ELECTRONIC MONITORING PILOT FOR INDUSTRIAL AND ARTISANAL LONGLINES (FIPS DORADO & ESPADA)

Motherships with ample cargo capacity, a full crew, and autonomy for 30-day voyages.

Operation:

- They set sail from port with associated artisanal vessels (“fiberglass boats”).
- They serve as a base: storing catch, supplies, and fuel.
- The mother ship also carries out fishing sets.
- They make it possible to extend both the fishing range and the time at sea.

TYPE OF VESSELS: DESCRIPTION AND OPERATING MODEL

Handmade boats (fiberglass) with limited hold capacity and reduced crew (2–3 people).

Operation:

- They operate in conjunction with nurse vessels, returning periodically to transfer the catch and replenish supplies.
  - They are responsible for making longline casts and returning to the mother ship for unloading.
- High dependence on the logistics of the wet nurse.

TYPE OF VESSELS, DESCRIPTION AND OPERATING MODEL

EXECUTIVE SUMMARY

- The ME longline pilot for the Dorado and Swordfish fisheries in Ecuador is being carried out on four motherships and two fiberglass vessels to demonstrate the technical feasibility and operational value of future species identification, size, condition, and fate.
- Implementation is aligned with the provisional minimum standard (Res. C-24-09), with specific gaps in critical views (Artisanal <20 m), longline table data, and VMP formalization/data management.
- Specific non-binding guidance recommendations for mothership fleets + fibers are proposed to generate comparable evidence 2025–2027.
- A voluntary KPI dashboard and activity timeline are suggested to address gaps in next steps and provide input into the 2027 review.
- The proposal does not modify obligations; it seeks to harmonize practices and highlight the progress of the Conservation Mahi Mahi and Swordfish.Ec FIPs for nurse-needle longline fisheries.

OBJECTIVE AND CONTEXT

Aim

- Present results and lessons from the ME longline pilot (FIPs Dorado & Espada) against the provisional standard C-24-09.
- Visualize FIP progress and operational gaps identified in views, data, and management, while maintaining vessel confidentiality.
- Propose recommendations and tools that are currently non-binding (nursery fiber appendix, expanded data, QA metrics) to generate comparable evidence by 2027.

Context

- Resolution C-24-09 establishes provisional minimum ME standards for long-distance tuna purse seine and longline industrial vessels; its revision is planned for 2027.
- CIAT's GTME is the technical forum for sharing pilot evidence, harmonizing practices, and preparing inputs for review.
- The presentation is for informational and guidance purposes only (non-binding).

PILOT SCOPE (COVERAGE, EQUIPMENT, PROTOCOLS)

- **The Boats:**
  - 4 industrial: 3 of 20–24 m and 1 >24 m.
  - 2 <20 m craft
- **ME Industrial Equipment:**
  - Central unit
  - 1–5 cameras per vessel
  - Sensor GPS
  - Encrypted storage with Backup
  - UPS; Battery Backup
- **ME Artesanal All-in-One Equipment**

AREA OF OPERATION: FAO 87.

- Covers installed:
  - **Industrial: Starboard, Fishing deck and stern (depending on vessel)**
  - **Handmade: stern mast (visualize the deck towards the bow).**
- Protocols:
  - **VMP / PME: Vessel Monitoring Plan per vessel.**
  - **Chain of custody of information**
  - **Revision**
  - **Quality Assurance (QA)**
  - **Confidentiality**

INSTALLED EQUIPMENT

zunibal

datafish

The central unit, cameras, GPS, UPS, and peripherals were supplied and installed following the technical procedures established by ZUNIBAL, with the assistance of its specialized TUNASAT team and supervision by DATAFISH.

This process ensured that each camera was properly positioned and calibrated, ensuring proper operation and the required electronic monitoring of the "Nodriza" longline fleet.

LOCATION OF THE NURSE CHAMBERS

Starboard

Starboard Deck

Port Deck

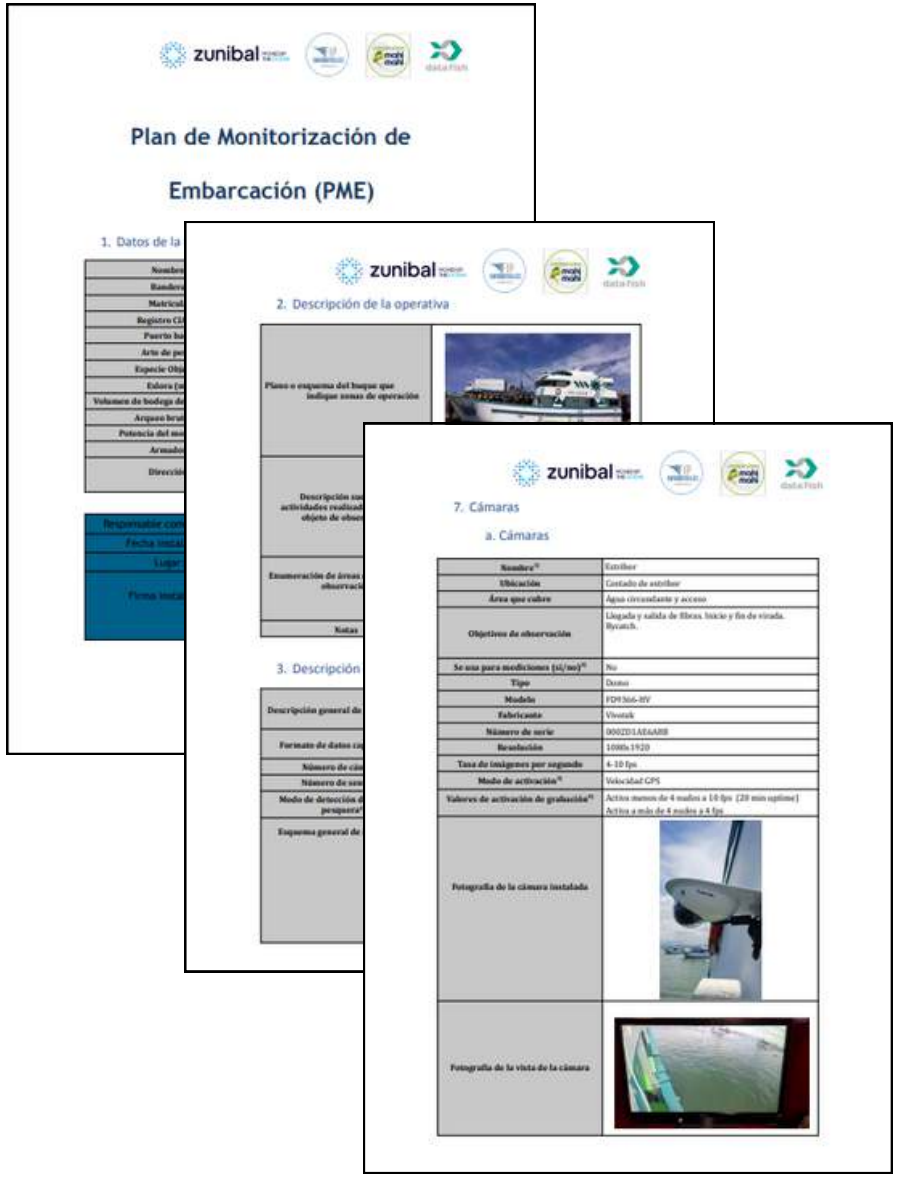
NURSE COVERAGE

Name[1]	Starboard	Starboard Deck	Port Deck
Location	Starboard side	Starboard Deck	Port Deck
Area covered	Surrounding water and access	Catch turn zone	Processing area and wine cellar hatch
Observation objectives	• Arrival and departure of fibers. • Start and end of turn. • Bycatch.	• Identification of catches, size, weight, sex • Identifying interactions with ETPs • Identification of discards	• Catch identification, size, weight, sex • Start and finish of the start
Resolution	1080x1920		
Viewing angle	108th		
FPS	4-10 fps		
Activation mode[3]	GPS speed		
Recording Trigger Values[4]	• Active less than 4 knots at 10 fps (20 min uptime) • Active at over 4 knots at 4 fps		

TEAM AND ARTISANAL COVERAGE

Name[1]	Pop
Location	Stern mast
Area covered	Deck and surrounding water
Observation objectives	• Start Turn • Identification of catches, size, weight, sex • Identifying interactions with ETPs • Identification of discards
Resolution	1280X720
Viewing angle	120th
FPS	4-10 fps
Activation mode[3]	GPS speed
Recording Trigger Values[4]	• Active less than 4 knots at 10 fps (20 min uptime) • Active at over 4 knots at 4 fps

VMP / PME: VESSEL MONITORING PLAN

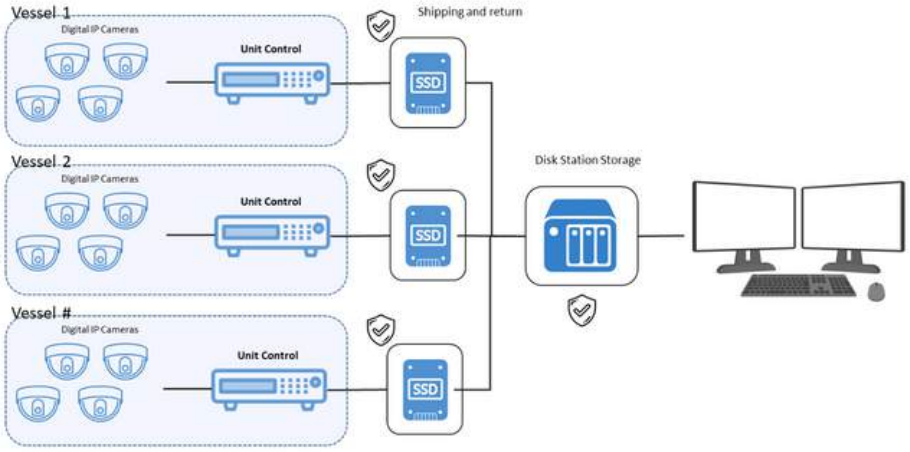


Drafting of the monitoring plan for each vessel, collecting all key data on the vessel, installation, and equipment:

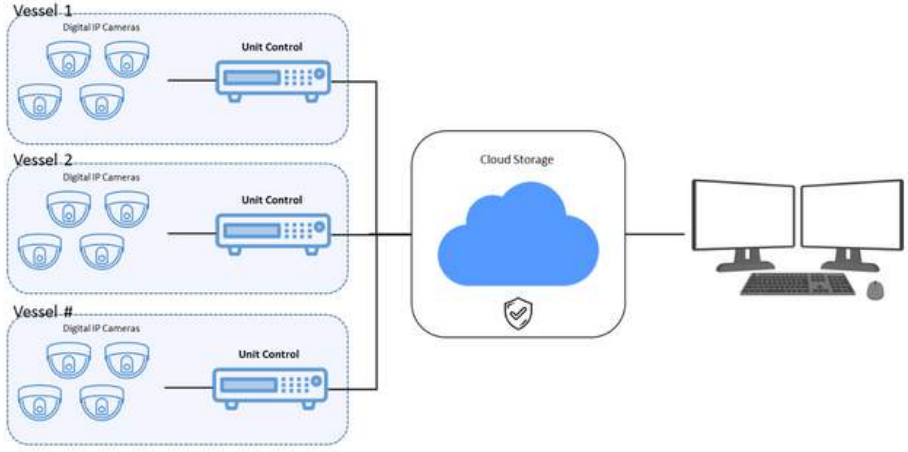
- Vessel details: name, registration, home port, type of fishing.
- Description of the operation and observation objectives
- EM system description: cameras, sensors, GPS, CPU, peripherals and their location.
- Recording settings and installation evidence.
- Data storage: How and when videos and data are transferred.

DATA FLOW

Disk-Based Flow



Cloud-Based Flow



Operational and data flow

- On-board capture (cameras + GPS/sensors).
- Extraction at the end of the trip (with backrest).
- Encrypted transmission (Wi-Fi/cellular/satellite or physical delivery).
- Review and Quality Assurance (QA) by authorized analysts.

Currently, the 2TB removable SSD drives are manually removed at the end of each trip. In the next phases of the project, the project will migrate to a cloud-based solution, equipping the wet nurses with the appropriate communications equipment.

ZUNIBAL ANALYSIS SOFTWARE

The ZuniRem system, developed and manufactured by Zunibal, is used to review the information.

The ZuniRem system enables efficient analysis by synchronizing all the information collected during the vessels' fishing activities, including geographic location, speed, heading, and the status of various resources installed on board, and by automating record-taking.

REVIEW PROCESS

The Quality Assurance (QA) Review process is a fundamental step in the Electronic Monitoring system implemented by the Spanish company DATAFISH. This activity is performed exclusively by authorized analysts, who have the necessary training to ensure the reliability of the data generated.

PROTOCOLS

Operational (BEFORE, DURING, AFTER)

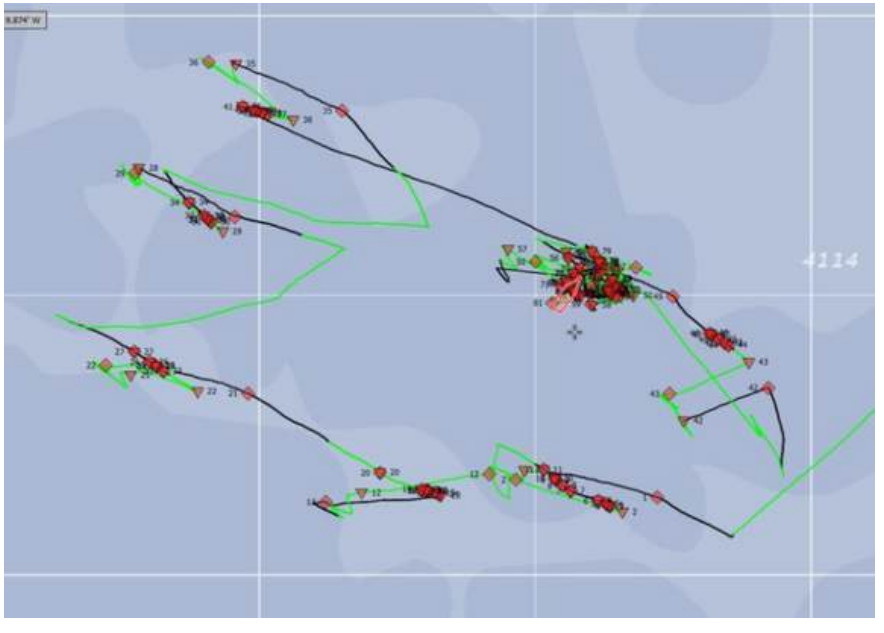
- PREVIOUS: Installation planning
- BEFORE: Clean lenses; check cameras and framing; check GPS signal and time synchronization; check power and disk space.
- DURING: Avoid obstructions; ensure critical view coverage (fish door/stern); mark events.
- AFTER: Quick review; incident log; safekeeping of assets; end-of-trip checklist; internet connection for sending records

TEMPLATES AND RECORDS

- Daily and pre-event checklist (lens cleaning, framing, time/GPS, power/disk space).
- Incident log (obstructions, backlighting, faults, corrective actions).
- Withdrawal/transfer form (hash, custodians, date-time).
- Contingency report (camera/SSD failure; measures taken; notifications).
- Weekly Quality Assurance (QA) summary (uptime, issues, latency).

OPERATING RESULTS

- Summary of the results of the first tide analyzed
- The collected disc contains the total recording of 20 analyzable days and 13 complete throws made.



OPERATING RESULTS

B: destination to hold DM: destination returned to the Dead Sea DV: destination returned to the living sea LPM: destination released by its own means

CAPTURE SUMMARY

- The only images analyzed by DataFish are those of the nurse vessel itself, so the catches reported correspond to the nurse vessel's catch and those downloaded by the fibers.

- The number of specimens captured by species and their destination are identified below.

SPECIES	B	DM	DV	LPM	Total general
BUT	1				1
BSH	59			1	60
BXQ	1				1
CUT		2			2
GO	1112				1112
FAL	1				1
MLS	5				5
MFA	1				1
PLS			28		28
PSK		6			6
PUSH		1			1
SMA	2				2
SSP	7				7
SWO	15				15
THR	4			1	5
THE	44				44
WAH	3				3
WAH	1				1
WHH	10	1			11
Total general	1266	10	28	2	1306

It is proposed to report these KPIs voluntarily, with quarterly values and trends:

Indicator	Definition	Base calculation	Quarterly value
Effective coverage	% of sets with complete views (boarding/discarding)	sets with full views / total sets	_____
Identifiability	% of individuals with verifiable species + fate	verifiable individuals / total individuals	_____
Uptime ME	% of system uptime	ME OK hours / browsing hours	_____
Latency to validation	Days from end of trip to validated data	average (days)	_____

Notes: Disaggregate by vessel size where possible; maintain confidentiality (Vessel 1–6).

FUTURE ACTIONS

With the goal of strengthening and improving the Electronic Monitoring project and ensuring greater efficiency in information management, the following actions are proposed for the second phase:

1. **Migrating hard drives to cloud solutions: Implement a cloud storage system that facilitates secure access, centralizes information, and reduces risks associated with physical data loss.**

2. Activate remote alarm systems: Enable internet connection to activate remote alert systems in real time, ensuring reliable fishing activity and contributing to the timely detection of technical failures in monitoring equipment.

3. Validation and development of KPI panels: Establish a reporting process for each voyage of each mother ship, facilitating performance evaluation and evidence-based decision-making.

PROPOSED NEXT STEPS

Installation and technical adjustments:

- Reorient critical views on artisanal vessels under 20 m (e.g. fish door)
- Validate standard location and orientation on all industrial vessels larger than 20.
- Update forms with expanded data fields.
- Share the abbreviated version of the VMP according to the size of the vessel.

Quality Management and Training: Operate the QA dashboard, consolidate the "Annual Electronic Monitoring Summary by Fleet," train crew and analysts, and implement internal incident review.

Testing and validation: Perform A/B testing (e.g., side view; fps ⩾5), apply before-and-after series analysis, and develop technical sessions within the framework of the GTME 2026–2027, in order to consolidate evidence for the standard revision.

Reporting templates: Design and implement fishing trip report templates that comply with the standard's guidelines.

RECOMMENDATIONS TO THE GTME

- Analyze in the future a guiding annex on nurseries and fibers in Resolution C 24 09 and the expanded data package (voluntary).
- Agree on a core KPI dashboard (voluntary) and schedule of technical sessions 2026–2027 for pilots.
- Facilitate the exchange of templates (VMP, glossary, evidence) and a repository of illustrative cases.

CLOSING AND QUESTIONS

- The pilot demonstrates the viability and value of ME in longlines.
- Guidelines for generating evidence and comparability with CIAT's provisional minimum standard until 2027.