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Electronic Monitoring Systems & Sustainable Tuna Fishing:
EMS Functions, Minimum Standards & Implementation

This fact sheet addresses questions that tuna vessels and other sustainability stakeholders may have about using electronic monitoring (EM) technology to avoid overfishing, illegal fishing, and bycatch and also to collect fishing data for compliance assessments and scientific study. Find additional information about electronic monitoring on the ISSF site.

1. What is an EM system?

An electronic monitoring system (EMS) is an advanced fishing-monitoring system installed in fishing vessels that integrates a set of components for continuously recording information during fishing trips.

An EMS largely consists of cameras integrated with GPS that register exact positions, and sensors that start recording when they detect specific actions on the vessels — such as setting or hauling fishing gear. The camera and sensor systems do not allow external manipulation of data.

EMS, if properly installed and designed, can be considered a reliable and accurate method to estimate catches and monitor fishing activities onboard vessels. EMS can be valuable for science and compliance purposes.

2. Why are EM standards needed?

EM minimum standards are essential for collecting the EM records and data in a standardized format and ensuring all fishing activities are recorded. Standardization is important so that data collected from EM systems is comparable from vessel to vessel.

Minimum standards for electronic monitoring systems establish a benchmark for how vessels should configure and use EM technology to collect required data on their fishing activities. When vessels adhere to well-defined EM standards, the data they collect and submit to fishing authorities and scientific bodies are standardized — allowing for accurate monitoring, comparison, and analysis across fleets and regions.

For RFMOs, having reliable, standardized data is essential to track compliance, enforce regulations, and improve policies.

3. Are ISSF EM standards aligned with tuna RFMO EM standards?

Yes. ISSF's EM minimum standards are aligned with tuna RFMO EM standards that have been adopted and/or are in discussion.

On ISSF's Vessels in Other Sustainability Initiatives (VOSI) list, vessels that meet or exceed ISSF minimum standards for EM, as documented in the ISSF 2022-09 technical report, will receive a checkmark in the Electronic Monitoring field.[1]

4. Which EM standards should be implemented to monitor activities?

EMS minimum standards describe the technical specifications necessary for monitoring fishing activities, including:

- EM equipment configuration and installation **before the trip**

[1] The VOSI audit protocol can be viewed or downloaded at https://www.iss-foundation.org/about-issf/what-we-publish/issf-documents/issf-vosi-audit-policy/.

- Collection of EM records (i.e., images and sensor data) and EM equipment maintenance **during the trip**, and
- Revision and submission of EM data outputs to research institutes/fishing authorities and/or tuna RFMOs **after the trip**

5. What is required before the fishing trip?

Before the fishing trip, a vessel monitoring plan that describes how vessels will record all required fishing activities and data should be in place.[2] The EMS should be customized to the vessel, ensuring enough cameras and camera placement to cover necessary fishing actions.[3] The EMS should be designed to record information on gear configuration, vessel fishing activities, safe handling and best practices, and retained catches and discards. The system design also needs to link all EM records to a specific vessel geographic position, date, and time.

For individual privacy, an EMS also can be set up to not record areas of the vessel not used for fishing activity.

6. What is required during the trip?

During a trip, the EMS should record 100% of catches and fishing activities for a complete trip. To accomplish that, the system should:

- Be robust in all at-sea conditions
- Be operated independently from the crew
- Incorporate a self-test function to remotely and continuously verify functionality
- Have its own uninterruptible power supply
- Be configured to be tamper-proof system for data security
- Have adequate data storage capacity
- Include separate backup services

7. What is required after the trip?

The EMS should be set up to support both the random review of at least 20% of the EM records on fishing sets and activities as well as the submission of EM reports and EM data to research institutions, national authorities, and/or tuna RFMOs. To accomplish that, the system should:

- Store EM records (images, sensor data, raw data) for at least one year after they have been received by designated EM review centers
- Guarantee data chain of custody
- Have qualified third parties in place for data analysis and reporting
- Have dedicated software for data review
- Generate EM reports using software compatible with standardized data flow and database

8. Can individual privacy be protected if a vessel has EM onboard?

Yes. While the system needs to record all fishing activity, an EMS is designed to address privacy concerns. An EMS does not need to record during periods of non-fishing or in areas of the vessel where fishing activity does not take place.

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[2] The specific data elements that should be recorded/collected are described in Appendix 1 of the report *ISSF 2022-09: Minimum Standards for Electronic Monitoring Systems in Tropical Tuna Purse Seine and Longline Fisheries*.

[3] Main working areas of the PS/LL vessels are specified in tables 2 and 3 of the technical report *ISSF 2022-09: Minimum Standards for Electronic Monitoring Systems in Tropical Tuna Purse Seine and Longline Fisheries*.

9. What is an EM record?

An electronic monitoring (EM) record is the imagery, sensor data, and any other raw data collected by the EM equipment.

10. What is EM data?

EM data is generated by the review of the images and information (i.e., EM records) captured by the EM system.

Although the system records 100% of the fishing activities, a subset of that information (e.g., 20%) is reviewed to generate EM data.

11. What does "100% monitoring" or "100% EM observation" mean?

Those phrases refer to recording 100% of the fishing activities.

12. Should all EM records be reviewed?

It is recommended to randomly review at least 20% of the EM records on fishing sets and activities.

However, increasing the EM record review rate above 20% for some vessels may be advisable in these and other risk-assessment scenarios:

- Vessel has higher bycatch rates for non-target and/or ETP species than similar vessels
- Vessel has higher bycatch rates than what are recorded in logbook
- Vessel has low compliance with certain management measures being tracked

Similarly, decreasing a vessel's review rate below 20% could be justified in some cases, such as when its logbook information is found to be consistently accurate over time and the vessel has a good compliance history.

13. What is the difference between observer coverage rates and EM review rates?

Human/EM observer coverage is equivalent to EM review rates, which refers to the proportion of fishing effort monitored by human observers or reviewed by EM and submitted to the tuna RFMO.

14. What information does the EM data contain?

The EM data includes:

- General information on the entire trip (i.e., start/end of trip, number of sets, position of sets, use of mitigation measures)
- Review of at least 20% of randomly selected sets (position; catch of target species, non-target and ETP species; fate of target/non-target/ETP species; use of FADs; use of bait; and use of mitigation measures[4]

15. Who owns the EM records and EM data?

It depends upon the EM program. It is an important matter to be decided during program design.

[4] For details see Appendix 1 of the technical report *ISSF 2022-09: Minimum Standards for Electronic Monitoring Systems in Tropical Tuna Purse Seine and Longline Fisheries*.

16. To whom should the EM data be submitted?

It depends on the program. Typically, EM data should be submitted to the national research institutes, national fishing authority, and/or relevant tuna RFMO within the required period.

17. Do templates exist for EM data submission?

Yes. The tuna RFMOs use templates:

- IATTC PS & LL
- ICCAT ST09-DomObPrg
- IOTC for LL, PS, PL, and GN
- WCPFC

18. How is EM different from a VMS?

A vessel monitoring system (VMS) is a satellite-based observation system that, at regular intervals, provides data to fisheries authorities on the location, course and speed of fishing vessels.

VMS are integral to effective fisheries management. They enable monitoring, control and surveillance of the activities of vessels involved in the catch and transportation of fisheries resources. VMS also provide additional information to fisheries scientists and are important for estimating catch per unit effort (CPUE).

VMS do not record and collect information on fishing activities, catch, and bycatches as EMS do. However, fisheries managers and authorities can evaluate VMS information together with EMS data to gain a more comprehensive view of vessel activity. VMS requirements and coverage vary among tuna RFMOs. See for example the *ISSF VMS RFMO Best Practice Snapshot* and *ISSF Technical Report 2022-06*.

19. Can an EM system also cover a vessel's VMS obligation (to avoid paying for a separate VMS service)?

Not currently, unless national or tuna RFMO VMS regulations are modified. In that case, information on vessel location, course, speed, etc. recorded by EMS would need to be submitted to RFMOs per the VMS reporting frequency and other requirements (e.g., reporting once every two [2] hours and simultaneously transmitted, or re-reported, to flag State Fisheries Management Centers, coastal States and/or RFMO Secretariats).