 1. This standard has not been presented for approval by the project team, consideration should be made on whether to consider this document, or roll the changes into a version consolidating new issues identified in testing.

Testing of the Standard has found that for most exchange purposes, the richness of the standard has captured most elements that may be required to make a maritime limit or

boundary deposit to the UN. A small number of features have not been captured, which can be addressed by simple additions to code lists. For instance, the standard has not captured the implicit straight lines closing lagoons on reefs covered by Article 6 of UNCLOS. Given that these omissions will provide difficulties for the affected States, it is appropriate that they are captured and a revised version of the Standard provided.

The standard carries a number of dependencies from ISO 19152 that have been revised and updated in the review of that standard. These dependencies should be updated when the relevant parts of ISO19152 have been approved.

S121 is presently compiled in S100 version 4 format. It would be appropriate to update the format of the standard to the current S100 version 5 when any amendments are made.

The standard is rich and complex, designed to capture the complexity of State practice in managing and distributing maritime limits and boundaries without judgement. This imposes a significant barrier to entry to all but the best resourced States in identifying which elements are relevant to them and which are not. Testing has also shown that it is possible to build an implementation of the standard with a simplified compliant model that can be built using readily accessible tools such as spreadsheets, python and QGIS. It is likely that the States undertaking this testing may proceed to implementation and deposit directly. Consideration needs to be made on the best mechanisms to capture these initiatives that could facilitate other States adopting this framework.

Testing of the standard has shown that it provides powerful tools for managing all offshore boundaries. For States that are wishing to use the standard for this purpose, a question of venue arises. Should the additional complexity needed to implement a cadastre be captured within S-121, ISO 19152 or solely within national profiles. This is a discussions that goes beyond the remit of any one body, and in which States will make their own choices depending on their own needs. The IHO should consider what role it may seek in this space.

Conclusions

S121 has undergone

Recommendations

It is recommended that online meetings of the S121 project team recommence with the goals of

- capturing lessons learned from testing and making any necessary changes in the standard
- Update the standard documentation to S100 version 5
- To resolve any dependencies with ISO19152
- To consider the relationship of this standard with other S100 standards

Action Required of S100WG

The S100WG is invited to:

- a. Take note of this report
- b. Provide any advice with regard to the recommendations and next steps
- c. Bringing to the notice of interested parties the recommencement of this work.