S-101 Test Plan

Preface

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Revision History

Date	Version	Description	Author
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S-101 Test Plan	S-101 TP 0.0.0

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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 must 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

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

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.

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.

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

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.

	Date: 6-3-2012
S-101 Test Plan	S-101 TP 0.0.0

Number	Requirement	S-101 Reference
1	**Feature Catalogue Creation**	
1.1	The system must be able to export a new feature catalogue in XML (version 1.0.0)	
Test		
1.2	The system must be able to export a correction to the feature catalogue (1.0.1)	
Test		
1.3	The system must be able to export a clarification to the feature catalogue (1.1.1)	
Test		
1.4	The system must be able to export an extension to the feature catalogue (2.0.0)	
Test		
1.5	The Feature catalogue must conform to S-100	
2.0	**Portrayal Catalogue Creation**	
2.1	The system must be able to export a new portrayal catalogue in XML (version 1.0.0)	
Test		

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

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

Number	Requirement	S-101 Reference
Test		
3.4	The system must display datasets in the chart display according to the rules and symbols set out in the S-101 Portrayal Catalogue	
TEST	Visual inspection of a test dataset to ensure that display conforms to that specified in the S-101 Portrayal Catalogue. Every feature in the test dataset must display correctly for the product to conform to this test.	
3.5	**Application of a Feature Catalogue -** The system must use the installed S-101 Feature Catalogue when listing Feature and Attribute details.	
TEST	With the default Feature Catalogue installed, specify a new catalogue. Load a dataset and query a feature which has been amended in the new catalogue. If the feature's name and definition correspond to the new catalogue the application conforms to this requirement.	
3.6	**Application of a Portrayal Catalogue -** The system must use the installed S-101 Portrayal Catalogue when displaying features in the chart display. The application may convert the symbol rules contained in the XSLT file to internal code but must be able to output the same results file as the standalone XSLT file.	
TEST	Generate an output display file from the application; difference this file against the output display file for the same input dataset. If the two files are identical then the application conforms to this requirement.	

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

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Number	Requirement	S-101 Reference
4.0	**S-101 Product Specification**	
4.1	Dataset Identification	3
4.1.1	The spatial resolution of the datasets (both minimum and maximum display scale) must conform to the standard radar ranges	3
TEST		
4.2	Data Content and structure	4
4.2.1	The system must conform to S-100 Part 3 – General Feature Model	4.2
TEST		
4.2.2	The system must be capable of reading and displaying Skin of the Earth features	4.3.2.1.1

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Number	Requirement	S-101 Reference
TEST		
4.2.3	The system must be able to override default metadata values defined by the data set descriptive records with values contained in meta features	4.3.2.2
TEST		
4.3.4	The system must be able to handle associations between features	4.3.3.1
TEST		
4.3.5	The system must be able to handle aggregations between features	4.3.3.2
TEST		
4.3.6	The system must be able to handle compositions between features	4.3.3.3
TEST		
4.3.7	The system must be able to handle information types	4.3.4
TEST		
4.3.8	The system must be able to handle complex attributes	4.3.5.2
TEST		

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Number	Requirement	S-101 Reference
4.3.9	Feature Object Identifier	4.4
4.3.9.1	Each feature within a dataset must have an unique FOID	
TEST		
4.3.9.2	The FOID may be used to identify that the same feature has instances in separate datasets	
TEST		
4.3.9.3	FOIDs must not be repeated in a dataset	
TEST		
4.3.9.4	Where a feature is repeated in different datasets the FOID should be repeated	
TEST		
4.3.9.5	FOIDs must not be reused by another feature, even when a feature has been deleted	
TEST		
4.4	Dataset Types	4.5
4.4.1	Datasets may contain more than one dataCoverage	4.5.2

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Number	Requirement	S-101 Reference
TEST		
4.4.2	Multiple dataCoverage's within a dataset must not overlap	4.5.2
TEST		
4.4.3	ENC updates must not change the limits of a dataset	4.5.2
TEST		
4.4.4	Datasets must not cross the 180 degree meridian	4.5.2
TEST		
4.4.5	Complete Datasets	4.5.3
TEST		
4.4.6	Scale Independent datasets	4.5.5
TEST		
4.4.7	Scale Dependent datasets	4.5.6
4.5	Display Scale Range	4.6

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Number	Requirement	S-101 Reference
4.5.1	The smallest display scale must be set in the minimum display scale	4.6
TEST		
4.6	Dataset loading and unloading	
4.6.1	The system must load and unload data using the minimum guidance set out in Annex C	4.7, Annex C4.7
TEST		
4.7	Geometry	4.8
4.7.1	The system must support S-100 Level 3a geometry	4.8.1
TEST		
4.7.2	The system must support masking	4.8.2
TEST		
4.8	Coordinate Reference Systems	5
4.8.1	The system must display data in a Mercator projection	5.2
TEST		

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

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Number	Requirement	S-101 Reference
4.8.2	The system must display polar data in a polar stereographic projection	#####
TEST		
4.8.3	The system may have different vertical datum's	5.3
TEST		
4.8.4	The system must indicate where a different vertical datum is.	5.3
TEST		
4.9	Data Quality	6
4.9.1	The system must display different data quality indicators	6.2
TEST		
4.10	Portrayal	
4.10.1	The system must be able to utilize the text placement override feature	9.2
TEST		
4.11	Data Product Format	10

Number	Requirement	S-101 Reference
4.11.1	The dataset must conform to S-100 profile of ISO/IEC 8211	10.1
TEST		
4.11.2	The dataset must set the coordinate multiplication factors for latitude and longitude (CMFX and CMFY) to 10^7	10.1.1
TEST		
4.11.3	The dataset must set the depth resolution (CMFZ) to 100	10.1.2
TEST		
4.11.4	The floating point or integer attribute values in the dataset must not be padded by non-significant zero's	10.1.3
TEST		
4.11.5	The dataset must use ISO 10646-1 in UTF-8 for character strings	10.1.4
TEST		
4.12	Data Product Delivery	11
4.12.1	The dataset must be in an exchange set	11.2
TEST		

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Number	Requirement	S-101 Reference
4.12.2	The exchange set may contain supplementary files	11.2
TEST		
4.12.2	The exchange set may deliver S-101 Feature Catalogues	11.2
TEST		
4.12.3	The exchange set may deliver S-101 portrayal catalogues	11.2
TEST		
4.12.4	The dataset may be an update	11.3.1
TEST		
4.12.5	The dataset may be a re-issue	11.3.1
TEST		
4.12.6	The dataset may be a new dataset or a new edition of the dataset	11.3.1
TEST		
4.12.7	The dataset must use the proper sequencing for New Editions, updates, and reissues	11.3.3

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

Number	Requirement	S-101 Reference
TEST		
4.12.8	The system must check the sequencing of S-101 datasets for New editions, updates, and reissues	11.3.3
TEST		
4.12.9	The dataset must be able to be cancelled via an update dataset file where the edition number must be set to 0	11.3.3
TEST		
4.12.10	The system must be able to cancel a dataset	11.3.3
TEST		
4.12.11	The dataset support files must be one of the following formats TXT HTM XML TIF – baseline TIFF 6.0	11.4
TEST		
4.12.12	The system must be able to read the following formats for support files: TXT HTM	11.4

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

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Number	Requirement	S-101 Reference
	XML TIF – baseline TIFF 6.0	
TEST		
4.12.13	The support file must carry an issue date and CRC value calculated on the content	11.4.2
TEST		
4.12.14	The system must be able to delete the support file is the "deletion" flag is tagged in the XML catalogue metadata file	11.4.2
TEST		
4.12.15	The system should store support files in a separate folder within the exchange set	11.4.2
TEST		
4.13	Exchange Catalogue	11.5
4.13.1	The exchange catalogue must be named CATALOG.101	11.5
TEST		
4.14	Data Integrity	11.6

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Number	Requirement	S-101 Reference
4.14.1	The dataset must have a CRC value	11.6.1
TEST		
4.15	Metadata	12
4.15.1	The dataset metadata catalogue must comply to all the mandatory metadata elements	12
TEST		
4.15.2	The system must be able to read the XML metadata catalogue	12
TEST		
5.0	S-101 Implementation Guidance (Annex C)	
5.1	Dataset Structure	C4.5
5.1.1	The dataset must indicate through the layerID of the metadata if the dataset is SI/SC/Complete	C4.5.3
TEST		
5.1.2	SI Datasets must set the maximumDisplayScale to 1:3,000,000 and the minimumDisplayScale to 1:2,000	C4.5.3

Comment [N2]: There needs to be a way to differentiate a system requirement versus a dataset requirement.

Comment [N3]: I think that most of this annex is out of scope until things are a bit more settled with portrayal.

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Number	Requirement	S-101 Reference
TEST		
5.1.3	The system must not display SI data that is outside the coverage of available scale dependent datasets	C4.5.3
TEST		
5.1.4	The system must verify that all DataCoverages of loaded Scale Dependent data are in the same geographic areas the DataCoverage for the loaded Scale Independent dataset.	C4.5.3
TEST		
5.2	DISPLAY	C4.6
5.2.1	The system must use the dataset loading and unloading algorithm for datasets	C4.6.1.1
TEST		
5.3	Portrayal	

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