IOTC-2025-CoC22-11_Add3 - IOTC VMS Pilot Project Key decisions

Indian Ocean Tuna Commission (IOTC) VMS Pilot project - K*ey specifications and key decisions*.

24 March 2025

The VMSWG08 requested two tasks:

27. The VMSWG08 REQUESTED the Consultant with the assistance of the Secretariat, to draft a list of specifications for the regional VMS, for consideration at the next VMSWG. The list of specifications will be presented as an annex of the final Consultant reports.

28. The VMSWG08 REQUESTED the Consultant with the assistance of the Secretariat, to compile and provide all decision points that may require validation by the Commission within the two reports, for CoC22. The list of decisions will be presented as an annex of the final Consultant reports.

The lists can be consulted in the final reports of the VMS consultant:

IOTC-2025-VMS Pilot Project-02_Rev1 - Final Consultant Report - Implementation Plan of the IOTC VMS Pilot Project

IOTC-2025-VMS Pilot Project-01_Rev1 - Final Consultant Report - Proposal, Design and Requirements of the IOTC VMS Pilot Project

The list of specifications and the list of decisions are reproduced below:

Decision Points requiring Commission Validation

Decision Points Requiring Commission Validation	Description
1. Amendments to IOTC Resolutions	
Amendment of Resolution 12/02	Strengthening VMS data security and confidentiality provisions, defining data-sharing protocols for volunteer CPCs.
Amendment of Resolution 15/02	Authorization to receive Flag State VMS data either directly or indirectly.
Amendment of Resolution 15/03	Mandating each CPC to forward required VMS information to the Secretariat and Coastal States when vessels operate in their waters, through direct or indirect means.
2. Governance and Regulatory Framework	
Approval of the Information Sharing Agreement (ISA)	Agreement between the IOTC Secretariat and volunteer CPCs for VMS data sharing.
Finalization and signing of MoUs and NDAs	Ensuring the transmission and protection of VMS data.
Establishment of the IOTC VMS Implementation Steering Committee	Committee responsible for monitoring and evaluating the pilot project.
3. CPC Engagement and Vessel Sample	
Validation of volunteer CPCs for the pilot project	Australia, Seychelles, Philippines.
Validation of the scope of the project	refer to final report Proposal Design and Requirements IOTC VMS pilot project-*Table 3: IOTC resolution 15/03 and its proposed amendments breakdown.*
4. Project Budget	
Approval of the pilot project budget	Includes costs for cloud infrastructure, system integration, maintenance services, VMS communication (e.g., estimated at 0.07 USD per VMS position), and dedicated human resources (VMS system operator and compliance supervision).
5. Data Security and Sharing	
Validation of VMS data access criteria	Defining access levels for different stakeholders (Secretariat, Flag States, Coastal States...).
Validation of data-sharing protocols	Ensuring secure exchange of VMS data with authorized stakeholders.

IOTC VMS PILOT: Technical Specifications

No.	Requirement Description	Level of requirement	Compliance Y/N	Reference to Technical Specification / Supporting Details
DATA COLLECTION AND TRANSMISSION				
1	The VMS system shall support dual reporting methods: "**shared decentralized**" receiving data from National VMS systems and "**Partially centralized**" receiving data directly from the Mobile Communication Service Providers (**MCSPs**).	Mandatory		

2	The VMS system shall receive in real-time and store in its Database the Dynamic Positioning Data transmitted either by Third Systems (National VMS connected to the Pilot VMS platform) or directly by Mobile Transmitter Unit (**MTU**) via the Mobile Communication Service Provider (MSCP) and containing at least following information (Note that some information is provided by either shared decentralized or partially centralized option only.):
	• **Message type** (Regular report, Manual report, event generated report, Response to poll report).
	• **Country Code / Flag State**.
	• **MTU ID**: ID of the VMS Transceiver.
	• **Vessel ID** (e.g. Radio Call Sign).
	• **Latitude and Longitude** coordinates in decimal
	• **Speed (in knots) and Course (in degrees)**.
	• **Date & Time in UTC of the position fix**.
	• **Event codes**: when the MTU enables it, the following event codes shall be received and treated by the VMS system:
	  ○ Power UP/DOWN.
	  ○ Antenna obstructed
	  ○ Intrusion/tampering detection
		Mandatory		

	○ Entry/exit zone			
3	In order to ensure high interoperability, the VMS system must support the following data formats (**NAF, XML, JSON, CSV**) using secure exchange protocols (**HTTPS, RESTful Apis, SOAP v1.2 with two-way SSL**).	**Mandatory**		
4	The system shall enable the creation, management and importation of vessels, groups of vessels and geographic objects (zones and annotations) and store it directly into the system database.	**Mandatory**		
5	The VMS system shall be capable of storing the Vessel Declarative data fields based on the IOTC Record of Authorised Vessels in a relational database (**refer to appendix C. IOTC Record of Authorised Vessels data fields**). The bidder must precise which data field is supported and which is not. [(1)]	**Highly Desirable**		
6	The system shall support the automatic migration of vessel registry declarative data from the IOTC RAV file into the system database during the installation and configuration phase.	**Highly Desirable**		
7	Additional Declarative data to be filled in the VMS system Database should be considered by the System Provider (**refer to appendix D. Additional Declarative dataset**).	**Optional**		
8	The VMS system Database must associate the Dynamic Positioning Data retrieved automatically with the Declarative Dataset filled in the system database.	**Mandatory**		
9	The VMS system must offer the possibility from its User Interface to insert manual position into the database in case of a failure of MTU communication.	**Mandatory**		
10	Manual import of VMS dataset must be supported by the VMS system (in CSV format).	**Mandatory**		

11	The VMS system shall enable data extract in CSV format for the Dynamic Positioning Data (VMS data)	Mandatory		
12	According to the Partially centralized reporting method, The VMS system shall be able to poll MTUs by sending commands (when MTU device enables to do so) directly to the MCSP.	Mandatory		
DATA PROCESSING AND ANALYTICS				
13	Data consistency automatic check mechanisms are critical to ensure the reliability and integrity of Dynamic Positioning Data received and processed by the VMS system. Consequently, the system shall perform automated integrity checks including: • Positional data range validation for: o Latitude data value to be between – 90° and + 90° o Longitude data value -180° and + 180° o Speed value within 0-100 knots o Course value within 0° and 360°	Highly Desirable		
14	The system shall detect anomalies such as duplicate records, unknown vessel data, and incomplete or inconsistent data points (**e.g. timestamp, vessel ID, geolocation coordinates…**) or incorrect formats.	Highly Desirable		
15	The system must provide User/operator alerts such as: • MTU Technical alerts (**Power Up/down, GNSS Signal Lost, Antenna Blockage/obstructed, Tampering/intrusion detection**). • Geofencing Alerts (**Entering/exiting area, Speed in Zone).** Position Report Overdue & Report too often.	Mandatory		
16	The system must provide alarms such as: • Unknown reporting Vessel.	Highly Desirable		

	• Data Consistency Alarm. VMS data Distribution with third systems crashed down alarm (to monitor two-way data exchange with third systems.			
17	The system shall offer following Alert settings: • Alerts can be shared with other user/operators • Alerts can be classified by level of severity (Emergency, only for guidance…). • Alerts can be configured according to seasonality period (active/inactive periods). Alert triggered can be notified by email to recipients with possibility to add a message in the notification.	Highly Desirable		
18	The system shall offer Reporting and Visualization insights as follow: • All Alerts raised shall be visualized in a Dashboard from where the operator will consult and treat these alerts with possibility to close it afterwards. • Alert Report exports shall be available (e.g. Excel) for operational reviews.	Highly Desirable		
USER INTERFACE				
19	Cross-Platform Web-based Interface: • The system shall provide a fully responsive web-based Interface, designed to ensure seamless access and optimal performance across both desktop and mobile devices. • The web-based Interface shall be compatible with modern web browsers, including Google Chrome, Mozilla Firefox, and Microsoft Edge.	Mandatory		

	It must Support concurrent access by multiple users, ensuring real-time updates and operational consistency.			
20	The system must provide, on an interactive Map interface following VMS Data Visualization features: • Display of vessel trajectories for real-time monitoring and historical analysis. • Display last positional data as icons on navigational charts. • Display vessel labels together with the positional data. • Display trajectories with color-coding based on speed. • Arrow indicators to highlight direction of vessels. • Dynamic clustering of vessels icons feature for improved visualization at different zoom levels.	Mandatory		
21	The system shall offer the following Basic tools: • Include options to zoom in/out and pan across charts. • Measurement tool to calculate distances on the map. • Enable a Full screen option for the map display • Support simultaneous display of map windows to support comparative analysis.	Mandatory		
22	The system shall allow filtering and display of data according to: • Date ranges (e.g., last X days, between two dates). • Vessel or group of vessels. • Vessel speed. • Zones.	Mandatory		

23	The system will be able to provide the following advanced tools: • Estimated Time Arrival (ETA) Calculation: o Estimate arrival times based on vessel positions, speed, and course directly drawn on the map. • Tracking Replay: o Replay vessel trajectories for historical analysis and compliance reviews. o Density Maps (heatmaps): Visualize vessel presence density on the map over a specified timeframe.	Optional		
24	The system allow users to customize vessels and vessel group icons and style, as well as vessel trajectories.	Highly Desirable		
25	Map and Layer Management. These specifications below are the minimum requirements needed for monitoring Vessel activities within the IOTC area of competence: • Display data marine charts (e.g. C-map) covering waters under IOTC governance. (FAO statistical areas 51 and 57) • Base maps with global and regional overviews. • Comply with WGS84 geodetic standards for positional accuracy. • Incorporate additional layers like Open Street map and Google maps. • Include layers for day/night limits, date and time and graticule grids.	Mandatory		
26	Geographical Objects (GO) Management: • Create and manage geographical objects interactively:	Highly Desirable		

	○ By drawing directly on the map using Line, Circle and polygons tools. ○ Entering positions and parameters directly in a management interface. ○ Importing predefined geographic areas in formats such as Shapefiles • Integrate GO with Alerts to monitor vessel movements and compliance. • Enable operators to share the GO creation with other Users.			
27	EEZ and boundaries: • The VMS system provider shall import and define in the map interface all IOTC CPCs EEZ.	Mandatory		
28	Remote Access to Web-based Interface: • **The Remote Web Interface** shall support real-time and secure access to the VMS Pilot system • **The web interface** will use HTTPS for secure access to the VMS system. • Authentication mechanism (Login/password as a minimum) to be provided by the VMS Pilot Platform to authenticate users and preserve Data confidentiality. • Automatic logout and Password change requirements after a certain period of time to enhance Data security access.	Mandatory		
29	Role-based Accounts. • The VMS system shall support the creation of role-based accounts with predefined roles, including Administrator, Operator and Viewer. • Data access right restrictions shall be available according to the following criteria: ○ By vessel, fleet, CPC Flag	Mandatory		

	○ By area (EEZ, specific zone) ○ By time range			
VMS DATA EXCHANGE AND AUDIT				
30	The system shall provide APIs (RESTful APIs and SOAP v1.2 with Two-Way SSL) to enable real-time data exchange with external systems, supporting NAF, JSON and XML formats for interoperability.	Mandatory		
31	The system shall use secure communication protocols, including HTTPS (POST/GET), for real-time or near real-time data exchange.	Mandatory		
32	The system shall handle standardized data formats, including NAF, XML, FLUX P1007, JSON, and CSV, for seamless integration and compatibility.	Mandatory		
33	The system shall provide role-based filtering, allowing tailored data access for stakeholders (e.g., flag states, CPCs, RFMOs) based on vessels, fleets, zones (e.g., EEZs), and timeframes.	Mandatory		
34	The system shall implement strong encryption (TLS 1.3) for all transmissions, with TLS 1.2 fallback for legacy systems.	Mandatory		
35	The system shall maintain audit trails by logging all data exchanges and deliveries for accountability and monitoring purposes.	Highly Desirable		
36	The system shall include a login/logout audit tool to trace user account usage for enhanced security and accountability.	Mandatory		
37	The system shall maintain audit trails for all modifications to vessels declarative data inputs in the database.	Optional		
TECHNICAL SPECIFICATIONS AND SYSTEM PERFORMANCE				

38	In order to provide cost-effectiveness, operational efficiency and scalability, the system shall adopt a cloud-based architecture.	Mandatory		
39	The cloud environment shall include automated backups with disaster recovery capabilities.	Mandatory		
40	The system shall handle a minimum of 100,000 transactions per day, support at least 100 concurrent users, and maintain data transmission latency under 5 minutes.	Mandatory		
41	The database shall support storage for at least 1,000 vessels during the pilot phase, with scalability to handle 10 times more vessels post-pilot.	Highly Desirable		
42	The system hosting architecture shall include a high-availability database cluster with multi-zone deployment and failover mechanisms to ensure data redundancy.	Mandatory		
43	Data retention and archiving shall be supported for all the duration of the pilot i.e. a minimum of 2 years.	Mandatory		
44	All data transmissions and storage shall comply with international standards (e.g., ISO 27001, GDPR) to ensure data security and privacy.	Highly Desirable		
45	The system shall maintain an availability rate of 99.5% to ensure continuous and reliable operation during the pilot phase.	Highly Desirable		
TRAINING AND DOCUMENTATION				
46	The VMS system implementation shall include tailored training programs for IOTC Secretariat (Administrator), VMS operators, and Volunteer CPCs (those who will participate to the pilot project) [(1)] based on their roles.	Mandatory		
47	Training components shall include:	Mandatory		

	• A general system overview session for all user profile (Admin/operator/Viewer) and for guidance for any other stakeholder which doesn't have direct action on the system: o General Overview of the System Components. o DataFlow. o Data sharing Protocol. (2) • A technical / administrator training session: o Technical support. o Initial set-up and Configuration. o Data Distribution connection and settings. o Role-based account Creation and management. o User role-based permissions. o Troubleshooting. • User Training session: o VMS Software usage for day-to-day operation. o User Interface features. o Software features and functionalities.			
48	Training materials shall include as a minimum user manual, quick start guide and training presentation available in both English and French.	Mandatory		
49	Training delivery methods shall include online webinars (e.g. for Volunteer CPCs) (3) and in-person workshops (for Administrator and Operators) including hands-on sessions.	Mandatory		

50	Post-training evaluations shall assess participant readiness and identify gaps, with feedback collected to refine future training programs.	Highly desirable		
51	Refresher training sessions shall be provided periodically to reinforce key concepts and address emerging challenges.	Highly desirable		
COMPANY PROFILE AND EXPERIENCE				
52	Vendor Business Profile and Reputability: The bidder shall provide a detailed company profile, including its legal name, corporate structure, years of experience and key customers.	Mandatory		
53	The vendor must demonstrate a proven track record in providing similar VMS/FMC related services by submitting at least three (3) customer references, including at least: • One (1) reference with a Regional Fisheries Management Organization (RFMO). • One (1) reference with an IOTC Contracting Party (CPC)	Mandatory		
54	The vendor shall provide evidence of **financial stability**, including audited financial statements for the last **three (3) fiscal years**.	Mandatory		