

PART 2 PROJECT PROPOSAL - Demonstrate interoperability of S-101 and S-102 on an S-100-compatible Electronic Chart and Display Information System

Project Objectives:

1. To portray and overlay high resolution S-102 bathymetric data onto S-101 ENC for optimal display in an S-100-compatible testbed ECDIS.
2. To validate interoperability of S-101 and S-102.
3. To investigate both identified and potential technical/technological constraints and challenges, and thereafter recommend and justify possible resolution paths.
4. To explore the possibilities of using S-102 data for marine digital twin applications.

Project Deliverables

1. Fit-for-purpose portrayal of high-resolution S-102 bathymetric data onto S-101 ENC, for example use of colour banding or depth contouring in the testbed ECDIS.
2. Functional standards-based methodology to enable the integration of S-101 and S-102 datasets.
3. Validation of methods (as per S-98 Interoperability Catalogue) for deconflicting discrepancies and to process a variety of S-102 data formats and its derived products (contours and/or depth areas) with other data such as S-101.
4. Recommendations on appropriate bathymetric data i.e., at various resolutions to produce optimal S-102 products, including examining the use of shoal-bias or exact bathymetric data for data processing.
5. Test cases of applying S-102 data to marine digital twin.

Practical relevance to Hydrographic Community/Industry:

1. Validation of S-102 enhancing navigational safety and efficiency as a use case, and that it can be implemented and function as envisioned.
2. Validation and better understanding of interoperability between S-101 and S-102.
3. Identifying of and solutions to any possible gaps to better understand the suitability of colour display, contour lines, depth areas, navigable waters etc described in S-102 product specification.
4. Assessment of production of suitable and feasible S-102 products for the desired outcomes.
5. Encourage further iteration, refinement and application in context of other high-traffic navigation areas.
6. Facilitate other applications such as buoy tending, channel dredging, and reclamation works.
7. Lay foundation for digital twin developments and other applications such as S-104 Water Level Information for Surface Navigation datasets with S-101 and S-102 on S-100 [testbed](#) ECDIS to improve end-users' operational overview of the dynamic physical environment.

Members of Project team (See Appendix 1 for details)

Project Lead

Dr. Sewoong OH, Principal Research Engineer, Korea Research Institute of Ships and Ocean Engineering (KRISO)

Advisor to Project

Mr. Eivind Mong, Senior Advisor, Canadian Coast Guard (CCG)

Hydrographic Offices

Ms. Lynn Patterson, Vice-Chair, S-102 Project Team, IHO | Manager, Canadian Hydrographic Service (CHS)

[Mr. Martin Park | Assistant Director, Korea Hydrographic and Oceanographic Agency \(KHOA\)](#)

Mr. Lee Weng Choy, Maritime and Port Authority of Singapore (MPA)

Collaborator scope of work:

KRISO will provide:

i) S-100-compatible testbed ECDIS for the duration of the project, including basic User Interface (UI) mock-ups and interactive “clickable” functions/features.

ii) Research & development (R&D) resources and capabilities for harmonisation and portrayal of S-101 and S-102 datasets in the testbed ECDIS.

CHS will provide:

Past S-102 trial results, including test scenarios and parameters.

[KHOA will provide:](#)

[S-100 testbed resources including software for S-101 and S-102](#)

MPA will provide:

S-102 dataset at various resolutions for the corresponding S-101 cells in the identified demonstration areas

Project schedule (See Appendix 2 for details)

Estimated project duration: Twelve (12) months.

Summary of project cost (See Appendix 3 for details)

No cost to the IHO-Singapore Lab. Self-funded participating applicants will provide their respective in-kind support/contribution.

Other source of funding

(Have you attempted, applied for or obtained any other form of incentives/funding for this project or any similar project)

NIL

Do you require a workspace at IHO Lab? (If so, please elaborate):

Work area needed at the Lab (physical or virtual)

- 2-desks space for workstations
- 2 to 4 pax meeting area

Declaration by applicants:

We the Applicants hereby declare that the information provided in this Application form, including the supporting documents attached hereto, are true and correct. We have read and understood the terms set out herein, including the Terms of Funding and we agree to be bound thereby.

Name of Applicant:

Dr. Sewoong OH, Principal Research Engineer, Korea Research Institute of Ships and Ocean Engineering (KRISO)

Date: 21 July 2023

Appendix 1

PROJECT TEAM LEADER AND MEMBERS

Korea Research Institute of Ships and Ocean

A)	Name	Dr. Sewoong Oh
B)	Designation	Principal Research Engineer
C)	Education / Professional Qualifications	Industrial System Engineering, PhD
D)	Department	Maritime Digital Transformation Research Centre
E)	Organisation	Korea Research Institute of Ships and Ocean Engineering
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Canadian Coast Guard

A)	Name	Mr. Eivind Mong
B)	Designation	Senior Advisor
C)	Education / Professional Qualifications	
D)	Department	
E)	Organisation	Canadian Coast Guard
F)	Postal Address	
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Canadian Hydrographic Service

A)	Name	Ms. Lynn Patterson
B)	Designation	Manager
C)	Education / Professional Qualifications	
D)	Department	
E)	Organisation	Canadian Hydrographic Office
F)	Postal Address	
G)	Tel No.	
H)	Email Address	

Korea Hydrographic and Oceanographic Agency

A)	Name	Mr. Martin Park
B)	Designation	Assistant director
C)	Education / Professional Qualifications	
D)	Department	International Cooperation Team
E)	Organisation	Korea Hydrographic and Oceanographic Agency
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G)	Tel No.	+82-51-400-4341
H)	Email Address	martin.park@korea.kr

Maritime and Port Authority of Singapore

A)	Name	Mr. Lee Weng Choy
B)	Designation	Deputy Chief Hydrographer
C)	Education / Professional Qualifications	Degree

D)	Department	Hydrographic Division
E)	Organisation	Maritime and Port Authority of Singapore
F)	Postal Address	7B Keppel Road #20-00 (S 089055)
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Appendix 2

PROJECT SCHEDULE

Task	Year 1 Q1	Year 1 Q2	Year 1 Q3	Year 1 Q4	Year 2 Q1				Parties Involved
Production of S-101 and S-102 dataset for demonstration area									<ul style="list-style-type: none"> MPA
Investigation and validation of S-102 interoperability with S-101									<ul style="list-style-type: none"> KRISO CCG
Display of S-102 dataset in Testbed ECDIS (Demonstration)									<ul style="list-style-type: none"> KRISO CCG
Exploration of marine digital twin utilization possibilities of S-102 data and production of test cases									<ul style="list-style-type: none"> MPA KRISO CCG
Project documentation									<ul style="list-style-type: none"> MPA KRISO CCG

Appendix 3

SUMMARY OF PROJECT COSTS (To Indicate Cash or In-Kind)

Qualifying Project Costs		Cost of Item €K	Collaborator Contribution (If Any) €K
Category*	Details of Items		
Manpower (Please provide itemised details and budget breakdown)	1 project management	€10K	In-kind by KRISO, CCG and MPA
	1 expert on S-101 and S-102 production	€10K	
	1 expert on providing feedback on S-98, identifying gaps and validation checks on S-102	€10K	
	Project documentation	€5K	
Equipment (Please provide itemised details and budget breakdown)	1 x CARIS tools (BASE Editor and S-100 Composer)	€12K	In-kind by MPA

	1 x Testbed ECDIS	€10K	In-kind by KRISO
Other Operating Expenditure (Please provide itemised details and budget breakdown)	IT support	€3K	In-kind by KRISO and MPA
Total €K		€60K	

*The Cost of Item indicated shall include any Collaborator Contribution(s) obtained for the same item.

*The Governing Board needs to discuss what are the qualifying expenses eligible for co-funding.