TECHNICAL AND COMPLIANCE COMMITTEE
Twentieth Regular Session
25 September to 1 October 2024
Pohnpei, Federated States of Micronesia (Hybrid)

ERandEM Cover Note and ERandEM IWG EM standards update 25-Sep

WCPFC-TCC20-2024-20_Rev1
26 September 2024

Submitted by ERandEM-IWG Chair

Dear ER and EM IWG participants:

Thank you for the very productive session on Tuesday. Your constructive engagement has allowed me to produce a further updated draft of the material which we worked through.

Two documents have been posted to the meeting website and these are described below. I also describe my proposed approach to continue our work here in Pohnpei.

ERandEM IWG EM standards update 25-Sep.docx (attached)

This contains updates on material previously contained in the SC20 paper based on feedback from IWG participants, specifically:

- Terms and definitions,
- Technical standards,
- Data requirements, and
- Reporting requirements.

I have used tracked changes from the material reviewed by the IWG, but I recommend that participants view the document without tracked changes and instead rely on the highlighted sections to focus their attention on the key changes or outstanding matters. I have made some changes to key definitions to attempt to address some of the major comments raised.

Proposed forward workplan for ER and EM IWG.docx (link)

This in a new paper that contains my initial thinking of tasks ahead of the IWG after the TCC meeting.

Meeting arrangements

Currently our next session is scheduled for 45 mins on Saturday so I propose to focus on the highlighted sections during the session and allow at least 5 minutes at the end to take comments on the proposed forward workplan.

Reporting back to TCC

Based on our progress in our next session I will then report back to the TCC on our progress under the TCC agenda item.

Again, many thanks for your hard work and please don't hesitate to reach out directly if you have any questions or concerns that you would like to raise before our next session.

Regards

Shelton Harley

ER and EM IWG Chair

~~Appendix 2: Glossary and technical Electronic Monitoring standards~~

~~Proposed Interim Standards, Specifications, and Procedures (SSPs)~~

~~This document addresses the following Standards, Specifications, and Procedures (SSPs):~~

~~SSP1a: On-board EM systems~~

~~SSP1b: EM hardware and software in Data Review Centres (DRCs)~~

Appendix 1: Terms and Definitions

Ancillary Logs - Data records from the EM system that are supplemental to the EM Records, such as a record of changes in system configurations and settings and a summary of system health checks performed.

Artificial Intelligence (AI) – A machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. Artificial intelligence systems use machine and human-based inputs to (A) perceive real and virtual environments; (B) abstract such perceptions into models through analysis in an automated manner; and (C) use model inference to formulate options for information or action.

~~**Cold Data Storage -** The storage of inactive data that is rarely used or accessed. Cold data storage takes longer to access but is generally much cheaper to store.~~

Control Centre - The EM control centre is a computer and software system that records and stores information from EM System components (e.g., video, sensor data, GPS data, system log data) and also controls the operation of onboard EM system components.

~~**Custodian** - A person or organisation designated by the EM records and EM data owner to manage authorization and storage of EM records and EM data. There may be a different custodian for records and data.~~

~~**Data Lake** - A storage repository that holds raw data in its native format until it is needed for analytics applications.~~

Data Records - Actual records or entries in a data file or database.

Data Review Centre (DRC) - A facility or entity with supporting software platform(s) used to analyse e-monitoring records and record e-monitoring data. This could be a standalone facility or a designated space within the premises of the fisheries administration.

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Designated Installer or Service Technician - A person or entity authorised by an EM Service Provider to install or service an EM System.

EM Analyst - A person qualified by the appropriate EM Programme provider to analyse e-monitoring records and record e-monitoring data in accordance with the EM standard and analysis procedures.

EM Analysis - See EM Records Analysis/Interpretation.

EM Analysis Rate - The proportion of e-monitored records that are analysed to produce EM data.~~-~~

EM Certifier - An individual or organisation which has been approved by the appropriate authority to inspect and approve e-monitoring systems for use.

EM Coverage -The proportion of vessels or fishing activities that are effectively covered by the EM Program. [Chair's comment: this definition is different to that used for Observer coverage and may be confusing with respect to CCMs obligations – more thought required]

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EM Data analysis - Data produced through analysis of e-monitoring records that conforms with the data standards specified in the SSPs.

EM data requirements – the minimum data fields that must be obtained from EM records and ancillary logs. These will be agreed by WCPFC. Note, for an interim period it is possible that not all EM data requirements will be mandatory.

~~**EM Data Quality Reviewer –** A EM Analyst who reviews EM Data to verify and validate information produced by the EM Analyst.~~

EM Programme - A process administered by one or a group of national fisheries regulator(s) that includes the use of EM systems on vessels to independently collect and verify fisheries data and information. This is different to the WCPFC EM Program.

EM Records - Footage (still images and video) and sensor data recorded by an EM System that can be analysed to produce EM Data. Sensors may include any number of sensors (e.g., hydraulic sensors) that are part of the EM equipment and whose data is recorded on the vessel as part of the EM system.

EM Records Analysis/Interpretation - The process of an EM Analyst reviewing EM records and converting them into EM Data.

EM Service Provider - A provider of EM technical and logistical services. An EM Programme may have multiple EM Service Providers and they may provide different services within the programme (e.g., onboard hardware, DRC software, DRC review services).

EM analysis software – any software used by an EM Analyst to support them in their role of EM Records Analysis/Interpretation. This software is often provided by the EM Service Provider and can include a range of features of tools that facilities the efficient and effective work of EM Analyst.

EM System - All the vessel and shore-based components supporting the generation, storage, transmissions, analysis and reporting of EM Records.

Event - An occurrence in the EM Records that is enumerated into EM data.

Fishing - as defined in WCPFC Convention Article 2(d)

Fishing Trip – The period between either (a) a vessel's departure from port after unloading part or all of the catch to transit to a fishing area, or (b) a vessel recommences fishing operations or transits to a fishing area after transshipping part or all of the catch at sea, and the time that the vessel either (c) returns to port to unload part or all of its catch, of (d) ceases fishing operations to tranship part or all of its catch at sea. ~~**Fishing Trip -** The collection of EM records from the time of a vessel's departure from port until the return to port. [Chair: For some large longline vessels 'port to port' could be many months].~~

Geolocation device - A device that is used to capture information on vessel position, speed, and heading.

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Independent - with respect to audits - no financial or current employment interest with the DRC

~~**Machine Learning (ML) -** A subset of AI that refers to the use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyse and draw inferences from patterns in data.~~

~~**Observer -** personnel who are trned under a common framework (WCPFC ROP and other accredited national or sub-regional programmes etc) to observe, collect, record and report on fishing activities both at sea and in port.~~

~~**Owner -** The CCM Member or entity that owns the EM Records and EM Data.~~

Regional Agency - A regional or sub-regional organisation that may support~~s~~ CCM national EM Program~~me~~s and EM Systems.

Review for Data Quality - The verification process of re-analysing/interpreting a portion of previously analysed EM records to determine completeness, adherence to protocols, and accuracy of the EM Data produced by the EM Analyst.

Sensors - EM systems may be equipped with a variety of integrated sensors that can provide additional information on fishing activity, trigger activation or adjustment of configurations of cameras, and identify points of interest to expedite EM video review. This may include "synthetic sensors" that use camera imagery used to capture imagery of fishing activities.

Uninterruptible power supply (UPS) - Provides power to the system and enables controlled shutdown in the event of a power loss so as to preserve the security and integrity of data ~~Provides power to the system and enables controlled shutdown in the event of a power loss~~[1].

User interface - A display that communicates EM system status messages and provides views of onboard cameras.

Vessel Monitoring Plan (VMP) - A document describing how an electronic monitoring system is specifically positioned and configured on a vessel (e.g. camera placement with images of camera views and types and locations of sensors) to allow effective monitoring of fishing activity and accurate generation of EM Data specified by the EM Program~~me~~.

Vessel Operator - any person who is in charge of, directs or controls a vessel, charterer and master.

~~**VMS -** systems employed to monitor the position of fishing vessels for the purpose of effective management of fisheries.~~

[1] CMM 2014-02 Annex 1 (5) "ALCs fitted to fishing vessels must be protected so as to preserve the security and integrity of data referred to in para 1."

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Appendix 2: Technical EM standards

~~SSP:~~ Onboard EM Systems

Onboard EM Systems comprise all vessel components supporting the acquisition of and reporting of EM Records. Onboard EM Systems shall be configured such that they allow collection of the data fields ~~information~~ set out in the ~~a relevant WCPFC agreed minimum~~ EM data ~~standards~~ requirements[2]. The core EM System components covered in these Specifications, Standards, and Procedures (SSPs) are: control centre, user interface, cameras, geolocation device, uninterruptible power supply, sensors, and communication system. Together, these components ensure that required information is collected, including system health status, to support fisheries management and enforcement objectives.

On-board EM System component	SSP
1. Control centre	The EM system control centre: a. MUST control all onboard EM hardware components. b. [~~MUST~~/SHOULD: JP- long trips] ~~MUST b~~be able to connect to the vessel's power source and sustain this power source throughout the duration of the fishing trip.~~]~~ c. MUST store and SHOULD transmit system health status information ~~(See System Health Status)~~. d. [~~MUST~~/SHOULD: JP- long trips] ~~MUST~~ have sufficient storage capacity for all EM Records required to be generated [during a fishing trip] until EM Records are transmitted to a DRC for review. e. [~~MUST~~/SHOULD: JP- long trips] ~~MUST~~ have sufficient backup storage to mitigate potential data loss. f. SHOULD have unambiguous and unique identification of storage devices (e.g., barcode on hard drives).

[2] ~~For example, such as in the current draft of the Data Collection Committee (DCC) Longline EM Minimum Data Fields Standards (NOV-2020), which may be revised in the future.~~

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On-board EM System component	SSP
	g. MUST allow EM records to be transmitted, stored or accessed surely. To secure EM records, the system SHOULD be equipped with applications such as user logins, EM record encryption and firewalls. h. SHOULD store all EM Records on storage devices and in formats that are compatible or can be readily translated into formats that are compatible with DRC hardware and EM review software.
2. User interface	The onboard user interface: a. MUST include a display on the vessel. b. MUST include software or hardware that shows EM system health status ~~(System Health Status)~~ and real time images from installed cameras on the display. c. MUST allow only authorised users (e.g., EM Service Providers, EM service technicians) to adjust system configurations. d. COULD Include a keyboard, mouse, touchscreen, or other device to allow user inputs to the system.
3. Cameras	a. An EM system MUST be outfitted with cameras to capture imagery of fishing activity. b. The number and position of cameras MUST be sufficient to capture necessary imagery to ~~collect, in~~ allow collection of the data fields set out in the EM data requirements ~~accordance with WCPFC measures~~. c. Cameras MUST, capture imagery that meets image quality standards under typical fishing conditions that allow for an EM Analyst to ~~extract all required data fields~~ collect the data fields set out in the EM data requirements ~~(subject to any conditions with respect to footnote 7 [6])~~. As a minimum standard[3] ~~[Chair: there was overwhelming feedback that these minimum standards for resolution etc. needs to be a MUST, however further discussion is needed to determine the appropriate values and this has implications across RFMOs]~~:

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[3] Other camera configurations (e.g. shutter speed, bitrate etc.) may vary to balance collection of adequate footage versus storage and transmission ~~needs~~costs

On-board EM System component	SSP
	1. Frame rate ~~[~~MUST~~/SHOULD]~~ be no lower than ~~[x/~~5 frames per second (fps) ~~fps]~~ for any imagery requiring identification of ~~catch or bycatch~~species; and 2. Resolution ~~[~~MUST~~/SHOULD]~~ be no lower than ~~[x/~~720p~~]~~ for any imagery requiring identification of ~~catch or bycatch~~species. ~~b. See also (Vessel Monitoring Plan)~~ ~~c.~~ COULD be capable of accommodating remote or onboard configuration of parameters to optimise camera functionality throughout a typical fishing trip; d. Recorded imagery: ~~d.~~e. SHOULD be recorded in a widely used and accessible video or image file format, such as MP4 or JPEG, or other compression standards that are able to be viewed. ~~e.~~f. SHOULD include a timestamp, GPS location, and WCPFC VID (vessel identification information) on the video or image.
4. Geolocation data and device	a. A geolocation device[4] MUST record vessel location coordinates and the associated date and time in a format capable of integration with EM Records b. The geolocation device MUST be installed and remain in a location in accordance with the manufacturer's guidelines such that the device can reliably function. c. The EM system [~~SHOULD~~/COULD as this information is already transmitted from other systems] transmit geolocation data and associated date and time, and vessel identification information to DRCs on a regular

[4] The EM system may use an existing geolocation device on type-approved hardware on the vessel (e.g., VMS) or have its own geolocation device.

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On-board EM System component	SSP
	basis, as defined by the relevant programme requirements, throughout the duration of a fishing trip in a format compatible with DRC software. d. The EM system [~~SHOULD~~/COULD as this information is already transmitted from other systems] ~~SHOULD~~ be able to verify whether transmissions of geolocation data and associated date and time, and vessel identification information to DRCs are successful. e. If the EM system is unable to transmit geolocation data due to a communication error, it SHOULD store geolocation data and automatically send it as soon as practically possible after communication is restored. f. ~~The vessel Relocation and timestamp data from the geolocation system MUST] be associated with the EM records.~~ [Chair – repeat of a above]
5. Uninterruptible power supply	The EM system SHOULD include a UPS in the event that the main source of power is interrupted.
6. Sensors	a. EM systems [SHOULD/COULD JP: could as optional, but US wants to future proof; Chairs comment: without some type of sensor the system is recording all the time which is expensive and inefficient therefore I prefer SHOULD] be outfitted with sensors, which may include the use of camera imagery as a synthetic sensor, to capture information about fishing activity. These may include, but are not limited to: i. Pressure sensors ii. Hydraulic or drum rotation sensors iii. Temperature sensors iv. Door open/closed sensors v. Proximity sensors vi. RFID readers

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On-board EM System component	SSP
	b. If ~~The~~ the EM system is outfitted with sensors, then it [SHOULD/COULD JP: could as optional, but US wants to future proof] ~~SHOULD~~ be capable of generating and recording a log file of readings from system sensors stored in a similar manner to time and geolocation information.
7. Communication system	a. The EM System SHOULD have or integrate with at least one network communication system that enables the reliable and regular transmission (e.g., daily or weekly, hourly) of near-real-time data on system health (including still images for EM system status verification when prescribed by the programme requirements), sensors (if applicable), and geolocation to DRCs during all fishing activity, and supports remote access to the EM system by the EM Service Provider or their designated service technicians. b. The network communication system(s) SHOULD be a widely used and globally recognized technology, such as i. 3G, 4G, or 5G cellular networks. ii. Wi-Fi iii. Satellite communications. c. The EM system [~~SHOULD~~/COULD TW] be ~~-~~able to verify whether transmissions of data on system health (including still images), sensors, and geolocation to DRCs are successful. d. The EM System SHOULD have ethernet or any other communication system allowing data transfer and remote access to the system via the onboard connection.

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General Requirements for onboard EM Components	
1. Weather Resistance	EM hardware components that are utilized on deck and are exposed to the elements (e.g., sensors and cameras) MUST be sufficiently dust and water resistant (e.g., IP66) and durable (e.g., corrosion, impact, and vibration resistant) to operate reliably under the range of conditions expected in their location on fishing vessels. IP67 or IP68 SHOULD be used for those locations where significant water contact is expected.
2. Tamper Resistant and Tamper Evident	a. The onboard hardware MUST be robust and tamper evident to mitigate the risk of intentional sabotage or malfunctions. This shall include physical and/or software features. b. The EM System SHOULD feature a login history tool which allows the tracking of information on when and by whom system configuration settings have been accessed offering insights into possible tampering attempts.
3. Compatibility with Other On Board Equipment	The EM System SHOULD be capable of functioning in close physical proximity to other onboard electrical and hydraulic equipment (i.e., EM System operations MUST not be materially impacted by the presence of other onboard electrical equipment and MUST not materially impact the proper functioning of other onboard electrical equipment).
4. Compatibility with DRC Review Software	All EM Records generated by the EM system MUST be in a compatible format, or be able to be converted into a compatible format, to allow the ingestion of the EM Records into an analysis software being used.
5. Capable of Spatial Calibration	An EM system SHOULD have capability for spatial calibration for accurate image and fish length measurements.
6. System Health Status	The system SHOULD execute a system health test either automatically or when initiated by user and MUST provide a visual signal on the display that the system is operational (i.e., it should be obvious, simply by looking at the display, whether or not the system is working properly) .

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	a. The EM system [MUST/SHOULD JP: either change to SHOULD or change i to xi as examples only. Chairs comment: (supported by the US): in order for a CCM to determine EM coverage they will need to know whether the EM system is functioning on a vessel – it will be difficult without the logs, e.g., you would have to review all EM records which is harder than reviewing log files] be able to generate a log file including, but not limited to, the following EM processes to capture the operational health status of the system: i. System power up ii. System shutdown planned iii. System shutdown unplanned (e.g., power cut) iv. Camera connectivity v. Camera recording start and stop times (planned) vi. Camera recording error[5] vii. Available hard drive space viii. Sensor connectivity, if applicable ix. Sensor recording start and stop times (planned) , if applicable x. Sensor recording error , if applicable xi. Activation and deactivation of recording triggers (e.g., vessel speed, drum rotation sensors, geofencing, and time scheduled), if applicable b. System SHOULD undertake regular system health checks throughout the duration of the fishing trip at a frequency defined by the EM Programme and MUST show malfunction alerts (errors and warnings) on the display of the user interface (Onboard User Interface) of the control centre. c. The EM system COULD be able to capture and store single frame images from each onboard camera on a regular basis (e.g., timed intervals, such as hourly, or on event triggers such as geofences) to show that cameras are operational, not obstructed, obscured, or displaced.

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[5] The appropriate time interval may require regular review and updating.

Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
1. *EM system installation*	[TW: regulating the EM service provider should be left to the EM Program; Chair: not sure what this means– do we remove this section or change to SHOULD?] The EM Service Provider or their designated installer: a. MUST coordinate installation with the vessel owner or their designated representative. b. MUST install an onboard EM system that meets the performance standards described in onboard EM System Component and General Requirements. c. MUST ensure the onboard EM system meets the performance standards described in onboard EM System Component and General Requirements through system tests. d. MUST provide the necessary information for the vessel owner/operator or their designated representative to complete a Vessel Monitoring Plan (Vessel Monitoring Plans) or complete the Vessel Monitoring Plan on behalf of the owner/operator. e. MUST brief the vessel operator and crew member(s) and provide documentation on EM system operation, maintenance, and procedures to follow during regular operation and in the event of a system malfunction (Vessel Monitoring Plans). f. MUST submit notification to the relevant EM Programme of system installation in the agreed form ~~-~~that attests to the system functionality and its conformance with the performance standards described in onboard EM System Component and General Requirements. ~~(See SSPs on EM Records and EM Data Security and Confidentiality)~~[6]

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[6] ~~Note: A standardised regional form could be useful for this purpose~~

Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
	The vessel owner or their designated representative: a. MUST provide information[7] describing the vessel configuration and systems to facilitate EM system installation. b. MUST make the vessel and appropriate personnel (such as engineers, fishing master, multilingual staff, etc.) available and provide the EM Service Provider unfettered access, including to the ship's power supply, to complete EM system installation.
2. Vessel Monitoring Plan	a. Vessel owner or EM Service Provider MUST complete a Vessel Monitoring Plan, and submit it to the EM Program ~~me~~ for approval.[8] b. A copy of the Vessel Monitoring Plan [~~MUST~~/SHOULD CN: Chair's comment – the VMP contains details of the obligations of the vessel operator including what to do in case of EM system malfunction etc.] be kept on board the vessel. c. Vessel Monitoring Plans MUST be updated and submitted to the EM Program~~me~~ at a frequency determined by the EM Program~~me~~ and anytime changes are made to information or requirements outlined in the VMP (e.g., new vessel contact information, change in EM System configuration, change in catch handling guidelines). d. The Vessel Monitoring Plan: i. MUST include contact information for the EM Service Provider, vessel owner(s), and vessel operator(s), and base manager(s) (if applicable).

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[7] ~~Note: A standardised regional form could be useful for this purpose~~

[8] ~~Note: A standardised regional form could be useful for this purpose~~

Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
	ii. MUST include ~~General~~ general vessel information as specified in the ~~vessel identification section of the latest version of the regional minimum data field standards~~EM data requirements.[Chairs comment: these would be the same as the ROP General vessel information fields] iii. MUST include a diagram, description, and photo(s) of the vessel layout that identifies where key fishing activities will occur on the vessel (e.g., hauling, sorting, discarding) and COULD include measurements of all items, tools, or areas on the vessel that EM to support estimation of lengths of fish caught. iv. A description of the EM setup: ● MUST include the number and location of cameras including images of their installation location and an image from each camera's perspective, and include nighttime images, as appropriate, to demonstrate sufficient lighting. ● MUST include a description and image of the location of all other components of the installed EM system (e.g., geolocations system, EM control system, sensors, power supply). ● MUST include relevant details of system configuration settings, including: ○ Camera configuration settings (e.g., frame rates, resolution, bitrate) ○ Sensor units and threshold values, if applicable ○ Data recording frequencies and/or sensor triggers for recording ○ Software and Firmware versions ○ Spatial calibration settings, if applicable v. MUST include any catch handling procedures required to ensure that EM Records ~~collected allow for an EM~~ allow collection of the data fields set out in the EM data requirements ~~Analyst to generate EM Data for all the required data fields~~ (e.g., handling in view of cameras, allowable discard locations).

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Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
	vi. MUST include vessel duty of care responsibilities to prevent system malfunctions and ensure effective operation of the system, such as: ● Verifying system functionality at the beginning and throughout the duration of each trip ● Instructions for cleaning camera lenses vii. MUST include vessel responsibilities in the event of system malfunctions that describe the steps that must be taken. ~~vii.~~viii. MUST include details of what steps, if any, are required to ensure the transmission of the EM Records to the DRC.
3. Field and Technical Support Services	The EM Service Provider, in a timely manner, [SHOULD/MUST - FFA members]: a. Communicate with vessel operators and the relevant EM Programme to coordinate service needs, resolve specific programme issues, and provide feedback on programme services. b. Provide maintenance and support services, including software and firmware updates, such that all installed EM systems perform according to the performance specifications described in onboard EM System Component and General Requirements and that field services are scheduled and completed with minimal delays to minimise disruption to fishing operations. c. Provide technical assistance to vessels upon request on EM system operations, diagnosing causes of system malfunctions, and providing assistance for resolving malfunctions. This assistance [SHOULD-/MUST FFA members] be available 24 hours a day, seven days a week, year-round. This service must be provided in the relevant languages as defined in the programme specifications.

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Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
	d. Submit to the relevant EM Programme, and the EM Certifier, where appropriate, reports of all requests for technical assistance from vessels and service calls that include: i. The name and designation of the vessel point of contact ii. The date(s) and time a request for service was made. iii. The date(s) and time(s) when the EM Service Provider called or visited the vessel to provide technical assistance. iv. A description of the issue. v. A description of how the issue was resolved, including actions completed during all service calls or visits in response to the request for service. vi. The date and time the issue was resolved. The vessel owner/operator: a. MUST follow duty of care responsibilities described in the Vessel Monitoring Plan. b. MUST report EM system malfunctions to the appropriate contact as outlined in the Vessel Monitoring Plan. This should be done as soon as is practicable, and include details of the date, time, and, if possible, the geolocation when the malfunction was first detected. c. MUST follow vessel responsibilities outlined in the Vessel Monitoring Plan in the event of system malfunctions. The EM Programme: a. MUST define vessel responsibilities in the event of system malfunctions that describe the steps that must be taken under different failure scenarios.

Installation, Operation, and Service of onboard EM Systems	
Requirement	SSP
	b. [SHOULD-/MUST: FFA members] respond to EM Service Providers or vessel owners/operators in a timely manner.

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SSP: Data Review Centres

A data review centre (DRC) is an entity with access to supporting EM analysis software ~~platform(s)~~ used by EM analysts to analyse EM Records and generate EM Data. DRCs may serve individual CCMs, subregional groupings, or the entire WCPFC membership. They may also be administered by individual CCMs members, a sub-regional or regional body, or a third-party (commercial) provider. This SSP is not specific to any DRC structure and covers the required infrastructure (hardware and software) to analyse EM Records.

DRC Component	SSP
1. EM Analysis Software ~~***NOTE: This section requires further discussion on Interoperability.*~~	The DRC MUST use EM analysis software to facilitate the generation of EM Data from EM Records. The EM analysis software: a. ~~SHOULD~~ MUST be compatible with the file types, data structures, syntax, and semantics of EM Records that will be analysed with the software. b. SHOULD be the latest version of analysis software, including security patches c. [MUST/COULD: US/FSM/JP to consider] be able to display EM analysed output: i. Display the vessel track on a map based on geolocation data integrated in the EM Records, with an option to display the geolocation data of each vessel. ii. Display synchronised imagery from all cameras simultaneously with zoom capability and other relevant imagery features. iii. Display a visual timeline with sensor readings or status, if applicable. iv. Display synchronised sensor data (including vessel heading and speed) and video imagery simultaneously, if applicable. d. [SHOULD/MUST: FFA members MUST; Chair's comment – there is currently insufficient technical detail in these Technical Standards to determine what is specifically required on the vessel or in the EM software to

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DRC Component	SSP
	achieve this] be able to spatially calibrate an image and measure the length of species brought onboard as required by the EM Programme (e.g. through a digital measuring tool in the EM analysis software). e. [SHOULD/MUST: FFA members this capability is critical for EM data analysis] allow the EM Analyst to create annotations to mark events where fishing activity occurred within the EM records. f. [SHOULD/MUST: FFA members crucial for many reasons including compliance review and monitoring] be able to extract and save segments of video and sensor data, including extraction and saving of still images and the ability to ~~automatically~~ extract short duration video clips of catch. g. MUST be able to produce EM Data into a format compatible (or that can easily made compatible) for incorporation into WCPFC ~~with relevant~~ databases ~~used in regional fisheries management organisations to store information on fishing activity~~. h. [MUST/SHOULD~~COULD~~: PEW (M) /TW and FFA (S): Chair's thoughts: whilst this is an ideal future state a 'MUST' would require any potential EM provider to understand exactly how every other potential providers EM system works AND/OR require a single format for EM records and ancillary files. This is a very significant burden on EM service providers which may not be achievable for some time] be able to import EM records (and related sensor and annotated data) from systems of other EM Service Providers. i. SHOULD have the ability to change the playback speed of the footage (e.g., 0.5x, 1x, 2x, 6x, 8x, 10x)
2. EM Analysis Workstations	The DRC MUST have EM analysis workstation(s) where EM Analysts will use EM analysis software to generate EM Data from EM Records. The EM analysis workstation: a. MUST have hardware and software, or cloud-based platforms that enable effective EM analysis b. MUST have reliable data transmission capabilities sufficient for efficient streaming or download/upload of data required for EM Records analysis, reporting of EM Data, and storage of EM Records. c. [SHOULD/MUST: USA] have proper ergonomics that support analyst well-being, quality, and efficiency.

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DRC Component	SSP
	~~c.~~d. SHOULD/MUST be designed to minimize the risks to commercially sensitive information. [FFA members]
3 EM Analysts	The use of EM software to generate EM Data from EM Records MUST be conducted by EM Analysts. The EM Analysts: FFA original proposal a. MUST complete an appropriate training programme which covers materials including (but not limited to): species ID, basic fishing practices, and EM review processes). b. MUST have an absence of fisheries-related convictions. c. MUST be independent from fishing-related parties including, but not limited to, vessels owners and operators, dealers, processors, canners, traders, shipping companies, fishers, or advocacy groups, to prevent conflicts of interest, whether it be a direct or indirect interest that could affect the performance or non-performance of the official duties of the EM Analyst. Any potential conflicts of interest must be declared to their employer and EM Certifier. IATTC text • EM analyses shall/MUST only be conducted by qualified EM analysts, ideally possessing some experience in fishing activities, with skills on how to use the dedicated EM analysis software and observe and record accurately data to be collected under the EM program. • EM analysts shall/MUST not be employees of a fishing company involved in the observed fishery or have other direct conflicts of interest. ROP equivalent – ***to be completed***

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DRC Component	SSP
	• EM Analysts MUST be independent and impartial and qualified in accordance with criteria approved by the Commission. [Training requirements could be taken from here: https://www.wcpfc.int/wcpfc-regional-observer-programme-standards%20latest (pg 12) excluding obvious ones relating to specifically being on a vessel] ~~c.~~
4. A system to monitor EM System health on vessels	a. The EM Programme [MUST/~~SHOULD~~: FFA members MUST; Chair's comment: the transmission of real-time information is only a SHOULD] have a health monitoring system to receive and display near real-time information of onboard EM System health status (System Health Status), this SHOULD include still images to verify functionality of onboard cameras (System Health Status) and geolocation data (Geolocation device). This system may be part of the DRC. b. If applicable, ~~The~~ the on-shore health monitoring system MUST receive any malfunction alerts (errors and warnings) that have been generated from the onboard health monitoring system. c. The health monitoring system [MUST/SHOULD FFA members MUST; Chair's comment: the submission of real-time geolocation information from the EM system is not a MUST] be able to display the latest geolocation of all covered EM Systems on a map.
5. ~~Retention~~Storage of footage to support audit / assurance process	X% of EM records reviewed to produce EM data, MUST be retained for Y months in order to be available for any assurance or audit process agreed by the Commission. [Chair's comment: interested in feedback, propose for some generic placeholder text ahead of further work on an assurance / audit program]

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Appendix 3: EM data requirements (***to be completed***)

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IWG participants have agreed to undertake intersessional work to attempt to achieve outcome 1 below.

1. Propose minimum EM data requirements based on the current WCPFC ROP minimum data fields (https://www.wcpfc.int/doc/table-rop-data-fields-including-instructions) (plus any others identified) but associated with a 'MUST / SHOULD / COULD / WON'T' assessment which gives CCMs specific guidance on what is necessary;
2. Propose the ROP data requirements as 'non-binding guidance' for CCMs and allow CCMs to use alternative mechanisms or simply not collect certain data. CCMs would document their chosen approach in their EM program description;
3. Not propose any minimum EM data requirements and leave it to CCMs to determine what information to collect during an interim period.

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Appendix 4: Interim EM program reporting requirements

That any CCM using EM and submission of EM data to meet WCPFC requirements MUST provide the following reporting in their Annual Report Part 1:

Description of the EM program

- an attestation that all 'MUST' minimum EM technical requirements have been met or a plan for the achievement of any not currently in place.
- an example of the Vessel Monitoring Plans used, including details of camera settings being used for each class of vessel within the EM program (e.g., longline vessels under 20m, 20-24m, or greater than 24m LOA);
- details of the individual vessels with EM systems installed (compatible with details on the WCPFC vessel register)
- a description of the responsibilities of the vessel owner/crew with respect to installing and maintaining equipment, including routine cleaning of cameras, and responding to mechanical or technical failure of the EM system;
- protocols for EM record data storage and transmission/retrieval;
- details of any WCPFC Conservation and Management Measures (CMMs) measures where the use of EM is necessary for the CCM to meet their requirements, including any protocols for reporting and following up on potential infringements detected through EM. [Chair's comment: have not yet resolved this]

Description of the implementation of the EM program during the last reporting period

- details of the individual vessels with EM systems installed to allow linking to the WCPFC vessel register)
- EM coverage levels (both in terms of vessels and fishing effort) achieved by fleet, including method of calculation
- EM analysis rate as percentage of both EM coverage levels and overall effort levels, including details on how EM records were selected for analysis and how the EM analysis rate was calculated; and where appropriate
- Any information relevant to compliance monitoring

For any CCM that voluntary chooses to use EM for WCPFC fisheries and provide EM data for the work on the Commission, it is recommended that this information be provided to allow the necessary operational context for the use of any EM data.

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