



# Electronic Monitoring 2018 System Specifications

This document provides system specifications for Electronic Monitoring (EM) systems for vessels approved to be in the 2018 EM selection pool in Alaska. More information on EM selection pool and EM deployment can be found in the Annual Deployment Plan (ADP): <https://alaskafisheries.noaa.gov/fisheries/observer-program-reports>.

If a vessel chooses to purchase EM equipment that is not provided by NMFS, the equipment must meet the specifications described below.

## EM Hardware

- All components in the EM system must be:
  - Able to withstand a marine environment.
  - Capable of accommodating vessel input power voltages from 10V – 32V DC and 110V AC.
  - Capable of accommodating reasonable variations in power quality common to small fishing vessels.
  - Utilize an uninterruptible power supply (UPS) or other system to allow data to continually be logged during short power fluctuations or temporary brownouts in order to minimize data loss.
  - Designed so the vessel's power state (engines or generators on/off) govern the EM system's power state to prevent draining vessel batteries. EM systems may power down to minimize battery drain when the main engine is off, but should automatically re-start when engine activity resumes.
  - Designed for a bridge environment to standards that minimize radio frequency interference with other electronics and instrumentation. (e.g. BS EN 60945);

And consist of the following elements:

- Control Center - The control center should be an independent, fully enclosed, device containing the operating software and data storage components of the EM System. It must be:
  - Capable of receiving and processing digital video inputs from a sufficient number of cameras to fully support species identification and fate determination of catch (longline and pot gear vessels); and determine presence/absence of seabird deterrent devices the wake area when setting gear (longline vessels only). Typically this requires three to four cameras on vessels fishing longline gear and two cameras on vessels fishing pot gear.
  - Capable of receiving and recording the following sensor data elements based on a configurable interval (typically 30 seconds):
    - Vessel position and speed from GPS
    - Hydraulic pressure
    - Deck equipment rotation (longline only)

- Contain a hard drive for data storage capable of being easily removed/replaced by the vessel operator and mailed in for EM review. Hard drives should have sufficient capacity to store approximately 1 month of fishing activity (typically 1 TB);
- Have “quick disconnect” connections to allow easy removal and installation on multiple vessels/yr.
- Video Monitor - A compact video monitor, powered by the control center, capable of displaying video images to allow vessel operators to evaluate system operation, (recording vs. not recording), system health, and video image quality in order to conduct maintenance as needed.
- Rail Camera(s) - Digital camera(s) housed in a waterproof (minimum IP66 rating,) low profile fixture, capable of providing color images of the hauling and discard areas at sufficient resolution and frame rate to support species identification and fate determination (typically 5 -10 FPS). Rail camera(s) are activated only during hauling events to avoid constant recording. The rail camera field of view (FOV) must monitor the entire area from where catch breaks the surface of the water to where it is brought onboard the vessel. Previous experience has identified a 20 degree outboard view angle of the hauling station as an optimal camera view.
- Deck Camera - Digital camera(s) housed in a waterproof (minimum IP66 rating) low profile fixture, capable of providing color images of the deck area at a sufficient resolution and frame rate (typically 5 to 10 FPS) to validate the fate of fish that pass from view of the rail cameras (longline vessels) or species identification and fate determination (pot gear vessels). Deck camera(s) are activated only during hauling events to avoid constant recording, and have adjustable run-on times to accommodate final deck sorting after the haul.
- Sea Bird Camera (longline vessels only) - Digital camera, housed in a waterproof (minimum IP66 rating) low profile fixture, capable of providing color images of the vessels wake area at a sufficient resolution and frame rate to validate presence/absence of seabird streamer lines (typically 1-5 FPS). Seabird cameras need to be activated by deck equipment rotation, hydraulic pressure, or vessel speed to avoid constant recording.
- Hydraulic pressure sensors - Pressure transducers appropriate for the deck equipment on the vessel (typically 0-3000 PSI) which can transmit gradations of hydraulic pressure as changes in base line voltage to activate camera recording during hauling events.
- Rotation sensors - Sensors capable of monitoring the rotation of deck equipment, such as a longline drum, and transmitting a signal to the control center to activate camera recording during hauling or setting events.
- GPS - Must provide a digital data stream of time, vessel location (lat/lon), speed, heading, and position accuracy to the control center for recording – time and location must be available on a per frame basis.

### **EM System Operating Software**

- User interface - Operating software must provide a “fisherman friendly” user interface to support vessel operator responsibilities and display video images and system operation status at all times when powered. Operating software should provide a separate user interface for EM service technicians to aid in on-site diagnostic and repair work.
- Function test - Operating software must provide a system health check capable of being executed by vessel operator to document EM system functionality prior to departing in a trip.

- Independent camera activation - Operating software must enable event based activation of camera recording based on a variety of sensor inputs such as vessel speed, rotation of deck equipment, and/or hydraulic pressure. Each camera should be independently activated with configurable “run-on” times after sensor trigger ceases to record final deck activity.
- Sensor configuration - Operating software must enable setting of vessel-specific, sensor threshold values which trigger activation of camera recording.
- System security - Operating software must provide system diagnostic files (i.e. system operation status, error detection, input voltage, operator commands etc.) of sufficient detail to support forensic determination of system malfunctions. These files should be password protected to prohibit access or tampering by vessel crew.
- Data Encryption - All sensor and video data must be encrypted using industry-standard encryption.

**For more information, contact National Marine Fisheries Service (NMFS) at:**

**Vessel Monitoring Plan**

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