



# Digitalisation of navigation in Solomon Islands

Supporting the development of hydrography and e-navigation for all in Solomon Islands

## Purpose

1. The purpose of this paper is to present a development programme of digital hydrography and effective delivery of hydrographic services by the Solomon Islands Maritime Authority (SIMA) to contribute to the sustainable use of the ocean and e-navigation for all in Solomon Islands waters.

## Background

2. The primary purpose of hydrography is to ensure safety of navigation (safe and efficient navigation of ships) and mitigate the risk due to the operations of ship to assets and the environment.

3. Hydrography is recognised as one of the ocean sciences requiring research and development as well as high technical skills in hydrographic surveying and marine chartering. Hydrography provides scientific and technical information in support of a wide range of marine activities, including marine tourism, security and defence, and environmental protection<sup>1</sup>.

4. Under the United Nations Convention on the Law of the Sea (UNCLOS), several resolutions have recognised the contribution of hydrography, the International Hydrographic Organization (IHO) and the provisions of hydrographic services to climate action through ocean-based adaptation and mitigation, climate resilient sustainable development, capacity-building, and disaster risk management.

5. The delivery of compliant hydrographic services is an international obligation for Solomon Islands which acceded to the International Convention on the Safety of Life at Sea (SOLAS) which require the collection and compilation of hydrographic data and the cooperation with other contracting governments in hydrographic surveying, preparation and publication of navigational charts and the effective management of data to support these services.

6. Solomon Islands is Contracting Government under SOLAS and member of IHO since 2018. The responsibility to deliver hydrographic services have been given to SIMA by the SIMA Act 2018 and cooperative arrangements are in place with the Australian Hydrographic Office (AHO) which is the Primary Charting Authority (PCA) to assist in meeting SOLAS obligations, providing hydrographic surveying and charting services, keeping hydrographic information, and transferring technical knowledge and capacity.

7. The delivery of hydrographic services is integrated to SIMA Corporate Plan under Goal 2: *Improved Safety of Navigation, Environment Protection and Response*. The *Strategy to implement relevant international maritime instruments* underpins SIMA Corporate Plan and adopts strategic actions to deliver international obligations as a Coastal State under SOLAS which includes ensuring safety of navigation in Solomon Islands waters so that all people and maritime operators benefit from safe navigation, clean seas and efficient response to all marine incidents in Solomon Islands waters.

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<sup>1</sup> Areas in which hydrography is required are: resource exploitation (fishing, minerals, etc.), environmental protection and management, maritime boundary and continental shelf delimitation, marine spatial data, maritime infrastructure development, marine tourism and recreational boating, maritime defence and security, disaster risk management (tsunami flood and inundation modelling, waves modelling and impact, etc.), submarine cable and pipeline deployment, coastal zone management.

# Digital hydrography and e-navigation for all in Solomon Islands

## *Status of hydrography in Solomon Islands*

8. To provide accurate hydrographic information, the capacity to conduct hydrographic surveys across jurisdictional waters is paramount. Hydrographic surveys are conducted in two phases: i) Reconnaissance Survey which involves topographic & coastline survey, tidal observation, and geodetic benchmarking, and ii) Hydrographic Survey which involves establishment of the geodetic control network, tide gauging & benchmarking, bathymetric observation, current observation, data processing and quality control, and preparation of navigational charts.

9. Hydrographic surveying and charting require a wide range of highly technical equipment, that includes echo sounders and side scan sonars, lidar and laser scanner technologies, sound speed profiling equipment, positioning systems and water level measuring equipment. The personnel conducting hydrographic surveys and preparing navigational charts must be qualified hydrographers and cartographers able to maintain technical skills to use equipment and software, collect and analyse data and produce charts. These skills are acquired in specialised training recognised by IHO and with experience in conducting hydrographic surveys and producing charts.

10. SIMA has the capacity to conduct single beam hydrographic survey within coastal waters with equipment and software owned and hydrographers and cartographers employed by SIMA<sup>2</sup>. The hydroscheme issued by SIMA in 2021 for coastal hydrographic surveying includes a number of sites to be surveyed across Solomon Islands<sup>3</sup> where risk for navigation and potential for marine activities have been identified. While the hydroscheme represents only a very restricted portion of ocean areas that need to be surveyed, it requires budgetary commitments well beyond SIMA's capacity and resources.

11. Since 2021, the Project for Development Support of Electronic Navigational Charts for Honiara and Noro Ports is implemented by JICA and SIMA and funded by JICA. As of 2023, the hydrographic surveys have been conducted for Honiara Port, Noro Port and its approach through Blackett Strait and extended to Diamond Narrows and Munda Bar. The project is building SIMA's capacity to conduct multi-beam hydrographic surveys providing bathymetric data at higher resolution than single-beam data and meeting the highest standards set by IHO.

12. Developing SIMA's capacity and operating hydrographic vessels, equipment and software in cooperation with national agencies is a development opportunity for Solomon Islands to shift to digital navigation, e-navigation for all and the capacity to develop resilient coastal and port infrastructure, implement effective marine spatial planning, negotiate and delimitate jurisdictional ocean areas and an extended continental shelf, and contribute to exploring new seabed resources. Failure to invest in hydrography may compromise safe navigation of new types of ships in the future, maritime development opportunities in marine tourism and a sustainable management of the ocean under the *Solomon Islands National Ocean Policy 2018*.

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<sup>2</sup> SIMA is currently employing two Category B hydrographers, one Category B Marine Cartographer; one officer is attending a Category B Hydrographer training in Japan (July – December 2023). Equipment and software include two survey boats (1x12m Stabi Craft and 1x6m aluminium boat); geodetic surveying equipment (Sokkia Topcon Theodolite (Digital)), bathymetry surveying equipment (single beam echo sounder and side scan sonar), CeeHydro Systems for bathymetry and tide and surveying software (Hypack surveying & data processing).

<sup>3</sup> Survey sites include Maringe Lagoon, Santa Isabel Island, Isabel Province, Auki Harbour, Malaita Island, Malaita Province, Star Harbour, Makira Island, Makira Ulawa Province, Tanatau Cove, Ngella Pile, Florida Islands, Central Islands Province, Takataka Bay, East Are'are, Malaita Province and Baolo to Suavanao Point, Santa Isabel Island, Isabel Province. Surveys of Honiara and Noro ports were included in the project funded by JICA.

## Development of digital hydrography and e-navigation for all in Solomon Islands

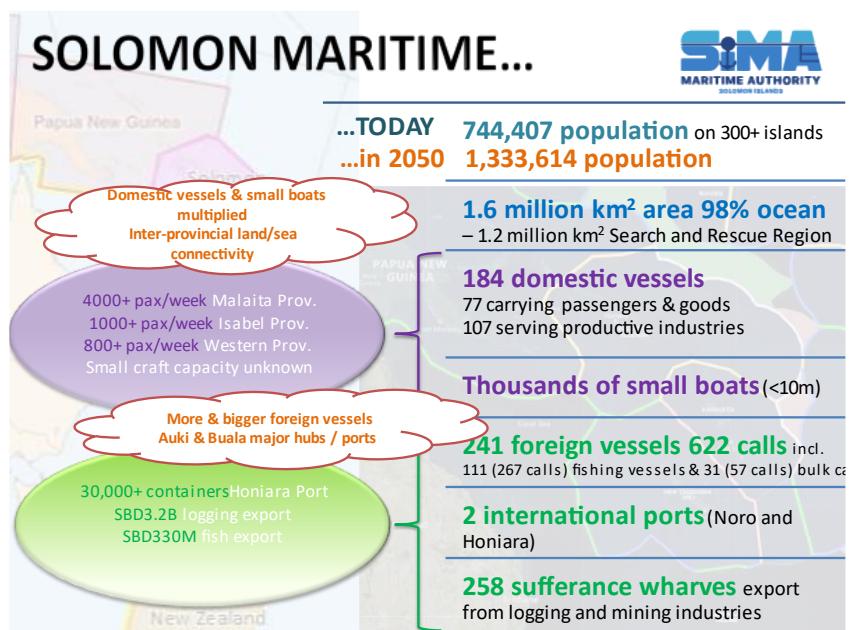
13. As a maritime nation made of 98% of ocean with a population of around 750,000 people living on more than 300 islands, Solomon Islands heavily relies on mobility at sea, the maritime industry (port, shipping) and the maritime workforce. With a growing population projected to pass 1 million in 2030 and reach 1.3 million in 2050, the Solomon Islands maritime sector will develop to offer an increased passenger and cargo capacity between provinces, allow navigation of larger technological vessels and provide port infrastructures able to operate international vessels in all provinces.

14. This development perspective underpins a new *Maritime Development and Resilience Strategy* that integrates the need for an equitable transition to decarbonisation of shipping and the commitment for development of a safe, resilient, green, clean, digital, gender-just maritime transport for the Blue Pacific agreed at the 5th Pacific Regional Energy and Transport Ministers' Meeting held in Port Vila, Vanuatu from 5 to 12 May 2023.

15. The *Maritime Development and Resilience Strategy* aligns to the *National Development Strategy 2016-2035* and the *National Ocean Policy 2018* with four main objectives: i) effective maritime governance and partnerships, ii) safer, green and cleaner mobility at sea, iii) digital navigation and security, and iv) improved maritime capacity and gender.

16. This hydrographic development programme is aligned to the *Maritime Development and Resilience Strategy* with the **overall objective to develop hydrography and electronic navigation for all in Solomon Islands waters**. The medium-term outcomes are:

- a. **Strengthened cooperation and single-beam hydrographic capacity and systems** to collect and compile hydrographic data and publish navigational charts in Solomon Islands.
- b. **Develop multi-beam hydrography capacity and systems** to support digitalisation of navigation and e-navigation in Solomon Islands waters.
- c. **Provide e-navigation services to all in Solomon Islands waters and reliable and quality hydrographic data** to support navigation, marine spatial planning, maritime boundaries and continental shelf delimitation and marine activities.





## Overall objective

Develop hydrography and electronic navigation for all in Solomon Islands waters.

Implementation period		2024-2030	2024	2025	2026	2027	2028	2029	2030
Total cost (SBD)		63,146,924	\$5,892,040	\$3,284,741	\$5,090,978	\$6,829,322	\$10,304,499	\$14,073,295	\$17,672,049
Outcome	Activities	Expected results			Costs (SBD)				
1. Strengthened cooperation and single-beam hydrographic capacity and systems.	<ul style="list-style-type: none"> <li>Implement AHO-SIMA memorandum of understanding to build capacity to process and conduct quality controls on hydrographic data.</li> <li>Purchase and maintain single-beam hydrographic equipment and software.</li> <li>Develop capacity of SIMA hydrographers and marine cartographers on hydrographic data processing and quality control, and on navigational chart production.</li> </ul>	<ul style="list-style-type: none"> <li>Single-beam hydrographic equipment and software are owned and maintained by SIMA.</li> <li>SIMA's hydrographers and marine cartographers process quality hydrographic data and produce navigational charts in accordance with AHO standards.</li> <li>Hydrographic data are safely stored in SIMA's system and backed up with AHO.</li> </ul>	Remuneration costs: 3 hydrographers, 2 marine cartographers, 1 administrator		\$7,690,186		\$15,238,675		
			Operational costs:	Travel costs: Airfares & per diem		\$2,758,486			
				Services costs: Consultancy, etc.		\$142,100			
				Goods & Equipment costs: Hardware, software, equipment, etc.		\$3,296,656			
Administrative costs: Other costs (taxes, stationaries, etc.)		\$1,351,246							
2. Develop multi-beam hydrographic capacity and systems.	<ul style="list-style-type: none"> <li>Purchase and maintain multi-beam hydrographic equipment and software including fittings on SIMA's boat and larger Solomon Islands vessels.</li> <li>Develop capacity of SIMA hydrographers and marine cartographers on high-resolution bathymetric data processing and quality control, other hydrographic data, and on electronic navigational charts (ENCs) production.</li> </ul>	<ul style="list-style-type: none"> <li>Multi-beam hydrographic equipment and software are owned and maintained by SIMA.</li> <li>SIMA's hydrographers and marine cartographers are qualified to collect and process high-resolution quality bathymetric data and other hydrographic data, and produce ENCs in accordance with IHO standards.</li> <li>Hydrographic data are safely stored in SIMA's system and backed up with AHO.</li> </ul>	Remuneration costs: Extra 1 hydrographer, 1 marine cartographer, 1 IT expert		\$4,756,110		\$39,274,329		
			Operational costs:	Travel costs: Airfares & per diem		\$1,379,243			
				Services costs: Consultancy, etc.		\$31,307,853			
				Goods & Equipment costs: Hardware, software, equipment, etc.		\$1,413,000			
Administrative costs: Other costs (taxes, stationaries, etc.)		\$418,123							
3. Provide e-navigation services to all in Solomon Islands waters and reliable and quality hydrographic data.	<ul style="list-style-type: none"> <li>Develop SIMA's integrated database and website to provide open-source maritime safety information on all available media platforms.</li> <li>Upgrade technical regulations related to maritime safety to use ENCs and approved digital navigation applications.</li> </ul>	<ul style="list-style-type: none"> <li>Maritime safety information and data are open-source and made available through SIMA's system and media platforms.</li> <li>Maritime regulations require use of ENCs and SIMA approved digital navigation applications.</li> </ul>	Remuneration costs: 1 Maritime Safety Information coordinator		\$1,984,881		\$2,893,290		
			Operational costs:	Travel costs: Airfares & per diem		\$459,748			
				Services costs: Consultancy, etc.		\$155,412			
				Goods & Equipment costs: Hardware, software, equipment, etc.					
Administrative costs: Other costs (taxes, stationaries, etc.)		293,249							
Management costs:		\$5,740,629							