

Paper for Consideration by HSSC

Report on the application of some ISO 9001 Principles in the development of S-101 PS, S-98 and S-164

Submitted by:	HSSC ISO 9001 Cell
Executive Summary:	This paper presents the work done by the HSSC ISO 9001 Cell and some recommendations are proposed to carry on the experiment of applying ISO 9001 for process management.
Related Documents:	1/ S-101 Detailed GANTT, April 2024 (.xlsx) 2/ Risks and Opportunities Management, April 2024 (.docx)
Appendices	-
Related Projects:	HSSC; S-100; S-101; S-164; S-98; DQWG.

Principal Activities and achievements

Regular VTC meetings have been held with an active participation of S-101 PT Chair, S-101 Vice Chair, acting as S-101 PCO¹, PCO of S-164/S-98 Sub-Group, S-100 WG chair and vice chair and HSSC vice chair, acting as HSSC PCO of the activities related to the application of ISO 9001 principles (29/08/2023, 14/12/2023, 29/02/2024, 04/04/2024).

The GANTT diagram and Risks and Opportunities Management Purposes document are maintained by the S-101 PCO. Meetings enable discussions and agreement on planning, risk assessment and mitigation.

Action HSSC 15/60 : “Given the dependency on others PS development timeline to validate S-101 PS edition 2.0.0 after a testing period, HSSC 15 agreed on the principle to expand the scope of the ISO Cell to S-164 and S-98 developments and designated S-100WG Vice-Chair as a PCO from the S-164/S-98 subWG to join the ISO Cell and participate to maintain Gantt diagram and risk management documents.” is completed
Scope has been extended, S-100WG Chair, Vice Chair and PCO from S-164/S-98 subGroup have joined the Cell and participate actively to the meetings. GANTT diagram has been completed to show the timeframe for both S-98 and S-164.

Action HSSC15/61 “**HSSC Chair** to consider the possibility of reporting at the next IRCC meeting on the benefits of having such a cell in HSSC and invite the **IRCC** to consider mirroring such an ISO Cell on S-101 with the following scope: RHC S-101 production/coordination/distribution in the near future. Aim: being in a position to report on an annual basis to NCSR on the predicted coverage (of S-101 ENC as a 1st step, then other S-1xx Phase 1/Route Monitoring products).” is completed.

Following the report at IRCC-15, WENDWG has been tasked to liaise with HSSC on how to mirror the HSSC ISO Cell on S-101 with the following scope: RHC S-101 production/coordination/distribution in the near future. WENDWG-14 agreed on the potential benefits of introducing ISO 9001 principles into S-100 coordination and production activities but due to lack of resources, nothing will be done by WENDWG-15.

Action HSSC 15/62 “**HSSC** endorsed the recommendation from the **HSSC ISO 9001 Cell** to consider, in cooperation with the S-100WG, how the efforts on S-101 PS development could be measured (monitoring of a “Effort KPI” and set up a new KPI for the S-101 PS process?).”

Setting an effort KPI should help measure and manage the workload or cost required to achieve the project's objectives within the specified timeframe. For that, most relevant “Effort metrics” have to be determined. Common ones include Person-hours, Cost, Workload distribution among team members.

Estimate of Person-hours and Costs was considered unlikely to be properly assessed. The number of contributors and issues from the Github Tracker (S-101 PT uses Github to monitor the process) along with a value for the

¹ Project Control Officer

number of significant items (e.g. items which require major effort or which lack a technical solution) can be used as a proxy.

The following definition of "Effort KPI" is proposed :

Objective	Monitor the resources required to achieve the development of the S-101 PS components in accordance with S-100 Timeline : FC & DCEG / Portrayal Catalog / Test data sets
Target	1- % of closed items \geq 70 % (KPI is green) 2- Number of active contributors \geq 7 (KPI is green) 3- No significant item open (significant items represent issues that must be resolved for edition 2.0.0 and don't currently have a clear way ahead) = 0 (KPI is green)
Data collection	From Github Tracker for 1 and 2 From Sub-Group leaders for 3
Periodicity	Update at each ISO Cell Meetings (chapter 5 – Performance indicators of S-101 PS process of Risks and opportunities document) Annual publication in the ISO Cell report for HSSC

Effort KPI values – Updated 02 April 2024

	% closed items (total items)	Workload distribution (number of contributors)	Number of significant items
FC & DCEG	68% (145)	19	<i>To be completed</i>
Portrayal Catalog	94% (349)	13	<i>To be completed</i>
Test datasets	65% (77)	9	<i>To be completed</i>

Analysis/Discussion

From the Risks and Opportunities analyze (refer to related document 2), the report focuses on the most “critical” risks (evaluation = high during the period) for which it is therefore necessary to plan actions to mitigate it.

1 – Final stretch to Ed 2.0.0

Finalization of S-101 Ed 2.0.0 is scheduled for July 2024, which is in line with the current S-100 timeline and seems an achievable goal. But this named “operational edition 2.0.0” would be mostly untested and may require significant changes post 2.0.0.

Lack of resources is highlighted every year, active contributions from Members States and additive funding is still necessary to meet the targets set out in the S-100 Roadmap. At this stage of the process, it is no longer the time to propose extensions or fundamental changes. It is strongly recommended to Members States contributors acting in the PT to focus on the deadline and restrict drastically model changes proposals.

2 – The critical dependencies

S-164 PS has been resourced and risk has been set from high to medium in September 2023. Finalizing S-164 Ed 2.0.0 is planned for 02/2025 and endorsement by HSSC expected on 31/05/2025. However, due to absence of testbeds, there is an important lack of visibility on the S-164 PS development progress and about its content.

S-98 PS at high risk - Finalization of Edition 2 is planned for 02/2025 and endorsement by HSSC expected on 31/05/2025. Even if good progress has been made within S-164/S-98 SG, much remains unimplemented by OEMs and untested: updates, WLA, dual fuel ... The involvement of implementers is crucial, especially this year, to mitigate that risk.

S-158 at high risk - Lack of resources is impacting the development of S-100 validation checks, which impact finalization of phase 1 PS. The need for formalized FC checks, using schematrons and a formalized validation process has been highlighted by the S-101 WG chair. To mitigate that risk, the possibility of funding part of this work is being investigated.

Feature Catalog Builder (FCB) – The upgrade of the FCB to be compliant with S-100 Ed 5.2.0 is mandatory to produce S-100 Feature Catalogs required for PS Ed 2.0.0. This risk has been set up to High in February 2024, and an action taken by the S-100 WG chair to raise the issue to KHOA and IHO secretariat. It is currently assessed as medium.

3 – Lack of full Testbeds environment and validation strategy

From ISO 9001 principles, there is a distinction between **verification** which aim is to make sure that the design has addressed every requirement while **validation** is used to prove, through the provision of objective evidences, that the requirements for a specific intended use have been fulfilled.

Currently, some testing is on track, but the full capacity is not achieved.

Testbed Programmes

Name	Contributors	Related standards	Information	Contact
KHOA S-100 Testbed	Rep.of Korea	S-98, S-1xx		Martin PARK
IHO-Singapore Lab	Singapore	S-101, S-102	LINK	Parry Oei
S-100 Across the channel	France, UK	S-101, S-102		Christian Mouden
PRIMAR Conversion Project	PRIMAR, PRIMAR RENC member states, NTOU, SevenCs, i4Insight, TCaris, ECC	S-101	LINK	data@ecc.no
S-100 / S-102 Demo	ECC, PRIMAR, Norway	S-101,S-102,S-111,S-129	S-100 Demo, S-102 Demo	
S-100 as a service	ECC, PRIMAR, CHS, TCaris, SevenCs	S-102, S-104, S-111	LINK	

From S100Resources webpage : <https://iho-ohi.github.io/S100Resources/>

To reach maturity in Phase 1 PS, it is necessary to build a validation strategy, involving OEMs, and to develop an action plan to:

- specify “use cases”;
- conduct testing in S-100 ECDIS prototypes able to ingest and manage all S-100 Phase 1 products and interoperability catalogue on one hand and to deal with DF concept on the other. Testing interoperability requires test datasets for all Phase 1 products, there is a need to increase their production (see available tests datasets at <https://iho-ohi.github.io/S100Resources/>);
- record and analyse results, identify failures, thus reducing risks.

How to encourage manufacturers to develop S-100 prototypes to validate standards?

IHO can liaise with CIRM to implement a strategy that can effectively encourage OEMs to shorten the development of S-100 prototypes for full testing (DF concept and interoperability) and participate actively in PS validation.

Future considerations for ISO Cell

ISO Cell has been set up after HSSC-13 with the aim to experiment ISO 9001 principles in the development of S-101 PS to operational edition 2.0.0. The scope has been extended to S-98 and S-164 at HSSC-15. The operational edition of these specifications is now planned for 2024, so what next ?

ISO Cell has set up :

- a project management approach compliant with ISO 9001, to monitor the critical path and mitigate risks (internal and external factors) that should impact and probably delay the process;
- process scheme and description of S-101 PS development;
- updated GANTT diagram;
- Updated Risk and Opportunities document.

As mentioned above, edition Ed 2.0.0 of S-101, S-164 and S-98 will be mostly immature, and may require significant revisions. Keeping the ISO Cell active up to first S-100 type-approved ECDIS and a stabilized version of the PS would enable to continue to monitor the critical path and seek collectively risks mitigation.

The principles implemented for these PS and the organization in place (ISO Cell and Project Control Officer (PCO) among WG) should be used for the development of others PS. The ISO Cell offers to volunteer chair support to set up such an organization in order to monitor more closely PS development and ovoid scope creep.

Action Required of HSCC

The HSCC is invited to:

- a. **Note** this paper
- b. **Endorse** the monitoring of the proposed "Effort KPI" as a new KPI for the S-101 PS process (the first one being the Progress on milestones from S-101 Ed 1.0.0 to Ed 2.0.0 measured through the GANTT diagram)
- c. **Consider** to update the current objective of the ISO 9001 Cell "Apply some ISO 9001 Principles in the development of Ed. 2.0.0 of S-101 PS" into "Apply some ISO 9001 principles in the development of a stabilized operational version of S-101, S-164 and S-98".
- d. **Consider** the need to keep active the ISO Cell up to the first S-100 type-approved ECDIS and a stabilized version of the PS (target date 2027).
- e. **Consider** the need to develop an action plan to validate the PS : validation must demonstrate that the PS meet users expectations.
- f. **Consider** the proposal for IHO to liaise with CIRM in order to define common strategy to accelerate S-100 prototypes development.
- g. **Consider** the ISO Cell offer to volunteer chairs to support to set up an ISO approach in order to monitor more closely PS development and ovoid scope creep.
- h. **Initiate** any further actions as considered necessary.