



16th Meeting of the Hydrographic Services and Standards Committee

Report on the Joint IHO-Singapore Innovation and Technology Laboratory and Possible Impact on HSSC Activities

Agenda Item 04.04A

HSSC-16, Tokyo, Japan, 27 – 31 May 2024



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Objectives of IHO-Singapore Lab

01 Facilitate

The conduct of innovative or **investigative projects** proposed by IHO Member States(s), IHO organs, or other stakeholders. (including test bedding)

02 Enable

Knowledge creation and foster collaboration to evaluate specifications of global standard setting within the scope of IHO standardization activities

03 Foster

A multidisciplinary and collaborative environment for technical experts to interact learn and promote new solutions and technologies, including collaboration and cooperation with **other international organizations** research and development bodies active in the maritime domain under the guidance of a Governing Board



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Composition of the Governing Board



John Nyberg
Chair
(Director, IHO)



Thomas Dehling
Member
(Chair, IRCC)



Magnus Wallhagen
Member
(Chair, HSSC)



Thomas Ting
Member
(Host Country Rep)



Yong Baek
Secretariat
(IHO)



Parry Oei
General Manager
(IHO Lab)

New Chair, Nov 2023



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Establishment of the IHO – SG Lab

- **Decision at 2nd IHO Assembly, 2020**
- **Formation of the Governing Board, May 2021**
- **Launch the IHO-Singapore Lab, Aug 2021**
- **Developed Webpage for Lab, Sep 2021**
- **Kick off Meeting of 1st Project in Mar 2022**
- **2 projects successfully completed:**
 - Apr 2023
 - Nov 2023
- **3 projects in progress through to 2024**
- **1 potential project with in-principle approval**





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ACTIVITIES SINCE HSSC15

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- GBM
 - July 2023
 - Nov 2023 (appointment of new Chair)
- S-57 to S-101 Project
 - VTC Meeting Sep 2023
 - Conduct of Workshop, Singapore, Nov 2023
- S-131 Project
 - PT VTC Meeting Aug 2023
 - PT In-person Meeting, Singapore, Nov 2023
 - PT VTC Meeting Jan 2024
- S-102 Project
 - Analysis of bathymetric data obtained at different frequencies, Q1 2024
 - Request to be observer within IHO S-102 PT, Nov 2023



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ACTIVITIES SINCE HSSC15

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- Engaging with industry and HOs to explore potential project collaborations
 - Furuno on supplementing AR Navigation | eRacon, Oct 2023
 - Indonesia, Malaysia, Singapore on Dual-fuel ENC's, Nov 2023
 - Discussion with potential stakeholders on Land-Sea datum integration, Nov 2023
- (approved Jan 2024) Dual-fuel ENC's Project
 - Planning Meeting, Kuching, Jan 2024
 - Scheduled Malacca and Singapore Straits (MSS-ENC Steering Committee Meeting, Bali, Mar 2024
 - Bi-weekly VTC meetings with project partners
 - Planned in-person First Harmonisation Workshop 11 to 13 June for MSS-ENC WG
- (newly-proposed) Land-Sea datum integration
 - Discussion at UNGGIM MGI-WG, Bali, Mar 2024



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STATUS OF IHO-SGP LAB PROJECTS

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1. Review of S-57 to S-101 Conversion Guidance Document and Workshop [Completed Nov 2023]
2. S-131 Project: Engaging relevant stakeholders for testing and making improvements, where appropriate [scheduled completion Q1 2024]
3. Creation and test-bedding of ECDIS capable of displaying S-102 Bathymetric Surface (Phase 1) and S-104 Water Level products (Phase 2) on S-101 ENC's [ongoing]
4. Proof of Concept Project between IHO and IALA: S-124 & S-125 [Completed Apr 2023]
5. Demonstrate availability of ENC's (S-57 and S-101) for S-100 ECDIS along major shipping routes [ongoing]
- 6 To integrate sea and land datum for monitoring of possible rise in sea level. [New Proposed Project]



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1. Review of S-57 to S-101 Conversion Guidance Document and Workshop

Goals of the Project:

- Thoroughly **test and propose refinements** to the "S-57 to S-101 Conversion Guidance" document, produced by the IHO ENC Working Group (ENCWG).
- Use existing conversion tools to **test and review existing the Conversion Guidance document** and produce outputs conformant to its contents
- Workshop conducted in Singapore, November 2023 – supported by IHO-SG Lab and IC-ENC
- Final report submission Q1 2024

Headed by:
Thomas Mellor, Chair ENCWG



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1. Review of S-57 to S-101 Conversion Guidance Document and Workshop



5-days workshop in Singapore with close to 30 HOs



Industry partners panel with Chair of S-100 WG



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2. S-131 Marine Harbour Infrastructure Database

Goals of the Project:

- Create a **database and interface** that will **improve the information exchange** between harbours and hydrographic offices by acting as a **neutral repository of harbour information**.
- In-person meeting held in Singapore, November 2023
- Project scheduled for completion Q1 2024

Headed by:
Sarah Rahr, Canadian Hydrographic
Services



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2. Meeting of S-131 Project Team at IHO-SG Lab in Singapore



S-131 Project Team Meeting



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3. Creation and test-bedding of ECDIS capable of displaying S-102 Bathymetric Surface (Phase 1) and S-104 Water Level products (Phase 2) on S-101 ENC

Goals of the Project:

- Analyse impact of bathymetric data obtained at different frequencies for S-102 product.
- **Interfacing S-102 with S-101** to explore display options to best match user needs & requirements without cluttering of information, including in conformance with S-98.
- Provision of Test-bed infrastructure or Testbed ECDIS which allows **display of S-102 onto S-101 ENC**.

Participating Parties:
Korean Hydrographic and
Oceanographic Agency (KHOA),
Singapore Hydrographic Office and
Canadian Hydrographic Services



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4. Proof of Concept Project : 1st IHO-IALA collaboration to demonstrate interoperability of S-101 and S-124/S-125 at sea using wireless updating via 4G/5G telecom links

Goals of the Project:

- Support navigational safety – supplementing **S-101 ENC**s using varying sizes of **S-125 dataset**, including overlays.
- Service S-125 datasets via **4G/5G telecom** means during sea-trial.
- Check **interoperability between S-124/S-125 and S-101** as interleaving and overlaying – which was agreed at joint IHO/IALA workshop held in Norway, September 2022.
- **Project completed April 2023**

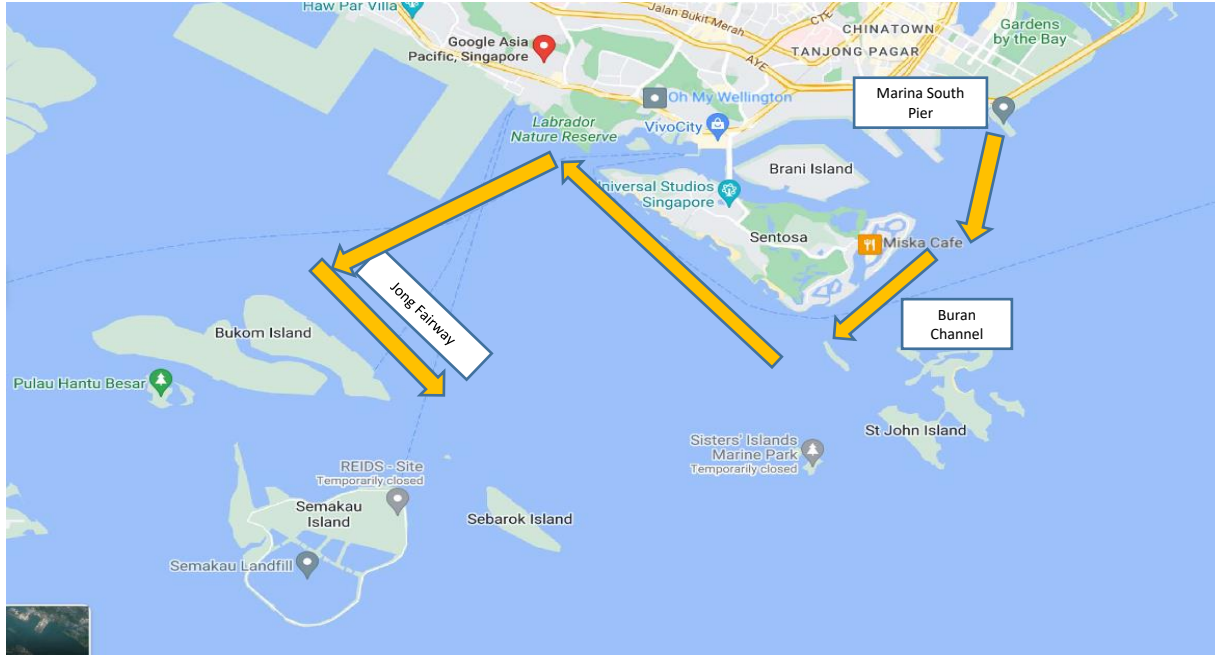
Joint Collaboration with Korean
Research Institute of Ships and
Ocean Engineering (KRISO),
Singapore HO and Chair NIPWG



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4. S-124/S-125 at test-bedding at sea



Sea-trial route



Sea-trial with Project Team and ECDIS OEM



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5. Demonstrate availability of ENC's (S-57 and S-101) in S-100 ECDIS for Dual Fuel along major shipping routes (2 Phases)

Goals of the Project:

- **Coordinate and provide** S-57 and S-101 covering the planned routes, e.g Malacca and Singapore Straits (Phase 1) and Round-the-World by Navy Ship (Phase 2)
- Demonstrate to the shipping community and other users that the IHO and our stakeholders stand ready to **make available ENC's in S-100 for Dual Fuel** covering major shipping routes ahead of the 1 January 2026 commitment to the IMO.
- Test portrayal of both S-57 and S-101 ENC's on the prototype **Dual Fuel S-100 ECDIS**, and possible testing of **wireless updating** of the S-101 ENC's, while at sea

Joint Collaboration with JHA,
HOs of Indonesia, Malaysia, and
Singapore, Italian Navy, KHOA
RENCs, software OEMs



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5. Dual-fuel ENC Project



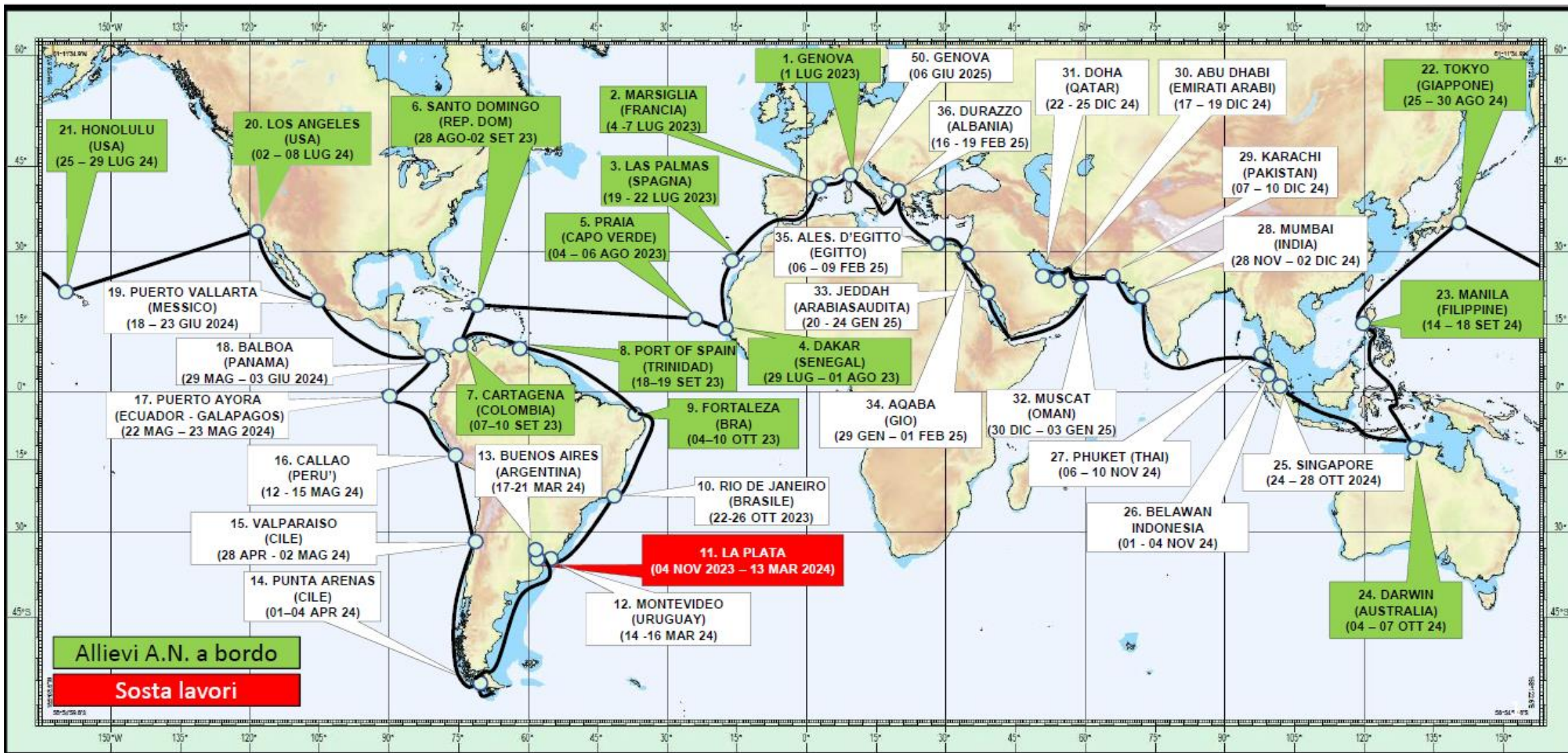
Project Planning (for S-101 MSS-ENCs) in Kuching, Jan 2024



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5. Dual-fuel ENC Project (Phase 2) – Route of Italian vessel ‘Vespucci’

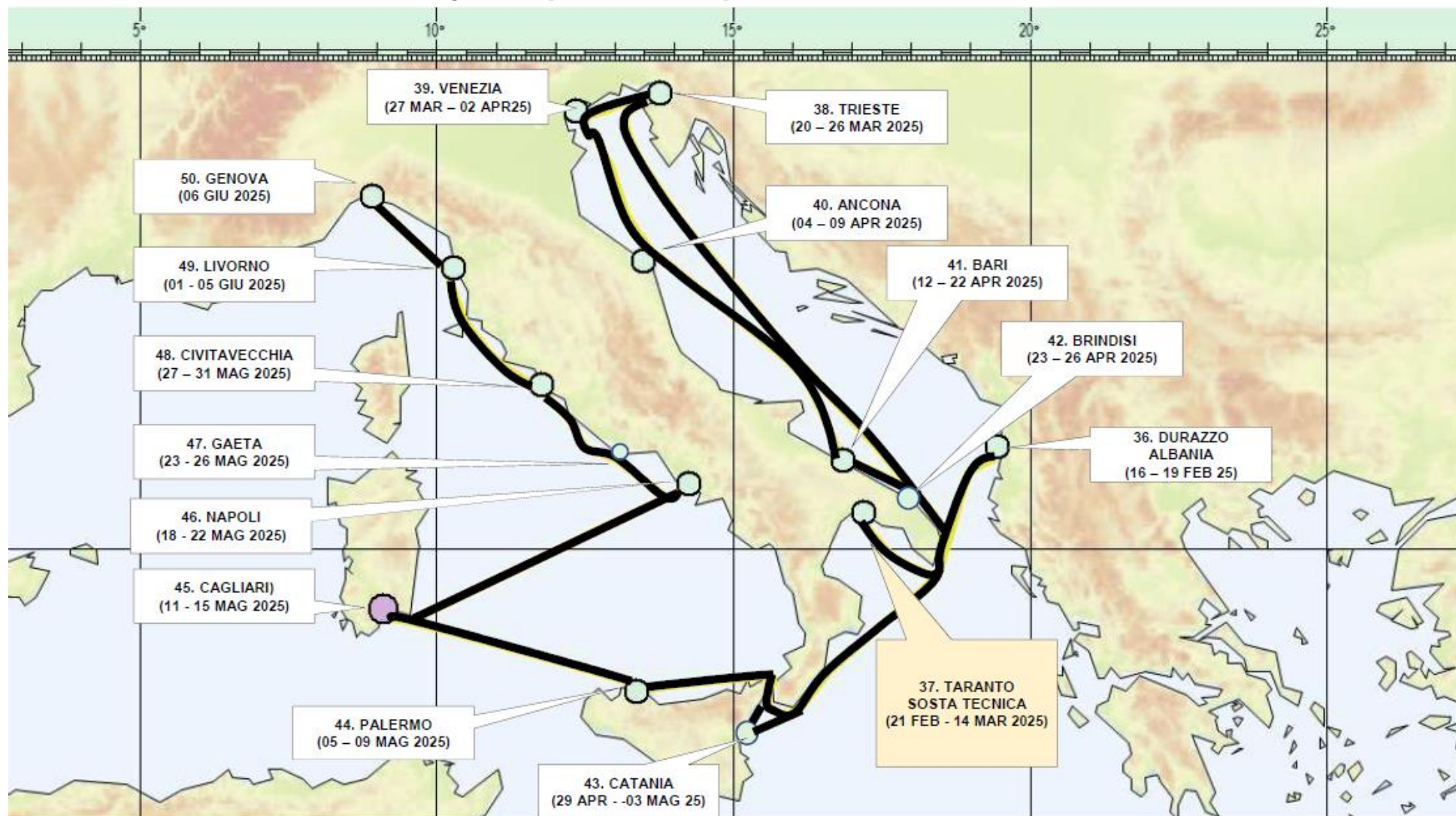




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5. Dual-fuel ENC Project (Phase 2) – Route of Italian vessel ‘Vespucci’



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5. Dual-fuel ENC Project (Phase 2) – Route of Italian vessel ‘Vespucci’

	PORTO	ARRIVO	PARTENZA	SOSTA	NAV	MIGLIA	SOA	NOTE
11	La Plata	sabato 4 novembre 2023	mercoledì 13 marzo 2024	131	1	95	4,0	Cantiere navale Astillero Rio Santiago Sosta lavori Estera (4 mesi ca)
12	Montevideo (Uruguay)	giovedì 14 marzo 2024	sabato 16 marzo 2024	2	1	110	4,5	
13	Buenos Aires (Argentina)	domenica 17 marzo 2024	giovedì 21 marzo 2024	4	11	1463	5,5	
14	Punta Arenas (Cile)	lunedì 1 aprile 2024	giovedì 4 aprile 2024	3	24	1463	2,5	Tratta che prevede ca 10 gg di margine al fine di valutare al meglio il passaggio dello Stretto di Magellano/Capo Horn (2 soste a Punta Arenas: 1 3 e 9-11 aprile)
15	Valparaiso (Cile)	domenica 28 aprile 2024	giovedì 2 maggio 2024	4	10	1300	5,5	
16	Callao (Peru')	domenica 12 maggio 2024	mercoledì 15 maggio 2024	3	7	1070	6,5	
17	Puerto Ayora (Ecuador- Galapagos)	mercoledì 22 maggio 2024	giovedì 23 maggio 2024	1	6,5	980	6,5	
18	Balboa (Panama)	mercoledì 29 maggio 2024	lunedì 3 giugno 2024	5	15	1910	5,5	
19	Puerto Vallarta (Messico)	martedì 18 giugno 2024	domenica 23 giugno 2024	5	9	1130	5,0	
20	Los Angeles (U.S.A.)	martedì 2 luglio 2024	lunedì 8 luglio 2024	6	17	2261	5,5	Imbarco Allievi
				164	101,5	11782	4,8	
				62%	38%	MIGLIA	SOA	



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5. Dual-fuel ENC Project (Phase 2) – Route of Italian vessel ‘Vespucci’

37	Taranto	venerdì 21 febbraio 2025	venerdì 14 marzo 2025	21	6	545	4,0	Sosta tecnica di 3 settimane
38	Trieste	giovedì 20 marzo 2025	mercoledì 26 marzo 2025	6	1	70	3,0	
39	Venezia	giovedì 27 marzo 2025	mercoledì 2 aprile 2025	6	2	135	3,0	
40	Ancona	venerdì 4 aprile 2025	mercoledì 9 aprile 2025	5	3	230	3,0	
41	Bari	sabato 12 aprile 2025	martedì 22 aprile 2025	10	1	80	3,5	Pasqua 20/04/2025
42	Brindisi	mercoledì 23 aprile 2025	sabato 26 aprile 2025	3	3	290	4,0	
43	Catania	martedì 29 aprile 2025	sabato 3 maggio 2025	4	2	200	4,0	
44	Palermo	lunedì 5 maggio 2025	venerdì 9 maggio 2025	4	2	225	4,5	
45	Cagliari	domenica 11 maggio 2025	giovedì 15 maggio 2025	4	3	275	4,0	
46	Napoli	domenica 18 maggio 2025	giovedì 22 maggio 2025	4	1	80	3,5	
47	Gaeta	venerdì 23 maggio 2025	lunedì 26 maggio 2025	3	1	70	3,0	
48	Civitavecchia	martedì 27 maggio 2025	sabato 31 maggio 2025	4	1	125	5,0	
49	Livorno	domenica 1 giugno 2025	giovedì 5 giugno 2025	4	1	86	3,5	Festa della Repubblica
50	Genova	venerdì 6 giugno 2025	martedì 10 giugno 2025	4	1	86	3,5	Giornata della Marina 2025
				82	28	2497	3,7	TOTALE COMPLESSIVO MIGLIA GDM 2023-25
				75%	25%	MIGLIA	SOA	43812
				SOSTA	NAV			



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6. *(New Proposed project)* Explore how to integrate sea and land datum for monitoring of possible rise in sea level

Goals of the Project:

- Understanding the significance of **integrated monitoring of relative and absolute sea level variation** using tide gauge and GNSS data to address short and long-term issues in climate change monitoring and adaptation.
- Accelerating **capacity building** and knowledge sharing amongst HOs and broader marine geospatial information community.
- Collaboration between **hydrographers and land surveyors** on innovative solutions to reach shared objectives

Participating Parties: Singapore
Land Authority and Maritime and
Port Authority of Singapore



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ACTIONS REQUESTED FROM HSSC

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Request HSSC-16 to note the Report on the IHO-SG Lab:

- HSSC to note the Report; and
- HOs and industry stakeholders strongly encouraged to actively engage and support in identifying and participate in **collaborative projects**.



For Information