**Submission of Project Proposal by Project Team Leader for Consideration by IHO-Singapore Innovation and Technology Laboratory Governing Board – Part 1**

**Project description** (proprietary or confidential information must be clearly indicated in the proposal)- No more than 3 pages.

1. Project objective, team composition and Project Team Leader, broad work packages, indicative budget and duration.
2. Project scope, challenges identified, innovation opportunities and potential benefits.
3. R&D or test-bedding work descriptions.
4. Key milestones and deliverables for each milestone.
5. Profile and respective of industry partner(s) participating in the industry consortium (if the company is forming a consortium) including their role and contributions (financial or in-kind).
6. Project risk assessment and mitigation plan.
7. Brief description of the Intellectual Property (IP) arrangements to facilitate eventual commercialisation of the project IP developed.

On receiving approval for the project, the Project Team Leader will be required to submit a more detailed proposal.

| 1. Project objective, team composition and Project Team Leader, broad work packages, indicative budget and duration. |
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The project aims to create a S-100 ECDIS capable of displaying S-102 Bathymetric Surface datasets with on S-57/S-101 ENCs.

To actualize this, sponsoring Hydrographic Office (HO) and SevenCs(7Cs) would look at it from 2 components:

Component 1: Production and Validation of S-102. This would include harmonizing of S-102 with S-57/S-101 datasets.

Component 2: Display of S-102 dataset with S-57/S-101 ENCs on a testbed infrastructure Testbed ECDIS.

The Project Team will consist of 7Cs technical team and sponsoring HO staff.

The budget for this project would be **EUR 50,000** comprising of EUR 25,000 in-kind contribution by 7Cs and EUR 25,000 funding support.

The estimated duration project for the creation of S-102 dataset and Testbed ECDIS capable of harmonising S-102 dataset with S-57/S-101 datasets is 6 months. Sea-trials on board stakeholders' vessel could also be carried out to showcase the capability of the testbed ECDIS vis-à-vis a current ECDIS to understand the effectiveness of the S-102 with S-57/S-101 for the Mariner.

Future extension of the project may include investigating the effects of interfacing more S-100 product groups such as S-104 Water Level onto ECDIS using various means of data transmission such as AIS and/or data (4G/5G) network.

| 2. Project scope, challenges identified, innovation opportunities and potential benefits |
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Project Scope

a. Production of S-102 data (by sponsoring HO)
  i. S-102 Bathymetric Surface
    1. Production
    2. Generalization
    3. Validation of S-102 dataset
  ii. Harmonization of S-102 with S-57/S-101 dataset

b. Interfacing S-102 with S-57/S-101 to explore display options to best match user needs & requirements without cluttering of information (by 7Cs)
  i. Provision of Test-bed infrastructure or Testbed ECDIS which allows display of S-102 onto S-101/S-57 ENCs;
  ii. Provision of hardware for Testbed ECDIS

Challenge

    a. Creation of suitable S-102 data

Creation of suitable resolution of S-102 data with consideration of application schema related to tiling scheme, tile size, grid resolution and maximum data file size.

    b. Harmonisation between S-102 and other datasets

To automate checks to deconflict discrepancy of S-102 dataset and its derived products (contours and/or depth areas) with other data such as S-57/S-101.

    c. Display of S-102 on a Navigation system

A testbed ECDIS to incorporate the various display to allow for optimum portrayal and resolution for S-102 with S-57/S-101.

2. R&D or test-bedding work descriptions.

Production of S-102 data (by sponsoring HO)

The project will test various datasets produced using the different S-102 datasets, with due consideration of resolution and file size. The schema of the creation of S-102 will be investigated which may be vary in different depth areas.

Visual display of S-102 on a testbed ECDIS (by 7Cs)

For the display of S-102 datasets on a test bed ECDIS, raster and vector mode will be explored to have optimum representation of the S-102 data. It would enable the user to visualise the dataset intuitively and allow for informed decision making.

The project would include investigating the flexibility of an adaptable safety contour and various 3D visual such as sun illumination and various colours depending on safety depth. The safety contour depth would be specific to each vessel draft, safety Under Keel Clearance (UKC) and colour adaptation.

7Cs will be providing a testbed infrastructure whereby S-102 data sets and S-101/S-57 data will be displayed in various options.

The result of the project will make recommendations for future work to be done.

3. Key milestones and deliverables for each milestone.

    a. Production of S-102 dataset for demonstration area (by HO +5 months)
    b. Validation of S-102 with S-57/S-101 (by HO +5 months)
    c. Display of Dataset in testbed ECDIS and Sea trial on stakeholder vessel (by 7Cs + 8 months)

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| 4. Profile and respective of industry partner(s) participating in the industry consortium (if the company is forming a consortium) including their role and contributions (financial or in-kind). |
| Based in Hamburg, SevenCs develops chart-display Kernels for ECDIS, WECDIS and other maritime applications, ENC production and distribution software, and professional maritime navigation software.<br><br>SevenCs would be contributing both in-kind via software and expertise to the project. This would include the provision of a Test-bed infrastructure for the display of S-102 with S-57/S-101 dataset. We would also contribute 2 x Hardware unit for the display of datasets on the testbed ECDIS.<br><br>Sponsoring HO will be undertaking the process of production and validation datasets that would be used for the testbed ECDIS. |
| 5. Project risk assessment and mitigation plan. |
| NIL |
| 6. Brief description of the Intellectual Property (IP) arrangements to facilitate eventual commercialisation of the project IP developed. |
| NIL |