

TERMS OF REFERENCE

For

**THE PROCUREMENT OF A VESSEL TRAFFIC MANAGEMENT
INFORMATION SYSTEM (VTMIS)**

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VESSEL TRAFFIC MANAGEMENT INFORMATION SYSTEM

1.0 INTRODUCTION

The Indian Ocean Commission (IOC) is spearheading the implementation of the Regional Port Security Programme (PSP) with financial support from the European Union and technical expertise provided by key international organizations, including the International Maritime Organization (IMO), the United Nations Office on Drugs and Crime (UNODC), and INTERPOL. This initiative underscores a collaborative effort to address the critical port and maritime security challenges within the Eastern Africa, Southern Africa and Indian Ocean (ES-SA-IO) region. The beneficiaries of the PSP programme include Mauritius, Madagascar, Kenya, Mozambique, Tanzania, Seychelles, Namibia, Angola and Comoros.

The overall objective of the programme is to enhance maritime security and safety in the ESA-IO region, aligning with the 2050 African Union Integrated Maritime Strategy (AIMS 2050). AIMS 2050 calls on Africa's coastal states to conduct Port State Control (PSC) and fulfil their responsibilities under Flag State Implementation (FSI) from 2018 onward.

The PSP Programme is designed to function in synergy with concerned regional organizations such as COMESA, EAC, SADC, Port Association of the Indian Ocean Islands (APIOI), and Port Management Association for Eastern and Southern Africa (PMAESA), as well as international stakeholders like CGPCS, EUNAVFOR, and WCO. Furthermore, it builds on the foundation of ongoing projects and initiatives such as MASE, CRIMSON, CRIMARIO and CRIMLEA, while leveraging existing mechanisms like the Djibouti Code of Conduct (DCoC). These collaborations ensure a comprehensive and coordinated approach to port and maritime security.

The programme is structured into three primary outcomes: -

- (i) Enhanced capacity of shipping safety authorities in the ESA-IO region**
This includes bolstering the operational and technical capabilities of maritime administrations to ensure safer navigation and improved incident response.
- (ii) Development of port security legislation and compliance frameworks**
This involves establishing robust legal and regulatory structures to enhance security measures across regional ports.
- (iii) Implementation of a regional information-sharing mechanism and a cargo and passenger data exchange system**
This aims to improve real-time data sharing and collaboration between regional authorities to counter maritime threats effectively.

The PSP Programme focuses on critical areas that have a direct impact on maritime security. These are: -

- (i) Information sharing on maritime freight and passengers**

Facilitating seamless communication and data exchange to enhance situational awareness.

(ii) Support for law enforcement and customs services

Strengthening capabilities to combat organized crime and mitigate the risks of terrorism.

(iii) Cargo control, surveillance, and seizure operations

Elevating the capacity to monitor, inspect, and take action against illicit activities in regional waters.

This tender seeks to procure a Vessel Traffic Management Information System (VTMIS) software that aligns with the PSP Programme's objectives. The proposed solution will serve as a vital component in enhancing maritime domain awareness, streamlining information exchange, and reinforcing port security measures across the ES-SA-IO region.

This document details the technical specifications of the VTMIS software which would be deployed in ports of a group of beneficiary countries which have expressed interest and are the followings: -

- Tanzania;
- Madagascar;
- Mauritius
- Kenya;
- Mozambique;
- Seychelles.

At national level, the VTMIS will be accessed by stakeholders, including National Coast Guard (NCG) and other Law Enforcement Authorities (LEA), Maritime Administration Authorities (MAA), Fisheries Department, Tourism Authority, Port Facility Security Officers (PFSO) and Customs among others.

At regional level, the VTMIS will serve as the link bridge to exchange information related to vessels, passengers and cargo between states of the ESA-IO region.

2.0 VESSEL TRAFFIC MANAGEMENT INFORMATION SYSTEM

2.1 About the VTMIS

The VTMIS is a comprehensive maritime surveillance and traffic management platform designed to enhance the safety, efficiency, and security of vessel navigation within designated maritime zones such as harbours, coastal areas, and inland waterways. As maritime trade continues to grow, so does the complexity of managing vessel traffic, especially in congested and high-risk areas. The VTMIS software addresses these challenges by offering real-time monitoring, data integration, communication tools, and decision-making support for

maritime authorities, harbour masters, vessel operators and other players of the maritime sector.

VTMIS plays a crucial role in ensuring maritime safety and regulatory compliance, especially in environments where vessel movements are dense, such as near major ports or busy shipping lanes. By providing real-time tracking and monitoring of vessel movements, the system helps prevent collisions, groundings, and environmental incidents, while also assisting with search and rescue (SAR) operations in emergencies.

Maritime operations are complex, involving numerous stakeholders including port authorities, ship operators, customs and immigration officers, coast guards, environmental regulators, and search and rescue teams. VTMIS serves as a centralized platform that unifies these different entities under a single framework, enabling efficient management of vessel traffic and enhancing situational awareness.

With the growing size of modern ships and the increasing volume of maritime trade, the risks associated with vessel congestion, hazardous weather, and restricted areas have increased significantly. VTMIS software provides maritime authorities with tools to mitigate these risks, and ensuring: -

- (i) Safe navigation through real-time tracking, monitoring, and automated collision detection systems;
- (ii) Traffic coordination by ensuring that vessels follow predetermined routes and adhere to port schedules;
- (iii) Regulatory compliance by facilitating adherence to international maritime laws, such as the International Maritime Organization's (IMO), Safety of Life at Sea (SOLAS) convention and local regulations;
- (iv) Efficient port operations through integration or information exchange with port management systems, optimizing berth assignments, and minimizing delays.

By ingesting data from various sources such as radar, Automatic Identification Systems (AIS), meteorological systems, and satellite-based communication, the VTMIS software provides operators with a unified real-time operational view of the maritime situation. The VTMIS not only enhances the immediate safety of vessels but also offers advanced analytics and reporting features for long-term planning and optimization of maritime traffic.

The implementation of an advanced VTMIS is essential for modern maritime operations, as it integrates cutting-edge tracking, communication, and data analysis technologies. These capabilities enable proactive decision-making, effective incident response, and improved regulatory compliance, thereby supporting the overarching goals of maritime security and environmental stewardship.

The key objectives of the VTMIS, which outline its role in advancing maritime operations in high-traffic regions are the following: -

- (i) Improved vessel safety by preventing collisions, monitoring compliance, identifying non-cooperative targets, and providing timely alerts for navigational risks.

- (i) Efficient traffic management by optimizing traffic flow and minimize disruptions by preventing congestion, enabling real-time vessel-to-shore communication, and reducing delays during port operations.
- (ii) Environmental protection and compliance by enforcing route compliance, avoiding sensitive areas, and monitoring adherence to environmental regulations on emissions and waste.
- (iii) Support for search and rescue, and other emergency operations with accurate positioning, drift prediction tools, and integrated communication for effective coordination.
- (iv) Data-Driven decision making through post-incident analysis, regulatory reporting, and long-term traffic optimization for improved safety and infrastructure planning.

The VTMIS system will have to be compatible with all existing information exchange systems and mechanisms used in the region, including IORIS. Regarding the AIS data flow, the software will ensure that this can be fed into IORIS. Whether the individual eligible countries decide to place their AIS data flow into IORIS, will remain prerogative of the same eligible countries.

2.2 System Architecture

The system architecture forms the foundation of the VTMIS software, and its design must ensure reliability, flexibility, and scalability. It must be constructed based on the following principles: -

- (i) **Modular Design** with separate components for different functions like, but not limited to, vessel tracking, communication, data storage, system administration and reporting.
- (ii) **Scalability** by supporting a growing number of vessels, increased monitoring zones, or additional features as needed, without performance degradation.
- (iii) **High Availability** by incorporating redundancy at all levels, including databases, servers, networks, and power supplies.

3.0 CORE FUNCTIONAL COMPONENTS OF THE VTMIS

The VTMIS, designed as a modular application, must include the following mandatory modules or components at a minimum: -

- Vessel Tracking
- Traffic Monitoring & Display
- Communication Systems
- Data Logging & Playback
- Alarms & Warnings
- Search & Rescue (SAR) Support
- Reporting & Analytics

The sub-sections below provide a detailed description of the specifications for each mandatory component of the software. Bidders are encouraged to include descriptions of any additional modules or capabilities offered by their proposed software solution in their technical submission. These additional features will be considered for their potential to enhance the system's functionality and effectiveness.

3.1 Vessel Tracking

Vessel tracking is the heart of VTMISS, ensuring that the system has real-time awareness of vessel positions, speeds, and other crucial data. The mandatory features of this component are described in the sub-sections below.

3.1.1 Automatic Identification System (AIS) Integration

3.1.1.1 AIS Reception Capability

- (i) AIS data must be received and processed in real-time from Class A and Class B transponders.
- (ii) AIS operates over two VHF channels (87B and 88B, 161.975 MHz and 162.025 MHz). The software must listen to both channels simultaneously.

3.1.1.2 AIS Message Decoding

- (i) Support decoding of AIS messages, including but not limited to: -
 - Message 1, 2, 3: Position report (Class A vessels)
 - Message 18: Position report (Class B vessels)
 - Message 5: Static and voyage-related data (vessel name, dimensions, etc.)
 - Message 21: Aid to navigation (AtoN) report for buoys and lighthouses
- (ii) The messages must be parsed and displayed in real-time, with position updates at least every 2-3 seconds for moving vessels.

3.1.1.3 AIS Antennas

- (i) The software must interface with AIS antennas that have a range of up to 40 nautical miles (dependent on conditions), ensuring coverage in coastal areas.

3.1.2 Radar Data Integration and Processing

3.1.2.1 Radar Integration

- (i) The software must integrate seamlessly with multiple radar systems, such as X-band and S-band marine radars, which are commonly used for short-range (X-band) and long-range (S-band) tracking.

3.1.2.2 Radar Data Formats

- (i) The software must support radar protocols such as NMEA 0183 or other proprietary formats (to be specified by bidder).

3.1.2.3 Radar Data Fusion

- (i) Vessel data from radar and AIS must be fused into a single cohesive display. The software must intelligently correlate radar returns with AIS information (where available) to reduce false targets and provide accurate situational awareness.

3.1.2.4 Non-Cooperative Target Detection

- (i) For vessels without AIS or in areas where AIS coverage is poor, radar must be the primary tracking source. The software must detect and track non-cooperative targets (vessels without AIS transponders) and generate unique identifiers for those objects.

3.1.3 Satellite-Based Tracking

3.1.3.1 Integration with Satellite AIS (S-AIS)

- (i) For offshore and deep-sea regions, integrate with satellite AIS data providers (For e.g. Orbcomm, Spire, MarineTraffic, etc.). Satellite AIS supplements the coastal AIS and radar feeds and provides for remote areas and global coverage.
- (ii) Since Satellite AIS data typically has higher latency (minutes instead of seconds), the software must process and display this data appropriately, with a time delay indicator to ensure operators are aware of the update frequency.
- (iii) The system must support integration with satellite communication networks to track vessels via satellite-based positioning data, especially for regions without coastal AIS or radar coverage.

3.2 Traffic Monitoring and Display

The VTMISS interface must provide a real-time visual overview of maritime traffic, offering detailed vessel data and various visualization tools.

3.2.1 Real-Time Traffic Display

3.2.1.1 Mapping System

- (i) The system must display vessel locations on a high-resolution chart-based interface, supporting formats like Electronic Navigational Charts (ENC) or S-57/S-63 vector charts, to be provided by the Bidder. Any license renewal implications for this feature must be detailed by the Bidder and accounted for in the financial proposal.
- (ii) Operators must be able to toggle chart layers (e.g., bathymetry, landmarks, buoys) and use navigation tools (zoom, pan, ruler) to measure distances or mark areas of interest.
- (iii) The display must update in real-time (with a refresh rate of 1-2 seconds), ensuring timely monitoring of vessel movements.

3.2.1.2 Vessel Information Overlay

- (i) Each vessel must display critical real-time information directly on the map:
 - Vessel name, MMSI (Maritime Mobile Service Identity), speed, heading, destination, ETA (Estimated Time of Arrival), draft, and type.
 - Icons must differentiate vessel types (cargo ships, tankers, fishing boats, yachts, etc.).
- (ii) Operators must be able to click on vessels for detailed information, including voyage history, recent communications, and alerts.

3.2.2 Geo-fencing Capabilities

3.2.2.1 Virtual Zones

- (i) The system must allow operators to create virtual boundaries around critical areas like ports, shipping lanes, restricted zones, or hazard areas (e.g., shallow waters, coral reefs, etc.).

3.2.2.2 Automated Alerts

- (i) When a vessel enters or exits a predefined geo-fence, the system must trigger an alarm. Alerts can include proximity warnings for vessels approaching restricted or dangerous areas.

3.2.2.3 Zone Configuration

- (i) Operators must have the flexibility to configure the size, shape, and behaviour of geo-fences. These configurations could include specific rules for speed limits, direction, or permissions to enter.

3.3 Communication Systems

Ensuring effective and continuous communication between vessels and shore-based systems is critical for managing maritime traffic.

3.3.1 VHF Radio Communication Integration

3.3.1.1 Real-Time VHF Communication

- (i) The system must be capable of integration with VHF radios, allowing operators to communicate directly with vessels through the software interface.

3.3.1.2 Interoperability

- (i) The VTMIS software must interface with marine radio systems that support both analogue and Digital Selective Calling (DSC) for distress alerts.

3.3.1.3 Channel Management

- (i) Operators must be able to select VHF channels, including specific channels for distress communication (Channel 16), and use group calling to address multiple vessels. It should be noted that the radio sets are not object of this tender.

3.3.2 Text Messaging and Alerts

3.3.2.1 Digital Messaging

- (i) The system must allow for sending text-based messages to vessels using AIS or satellite communication. These messages may include warnings, instructions, weather alerts, or port directives.

3.3.2.2 Predefined Templates

- (i) Operators must be able to use predefined message templates (e.g., collision warnings, entry/exit permissions) for faster communication.

3.3.2.3 Message Logging

- (i) All sent and received messages must be stored and time-stamped for audit purposes.

3.4 Data Logging and Playback

Data logging and playback functions of AIS Data provide the foundation for incident investigation, compliance auditing, and historical analysis.

3.4.1 Historical Data Storage

3.4.1.1 Log Data

- (i) The system must log vessel positions, radar sweeps, communications, and alarms at predefined intervals (e.g., every 1 second). This data should be stored in a relational database for efficient querying.

3.4.1.2 Storage Duration

- (i) The system must retain this data for at least 12 months, with options to archive older data for extended retention (compliant with local regulations).

3.4.2 Playback Feature

3.4.2.1 Incident Reconstruction

- (i) The software must allow operators to reconstruct vessel movements by selecting a time and date range, displaying historical vessel positions, based on AIS Data, radar sweeps, and geofencing events.

3.4.2.2 Multilayer Playback

- (i) Playback must display data in layers: AIS data, radar data, geofencing breaches, and communication logs, each with the ability to pause, rewind, fast-forward, or zoom in. Bidders are required to provide details on how this feature is achieved through their proposed software.

3.4.2.3 Export Options

- (i) The system should allow operators to export playback sessions in video format or export the data in CSV, JSON, or XML for reporting and analysis.

3.5 Alarms and Warnings

Automated alerts ensure that operators can react quickly to potential hazards or incidents.

3.5.1 Collision Detection Alerts

3.5.1.1 Real-Time Collision Detection

- (i) The system must calculate Collision Avoidance and Target Tracking (CPA/TCPA) based on vessel speed, heading, and proximity. When vessels are on a collision course, the software should provide visual and audio alerts.

3.5.1.2 Threshold Customization

- (i) Operators must be able to configure thresholds for CPA and TCPA (e.g., when two vessels will come within 0.5 nautical miles of each other within 10 minutes).

3.5.1.3 Alert Prioritization

- (i) Collision alerts must be categorized into different priority levels (e.g., low, medium, high) depending on the risk and proximity.

3.5.2 Weather Alerts

3.5.2.1 Weather Data Integration

- (i) Integration with meteorological systems to display real-time weather conditions such as wind speed, wave height, visibility, and storm warnings is a must.

3.5.2.2 Automated Alerts

- (i) The system must generate alerts based on weather conditions that could impact vessel navigation (e.g., gale force winds, fog, or high waves).

3.6 SAR Support

The system must provide a range of tools specifically designed to assist in SAR operations, ensuring a swift and coordinated response in emergencies. These tools should include features such as: -

3.6.1 Last-Known Position Tracking

3.6.1.1 Automated SAR Tools

- (i) When a vessel issues a distress signal, the system must automatically mark the vessel's last-known position and begin tracking based on drift patterns generated using weather and current data.

3.6.1.2 Predictive Tracking

- (i) The software must calculate and display drift patterns for vessels or survivors, allowing SAR teams to predict their future positions.

3.6.2 SAR Communication Support

3.6.2.1 Integrated Messaging

- (i) The system must support the coordination of search and rescue efforts by ensuring that information is shared instantly. Seamless integration with communications tools that enable real-time coordination between SAR teams, vessels, and shore-based operators to streamline response efforts.

Together, these tools should ensure that SAR operations are effective, well-coordinated, and timely, improving the chances of successful rescues and reducing response times during critical maritime incidents.

3.7 Reporting and Analytics

The VTMIS must include a robust reporting and analytics module, essential for optimizing maritime operations, ensuring regulatory compliance, and enhancing safety. These features should enable operators and authorities to generate detailed reports on vessel movements, traffic patterns, and environmental factors, supporting data-driven decision-making.

The reporting and analytics capabilities of the system should accommodate: -

3.7.1 Traffic Reports

The system must generate detailed reports on vessel traffic in a specific area, providing insights into traffic patterns to identify potential congestion points, optimize route planning, and reduce delays. The reports should include data on vessel types, speeds, routes, and compliance with traffic regulations.

3.7.2 Incident Reports

The system must provide predefined templates for documenting maritime incidents, such as collisions, groundings, or environmental pollution. These reports should include all relevant data, such as vessel positions, communications, and weather conditions at the time of the incident. The system should also enable the creation of detailed reports following incidents or near-misses, helping to identify causes, improve protocols, and reduce future risks.

3.7.3 Compliance Tracking Reports

The system must provide reporting options to monitor vessel adherence to regulations, such as environmental standards and maritime laws, and generate reports to ensure compliance.

3.7.4 Statistical Analysis Tools

The system must include statistical tools to analyze trends in traffic, incidents, and vessel behaviour over time. These tools will help identify bottlenecks, improve operational efficiency, and suggest safety improvements.

4.0 USER INTERFACE AND EXPERIENCE (UI/UX) OF THE VTMISS

Given the high-pressure nature of VTMISS operations, where quick decision-making and real-time responses are critical, the system's user interface must be designed to prioritize ease of use and clarity. An intuitive interface minimizes the learning curve for operators, allowing them to focus on managing vessel traffic effectively rather than navigating complex system controls. It should present essential information in a clear and organized manner, ensuring that critical data is easily accessible and actionable, even during high-stress situations. Responsiveness is equally important, as delays in system interactions can hinder timely decision-making and impact overall operational efficiency. By combining these elements, the user interface can empower operators to maintain safety, efficiency, and compliance in maritime operations.

4.1 Web and Mobile Web Access

The VTMISS application must be a web-based solution accessible through standard web browsers. Users should be able to access the application on both desktop and mobile devices, allowing authorized personnel to monitor operations and make decisions remotely. Security

measures must be in place to ensure that mobile and web access have restricted functionality, preventing unauthorized control actions and ensuring the integrity of the system.

4.2 GIS Support

The Web User Interface shall include a robust Geographical Information System (GIS) display tool that provides advanced functionality for enhanced situational awareness and operational efficiency.

The GIS tool must offer the following features: -

4.2.1 Support for Standard Maps and Protocols

- (i) Compatibility with standard Electronic Nautical Charts (ENC) and Open Geospatial Consortium (OGC) map protocols, including WMS, TMS, and WFS.
- (ii) Integration with Open Street Map, Bing Maps, and Google Maps for background map visualization. Note: ENCs are not required at this stage.

4.2.2 Day, Dusk, and Night Modes

- (i) Display modes in compliance with the IEC 61174 standard, ensuring optimal visibility in various lighting conditions.

4.2.3 Customizable Tracks and Workspace

- (i) User-defined customization of tracks, including symbols, colors, and labels.
- (ii) Flexible workspace configuration tailored to user preferences.

4.2.4 AIS Tracks and Data Display

- (i) Visualization and management of AIS tracks and data from all AIS-equipped devices, including Class A and Class B vessels, AtoN, SAR, SART, and Base Stations.
- (ii) Display of AIS data sourced from external systems connected to the national server.

4.2.5 Advanced Chart Functions

- (i) Navigational tools such as pan, zoom, and track representation.
- (ii) Filtering and display of track data within a dedicated panel, including AIS static and dynamic data stored in the Database Management System.

- (iii) Features for labelling, measurement, and advanced search functionalities.

4.2.6 User-Defined Areas and Alarms

- (i) Creation of lines, polygons, circles, and zones to define areas of responsibility, restricted areas, and crossing lines.
- (ii) Configuration of alarms with both popup and audio notifications for:
 - Line crossings (in both directions).
 - Entering or exiting restricted areas.
 - Estimated Time of Arrival (ETA) alerts.
 - Anchor dragging or speed limit violations.
 - Specific triggers linked to fields within the Database Management System or AIS messages.

4.2.7 Playback of Historical Data

- (i) Timeline selection for historical data playback with controls for speed adjustment, pause, and stop.

This GIS tool must be seamlessly integrated into the VTMS Web User Interface, offering intuitive navigation, comprehensive visualization, and real-time monitoring capabilities.

4.3 Intuitive User Interface

The user interface (UI) of the VTMS should be designed with a strong focus on usability to ensure operators can perform their tasks efficiently and with minimal friction.

4.3.1 Usability

The UI design must offer clean and straightforward navigation to ensure tasks can be performed easily and with minimal training. This approach is essential for enabling users to access key functionalities without unnecessary complexity or confusion.

4.3.2 Drag-and-Drop Geo-Fencing

The UI must support advanced features, such as drag-and-drop geo-fencing, which provides a user-friendly method for defining and managing maritime zones, significantly reducing the time and effort required for these tasks.

4.3.3 Real-Time Data Displays

The UI must provide operators with immediate access to critical information, such as vessel positions, speeds, and alerts, ensuring timely and informed decision-making. It must also

ensure that the displayed information is real-time, allowing operators to make quick, accurate decisions based on the most up-to-date data.

4.3.4 Shortcut Keys

The UI must include shortcut keys to facilitate the rapid execution of frequently used commands, enhancing efficiency and allowing operators to perform tasks quickly during high-pressure situations.

4.3.5 Clear Data Visualizations

The UI must provide intuitive and clear data visualizations that translate complex information into easily understandable formats, including: -

- Color-Coded Alerts to quickly indicate priority levels and statuses;
- Vessel Icons facilitating the clear display of vessel positions and types.
- Interactive Map Tools which allow for seamless tracking and management of vessel movements.

4.3.6 Enhanced Efficiency

The UI must support operators in maintaining maritime safety and optimizing workflows efficiently, ensuring that tasks are completed quickly, accurately, and with minimal effort.

4.4 Operators' Console and Large Monitoring Display Support

While this section outlines the functional requirements for the operators' console and large monitoring display, bidders are only required to confirm that their proposed VTMIS software fully supports the features specified in this section.

The proposed VTMIS software must be capable of integrating with and displaying data on high-resolution monitors and large-scale monitoring systems. However, bidders are not required to supply any large displays, consoles, or additional hardware equipment as part of their proposal.

The confirmation should address the following capabilities:

- Compatibility with standard high-resolution monitor setups and video wall systems.
- Support for multi-source display configurations, allowing simultaneous visualization of GIS maps, vessel traffic data, alarms, and other operational metrics.
- Functional alignment with ergonomic and user-centric design principles for consoles with multiple displays.
- Seamless integration with external audio systems for alerts and communications, if applicable.

Bidders must include a clear statement in their proposal confirming compliance with the software requirements listed above, supported by technical brochures where applicable..

4.5 Multilingual Support

Since maritime operations are international, and this application software will be deployed in both English and French-speaking countries in the region, multilingual support (at least English and French, with the possibility of supporting additional languages) is essential. The interface must allow operators to easily switch between languages, ensuring accessibility and usability for users in diverse linguistic settings.

5.0 INFORMATION EXCHANGE CAPABILITIES

The VTMISS must be able to seamlessly exchange information with other relevant systems to enhance operational efficiency and improve coordination between maritime stakeholders. This integration ensures that critical data is shared in real-time across various platforms, enabling stakeholders such as port authorities, coast guards, fishing authorities, customs agencies, and law enforcement to make informed decisions quickly and collaboratively.

The automated information exchange process can be implemented either through the VTMISS application's Electronic Data Interchange (EDI) interface or via custom-coded integration. The EDI interface is the preferred method, as it eliminates the complexities associated with coding, testing, and validation processes. Additionally, this approach ensures easier future upgrades for both the VTMISS and the connected systems, avoiding potential compatibility issues. Accordingly, all aspects of information exchange and integration with external systems will be realized through the EDI interface of the VTMISS, ensuring efficient communication while minimizing the challenges associated with custom development.

5.1 Key aspects of information exchange

5.1.1 Interoperability

The VTMISS must be compatible with other maritime systems such as Automatic Identification Systems (AIS), Vessel Traffic Services (VTS), and Customs and Border Protection systems, allowing for smooth data flow between them.

5.1.2 Data Sharing

The system should facilitate the exchange of vessel tracking information, traffic updates, and regulatory compliance data, ensuring all stakeholders are operating with the most current and accurate information.

5.1.3 Cross-System Alerts

Real-time alerts should be transmitted to connected systems to ensure swift responses to any incidents or potential threats, such as deviations from the designated routes, collisions, or non-compliance with regulations.

5.1.4 Enhanced Coordination

By exchanging vital information with law enforcement, customs, and environmental monitoring systems, the system should improve the coordination of joint operations, such as search and rescue (SAR) missions, anti-smuggling efforts, and environmental protection activities.

5.1.5 Efficient Resource Allocation

The system must share data on resource availability (such as vessels or personnel) to enable optimized deployment and resource management, particularly in emergencies or high-traffic periods.

5.2 Information exchange with external systems

The VTMISS must facilitate seamless information exchange with external systems to enhance coordination and operational efficiency among maritime stakeholders at both the national level (e.g., Port Authority, Customs) and the regional level (e.g., DCoC, CRIMARIO's IORIS, MASE's PFMIS and MCP, and other relevant systems).

Bidders are required to provide details on the information exchange capabilities of their proposed software.

6.0 REFERENCE DATABASES

This section outlines the foundational data structures necessary for the effective operation of the VTMISS. These databases serve as a centralized repository for critical information, including vessel details, voyage records, and associated operational data. They ensure data consistency, facilitate seamless information exchange among stakeholders, and support both operational and regulatory requirements.

The database models provided in this section are indicative and must be further refined or customised to meet the specific needs of different vessel types, operational scenarios, and port requirements. The final design of the databases for each country will be provided to the successful tenderer for their implementation.

6.1 Vessel Information

The vessel information requirements are based on the fields typically included in a Notice of Arrival. These fields must form part of the database for commercial vessels, with associated field types and descriptions. The database model must also be customizable and adaptable to accommodate information for other vessel types, including fishing vessels, leisure crafts, cruises, military vessels, and cargo ships.

As many vessels make regular calls to the same ports, "master" vessel records will need to be created and maintained by agents for efficiency. The tables below present a proposed design model for the Vessel Information database. This design is flexible and can be modified or enhanced as necessary to meet the needs of all vessel categories and operational requirements.

Vessel - Key Details			
No.	Field Name	Type	Comment
0	Vessel Unique Identifier	Text	
1	Name	Text	
2	Call Sign	Text	
3	MMSI No.	Numeric	
4	IMO No.	Numeric	
5	Official Registration No.	Text	
6	Class	Text	Drop down List containing the different classes
7	Flag State	Text	Drop Down List containing countries
8	Port of Registration	Text	Drop Down List containing ports
9	Year Built	Numeric	Drop Down List containing years
10	Type of Trade	Text	Drop Down List containing types of trade
11	Type of Service	Text	Drop Down List containing types of service
12	Type of Vessel	Text	Drop Down list containing vessel types
13	Other Information	Text	
14	Ship's Register Cert.	Attachment	
15	Safety Equipment Cert.	Attachment	
16	Safety Radio Cert.	Attachment	
17	Safety Construction Cert.	Attachment	
18	Load Line Cert.	Attachment	
19	Intl. Oil Prevention Pollution Cert.	Attachment	
20	Minimum Safe Manning Cert.	Attachment	
21	Intl. Ship Security Cert.	Attachment	
22	Civil Liability Cert.	Attachment	
23	Vessel and Crew Insurance Cert.	Attachment	
24	Passenger Ship Cert.	Attachment	
25	Power of Attorney	Attachment	
26	Other Information	Text	

Vessel - Characteristics (Port Operations)			
0	Vessel Unique Identifier	Text	
1	Gross Tonnage	Numeric	
2	Net Tonnage	Numeric	
3	Dead Weight	Numeric	
4	LOA	Numeric	
5	Max Beam	Numeric	
6	Depth	Numeric	
7	Max Summer Draft	Numeric	
8	Summer Freeboard	Numeric	
9	Max Air Draft	Numeric	
10	Max Capacity	Numeric	
11	Cellular	Text	
12	Number of Hold	Numeric	
13	Number of Hatch	Numeric	
14	Hold Details	Text	
15	Hatch Details	Text	
16	Geared	Text	
17	Gear Details	Text	
18	Vessel Power (Tug)	Numeric	
19	Number of Bow Thrusters	Numeric	
20	Capacity of Bow Thrusters	Numeric	
21	Number of Stern Thrusters	Numeric	
22	Capacity of Stern Thrusters	Numeric	
23	Other Information	Text	

Vessel - Contact Details			
No.	Field Name	Type	Comment
0	Vessel Unique Identifier	Text	
1	Phone 1	Numeric	
2	Phone 2	Numeric	
3	Inmarsat 1	Numeric	
4	Inmarsat 2	Numeric	
5	Fax	Numeric	
6	Telex	Numeric	
7	E-mail	Text	
8	Other	Text	

Vessel - Owner Contact Details			
No.	Field Name	Type	Comment
0	Vessel Unique Identifier	Text	
1	Name	Text	
2	Address 1	Text	
3	Address 2	Text	
4	Address 3	Text	
5	Phone	Numeric	
6	Fax	Numeric	
7	E-mail	Text	

Vessel - Operator Contact Details			
No.	Field Name	Type	Comment
0	Vessel Unique Identifier	Text	
1	Name	Text	
2	Address 1	Text	
3	Address 2	Text	
4	Address 3	Text	
5	Phone	Numeric	
6	Fax	Numeric	
7	E-mail	Text	

6.2 Voyage Information

The requirements for voyage (arrival) information are based on the fields typically included in a Notice of Arrival, along with their types and additional descriptions where applicable. This information is dynamic, as it changes with each vessel's call to a specific port.

Upon submission of voyage information, various stakeholders independently review the data and provide the necessary authorizations (or refusals) for port entry through the Authorizations Tab. Additionally, authorities may conduct inspections on certain vessels, either within or outside the port premises, with inspection details recorded under the Inspections tab. Except for the Authorizations and Inspections tabs, where relevant authorities contribute information, agents will be the primary source for all other voyage-related data.

The database model must also be adaptable to handle departure processes, ensuring a seamless flow of information for vessels leaving the port. While the proposed fields are organized into logical groups for clarity, the successful tenderer will be responsible for defining and implementing the final voyage database schema.

Arrivals - Main Voyage Details			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	
0	Vessel Unique Identifier	Text	
1	Voyage Number	Text	Reference of Agent
2	Local Agent	Text	Automatic (by login)
3	Name of Master	Text	
4	Maximum Arrival Draft	Numeric	
5	Arrival Air Draft	Numeric	
6	Port of Arrival	Text	Drop Down List containing ports
7	Port Facility of Arrival	Text	
8	Port of Origin	Text	Drop Down List containing ports
9	Last Port of Call	Text	Drop Down List containing ports
10	Departure Last Port of Call	Date	
11	ETA	Date/Time	
12	ETD	Date/Time	
13	Next Port of Call	Text	Drop Down List containing ports
14	Port of Destination	Text	Drop Down List containing ports
15	Purpose of Call	Text	
16	Fuel on Board	Numeric	
17	Fuel Type	Text	Drop Down List containing fuel types
18	Defective Equipment	Text	Drop Down List of equipment options
19	Defective Equipment Remarks	Text	Mandatory if defective equipment present
20	Other Information	Text	
21	IMO FAL Form 1 - General	Attachment	
22	Last Port Clearance	Attachment	
23	Master's Report	Attachment	
24	Master' Supplementary Declaration	Attachment	
25	Authorisation to Enter Port	Text	Yes or No (depending on individual authorisations)

Arrivals - Pre-Arrival Information (ISPS Details)			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	

0	Vessel Unique Identifier	Text	
1	Name of CSO	Text	
2	Name of SSO	Text	
3	Valid ISSC	Text	Yes or No
4	Date of ISSC Issue	Date	
5	Date of ISSC Expiry	Date	
6	Reason (no valid ISSC)	Text	
7	Approximate Port Call Duration	Numeric	Duration in hours
8	Vessel Security Level	Numeric	
9	Location of Vessel	Text	
10	SSP (Ship Security Plan) on bord	Text	Yes or No
11	Other Information	Text	
12	Security Information Form	Attachment	

Arrivals – Authorisations			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	
0	Vessel Unique Identifier	Text	
1	Organisation (1 to X)	Text	Drop Down List of organisations
2	Name and Surname (1 to X)	Text	
3	Authorisation (1 to X)	Text	Yes or No
4	Reason for no authorisation (1 to X)	Text	
5	Date and Time (1 to X)	Date/Time	
6	Other Information (1 to X)	Text	

Arrivals - Crew and Passenger Details			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	
0	Vessel Unique Identifier	Text	
1	Number of Crew	Numeric	
2	Number of Passengers	Numeric	
3	No. of Passengers to Disembark	Numeric	
4	No. of Passengers to Embark	Numeric	
5	No. of Passengers in Transit	Numeric	
6	Other Information	Text	
7	IMO FAL Form 5 - Crew List	Attachment	

8	IMO FAL Form 6 - Passenger List	Attachment	
9	Maritime Health Declaration	Attachment	
10	Temperature List (COVID)	Attachment	
11	Vaccination List (COVID)	Attachment	

Arrivals - Cargo Details			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	
0	Vessel Unique Identifier	Text	
1	No. of Mail Bags	Numeric	
2	Cargo (Bill of Lading)	Numeric	
3	Cargo in Transit	Numeric	
4	Deck Cargo for This Port	Numeric	
5	Deck Cargo for in Transit	Numeric	
6	Livestock for this Port	Numeric	
7	Livestock for in Transit	Numeric	
8	Type of Cargo	Text	Drop Down List containing cargo types
9	Brief Cargo Description	Text	
10	Dangerous Cargo on Board	Text	Yes or No
11	IMO FAL Form 7 - Dangerous Cargo	Attachment	
12	IMO FAL Form 2 - Cargo Declaration	Attachment	
13	IMO FAL Form 3 - Stores Declaration	Attachment	
14	IMO FAL Form 4 - Affects Declaration	Attachment	
15	Parcel List	Attachment	
16	Bonded Store List	Attachment	
17	NIL List	Attachment	
18	Narcotics List	Attachment	
19	Arms and Ammunitions List	Attachment	

Arrivals – Inspections			
No.	Field Name	Type	Comment
0	Voyage Unique Identifier	Text	
0	Vessel Unique Identifier	Text	
0	Inspection Unique Identifier	Text	
1	Organisation Name	Text	Drop Down List of organisations
2	Reason for Inspection	Text	Drop Down List of reasons

3	Reason Details	Text	
4	Location of Inspection	Text	
5	Boarding Date and Time	Date/Time	
6	Duration	Numeric	
7	Inspection Report	Attachment	
8	Conclusion of Inspection	Text	Drop Down List of conclusions
9	Reason Details	Text	

7.0 SYSTEM ACCESS AND SECURITY

The VTMIS must ensure that user access to vessel and voyage information is managed based on predefined roles and permissions, centrally administered to maintain control and consistency. Stakeholders will be assigned varying levels of access, with some granted read-only permissions while others will have write access to modify records, such as authorizations. For instance, the immigration department will have read-only access to voyage and crew/passenger details but will have write access to sections like "Authorizations" and "Inspections." The system must allow customization of access rights for each stakeholder to ensure they only interact with information relevant to their role.

7.1 Access Rights

The successful tenderer will be provided with access rights matrices for each country where the VTMIS is deployed. These matrices will detail which stakeholders are permitted to create, read, or write data for specific system components and will form the foundation for implementing system access rights. Access rights for individual stakeholders will be centrally managed at the national level by the designated VTMIS system administrator to address the varying requirements of different authorities within each country.

At the regional level, information exchange between countries will align with the policies of each nation, and not all data will be replicated. For example, attachments related to arrivals and departures, such as IMO FAL Forms or Inspection Reports, may be excluded from sharing. This approach ensures that sensitive or non-relevant information is safeguarded according to national and regional guidelines.

The access rights matrices included in this document are for illustrative purposes only. The finalized matrices, which will detail specific access levels and permissions for stakeholders, as well as the complete list of stakeholders for each country, will be provided to the successful tenderer during the implementation phase.

Database Register / Stakeholder	Agent	Port	Fisheries	Immigration	Customs	Coastguard	Shipping	Environment
Vessel - Key Details	CRW	R	R	R	R	R	R	R
Ship's Register Certificate	CRW						R	
Safety Equipment Certificate	CRW						R	
Safety Radio Certificate	CRW						R	
Safety Construction Certificate	CRW						R	
Load Line Certificate	CRW						R	
Intl. Oil Prevention Pollution Certificate	CRW						R	
Minimum Safe Manning Certificate	CRW						R	
Intl. Ship Security Certificate	CRW						R	
Civil Liability Certificate	CRW						R	
Vessel and Crew Insurance Certificate	CRW						R	
Passenger Ship Certificate	CRW						R	
Power of Attorney	CRW				R		R	
Vessel - Characteristics	CRW	R					R	
Vessel - Contact Details	CRW	R	R	R	R	R	R	R
Vessel - Owner Contact Details	CRW	R					R	
Vessel - Operator Contact Details	CRW	R	R	R	R	R	R	R
Arrivals - Main Voyage Details	CR	R	R	R	R	R	R	R
IMO FAL Form 1 - General	CR	R	R	R	R	R	R	
Last Port Clearance	CR				R		R	
Master's Report	CR	R					R	
Master' Supplementary Declaration	CR	R			R		R	
Arrivals - Pre-Arrival Information (ISPS)	CR	R	R	R	R	R	R	
Security Information Form	CR	R	R	R	R	R	R	
Arrivals - Authorisations		CRW	CRW	CRW	CRW	CRW	CRW	R
Arrivals - Crew and Passenger Details	CR	R	R	R	R	R	R	R
IMO FAL Form 5 - Crew List	CR	R	R	R	R	R	R	
IMO FAL Form 6 - Passenger List	CR	R	R	R	R	R	R	
Maritime Health Declaration	CR		R					

Database Register / Stakeholder	Agent	Port	Fisheries	Immigration	Customs	Coastguard	Shipping	Environment
Temperature List (COVID)	CR		R					
Vaccination List (COVID)	CR		R					
Arrivals - Cargo Details								
	CR	R	R	R	R	R	R	R
IMO FAL Dorm 7 - Dangerous Cargo	CR	R			R	R		R
IMO FAL Form 2 - Cargo Declaration	CR	R			R			
IMO FAL Form 3 - Stores Declaration	CR				R			
IMO FAL Form 4 - Affects Declaration	CR				R			
Parcel List	CR				R			
Bonded Store List	CR				R			
NIL List	CR		R	R	R	R		
Narcotics List	CR				R			
Arms and Ammunitions List	CR				R			
Arrivals - Inspections								
		CRW	CRW	CRW	CRW	CRW	CRW	
Inspection Report		CRW	CRW	CRW	CRW	CRW	CRW	

7.2 Personalised Views

The VTMIS must provide stakeholders with personalized views tailored to their roles and permissions, as defined in the centrally administered access rights matrices. These customized interfaces will enable users to efficiently visualize relevant information and, when authorized, modify it. Personalized views should ensure that each stakeholder interacts with the system effectively, focusing exclusively on data relevant to their role while streamlining workflows. The key features of these personalized views are outlined in the subsections below.

7.2.1 Role-Specific Dashboards

Upon login, stakeholders, such as immigration authorities, should see a dashboard highlighting tasks requiring their immediate attention, such as pending authorizations for vessel arrivals.

7.2.2 Customizable Data Displays

Stakeholders should only view information relevant to their responsibilities. For instance, immigration authorities may access specific details in the "Main Voyage Details" tab but exclude irrelevant fields, streamlining the interface and reducing clutter.

7.2.3 Interactive Views

Some views must allow stakeholders to edit records as required. For example, health authorities can grant or deny authorizations by updating relevant fields, including the authorizer's name, decision, and comments, facilitating efficient processing of vessel arrivals.

7.2.4 Historical Data and Reporting

Stakeholders must be able to access historical data and generate reports, such as inspection records or statistics over specific timeframes. There must be options to print the reports or export them for further analysis.

7.2.5 Agent-Specific Views

Agents must have access to comprehensive views for submitting and managing all required information and attachments in the system. They may also monitor authorization statuses to address missing data or resubmit necessary documents.

7.2.6 Regional Centre Views

Users at the regional centre must have access to broader maritime activity views, including vessel visits across multiple countries. These views should support actions such as creating and sharing warnings about specific vessels with member countries.

7.3 Security Features

Security is critical for protecting sensitive maritime data from cyberattacks and unauthorized access.

7.3.1 Authentication and Role-Based Access

The VTMIS must be incorporated with strong authentication mechanisms (e.g., two-factor authentication). Different users (operators, managers, IT staff) should have role-based access controls, restricting access to sensitive functions.

7.3.2 Encryption

All communication between vessels, shore stations, and servers should be encrypted (e.g., using TLS/SSL) to prevent eavesdropping or tampering with AIS, radar, and communication data.

7.3.3 Cybersecurity Protection

The software provider should comply with global cybersecurity standards like ISO 27001 and the National Institute of Standards and Technology (NIST) framework.

8.0 COMPLIANCE WITH INTERNATIONAL STANDARDS

The VTMIS software must adhere to the following global maritime laws and best practices: -

8.1 IMO Guidelines on VTS

The system must be aligned to the International Maritime Organization's (IMO) guidelines on Vessel Traffic Services (VTS), which specify operational requirements for monitoring and controlling ship movements.

8.2 SOLAS (Safety of Life at Sea)

The system must Comply with SOLAS, which mandates safety measures for vessels, including the use of AIS and the management of ship traffic in coastal waters.

8.3 IALA VTS Standards

The system must comply to standards set by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) for effective traffic management, communication protocols, and navigation safety.

9.0 LICENCING

The licensing options for the VTMIS, database, and other software utilities required for the implementation of this project must comply with the following conditions: -

9.1 VTMIS Software

The VTMIS software license must be perpetual, allowing for a one-time payment that grants users indefinite and unlimited usage rights for the current version of the software. This licensing model ensures that the beneficiary countries retain long-term operational control over the system without recurring license fees.

9.2 Relational Database Management System (RDBMS)

The RDBMS required to support the VTMIS must also be licensed on a perpetual basis. Bidders must ensure that the proposed RDBMS includes necessary features for scalability, security, and integration, and the perpetual license must cover all such functionalities.

9.3 Other Software Utilities

Any additional software utilities required for the operation or integration of the VTMIS system, including middleware or tools for information exchange, must also be licensed on a

perpetual basis. Bidders must provide details on these utilities, their functionalities, and how they contribute to the overall solution.

9.4 Software Maintenance and Upgrades

While the licenses must be perpetual, bidders must include options for annual maintenance and support contracts that provide access to updates, patches, and technical support for all licensed software. These services must be priced as a separate line item as part of the annual maintenance services (refer to Section 12.0 below).

9.5 License Documentation

Bidders are required to provide: -

- Detailed descriptions of the licensing models for each component of the solution.
- Sample license agreements for the VT MIS software, RDBMS, and other software utilities.
- Licensing terms that clearly specify usage rights, limitations, and any dependencies.

10.0 IMPLEMENTATION SERVICES

This section outlines the scope of work and services required for the successful implementation of the VT MIS.

10.1 Deployment Approach

The successful tenderer will not be required to physically relocate technical resources to the beneficiary countries. Instead, the installation, configuration, and deployment of the VT MIS will be conducted remotely. The required underlying infrastructure to host the VT MIS for each beneficiary country (refer to the list of installation locations below) will be procured through a separate tender process. This infrastructure will be deployed as a private cloud platform, where the VT MIS, its supporting Relational Database Management System (RDBMS), and other dependent utilities will be installed and configured to ensure seamless operation.

The IOC, serving as the overall project manager for this regional initiative, will provide the successful tenderer with the necessary access to the private cloud platform for each installation site. Additionally, the IOC will facilitate all required communications between the successful tenderer, the users/operators of the VT MIS in each beneficiary country, and other stakeholders as needed. This coordination will ensure smooth interactions and effective collaboration throughout the implementation process, supporting the successful execution of the project.

10.2 Installation and Configuration

The successful tenderer must ensure that all VTMS software modules, databases, and supporting utilities are properly installed and configured on the provided cloud platforms. The system must be fully operational and tested in alignment with the functional and technical specifications outlined in this document.

10.3 Integration with External Systems

The integration with external systems will primarily involve configuring industry-standard EDI interfaces for information exchange, as previously outlined. However, during the implementation phase, it may become necessary to perform some custom coding in addition to the EDI interface configuration to ensure automated information exchange. In such cases, the tenderer must provide a proposed rate for the software development effort in their financial proposal. If additional training is required for stakeholders to familiarize them with new features or integrations, these training efforts must also be included in the proposal. The tenderer will be fully responsible for managing the overall development process, including coordination with any third-party system providers, if applicable.

10.4 Deployment Methodology and Implementation Plan

Bidders are required to submit a detailed deployment methodology and implementation plan as part of their proposal. The plan must include:

- A time-based implementation schedule with clearly defined milestones.
- Intermediate progress reports upon the completion of each milestone.
- A final implementation report summarizing the completion of all tasks and deliverables.

10.5 Project Management and Team Composition

Bidders must provide details of the proposed project management and implementation team, including:

- Roles and responsibilities of each team member.
- Qualifications and relevant experience of team members.
- A clear organizational structure showing how the implementation team will be coordinated.

10.6 Support During Implementation

The tenderer must offer technical support throughout the implementation phase, ensuring that all issues or challenges encountered are promptly resolved. Communication channels and escalation mechanisms must be clearly outlined.

10.7 Commissioning and Acceptance

At the completion of the project, the system will undergo a formal commissioning process, followed by an acceptance phase. During this phase, the system's functionality, performance, and compliance with the project requirements will be assessed to ensure that it meets the agreed-upon specifications and objectives.

The commissioning process involves the final configuration, testing, and verification of the system in its live environment, confirming that all components of the VTMS are fully operational. Acceptance reports will document the results of the commissioning phase, outlining any issues or deviations, if any, from the agreed specifications and how they have been addressed.

Bidders are required to provide templates or models for these commissioning and acceptance reports in their proposals. These reports will be mutually signed by the IOC and the successful tenderer upon final acceptance of the system.

11.0 TRAINING SERVICES

Bidders are required to include the following training services as part of the VTMS implementation: -

- Administrator's training on database structure, creation and management of access rights, and overall management of the VTMS software application.
- Users'/Operators' training on all modules of the VTMS software application.
- Users'/Operators' training on vessel traffic monitoring and management techniques. This training must be based on simulations of real-life scenarios that present issues in vessel traffic monitoring and management.

Bidders must provide detailed training plans, including schedules and course content for the requested training. Additionally, user and administrator manuals must be provided for reference once the training is complete.

12.0 MAINTENANCE SERVICES

The maintenance services for the VTMS will consist of both preventive and corrective maintenance, offered on an annual basis and renewable throughout the lifecycle of the system. These services are critical for ensuring the continued smooth operation and functionality of the system, as well as addressing any potential faults or performance issues promptly.

In order to ensure and maintain the reliability and functionality of the VTMS, preventive maintenance services must be scheduled twice yearly and include the following activities: -

- Verification of the databases to ensure data integrity and optimal performance.
- Review and analysis of system logs to identify potential issues and prevent future failures.
- Inspection and validation of configurations to ensure alignment with operational requirements.
- Performance testing to confirm system efficiency and responsiveness.
- Application of any recommended updates or optimizations to enhance system stability and security.

The minimum corrective service requirements are as follows: -

- The system must include a response time of no more than 4 hours from the time a fault report is submitted.
- Qualified support personnel must remotely troubleshoot and resolve reported issues within the following time frames:
 - Minor issues: Resolution must occur within 4 hours from the fault report.
 - Major issues: Resolution must occur within a maximum delay of 12 hours from the fault report.
 - Force Majeure: To be agreed on case to case basis, considering the nature of the event and its impact on service delivery.
- 24/7/365 Availability: On-call support personnel must be available on a continuous basis (24 hours a day, 7 days a week, 365 days a year) to provide immediate support for issues that may arise.

Bidders must include an optional service for software maintenance and upgrades, as detailed in Section 9.4. This option should be clearly priced and included in the proposal. It should cover access to software patches, updates, and enhancements, ensuring the VTMS software remains up-to-date and fully functional throughout its lifecycle.

In addition, the bidder is required to submit a model of the service contract or Service Level Agreement (SLA) that outlines these maintenance provisions. The SLA must clearly define the response times and the processes for attending to and resolving faults related to the VTMS software application. This model contract should ensure clarity on the expectations and commitments related to maintenance services and provide a reference for performance monitoring and accountability.

13.0 INSTALLATION LOCATIONS

The VTMS system will be installed in the following locations of the beneficiary countries: -

Beneficiary Country	Location
Madagascar	Capitainerie du Port – SPAT, Port of Tamatave
Mauritius	National Coast Guard, Port Louis
Kenya	Kenya Port Authority, Port of Mombasa
Mozambique	Maritime Rescue Coordination Centre, Port of Maputo
Tanzania	Tanzania Port Authority – Information Sharing Centre, Dar Es Salaam
Seychelles	Coast Guard Office, Port of Victoria, Mahé