DRAFT Pacific Islands Region Longline Electronic Monitoring Program; Vessel Monitoring Plan Guidance Document

Vessel Monitoring Plan

A vessel monitoring plan (VMP) describes how an electronic monitoring (EM) system is configured on individual vessels and how fishing operations must be conducted to effectively monitor catch and discards including bycatch of fish and protected species. The VMP provides clear objectives and outlines EM program requirements and documents specifics of EM installation on individual vessels. Specifically the VMP would include information on the hardware that makes up the system, the EM system operations, and the operators responsibilities for operation, maintenance, reporting, and data retrieval.

The EM equipment identified in the VMP would be reviewed by NMFS for adherence to minimal standards and the VMP would be reviewed and approved by NMFS as part of the vessel's EM approval process. A vessel electing or required to use EM as part of the Pacific Islands longline EM program may work with a selected or approved service provider to develop a VMP for NMFS approval. This document includes guidance for selected EM service providers on what needs to be included in an individual vessel VMP in the region and the NMFS approval process and timeline.

VMP Submission and Approval Timelines

It is expected that vessel owners/operators would work directly with NOAA approved EM service providers to develop VMPs that satisfy regulatory reporting requirements and establish vessel-specific catch handling procedures that meet program objectives. The service provider would submit VMPs on behalf of vessel owners for agency approval.

If modifications are made to a vessel with an approved VMP, a revised VMP may be required to be submitted to the agency and approved prior to fishing. Modifications requiring agency approval could include: changes to deck configuration, repositioning cameras, addition/removal of a camera, changes to catch handling, discard control point adjustments, new vessel owner, system replacement, etc. New or revised VMPs would be submitted to NMFS for approval prior to a vessel's intended departure date. Vessel owners or their contracted service providers should consider the approval timeline and the vessel's anticipated fishing start date when submitting VMPs to ensure the required time for approval is provided.

Discussion Topics:

1) Need to ensure consistency with Council recommendations and draft regulations that allow single vessels to have VMPs revised at any time with mutual agreement between all parties. This could include new contact information, change in vessel-specific camera orientation, or vessel-specific defined areas on the vessel deck (see subsequent sections)
2) If VMP requirements or general characteristics affecting numerous vessels are proposed, then it would be subject to Council review

Burn-In Trips

A vessel would need to have a NMFS-approved VMP to meet monitoring requirements. As part of the VMP approval process, vessels may need to complete a "burn-in trip" to demonstrate the EM system is functioning properly, camera views are sufficient, and to ensure the crew understands catch handling requirements. A burn-in trip is where a vessel runs their EM system and follows catch handling protocols outlined in the VMP to allow NMFS to determine if the VMP is suitable for approval. A burn-in trip may be required upon the initial VMP application submission or for certain VMP system modifications. A burn-in trip may be waived if no testing is necessary to ensure the EM system is functioning properly. Once a draft VMP is submitted, the agency will determine if a burn-in trip is required and will communicate the requirement to the vessel owner or service provider.

If a VMP approval requires a burn-in trip, NMFS would coordinate with the provider and vessel to determine eligible trips. Burn-in trips may be eligible for Pacific Islands Regional Observer Program (PIROPS) or human At-Sea Monitor coverage and, if selected, the vessel is required to carry the observer. NMFS or the provider would conduct an evaluation of the burn-in trip and complete an evaluation form (see Table 1).

Discussion Topics:

1) It would provide a formal check for each vessel after installation, verifying both equipment functionality and vessel compliance. Data could be used if the vessel passes the check(s). The logistics of implementing this process would need to be coordinated between PSMFC and FRMD. Feedback could be provided to vessel operators in this initial process.

Vessels Evaluation

The vessel operator and crew would need to comply with all catch handling protocols and other requirements described in the VMP, including pulling unboarded catch, including protected species, alongside the vessel and processing any boarded discards within view of the cameras and consistent with the vessel monitoring plan. The VMP would be required to be onboard the vessel at all times. EM could be used to audit operator completed logbooks for catch including catch of, and interactions with, protected species.

Table 1. Sample Burn-In Trip Evaluation Form

Assessment		
System Operations and Functionality	Pass	Fail
System check completed prior to departure (*cameras recording prior to departure*)		
System was not manually shut-down prior to the end of the trip		
GPS/Sensor Data intact and properly logged		
Camera array captures all activity, meets requirements for specific gear category		
Cameras are securely mounted		
Camera views remained operational throughout trip		

There were minimal concerns with system impairment		

On Deck Operations and Catch Handling	Pass	Fail
Vessel's overall adherence to their VMP catch handling protocols		
Crew pulled species that were not brought onboard alongside the vessel in the view of the camera before release		
Crew complied with usage of discard control points of boarded species (All discarding events took place in camera view at established discard control points)		
Crew did not intentionally or unintentionally obstruct camera views during fishing operations		
Cameras were maintained (cleaned when necessary) throughout the trip		

Example VMP Template

VMPs would include information similar to the information outlined below. Outlined are the basic components of a Pacific Islands longline VMP and are likely necessary for the successful operation of the EM Program. The information in below **bold** is an example of information that would likely be included in a Pacific Islands longline VMP.

I. General Information

Information on the VMP submission date and version number must be included.

Table 2. VMP Date and Version

VMP Submission Date:	
VMP version number:	

The following vessel identification items would likely be included: vessel name, vessel ID, home port, primary landing port(s), gear type(s) to be used (e.g. shallow and/or deep), name of vessel owner and their contact information, and primary point of contact if different from owner.

Table 3. Vessel Summary

Vessel Name:	
Vessel ID:	
Home port:	
Primary landing port(s):	
Gear type(s) to be used:	
Vessel Owner name:	
Owner Address:	

Owner Email:	
Owner Phone number(s):	
Vessel Primary Point of Contact: (if different from owner)	
Vessel contact Address:	
Vessel contact Email:	
Vessel contact Phone number(s):	

II. Provider Support and NMFS Contact Information

All VMPs would include a list of EM provider and agency contact information for vessel operators. Vessels participating in the Pacific Islands longline EM program must maintain current federal permits and continue to meet standard vessel reporting requirements including trip notification requirements at 50 CFR 665.803 (Notify RA of trip departure date and trip type 72 hrs before departing). If the vessel is longer than 50 ft (15.2 m), it must also carry an operational NOAA Enforcement-owned and installed VMS unit onboard whenever the vessel is at sea. Contact numbers for trip notification and for the NOAA Office of Law Enforcement would also be included as seen in Table 5. below.

Table 4. EM Provider Contacts

TITLE (NAME)	CONTACT #	EMAIL
EM Provider 24-hr Technical Support		
Technician Assigned to Vessel		
EM Program Manager		
Provider Weekend or Alternate Contact		
Software Support Staff		

Contact		

Table 5. NMFS EM Contacts

TITLE (NAME)	CONTACT #	EMAIL
VMS Support		
Trip Notification		
Data Request Information		
PIRO EM Lead		
PIFSC EM Lead		
American Samoa		
NOAA Office of Law Enforcement		

III. EM System Overview

The VMP should include the following overview of EM equipment:

- **Your vessel is equipped with an electronic monitoring system consisting of cameras, GPS, gear sensors, user interface, and a control center.**
- **The system will continuously record GPS coordinates, hydraulic pressure, and rotation sensor data while powered.**
- **High-definition video will be recorded from rail and deck view cameras before, during, and after fishing activities as measured using hydraulic system pressure changes and drum rotation data.**
- **More specific information about your EM system is provided in *Section V – System Specifications and Installation Summary.***
- **Specifies when cameras are recording and any impacts to privacy**

This section is for vessel operator awareness regarding the system and notifies that there could be periods of reduced privacy when vessels are operating with EM systems

IV. Vessel Owner/Operator Responsibilities

This section would outline the likely vessel owner/operator responsibilities in the EM program. The VMP, at a minimum, would likely include the following vessel requirements:

Please turn your EM system on and confirm function 72 hours prior to leaving the dock. The EM system shall remain powered on for the duration of each trip, even if an observer is present. Click end trip and turn the system off when you return to the dock. System operation details are included in this section.

EM Requirements

- **Carry on board the vessel's approved VMP and make the VMP available for review at all times. The vessel is prohibited from fishing in an EM program without a NMFS-approved VMP.**
- **Comply with requirements outlined in the VMP.**
- **The EM system must be operated continuously for all fishing trips after installation (see exceptions for equipment malfunctions)**
- **Ensure that no person tampers with, disconnects, or destroys any part of the electronic monitoring system, associated equipment, or recorded data.**
- **When requested, provide NMFS or a NMFS service provider access to your vessel to collect data and service the EM system.**
- **Contact the EM service provider if there has been a lapse of 30 days or more between trips, to review protocols and verify the system is functioning before departing on the next trip.**

Each Trip

- **The EM system must operate on all trips from the vessel's time of departure from a port until its return to a port.**
- **Confirm Hard Drive Storage Space: The vessel operator should ensure that the system has adequate storage to record the entire trip. The vessel operator should carry one or more spare hard drives, sufficient to record the entire trip, as a back-up. If you are out of hard drives or are concerned you might run out of hard drives, contact your regional technician for assistance.**
- **Power: Maintain uninterrupted electrical power to the EM unit for the duration of the trip.**
- **Function Test: Prior to leaving port, the vessel operator should turn the system on and conduct a system function test following the instructions provided in *Section VI – System Testing and Troubleshooting.* If the function test identifies a malfunction, the vessel operator should follow the troubleshooting guidelines listed in *Section VI – System Testing and Troubleshooting.***

Discussion Topics:

1) Are pre-trip tasks for vessel operators reasonable and feasible?
2) Could a PSMFC staff determine how much hard drive space is available or is this a simple means to determine by vessel operator?
3) Will operators be provided a new hard drive, back-up, or a set of spares? (see below for Post-Trip requirements)

Each Haul

- **Prior to each haul, the vessel operator should:**
    - **Verify that all cameras are operational, and all sensors and other EM system components are functioning as instructed in *Section VI – System Testing and Troubleshooting.*** Note: this requirement may not apply, contingent on EM hardware and service provider.
    - **Check the viewfinder monitor and verify that the camera views are clear, unobstructed, and consistent with the images provided in *Section V – System Specifications and Installation Summary*. Ensure lighting is sufficient to illuminate catch, so that catch and discards are visible to the video cameras and may be identified and quantified as required. Vessel operators are not expected to modify**

camera angles or focus.

- **Clean camera lenses to maintain video quality. Video quality will be reported in the trip summary report.**

Discussion Topics:

1) Need to ensure consistency with Council recommendations and draft regulations
2) Are pre-haul tasks for operators practical and feasible? Operators should not be moving cameras and just checking view finder
3) What kind of materials can be used to wipe down EM camera lens (i.e. rags or applications of RainEx)? Do the cameras need to be at arms length of the crew? What is sufficient to ensure clean cameras?

- **Catch Handling:**
  - **To effectively meet the goals of the program, we require the following catch handling procedures:**
    - **The vessel operator is responsible for ensuring all catch is handled within view of the cameras as defined in the camera descriptions and images in *Section V – System Specifications and Installation Summary.***
    - **Retained catch should be brought aboard through the retention control point defined in section XX before being moved for processing.**
    - **All discards removed from the line at the rail or catch that is not boarded should be discarded within the discard control point defined in section XX. This means they should be brought fully to the surface and hauled alongside the vessel before cutting the line or removing gear. (e.g. sharks)**
  - **All discarded catch and protected species that were brought on board (including non-target catch) should be placed in view of the deck camera before being discarded from the vessel's designated Discard Control Point.**
  - **Follow all protected species handling requirements at CFR…. (Appendix to VMP)**

Discussion Topics:

1) How do we ensure compliance with catch handled in a designated area within EM camera view?
2) Means to simplify and make it easiest to comply with catch in a retention control point. This can include placing a pre-measured mat or tape on deck as predetermined location on deck
3) Gear handling/measurements: Signalling cut line on camera, hold line/hook into camera view, have the animal over a pre-measured mat or box.
4) Treat protected species, including sharks, manta rays, turtles, birds, and marine mammals according to their individual handling requirements.
5) For animals that are not boarded (large turtles, marine mammals, sharks) bring these animals as close to the vessel as possible.
    a) For marine mammals: follow the whale handline and release guidelines: If hook will not straighten, or if the marine mammal has swallowed the hook, bring the marine mammal close to the vessel and cut line as close to the hook (or mouth) as possible, using the long-handled line cutter.
    b) For sharks: (CFR 300.27) Use a line clipper meeting the minimum design standards in paragraph (m) of this section to cut the branchline so that less than 1 meter (or 3.3 ft) of line remains on the animal. If this is not possible without compromising the safety of any persons, cut the branchline as close to the hook as possible.
    c) For Birds: Bring birds into the ‘designated on-deck view area’ for identification.
    d) Turtles: Board all small turtles and bring them into the ‘designated on-deck view area’ for identification.
    e) When a turtle is too large to bring aboard (for example, a large leatherback sea turtle), or the turtle cannot be brought aboard without causing it further injury, fishermen must disentangle and remove the gear, or cut the line as close as possible to the hook or entanglement to remove as much gear as possible from the turtle.
    f) If gear breaks or a hook straightens during a marine mammal or sea turtle interaction, bring the remaining gear or straightened hook to the ‘designated on-deck view area’

Table 6. Discard (& Possibly Retention) Control Point Location

*Define and describe the location of the vessel's discard control point(s) where catch may be discarded here.

Trip End

- **Within 3 business days after each trip and before returning to sea, ensure that the hard drive is dropped off at the designated control point or collected by EM service provider.**
- **If fishing from port outside of Honolulu or Pago Pago, within 3 business days after each trip, mail to the service provider.**
    - **Provider Address**
- **If mailing, along with the hard drive, include vessel name, the mailing address where replacement hard drives should be mailed, trip dates, and prepaid return envelope.**
- **Report any malfunctions to the appropriate regional technician.**

Discussion Topics:

1) Need to make sure there is a seamless process between vessel operators and PSMFC staff to swap out hard drives and provide new hard drives for the next trip. Could there be a drop box for vessel operators to leave hard drives?
2) How easy and simple is it to remove the hard drives and insert them? Would there be a need for a PSMFC staff to remove the hard drives and insert new hard drives?
3) Under what situations would there be a need to mail hard drives? If ingress/egress from California? In those situations in which there is a return to Honolulu or Pago Pago, could those hard drives be provided then?

Equipment Malfunctions

The EM provider would outline a comprehensive action plan to address system errors or malfunctions pre and mid-trip and include 24-hour technical support contact information for the vessel operator. An operational EM system is defined as the following: the EM system must be functional and in use, meaning that the system is recording fishing operations, including the video, images, and other sensor data, as well as the metadata that provides information (e.g., trip departure date, vessel information) onto a hard drive or other suitable video storage device.

Pre-trip malfunctions

If the system function test identifies a malfunction, the vessel operator should follow the troubleshooting guidelines listed in *Section VI – System Testing and Troubleshooting.* If this does not resolve the issue, the vessel operator should contact the EM service provider immediately. The EM service provider will determine if the malfunction is critical or non-critical:

- **Non-Critical Malfunction: If the malfunction cannot be repaired in a timely fashion, the vessel operator may depart on the scheduled trip, but should follow the service provider's instructions. Please call the service provider and make arrangements for them to service the vessel upon return from this trip.**
- **Critical Malfunction: A critical malfunction prevents the data collection objectives from being achieved. A service provider technician should be available to service the vessel within a determined number of hours of notification of the malfunction. The system must be repaired prior to the vessel leaving on a trip. If the system cannot be repaired in a timely manner (e.g., 72 hours), written permission must be obtained from NMFS in order for the vessel to fish with a system experiencing partial or complete failure. If the vessel is running a trip with a waiver for a partial system failure, the vessel must run the remaining components of the system unless otherwise instructed by the provider.**
- **If the vessel has been selected for human observer coverage, an exemption of an operational EM system is granted for critical equipment issues, as long as malfunctions were reported upon arrival from the previous trip and there has been 72 hours notice. The exemption issued is not a waiver from observer coverage, only EM coverage due to the critical system issue.**

Mid-trip malfunctions

- **If the system passed the function test prior to leaving port, and remains continuously powered during the trip, follow the instructions provided in *Section VI – System Testing and Troubleshooting.***
- **If the malfunction cannot be resolved following the troubleshooting guide and/or with remote support, the vessel operator should continue the trip, run the system with all**

functional parts, and contact the service provider immediately (from sea if possible) to assist with scheduling service at the time of landing.

- **Any malfunctions must be fixed prior to departing on subsequent trips, unless not reconciled upon 72 hours from notification and return from previous trip.**

Discussion Topics

1) Is 72 hours enough time to reconcile most malfunctions? And is that a fair duration for longline vessels between subsequent trips?
    - Exemptions to operate without operational EM system could include when there has been 72 hour notice and time period to reconcile malfunctions with notice from RA or if observer is placed onboard; or if a vessel is not fishing with longline gear
    - See Council recommendations and draft regulations
2) What other exemptions or exceptions could be noted to keep vessels operating under reasonable situations where there is a malfunction? (See Council recommendations and draft regulations)
3) Troubleshooting guide must be simple and clear, easy to follow

V. System Specifications and Installation Summary

This section of the VMP would describe and illustrate each component of the system. A vessel diagram featuring the layout and location of all components (cameras, sensors, GPS, power source, control box, keyboard, and all monitors) would be included (Figure 1). The diagram would illustrate the work deck during fishing activity and include the following items: gear bins, fish doors, deck houses, designated discard and retention control points, fish hold, mainline reels, catch processing area, float storage including radio buoys, and mechanical equipment such as winches, hauling devices, or cranes (Figure 2). These items could be on a single diagram or separate diagrams. If the vessel would use EM with multiple gear categories (shallow-set or deep-set gear), the service provider could create gear specific diagrams that illustrate the layout of the work deck if deemed necessary.

Camera specifications would be provided, and could include, the location and materials used to mount the camera, frame rate settings, advanced video coding capabilities, if the camera records in color or will record in greyscale under low light conditions, lens size, manufacturer, general description of focal point, and its primary purpose (i.e., rail camera, deck camera, etc.) (Tables 8a and b). Additionally, sensor specifications could be listed, including the sensor type and frequency or ping rate that data is broadcasted. Still images of each camera in the system would be included. Still images selected for a VMP would be representative of how the work deck would appear when the vessel is fishing, and could include the locations of the discard and retention control points within the camera views. Camera images would come from either a data drive or the EM review platform and cannot include images taken with handheld cameras.

NMFS staff would assess the proposed location and evaluate images based on concerns such as camera blocking and the crew's ability to clean camera lenses in advance of approving a VMP. If primary views are reliant on cameras installed in rigging or on top of the wheelhouse, the service provider should develop a camera maintenance plan and offer alternate solutions to vessels to keep cameras clean that are not readily accessible or pose safety concerns to the crew.

Data Collection Process

The EM system installed is set to record sensor data every x seconds for the duration of the trip. Video recording is triggered by the hydraulic pressure sensor when pressure is equal to or greater than a predetermined threshold and/or the rotation sensor detects reel movement in the hauling direction. All cameras will record during hauling events and up to x hours after the last triggering event. Cameras will record at x p at x frames per second during fishing events.

Table 7. Hardware and Equipment Installed

GPS Model:	
GPS Location:	
Rotation Sensor:	
Rotation Sensor Location:	
Hydraulic Sensor:	
Hydraulic Sensor Location:	
Sensor Processing Unit Location:	
Control Box Location:	
Monitor and Keyboard Location:	
Software Version:	
Power Type:	
Power Location:	
Power Configuration:	

Power Hardware:	

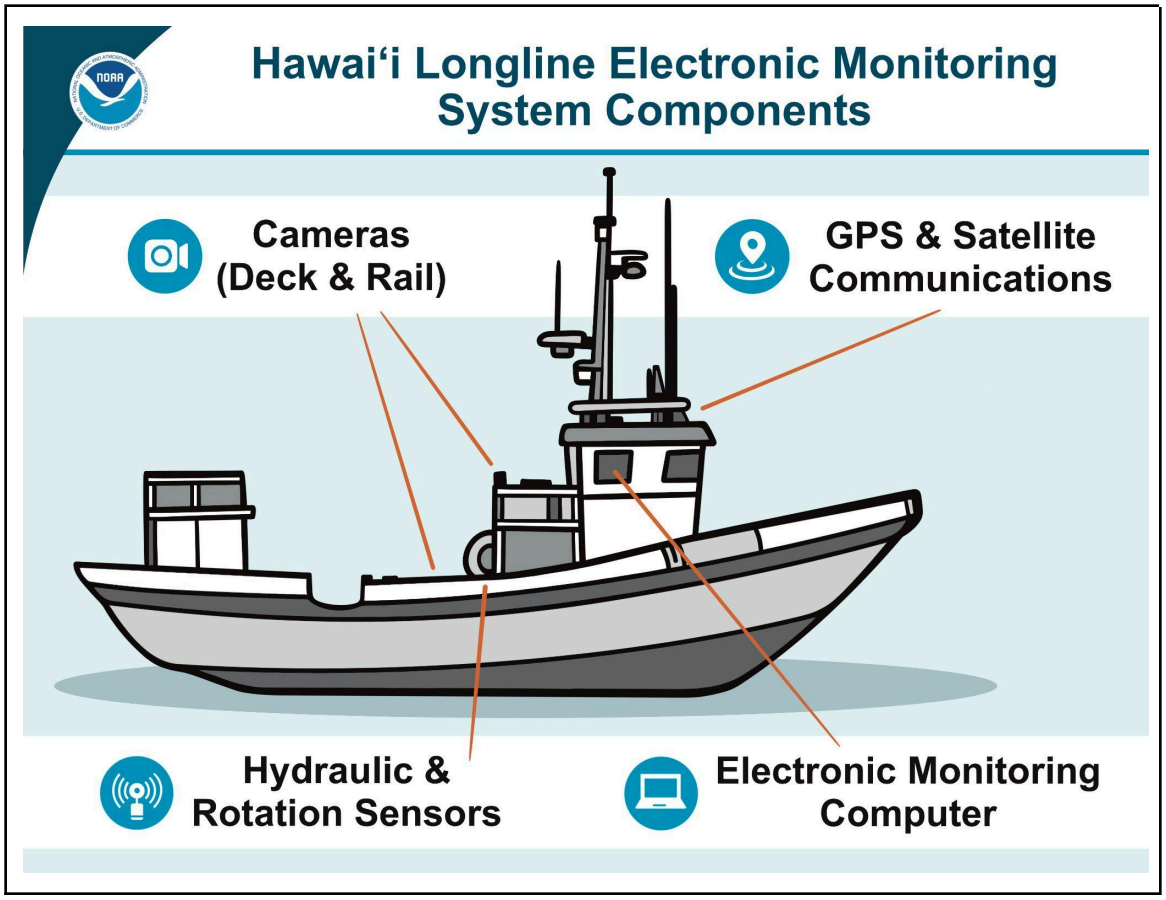

Figure 1. Vessel diagram example of system component placement

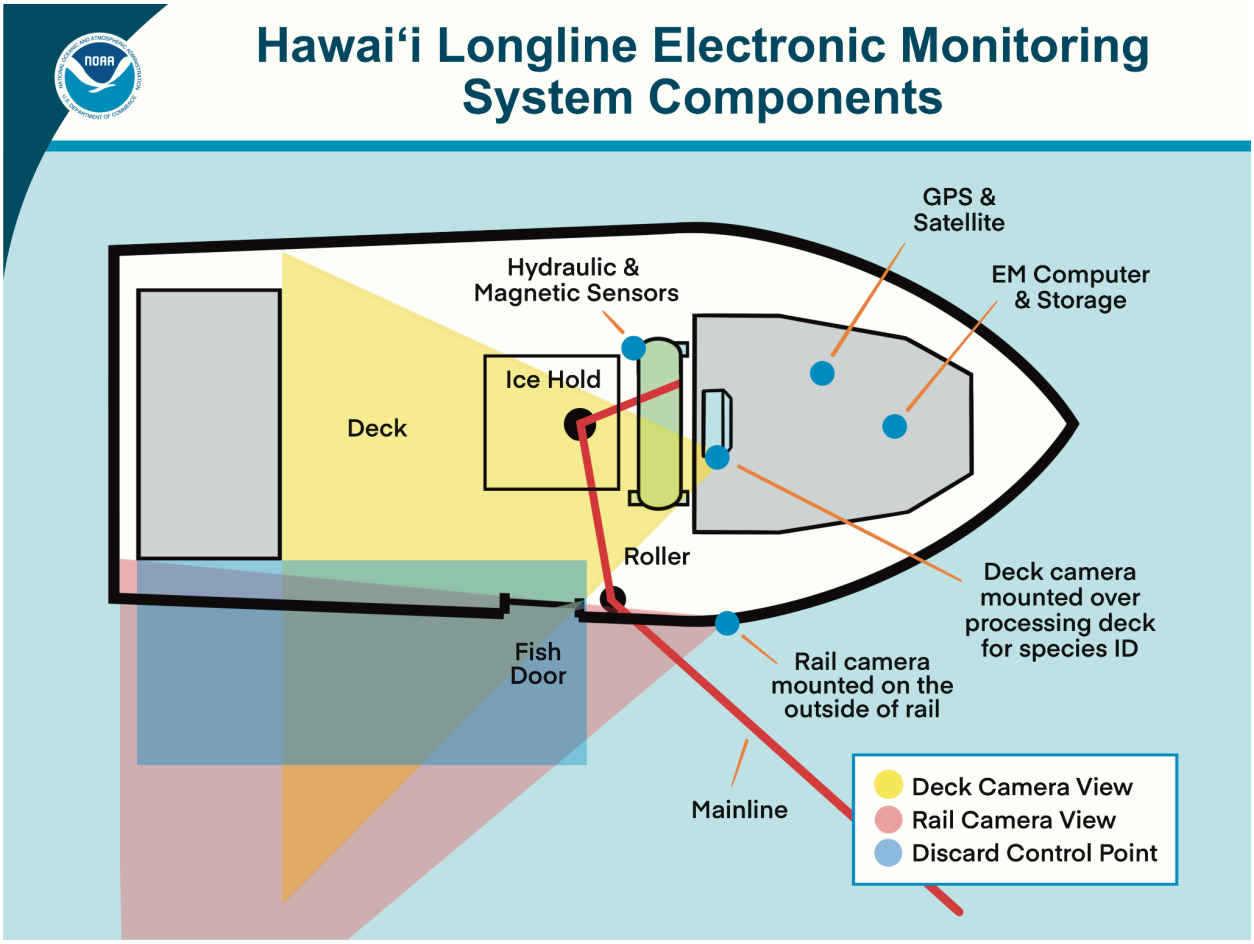

Figure 2. Vessel diagram example of working deck during fishing activities

Table 8a. Camera Installation

Camera Name:		\\\SAMPLE STILL IMAGE: CAMERA #///
Location:		
View:		
Aim:		
Hardware:		
Resolution/FPS:		
Recording Trigger:		
Run On Time (if applicable)		
Recording		

Exceptions (if applicable):		

*complete this table for each camera

Table 8b. Camera Installation (example from Alaska fisheries EM program)

Camera Name:	Camera 1	
Location:	Mounted on inner side of wheelhouse looking aft at hauler	
View:	View of the hauler, line exiting the water and the port rail	 https://i.ytimg.com/vi/BoSt2c7-omE/maxresdefault.jpg
Aim:	Downward and facing aft (towards the stern)	
Hardware:	Lorex PTZ	
Resolution:	2560p (2K)	
Frames per Second	30	
Recording Trigger:	Hauler pressure > 250 PSI	
Run On Time:	n/a	
Recording Exceptions:	Records until vessel returns to port (manual shut-off)	

VI. System Testing and Troubleshooting

This section would be highly detailed and organized by common EM system issues (power, monitor/keyboard, cameras, control box, activity sensors, etc.) to assist a vessel operator with testing system components as well as readily diagnosing and rectifying problems. Technical diagrams are recommended and components should be clearly referenced and labeled. The provider shall also train vessel operators in diagnosing common system issues.

Many problems can be solved by turning the system off and then restarting it. If that does not resolve the issue, use the guide provided in this section to troubleshoot the problem. If the problem persists, call the Service provider Support Line.

VII. Signature Page

The signature page acknowledges the intent to be bound to the terms of the contract and would be signed by the EM provider, the vessel owner, the vessel operators that have been fully briefed/trained to operate the vessel, and a NOAA Fisheries representative upon plan approval. The signatures certify that the vessel owner and the vessel operator have been briefed/trained on EM operations and catch handling, and program requirements and understand the requirement to comply with the components of the VMP. In addition, the signatures document that NOAA Fisheries has approved the Service Provides VMP. A signed copy (hand written or digital signature) of the VMP must be onboard at all times**.** Each time a VMP is modified and sent to the agency for approval, the VMP would require a new signature and date.

The list below demonstrates a vessel's understanding of the EM system and Pacific Islands longline EM program. It also documents the system has been fully installed and is operational. The technician and vessel representative(s) should place their initials next to each bullet point and sign/date the bottom of this page. A copy of this document will be scanned and provided to the vessel.

- **I understand how and when to turn on my EM system. I know how to complete the pre-trip check. I know how to view the status of my cameras, GPS, pressure sensor, and remaining hard drive space.**
- **I know where the mouse/trackball is that controls the EM system.**
- **I understand how to swap hard drives, who to mail them to, and the frequency that I should mail them.**
- **I have been shown where all EM system components are mounted. I understand the field of view and purpose of each camera.**
- **I have been given an example Vessel Monitoring Plan (VMP). I understand I will need to keep an approved, signed, and current copy onboard.**
- **I am aware of the 24-hour support line and know who to contact if there are EM system issues or if I have questions.**
- **I will clean the camera before and during EM trips. I will keep the deck well-lit during fishing operations.**
- **I understand the program requirements and will call the 24-Hour support line if I have any questions.**

This certifies that the vessel owner/operator has been trained in the function and operation of the EM system installed on the vessel and that the vessel owner/operator must comply with the components of this Vessel Monitoring Plan. A signed copy of this VMP must be aboard at all times when the vessel is participating in this Electronic Monitoring Program. Digital signatures are acceptable.

Vessel permit holder signature: _____ Date: _____

Vessel Operator signature: _____ Date: _____

Service provider representative signature: _____ Date: _____

NOAA fisheries VMP approval signature: _____ Date: _____

Discussion:

1) Could there be omission of vessel operator signature? This is because of frequent turnover of captains and crew.
2) How to ensure captains are aware of the EM system and requirements otherwise? Could this be the responsibility of the permit holder?