



**EXPRESSION OF INTEREST (“EOI”) TO DESIGN AND DEVELOP
AUTONOMOUS INTER-GATEWAY FEEDER (“PROJECT”)**

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EXPRESSION OF INTEREST (EOI) TO DESIGN AND DEVELOP AUTONOMOUS INTER-GATEWAY FEEDER (“PROJECT”)

1 INTRODUCTION

1.1 Singapore aims to become a leading global port capable of managing autonomous and remotely operated ocean-going vessels and domestic harbour craft. This vision centres on establishing the standards and certification requirements for autonomous shipping, creating a "regulatory-ready" environment that supports the safe and successful deployment of these technologies locally. As a global maritime hub, Singapore's position requires continuous innovation in port operations and connectivity solutions. In line with the nation's commitment to achieving net zero emissions by 2050, there is a growing need for autonomous maritime solutions that can enhance operational efficiency while reducing environmental impact.

1.2 As the PSA Corporation (“PSAC”) terminals in Singapore are spread across mainly two geographical clusters (in Pasir Panjang Terminals (“PPT”) and Tuas Port), PSAC is required to carry out the Inter-gateway Transfer (“IGT”) of containers to enable seamless connection for their customers. Currently, IGT is carried out either by road or sea using feeder vessels.

1.3 Autonomous inter-gateway feeder (“aIGF”) represents a transformative technology that can revolutionise cargo movement between port terminals, offshore facilities, and neighbouring maritime gateways, providing seamless connectivity while reducing reliance on conventional manned vessels and land-based transport.

2 PURPOSE OF EOI

2.1 This EOI is jointly developed by the Maritime and Port Authority of Singapore (“MPA”) and PSAC. The EOI will allow MPA and PSAC to assess the feasibility of designing and developing an aIGF¹ capable of operating between Singapore's port terminals with minimal human intervention, with inter-gateway operations as a main use case.

2.2 The Project will verify, demonstrate, and build autonomous maritime capabilities that enhance port connectivity, reduce operational costs, and support Singapore's transition to smart and green port operations.

2.3 The Project aims to achieve the following desired outcomes:

- 2.3.1 Design and develop an autonomous feeder vessel for inter-gateway operations;
- 2.3.2 Establish autonomous vessel operations and cargo handling systems suitable for port environments;
- 2.3.3 Develop integration protocols with existing port infrastructure and systems;

¹ Not limited to a single vessel design. Participants may propose designs and/or vessel combinations that can achieve or exceed the stated operational requirements.

- 2.3.4 Demonstrate safe and efficient autonomous operations in complex maritime environments; and
- 2.3.5 Design and develop suitable energy and propulsion systems i.e. be fully electric, or be compatible with net-zero fuels² from 2030 onwards.

2.4 MPA and PSAC will assess the returns of the EOI and may refine the submitted aIGF design and launch a Request for Proposal (“RFP”) to implement the Project subsequently. MPA and PSAC reserve the right to approach EOI Participant(s) directly after the EOI closes and commence negotiations to award the Project directly without going through an RFP.

3 OVERVIEW OF REQUIREMENTS

3.1 Participants are required to submit their Proposal for the design, mock-up/ scale model (digital and/or physical), and prototype of an aIGF with a strong emphasis on safety, autonomous operations, good seakeeping, manoeuvrability, energy efficiency and stability for PSAC’s operations in port waters. The aIGF shall be designed with excellent seaworthiness, survivability, energy optimisation, and functionality for inter-gateway operations.

(a) Operational Requirements

3.2 The Participant may propose the design and development of an aIGF within the following operational parameters:

- 3.2.1 Capable of operating at sea state 4 conditions and surviving up to sea state 5 conditions considering its seakeeping and manoeuvrability capabilities for PSAC’s operations in port waters;
- 3.2.2 Capable of different modes of autonomous navigational operations including but not limited to:
 - a) Remote operations with autonomous system support (with crew onboard)
 - b) Autonomous operations supported by remote takeover capabilities
 - c) Autonomous operations (with reduced crew onboard)
- 3.2.3 Capable of being fully supported from a Remote Operation Centre (“ROC”) with appropriate redundant secured communications to facilitate telemetry exchanges and safety measures, such as collision detection and avoidance system and fallback measures;
- 3.2.4 Capable of multi-mode low latency, high bandwidth, and communications (e.g. 5G, satellite communications) to facilitate two-way transmission of data (including video, imagery and data to/from MPA and PSAC sensors/assets);
- 3.2.5 Cargo capacity of minimum 800 Twenty-foot Equivalent Unit (“TEU”) equivalent, with modular design allowing for different cargo configurations;

² Net zero fuels refer to methanol, ammonia, hydrogen or biofuel. If the latter is proposed, the aIGF shall be B100-capable.

- 3.2.6 The turnaround time will depend on the capacity of the vessel. For a 800 TEU aIGF, the turnaround time of 24 hours between berths will be expected;
- 3.2.7 Charging capability (i.e. charging speed for full charge, fast charge), arrangement for battery replacement if required;
- 3.2.8 24/7 operational capability with predictive maintenance systems to minimise downtime to less than 15 days annually;
- 3.2.9 Approximate dimensions of the proposed design to be as follows:
 - a) Length overall: minimum 100m;
 - b) Moulded Breadth: to have a minimum of 27.5m to accommodate operations between two adjacent working quay cranes (e.g bay 2 and bay 10).
 - c) Freeboard: minimum 7.5m during full load and lowest tide
 - i. Freeboard needs to be sufficient where it will be above the height of the Tuas Port (7.5mCD), wharf fenders during the lowest tide in full load condition.
 - ii. The main deck level must be at least even or above the height of Tuas Port wharf fenders (7.2mCD) at full load condition during the lowest tide.
 - iii. As deck outfitting such as railings and stanchions are not designed to absorb impact or cushion sea wake, an alternative solution must be proposed to address any freeboard-wharf height discrepancy.

3.3 The Project is expected to be operational by 2029. The Participant shall propose a Project timeline and milestones to be met.

(b) Requirements relating to the design of the aIGF

3.4 The Participant shall design an aIGF which can meet or exceed the existing operational requirements of its conventional equivalent counterpart. In addition, the proposed design must be able to meet the following requirements:

- 3.4.1 The vessel type and hull form shall be proposed by the Participant and appropriately selected to ensure low hull resistance and high structural integrity, thereby minimising power requirements.
- 3.4.2 If the Participant propose a tug-barge design, the tug shall be capable of harbour towage operations with minimal reconfiguration.
- 3.4.3 The proposed design shall conform to all applicable and relevant Classification Society Standards.
- 3.4.4 The propulsion system and its interaction with the hull shall be optimised to deliver highly efficient optimal cruising speeds while conforming to all applicable marine regulations including Flag state and Port state controls.

- 3.4.5 The material of the superstructure shall be appropriately selected with attention to minimising noise and vibration, while meeting Maritime Labour Convention (“MLC”) standards.
- 3.4.6 The design of the aIGF shall enable the operating system of the ship to make decisions and determine actions including navigation, propulsion, manoeuvring. The design should include a clearly defined Operational Envelope, and Operational Design Domain.
- 3.4.7 The aIGF shall be equipped with navigational aids as per Classification Society Standards, Port and Flag requirements but not limited to:
- a. Radar
 - b. Automatic Identification System
 - c. Differential Global Positioning System
 - d. Echosounder
 - e. Wind Direction and Speed Sensor
 - f. Magnetic Compass
 - g. Integrated Multifunction Displays (to show navigation system software data to the operator)
 - h. Electronic Chart Display Information System
 - i. Gyro compass
- 3.4.8 The onboard systems (e.g. Sensor Suite (“SS”) systems, navigational system, energy management systems, etc) shall allow remote monitoring and data exchange via the Connectivity Suite (“CS”). The Participant shall provide the details on the remote monitoring and autonomous capabilities in their proposal.
- 3.4.9 Sensor Suite (“SS”). The aIGF shall be optimally fitted with a SS including and not limited to the following:
- a) CCTV system that includes stabilised camera(s) with functionalities such as pan-tilt zoom, fixed, thermal, daylight/low-light sensing, with video recording and real-time transmission to shore-based operations centres. Access to downloading CCTV footage should be restricted to authorised personnel only, to ensure privacy and prevent misuse. Participants to propose on the list of items that are needed for the SS, to allow for safe, effective and cybersecure navigation of the vessel;
 - b) Light Detection and Ranging (“LiDAR”) system, radar subsystem; and
 - c) Additional proposed supplementary sensors/detectors as required.
- 3.4.10 Connectivity Suite (“CS”). The aIGF shall be optimally fitted with a CS that includes satellite connectivity, cellular connectivity and onboard connectivity. This could include SATCOM terminals (e.g. Starlink), multi-SIM 4G/5G network routers (e.g., Cradlepoint) and wireless/wired Local Area Network (LAN) devices to facilitate 24/7 and load-balanced access to the Internet as well as data exchanges between the on-board systems and with ROC. The design of aIGF shall ensure that all radio frequency

antennas can be optimally positioned onboard the aIGF to maximise data rate and minimise latency and interference.

3.4.11 Environmental Survivability. All equipment installed outdoor shall be specified to survive the marine environment with appropriate IP ratings.

3.4.12 The design of the aIGF shall comply with existing applicable regulatory requirements for harbour craft, including the MPA (Harbour Craft) Regulations, the Merchant Shipping Act³, and Prevention of Pollution of the Sea Act. In addition, the proposed design shall comply with applicable international regulations and conventions (International Convention for the Safety of Life at Sea (“SOLAS”), International Convention for the Prevention of Pollution from Ships (“MARPOL”), International Convention on Load Line (“LOADLINE”), International Safety Management Code (“ISM”), International Ship and Port Facility Security Code (“ISPS”), MLC, etc.), including energy efficiency requirements, Classification Society Standards, Flag state, and Port state control standards.

3.4.13 The aIGF shall be duly registered with, and shall maintain her registration under the Singapore flag administration. Furthermore, the aIGF hull and machinery construction, energy and propulsion system, autonomous system, etc including plans/drawings shall be appraised and approved by the recognised organisations⁴ (“ROs”) reference to its relevant class rule(s).

3.4.14 The aIGF shall be designed to be fully electric, or be compatible with net-zero fuels from 2030 onwards.

3.4.15 Designed to be future ready for addition of future systems, sensors, machineries and/or equipment with data transmission to MPA’s Cyber Assurance and Operations Centre (additional 30% I/O spare capacity for future expansion).

(c) Requirements relating to the autonomy, navigation systems and remote operations and/or control of the aIGF

3.5 The Participant shall provide a comprehensive assessment of existing technological limitations regarding Maritime Autonomous Surface Ships (“MASS”) and ROC. Specifically, the proposal must identify specific gaps where current off-the-shelf or proprietary technology falls short of meeting regulatory, safety, or operational requirements, and outline the necessary Research & Development (“R&D”) pathways required to bridge these gaps.

3.6 The design of the aIGF shall consider and propose mode of operation at different points of operations i.e. berthing/ unberthing, channelling operations, loading/unloading. This include but are not limited to the following:

³ E.g. Merchant Shipping (Non-Convention Ships) Safety Regulations and Merchant Shipping (Load Line) Regulations

⁴ ABS, BV, CCS, DNV, KR, LR, NK and RINA

- 3.6.1 The Participant shall map out monitoring and control of navigational/propulsion equipment engine and other vessel systems and interactions with human in the loop.
 - 3.6.2 Advanced sensor fusion solutions incorporating relevant sensors articulated in paras 3.4.7 and 3.4.9.
 - 3.6.3 Artificial intelligence-based collision avoidance system capable of detecting and avoiding obstacles at distances of at least 6 nautical miles with a duration of 24/7.
 - 3.6.4 The system must be capable of managing both Convention on the International Regulations for Preventing Collisions at Sea, 1972 (“COLREG”)-compliant and non-COLREG scenarios, automatically executing appropriate manoeuvres in accordance with the COLREG.
- 3.7 The Participant shall incorporate advanced navigation and decision-making systems to enable the aIGF to meet or exceed existing operational requirements of its conventional equivalent counterpart. In addition, the proposed design must be able to meet the following requirements:
- 3.7.1 Fully autonomous navigation system compliant with relevant IMO guidelines/ MASS Code and the COLREG.
 - 3.7.2 Advanced sensor fusion solutions incorporating relevant sensors articulated in paras 3.4.7 and 3.4.9.
 - 3.7.3 Artificial intelligence-based collision avoidance system capable of detecting and avoiding obstacles at distances of at least 6 nautical miles with a duration of 24/7.
 - 3.7.4 Connectivity Suite as articulated in para 3.4.10.
 - 3.7.5 Cybersecurity framework compliant with industry standards (e.g. NIST 800-53, CSA Cyber Trust (2025) mark, NIST SP 800-82, SRS Cyber Notation, Guidelines on Maritime Cyber Risk Management (MSC-FAL-1/Circ.3/Rev3, ISO 27000, IEC 62443, IACS UR E26 and E27, etc) with continuous monitoring and threat detection capabilities.
- 3.8 The Participant shall propose the ROC designed for the monitoring of proposed aIGF and PSA’s vessels:
- 3.8.1 The Participant shall include the role of ROC for the different mode of operations considered;
 - 3.8.2 The ROC hardware and software shall support the simultaneous monitoring and active control of up to 1 vessel per operator station;

- 3.8.3 Implementation of human-machine interfaces that include augmented reality overlays, real-time telemetry, and situational awareness feeds from vessel-based LiDAR and vision systems;
- 3.8.4 The design of ROC shall include considerations for cybersecurity;
- 3.8.5 Ship to shore communications shall be secured against unauthorised disruptions. The autonomous craft network shall be segmented to separate safety critical systems, cargo systems, navigation systems and telemetry systems. Network monitoring and alerting shall be implemented; and
- 3.8.6 Security logs shall be generated from the various systems, and the platform should be capable of capturing and reporting any anomalies.

(d) Requirements relating to the cargo and integration with port

3.9 In designing the cargo systems of the aIGF, the Participant shall take into consideration the operational requirements of PSAC's aIGF and the technical requirements which include but are not limited to the following:

- 3.9.1 Cargo capacity of minimum 800 TEU, with modular design allowing for different cargo configurations;
- 3.9.2 The Participant may propose a hatch-less, fully-cellular design to eliminate the need for manual hatch cover handling. This configuration must be optimised for existing terminal crane infrastructure, ensuring seamless container engagement with zero or minimal lashing requirements to enhance safety and turnaround speed;
- 3.9.3 Cargo holds shall be equipped with reinforced and precision-aligned cell guides, engineered to withstand the structural stresses of high-volume, automated loading and unloading cycles;
- 3.9.4 For hatch or hatch-less operations, the proposed design must be equipped with a high-capacity, adequate bilge system with sufficient capability capable of effective water ingress management during adverse weather conditions to ensure cargo and stability remains uncompromised. Anti-heeling system to be included to maintain vessel stability during cargo operations, crane lifts, or uneven loading;
- 3.9.5 The deck and hold configuration must accommodate a diverse range of ISO containers, including General Purpose ("GP"), High-Cube, Out-of-Gauge ("OOG"), and specialised units;
- 3.9.6 The proposed design shall provide dedicated stowage and power distribution for reefer units at Tier 82 across the vessel/bays. Power management systems must ensure stable load distribution for sensitive temperature-controlled cargo;

3.9.7 The proposed design shall be designed, equipped with specialised fire-fighting suppression systems, and Class-certified for the carriage of Dangerous Goods (“DG”). This includes class certification for the transport of IMO Classes 1 to 6, ensuring compliance with the International Maritime Dangerous Goods (“IMDG”) Code requirements; and

3.9.8 The proposed design shall provide a provision crane that is at least 5 tonnes of SWL.

3.10 The Participant shall in its Proposal provide MPA and PSAC with technical and operational information which is capable of demonstrating that the design is able to meet the requirements set out at paragraphs 3.4, 3.6, 3.7, 3.8 and 3.9. This may include:

3.10.1 Engineering, technical, design/ schematics/ drawings, calculations, and modelling where applicable;

3.10.2 Information related to operations and maintenance of the energy storage and management systems; and

3.10.3 Any other information which is to be mutually agreed by all parties.

(e) Requirements for the aIGF propulsion system

3.11 The Participant shall design the aIGF to be fully electric, or be compatible with net-zero fuels from 2030 onwards.

3.12 If the participant proposes an electric design, the proposed design shall consider a modular and scalable energy architecture that accounts for the dynamic berthing environment of Singapore’s major container terminals. The considerations for charging operations and associated charging infrastructure include the following:

3.12.1 The Participant may propose the use of fixed shore-charging infrastructure and provide a technical assessment and detailed cost-benefit analysis. If considered, the proposal shall address the technical considerations required for system integration and outline how the solution maintains operational flexibility regarding berth allocation at the terminals;

3.12.2 The Participant may propose containerised swappable battery systems. If the battery swapping concept is considered, the Participant shall propose the design of charging depot for distribution of swappable battery systems;

3.12.3 The design of the power system shall be optimised for a mission profile consisting of a 24-hour turnaround time between berths and a 4-hour transit time;

- 3.12.4 The design of the power system shall accommodate high simultaneous load demands, specifically during berthing, unberthing, and manoeuvring;
- 3.12.5 A Power Management System (“PMS”) shall be included to manage the combined loads of the required onboard machinery and reefer containers. The PMS shall forecast consumption and provide recommendations on the optimal charging times based on fluctuating reefer container counts;
- 3.12.6 A secondary or emergency power source shall be available to support essential systems in the event of a main power failure; and
- 3.12.7 The system shall be equipped with the required fire-suppression, fire-fighting systems and thermal management technology for high-density energy storage, including but not limited to onboard batteries.

3.13 If the Participant proposes a design that is compatible with net-zero fuels, the proposed design shall ensure that the proposed energy source must not be "brown" or high-carbon in origin (e.g., fossil-derived fuels without carbon capture). Participants must provide preliminary evidence of the fuel's "Well-to-Wake" sustainability, ensuring that production methods—whether green, blue, or synthetic—align with international transition pathways toward absolute net-zero emissions.

(f) Requirements relating to the safety of the aIGF

3.14 To ensure the safe operation of the aIGF, the Participant shall include the following in its Proposal:

- 3.14.1 Infrastructure or systems to enhance safe boarding practices for shore-ship and ship-ship movement;
- 3.14.2 Appropriate provision and placement of gas detection sensors and gas detection response plans;
- 3.14.3 Appropriate external fire monitoring, early warning systems, and detection (e.g. heat sensors, smoke sensors, thermal cameras) and firefighting systems (e.g. gas, aerosol, foam, water mist/ sprinkler);
- 3.14.4 For electric designs, appropriate thermal runaway (“TR”) propagation insulation (e.g. cell/ module level), TR propagation control (e.g. passive/ active), TR gas exhaust system (e.g. open/ closed) and location of ventilation exhaust, TR response plans for electrification, as well as fire-fighting systems on board that are specialised to manage the unique risks of TR;
- 3.14.5 Routine inspections of battery spaces and incident risk assessments and response plans;

3.14.6 Emergency steering operations in case the primary control is out of control; and

3.14.7 Emergency stop function (such as to release the anchor) for vessel in case the propulsion cannot be stopped or engine cannot be killed off.

3.15 The aIGF design proposed by the Participant must be able to meet the following safety-related requirements within relevant and applicable Codes and Conventions, including but not limited to the following.

3.15.1 Ship steering and manoeuvrability shall be controllable from the primary source of power or emergency/ backup power (auto-switching feature when primary source of power fails) with an ergonomic design layout from the wheelhouse (e.g. remote operation).

3.15.2 Advanced navigational equipment shall constantly monitor position, course, speed, surroundings (e.g. automatically acquires other vessel in its vicinity), operational from primary source of power or emergency/ backup power (auto-switching feature when primary source of power fails).

3.15.3 Cybersecurity requirements, including but not limited to strong identify, access controls, secured authentication, secure and segmented networks, comprehensive logging, monitoring and detection measures of shipboard systems against cyber threats, effective backup, recovery taking reference from industry best practices (e.g. NIST 800-53, NIST SP 800-82, SRS Cyber Notation, Guidelines on Maritime Cyber Risk Management (MSC-FAL-1/Circ.3/Rev3, ISO 27000, IEC 62443, IACS UR E26 and E27, etc.) for the cyber safety of the aIGF.

3.15.4 Provisions for the monitoring of onboard computer/system vulnerability and/or detection of abnormal cyber events on the networks, sensors, systems and equipment of onboard systems, etc and to transmit the information securely to MPA and PSAC system(s) for real-time cyber monitoring, detection and intervention.

3.15.5 In the event of connectivity degradation or complete failure, the system shall prioritise critical systems to ensure safety of operations or execute pre-programmed contingency protocols (autonomous return to designated location and or station-keeping at a safe location).

(g) Requirements relating to data monitoring and transfer

3.16 The Participant shall ensure the proposed aIGF transmit its status/mode of operation to MPA and PSAC so that relevant interventions can be made during emergencies.

(h) Requirements relating to the Concept of Operations (“ConOps”) of the aIGF

3.17 The Participant shall ensure the proposed aIGF design meets the following routing requirements:

3.17.1 High-frequency transits between Singapore Port terminals at both PPT and Tuas Port (including Jurong Island Terminal); and

3.17.2 The aIGF should be able to accommodate up to 2 days at anchorage.

3.18 To ensure seamless terminal flow, the proposed system must provide high fidelity integration with Singapore’s maritime digital ecosystem and PSAC’s operating system:

3.18.1 Full compatibility and automated data exchange with existing port management systems, specifically Maritime Digital Twin and relevant maritime single window;

3.18.2 Use of open-architecture protocols to allow for future scaling and cross-platform communication between vessel and shore-side infrastructure; and

3.18.3 Capable of real-time monitoring of reefer unit temperatures connected to the onboard aIGF system, with alerts for temperature deviations.

(i) Requirements relating to the manpower requirements of the aIGF

3.19 The Participant shall ensure the design and development of aIGF support human-centric and lean operations to achieve minimum manning requirements. The design shall incorporate advanced functions to enable remote monitoring, automated cargo operations, support autonomous navigation including but not limited to: vision enhancement under adverse weather and environmental conditions (i.e. rains, storms, etc), remote monitoring of system and equipment health status (i.e. battery power and propulsion system, etc), situational awareness, voyage optimisation (i.e. route planning and speed optimisation), grounding warning, collision warning and avoidance, sensor information fusion for transmission via the CS to a ROC, and fallback measures (i.e. onboard personnel to take over the control at any time where necessary). The design should include manning requirements at the ROC.

3.20 The design of accommodation shall comply with MLC standards.

3.21 The Participant shall propose requirements for crew training including but not limited to:

- a. Required enhancements to existing Certificate of Competency courses
- b. Battery management and safety (if applicable)
- c. Fire safety and training
- d. Maintenance regime

(j) Requirements relating to the economic viability of the aIGF

- 3.22 The Participant shall demonstrate in its Proposal the value-proposition of the aIGF design with a focus on the loading of the vessel to the maximum capacity while maintaining the safety and stability, and ability to meet or exceed operational requirements of its conventional equivalent counterpart or propose ways in which the existing operational requirements can be better met through higher utilisation of a fleet of vessels.
- 3.23 The Participant shall provide a comprehensive business model and commercialisation plan that demonstrates the long-term sustainability and market potential of the proposed solution. This plan must clearly outline the strategy for transitioning from a successful technical demonstration to full-scale commercial operations.
- 3.24 To demonstrate economic viability of its Proposal, the Participant shall provide the following financial information in their Proposal. Amongst others, this may include:
- 3.24.1 Financial breakdown and projections related to capital costs for the design, build, testing, and delivery of one unit of aIGF, fully equipped and outfitted as specified with consideration of value engineering.
- 3.24.2 Financial breakdown and projections related to operational costs for the insurance, consumables (e.g. cost of electricity), maintenance, repair, overhaul, disposal costs, and residual value (including battery recycling if applicable) over the lifecycle of the aIGF (i.e. hull, propulsion system, navigation system, and electrical equipment, etc.)
- 3.24.3 The total cost of ownership (“TCO”) shall be calculated over its estimated lifecycle, assuming 15, and 20 years of operations. This should take the lifespan of the battery (for electric design) into consideration, assuming 5, 8, and 10 years of operations.
- 3.24.4 The cost of electricity where the TCO of the aIGF matches or is lower than the TCO of its conventional equivalent counterpart.
- 3.25 In providing the information stated at paragraph 3.24.2, the Participant shall specify the scope of preventive and scheduled maintenance requirements and frequency for the aIGF outboard, propulsion system, energy storage system and battery management system (if applicable), and electrical components, etc.
- 3.26 In submitting its proposal, the Participant shall assess the financial viability of the aIGF design. The assessment shall be based on: (a) the TCO of the proposed aIGF design and (b) the projected price of the net-zero fuel proposed in the design (if applicable). The Participant shall provide the said assessment to MPA and PSAC.

(k) Optional Requirements for the aIGF

3.27 The Participant may include an optional solution for autonomous berthing at various berth to demonstrate integration capabilities with PSAC's terminal. If proposed, the system shall:

3.27.1 Be designed and scaled to the dimensions and displacement of the proposed aIGF design;

3.27.2 Demonstrate high-precision positioning and collision avoidance during the aIGF's approach and departure phases within the terminal;

3.27.3 Detail any specific shore-side requirements or communication protocols necessary for integration with existing port infrastructure.

4 FORM OF EOI

4.1 The Participant shall submit the EOI using the format set out in **Appendix A**.

4.2 The Participant should provide supporting reasons if there are deviations to the requirements set out in this EOI or if it is unable to furnish any of the commercial and technical details in **Appendix A**.

5 FORMATION OF CONSORTIUMS

5.1 Through this joint EOI, MPA and PSAC seek to catalyse the formation of industry-led, mission-centric maritime consortiums comprising like-minded maritime companies and Institutes of Higher Learning ("IHLs") / Research Institutes ("RIs") to deliver the expected requirements.

5.2 Each consortium may consist of the following members:

5.2.1 The Lead Applicant shall have strong interest in developing the solution and support PSAC (end user) in deploying the outcomes. This include identifying necessary consortium partners, overall project management and oversight of the Project and ensure timeliness of project milestone(s).

5.2.2 Industry Collaborator(s) may consist of participants such as but not limited to technology developers, original equipment manufacturers and classification societies with strong interest to work with the Lead Applicant to develop the Project outcomes.

5.2.3 The IHLs/RIs shall be from publicly funded institutes in Singapore with strong interest to work with the industry to translate research into industry solutions.

5.3 The Lead Applicant must be a Singapore-based company and Industry Collaborators within the consortium may be of local or international companies. All work done should be conducted in Singapore. This includes the system design and engineering, integration, test bedding, certification and eventual deployment. The

Participant should provide supporting reasons if there are deviations to the requirement.

6 ASSESSMENT CRITERIA

6.1 The proposals will be evaluated by a joint project evaluation panel formed by MPA, PSAC, Singapore Maritime Institute and relevant technical experts, where necessary. Project proposals with clear strategies for commercialisation and demonstrate clear collaboration between consortium partners would be preferred.

6.2 Proposals will be assessed based on:

6.2.1 Quality and strength of Participant's technical and commercial proposals including but not limited to: autonomous operations and connectivity, perception and detection metrics, decision-making and navigation in accordance to COLREGS, reference design that allows for potential scale-up and further demand aggregation in the future, delivery timeline, financial viability of proposed design, value capture in Singapore, and Participant's compliance to the requirements of the EOI summarised in Section 3 and detailed in **Appendix A**.

6.2.2 Robustness and completeness of safety and training requirements.

6.2.3 Proven financial strength, experience track record, and capability of the Participant in value-chain development.

6.3 Only proposals submitted by 12:00PM on the closing date will be considered.

6.4 All the work should be conducted in Singapore. This includes the system design and engineering, integration, test bedding, certification and eventual deployment.

6.5 For technologies to be test-bedded, the aIGF should be harbour crafts licensed to operate within the Port of Singapore and flagged with the Singapore Registry of Ships.

7 ADMINISTRATIVE DETAILS

7.1 Please submit your EOI in **Microsoft Word** and/or **PDF** formats⁵ via email to:

mint@mpa.gov.sg

7.2 The closing date for submissions is 24 July 2026, 12:00 PM (Singapore time).

7.3 MPA will acknowledge receipt of each submission via email. If you do not receive an acknowledgement of your submission within one week, please contact mint@mpa.gov.sg.

⁵ The Participant shall validate its assumptions and calculations as requested by MPA and PSAC, using digital software and models as required. These files shall be presented and shared with MPA during further clarifications

7.4 MPA and PSAC reserves the right to share any information submitted by Participants in their EOI for the purpose of assessing the Participant's Proposal. Any part of the submission that is considered by Participants to be confidential should be clearly marked. MPA and PSAC reserves the right to aggregate/anonymise the information before sharing on a need-to basis. All EOIs submitted shall be on a non-binding basis and MPA and PSAC shall not be bound or under any obligation to accept any proposal submitted.

* * *

Appendix A

FORM OF EOI

Instructions: Please use this form to submit your EOI and include any supporting documents, justifications or key assumptions where applicable.

1. Participant's name, registered business address, contact person's name, designation, email and contact number.
2. Profile of Participant and its partners, if any, in the Project consortium, and details of relevant experience. If the Participant consists of a consortium of companies, the Participant shall also list the key personnel from each company.
3. Most recent 3 years' audited financial statements in respect of the Participant and its partners in the consortium, if any.
4. Technical Details

4.1 The Participant shall provide the following specific details on technical specifications of the proposed reference design for the aIGF, which include but are not limited to the following:

(If the proposal includes plans for scale-up through demand aggregation, the participant shall also include the following details for the scale-up phase as separate line items within.)

1. General	
a. Hull type	
b. Hull material	
c. Superstructure material	
2. Dimensions	
a. Length moulded	

b. Beam moulded	
c. Draught (max)	
d. Gross tonnage	
3. Performances	
a. Maximum speed (kts)	
b. Operating/ service speed (kts)	
c. Range (nm)	
4. Autonomous Navigation Systems (ANS)	
a. Details of ANS	
5. ROC systems	
a. Details of ROC	
6. Propulsion system	
a. Type of propulsion system	
b. Make of propulsion system	
c. Propulsion power	
7. Energy management systems (if applicable)	
a. Battery capacity (kWh)	
b. Battery weight (kg)	
c. Type of battery chemistry	
d. Type of battery cells	
e. Type of battery system design	
f. Battery lifetime	
g. Charging current (i.e. AC, DC)	
h. Charging connections	
i. Charging duration to meet operational needs	

4.2 The Participant shall provide a detailed Proposal as set out in Section 3 of this EOI.

4.3 The Participant shall provide a technology gap analysis and identify technical hurdles associated with the proposed MASS/ROC integration.

Category	Current capability	Identified Technology Gap	Proposed R&D
e.g MASS (feeder), ROC, connectivity etc			

5. The Participant shall provide details on the overall Project timeline, management, and risk details. These include but are not limited to the following:

5.1 Project Timeline. Key Project tasks and milestones, including but not limited to technical studies, regulatory and permitting approvals.

5.2 Project Management. Engineering, Procurement and Construction (“EPC”) date and Commercial Operational Date (“COD”). Phased or future expansion, if any, and associated timeline.

5.3 Project Risk Assessment. Identification of potential show-stoppers that may impact the technical and commercial viability of the Project and their associated mitigation measures, if any.

5.4 Technical and Commercial Non-Compliance. Participant shall state clearly any non-compliance to the technical and commercial requirements stated in the EOI. For all non-compliance, Participant shall explain the extent and reason of the deviation and provide mitigation measures if possible.

5.5 Regulatory Non-Compliance. To state clearly any regulatory requirements or standards that could not be met or are at risks breaching through the construction and operational lifetime of the project. Participants are to provide the amount of deviation, and explanations for such non-compliance.

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