

Original: English

Draft ICCAT Minimum Technical Standards for EMS in pelagic longliners

Objectives

The SCRS recognizes that the ultimate decision on the objectives (e.g. compliance, scientific data collection) for the use of EMS in ICCAT fisheries will be up to the Commission. For the purposes of the work of the SCRS, the priority for electronic monitoring systems (EMS) would be to implement them in a way that will allow the collection of fisheries data that are usable for scientific purposes. They should be designed in a way that complements, and to the extent possible, is consistent with what is currently collected by human scientific observers. As such, EMS could be implemented in a way that can address both scientific data collection and compliance objectives. EMS intended to address both objectives should be designed to at least meet the requirements of the more demanding objective. For instance, scientific data often must be collected at a finer (e.g. spatial, temporal) resolution than would be required for compliance purposes. In such a situation, meeting the minimum requirements needed for science, would allow use in both scenarios.

Structure (who is responsible)

While there are several possibilities for the EMS program structure, the SCRS will discuss two: decentralized and centralized programs. A “decentralized system,” is where each CPC is responsible for EMS implementation in its own fleets, including the recordings, processing, data extraction and summarization, and submission of data to ICCAT (based on minimum standards to be adopted by the Commission). This is similar to what currently exists at the level of national observer programs for scientific purposes in ICCAT, where each CPC is responsible for their own programs and for reporting the required data to ICCAT. Since the cost of implementing this approach would be borne by the CPCs, there would be little financial costs for the Commission to develop or implement the program and a lower administrative burden for the ICCAT Secretariat. A potential issue, however, is inconsistent implementation of the EMS requirements across the ICCAT members – as has been the case with regard to the implementation of ICCAT’s minimum standards for scientific observer programs (*Recommendation by ICCAT to Establish Minimum Standards for Fishing Vessel Scientific Observer Program (Rec. 16-14)*).

Another approach to EMS is to establish a “centralized system” that would be coordinated at the ICCAT Secretariat level. The benefits of this approach include a more consistent implementation of EMS requirements across the ICCAT members. It might also benefit CPCs who lack the resources to set up their own local EMS databases and auditing infrastructure. There are, however, significant challenges that would be associated with this approach, particularly related to the financial costs to the Commission and the administrative burden for the ICCAT Secretariat. Among others, issues regarding data sharing and confidentiality would also need to be addressed.

It is clear that there are important trade-offs associated with the approach selected. In addition, as has been done in the case of human observer programs in ICCAT fisheries, it may also be feasible to develop a combination of the two approaches depending on data and compliance needs of the fishery. These questions and tradeoffs should be further considered by scientists and managers. Taking into consideration data needs and given the significant financial costs and other challenges associated with the implementation of centralized EMS however, the sub-group focused its work on the development of input related to a decentralized system. That said, a centralized program or combination of approaches could be considered in the future. The sub-group acknowledges, however, that such a structure or combination of approaches would require substantial additional work, as well as financial and administrative resources.

Periodic reviews

Electronic Monitoring systems should undergo regular evaluations to ensure they reach the outlined objectives. These periodic reviews also give the opportunity to incorporate new technologies (i.e. improved cameras, artificial intelligence) as they become available, as well as to update and incorporate new objectives. A review framework should also allow a faster implementation of the updated minimum standards, that can be reviewed and adapted as needed in the future.

Standards described in this document

- 1) Standards for onboard EMS technology, including equipment and camera system requirements, installation, and maintenance;
- 2) Standards for data storage requirements and what data are subject to those provisions;
- 3) Standards for data collection, review, and reporting to ICCAT;
- 4) Standards for data protection and potential privacy issues.

1. *Standards for onboard EMS technology, including equipment and camera system requirements, installation and maintenance*

Electronic Monitoring systems have to be capable to resist rough conditions at-sea with minimum human intervention. In many cases, proper maintenance and inspection can only be achieved at port, in-between long fishing trips.

The vessel owner/operator is responsible for notifying the national authority and/or the EMS service provider if their EM system is not functioning properly.

The EMS must be linked to a receiver (e.g. GPS, GNSS) which records vessel location, speed, and heading information, and is directly and continuously logged by the control box. The receiver must be installed and remain in a location where it continuously receives a strong signal.

The EMS should have a battery backup system with capacity to provide power if the main power source from the vessel fails, to allow proper shutdown of the system and not corrupt the data.

Access to administrative configuration tools and data must be password protected. The EMS must be proof against any manual data input or external data manipulation and record any attempt to tamper with the equipment or the archived data.

The specifications for selecting, installing, operating, and maintaining EMS and their equipment (cameras, sensors, data storage devices, etc.) onboard vessels should be based on performance standards rather than being prescriptive in terms of pure technical requirements.

The video cameras must be mounted and placed so as to provide clear and unobstructed views of the areas that are being covered (see example table below). There must be sufficient lighting to clearly illuminate the area and the individual specimens captured. If vessels fish at night and use artificial lights to illuminate the deck, the quality of images under these circumstances should be checked to ensure there isn't excessive glare.

Longline vessels should be equipped with a sufficient number of cameras to allow data collection to the required standards (see table below for example of a 4-camera system), with sufficient resolution to determine the number, species, sizes and other details of the capture, and processing operations.

Crew should aim to ensure that all specimens that are caught, even those that are released, are handled in a manner that enables the video system to record each specimen brought onboard and each release, taking into consideration any adopted safe release guidelines.

In most cases video will be the primary data collection method, but it may be possible for some CPCs to collect the data needed for ICCAT submission using still images. Whichever the chosen method, the quality of the data must be sufficient to allow species identification and detailed measurements of specimens. To allow this, it is suggested that cameras recording video must have a resolution of no less than 720p, with a minimum frame rate of 5-10 FPS. Where still images are captured, it is suggested they are captured with a resolution of no less than 2MP, with a rate of image capture determined by the characteristics of each fishery. For both data collection methods, there will be different implications for data storage which will need to be considered by the CPCs at the point of implementation.

The EMS should be independent from the crew during the trip, with the exception of some basic maintenance such as periodically cleaning the camera lenses.

It is in general not necessary for the videos to record 24h/day, but only when relevant operations are taking place. For longline vessels, the EMS should be capable of initiating video recording, and record only during the period of gear deployment (aft camera) and gear retrieval operations (work deck, processing area, surrounding water cameras) (see **Table 1** below for an example of camera locations/specifications). Electronic monitoring systems must continue to record for at least 30 minutes after the end of the haulback operation to ensure that there are recordings of the processing or discarding of all the specimens captured. The capability of initiating and ending the recording can be controlled by sensors that continuously monitor the hydraulic pressure signal and drum rotation sensors; these hydraulic pressures from the sensors should be recorded and stored by the control box.

The system must include a control box that receives and stores the raw data provided by the sensors and cameras.

A wheelhouse monitor must include a user interface to provide information about the functioning of the system and for the vessel operator to monitor the control box, and cameras. This can include details such as current date and time (synchronized via GPS/GNSS), vessel location, current hydraulic pressure reading, presence of a data disk, percentage used of the data disk, and video recording status.

The EMS should have a self-diagnostic test for functionality of the system components and record the outcome of the tests.

Table 1. Example of a four-camera system EMS deployment for pelagic longlines.

<i>Camera location</i>	<i>Action covered</i>	<i>Possible data collected</i>
Aft of the boat	Setting operation	Set position, date, time
		Total number of hooks, hook types, hooks between floats
		Bait type/species
		Bait ratio (%)
		Mitigation measures used (painted bait, tori lines, line weight)
Work deck	Catch at hauling	Species ID/composition
		Specimen sizes
		Condition (dead/alive)
		Fate (retained/discarded)
		Predators observed
	Discarding (if hauled before discarded)	Discards by set
	Discards ID/composition	
Processing area	Catch while processing	Species ID/composition
		Total catch by set
		Specimen sizes
		Sex
		Weights?
		Product type (fresh/processed)
Surrounding water area	Discarding (if discarded in the water)	Discards by set
		Discards ID/composition
		Condition of discards?

2. Standards for data storage requirements and what data are subject to those provisions

The control box must contain data storage systems adequate for the trip duration that each national program is designed to cover. Each vessel must have sufficient storage space for the specific trip duration.

Regulations relating to data storage and transmission should be flexible as new technology may allow for different ways of storing or transmitting data that are less logistically challenging or more efficient.

The system must be verified to be functioning properly before the start of each trip, remain powered on and positioned correctly for the duration of each trip.

3. Standards for data collection, review and reporting to ICCAT

Raw data (i.e. video recordings) will be managed by each CPC, which can designate a contracted EM service provider for its national program.

The review of the video footage for extraction of the data to be submitted to ICCAT should be done by the CPCs authorities directly, and/or by a contracted EM service provider assuring that EM records are analysed by a qualified and experienced EM analysts.

Each CPC must assure that the EMS should be able to collect, to the extent possible, the observer data that is required to be submitted to ICCAT (ST-09) or any subsequent update of the form.

Electronic Monitoring systems cannot fully replace all the functions of human scientific observer programs, such as biological sampling. Given that, EM should be used as a complement or supplement to such programs, and a minimum human observer coverage should still be maintained for scientific purposes. This is currently 5-10% for most ICCAT fisheries, although the SCRS has indicated in the past that higher coverages would be more appropriate.

The EMS analyses and data extraction require trained EMS analysts. One potential source are trained observers with at-sea experience, who are familiar with the fisheries and species identification. There may be the need for CPCs to train EMS analysts for their programs. The ICCAT Secretariat might be involved in providing standardized training for EMS analysts or signoff/approve training programmes implemented by each CPC, to improve and harmonize the data processing and extraction from the various national programs.

The analysis software should make entering the EMS records and generating the EM data as automatic as possible. This should include, among others, location, date, and time stamps on any activity identified by the cameras, as well as user-friendly tools to directly include information regarding the processed EMS data or reports, and generally expedite the EMS data analyses.

For measurements to be taken, catch will need to be positioned by the crew on one or more calibrated areas. A calibrated area is an area of known size, such as a hatch or area of the deck, that can be defined in the EMS analysis software (see example in **Figure 1** below).



Figure 1. Example of a calibrated hatch onboard a commercial fishing vessel. These areas will vary from vessel to vessel, depending on available surfaces and the species being measured. This image is provided as an example from a non-tuna fishery. For tuna and tuna-like fisheries, the defined areas will have to be larger to accommodate larger species.

Once data is collected, it should be subject to a quality control (QC) procedure, as is standard with most observer programmes, to ensure data quality. This procedure should be defined by each CPC and be repeatable. It may be necessary for minimum standards/requirements to be set for this procedure by the Commission.

Any conversion factors (e.g. length-length or length-weight) used by the CPCs must be reported to ICCAT and they should be the conversion factors adopted by the SCRS, when available.

CPCs are responsible for reporting the data to the ICCAT Secretariat using the ICCAT ST-09 electronic form, or any other forms that in the future might be developed and approved by the SCRS for EMS data reporting. Submission of EMS data should comply with the Task 1, 2, and 3 data submission deadlines established by the SCRS and adopted by the Commission.

4. Standards for data protection and potential privacy issues

With a decentralized program, in which each CPC is responsible for the implementation, recordings, extraction of data, and submission of data to ICCAT, the aspects relative to potential issues related to the privacy or confidentiality of the data will depend on national regulations and legislation. In a decentralized system, only the CPC that is responsible for the collection of the data has access to the original recordings. Those original data are therefore managed directly by each CPC national authority.

Data submitted to the Secretariat should follow the ICCAT Rules and Procedures for the Protection, Access to, and Dissemination of Data.