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Governance of Electronic Monitoring (EM) Systems for Industrial Tuna Fisheries

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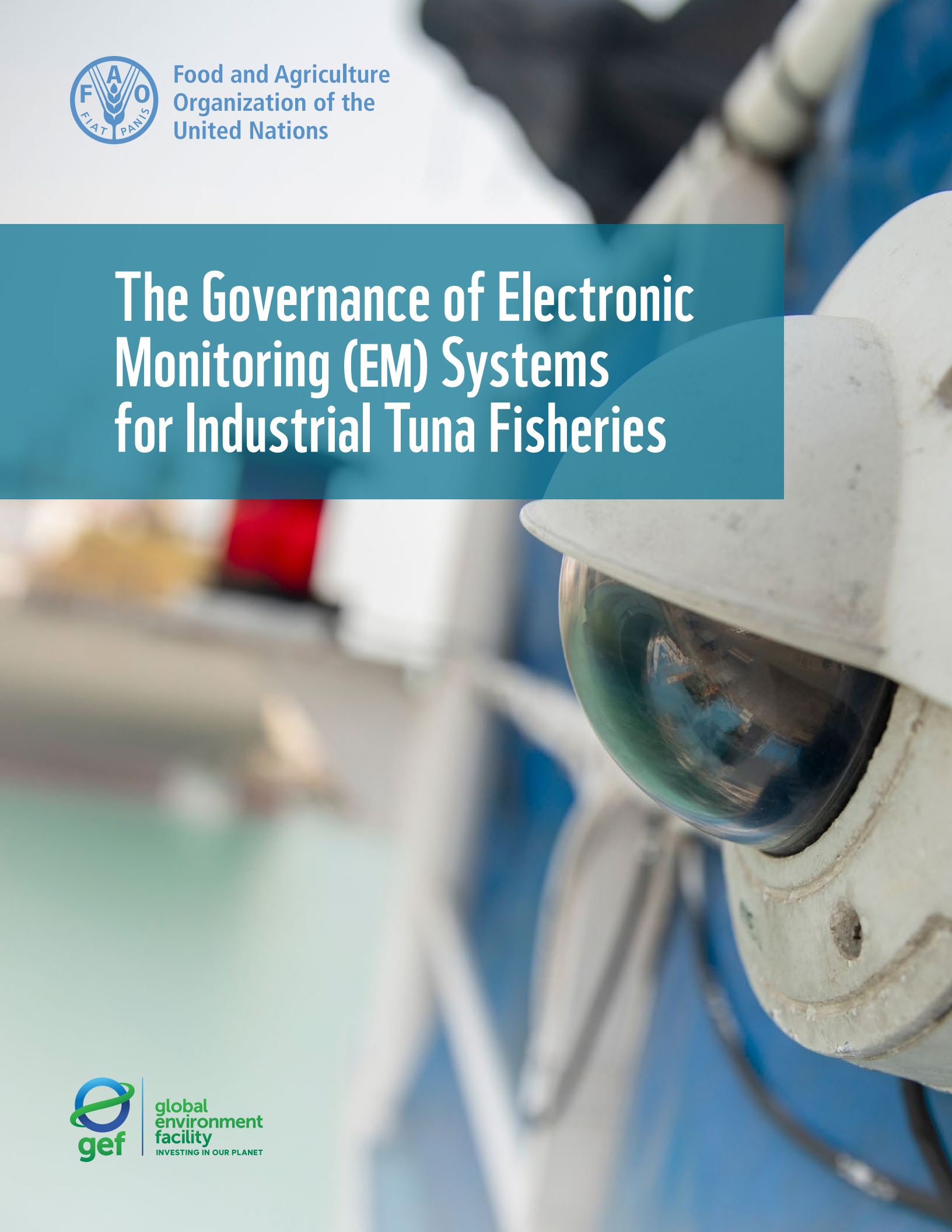
The Governance of Electronic Monitoring (EM) Systems for Industrial Tuna Fisheries



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This document, developed by the World Wildlife Fund Inc. (WWF-US) under the FAO Common Oceans Program, aims to serve as a technical resource for the development of governance for Electronic Monitoring (EM) in industrial tuna fisheries. The following is a summary of its contents. View the full report here.

Electronic Monitoring (EM) in Tuna Regional Fisheries Management Organizations (RFMOs)

The design of a program to govern electronic monitoring (EM) can proceed in several different ways, depending on:

- What functions a government agency chooses to implement in-house,
- How the program will be financed,
- And whether it is conducted in conjunction with other government agencies, private sector technology, fishing industry stakeholders, or regional bodies.

One shared priority, regardless of the programmatic pathway pursued, will be for regional fisheries management and regulatory strategies to explicitly build flexibility and adaptability into their base frameworks. Further, policies that focus on purpose and performance, rather than specific technical attributes, are essential tools for building such an adaptive framework.

Benefits of Standards Harmonization

All EM stakeholders stand to benefit from increased harmonization across RFMO EM standards. These benefits include:

- Cost efficiencies for all stakeholders such as: better for vendors, bulk procurement opportunities for programs, less customization costs, no duplications of capabilities required for vessels working in multiple jurisdictions, etc.
- Better engagement with vendors
- More reliable quality and data for compliance and science regionally
- Better stock management
- Interoperability for vessels working across multiple RFMO jurisdictions

EM Governance Needs

Minimum standards, the central focus of many current RFMO discussions, set an important baseline and support structure for the development of EM programs However, they are just one of several key elements that underpin EM implementation. Among the additional EM needs are:

- Appropriate national regulations/legislation that require data collection or monitoring that can be addressed using EM.
- EM policy and guidance documents that define the objectives and needs of the programs.
- Multinational or regional agreements to enable effective EM data use in the management of highly migratory species.
- Minimum EM program standards.
- Specifications and procedures that accompany the standards to harmonize expectations for key processes.
- The necessary infrastructure to implement the program and carry out data analysis.
- A consultation program for relevant stakeholders to troubleshoot and improve all aspects of the system.
- Resources to train and maintain personnel on relevant tasks listed above.

The process of drafting and refining standards for EM can serve as an important conversation opener for other critical elements in stakeholder dialogue that helps define implementation strategies.

Key Elements Required for Successful Design and Implementation of an EM Program

While each roadmap and toolkit available to support EM implementation is unique, they all cover a few main stages of development, which are highlighted below:

Phase I – Assessment

This first stage should bring stakeholders to the table to achieve three main objectives:

1. Build agreement on monitoring and management objectives
2. Identify the most promising approaches to achieving objectives
3. Build a participatory process for all relevant stakeholders through the EM program development life cycle

Phase II – Program Design

During this phase many of the important details of an EM program will be decided, including:

1. What data will be collected
2. Program standards and specifications
3. Who will perform different functions
4. How data will flow
5. Who has access and ownership rights of EM records and analyzed data

For each component, there can be a variety of implementation approaches. Each choice has tradeoffs, including cost implications, that need to be evaluated. It is essential in this phase to maintain strong stakeholder engagement and communication to ensure good program design and build buy-in to the program.

Phase III – Pre-implementation and Policy/Regulatory Alignment

The goal of this phase is to ensure that all parts of the EM program are prepared and ready for implementation, including the policy and regulatory framework, the fishing industry, and the human resources for various parts of program execution.

Phase IV – Initial Implementation

During this phase, tenders will be executed, systems installed, video reviewed, and all program elements will go live. There will be bumps and challenges, which will require active management, refinements and troubleshooting until the program reaches a steady state.

Phase V – Ongoing Management and Continuous Improvement

Once initiated, the program should be continually monitored to understand if it is meeting the desired management objectives cost-effectively. On a longer timescale, program reviews should be conducted to determine if there are any new technologies or approaches that can improve implementation, reduce costs, and/or expand the data the EM program can provide in support of fisheries management.

For more details on each phase of implementation, see the full report.

State of Tuna RFMO (t-RFMO) EM Standards Development and Support Resources

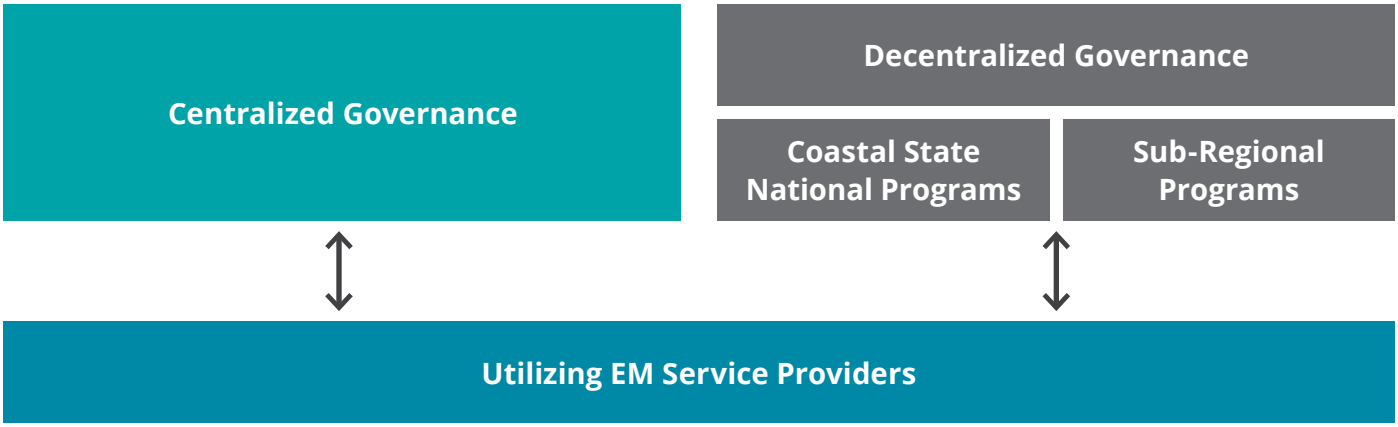
EM programs are increasingly being used to meet the data needs of robust fisheries science, management, and compliance, in complement with conventional onboard human observer programs or in instituting at-sea monitoring where none previously existed. *See the full report for an overview of current status.*

Further, there is broad agreement that RFMOs should be focused on the EM outputs and should incorporate flexibility to enable ongoing innovation. There are important resources, including additional standards, specifications and procedures, roadmaps and toolkits, available to support implementation of RFMO minimum standards. *See the full report for links to additional resources.*

EM Governance Scenarios

Effective implementation of EM programs at scale requires a clear, well-thought-out governance design to ensure success. There are several EM implementation approaches that can be considered, including an RFMO-wide program, individual national programs, sub-regional programs, or aspects of national programs being pooled between countries. Each type has its advantages and disadvantages, with the most appropriate type influenced by the fishery management history, geography, and politics of the area. One of the first decisions is to determine whether a centralized or decentralized model is most appropriate.

Table 1



WWF's Technical Resource Document was developed to support managers in developing EM governance, including determining if a centralized, decentralized or hybrid model is best.

Implementing Program Elements: In-House vs. Outsourcing

Once it has been decided whether a centralized or decentralized model is the best fit, it must then be determined which programs elements will be kept in-house and which may best be outsourced to a third-party provider. For more information, see the Technical Resource Document.

In Focus: Program Design Options

For each component of an EM program, there can be a variety of approaches to implementation, each with tradeoffs, that must be evaluated to select the best option for meeting the needs and constraints of a particular fisheries program. As an example, Table 2 shows various design options for transmission and EM records analysis.

Table 2

Transmission of EM Records	EM Records Analysis Approaches
Physical removal of hard drives Common method – mailed to a Data Review Center (DRC) or uploaded to cloud in local office	**Census** EM records generated and analyzed for all fishing events – high accuracy but high costs
WiFi Viability depends on data volume, bandwidth, cost	**Sampling** EM records generated for all activity and subset is reviewed and extrapolated to estimate all fishing activity. Accuracy is dependent on frequency of events
Cellular Viability depends on data volume, bandwidth, coverage, costs	**Logbook Audit** EM records generated for activity and small sample is reviewed and compared to logbooks
Satellite Historically only cost effective for small data volumes	**EM use to leverage other data collection** Example: using EM to ensure no discards at sea, or using dockside monitoring to collect catch data
	Shoreside AI AI may be used with any of the above approaches to streamline analysis
	AI Analysis on the Edge Emerging approach to identifying potential events of concern that can then be transmitted to shore for immediate review

EM Certification Mechanisms

One element of successful t-RFMO scale implementation is ensuring that all stakeholders feel confident in the quality, affordability, security and comparability of EM hardware, software, and data. Some form of EM certification will be necessary to enable this. The Technical Resource Document describes three scenarios:

1. **EM Service Provider Approval by the RFMO Secretariat or other Designated Body**
   Individual EM service providers apply to an oversight organization that reviews their qualifications and certifies that they meet the standards required of the EM program.
2. **Type Approval by the RFMO Secretariat or other Designated Body**
   Individual EM systems are evaluated with respect to a set of minimum standards established by the RFMO and certified by an oversight organization.
3. **Minimum Standards Set by the RFMO Secretariat or other Designated Body**
   A set of minimum standards is established by the RFMO for the regional EM program; however, individual RFMO members undertake their own processes for determining which systems and/or service providers meet or exceed the minimum requirement set forth by the RFMO program.

Governance Decisions to Address Technical and Physical Challenges

There are several technical and physical challenges associated with EM today that are poised to change as technology continues to advance. While some technological advancements aim to reduce costs, others, like some that focus on better meeting compliance and fisheries science needs, may increase costs. Thus, ongoing decision making will be needed.

To learn more about technical and physical challenges, review the full report.

Interoperability

Different multi-provider programs have taken different approaches to the challenge of interoperability of EM records. Box X highlights three real-world options. There are tradeoffs across the different approaches, but an EM program with multiple providers will need to decide how to address this challenge.

FFA Interoperability Discussion Case Study

"**Interoperability** is the requirement for EM Analysis software to be able to facilitate the generation of EM Data from all EM Records that will be reviewed in the DRC. The main options for consideration [for FFA members were discussed to be]:

OPTION 1:
Requiring the use of a single EM Service Provider for onboard hardware for all vessels that will deliver EM Records to the DRC for analysis and using EM Analysis software from the same EM Service Provider.

OPTION 2:
Using multiple EM Analysis software packages; one from each onboard hardware provider delivering EM Records to the DRC.

OPTION 3:
Using EM Analysis software that can analyze EM Records from multiple EM Service Providers. This may be facilitated by:

- Requiring ME Service Providers to share the file types, data structures, syntax, and semantics of their EM Records and reference datasets.
- Specifying a common format for exchange of EM Records."

Legal/Regulatory Considerations

In broad terms, primary legal and regulatory considerations pertain to:

1. **Appropriate National Regulations/Legislation**
   While RFMO members have the legal capacity in place by which they can turn RFMO management measures into national regulation, some may need additional legal structures to support EM.
2. **RFMO Requirements Meet Local Regulatory Requirements**
   It is important that existing national legal frameworks are considered during the design of RFMO EM policies.
3. **Appropriate Multinational Agreements**
   Establishing agreements among members, cooperating non-members and flag states regarding data collection, usage, and associated costs is critical.

Cost Considerations

The ability to more fully understand the cost implications of implementing EM programs at scale is critical. While the Technical Resource Document has not considered these challenges in depth, it does highlight for program developers cost elements that should be considered early in the development process.

For more information on cost considerations involved in implementing EM, review the full report.

Acknowledgments

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FOR MORE INFORMATION:

Vishwanie Maharaj
Oceans, World Wildlife Fund-Inc.
1250 24th, St, NW, Washington, DC 20037
Vishwanie.maharaj@wwfus.org
Tel: + 1 202-495-4711

For a full copy of the technical resource report, go to: this URL

PHOTO CREDITS

Page 1: Close up of a Satlink camera, an on-ship camera system. Tema port, Ghana. © Kyle LaFerriere / WWF-US

Page 7: WWF Indonesia Hafizh Adyas and their fisheries observer Rudy Masuswo Purwoko demonstrate a bycatch de-hooker to longline tuna fishing boat crew of Nutrindo Fresfood International. Bitung, North Sulawesi, Indonesia. © Jürgen Freund / WWF