

## Standards Specifications and Procedures for the WCPFC Electronic Monitoring Program

**Chairs Consultative Draft**

**Commented [VDGC1]:** Outstanding issues reflected in the comments throughout, plus new comments added.

**Place holder introductory language and link to the CMM**

### A. **Technical Specifications**

1. The Technical Specifications set out the requirements of the EM system. CMMs shall ensure all EM systems installed in their national or subregional programs are consistent with these technical specifications.

**Commented [VDGC2]:** Need to consider the ordering of the SSPs to ensure logical sequencing of the SSPs.

**Commented [VDGC3]:** Expanded to cover all aspects of the EM equipment and specifications for each.

### **General specifications of EM Systems**

2. The EM System shall:
  - a. Be continuously powered during fishing trips by an uninterrupted power supply capable of controlled shutdown in the event of power loss
  - b. Contain a login tool to allow tracking of system access information
  - c. Be capable of issuing real time automated alerts when the system is malfunctioning or storage is reaching capacity, including indicators that monitor gear usage to show when fishing activity is occurring
  - d. Be capable of testing, tracking through time and monitoring the functioning of the system throughout the durations of the fishing trip and generate an EM system function file with data including, but not limited to:
    - i. System power
    - ii. Function testing
    - iii. Data drive and storage
    - iv. Sensor component performance
    - v. Video/still recording
    - vi. Vessel positioning
  - e. Be capable of securely storing and transmitting all recorded **EM Records** and sensor component data with encryption
  - f. Record, store and transfer all EM records through the submission of data drives (e.g., HDDs or SDDs) or **transmission** of EM records via GSM or satellite transmission and in accordance with the Data Standards (refer to Section E below)
  - g. Be tamper resistant and tamper evident, including through prevention of any manual data input or external data manipulation
  - h. Include a VMS or Global Positioning System (GPS) antennae to monitor vessel position, route and speed as well as provide information on fishing times and location
  - i. Not generate or cause radio frequency interference with other on-board vessel communication, navigation, safety, geolocation devices (e.g., VMS) or fishing equipment

**Commented [VDGC4]:** All terms will need to be cross referenced with the definitions in the CMM.

**Commented [VDGC5]:** Who is responsible for the transmission of what EM Records and Data needs to be fleshed out and possibly included in the Roles and Responsibilities in the CMM. For discussion

- j. Have components that are sufficiently water resistant (e.g., Ingress Protection Code IP66) and robust enough to withstand a range of climatic conditions and rough conditions at-sea with minimum human intervention
- k. Be capable of providing monitoring of a trip and have sufficient storage for EM records for a trip or ensure backup arrangements are in place
- l. Generate data that are interoperable and, where possible, integrate with other data collection and monitoring tools, and
- m. be installed by an installer approved by the CCM.

**Commented [VDGC6]:** Yet to be defined – port to port?

**Commented [VDGC7]:** Needs more work – the requirement needs to be that the National EM program requires that the entire trip is record, how this is managed could up the CCMs program and therefore unspecified here

**Commented [VDGC8]:** Necessary – or is interoperable sufficient?

**Commented [VDGC9]:** One CCM suggested delete. Some CCMs have indicated that they have approved installers that are not government employees. Chair – for further discussion.

**Commented [VDGC10]:** Suggest that this is kept general so that changes to other WCPFC documents don't require updates to these SSPs

### **Specifications for Specific EM Systems Components**

#### **Cameras**

- 3. The EM System must have one or more cameras, installed in specific locations on the vessel to capture high quality video and/or stills footage of all fishing activities (e.g., deployment and retrieval of fishing gear, handling of catch and bycatch) to meet the specified WCPFC data requirements.
- 4. Imagery should be of a sufficient quality (e.g., resolution and frame rate) to enable the review of EM record by a specialised EM Analyst and/or through the application of Artificial Intelligence and Machine Learning (AI-ML) technology to meet the specified WCPFC data requirements.
- 5. The EM cameras shall meet the following technical specifications:
  - a. Include a sufficient number of cameras to collect necessary fishery related data and information about all relevant fishing activities
  - b. Cameras must capture footage (video and or stills) in full high definition (HD) at a minimum resolution of 1920 x 1080 (2.1 MP) and at a minimum frame rate of 15 frames per second (15 fps) to enable species identification
  - c. Cameras must be water resistant (e.g., IP66) and in a self-contained, weather resistant housing that is able to be affixed with adjustable brackets to masts, booms and/or fixed surfaces
  - d. Cameras and housings must allow for easy cleaning and maintenance by crew
  - e. The camera system must be capable of being configured for different fishing methods and vessel configurations to ensure the acquisition of high-quality EM footage covering all fishing activities under both day and night (low light) conditions
  - f. EM footage must be recorded on a data drive (e.g., HDD; SSD), or in secure cloud storage, in a widely used and open formats following a specified naming convention including a timestamp, GPS location, and data drive information

#### **Sensors**

- 6. The EM System must consist of and record data from a sensor component. The sensor component can be in the form of physical sensor units which are deployed on vessel and activate the cameras to record during fishing activities only, or this targeted EM footage capture may be achieved through the application of integrated AI-ML technology.
- 7. The EM systems sensors shall have the capacity to support, activate and record data from the following physical sensor types, (including but not limited to):
  - a. Rotation sensors
  - b. Hydraulic pressure sensors
  - c. Proximity sensors
  - d. Temperature sensors

- e. Door open/closed sensors
  - f. A minimum of four sensor inputs/types in total
8. The EM System must generate and record a log file of readings from all sensors (physical or AI-ML) integrated with vessel location and timestamp from the geolocation device.

#### Geolocation

9. The EM System must contain a GPS or VMS unit on the vessel that shall be capable of:
- a. Being continuously powered and remain on while the vessel is operating
  - b. Continuously recording ( $\leq 5$  minute intervals) date, time, latitude and longitude (geolocation data) as well as vessel course and speed, in a specified format
  - c. Record latitude and longitude positions to  $1/100^{\text{th}}$  of a decimal minute
  - d. Record latitude and longitude positions within 100 meters of true location
10. The GPS receiver or VMS unit must be installed and remain in a location where it can reliably function
11. The recorded geolocation data, including vessel identification must be transmitted as defined in the VMS CMM and associated SSPs on an hourly basis throughout the duration of the fishing trip. In the case of VMS, this transmission must be continuous at all times (e.g., during fishing trips and when the vessel is tied up in port).

Commented [VDGC11]: Cross reference with the VMS requirements

#### EM Control Centre

12. The EM system control centre shall:
- a. Be continuously powered and remain on while the vessel is operating
  - b. Record and store/transmit all EM records (e.g., sensor, EM footage, GPS, EM system function) from each fishing trip
  - c. Have sufficient storage capacity for all EM records collected during all fishing activities until these data are submitted (e.g., HDD or SDD) or transmitted (e.g., via satellite) to the CCM
  - d. Have sufficient backup storage to prevent data loss
  - e. Have the ability to encrypt EM records
  - f. Have a unique identifying code for data drives (e.g., HDDs) that are registered with the CCM
  - g. Allow for the recovery and secure transmission of EM records (e.g., GPS)
  - h. Store EM footage on data drives and in formats that are compatible with WCPFC data submission procedures and EM review software
  - i. Activate EM footage recording in response to the activation of sensor components
  - j. Not generate or cause Radio Frequency Interference (RFI) with VMS and other vessel communication, navigation, safety or vessel equipment (e.g., fishing gear)
  - k. Have an onboard user interface that:
    - i. Displays live footage from all camera feeds on the vessel
    - ii. Allows the operator to test and monitor the functionality of the EM system prior to and during the fishing trip to ensure it is fully functional
    - iii. Includes a functionality to verify receipt of EM records, in the case of transmission via WIFI, mobile data connection or satellite.

#### Communication

13. The EM system must contain a communication system that shall:

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- a. Enable the transmission of EM records on an hourly basis (e.g., at least on an hourly basis) of near real-time data related to system health, sensor component data (if applicable) and geolocation (e.g., VMS, GPS) as well as vessel course and speed to CCMs during all fishing activities and support remote access to the EM system by authorised entities
- b. Contain a 'standby' or 'reduced power' mode that ensure continual transmission of (at a minimum) geolocation data, regardless of camera or sensor component status and/or fishing activity
- c. Use standard technology accessible to CCMs, such as:
  - i. Mobile Communication Support Provider's (MCSPs) communication networks
  - ii. Satellite communications
- d. Allows data transfer and remote access to the EM system via the onboard internet connection

EM Records

14. The EM system must record, store and submit/transmit all EM records in open formats:
  - a. EM footage: Video in MP4, MOV, WMV or AVI
  - b. EM footage: Stills in JPEG, PNG, GIF or TIFF
  - c. Sensor component data in CSV, HTML or XML
  - d. Geolocation device data in CSV, HTML or XML
  - e. EM System function data in CSV, HTML or XML
15. The EM Records shall contain the following information:
  - a. EM Record file name including, at a minimum, the vessel name and vessel ID and trip ID
  - b. EM footage data (i.e., video and stills) shall have continuous imbedded:
    - i. Camera number
    - ii. Vessel name and vessel ID, and
    - iii. geolocation data (date, time (UTC), latitude and longitude)
  - c. Sensor data shall have the following data fields continuous imbedded:
    - i. Vessel name and vessel ID, and
    - ii. Date and time (UTC)
  - d. Geolocation device data shall have the following data fields continuous imbedded:
    - i. Vessel name and/ vessel ID, and
    - ii. Date and time (UTC)
  - e. EM system function data shall contain, at a minimum:
    - i. Vessel name and vessel ID
    - ii. Geolocation device status and data (date, time (UTC), latitude and longitude)
    - iii. Camera status and recording times
    - iv. Sensor activation and recording times
    - v. Data drive storage, and
    - vi. EM system status (e.g., power on) and function tests

**Commented [VDGC12]:** Depends on the WCPFC framework – this may only apply to the high seas component of the fishery

EM Records Storage

16. The EM system shall consist of data drives (e.g., HDDs and SSDs) or secure cloud storage with a storage capacity sufficient to cover the entirety of the fishing trip
17. The EM Record storage devices shall ensure:
  - a. Storage of EM footage for all fishing activities during the fishing trip

- b. Storage of sensor component data
- c. Encryption of EM footage and sensor component data
- d. Storage of continuously collected geolocation data

## B. Program Specifications

- 18. The Program Specifications section sets out the framework that national and subregional EM programs are expected to contain, for example related to the legislative and policy settings, the independence and impartiality of the EM record analysis, data ownership, confidentiality, sharing, system downtime and protocols in the event of system failure.
- 19. CCMs shall consider their domestic legal and policy frameworks to support national implementation of their EM program.
- 20. CCMs shall ensure that there are appropriate data policies, procedures and systems in place at the national level that give regard to data security, ownership and confidentiality.
- 21. CCMs shall require EM Analysts to be independent from all vessels and companies operating in the fishery.
- 22. CCMs shall have in place installation, maintenance and technical support services to enable the proper installation, use and repair of the EM System as and where required, including in remote, regional or global ports.
- 23. CCMs shall ensure that all EM systems are installed and configured to meet all technical standards and can provide all relevant data as specified in the WCPFC data standards and are tested to ensure functionality.
- 24. CCMs shall document the roles and responsibilities of government authorities and vessel crew with respect to *inter alia* installing and maintaining equipment, routine cleaning of cameras, sending storage devices, access to EM records and data, responses to mechanical or technical failure of EM system.
- 25. CCMs shall provide training and instructions to fishing crews on all aspects of the system operation and maintenance procedures and protocols to follow to ensure the continued functioning of the system and in the event of technical error or system malfunction or failure.

### Acceptable Program Downtime, Predeparture and System Failure Procedures

- 26. CMMs shall ensure that their EM program has not more than 5% downtime (i.e., the EM program is expected to be functioning correctly 95% of the time for all vessels). Program downtime will be reported annually to the Commission in that report of implementation including the boats which reported the downtime.
- 27. CCMs shall implement a predeparture protocol, applicable to all of their vessels on the Record of Fishing Vessels, to ensure that EM systems are operational prior to the vessels departure from port or any other event, such as if the vessel or EM system has undergone maintenance.
- 28. CCMs shall have in place protocols and procedures that outline steps to be taken if the EM system fails while the vessel is at sea. At a minimum these protocols shall include predeparture checks to ensure EM systems are working prior to leaving port, monitoring EM systems during trips, liaison with vessel operator in relation to malfunctioning systems and the imposition of sanctions for deliberate tampering of equipment.

**Commented [VDGC13]:** Needs further development – for example:  
Specifying the expectations around acceptable ‘downtime’ which links to maintenance requirements  
Procedures in the event of a failure of the EMP at sea for example in the same way the VMS measure outlines this  
Clarity around expectations of the crew – cleanliness of, not blocking the cameras etc

**Commented [VDGC14]:** Seeks to strike a balance between CCM comments about the need for independence and impartiality of the EMP, similar to the ROP.

**Commented [VDGC15]:** One CCM has suggested delete because these are discretionary. Chair's response – these elements were discussed as part of break out group in Busan in 2018. Suggest this is resolved by keeping Min Standards separate to the draft CMM.

**Commented [VDGC16]:** Some CCMs suggested not necessary as part of standards.  
Chair – further discussion needed on whether a type approval process is needed but needs to recognise precedents agreed with other WCPFC monitoring programs.

**Commented [VDGC17]:** Need to consider if the EMP, like the VMS CMM, outlines more specifically the actions to be taken in the event of an EM failure at sea

### C. Logistical Specifications

29. The logistical specifications prescribe the requirements that national and subregional EM programs shall adhere to in relation to the transmission, sharing, compatibility, and accreditation within the WCPFC EMP.

**Commented [VDGC18]:** Needs further development to ensure all logistical components are captured and that the WCPFC EMP Framework is considered.

#### Transmission of EM Records

30. CCMs shall document handling and storage procedures for EM records including data confidentiality, retention, disposal or clearing of storage devices.
31. CCMs shall prescribe the method and frequency of transmission of EM records to data review centres. Consideration shall be given to the duration of the trip, the volume of data being generated and to be transferred and location of fishing activity (e.g., high seas or in-zone).
32. For trips undertaken in the high seas and one or more coastal States or in the waters of two or more coastal States, the CCMs EM program shall require the data storage devices to be exchanged to enable the transmission of data to the relevant coastal State, flag State or WCPFC Secretariat for trips in areas beyond national jurisdiction (high seas).
33. If using storage device exchange, CCMs shall have in place operational procedures for the secure collection and distribution of storage devices and other associated equipment, taking into consideration any necessary evidentiary or chain of custody requirements and arrangements. Such procedures may require bilateral or multilateral agreements between CCMs setting out roles and responsibilities including dispute resolution.
34. If using electronic exchange, CCMs shall have in place operational procedures for the receipt and back up of EM records, taking into consideration any necessary evidentiary or chain of custody arrangements. Such procedures may require bilateral or multilateral agreements between CCMs setting out roles and responsibilities, including dispute resolution.

**Commented [VDGC19]:** Need to define the frequency of transmission – suggest monthly. This will need to link to the volume of data and available storage on devices plus the time it takes to get the drive back to the data review centre etc.

**Commented [VDGC20]:** Depends on the decision about the high seas component of the WCPFC EMP.

**Commented [VDGC21]:** Needs to be consistent with existing data sharing and ownership decisions of the Commission, or if additional are required, may need to suggest text to take into consideration the EMP.

**Commented [VDGC22]:** As above

#### Accreditation in the WCPFC EMP

35. CCMs shall apply to the WCPFC Secretariat to have their EM programs accredited as part of the WCPFC's EMP. The WCPFC Secretariat shall audit the national or sub-regional program against these SSPs. If the program meets these SSPs, then the program shall be considered accredited by WCPFC and form part of the WCPFC EMP.
36. Any national or sub-regional program that has been accredited shall be subject to regular and periodic audits. The Secretariat will report annually to the Commission on the status of national or sub-regional EM programs.

**Commented [VDGC23]:** Needs further development and consideration of the proposed EM Framework and previous decisions of the Commission

**Commented [VDGC24]:** Majority preferred binding language. However it was noted that more discussion was required, including ownership of EM records.

**Commented [VDGC25]:** Chair – this point generated a lot of discussion. One CCM suggested processes similar to the handling of observer records. One CCM suggested that records "shall" be shared if they are evidence of infringements. To be considered further.

**Commented [VDGC26]:** Chair – needs further clarification. More discussion needed on best way to handle as a minimum standard. Majority of CCMs agreed with the principle of independent and impartiality.

#### Compatibility

37. CCMs shall collaborate to ensure national and subregional programs are compatible and harmonised as necessary.
38. CCMs shall share EM records and data on vessels flying its flag with other parties, subject to national laws, and data exchange arrangements.
39. Under the guidance of the Commission, CCMs shall ensure that EM programs are independent, impartial, transparent and accountable.

D. EM Records Analysis Specifications

40. The EM Records Analysis Specifications prescribes the minimum requirements related to converting EM Records to EM Data and submission of the data to the WPCFC Secretariat.
41. CCMs shall require EM Analysts to be independent from all vessels and companies operating in the fishery.
42. CCMs shall require EM Analysts to have the ability to observe and record data accurately, undergo training, including induction and refresher training on WCPFC CMMs and WCPFC fishing activity, and are adept at identifying, at a minimum:
- Fish species and species of special interest
  - Fishing methods used in the Western and Central Pacific Ocean
  - Events that may indicate non-compliance with WCPFC CMMs
  - Start and finish of fishing activity, and
  - Mitigation devices or methods.
43. CCMs shall also give consideration to ensuring that analysis of EM Records for audit purposes are representative, random and risk based.
44. CCMs shall take measures to ensure that analysis of EM Records is quality controlled, have a second review, including data entry checks and debriefing as required, and includes appropriate feedback mechanisms for EM Analysts.
45. CCMs shall have in place steps to initially respond to non-compliance identified during data analysis. In such situations, CCMs may seek to collect additional information to support investigations.

EM Records Analysis for Trips in the high seas

46. For trips in the high seas analysis of EM Records will be facilitated by the Secretariat. This may be a WCPFC program or a third party contract for EM Record Analysis.
47. The Secretariat shall require EM Analysts to be independent from all vessels and companies operating in the fishery.
48. Any instances of alleged non-compliance found for trips on the high seas will be simultaneously transmitted to the flag State and to the Secretariat. The Secretariat will enter any alleged non-compliance into the WCPFC Case Management System, with management of the allegation conducted in the same way as all other entries in the Compliance Case File System including at the TCC.

Submission of Data to the WCPFC Secretariat

49. CCMs shall require that data is submitted to WCPFC Secretariat consistent with the WCPFC data rules and in the appropriate format as prescribed in the ER Data Standards.

E. Data Standards

50.

F. Audit Protocols

51. [needs to include elements such as supply of manuals, guides, policies and legislation to the Secretariat, nomination of a national contact point, official request to be audited]

**Commented [VDGC27]:** Will need to be refined once the WCPFC EMP framework is developed.

**Commented [BK28]:** Is there a need to include AI specifications if being used?

**Commented [VDGC29]:** One CCM sought clarification. One suggested delete. Chair response – further discussion on how members saw the accreditation process working.

**Commented [VDGC30]:** CCM suggestion – needs a time frame for responding. Chair – for further discussion as does not apply to just EM data but any data that identifies a serious matter of non-compliance. May be resolved by changes to the Case File System.

**Commented [VDGC31]:** For discussion within the context of the WCPFC EMP framework

**Commented [VDGC32]:** Needs to be cross referenced with the Secretariat processes to ensure this works harmoniously with other processes.

**Commented [VDGC33]:** Further work required. CCM comment. – WCPFC data rules have a report deadline of 30 April and 12 July each year. Chair – agree. Part of future work.

**Commented [VDGC34]:** Simply link to WCPFC Data Standards, ER Standards – or just refer to these other documents/CMMs

**Commented [VDGC35]:** Need to consider where this is best placed – in the CMM or the SSPs

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