European Parliament

Research for PECH Committee - Workshop on electronic technologies for fisheries - Part II: Electronic monitoring systems

KEY FINDINGS

- Since 1999, the use of camera-systems on board, commonly referred to as **Electronic Monitoring (EM)**, has emerged as an **innovative approach** for **documenting catches** in fisheries.

- The number of vessels involved in **EM is steadily growing**, and estimated at approximately **1 900** fishing vessels worldwide in 2019. Canada, the United States of America, Australia and Chile have successfully **implemented EM** in their **national fisheries management administrations**.

- During the period 2008 – 2019, **more than twenty EM trials** were conducted in the EU. Despite promising results, **none of the trials evolved into a fully integrated EM programme**. Still, valuable lessons are learnt on EM implementation in European fisheries.

- EM **improves monitoring coverage** without a considerable increase in the monitoring budgets.

- **Involvement of fishers is crucial for EM implementation**. Fishers need to conform to the operational practices on board to facilitate the success of EM.

- In the context of the **EU Landing Obligation** and the requirement to **record discards**, further **work on development** is still needed. Detecting **smaller fish specimens** in large volumes of catch is still **challenging**.

Background

The first trial with CCTV (closed-circuit television) video camera systems on board fishing vessels were implemented in British Columbia, Canada in 1999, in order to cope with management reforms and gear theft. It was quickly **recognized that cameras on board fishing vessels could be used for monitoring and control in fisheries.**

The present document is the executive summary of the study for the Workshop electronic technologies for fisheries - Part II: Electronic monitoring systems. The full study, which is available in English can be downloaded at: https://bit.ly/3u2ok82

EN

Since this first trial of this Electronic Technology (ET) the use of camera systems on board, commonly referred to as Electronic Monitoring (EM), has emerged as an innovative approach for documenting catches in fisheries. A typical EM system consists of various **activity sensors**, Geographical Positioning System **(GPS)** recording device, **computer** hardware and **cameras**, which allow for **video monitoring of catches**, and **detailed fishing effort registration** without requiring additional on-board personnel.

EM already demonstrated its ability to cost-effectively transform **management and compliance** in several fisheries. The aim of this report is to review **the current status** of EM and provide an **overview of the latest developments** in European fisheries, as well as potential **benefits and risks** of EM in fisheries.

State-of-play of Electronic Monitoring worldwide

The implementation of EM in fisheries is **steadily growing**. Currently, the total number of vessels, that are or have been, involved in EM schemes is estimated at approximately **1 900** (Figure 1). **Fully implemented EM programmes** exist in Canada, the United States of America (USA), Australia and Chile. These full programmes are defined as **management-driven** monitoring schemes, where **EM** is **officially** used for **compliance monitoring** purposes. Vessels under these regulations are required to have an EM system on board. Other remarkable EM implementations are the **fishing industry driven** French and Spanish tropical **tuna purse seine programmes** in the Atlantic and Indian Ocean, where fishers **voluntarily** adopted a full EM programme, **covering 100% of fishing activities.**

Figure 1: Increasing number of fishing vessels involved in Electronic Monitoring worldwide
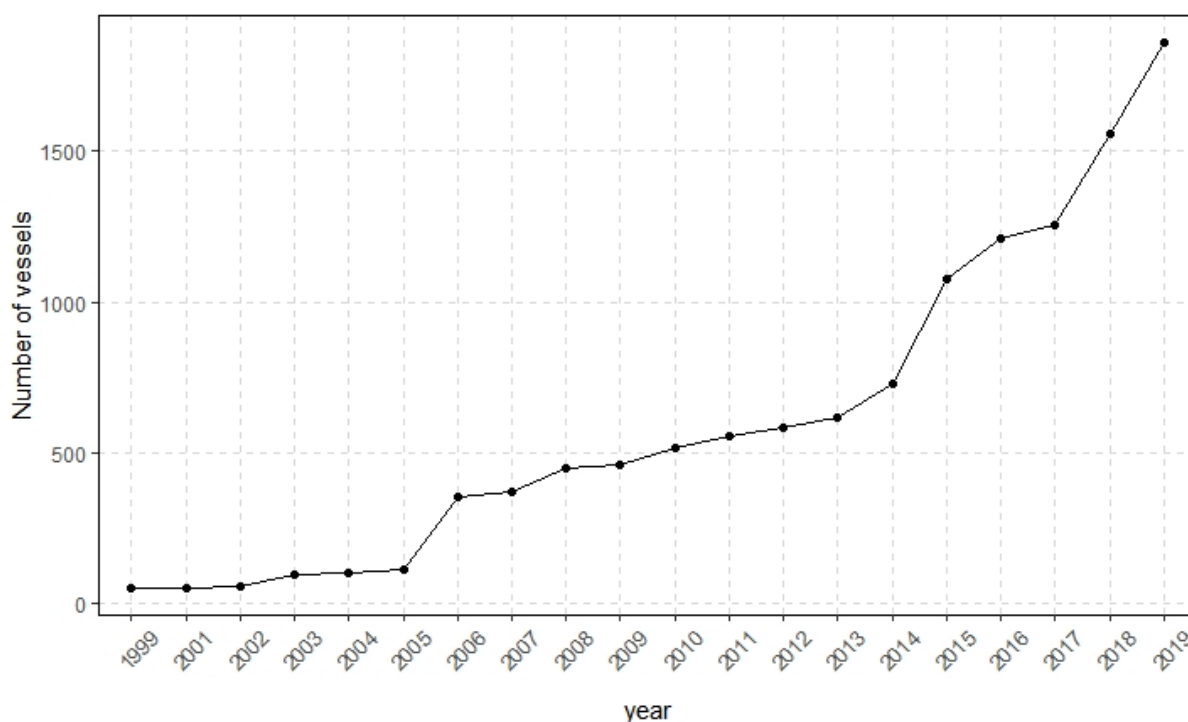
Source: Author based on data collected during review.

Electronic Monitoring in European fisheries

In European fisheries a total of **26 EM trials** carried out by seven different countries (Denmark, France, the Netherlands, Germany, Spain, Sweden, and United Kingdom) were encountered during the review. The more comprehensive EM trials involve **more than ten vessels**. So far, **none of the trials have moved to full implementation**.

EM trials were executed in a **variety of fishery types**, from larger beam trawlers and seiners to small inshore fishing boats of less than 10 metres in length. EM proved to be an efficient monitoring tool in **catch quota management (CQM)** trials for cod in Denmark, Germany, the Netherlands and the United Kingdom.

Benefits and Risks

The biggest advantage of EM is the **increase of sampling coverage** and the level of detailed fisheries information that can be collected **without an extreme increase in monitoring budgets**. However, it should be emphasized that **EM is not a "plug and play" system**. Firstly, the **involvement of the crew on board fishing vessels** is crucial for a successful EM implementation. Fishers need to conform to maintenance of the EM systems, camera lenses need to be cleaned on regular intervals as footage collected from dirty cameras is useless. Secondly, the manual review of video EM data is labour intensive. Automated specifies recording systems, through **computer vision technology**, seem the logical next step in **reducing time and manual labour** needed for video review (Figure 2). Such technology is currently still under development. Furthermore, the implementation of EM on a large scale requires sufficient **IT infrastructure** data storage and processing.

In contrast with the in general negative attitude of the fishing industry around EM, the majority of the **participating fishers in EM trials were positive and supportive of using EM** for fisheries management purposes. Although, in some cases strong incentives to participate were provided (e.g. substantial quota uplifts).

Figure 2: Computer vision technology in practise: Example of automated classification of fish species on the sorting belt of a beam trawler
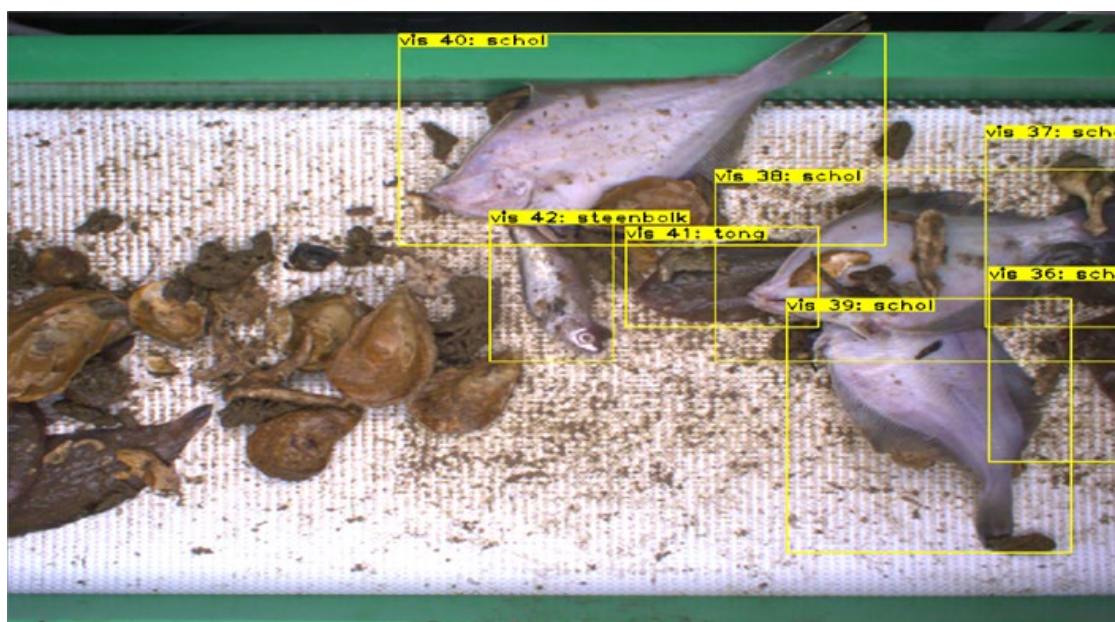
Source: Wageningen University & Research
Note: „schol" = plaice, *Pleuronectes platessa*; „tong" = sole, *Solea solea*; „steenbolk" = pouting, *Trisopterus luscus*

Conclusions

Experiences and lessons learnt from EM trials are valuable and useful for **implementing EM on a larger scale in European fisheries**. In the context of the EU landing obligation and the requirement to record discards, further work on **EM development is still needed**. Processing large amounts of video data and detecting **smaller fish specimens** in large volumes of catch with video review can still be challenging. **Computer vision technology** is a possible solution to facilitate processing large amounts of EM data and improve fish detection.

Policy recommendations

- **Support the development of technical innovation in Electronic Monitoring**. Facilitate research on species recognition through computer vision technology; support networking between fisheries research, EM providers and robotics, e.g. (technical) universities and private sector; develop strategies to process large amounts of EM data (video data).

- **Build fishing industry support for Electronic Monitoring**. Demonstrate EM benefits and best-practise examples; facilitate communication around EM between stakeholders; develop "win-win" scenarios through alternative uses of EM data.

- **Create a European Electronic Monitoring infrastructure**. Provide legal guidelines around EM (e.g. privacy, data ownership); facilitate workgroups or committees with experts representing all stakeholder parties when implementing EM in a particular fleet or fisheries. Provide **legal requirements** and **governing framework** for Member States to implement EM.

Further information

This executive summary is available in the following languages: English, French, German, Italian and Spanish. The study, which is available in English, and the summaries can be downloaded at: https://bit.ly/3u2ok82

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