REPORT OF THE SUB-GROUP ON ELECTRONIC MONITORING SYSTEMS: PROPOSAL OF ICCAT MINIMUM TECHNICAL STANDARDS FOR EMS IN PURSE SEINE FISHERIES TARGETING TROPICAL TUNAS

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SUMMARY

This report summarizes the work that has been carried out to date by the Technical Sub-Group on Electronic Monitoring Systems (EMS), since it was originally created in 2021. We provide a summary of the main conclusions of the work that was carried out, and a proposal for draft minimum technical standards for implementation of EMS in purse seine vessels targeting tropical tunas in ICCAT fisheries. Finally, we provide a draft response to the Commission following the request contained in ICCAT Rec. 19-05 (paragraph 20).

RÉSUMÉ

Ce rapport résume les travaux réalisés jusqu'à présent par le Sous-groupe technique sur les systèmes de surveillance électronique (EMS) depuis sa mise en place initiale en 2021. Nous fournissons un résumé des principales conclusions des travaux menés ainsi qu'une proposition comportant le projet de normes techniques minimales pour la mise en œuvre de l'EMS sur les senneurs ciblant les thonidés tropicaux dans les pêcheries relevant de l'ICCAT. Finalement, nous fournissons un projet de réponse à la Commission suite à la demande contenue dans la Recommandation 19-05 de l'ICCAT (paragraphe 20).

RESUMEN

Este informe resume el trabajo realizado hasta la fecha por el Subgrupo técnico sobre sistemas de seguimiento electrónico (EMS) desde su creación en 2021. Incluimos un resumen de las principales conclusiones de los trabajos realizados, así como una propuesta de normas técnicas mínimas para la implementación de los EMS en los cerqueros cuya actividad va dirigida a los túnidos tropicales de las pesquerías de ICCAT. Por último, proporcionamos un proyecto de respuesta a la Comisión tras la petición contenida en la Recomendación 19-05 (parráfo 20) de ICCAT.

KEYWORDS

Electronic Monitoring Systems (EMS), Purse Seine Fisheries, Tropical Tunas

1. Introduction

ICCAT Recommendations 19-05 and 19-02 asked the SCRS to work with the Integrated Monitoring Measures (IMM) Working Group to develop minimum standards for Electronic Monitoring Systems (EMS). Within the SCRS this issue started to be addressed by the Billfishes Species Group in 2021. At the 2021 Billfishes intersessional meeting an EMS Sub-group was created dedicated to technical aspects of EMS and to address this Commission request. Requests for participation to all interested scientists were made during all communications with the SCRS, namely at the Species Groups and the Sub-Committee on Statistics. A list of the current Subgroup participants can be consulted in **Annex 1** of this report.

During the 1st phase of the work that took place in 2021, the Subgroup compiled a list of previous EMS works, focusing on reviewing EMS data collection in comparison with human observers. Each paper was assigned a reviewer within the members of the Subgroup. The main outcomes of these revisions were presented to the SCRS in 2021 under document SCRS/2021/165 (Anonymous, 2021).

During 2022, most of the work focused on developing the minimum standards for pelagic longline fisheries, that were presented to the Sub-Committee on Statistics (SC-STATS) during the SCRS Species Groups Meetings in September 2022, and afterwards adopted by the SCRS plenary (Anonymous, 2022).

For purse seine fisheries, it was noted there were already minimum standards agreed by the SCRS for fleets that voluntarily wished to adopt and implement those (see Ruiz et al. 2017, and the Recommendations that are contained in the Reports of the SCRS in 2016 and 2017). In 2022, it was also noted that the minimum standards for EMS in purse seine fisheries should also be addressed by the Sub-group, as well as other fisheries (e.g., gillnets) at a later stage.

During 2023, the main task of the Sub-group focused on purse seine fisheries targeting tropical tunas. This paper summarizes the work carried out for the purse seine fisheries, and presents a proposal with the draft Minimum Technical Standards for EMS in purse seines targeting tropical tunas in ICCAT fisheries. We also provide a draft response for the commission request within ICCAT Rec 19-05 (paragraph 20).

2. Comparison of what can be recorded with EMS vs human observers for purse seiners targeting tropical tunas

The work of the Subgroup during early 2023 focused mostly on completing and discussing what data can be recorded with EM systems versus at-sea human observers. As was previously done in 2021 and 2022 for pelagic longline fisheries (Anonymous, 2022), the comparison was carried out using ICCAT form ST-09 that is currently used for reporting at-sea observer data (Form A on fishing activity, Form B on catches and Form C on samples).

The outputs of this comparative work are presented in **Annex 2** of this report.

3 Proposed Draft ICCAT Minimum Technical Standards for EMS in for purse seiners targeting tropical tunas

Finally, the last phase of the work of the Subgroup during 2023 was to create a draft proposal for ICCAT minimum standards for EMS in pelagic longline fisheries. This draft proposal is presented in **Annex 3** of this report.

4. EMS terminology

EMS uses specific terminology such as EM records, EM analysis, EM data, etc. It will be important in the near future to have such terminology clearly defined. In this document we do not provide specific definitions of terminology as the Subgroup has not addressed this issue. But we provide here links to the work of other t-RFMOS that can be used as a basis for ICCAT in the interest of t-RFMO harmonization, namely for IOTC[1] and IATTC[2].

5. Draft answer to Commission request (ICCAT Rec 19-05, paragraph 20)

Following the Commission request contained in Rec 19-05 (paragraph 20) a Subgroup within the Billfishes Species Group was created in 2021 to address this issue.

The Subgroup worked inter-sessionally between 2021 and 2023. In 2021 most of the work was a revision of the knowledge, with the main conclusions presented in Anonymous (2021). In 2022, the Sub-group addressed the pelagic longline fisheries, with a comparison of what could be collected with human observers vs EMS and drafted the minimum standards for EMS in pelagic longline fisheries. This work was presented to the Sub-Committee on Statistics and adopted by the SCRS in 2022 (Anonymous, 2022). In 2023, the work of the subgroup focused the purse seine fisheries targeting tropical tunas, with a comparison of what data could be collected by human observers versus EMS, and created the draft proposal for ICCAT EMS minimum standards for pelagic longlines.

With regards to pelagic longline fisheries, the summary of the main work and conclusions from the Subgroup is presented in document SCRS/2022/165, and **Annex 3** of that document provides specifically the ICCAT EMS minimum standards for pelagic longlines that was adopted by SC-STATS and the SCRS.

With regards to purse seine fisheries targeting tropical tunas, the summary of the main work and conclusions from the Subgroup is presented in this document SCRS/2023/151. **Annex 3** provides the proposal of the ICCAT EMS minimum standards for purse seines targeting tropical tunas, that is now pending approval by the SC-STATS and the SCRS.

[1] Definitions in Annex 1 of IOTC Resolution 23/08 on Electronic Monitoring Standards for IOTC Fisheries: https://iotc.org/sites/default/files/documents/compliance/cmm/iotc_cmm_2308.pdf

[2] IATTC Resolution C-21-03 Definitions used in the implementation of an Electronic Monitoring System for the tuna fisheries of the Antigua Convention Area https://iattc.org/GetAttachment/a5d41968-7690-4bf2-9089-809394a89752/C-21-03-Active_Electronic-Monitoring-System-(EMS)-Definitions.pdf

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Annex 1

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Annex 2

Tables with comparison between what can be recorded with human observers versus EMS, using the current ICCAT ST-09 data fields for Purse Seine (PS) fisheries targeting tropical tunas. We provide here 3 tables, namely for each form (A, B and C) contained in file ST-09, specifically: Form A - fishing activity, Form B – Catches, Form C – Samples.

ST-09A DATA FIELDS			*Reported by human observers?*	*Reported by EMS?*	*Comments*
Fishing operations & fleets	Fish. Oper. (FO)	FO group ID	Not applicable	Not applicable	Coding variable applied post-processing
	Fleet attributes	Flag of Vessel (cod)	Yes	Yes	Might be obtained from EMS instalation ID
		Base port/zone	Yes	Yes	
		Vessel (size class)	Yes	Yes	
Temporal attributes	Year, month/trimester	Year	Yes	Yes	Onboard equipment should integrate GPS or VMS as a minimum standard.
		T. Period (ID)	Yes	Yes	
Geographical attributes	Resolution and position (Lat, Lon)	Square type (cod)	Yes	Yes	
		Lat (centroid) (± dd.ddd)	Yes	Yes	
		Lon (centroid) (± dd.ddd)	Yes	Yes	
Effort attributes	All fishing gears	Gear group (cod)	Yes	Yes	
		Nº vessels	Not applicable	Not applicable	Grouping variable applied post-processing
		Nº Fish. Oper. (observed)	Not applicable	Not applicable	Grouping variable applied post-processing
		Fish Oper. Type (cod)	Yes	Yes	
		School type (cod)	Yes	Yes	Based on different data sources, such as vessel track previous to the set, catch composition, speed boat images, FAD images.

ST-09A DATA FIELDS			*Reported by human observers?*	*Reported by EMS?*	*Comments*
	Longline (LL) only	LL type	Not applicable to PS	Not applicable to PS	
		Nº hooks (total)	Not applicable to PS	Not applicable to PS	
		No. hooks (observed)	Not applicable to PS	Not applicable to PS	
		Hook type (main)	Not applicable to PS	Not applicable to PS	
		Set depth (hooks per basket)	Not applicable to PS	Not applicable to PS	
Mitigation measures (MM) on bycatch species	Seabirds	MM 1	Not applicable to PS	Not applicable to PS	
		MM 2	Not applicable to PS	Not applicable to PS	
	Other bycatch	MM 3	YES	YES	
	Additional notes	Description (MM)	Not applicable to PS	Not applicable to PS	

ST-09B DATA FIELDS			*Reported by human observers?*	*Reported by EMS?*	*Comments*
Catch composition by fishing operation	Fish. Oper. (FO)	FO group ID	Not applicable	Not applicable	Coding variable applied post-processing
	Species (attributes)	Species (cod)	Yes	Yes	Normally yes, but there could be difficulties in reaching the species level in some species groups. High-resolution cameras should improve species identification. For some taxonomic groups (e.g., turtles) the crew could be required to place the specimens in designated areas (e.g., calibrated areas) that would improve species identification and allow taking additional information such as sizes and condition.
		Targeted (Y/N)?	Yes	Yes	Might be possible to integrate with additional info from logbooks
	Catches (retained)	Weight (kg)	Possible	Possible	For retained catch it might be necessary to integrate with additional information from logbooks or port sampling. EMS trials tried to estimate species composition by set, but without consistent results; we note that human observers have the same difficulty when estimating species composition. Because of the large catch volumes that can result in a set, and the speed with which the fish are put into the wells, species composition estimates – especially bigeye and yellowfin proportions– are likely more accurate if done via port sampling. Artificial intelligence applied on the conveyor belt showed preliminary promising results.
		Product type (cod)	Yes	Yes	
		Number (catch number)	Possible	Possible	
	Discards (Number)	Dead (DD)	Yes	Possible	Discards of tunas are usually composed of dead discards and can be estimated. The condition of other discarded species (e.g., sharks) can be doubtful. For discarded specimens, they can be released in various areas, so it would be necessary to either have more cameras or require that the releases are always done in the same place, although there may be logistic difficulties. Observers also face similar difficulties, as they cannot monitor the main and wells' decks simultaneously.
		Alive (DL)	Yes	Possible	
		Unknown	Yes	Yes	
	Sampling (data)	Nº sampled	Yes	Yes	

ST-09C DATA FIELDS			*Reported by human observers?*	*Reported by EMS?*	*Comments*
Specimens & fishing operations (FO)	Specimen Identifier	Unique specimen ID	Not applicable	Not applicable	Coding variable applied post-processing
		FO group ID	Not applicable	Not applicable	Coding variable applied post-processing
		Species (cod)	Yes	Yes	Normally yes, but there could be difficulties in identifying to species level in some species groups (look-alike species). High-resolution cameras should improve species identification. For some taxonomic groups (e.g., turtles) the crew might be required to place the specimens in designated areas (e.g., calibrated areas) that would improve species identification and taking additional information such as sizes and condition.
Biological data (observed)	Sex	Sex (cod)	Possible only in some cases	No	Handling bycatch in PS is more complex than LL, as the bycatch can be processed in several different places onboard. For observers, sex might be recorded only for elasmobranchs and turtles (visible externally), but because priority is given to quick release, this is not always achievable. For EMS it might be visible in very few cases. Additional cameras would be needed in specific and various places where bycatch is released. Current EMS configurations have the starboard camera too far away to distinguish the sex. For the target tunas it is not possible to collect sex information with either Human observers or EMS.
	Size	Length (cm)	Yes	Possible only in some cases	Retained specimens are passed through one specific area (i.e., conveyor belt) so it could be possible to have a calibrated area defined for taking size samples. For discarded specimens, they can be released in various areas, so it would be necessary to either have more cameras or require that the releases are always done in the same place, although there may be logistical difficulties.
		Size class type (cod)	Yes	Possible only in some cases	

ST-09C DATA FIELDS			*Reported by human observers?*	*Reported by EMS?*	*Comments*
	Weight	Weight (kg)	Yes	Possible in some cases but need adaptations	Both human observers and EMS can only do that in vessels that have scales, for taking individual weight of specimens. Most vessels don't have these onboard. If the vessels have scales, then the human observers can take weights directly. For EMS might be possible to put cameras facing the scales, or there might be a way to connect the scales to the EMS directly
		Product type (cod)	Yes	Possible in some cases but need adaptations	
	Samples obtained (Y/N)	Genetics (YN)?	Yes	No	Only possible to do biological sampling with human observers
		Otoliths (YN)?	Yes	No	
		Stomach (YN)?	Yes	No	
		Gonads (YN)?	Yes	No	
Release attributes and others	Condition (external injuries)	Released (YN)?	Yes	Yes	
		Injuries (scale)	Yes	Possible only in some cases	Discards of tunas are usually composed of dead discards. The condition and injuries of other discarded species (e.g. sharks, turtles) can be doubtful.
	Others	Tag number	Yes	No	
		Notes	Yes	Yes	

Annex 3

Draft ICCAT Minimum Technical Standards for EMS in purse seiners targeting tropical tunas

Objectives

For the SCRS, the priority for electronic monitoring systems (EMS) is to implement them in a way that will allow the collection of fisheries data that are usable for scientific purposes. The EMS should be designed in a way that complements, and to the extent possible, are consistent with what is currently collected by human scientific observers. The SCRS also recognizes that EMS are also being used for compliance and other purposes. As such, EMS should 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 to address both objectives.

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 regards to the implementation of ICCAT's minimum standards for scientific observer programs (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.

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, 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 for a faster implementation of the updated minimum standards, that can be reviewed and adapted as needed in the future.

Standards described in this document[3]

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 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 to 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.

Purse seine vessels should be equipped with a sufficient number of cameras to allow data collection to the required standards, noting that the number of cameras should be tailored to the specific types of vessels to ensure adequate coverage (e.g., large purse seiners with conveyor belts will need more cameras). See the table below for the minimum areas to be covered in purse seiners, with sufficient resolution to determine the number, species, sizes and other details of the capture, and processing operations. An example of a 7-camera system to cover those areas is provided in **Figure 1**.

Crew should ensure that all specimens that are caught, even those that are released, are handled in a manner that enables the video system to record such specimens to the extent possible.

In most cases, video will be the primary data collection method, but it may be possible for some CPC's 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 fishing action covered. 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.

[3] For definitions see IOTC EM Terms and Definitions adopted by the IOTC Commission (See Definitions in Annex 1 of IOTC Resolution 23/08 on Electronic Monitoring Standards for IOTC Fisheries: https://iotc.org/documents/electronic-monitoring-standards-aus)

The EMS should operate independently 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 purse seine vessels, the EMS should be capable of initiating video recording, and record only during the period of operations that must be recorded according to ICCAT requirements (e.g., setting, brailing, sorting, discarding, FAD deployment-retrieval-visit) (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 brailing 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; 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 recorded 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 the minimum areas that should be covered with EMS deployment for purse seines. Note that some of the areas (e.g., conveyor belt) might need more than one camera to fully cover the activities.

Camera location	*Action covered*	*Possible data collected*
Work deck (Port side)	Brailing	Total catch by set
	Tuna discards	Total tuna discards by set
	Bycatch handling	Bycatch estimation
Work deck (Starboard side)	Bycatch handling	Bycatch estimation
In-water purse seine area	Brailing	Total catch by set
	Bycatch handling of big species (e.g., whale sharks, manta rays)	Total bycatch by set Best practices
	Bycatch release of big species (e.g., whale sharks, manta rays)	Total bycatch by set Best practices
Foredeck or amidships	FAD activity (deploying, replacement, reparation…)	Total number of FAD activities by trip and FAD design.
Well deck and conveyor belt	Catch well sorting	Species composition
	Bycatch discarded, released or retained	Total bycatch by set Species composition

Figure 1. An example of a 7-cameras EMS (4 in the upper deck and 3 in the well deck) installed in a purse seiner covering main areas of fishing and fishing handling operations including 1 more camera in the conveyor belt: (B1) 360˚ Panoramic view camera (e.g port side view), (B2) Crows nest stern view camera, (B3) Working deck crane camera view , (B4) Foredeck view camera, (B5) Conveyor belt stern camera view, (B6) Conveyor belt middle camera, and (B7) Conveyor belt bow camera (source: Digital Observer Services).

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 duration of the trip 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

EMS raw data (i.e, video recordings) will usually be managed by each flag CPC, which can designate a contracted EMS 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 EMS service provider assuring that EMS records are analyzed by qualified and experienced EMS 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 using the ST-09DomObsProg electronic form 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, EMS 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 100% for purse seine vessels targeting tropical tunas as per Rec. [22-01].

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, if the Commission so decides.

The analysis software should make entering the EMS records and generating the EMS 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.

In tropical tuna purse seine fisheries, catch per set tends to be very large and processed very quickly, which makes it difficult to take size measurements onboards either with EMS or human observers. This may change for EMS with developments in Artificial Intelligence, but until then it is probably necessary to rely on sampling in port. Measurements could be taken in specimens from species that are discarded (e.g., sharks, turtles), and for that the 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 2** below).

Figure 2: 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 (image source: CEFAS).

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 adopted 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-09DomObsProg 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 issu**es.**

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" adopted by the Commission in 2022.