Electronic Monitoring Overview for Vessels

Background

Several fish purchasing companies are considering implementing or expanding electronic monitoring (EM) requirements for vessels in their supply chain. The objectives of EM programs are to increase accuracy, consistency, and confidence in fisheries catch and activity data in longline, purse seine, and pole and line fisheries; to improve the accuracy of logbook reporting, and to ensure individual vessel compliance with company codes of conduct and where applicable, relevant national and RFMO regulations. EM data will also be used to support company sustainability objectives, including meeting data needs of Fishery Improvement Projects (FIPs) and communicating social and environmental performance to markets. The EM program supports a "trust but verify" approach, where vessels will continue to self-report data that illustrates compliance with codes of conduct and regulatory requirements, but EM will be used to verify logbook vessel reporting.

The following document provides an overview of what an electronic monitoring system would look like and require onboard participating vessels.

What is EM

Electronic Monitoring (EM) is a tool used to collect data related to fishing activities using cameras on board the vessels whose information can be reviewed later to verify logbooks and other self-reported information related to catch documentation, labor, pollution, transshipment, and more.

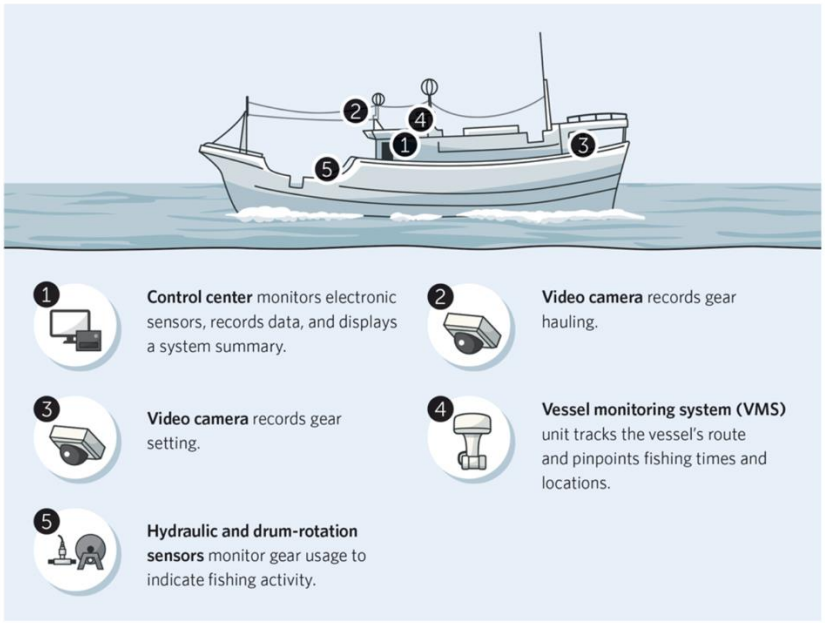
The cameras typically record videos 24 hours a day **ONLY** in areas where fishing activities are taking place so that they do not record any videos in private areas.

A typical system has the following main components. An operating diagram of a system is provided below for a representative vessel.

- 3 to 8 x Cameras (depending on vessel configuration and gear type). Smaller boats may only need 1-2 Cameras.
- 1 x Core unit
- 1 x Set of HDDs.
- 1 x Laptop to view the cameras on the bridge in real time (Camrepeater)
- 1 x VMS antenna with connection for remote monitoring of the health of the system
- 1 x Uninterruptible Power Supply (UPS) unit

Figure 1

Electronic Monitoring Uses Technology To Collect Timely and Verifiable Catch Information



What are the benefits of EM for a vessel owner?

- Electronic monitoring can be used to meet observer requirements in Fishery Improvement Projects and MSC-certified fisheries, unlocking premium pricing for fishing companies.
- Electronic monitoring can inform company operations and serve as a critical risk mitigation tool. Including mitigating:
    - **Brand risk**: consumers and customers are increasingly aware of potential environmental and social issues with bad actors. Positive brand recognition = increased market share.
    - **Legal risk:** particularly around social issues.
    - **Bottom line risk:** License to operate if issues are found throughout supply chain.
    - **Competitive risk:** Missing the boat. Positive results with competitors and more efficient, effective and transparent operations going forward.
- **Early adopter incentives:** Help shape the way the program develops from the beginning. Depending on the fishery, early EM adopters may receive special incentives for agreeing to participate.
- Identifying and documenting practices that contribute to better quality and therefore higher profits (e.g. getting fish on ice fast).
- Collecting scientific information that can be used to sustainably manage stocks.
- Documenting practices for additional performance-based incentives (e.g. for workers or vessels performing well).
- Efficiency: can reduce cost of monitoring over time.

What information is collected?

The EM videos will be used by fish purchasing companies and, where applicable, fisheries authorities, to ensure that the vessel adheres to the company's code of conduct and relevant fishery regulations, including:

Table 1. High-level overview of typical program data requirements.

Overall Objective	**Specific Objective**
Catch events	Identify all catch items (fish, non-fish, and ETP species) to a reasonable level, including: a) catch items retained b) catch items discarded after being brought on board the vessel c) catch items that are discarded or struck off the line by the crew before being brought on board d) catch items in the water adjacent to the vessel during hauling e) life status for all catch items
Use of mitigation measures	Record the use of mitigation measures during sets.

The EM videos will be used by fish purchasing company to ensure that the vessel adheres to the fish purchasing company code of conduct, including:

- Verifying the set type (i.e., free school, associated) and ensuring catch/well segregation based on set type.
- Verifying that best practices for handling protocols are followed during interactions with Endangered, Threatened or Protected (ETP) species and other species managed by non-retention RFMO Conservation and Management Measures (CMMs), such as silky and oceanic white tip sharks.
- Verifying that worker health & safety protocols are followed in primary working areas.

EM data reviewers will analyze EM data as follows:

- Verify that logbooks have accurately characterized set type and bycatch interactions
- Verify adherence to health and safety protocols

How will EM data be collected, analyzed, accessed, stored, and used for management?

EM data access is highly protected and restricted only to parties who have been granted permission for access.

The EM service provider will coordinate with vessels to collect hard drives and ensure replacement drives are available when vessels come to port, such that hard drive hand off is timely and minimizes interruptions to fishing activities. It is the service provider's responsibility that, at the end of each trip, hard drives contain video and sensor data sufficient to meet the data outputs of the EM program, assuming vessel compliance with their EM obligations in their code of conduct.

The EM service provider extracts and provides the data requirements for all reviewed EM video records and raw data files. The EM provider reviews a specified percentage of randomly selected fishing events and compares the EM data with logbook data for those events. If this subset of EM data matches the associated subset of logbook data within an allowed range of variation, the entire logbook data may be submitted as valid fishing trip data. If not, the data extracted from the EM video review will be used as the fishing trip data. The EM provider may also identify any non-compliance with the fish purchasing company's code of conduct (e.g., inaccurate logbook reporting, failure to keep EM camera lenses clean, mistreatment of ETP, pollution events) and include this information in vessel trip reports.

Depending on the design of the EM program, the EM provider could deliver all EM video records and raw data files, as well as the corresponding annotated data and vessel trip reports, to a data manager. The EM service provider will also be required to provide the data manager or the independent auditor, on request, EM video records and data files as well as required analysis software or information on video and data formats to enable auditing of analyzed EM data. If fishing activities occur within a jurisdiction with an EM program, the EM service provider and data manager may be required to share records and data with the relevant fisheries authority.

The data manager will receive and store EM video records and raw data files, annotated EM data, and fishing trip reports delivered by the EM provider. EM video and raw data files shall be stored for at least 6 months after the date of receipt, while annotated data and fishing trip reports shall be stored indefinitely. The data manager will be responsible for managing access to this data by authorized parties (e.g., vessels, governments, fish purchasing companies, independent auditor). They will also manage an audit process by providing a small subset of reviewed video to the independent auditor. The data manager will receive a copy of the audit report that it will store indefinitely.

Vessels and fish purchasing companies will develop a governance system using incentives and penalties to achieve the program goals. One example of how EM programs drive continual on the water improvement is through validation of logbook and self-reported information provided by the vessel through the data review process. To do this, the EM service provider reviews and compares EM data against the provided vessel fishing logbook for all data requirements for a random 20% of the fishing events recorded on each trip. Depending on the accuracy of the data or the events found in the data review, the governance policies may require additional data review at the cost of the vessel, or other penalties or incentives as set forth in the agreement. An example review process is provided in the Appendix.

What are my responsibilities as a vessel owner or operator?

Vessels participating in an EM program are bound to comply with the fish purchasing company's code of conduct, which provides guidelines for fishing activities, catch and bycatch safe handling and release protocols (including for ETP species), on-the-water behavior, labor conditions, and actions required of vessel operators to ensure EM hard drives are delivered to EM service providers with full, useable coverage of fishing trips. While vessels may work most closely with EM service providers to ensure program success, fish purchasing companies will ultimately drive this cooperation through incentives and sanctions. When vessels license with national or regional jurisdictions with EM programs, they may be required to meet any additional data, performance, and licensing requirements set forth by the fisheries authority.

Vessel operators will be trained in routine system maintenance, basic on-the-water repair, and proper system care by the EM service provider. EM providers will provide vessel owners and operators with technical support. In turn, vessel owners and operators will be required to ensure the full functionality of the EM system onboard their vessels and the ability of the EM system to capture all necessary data while onboard (e.g., ensuring camera views are not obscured and catch events are not removed/hidden from camera views). Vessel owners and operators will also be required to follow established protocols to communicate system failures promptly to EM service providers and to seek technical assistance and make onboard repairs as needed to ensure proper EM system functioning and data capture. These parties will also be responsible for delivering hard drives with EM data promptly on return to port.

Vessel compliance with these requirements will ensure EM systems are functional and generate usable data.

Appendix

Example EM review process:

1. Basic vessel identification and activity data should be documented.
2. All fishing sets and hauls are to be identified from the sensor data to determine the total number of fishing events for the trip, their time, and location. Each set should be reviewed to identify the bait species.
3. 20% of all sets across the program will be reviewed to meet catch identification and protected species mitigation data requirements. The selection of trips for review will include a lower sampling rate for vessels with no compliance issues and a higher sampling rate for vessels with previous noncompliance issues.
4. This data is to be linked to the corresponding fishing events documented by the vessel in the fishing log for comparison across the data requirements.
5. If EM data from fishing events aligns with the vessel's fishing logbook across the data requirements, the logbook shall be considered verified and recorded in the trip report as such.
6. All compliance issues identified during review will be annotated and managed according to the Compliance Notification Requirements. Compliance notifications are to be provided to the tuna company via email within 24 hours of identification and included in the vessel trip report.
7. The EM provider shall produce a trip report containing a detailed and high-level summary on the accuracy of the logbook data. The trip report shall also indicate any compliance

notifications generated from the analysis of the trip. This is in addition to any immediate compliance notifications provided to the tuna company during analysis.

8. The EM provider shall also produce a vessel feedback report for each trip comparing EM data with the vessel fishing logs. The vessel feedback report should also provide feedback on how the EM system performed during the trip and any technical issues identified during review. The report will record protected species interactions that were identified during review. These reports will be provided to the vessel's nominated contact.
9. For vessels with ongoing compliance challenges, higher levels of review may be required, based on risk-, compliance-, or science-based review requirements. For vessels with strong compliance records, lower review rates may be considered.
10. Complete analyzed fishing data sets from each trip will then be uploaded to the data manager within 24 hours of the completion of the analysis for that trip.
11. All raw EM video and data, analyzed fishing data, and trip reports are to be retained by the EM service provider for a minimum of one month from the date of receivership by the data manager after which it can be deleted.