13th Meeting of the Hydrographic Services and Standards Committee

Report of the S100WG

Agenda Item 5.1

HSSC-13, Virtual, 3-7, May 2021

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

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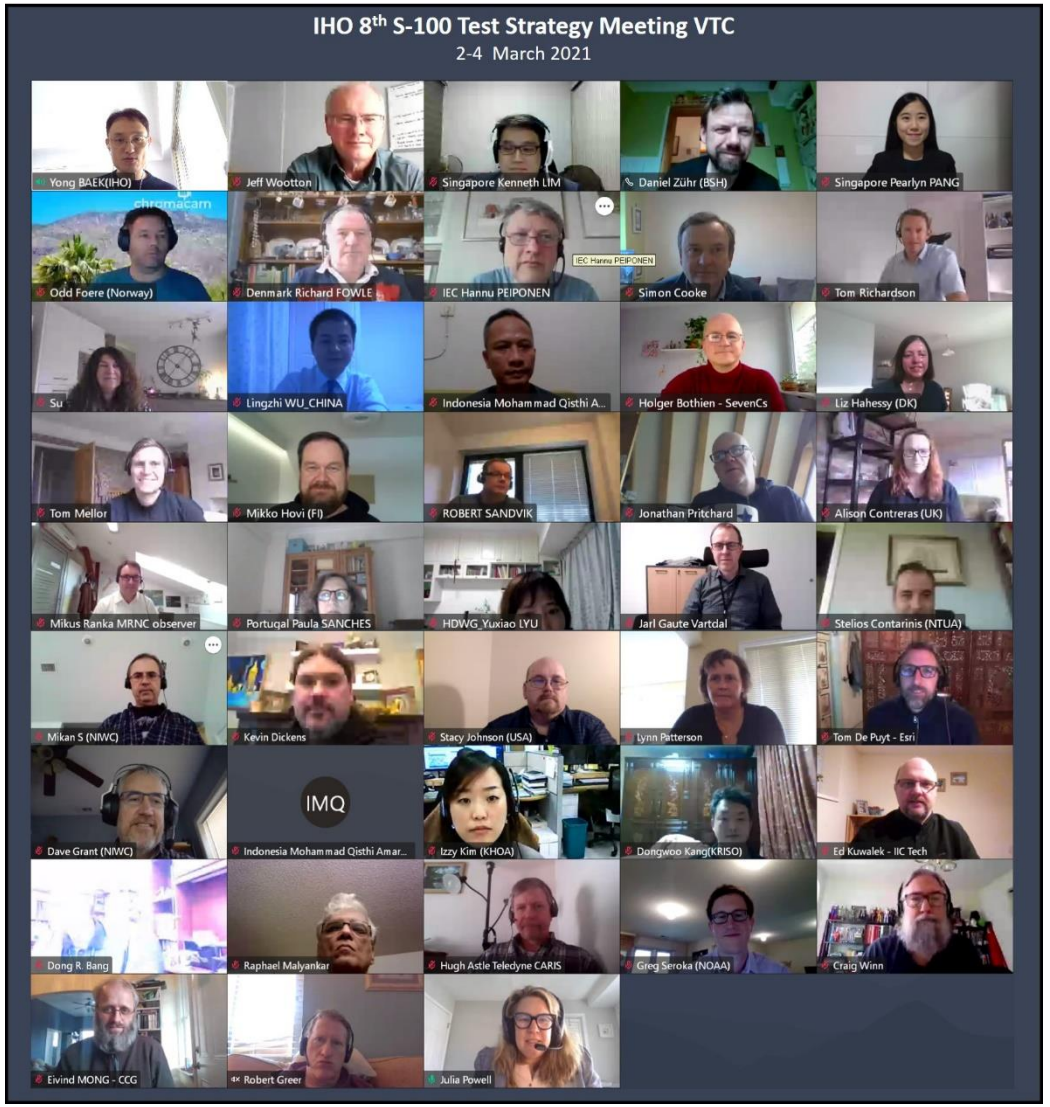
- Membership
  23 member states, 15+ industry members
- Meetings
  - Test Strategy Meeting – March 2021 (Virtual) – 57 participants



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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

- S-100 Edition 4.0.0 → Edition 5.0.0
- S-98 Interoperability Specification
- S-164 Test Data Set Development
- S-100 Test Bed Development
- S-100 Open Online Platform

S-100 EDITION 5.0.0 - PROGRESS

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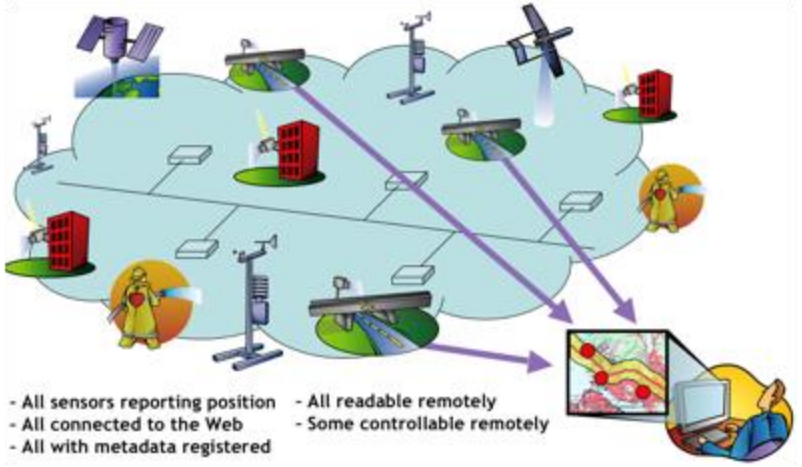
- Work continues on S-100 Edition 5.0.0
  - Comprehensive discovery metadata review (new part)
  - Portrayal harmonization (new part)
  - Updates to the portrayal process based on implementations
  - Revisions to GML to align it better with S-100 concepts
  - Change proposal log captures additional proposals
  - S-100 Validation Checks
  - UML models will need a comprehensive update to align with 5.0.0



S-100 EDITION 5.0.0 – FINALIZATION PLAN

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- Schedule Proposed to HSSC13

Month/Year	Action	Notes
July 2021	Last submission for any new proposals to S-100 Edition 5.0.0	The working group will discuss these via VTC and correspondence
November 2021	Final Submission date for any re-worked proposals to edition 5.0.0	Most of these were initially presented at TSM8
January 2022	Final Consideration of S100WG proposals	In person meeting for the S100WG
March 2022	Submission to HSSC14	
May 2022	Consideration at HSSC14	
June 2022	IHO Circular Letter for MS vote	
Fall 2022	Publication of the next edition of S-100	Edition 5.0.0

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S-100 EDITION 5.0.0

- HSSC13 is requested to note the planned finalization of S-100 Edition 5.0.0
- HSSC13 is requested to allocate 15,000 Euros to assist in updating the UML models for S-100 Edition 5.0.0 and S-101

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S-98 INTEROPERABILITY SPECIFICATION

- Work continues towards Edition 1.0.0
  - Reorganized S-98
    - S-100 Part 16 will be created as an abstract specification of interoperability
    - Contains the UML model and how to create the Interoperability Catalogue
    - S-98 Main Document – Describes how the abstract functionalities described in S-100 Part 16 are encoded and implemented
    - S-98 – Part A/B/C/D – Describes each interoperability level from 1 to 4
    - Provides the application schema
  - Moved to the comment stage of the finalization process
    - Over 75 technical comments were received
    - Plan to adjudicate them over a series of VTC throughout the next 4 months

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S-98 INTEROPERABILITY SPECIFICATION

- Originally targeted Edition 1.0.0 for this year
  - Underwent a major overhaul
  - Portrayal harmonization section of S-98 was moved to S-100 Edition 5.0.0
  - This ties capabilities for S-98 to S-100 Edition 5.0.0
  - More difficult to work through technical comments over a series of VTCs
- IMPACTS
  - S-98 Edition 1.0.0 will now follow the same approval path as S-100 Edition 5.0.0

S-98 INTEROPERABILITY SPECIFICATION

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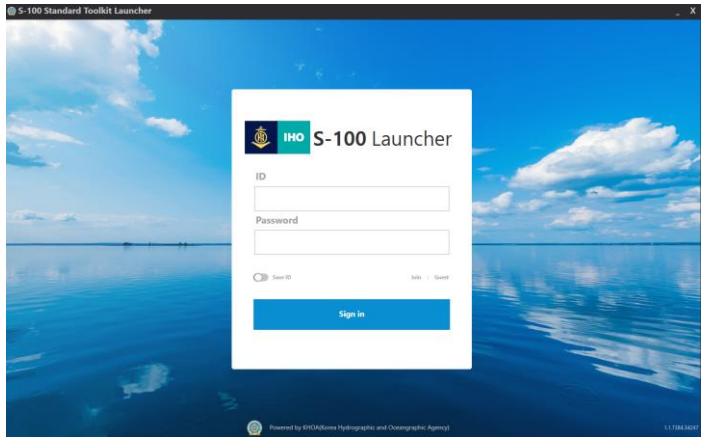
- HSSC13 is requested to note the progress of S-98 and the target approval for HSSC14

Month/Year	Action	Notes
March - July 2021	Adjudication of S-98 Comments and S100 Part 16	Discussed high impact comments at TSM8
January 2022	Submission to S100WG for approval	In person meeting for the S100WG
March 2022	Submission to HSSC14	
May 2022	Consideration at HSSC14	
June 2020	HSSC Letter announcing S-98 Edition 1.0.0	

S-100 INFRASTRUCTURE

- S-100 GI registry: 3rd registry has been operated officially since November 2020 (the former registry is still available, but shot down soon)
  - Registers: Producer Code register migrated to the GI registry



- FC / PC builder
  - FC builder: fixed some bugs such as special character
  - PC builder: available via S-100 toolkit

- S-100 toolkit launcher
  - Maintain all S-100 infra-applications including FC/PC builder, DCEG builder
  - New toolkits (symbol editor, document converts …)

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S-164 TEST DATA SET DEVELOPMENT

- In 2019 IHO released a tender to complete an analysis of what types of test data sets are required for S-100 operations within an ECDIS environment
- In 2020 the United States (NOAA) funded phase 1 work that was identified in the initial tender to begin building an initial version of S-164 ECDIS test datasets for S-100
  - Setup and simple migration

S-164 PHASE 1

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- Setup and simple migration
  1. Setup an environment for conversion of existing test datasets into S-101 format and the ability to change manage, document and track issues on created data
  2. An initial assessment of the data contained within the converted datasets
  3. Creation of simple “new” content (for S-101)
  4. Documentation of issues where they arise

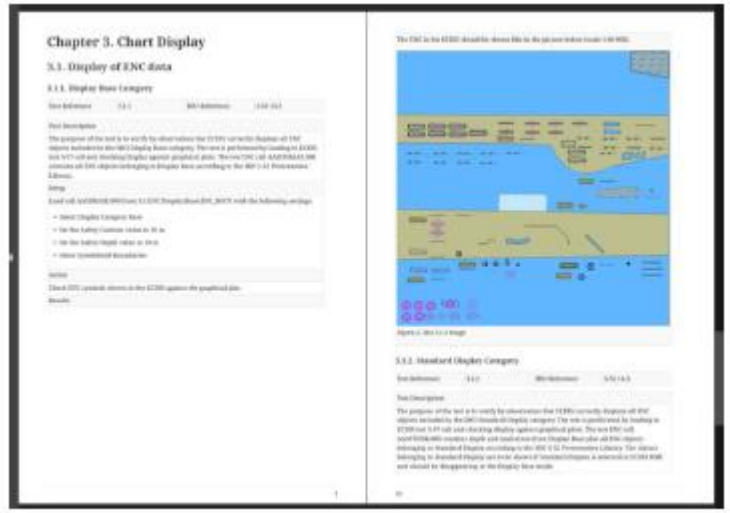

Figure 6: Auto-generated PDF of test dataset manual test 3.1.1

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S-164 FUTURE WORK

- Migrate S-101 datasets into S-164 folder structure
- Focus on purpose of tests
- Add more ECDIS functionality
  - Coverage
  - Hazards/Warnings
  - Portrayal
  - Exhaustive testing
  - Encryption
- Consideration of the DF-Concept within S-164
- Support for S-98 – including S-102, S-111, S-104 and S-124

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S-164 FUTURE WORK

- HSSC13 is requested to approve the use of IHO special project funds for phase 2 of S-164 development
  - Between 50-80K Euros
  - Estimated timeline 12 to 16 months

S-101 PROJECT TEAM UPDATES

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- See separate presentation

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S-102 PROJECT TEAM UPDATE

- Elected a new chair - Lawrence Haselmaier (US)
- Project Team agreed to de-scope S-102 to just focus on High Resolution Bathymetry for navigation systems
  - Prior edition was a mix of data for navigation system but also for intra-office exchange and scientific purposes
- Completed draft of Product Specification v. 2.1.0
  - Would like the S100WG to have the ability to approve edition 2.1.0 in accordance with TR 2/2007*
- Major priority is to align S-102 with S-100 Edition 5.0.0
  - Expected finalization: Q4 CY2022
- Plan to conduct and Impact Study prior to HSSC14

*It is noted that WG approval for incremental updates under TR 2/2007 is applicable to 1.0.0 editions, however, S-102 is a special case in that the 2.0.0 edition is widely recognized as the edition for implementation

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S-129 UNDER KEEL CLEARANCE MANAGEMENT

- Continued Development of S-129 Feature and Portrayal Catalogues by KHOA
- Limited testing of the OMC Torres Strait based data sets on ROK and NWIC viewers
- Anticipate Edition 2.0.0 in 2023

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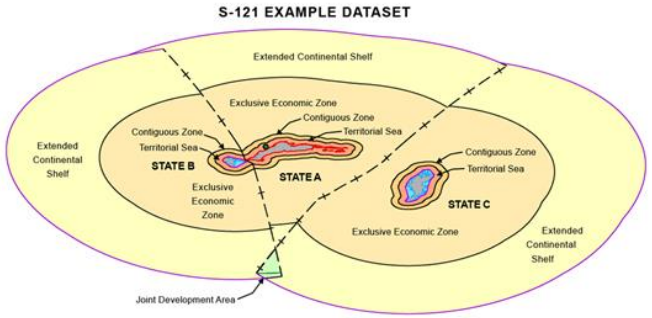
S-121PT PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

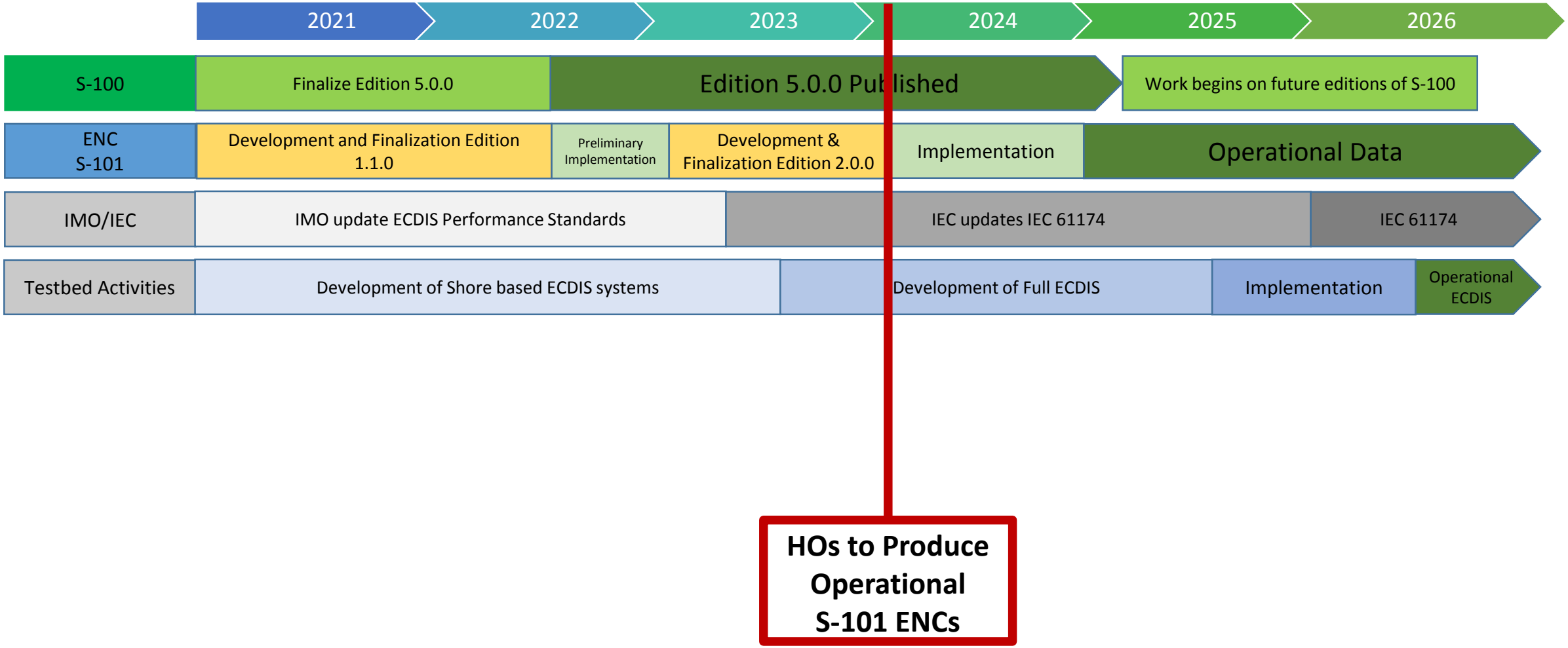
1. IHO S-121 is in the testing phase until 2022
2. Several Member States are actively testing the standard and investigating implementation for domestic purposes.
3. The OGC pilot project (http://ogc.org/projects/initiatives/mlbp), supported by Canada, Australia and UK provided an initial test of its capabilities and potential.
4. No major revisions are planned to v1.0.0 of the standard. A limited number of clarifications will be incorporated into a version 1.1.0 (ongoing) have been completed and will be published after the S100WG has approved them according to TR 2/2007



S-100 PROJECT TEAM

- HSSC13 to note the progress of S-101, S-102, S-129 and S-121
  - Agree to apply TR 2/2007 to edition 2.0.0 of S-102 until edition 3.0.0

S-100 Product Specifications developments and Timeline



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IMO AND S-100

- The IMO Maritime Safety Committee at its 102nd meeting held from 04 to 11 November, noted the recommendations from NCSR and agreed with the recommendations of the Sub-Committee regarding consolidation and renaming of outputs, as well as the expansion (resolution MSC.232 (82) on Revised Performance Standards for Electronic Chart Display and Information Systems (ECDIS)
- With respect to the proposal, on the inclusion of outputs in the 2020-2021 biennial agenda of the Sub-Committee, the Committee did not approve their inclusion since there would not be sufficient time to address those outputs during this biennium, due to the rescheduling of NCSR 8 in view of the pandemic.
- The outputs could thus, at the earliest, be included in the next biennial agenda of 2022-2023

WHAT THIS MEANS

- The initial proposal suggested to amend the footnotes and references to include S-101 and S-100
- However, the way S-100 and S-98 are now structured their needs to be more thought put towards this approach.
  - For example, remove the footnotes and refer to Appendix 1 and to the IHO List of Approved Standards for ECDIS
  - https://iho.int/en/standards-in-force
- Need to work with relevant stakeholders such as CIRM to provide a cohesive approach to recommending changes to the ECDIS PS to cater to the needs of an S-100 based ECDIS
  - For example, there may need to be some editorial changes to cater to a broader range of navigation related product specifications that have been identified in S-98

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ACTION REQUESTED OF HSSC13

- HSSC13 to note the need to work with relevant stakeholders such as CIRM, IMPA, BIMCO to provide a cohesive approach to recommending changes to the ECDIS PS to cater to the needs of an S100 based ECDIS

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DUAL FUEL CONCEPT

- HSSC12/18 – tasked the S-100WG/S-101PT to liaise with Stakeholders to prepare a governance document that formalizes the guiding principles of DF-Concept for incorporation into the S100 Implementation Roadmap
- Presented the DF-Concept at the CIRM Annual Technical Workshop in December 2020
- CIRM Workshop on S-100 and the future of ECDIS in April 2021
  - DF-Concept Session

Dual Fuel ECDIS

Update

- At S-100WG5 we drafted principles of operation for Dual Fuel ECDIS and began discussions on aspects of its operation and how it is supported by standards and stakeholders.

- It should allow unambiguous and standardised import and use of both S-57 and S-101 data. In addition, a selection of S-100 compliant data products should be able to be imported and used to enhance user functionality and safety.
- ECDIS behaviour should not be any less "safe" (as defined by the IMO PS) regardless of whether S-57 or S-101 data is in use and taking into account any ENC scheming differences and/or overlaps. The requirements of the IMO PS should be met in all eventualities.
- User Experience should never be negatively impacted by the introduction of any S-100 compliant data to the ECDIS.

"DF-ECDIS functionality should be split between legacy S-57 data and operations involving S-101. This will "partition" the ECDIS operation wholly between the two fundamental ENC products acceptable under the IMO regime during the transition period"

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What we said at HSSC

- Initial workshops have not identified any major issues with the rollout plan. There will certainly be challenges though.
- It is clear that defining the operation of ECDIS with dual fuel will require considerable effort from stakeholders across the ECDIS ecosystem and coordination between standards, regulatory and production efforts.
- S-100WG and ENCWG has commenced these activities and efforts in industry are also under way.
- Efforts will focus on
  - Better definition of “identical presentation regime” - Portrayal Sub-WG
  - “Seamless Operation” of ECDIS (S-100WG and others)
  - ENC Data Production - ENC “Conversion” sub-WG (and others)

- HSSC agreed on the Dual-Fuel Concept principles (Essential Principles of Operation) provided in Doc. HSSC12-05.1F… … and tasked S-100WG/S-101PT to liaise with Stakeholders (OEM, etc.) to prepare a governance document that formalizes the guiding principles of DF-Concept for incorporation into the S100 Implementation Roadmap

Dual Fuel Concept Definition – A Governance Documen

The aim of writing a governance document is to use the principles defined to capture clearly and simply:

- S-100 ECDIS
- How Dual Fuel bridges the gap from now

There is a “simple” explanation of how DF-Concept “works” which can be written.

From that:

- Promote the benefits of S-100 on the bridge
- Define each stakeholder group and the impact on them.
- Better define what changes are needed for non-IHO documents

From HSSC.

- S-100WG has discussed the concept of dual-fuel ECDIS (DF-Concept)
- Papers at S-100WG5 proposed “…its operation, data handling and user experience can be made consistent and logical in accordance with the current, relevant standards”
- The task at hand is to define better “identical presentation regime” and “seamless operation” in concrete terms

Content and Structure Suggestions

- S-100 ECDIS
  - The expansion of ECDIS to include “S-100” implementation
  - S-100 contains fundamental re-statements of how “information” is managed
    - Portrayal and Feature Catalogues
    - Feature Models (S-101)
    - Alarms and Indications, Context Parameters
    - “Data Loading”
    - Data Protection
  - Added benefits
    - “Additional Information” (S-100 product specifications) and its integration (Interoperability)
    - Update (Catalogues) and Customisation (new product specifications, updated interoperability)
- Dual Fuel Concept
  - The ability of an ECDIS to manage both S-57 and S-100 data simultaneously
  - How data, portrayal and functionality can co-exist

- Introduction and Background
  - History of ECDIS and ENC development
  - ECDIS stakeholders and their relationships.
  - Top level definition of the S-100 ECDIS
  - How S-100 differs from S-57 throughout the data path.
- Summary
  - What is S-100 ECDIS
  - The Dual Fuel Concept
- IHO Transition period – S-57 to S-100
  - Data Producers
  - The transition concept
  - Supporting transition through co-production
  - "Coverage" and "Scheming"
- Standards (IHO, IMO)
  - IMO/IEC and IHO standards framework
  - How the S-100 framework functions to support navigation (+changes)
- The IMO concept of the S-100 ECDIS
  - IMO concepts (minimum test requirements)
  - Display
  - Alarms and Indications
  - Other operations
  - The path to "S-100 only"
- What is "ENC" and "SENC" - Data suitable for primary navigation
  - Extra Layers, what obscures and what doesn't (e.g Water Levels)
  - Arbitrary Data Content
  - Interoperability
- ECDIS Operations
  - Ingest / Loading
  - Portrayal, data loading
  - Co-Display and behaviour of S-57/S-101
- Support for ECDIS Operations
  - Type approval testing
  - Distribution – IHO data protection scheme
  - Loading, Ingest, management
  - "Data Loading" - portrayal
  - Display and co-Display
  - Interoperability Operations.
- Data Production Support
  - "ENC is the bare minimum" – considerations with multiple product specifications
  - "Other products" and their benefits
  - "What should I produce?"
- Transition to S-101/S-57 Co-production
  - Adoption: initial conversion vs ongoing production
  - Co-production guidance, coverage, scheming, consistency, validation

Draft content – Governance document.

DUAL FUEL CONCEPT – ACTION REQUESTED OF HSSC

- HSSC13 is requested to allocate 15,000 Euro's to draft the Dual Fuel Concept Governance document
  - This will allow for words to be put on paper for MS to consider
  - Member State and expert contributor participation is highly encouraged during the editing process

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S100 WORKING GROUP PRIORITY LIST

1. S-100 Edition 5.0.0 Finalization
2. S-98 Edition 1.0.0 Finalization
3. Continue to progress S-101 towards edition 2.0.0

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ACTIONS REQUESTED OF HSSC13

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