TERMS OF REFERENCE

For

PROCUREMENT OF AIS SHORE STATIONS
VTMIS

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1.0 Introduction

1.1 The Indian Ocean Commission

The Indian Ocean Commission (IOC) is an intergovernmental organization comprising five island Member States: Comoros, France (on behalf of Réunion), Madagascar, Mauritius, and Seychelles. Established by the Port Louis Declaration (1982) and formalized under the Victoria Agreement (1984), the IOC is the only African regional organization composed exclusively of islands.

The IOC promotes regional solidarity and cooperation across key sectors such as ecosystem preservation, maritime safety, renewable energy, public health, entrepreneurship, and culture, with support from international partners. It plays a strategic role in supporting its Member States through collective action that adds value, respects complementarity, and aligns with Sustainable Development Goals (SDGs).

Over its 35-year history, the IOC has expanded its scope beyond its Member States to include Eastern and Southern Africa, as well as island nations on Africa's western coast. Recognized for its expertise, the IOC continues to grow in political stature and global partnerships, welcoming observer members since 2016.

The IOC remains a pivotal force, guiding the collective action of a region vulnerable by nature yet ambitious by choice.

1.2 Port Security Programme

The IOC is implementing the regional PSP programme with funding from the European Union and technical support from the International Maritime Organization (IMO), the United Nations Office on Drugs and Crime (UNODC) and INTERPOL.

The programme is working closely with regional organisations (COMESA, EAC, SADC, APIOI, PMAESA), international organisations (CGPCS, EUNAVFOR, WCO), ongoing projects and programmes (MASE, CRIMSON, CRIMLEA), existing mechanisms (DCoC) and other key players in the field.

The result areas of the programme are: -

a) Enhanced capacity of shipping safety authorities in the ESA-IO region
b) Development of port security legislation and related compliance framework
c) Implementation of a regional information sharing mechanism and a cargo and passenger data exchange system

The programme focuses on key areas aimed at enhancing maritime security and efficiency. These include information sharing on maritime freight and passengers,

support for law enforcement and customs services and enhanced cargo control, surveillance, and seizure operations:

1.3 The Vessel Traffic Management Information System

The Vessel Traffic Management Information System (VTMIS) is a combination of Vessel Traffic Service (VTS) and Management Information System (MIS). VTMIS is not just an extension of the VTS, but an advanced integrated solution suitable for monitoring and surveillance purposes. The range of its functions, interfacing with sensors and system flexibility, integrated services for direct sharing of VTS data or access to certain subsystems makes it a highly efficient and configurable solution for small, medium sized and large ports and harbours.
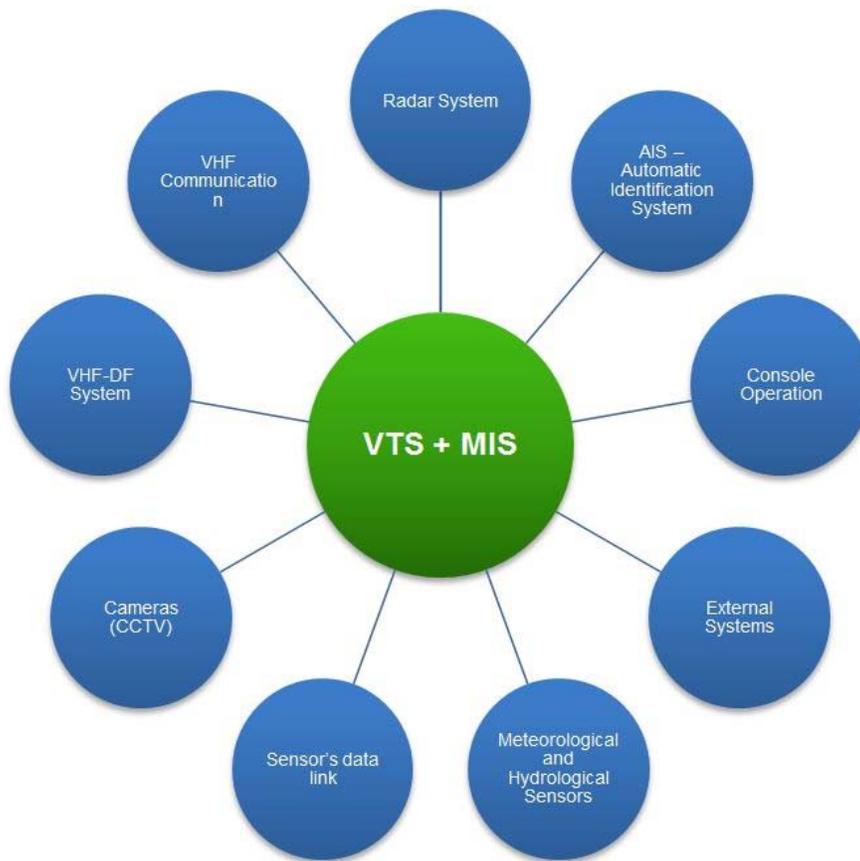
Diag. 1 – Subsystems of the integrated VTMIS solution

VTMIS interfaces and/or incorporates with other telematics resources to allow allied services and other interested agencies in the direct sharing of VTS data or access to certain subsystems in order to increase the effectiveness of port or maritime activity operations as a whole.

FUNCTIONAL COMPONENTS OF A SIMPLE VTMIS SETUP
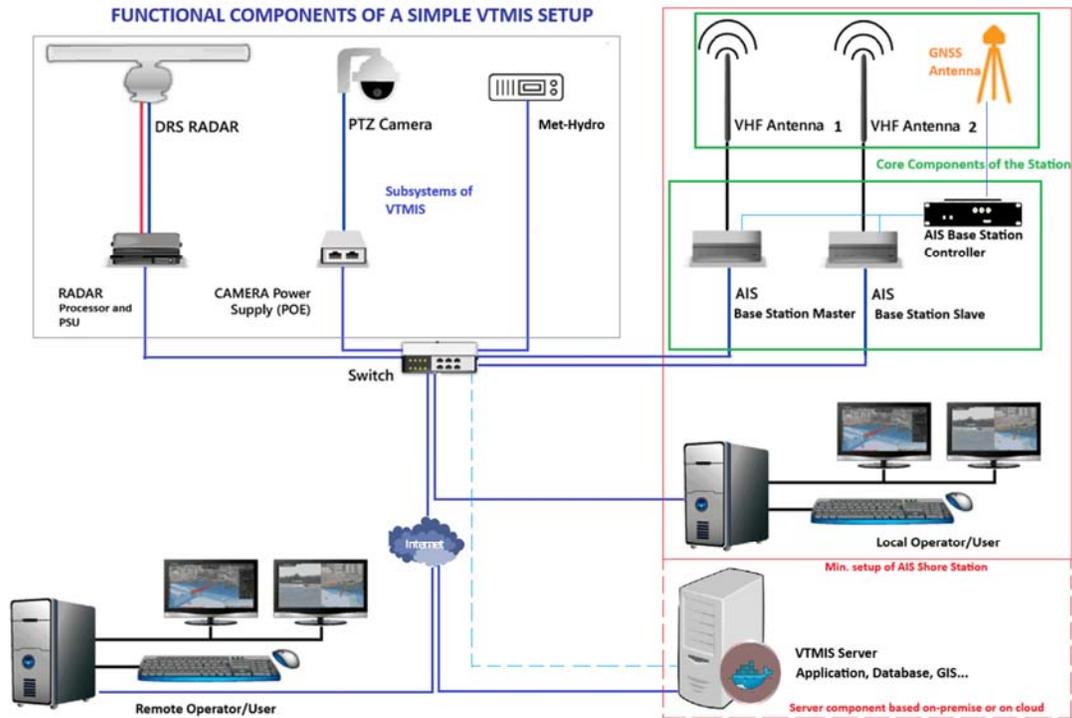
Diag. 2 – Components of a simple integrated VTMIS solution

The VTMIS solution comprises the following components: -

➢ AIS Shore Station, including base stations, base station controllers, antennas, connectivity equipment, and accessories.

➢ VTMIS application software along with the host IT infrastructure.

➢ Operators' consoles, consisting of workstations with consoles and wall-mounted large-format displays.

➢ Connectivity equipment such as switches, firewalls, and internet routers.

➢ Optional subsystems, including CCTV, coastal radar, and meteorological-hydrological sensors.

The implementation of a VTMIS solution aims to achieve several critical objectives. It enables the monitoring of all IMO regulations within the VTMIS area, along with the identification and tracking of vessels and other navigational objects. The system facilitates the efficient utilization of port infrastructure and enhances traffic control to improve overall traffic efficiency. Additionally, it supports the detection of illegal

activities, including terrorism, piracy, illegal immigration, illegal fishing, and smuggling, while also providing collision avoidance measures. The VTMIS solution assists in search and rescue operations and coastguard activities, ensures the storage of VTS data for administrative purposes and incident analysis, and contributes to environmental protection.

A VTMIS offers a range of essential features to its users, including support and control for radar, AIS, CCTV, RDF, and Meteorological Hydrological sensors. It enables multi-radar and multi-sensor (radar and AIS) tracking integration, as well as multi-AIS data filtering and integration. The system allows for manual or automatic target acquisition, identification, and drop, along with radar video presentation and AIS dynamic and static data display. It supports the transmission and reception of AIS text telegrams and provides target manoeuvre prediction, even in radar "shadow areas."

The system includes advanced zone configuration capabilities, such as traffic, guard, auto-acquisition, and responsibility zones, alongside comprehensive alarms management for navigation and sensor alerts. It features record and playback functionality, extensive chart capabilities with editing and S-57 support, and full diagnostics for the system and sensors.

Users or groups of users of the VTMIS can be from various departments, including: -

- ➢ Port Authorities
- ➢ Cargo Handling Authorities
- ➢ MRCC (Maritime Rescue Control Centre)
- ➢ Maritime Administration
- ➢ Coast Guard
- ➢ Customs and Immigration
- ➢ Fisheries Authorities
- ➢ Ship Agents

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.

1.4 AIS Shore Station

An Automatic Identification System (AIS) Shore Station, also referred to as a Physical Shore Station (PSS), is a vital terrestrial infrastructure within the global AIS network. These stations are designed to enhance maritime safety, situational awareness, and vessel monitoring by receiving, processing, and transmitting AIS data in real-time. By serving as a communication bridge between vessels and shore-based authorities, AIS Shore Stations enable the exchange of critical information, such as vessel identities, positions, courses, speeds, and other voyage-related data.
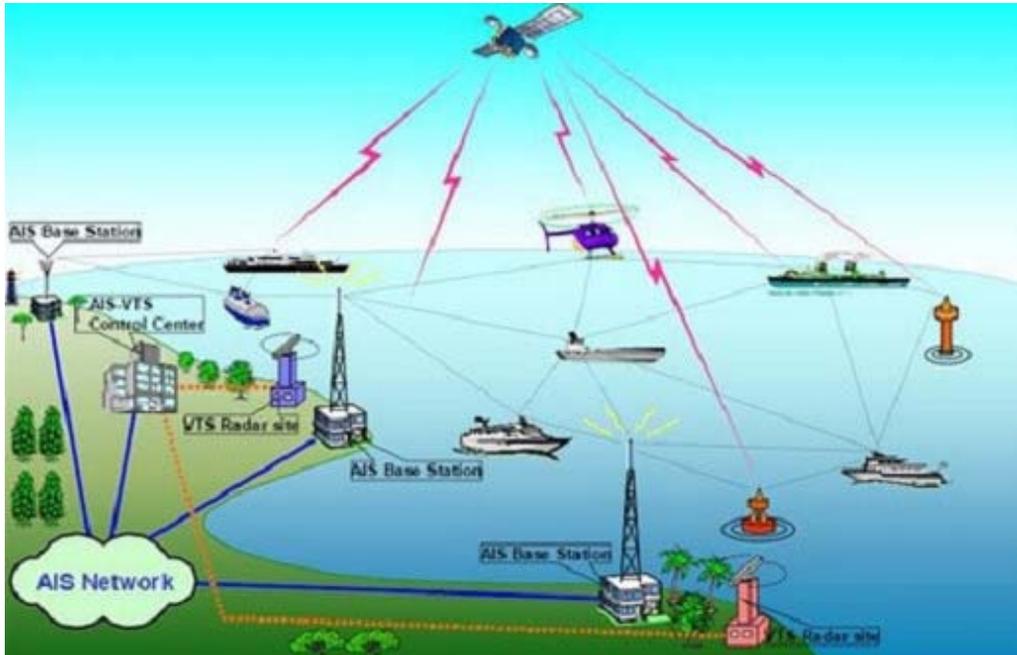
Diag. 2 – Illustration of vessel traffic management by networked AIS Shore Stations (Source: NATO)

Strategically installed along coastlines, ports, and key waterways, AIS Shore Stations play a crucial role in maritime traffic management. They contribute to the prevention of collisions, improve navigation safety, and assist in search-and-rescue (SAR) operations. Additionally, they support regulatory compliance and monitoring by providing authorities with accurate data for managing vessel activities within their jurisdictions.

AIS Shore Stations form the backbone of shore-based maritime monitoring systems, seamlessly integrating with Vessel Traffic Management Information Systems (VTMIS) and regional or global AIS networks. Their capabilities extend beyond safety, enabling data-driven decision-making, optimizing maritime operations, and bolstering security measures. These stations are indispensable for achieving a comprehensive maritime domain awareness framework, particularly in coastal regions with high traffic density or complex navigational challenges.

An AIS Shore Station must comply with and adhere to the following norms and standards: -

➢ The AIS standards set by the International Maritime Organization (IMO) and the International Telecommunication Union (ITU).

➢ Guidelines for AIS Base Station equipment as specified in IEC 62320-1.

As illustrated in Diagram 2 of Section 1.3 above, the core components of an AIS Shore Station are as follows:

➢ AIS Base Station Controller: This is the primary equipment of the station, responsible for controlling the operation of AIS base stations, managing

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redundancy, and enabling networking. It supports the integration of multiple AIS Shore Stations.

- ➢ AIS Base Stations: These are deployed in pairs (master and slave) to ensure high availability and redundancy. Each AIS Base Station connects to a VHF antenna to receive and send AIS messages.

- ➢ Antennas: Two VHF antennas are connected to each AIS Base Station, along with one GNSS antenna connected to the AIS Base Station Controller.

- ➢ Connectivity Equipment: Includes switches and a firewall to support network communication.

- ➢ Uninterruptible Power Supply (UPS): Provides backup power to ensure continuous operation.

2.0 Technical Specifications for AIS Shore Station

2.1 AIS Base Station Controller

This is the primary equipment of the station, responsible for controlling the operation of AIS base stations, managing redundancy, and enabling networking. It supports the integration of multiple AIS Shore Stations.

The minimum technical specifications of the AIS Base Station Controller are as follows: -

No.	Specifications	Specifications required
1	Equipment format	1U, 19" rack mountable.
2	Relative humidity	95% @ +25° C to +55° C or better
3	Power	115/220 V AC and 18 to 48 V DC input
4	GNSS receiver	Receiver: 72 channels, up to 3 concurrent GNSS (GPS, Galileo, GLONASS, BeiDou) Horizontal position accuracy (CEP, 50%): 2.5m - GPS / GLONASS+GPS
5	Ports & Interfaces	Ethernet: 2 x RJ45 Serial ports: Up to 5 ports, each port is configurable as: ➢ RS-232 DTE (DB9 male) ➢ RS-422 (DB9 female) ➢ USB type B Maintenance ports: 1 x RJ12 Others: To be specified by Bidder.

6	Robustness	The equipment must be of military-grade quality, incorporating solid-state technology, a fan-less design, and instant-on functionality, among other advanced features.
7	Device Management	The equipment must include a Web User Interface (WUI) that facilitates configuration and monitoring of both the device itself and the connected AIS Base Station units. Additionally, the WUI must provide an option for firmware upgrades.
8	Processing AIS Messages	The system must support AIS data acquisition and transmission via serial or Ethernet ports. It should enable the configuration of data forwarding for each port type through the application of filters, including down-sampling, ITU message ID types, area, MMSI, ship type, and repeat indicator filters. AIS data exchange must occur in near real-time, with typical delay times significantly below one second.
9	Data Storage	The device must be equipped with a 32GB memory card to ensure persistent local AIS data storage, preventing data loss during temporary disruptions in the connection to the VTMIS centre. Once the communication link is restored, the offline-stored data will be automatically transmitted to the VTMIS centre.
10	AIS Base Stations management	The system must support remote configuration and management of AIS Base Stations, allowing for the configuration of parameters such as ID (MMSI, Unique ID, Name), FATDMA schedules and allocations, and device processing and output settings (VSI and FSR sentence configurations).

All real-time data communications must adhere to the standard IEC 61162 protocol. Additionally, IEC 62320-1 comment block extensions and NMEA 0183 TAG blocks must be supported, ensuring a standardized and efficient approach for addressing data users and devices, as well as attaching timestamps to AIS data.

The system must support the RTCM protocol, enabling the routing of DGNSS corrections to connected AIS stations from both local and remote DGNSS reference stations |
11	Alarms and Status	The system must include dedicated modules for monitoring the status and detecting alarms generated by the internal circuitry and connected Base Stations. Alarm and status information must be accessible and manageable through the Web User Interface (WUI). Additionally, the system must feature an SNMP agent to enable remote centralized monitoring.
12	Warranty	3 Years
13	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above.

2.2 AIS Base Station

This equipment is a core element of the shore station that operates on the VHF maritime band. It receives AIS signals transmitted by vessels, such as static (Name, Call Sign, MMSI and IMO Number), voyage-related, and dynamic information. It transmits messages to vessels, including navigational warnings, weather updates, and traffic coordination instructions.

For high availability and redundancy, 2 AIS Base Stations are deployed as a pair of redundant equipment.

The minimum technical specifications of the AIS Base Station are as follows: -

No.	Specifications	Specifications required
1	Form factor	2U, 19" rack mountable.
2	Relative humidity	95% @ +25° C to +55° C or better
3	Power	115/220 V AC and 24 V DC input
4	VHF transceiver	Frequency Band: 155 to 163 MHz Channel width or Bandwidth: 25 kHz RF Power output: 2 or 12.5 W Modulation: GMSK-FSK/FM Bit rate: 9600 bps (AIS), 1200 bps (DSC) Sensitivity: < -112 dBm @ 20% PER
5	GNSS receiver	Receiver: Differential GPS, 16 channel Accuracy (2D): 5 m (95%) – GPS; 1.5 m (95%) - DGPS
6	Ports & Interfaces	Bidirectional: 4 x IEC 61162-2 / RS-422; 1 x RS-232 Input: 3 x IEC 61162-1 / 2; 1 x ITU 823-2; 1 x PPS input pin; 1 x TX INHIBIT input pin Output: 1 x ITU 823-2 / IEC 61162-1 / 2; 1 x Alarm relay; 1 x PPS output pin; 1 x BIIT output pin RF: 1 x BNC for VHF antenna; 1 x TNC for GPS antenna; 1 x SMA for VHF Rx ant. (opt.)
7	Modes of operations supported	Dependent: Yes Independent: Yes RATDMA: Yes
8	Transmission Security	Encryption algorithms: AES, Blowfish, Custom Binary encapsulation: 8 or 25, 26 Support for external encoder: Yes Separate channel for secure AIS transmission: Yes
9	Positional data & Time	GPS output port: Yes DGNSS corrections output port (RTCM): Yes DGNSS corrections dedicated input port (RTCM): Yes External synchronization supported: Yes Fallback algorithms for time synchronization: Yes External position sensor supported: Yes Fallback algorithms for position sensor: Yes
10	ITU-R M.1371 messages	Base Station report (Msg. 4): Yes DGNSS corrections (Msg. 17): Yes Data link management (Msg. 20): Yes Channel management (Msg. 22): Yes Group assignment (Msg. 23): Yes Station name (Message 24A): Yes
11	Processing capacity	FATDMA message queue: Up to 100 messages RATDMA message queue: Up to 100 messages

		AIS internal directory: 2048 remote stations Frame Summary Report (FSR): Yes, configurable Slots with valid transmissions: Yes Slots with CRC errors: Yes Slots with strong signal: Yes Average noise level: Yes VDL Signal Information (VSI): Yes, configurable RSSI: Yes TDMA slot number: Yes Time of Arrival: Yes, accuracy < 50 μs
12	Device Management	The device must support configuration and management through an embedded web server.
13	Extended Capabilities by integration with external controller	Connectivity: Ethernet, USB, Wi-Fi, GSM/GPRS connectivity, TCP/SSL communications; Management: SNMP, NTP, embedded HTTP Web Server; Storage: local AIS data storage.
14	Compliance to Standards	The device must comply to at least the following: - - IMO MSC.74(69) Annex 3; - IEC 62320-1, edition 1.1 or newer editions; - IEC 60950, edition 2 or newer editions; - ITU-R M. 1371-4, or newer editions; - ITU-R M. 1084-4, or newer editions; - IEC 61162-1, edition 4.0, and IEC 61162-2, edition 1.0, or newer editions. Certificates must be included in the technical offer.
15	Warranty	3 Years
16	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above

2.3 Antenna System

The antenna system for the AIS Shore Station comprises two high-gain VHF antennas and one GNSS antenna. These antennas will be installed on rooftops or elevated structures to optimize coverage and reduce interference. The coverage area is expected to extend up to 40 nautical miles, depending on factors such as terrain, antenna height, and environmental conditions.

2.3.1 VHF Antenna

The minimum technical specifications of the VHF antenna are as follows: -

No.	Specifications	Specifications required
1	Type	Whip
2	Frequency Range	146-163 MHz
3	SWR	≤ 1.5 in the specific frequency band
4	Impedance	50 Ω
5	Max RF power	100 W
6	Polarization	Vertical
7	Gain	0 dB Half Wave Dipole

8	Input Connector	N-type
9	Wind Resistance	Resistant to gusts of wind with speeds of at least 150 km/h
10	Height	Max 2 m, depending on the proposed model.
11	Weight	Max 5 Kg, depending on the proposed model.
12	Accessories for installation and fixation	Mounting brackets, provision of at least 50m RF cable from rooftop to the location of the AIS base station, connectors, surge protectors, and other sundries required should be provided.
13	Warranty	3 Years
14	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above

2.3.2 GNSS Antenna

The minimum technical specifications of the GNSS antenna are as follows: -

No.	Specifications	Specifications required
1	Type	Active Antenna with built-in LNA with either TNC of F Connector
2	Constellations Supported	GPS, GLONASS, GALILEO and BEIDOU
3	Protection	Connector ground terminal must be isolated from the mounting hardware by means of galvanic isolation.
4	Operating temperature range	-40°C to 90°C
5	Power	3 V - 5 V supply voltage DC Supply through RF
6	Frequency Range	1561 to 1602 MHz
7	Impedance	50 Ω
8	Low Noise Amplifier (LNA)	Gain: > 29 dB ± 3 dB; Noise Figure: < 3.5 dB
9	Azimuth coverage	360° Omni-directional
10	Wind Resistance	Resistant to gusts of wind with speeds of at least 150 km/h
11	Accessories for installation and fixation	Mounting brackets, provision of at least 50m RF cable from rooftop to the location of the AIS base station, connectors, surge protectors, and other sundries required should be provided.
12	Warranty	3 Years
13	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above

2.4 Uninterruptible Power Supply

The Uninterruptible Power Supply (UPS) is a vital component, providing stable and reliable power to the AIS Shore Station equipment and, where applicable, supporting the ICT infrastructure of the VTMIS system (not included in this tender). The UPS is

required to supply continuous power during outages, safeguard against power surges, and protect all sensitive equipment connected to it from electrical fluctuations.

The ICT infrastructure of the VTMIS system (not included in this tender) comprises the following rack-mountable equipment: one server, one server console, one standalone tape drive, one switch, and one firewall. The combined power requirements of this equipment will not exceed 3.5KVA.

The UPS must have a minimum capacity of 6 KVA, providing sufficient runtime to maintain operations until backup generators are activated. This ensures uninterrupted functionality and seamless operation of the VTMIS/AIS systems, which are critical to supporting maritime activities.

The minimum technical specifications of the UPS are as follows: -

No.	Specifications	Specifications required
1	Form Factor	19" Rack Mountable
2	Type	Online UPS
3	Power Rating	At least 6 KVA Conversion
4	Efficiency	Double Conversion Mode: 95% Eco Mode: 98%
5	Power Factor	>0.98
6	Rated Input Voltage	220/230/240V
7	Certification/Compliance	Safety IEC EN 62040-1; EMC IEC EN 62040-2; RoHS compliant; Classification in accordance with IEC 62040-3.
8	Accessories	Fixation kit for rack mounting must be included Input Power Cords, Output connection to rack PDU's, Manuals, and any other required cables.
9	Warranty	3 Years
10	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above.

2.5 Rack

All components of the AIS Shore Station must be fitted in a rack with the following minimum specifications: -

No.	Specifications	Specifications required
1	Dimensions	42U Equipment Rack Height x Depth x Width: 203 x 107 x 60 cm
2	Colour	Carbonite or Dark Grey or Black with matt finish
3	Doors	Perforated finish for both front and rear doors for better air flow
4	Side Panels	Removable panels
5	Security	Front and rear doors with handles and locks

6	Accessories	Cable management, Rack stabilizer, baying, grounding kit, Power distribution bars, Cooling fans.
7	Compliance	EIA-310D, RoHS, TAA
8	Warranty	3 Years
9	Others	A technical brochure for the proposed equipment model and type must be provided. The brochure should clearly demonstrate compliance with all the specified requirements outlined above.

In addition to housing the equipment procured under this contract, the rack will also accommodate the VTMIS IT infrastructure, including servers, a KVM switch, a console, and a UPS system, which will be procured under a separate tender exercise.

3.0 Quantities & Delivery

The AIS Shore Station will be deployed in 6 locations throughout the ESA-IO region as follows: -

No.	Country	Installation Site
1	Kenya	Kenya Port Authority, Port of Mombassa
2	Madagascar	Capitainerie du Port-SPAT, Port of Tamatave
3	Mauritius	National Coast Guard, Port Louis
4	Mozambique	Maritime Rescue Coordination Centre, Port of Maputo
5	Seychelles	National Coast Guard, Mahé
6	Tanzania	Tanzania Port Authority, Information Sharing Centre, Port of Dar-Es-Salaam

The quantities required per beneficiary country for each of the requested items are summarised in the table below: -

No.	Item Description	Total Qty	Remarks
1	AIS Base Station Controller	6	1 unit per each beneficiary country
2	AIS Base Station	12	2 units per each beneficiary country
3	VHF Antenna	12	2 units per each beneficiary country
4	GNSS Antenna	6	1 unit per each beneficiary country
5	Rack	6	1 unit per each beneficiary country
6	UPS	6	1 unit per each beneficiary country

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 VTMIS 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.

4.0 Installation & Commissioning

4.1 Physical installation

This project is a turnkey solution, requiring that the AIS Shore Station becomes fully operational upon the installation and configuration of all delivered equipment at each site. The installation sites are located at the main commercial port as indicated in Section 3 above.

All equipment, including the AIS Base Station, Base Station Controller, Antenna, and UPS, must be unpacked and installed in their designated locations. The 42U equipment rack should be assembled and positioned in the designated equipment room. The AIS Base Station, AIS Base Station Controller, UPS, and other accessories should be securely mounted in the equipment rack, while the Antenna should be installed on a rooftop or another suitable elevated location to ensure optimal signal coverage. Cable laying should be carried out according to the equipment connection plan. The installation must adhere to best practices to ensure the secure, reliable, and long-term operation of the system.

Bidders are required to provide a detailed project implementation plan for the operationalisation of the station. Any risks foreseen and their mitigation strategy should be detailed.

The successful tenderer will be provided with the following: -

- ➤ A designated space within an equipment room (computer room) for the installation of the equipment rack. The exact location within the building will be determined during the site survey, which will take place after the contract award. Please note that the equipment room may be located on an upper floor without elevator access. The space will be air-conditioned, and an industrial-grade electrical power outlet will be provided near the designated equipment rack area.
- ➤ A designated rooftop space at the installation site will be provided for mounting the VHF and GNSS antennas. The antenna installation will involve only the fixation of the installation kits to the roof, with no civil works or elevated platform construction required.
- ➤ Cable trays (internal and/or external), conduits and cable entry points from antennas to equipment room will be provided to the successful tenderer. The cabling work required will be limited to laying the cables within the provided trays and conduits.
- ➤ A functional internet connection provided by a local Internet Service Provider (ISP), with the modem or similar equipment installed within the equipment rack.

4.2 Connection and configuration of equipment

Following to the physical installation works, the following minimum tasks must be fulfilled: -

- Connection UPS to main electrical supply, testing and verification;
- Connection of AIS Base Stations to the VHF Antennas and configuration for reception and transmission of AIS Messages;
- Connection of AIS Base Station Controller to the AIS Base Stations and GNSS Antenna;
- Configuration of the AIS Base Station Controller and creation of the local AIS Network;
- Testing and verification of reception/transmission of AIS Messages
- Testing and verification of communications with vessels by means of text messages/audio alarms.
- Any other tasks required for project completion.

4.3 Commissioning, Acceptance and Warranty

After the successful installation and configuration of the AIS Shore Station, the system will undergo a formal commissioning process. This process will include the verification and assessment of the system's functionality, performance, and compliance with the project requirements to ensure it meets the agreed-upon specifications and objectives.

Upon successful commissioning, system acceptance reports will be jointly signed as part of the project completion process.

The warranty will take effect from the date of system acceptance. The submission of a warranty certificate for each item is mandatory at project completion.

Bidders are required to provide a model of their warranty agreement as part of their proposal, clearly specifying the coverage details, including parts, labour, transport, and other applicable terms, for the requested warranty period.

5.0 System Training

As part of the project deliverables, comprehensive training on the AIS Shore Station must be provided to the designated personnel. The training program should ensure that operators, technicians, and administrators acquire the necessary skills to effectively operate, manage, and maintain the AIS Shore Station.

Bidders must submit detailed training plans as part of their proposal, including schedules, training methodologies, and comprehensive course content. These plans should ensure flexibility to accommodate the specific needs of each installation site.

The training should cover the following aspects: -

(i)   System Overview: Introduction to the AIS Shore Station, its components, and overall functionality.
(ii) Operational Training: Step-by-step guidance on system operation, including monitoring, data management, and use of the Web User Interface (WUI).

(iii) Configuration and Management: Instructions on configuring system settings, managing network connections, and performing regular updates.

(iv) Maintenance Training: Procedures for routine maintenance, troubleshooting common issues, and managing system diagnostics.

The training sessions must include both theoretical instruction and practical demonstrations, allowing participants to gain hands-on experience. A detailed training manual and other necessary documentation should be provided to all trainees.

The training can be conducted on-site or online for each installation location. The sessions should be tailored to meet the specific needs of the operating environment. A training schedule will be developed in consultation with the client to ensure the availability of the designated personnel.

Upon completion of the training program, participants will receive certificates confirming their successful participation and readiness to operate and maintain the AIS Shore Station.

6.0 Maintenance Service

All items requested in this tender form part of a mission-critical system that requires an availability rate of over 95% throughout the year. In addition to the standard warranty services provided for the hardware items delivered, a guaranteed service agreement will be established with the successful bidder to ensure optimal performance and minimize downtime. The service agreement must guarantee the following: -

- A response time of no more than one hour from the time the fault is reported.
- On-site visit by a qualified engineer for troubleshooting within hours of the fault report.
- Replacement of critical faulty parts or equipment on the same business day.
- Replacement of non-critical parts or equipment on the next working day following the fault report.
- Availability of on-call engineer(s) on a 24/7/365 basis to ensure immediate support.

Bidders are required to provide a model of their service level agreement (SLA) as part of their proposal. This agreement must detail the scope of support, response

times, and other relevant service terms to meet the critical maintenance needs of the system.