CALL FOR PROPOSALS FOR DIGITAL BUNKERING PHASE 2 TEST-BEDDING

Objectives

1. The Maritime and Port Authority of Singapore (MPA) invites Bunker Craft Operators (BCOs) and Technology Providers to participate in a test-bedding initiative under Digital Bunkering Phase 2. The initiative will trial solutions for automated, secure and reliable capture, storage and transmission of Mass Flow Meter (MFM) data under actual bunkering conditions in Singapore.

2. The test-bedding will assess solution performance, data integrity, cybersecurity, interoperability and operational readiness. The findings will inform MPA's future whitelisting requirements and considerations for wider industry adoption.

Test-Bedding Scope and Requirements

3. This Call for Proposals (CFP) focuses on existing or sufficiently mature hardware and software solutions ready for onboard deployment and operational test-bedding. Early-stage research, conceptual development and visual prototypes are not the focus of this CFP.

4. Each application shall cover one MPA-licensed bunker craft used as a participating bunker tanker. The proposed solution should capture and securely store MFM data and transmit it to electronic Bunker Delivery Note (e-BDN) systems and MPA-designated system through application programming interfaces (APIs).

5. Projects are expected to cover the following areas:

- Installation and trial deployment of the proposed solution onboard the participating bunker tanker;
- Integration with the approved MFM systems, whitelisted e-BDN solutions and MPA-designated system;
- Assessment of data integrity by National Metrology Centre (NMC);
- Assessment of transmission reliability, cybersecurity and operational performance under actual bunkering conditions; and
- Submission of operational test results, assessment findings and project reports.

Detailed technical specifications, applicable standards, test activities and assessment requirements are set out in **Annex A.**

Joint Application and Participation Requirements

6. Proposals shall be submitted jointly by a BCO and a Technology Provider incorporated and operating in Singapore (the Joint Applicants). Both parties shall be responsible for delivering the approved project. Their respective roles, responsibilities and contributions should be clearly stated in the proposal.

7. Each BCO may participate in up to two applications, including applications involving different Technology Providers. Technology Providers may participate in multiple applications. Each application shall cover one participating bunker tanker, and all project configurations are subject to MPA's approval. Joint Applicants shall secure the necessary support from relevant project collaborators.

Applicant and Project Eligibility Criteria

8. The participating BCO must carry a valid MPA licence and both BCO and Technology Provider must meet all Maritime Innovation and Technology (MINT) Fund eligibility criteria stated on the MINT Fund Application Form.

9. The proposed solution must be sufficiently mature for test-bedding and compatible with the participating bunker tanker's approved MFM system. The proposed solution and project activities shall comply with regulatory requirements, standards and MPA requirements, including the applicable Code of Practice for Bunker Mass Flow Metering (e.g. SS 648), Specification for Digital Bunkering Supply Chain Documentation (e.g. SS 709) and any technical, cybersecurity and data submission requirements issued by MPA.

10. Where a Technology Provider participates in multiple projects, it shall apply a consistent basis for pricing and allocating common costs. Any material variation in the pricing of comparable equipment, services or work scopes shall be disclosed and justified to MPA. Common development, integration or manpower costs shall not be charged more than once across participating projects.

11. Participation in or completion of the test-bedding does not constitute MPA's endorsement of the solution and does not guarantee the solution's whitelisting or approval. Any subsequent determination will be subject to MPA's assessment of the project outcomes and other applicable requirements.

Funding Support and Qualifying Costs

12. Funding support will be administered under the MINT Fund. Selected projects may receive up to 50% of qualifying costs where the participating BCO is a Small and Medium Enterprise (SME), or up to 30% where the participating BCO is a non-SME, capped at S$42,000 per bunker tanker. MPA will also support up to about 10% of the total population of licensed bunker tankers in Singapore. The BCO shall be the designated grant recipient, and the applicable funding rate shall be determined based on the BCO's SME status in accordance with the prevailing MINT Fund eligibility criteria and terms and conditions.

13. Funding is limited to one installation per participating bunker tanker. Project work and qualifying expenditure must commence only from the start date in MPA's Letter of Offer. The final grant amount is subject to approved qualifying costs actually incurred and paid.

Proposal Evaluation Criteria

14. Proposals will be evaluated and shortlisted by MPA and, where applicable, other relevant agencies or appointed assessors. Evaluation will consider the proposed scope and the following factors:

- Compliance with the MINT Fund and project eligibility requirements;
- Technical maturity, MFM compatibility and readiness for deployment;
- Interoperability with whitelisted e-BDN solutions and MPA-designated system;
- Data integrity, cybersecurity, operational resilience and contingency arrangements;
- Suitability of the BCO, participating bunker tanker and MFM configuration; and
- Project delivery capability, resourcing, budget reasonableness, and cost-effectiveness.

15. Requests for additional funding beyond the stated cap may be evaluated on a case-by-case basis.

16. MPA may request additional information or clarifications, invite applicants to present their proposals, and impose conditions before or after approval.

17. For the avoidance of doubt, the evaluation of proposals and awarding of grants to the CFP proposals shall be at MPA's sole discretion and are subject to MPA's discretion and approval.

Project Duration, Deliverables and Grant Disbursement

18. Each approved project shall undertake at least four months of operational test-bedding. Joint Applicants should plan to complete their project by **31 Oct 2027** where practicable**.** Detailed deliverables are listed in **Annex B**.

Application and Submission Requirements

19. Application and project timeline:

Milestone	Date/Details
Application Start	**23 November 2026**
Submission Deadline	Interested parties may request the MINT Fund Application form and submission instructions and submit the proposal by **31 March 2027.**
Submission Email	digital@mpa.gov.sg
Proposal Approval	Applications and approvals will be carried out on a rolling basis.

ANNEX A — TEST-BEDDING SCOPE AND TECHNICAL REQUIREMENTS

A1. Minimum solution requirements

- Operate on a read-only basis in relation to the approved MFM system and preserve unaltered source data.
- Capture MFM data at intervals not exceeding two seconds, with a resolution at least equal to the MFM output.
- Prevent data loss or duplication during capture, storage and transmission.
- Provide buffering, recovery, retransmission, contingency and audit-trail capabilities when immediate transmission is not possible.
- Transmit relevant MFM data securely to e-BDN solutions and MPA-designated system through APIs.

A2. Deployment and validation

- Install and operationally deploy the solution onboard the approved participating bunker tanker.
- Interface with the approved MFM system without affecting system integrity, metrological controls or applicable requirements.
- Complete NMC assessment of accuracy, integrity, completeness, transmission reliability and latency under actual operations.
- Undertake cybersecurity assessment or certification as required by MPA.
- Test performance under connectivity loss, equipment failure and other operational or technical disruptions.

ANNEX B — APPLICATION REQUIREMENTS AND PROJECT DELIVERABLES

B1. Joint Applicant and partner responsibilities

The BCO shall provide vessel access and support deployment and operational test-bedding. The Technology Provider shall supply, install, integrate and support the solution and provide necessary technical and cost information. Joint Applicants shall agree on project administration, procurement and payment arrangements. The BCO is the designated grant recipient and shall submit claims. Joint Applicants shall obtain and submit relevant collaboration letters where applicable.

B2. Required project deliverables

- Installation and commissioning records and pre-test readiness evidence;
- Operational test records and data covering the test-bedding period;
- Interoperability, data integrity, transmission performance and cybersecurity assessment findings; and
- Progress reports, incident logs, corrective-action records and other information requested by MPA.

B3. Implementation and changes

The Joint Applicants should establish suitable contingency and recovery arrangements. Material changes to the approved project, participating tanker or schedule should be referred to MPA for consideration. The project must comply with the approved scope, reporting and data-sharing requirements.