

Draft Electronic Monitoring Program Service Plan Guidelines

As part of an application for an EM (EM) service provider permit and endorsement, a service provider must develop and submit an EM Service Plan (EMSP) that describes how the EM service provider will provide EM services to the fleet. NMFS will review the EM Service Plan as part of the application package to ensure that it meets all the required elements and would effectively fulfill the EM service provider responsibilities. This document provides additional information on what NMFS is looking for in an EMSP and describes best practices and suggested language that could be used to satisfy the required components. EM service providers may propose and NMFS may consider alternative, but equivalent, methods to meet the requirements of the EM program in the EMSP. Excerpts of regulations cited are provided in appendices for convenience.

Contact the Permits Branch with questions and assistance in completing the EM Service Plan and provider permit application: (206)526-4353.

EM Service Plan Contents

The EM service plan should include the following sections:

- A. EM service provider information – This section should include contact information for the EM service provider(s) for NMFS to use during the year.
- B. Program management – This section should describe the service provider’s plans for hiring and training program staff, communicating with NMFS and vessel representatives, and delivering and managing field and data services.
- C. EM system and software – This section contains detailed information about the EM system and software that the provider is proposing to deploy to allow NMFS to evaluate them.
- D. Field and technical support services – This section should describe the service provider’s procedures for installing and servicing EM systems and for providing technical support to contracted vessels.
- E. Data services – This section should describe the service provider’s procedures for data processing, including review and storage of EM data, and reporting of summary data to NMFS.

A. EM Service Provider Information

- 1. Provide the name, address, phone number, and email address of the EM service provider.**

2. **Provide contact information for a primary point of contact for program operations inseason.** This should be the person, such as the project manager, that NMFS would call with questions regarding installations, vessel monitoring plans, service events, technical issues, data analysis, reports, and other program logistics during the year.

B. Program Management

1. **Describe procedures for hiring and training of competent program staff to carryout EM field services.**
 - a. Describe minimum qualifications for EM technicians, EM data analysts, and other staff that may handle hard drives/EM data, process EM data, or generate reports.
 - b. Describe or provide terms and conditions of employment.
 - c. Detail EM technician and EM data analyst recruitment/hiring procedures including provider's interview process, review of educational background, background checks, physical/medical condition, CPR and first aid certification, citizenship.
 - d. **Describe training program for staff in providing EM field and data services, including any certification of program staff to work on EM equipment and procedures to maintain the skills of EM data processing staff in:**
 - i. **Use of data processing software;**
 - ii. **Species identification;**
 - iii. **Fate determination and metadata reporting requirements;**
 - iv. **Data processing procedures;**
 - v. **Data tracking; and,**
 - vi. **Reporting and data upload procedures.**
2. Describe provider's procedures for tracking performance and responding to identified poor performance by an EM technician, EM data analyst, or other staff that handle hard drives/EM data and reports.
3. **Describe provider's procedures for tracking, reporting to NMFS, and responding to identified harassment of EM provider staff.**
4. **Describe provider's procedures for tracking, reporting to NMFS, and responding to identified EM provider staff conflicts of interest.**
5. Describe what support services are provided to the EM technicians deployed to a fishing community (i.e.; list of rentals, motels, laundry facilities).
6. Describe provider's interactions with vessel owners and NMFS to solicit feedback on EM staff performance (e.g., post service visit check-in) and actions taken by a provider when performance issues involving the EM staff are identified.
7. Describe provider's process for tracking EM technician and EM data analyst pay data and the system to record overtime, benefits, etc.
8. **Describe the company's procedures and policies related to data storage, access, handling, and release, to maintain the integrity and confidentiality of the EM Program data as required (see 50 CFR 660.603(n)).**

- a. **The EM service provider must not release a vessel owner's EM data and other records except to NMFS and authorized officers, unless otherwise authorized by the owner or operator of the vessel.**

C. EM System and Software

1. **Describe the identifying characteristics of the EM system to be deployed and the video review software to be used in the fishery, including but not limited to: manufacturer, brand name, model name, model number, software version and date, firmware version number and date, hardware version number and date, monitor/terminal number and date, pressure sensor model number and date, drum rotation sensor model number and date, and GPS model number and date.**
2. **Describe the EM system and software specifications, including a narrative statement describing how the EM system and associated equipment meets the performance standards at § 660.604(j). The specifications (e.g., image resolution, frame rate, user interface) and configuration of an EM system and associated equipment (e.g., number and placement of cameras, lighting) used to meet the requirements of this section must be sufficient to:**
 - a. **Allow easy and complete viewing, identification, and quantification, of catch items discarded at sea, including during low light conditions;**
 - b. **Continuously record vessel location (latitude/longitude coordinates), velocity, course, and sensor data (i.e, hydraulic and winch activity);**
 - c. **Allow the identification of the time, date, and location of a haul/set or discard event;**
 - d. **Record and store image data from all hauls/sets and the duration that fish are onboard the vessel until offloading begins;**
 - e. **Continuously record and store raw sensor data (i.e., GPS and gear sensors) for the entire fishing trip;**
 - f. **Prevent radio frequency interference (RFI) with vessel monitoring systems (VMS) and other equipment;**
 - g. **Allow the vessel operator to test and monitor the functionality of the EM system prior to and during the fishing trip to ensure it is fully functional;**
 - h. **Prevent tampering or, if tampering does occur, show evidence of tampering; and,**
 - i. **Provide image and sensor data in a format that enables their integration for analysis.**
3. **NMFS recommends that the EM system have the following features to meet the performance standards:**
 - a. **Simple to use and require minimal maintenance.**
 - b. **Durable in harsh marine environments.**
 - c. **Be secure, using end-to-end encryption of data files and restricting access to system settings (i.e., prohibiting administrative access to vessel crew).**
 - d. **Modular, small size, for ease in installation and component replacement.**

- e. Have an internal UPS that carries the system through short power interruptions and provides for a controlled shutdown.
 - a. Have a single means of distributing power to all system components with the ability to log the time and reason for any interruption to system power.
 - b. Logs occurrences and reasons for system shutoff.
 - c. Automatic re-starting of system based upon restoration of sufficient power.
 - d. Data storage hardware should be resistant to damage and data loss and provide safeguards to retain data in the event of electrical failure or power spikes.
 - e. Cameras should record continuously at a frame rate of 5 unique frames per second, and provide the option to produce still images for enhanced species identification and measurement.
 - f. Cameras should produce images compatible with zoom function for enhanced identification during video review.
 - g. Cameras should be capable of recording data at a resolution of 2MP (1080P).
 - h. Cameras should produce color imagery with the ability to revert to black and white video output when light levels become too low for color recognition.
 - i. The control box should log GPS positions every 10 seconds. The GPS should use a minimum of 3 satellites to triangulate vessel position. If 3 satellites are not available at any time, the system should not log a location rather than imputing a calculated location.
 - j. Video imagery should be capable of being viewed on the vessel by the vessel crew or authorized officers without interfering with data collection.
 - k. The video imagery should have embedded time stamps with time synced between GPS, imagery, and other sensors and data sets.
- 4. If the technologies have previously been subject to scrutiny in a court of law, provide a brief summary of the litigation and any court findings on the reliability of the technology.**

D. Field and Technical Support Services

- 1. Describe procedures for communicating with individual vessel operators and NMFS to coordinate field services, provide technical support and other assistance, and to communicate feedback on vessel operations.**
2. Describe the plan for provision of services including service locations, response timelines, equipment inventories, and procedures for installations, service visits, repairs, technical support, and other program services required of an EM service provider (*see* § 660.603(k)).
 - a. The EM service provider must provide maintenance and support services, including maintaining sufficient equipment inventory, such that all deployed EM systems continuously perform according to the performance standards at § 660.604(j) and that field service events are scheduled and carried out with minimal delays or disruptions to fishing activities.**
 - i. The EM provider should maintain appropriate inventory levels to service vessels as problems occur (e.g., 10% pool), conduct periodic stock

inventories, maintain a list of component suppliers and stock availabilities, order stock as necessary, and monitor shipping/receiving and movements of inventory.

- b. Technical support must be available 24-hours per day, seven days per week, and year-round.
- c. The EM service provider must submit to NMFS reports of requests for technical assistance from vessels, including when the call or visit was made, the nature of the issue, and how it was resolved.

E. Data Services

1. Describe EM video review software specifications, including a narrative statement describing how the software is sufficient to process EM data to provide NMFS with EM summary reports, including discard estimates, fishing activity information, and meta data (e.g., image quality, reviewer name) and incident reports of compliance issues, as described in the EM Program Manual (*see* § 660.603(m)(5)).
3. Describe procedures for tracking hard drives and data files throughout their use cycle. This would apply to all providers that may come into possession of hard drives or data files containing EM data, either through providing data services or technical support to vessel owners and NMFS (e.g., recovering corrupted data).
 - a. An inventory management system should be used to track individual hard drives/data files using a unique ID number or other identification system. The provider should be able to determine whether a hard drive/data file is deployed, in transit, or at the provider and at what stage in the use cycle.
 - b. The inventory management system should log the names of any employees that come into possession of or accessed the hard drive/data files.
 - c. The system should also log tracking numbers from shipping companies that were used, and dates of mailing and receipt.
 - d. EM staff must not handle or transport hard drives or other medium containing EM data except to carry out EM services as described in the NMFS-accepted EM Service Plan.
4. Describe procedures to ensure the integrity and security of hard drives/data files in transit (e.g., use of sealed tamper evident envelopes for hard drives, end-to-end encryption of data files).
5. Describe procedures to remove confidential data from hard drives before returning them to the field.
6. Describe procedures for tracking EM datasets throughout the processing cycle, including documenting any access and modifications.
7. Describe procedures for communicating with individual vessel operators and NMFS to coordinate data services, resolve specific program issues, and provide feedback on program operations.
8. Describe procedures for providing feedback to vessel representatives, field services staff, and NMFS, regarding:
 - a. Adjustments to system settings;

- b. Changes to camera positions;
 - c. Advice to vessel personnel on duty of care responsibilities;
 - d. Advice to vessel personnel on catch handling practices; and,
 - e. Any other information that would improve the quality and effectiveness of data collection on the vessel.
- 9. Describe procedures for processing EM data from contracted vessels and submitting to NMFS EM summary reports, including discard estimates, fishing activity information, and meta data (e.g., image quality, reviewer name), and incident reports of compliance issues, according to the EM Program Manual (see § 660.603(m)(5)).**
- 10. Describe procedures for correcting and resubmitting datasets and reports identified by NMFS as not meeting the program standards.**
- 11. Describe how EM data and other records will be stored as required (see § 660.603(m)(6) and (n)). The provider must maintain all of a vessel's EM data and other records for a period of not less than 3 years after the date of landing of a trip. EM data and other records must be stored such that the integrity and security of the records is maintained for the duration of the retention period. The provider must produce EM data and other records immediately upon request by NMFS or an authorized officer.**
- a. The original EM data files should be copied, catalogued, and stored unmodified, immediately upon receipt from the vessel. EM staff must not write to or modify any EM hard drive or other medium that contains EM data before it has been copied and catalogued.
 - b. The original data files or an exact copy should be stored, unmodified. Data processing, annotations, and any other modifications should be done on copies.
 - c. All EM data and other records should be stored using redundancies and back-ups to guard against failure or physical destruction.
 - d. EM data may be stored locally on hard drives, local servers, or using cloud storage services.
 - e. NMFS expects most requests for access or submission of EM data and other records associated with a specific EM trip will be made during the year in which that trip was taken (January 1 – December 31) and until data is finalized for that year (on or about March 1 of the following year). EM data files may be transmitted to NMFS via a secure website where NMFS and authorized officers can access and download the data files, or by mailing a hard drive, CD, or other medium containing the data files. The provider may wish to take this information into account when planning for and comparing the costs and accessibility of different storage options.

Excerpts of the Regulations

Excerpt from 660.603(k)-(n)

(k) *Field and technical support services.* The EM service provider must provide and manage EM systems, installation, maintenance and technical support, as described below and according to a NMFS-accepted EM Service Plan, which is required under § 660.603(b)(1)(vii), and as described in the EM Program Manual or other written and oral instructions provided by the EM Program, such that the EM program achieves its purpose as defined at § 660.600(b).

(1) At the time of installation, the EM service provider must:

(i) Install an EM system that meets the performance standards under § 660.604(j);

(ii) Ensure that the EM system is set up, wires run, system powered, and tested with the vessel in operation;

(iii) Brief the vessel operator on system operation, maintenance, and procedures to follow for technical support or field service;

(iv) Provide necessary information for the vessel operator to complete the VMP, such as images and diagrams of camera views and vessel layout, specific information about system settings, and designated discard control points; and,

(v) Complete an EM System Certification Form for the vessel owner.

(2) The EM service provider must communicate with vessel operators and NMFS to coordinate service needs, resolve specific program issues, and provide feedback on program operations.

(3) The EM service provider must provide maintenance and support services, including maintaining an EM equipment inventory, such that all deployed EM systems perform according to the performance standards at § 660.604(j) and that field service events are scheduled and carried out with minimal delays or disruptions to fishing activities.

(4) The EM service provider must provide technical assistance to vessels, upon request, in EM system operation, the diagnosis of the cause of malfunctions, and assistance in resolving any malfunctions. Technical support must be available 24-hours per day, seven days per week, and year-round.

(5) The EM service provider must submit to NMFS reports of requests for technical assistance from vessels, including when the call or visit was made, the nature of the issue, and how it was resolved.

(1) *Technical assistance and litigation information.* As a requirement of its permit, the EM service provider must provide the following to NMFS or authorized officers, upon request.

(1) Assistance in EM system operation, diagnosing and resolving technical issues, and recovering corrupted or lost data.

(2) Responses to inquiries related to data summaries, analyses, reports, and operational issues with vessel representatives.

(3) Technical and expert information, if the EM system/data are being admitted as evidence in a court of law. All technical aspects of a NMFS-approved EM system may be analyzed in court for, inter alia, testing procedures, error rates, peer review, technical processes and general industry acceptance. To substantiate the EM system data and address issues raised in litigation, an EM service provider must provide information, including but not limited to:

(i) If the technologies have previously been subject to such scrutiny in a court of law, a brief summary of the litigation and any court findings on the reliability of the technology.

(ii) Reserved.

(4) All software necessary for accessing, viewing, and interpreting the data generated by the EM system, including maintenance releases to correct errors in the software or enhance the functionality of the software.

(5) Notification NMFS within 24 hours after the EM service provider becomes aware of the following:

(i) Any information, allegations, or reports regarding possible harassment of EM provider staff;

(ii) Any information, allegations, or reports regarding possible EM system tampering;

(iii) Any information, allegations, or reports regarding any action prohibited under §§ 660.12(f) or 660.602(a)(13); or,

(iv) Any information, allegations or reports regarding EM service provider staff conflicts of interest.

(6) Notification to NMFS of any change of management or contact information or a change to insurance coverage.

(7) A copy of any contract between the service provider and entities requiring EM services;

(8) Proof of sufficient insurance as defined in paragraph (i);

(9) Copies of any information developed and used by the EM service provider and distributed to vessels, including, but not limited to, informational pamphlets, payment notifications, and description of EM service provider duties; and,

(10) EM data and associated meta data, and other records specified in this section.

(m) *Data services*. For vessels with which it has a contract (see § 660.604(k)), the EM service provider must provide and manage EM data processing, reporting, and record retention services, as described below and according to a NMFS-approved EM Service Plan, which is required under § 660.603(b)(1)(vii), and as described in the EM Program Manual or other written and oral instructions provided by the EM Program, and such that the EM Program achieves its purpose as defined at § 660.600(b).

(1) The EM service provider must process vessels' EM data according to a prescribed coverage level or sampling scheme, as specified by NMFS, and determine an estimate of discards for each trip using standardized estimation methods specified by NMFS. NMFS will maintain manuals for EM data processing protocols on its website.

(2) The EM service provider must ensure that its data processing staff are fully trained in:

(i) Use of data processing software;

(ii) Species identification;

(iii) Fate determination and metadata reporting requirements;

(iv) Data processing procedures;

(v) Data tracking; and,

(vi) Reporting and data upload procedures.

(3) The EM service provider must track hard drives and EM datasets throughout their cycles, including documenting any access and modifications. EM data must be removed from hard drives or other medium before returning them to the field.

(4) The EM service provider must communicate with vessel operators and NMFS to coordinate data service needs, resolve specific program issues, and provide feedback on program operations. The EM service provider must provide feedback to vessel representatives, field services staff, and NMFS regarding:

(i) Adjustments to system settings;
(ii) Changes to camera positions;
(iii) Advice to vessel personnel on duty of care responsibilities;
(iv) Advice to vessel personnel on catch handling practices; and,
(v) Any other information that would improve the quality and effectiveness of data collection on the vessel.

(5) On behalf of vessels with which it has a contract (see § 660.604(k)), the EM service provider must submit to NMFS EM summary reports, including discard estimates, fishing activity information, and meta data (*e.g.*, image quality, reviewer name), and incident reports of compliance issues according to a NMFS-accepted EM Service Plan, which is required under § 660.603(b)(1)(vii), and as described in the EM Program Manual or other written and oral instructions provided by the EM Program, such that the EM program achieves its purpose as defined at § 660.600(b). If NMFS determines that the information does not meet these standards, NMFS may require the EM service provider to correct and resubmit the datasets and reports.

(6) *Retention of records.* Following an EM trip, the EM service provider must maintain all of a vessel's EM data and other records specified in this section, or used in the preparation of records or reports specified in this section or corrections to these reports, for a period of not less than three years after the date of landing for that trip. EM data and other records must be stored such that the integrity and security of the records is maintained for the duration of the retention period. The EM service provider must produce EM data and other records immediately upon request by NMFS or an authorized officer.

(n) *Data integrity and security.* The EM service provider must ensure the integrity and security of vessels' EM data and other records specified in this section. The EM service provider and its employees:

(1) Must not handle or transport hard drives or other medium containing EM data except to carry out EM services required by this section in accordance with a NMFS-accepted EM Service Plan.

(2) Must not write to or modify any EM hard drive or other medium that contains EM data before it has been copied and catalogued.

(3) Must not release a vessel's EM data and other records specified in this section (including documents containing such data and observations or summaries thereof) except to NMFS and authorized officers as provided in section § 660.603(m)(6), or as authorized by the owner or operator of the vessel.