

PART 2 PROJECT PROPOSAL - INTEGRATION OF SEA AND LAND DATUM FOR POSSIBLE USE CASES ON COASTAL INUNDATION SCENARIOS

Project Background:

Following the completion of the “Open Geospatial Consortium (OGC) Federated Marine Spatial Data Infrastructure project (FMSDI Pilot 2023 - Connecting Land and Sea for Global Awareness, Thread 1: Digital Twin of Land & Sea – Singapore”, and the Cities of Tomorrow (CoT) project - Feasibility Study Using a Single Operation to Acquire Nearshore Topographic and Bathymetry Data, there are opportunities to build on the projects’ successes.

This could potentially be achieved by bringing the resulting findings and outputs together and combining it with invaluable knowledge gained through the Focus Group Discussions on Land-Sea Integration.

The goal is to have a consistent and accurate method to integrate the land and sea datums which further improves the precision of the projection of terrain and bathymetry datasets, thereby strengthening the reliability of coastal inundation simulations and projections.

This project shares common interests with initiatives on integrating terrestrial, maritime, built and cadastral domains pursued by United Nations Global Geospatial Information Management (UN-GGIM) expert groups, particularly the Expert Group on Land Administration and Management (EG-LAM) and the Working Group on Marine Geospatial Information (MGI-WG).

Project Objectives:

1. The main objectives of the proposed project are to:
 - a. Combine current and past efforts to demonstrate how different datums for i) sea level data and ii) geodetic data pertaining to the land, can be integrated in order to facilitate the development of better applications, e.g., for evaluating the impact of climate change, natural disasters or extreme weather events along the coastlines.
 - b. Contribute a reference in order to support IHO Member States’ efforts to identify, deploy and maintain infrastructure(s) for addressing potential impacts on coastlines.

Project Deliverables

1. A prototype TopoBathy dataset that integrates bathymetry and land-based observations, and serves a baseline for developing mitigation tools and strategies for climate change, natural disasters or extreme weather.
2. A dataset profile document informing the TopoBathy dataset's metadata, format, spatial properties, and other relevant characteristics to facilitate understanding and further use.
3. Conduct a stakeholder engagement workshop(s) to gather feedback and insights from local geomatics engineers / land surveyors, hydrographers and coastal protection specialists.

Practical relevance to Community/Industry:

1. The TopoBathy dataset supports data-enabled decision-making for coastal zone management, shoreline protection, and marine spatial planning, and towards “UN SDG 11: Sustainable Cities and Communities - Make cities and human settlements inclusive, safe, resilient, and sustainable” and “UN SDG 13: Climate Action - Take urgent action to combat climate change and its impacts”. Additionally, it supports the IHO’s commitment, as part of the theme for World Hydrography Day 2024, to engage broader non-navigation users to address global policy drivers such as conservation, climate, and hazard mitigation.
2. The TopoBathy dataset ensures that terrestrial surveys, bathymetric mapping, and coastal engineering and protection projects can rely on an integrated height datum. This allows for the creation of continuous elevation models from land to sea, simplifies data comparison and facilitates interoperability. Consequently, it streamlines the data processing and analysis workflows for improved flood risk modelling or assessing risks associated with sea-level rise and coastal inundation.
3. Support implementation of UN-GGIM EG-LAM’s Framework for Effective Land Administration (FELA).
4. Accelerating capacity building and knowledge sharing amongst HOs and broader marine geospatial information community, and towards “UN SDG 17: Partnerships for the Goals - Strengthen the means of implementation and revitalize the global partnership for sustainable development”.
5. Demonstrate cooperation between land surveyors, hydrographers and coastal protection specialists on innovative solutions to reach shared objectives.

Members of Project team (See Appendix 1 for details)

Co-Leads:

- Geomatics Engineers from the Singapore Land Authority (SLA)
- Hydrographers from the Maritime and Port Authority of Singapore (MPA)

Advisor to Project: Parry Oei

Collaborator(s) scope of work:

Provision of validated datasets (Digital Terrain Model, bathymetry data) – SLA & MPA

Develop TopoBathy dataset (incl. develop and/or apply optimal vertical datum transformation parameters, depending on Area Of Interest) - SLA

Validate TopoBathy dataset, e.g. using InterTidal Zone data – MPA

Inter-agency coordination – IHO-SG Lab

Workshop organisation – IHO-SG Lab

Reporting – MPA, supported by SLA

Project schedule (See Appendix 2 for details)

Estimated project duration: Twelve (12) months.

Summary of project cost (See Appendix 3 for details)

Other source of funding

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

Self-funded participating applicants will provide their respective in-kind support/contribution.

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

NA

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:

Date:

Appendix 1

PROJECT TEAM LEADER AND MEMBERS

Singapore Land Authority

A)	Name	Evert Mulder
B)	Designation	Geomatics Manager
C)	Education / Professional Qualifications	Master's degree
D)	Department	Geodesy & National Mapping, GeoSpatial & Survey Division
E)	Organisation	Singapore Land Authority
F)	Postal Address	55 Newton Road, #09-01, 307987 (Revenue House)
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Maritime and Port Authority of Singapore

A)	Name	Jotham Teo
B)	Designation	Manager
C)	Education / Professional Qualifications	Degree
D)	Department	Hydrographic Division, Geospace-Sea
E)	Organisation	Maritime and Port Authority of Singapore
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Appendix 2

PROPOSED PROJECT SCHEDULE

Task	Year 1 Q4	Year 2 Q1	Year 2 Q2	Year 2 Q3	Parties Involved
Kick-off meeting					SLA, MPA
Select or determine transformation parameters to integrate and convert height measurements between land and sea datums.					SLA
Develop the TopoBathy dataset for the Area Of Interest					SLA
Validate TopoBathy dataset using Inter TidalZone data					MPA
Conduct an engagement workshop					MPA, supported by SLA
Project documentation					MPA, supported by SLA

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 (SLA, MPA)
	1 Geomatics expert with relevant GIS expertise.	€30K	
	1 hydrographer with expertise in sea level measurements and tidal patterns	€30K	
	Project documentation	€3K	
Equipment (Please provide itemised details and budget breakdown)	Software and datasets	€10K	In-kind (SLA, MPA)
	Digital Terrain Model (DTM)	€5K	
Other Operating Expenditure (Please provide itemised details and budget breakdown)	Logistics and IT support	€2K	In-kind (SLA, MPA)
Total €K		€90K	

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