

Paper for Consideration by TSMAD and DIPWG

S-101 Test Plan and Test Beds

<i>Submitted by:</i>	S-101 Work Item Leader
<i>Executive Summary:</i>	This paper offers a preliminary test plan for S-101 in order to promulgate discussion.
<i>Related Documents:</i>	Any relevant documents and references to the extent that they are known to the originator.
<i>Related Projects:</i>	S-101

Introduction / Background

As the development of S-101 begins to wrap up, it has been clear from the onset that prior to use by the general hydrographic community, S-101 needs to be thoroughly tested before it is voted on by the IHO MS and is available for use. The intent of this document is to scope out the type of testing that needs to be done and then create a test plan to execute the testing of S-101 in 2013.

Analysis/Discussion

One of the requirements of TR 2/2007 – Principles and Procedures for making changes to IHO Technical Standards and Specifications is that there must be a testing phase; therefore the first step in accomplishing this phase is developing a test plan for S-101.

One of the main factors in developing a test plan is to establish what the scope of the test plan shall encompass and what requirements need to be met in order for S-101 to be declared a completed product specification.

In order to accomplish this, it is proposed that TSMAD and DIPWG jointly develop an S-101 test plan which will detail the approach used to test the functionality of S-101. In order to begin this process a draft test plan has been developed for review by TSMAD/DIPWG. It includes all the necessary components that are required for successful testing and loosely follows the IEEE 829 test plan structure.

The draft document is laid out as follows:

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Appendix B will contain the requirements and the test case that is needed to pass the requirement during the test bed process.

Conclusions

Since many of the concepts that are contained within S-101 have not been properly tested, it is necessary to follow a proper test plan to develop the S-101 test beds. It is during the test phase of many projects where issues are encountered, and thus TSMAD and DIPWG will be able to make the appropriate changes to S-101 to ensure that when it goes to IHO MS vote it is a viable standard and is stable for implementation by the hydrographic community.

In addition, this plan will assist in compliance with the IHO TR 02/2007.

It should be noted that executing this test plan may require resources that are beyond the capacity of TSMAD and DIPWG. However, as the test plan becomes more mature, the working groups will be better able to understand the resource implications.

Recommendations

It is recommended that TSMAD/DIPWG form a small sub group to review the test plan, document the requirements that need to be tested and develop the test cases to be used during the test bed process.

Justification and Impacts

Justification for any proposed action or recommendations.

- The test plan and test bed are part of the compliance of S-101 to IHO TR 02/2007
- This will allow for TSMAD/DIPWG to identify any issues with S-101 prior to acceptance
- This may involve additional resources beyond the scope of TSMAD/DIPWG.

Action Required of TSMAD and DIPWG

The TSMAD and DIPWG is invited to:

- a. note the draft test plan
- b. endorse the test plan structure
- c. establish a sub-working group to finalize the test plan by the end of 2012.

TSMAD/DIPWG



S-101 Test Plan

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Preface

Document Version Control: It is the reader's responsibility to ensure they have the latest version of this document. Questions should be directed to the owner of this document, or the project manager.

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Revision History

Date	Version	Description	Author
March 6, 2012	0.0.0	Original	Julia Powell

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1 Introduction

This is Test Plan for S-101. It defines the key premises, test approach, test execution and process for S-101 Acceptance.

1.1 Background

S-101 has been in development since 2005, and has followed the IHO standards development process as outlined in TR 02/2007. S-101 is a major step forward in the development of the Electronic Navigational Chart product specification.

In order to promote S-101 to a final IHO standard it is necessary for the product specification to undergo extensive testing.

Comment [N1]: Insert some background from the S-101 paper.

1.2 Purpose

The purpose of this document is to establish the scope and approach to S-101 testing and to outline the test criteria and procedures, that when successfully executed, will constitute the IHO's readiness to move S-101 forward for acceptance by the IHO Member States.

1.3 Scope

In alignment with IHO TR 02/2007 the scope of this test plan only includes testing and verifying the functionality introduced in S-101. It does not include compliance testing to IEC 61174, however, the results may feed into a new edition of IEC 61174 for use by type approval. This test plan shall only test to S-101 and the requirements outlined by TSMAD/DIPWG that are included in this test plan.

1.4 References

The following documents serve as reference to support system acceptance and further the understanding of S-101 for the reader of this document.

- S-100
- S-101

1.5 Definitions, Acronyms and Abbreviations

See Appendix A - Acronyms and Abbreviations

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2 Key Premises

The following are key premises derived as part of defining the scope and establishing the framework for system acceptance:

1. S-101 will be considered fully capable if it passes the tests outlined in this document

3 Approach

The approach to system acceptance will establish the framework for test execution by defining roles and responsibilities, the test schedule, acceptance test readiness review and the test procedures.

3.1 Roles and Responsibilities

S-101 Testing will be conducted by representatives from TSMAD and DIPWG. Test procedures will be executed jointly by TSMAD and DIPWG. Testing will be witnessed by the IHO as appropriate.

The following are roles and responsibilities for System Acceptance:

Acceptance Test Manager (ATM) - The ATM will be a IHO representative who will coordinate and monitor acceptance test activities; the ATM will be responsible for scheduling resources and maintaining the acceptance test schedule. The ATM will prepare and conduct the Test Readiness Review and prepare the Test Report

Tester – Tester(s) will exercise the acceptance test procedures and document acceptance test step results accordingly

3.2 Test Schedule

The system acceptance test schedule is outlined below:

Activity	Start Date	End Date

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3.3 Acceptance Test Readiness Review (TRR)

An Acceptance Test Readiness Review (TRR) will be conducted prior to acceptance test to review dry run results and any outstanding requirements or deficiencies within S-101. The result of the review will be a go/ no go decision for acceptance test.

3.4 Test Procedure Definition

Acceptance test procedures are a combination of requirements testing and test scenarios to demonstrate the functionality of S-101.

4 Test Execution

Testing will be executed by TSMAD/DIPWG.

4.1 Resources

The resources required to support acceptance test are the same resources used to support integration testing. These include:

- S-101 Feature Catalogue Builder
- S-101 Portrayal Catalogue Builder
- S-101 Viewer
- S-101 Test Data Sets
- S-101 Test Procedures

4.2 Test Procedures

The acceptance test procedures as defined earlier in this document will be used to test S-101 functionality and determine if expected results are obtained. These procedures are located in Appendix B.

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4.2.1 Pass/ Fail Criteria

Each test case or scenario will have a descriptive process or number of steps to execute and “Expected Result(s)” to observe and document. One expected result may be tied to one or more process or steps executed by the Tester.

The pass fail criteria will be developed to be discretely detailed to avoid miss-interpretation or room for subjectivity. The expected results will be vetted by the TSMAD/DIPWG prior to system acceptance execution.

4.2.2 Issue Resolution

As procedures are executed and results logged, any discrepancies or issues will be noted and set aside for further adjudication. Once noted, and as permitted, testing will resume through the completion of the procedure. If the issue prevents the continuation of testing within the procedure, then testing will resume with the next procedure. If the issue prevents test continuation all together, then testing will be suspended until the issue is researched and resolved to a degree that testing can re-convene.

At the close of system acceptance test, any outstanding issues will be reviewed by TSMAD/DIPWG for further dispensation.

5 Test Report and Formal System Acceptance

At the conclusion of system acceptance testing, a report will be generated detailing the system acceptance test activities, results, and any residual issues to be addressed, deferred or accepted “as-is”.

Once reviewed and approved, the test report and marked up procedures will be packaged and will become an artifact to be archived by the IHO along with a predetermined procedural mechanism for the IHO to formally accept S-101.

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Appendix A – Acronyms and Abbreviations

Acronym/ Abbreviation	Description
ATM	Acceptance Test Manager
DIPWG	Digital Information and Portrayal Working Group
ENC	Electronic Navigational Chart
TSMAD	Transfer Standard and Maintenance Application Document Working Group

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Appendix B – S-101 Acceptance Test Procedures

The S-101 acceptance test procedures within this appendix are meant to exercise the S-101 Product Specification to demonstrate capability as part of system acceptance test. The procedures currently exist in draft and require red-line and update as part of an acceptance test dry run.

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Number	Requirement	S-101 Reference
1	Feature Catalogue Creation	
1.1	The system shall be able to export a new feature catalogue in XML (version 1.0.0)	
Test		
1.2	The system shall be able to export a correction to the feature catalogue (1.0.1)	
Test		
1.3	The system shall be able to export a clarification to the feature catalogue (1.1.1)	
Test		
1.4	The system shall be able to export an extension to the feature catalogue (2.0.0)	
Test		
2.0	Portrayal Catalogue Creation	
2.1	The system shall be able to export a new portrayal catalogue in XML (version 1.0.0)	
Test		

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2.2	The system shall be able to export a correction to the portrayal catalogue (1.0.1)	
Test		
2.3	The system shall be able to export a clarification to the portrayal catalogue (1.1.1)	
Test		
2.4	The system shall be able to export an extension to the portrayal catalogue (2.0.0)	
Test		
3.0	S-101 Enabled ECDIS	
3.1	The system shall be able to manage multiple versions of a Feature Catalogue	
Test		
3.2	The system shall be able to manage multiple versions of a Portrayal Catalogue	
Test		
3.3	The system shall be able to read and display data that are associated to multiple versions of a feature and portrayal catalogue	
Test		

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4.0	S-101 Product Specification Tests for ECDIS	
4.1	Text Placement	4.3.5.3.1
Test		
4.2	Dataset Structure	4.5
4.2.1	Complete Datasets	4.5.2
4.2.2	Scale Independent and Scale Dependent Datasets	4.5.3
4.2.3	Scale Independent Dataset	4.5.4
4.2.4	Scale Dependent Dataset	4.5.5
4.6	Display Scale Range	4.6
4.6.1	Dataset Loading and Unloading	4.6.1
4.6.2	Algorithm for dataset loading and unloading	4.6.1.1
4.7	Geometry	4.7
4.7.1	S-100 Level 3a Geometry	4.7.1
4.7.2	Masking	4.7.2

Comment [N2]: The intent is to go through each section of the product specification to see if we need a specific test for functionality to ensure that it is working properly. SI/SD would fall into this category.

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4.8	Portrayal	
4.9	Data product format	
4.9.1	Encoding of Latitude and Longitude	10.1.1
TEST	Check that the coordinate multiplication factor are set to 10^7 for all datasets	
4.9.2	Encoding of Depths	10.1.2
TEST	Check that the CMFZ is set to 100	
5.0	Exchange Set	
5.1	Dataset	
5.1.1	Complete Datasets – DataCoverage	10.3.1.2
5.1.2	Scale Independent Datasets – DataCoverage	