

ECGFF – EFCA Workshop on the Use of evidence produced by innovative fisheries surveillance and inspection technologies

2 – 4 May 2023 –Bruges/Ostend, Belgium

Report

1. Background

In the framework of the cooperation between the European Coast Guard Functions Forum (ECGFF) and the three EU Agencies (European Fisheries Control Agency - EFCA, European Maritime Safety Agency – EMSA, and European Border and Coast Guard Agency - Frontex) thematic workshops are organised each year. The ECGFF and EFCA have chosen an important subject related to the use of evidence produced by innovative fisheries surveillance and inspection technologies as the subject for the workshop held in 2023.

Adequate fisheries surveillance and inspection capacities are key to ensure compliance with the relevant fisheries regulations and, thus, to reach the objectives of the Common Fisheries Policy (CFP). Proper enforcement requires establishing solid evidence in case of a potential noncompliance situation. In recent years, the use of innovative surveillance and inspection technologies, such as earth observation, remote sensing, vessel detection technologies and many others have led to a wide range of potential new ways of collecting evidence.

The objective of the workshop is to:

- Provide an overview of existing and emerging surveillance technologies and the type of evidence they could provide.
- Outline the legal requirements and challenges in view of using such evidence in enforcement and legal follow-up / prosecution procedures.
- Exchange views and collect feedback on the actual operational use, experiences, and challenges related to the use of evidence sourced from innovative technologies.

2. Opening

The Workshop was launched by Mr Jacques Verborgh, Mr Piet Pieters, co-chair of the ECGFF, Dr Susan Steele Executive, Director of EFCA, and Ms Iglia Yakova, from the European Commission. Mr Jacques Verborgh and Mr Piet Pieters welcomed everyone, gave an introduction on what awaited the participants in the two-day workshop and pointed out the interconnectedness between Bruges and the rest of the world throughout its history. The connection with the sea was also highlighted. Dr Susan Steele stressed the importance of cooperation between the different services operating in European waters. Sharing information, best practices and experiences among the different services will make control on our European waters more efficient and effective. This is therefore one of the many benefits of organising similar workshops, where different EU Member States can learn from each other. This is also happening at the European level between the three EU agencies EFCA, EMSA and Frontex. Ms Iglia Yakova also underlined the importance of the ECGFF and the organisation of these types of workshops and informed about the state of play of the revision of the EU Maritime Security Strategy and its Action Plan.

3. Present and future perspectives on maritime surveillance and use of evidence in Belgium –

Mr. Geert Devogel, Government of Flanders, Department of Agriculture and Fisheries, Fisheries Authority and

Mr. Ian Monteyne Government of Flanders, Department of Agriculture and Fisheries, Fisheries Authority

The Belgian delegates provided insights and perspectives on maritime surveillance and the use of evidence in fisheries infringement cases in Belgium. Mr Geert Devogel presented specific challenges faced by the Belgian control services. He highlighted the unique Belgian situation, namely, that the Belgian EEZ only represents a small part of the North Sea. Its coastline is only 67 km and its area is less than 1% of the total area of the North Sea. At the same time, it is one of the busiest sea areas in the world. Consequently, it requires close cooperation with the other coast guard partners. The Belgian coast guard has 17 partners in total, operating at 3 different policy levels. This makes cooperation a must and ensures that 'Multipurpose Maritime Operations' take place. As part of the coast guard, the Fisheries Department works with the Flemish Agency for Maritime and Coastal Services (MDK), Defence, Customs and the Management Unit of the North Sea Mathematical Models (MUMM) to carry out part of their control activities. These controls take place both at sea and from the air. A priority for the Belgian fisheries control services is the so-called 'Plaicebox' (Scholbox). It is partly located in Belgian waters and beam trawlers with an engine power of more than 221 kW are prohibited from fishing there.

A further distinction was made between cooperative and non-cooperative enforcement. Cooperative enforcement means that, as a control authority, it depends on the cooperation of fishermen. VMS and T-AIS are two examples of control means where cooperation is required. But there are also enforcement systems where cooperation is not required. Examples here are radar technologies and surveillance with an aircraft. However, aircrafts are expensive to operate. The use of drones seems promising in the fight against Illegal, unreported and unregulated (IUU) fishing.

Mr Ian Monteyne explained the different tasks within the fisheries control service: Training new staff, verifying the import and export of fishery products from third countries, performing risk analysis, inspection activities at sea or at the fish auction. In other words, the range of tasks of fisheries inspection is very wide. To carry out these variety of tasks, the control services have different tools at their disposal. The POLARIS IT system is the most important tool used for monitoring the Belgian fishing fleet. In that application all information from VMS (Vessel Monitoring System), ERS (Electronic Reporting System), the fishing fleet and also sales information is pooled. This allows for regular cross-checks to be made. Spotfire, M-Catch, regional groups' websites, IT applications provided through EMSA and EFCA as well as CIRCABC (Communication and Information Resource Centre for Administrations, Businesses and Citizens) are also used. All these resources ensure that the Belgian control services have a complete picture of everything falling within their responsibility. A detailed description and explanation of the Polaris and Spotfire IT system was provided. To conclude a video was presented on the daily work of the Belgian fisheries control services.

4. Thematic presentations from EU Agencies

Mr. Sven Tahon - European Fisheries Control Agency

Mr Sven Tahon gave a presentation on the existing surveillance technologies and their potential for gathering evidence in supporting fisheries control activities.

EFCA supports Member States and the EC in providing access and using innovative surveillance techniques in the fisheries control operational environment.

Emphasis was put on the importance of innovation on the one hand and cooperation with various agencies and international bodies in the surveillance technology domain on the other. Collaborating with different institutions increases knowledge and potential access to innovative technologies. Furthermore, the EFCA is constantly assessing the R&D landscape for technologies that potentially could provide an added value for the fisheries control domain,

when this is the case project support, including the provision of specific business needs, is provided. However, it was emphasised that one should always consider the feasibility and the realistic cost-benefit of the proposed technology. In addition, the way how such technologies can be integrated on the operational work floor and the useability of its outputs as potential evidence needs to be assessed carefully. More specifically, the integration of such technologies in the MS's Fisheries Monitoring Centres (FMC) or the EFCA coordination Centre is very important. Next to providing an overview of technologies that are currently available or will become available in the near future for fisheries surveillance, some concerns were raised with regards to handling the outputs of such technologies.

As many of these technologies produce a huge amount of data, we need to be able to distill only the useful data and very importantly ensure its quality. Only in this way the data produced, and thus the innovative technology producing it, will be of value and provide usable and trustworthy information for the fisheries control user community. This aspect should not be underestimated. In the event of a potential non-compliance situation there should be sufficient trustworthy information available in support of legal proceedings that would be indisputably acceptable to the court.

Mr. José Gata - European Maritime Safety Agency

An overview was provided of EMSA's Maritime Support Services focusing on the EMSA Copernicus Maritime Services (CMS) and Remotely Piloted Aircraft Systems (RPAS) which can assist Member States and EU institutions in maritime surveillance.

With CMS EMSA provides access to SAR and optical satellite imagery for specific users. These can support pollution control activities, fisheries monitoring activities and enhance the maritime awareness picture, including the delivery of specific services. Also, RPAS can play an important role in monitoring fishing activities. They can provide support for a wide range of coast guard tasks such as marine pollution, general maritime surveillance, fisheries control tasks, search & rescue operations and border controls or even a combination of all those. In addition to coast guard functions, RPAS can also be used to monitor emissions and port activities. The data collected is made available to all users via the RPAS data centre.

As a result of the rapid development and use of these technologies, there is a huge increase in available information and data. These data can be used for different purposes. First, it may be used for law enforcement; it may be used as evidence in court. Second, it can serve to trigger the use and guide the deployment of other resources. When an RPAS detects a potential non-compliance situation, this may result in a manned aircraft being deployed for further verification and follow-up. It has a reinforcing effect in this. Third, it may benefit the decision-making process.

Mr. Konstantinos Lagoudianakis, European Border and Coast Guard Agency

FRONTEX, EMSA and EFCA cooperate in the context of maritime operations. Here, there is a focus on practical cooperation between the different partners. Synergies were detected in five different areas; namely, information sharing, surveillance, capacity building, risk analysis and capacity sharing. It was emphasised that there should be a focus on practical cooperation, sharing best practices and future challenges.

An overview was provided of the different Joint Operations (JO) and Multipurpose Maritime Operations (MMO) that took place. An example of such practical cooperation is the exchange of fishing vessel sighting information. There is a strict procedure that must be followed. After observing a vessel, a 'Fishing Vessel Sighting Form' (FVSF) is completed and sent to ICC/ECGFO. The latter supports drafting and verifies the quality. Finally, it is up to EFCA to decide how to further handle the report.

Finally, there are also multipurpose aerial surveillance operations. The main aim is real-time surveillance, which is livestreamed to the headquarters. For example, cages at sea are spotted through these operations. Multipurpose Aerial Surveillance operations are planned in the Western Black Sea, the Baltic Sea and the Adriatic Sea in 2023.

Prof. Dr. Manuel Lopez Martinez, European Union Agency for the Space Programme (EUSPA)

EUSPA is a provider of EU Space services, the most important one being Galileo, Europe's Global Satellite Navigation System (GNSS). Galileo is an open service (OS) and can thus be used free of charge.

Recently the Open Service Galileo Navigation Message Authentication (OS-NMA) has been developed. Among other things, it verifies the data received from Galileo and detects attempted spoofing attacks. After 2 minutes it can start authenticating the data every 30 seconds.

Galileo is an indispensable asset for an enhanced functioning of the Vessel Monitoring System (VMS). It can provide authentication of the transmitted information. Authentication is welcomed by the control authorities not only to protect fishing vessels from spoofing attacks but also, to ensure GNSS data can be authenticated. Currently a specific VMS bluebox with GNSS (Global Navigation Satellite System) authentication is being developed allowing for the inclusion of authentication messages. Galileo authentication can also be applied and integrated with drone imagery. Consequently, this results in evidence outputs that are of high quality which can be undisputedly used in legal proceedings.

Ms. Patricia Romeyro, European Union Satellite Centre (EU SatCen)

The intervention of EU SatCen focused on the tasking and services available at the centre and on the potential of using high end image analysis capacities for the detecting and monitoring of Bluefin Tuna farming facilities. More specifically reference was made to the SatCen-EFCA pilot project for the detection of farming facilities, on the high seas in North-African waters. For this purpose, low resolution large area satellite imagery was used with findings subsequently confirmed with very high-resolution images. SatCen also provided support in Maritime Monitoring Operations in the Black Sea. The results of these operations were very promising in terms of applying certain image analysis technologies. There are, however, also some challenges such as false positive detections. This can be avoided in the future when applying deep learning technologies. Furthermore, Artificial Intelligence (AI) was used for detecting the farming facilities and was considered very useful when covering and analysing huge areas. Nevertheless, SatCen stressed that deep learning and AI technologies are to be used as supporting technologies and should never replace the role of business specific image analysts.

Additional technologies such as social media data mining was highlighted and their potential for detecting alternative patterns and additional information sources which can feed into the decision-making process.

It was also indicated that in the future the possible use of newly emerging satellite constellations should be explored.

Mr. Gordon Campbell, European Space Agency (ESA-ESRIN)

Earth observation (EO) has already been used for quite some time as evidence. It has been used in a wide variety of legal issues, going from detecting oil spills to war crimes (Rwanda).

In 2012 a study was carried out on the admissibility of EO-derived information as evidence. The main findings were that there is a gap between legal, technical and administrative communities regarding the use of EO information. In addition, it showed that existing standards and procedures may not adequately address the use of space derived EO evidence for legal proceedings and their acceptance in courts and tribunals. More attention must be paid to certification and authentication of the satellite imagery and derived products.

The EO capabilities are evolving rapidly and have a lot of potential. In the future EO derived information will contribute increasingly to the evidence chain. Furthermore, access to EO derived information expands constantly. This could provide for a greater risk of modified, and less trustworthy data hence jeopardising the overall acceptance of such outputs as evidence.

Finally, the use of EO technologies has the potential to provide early indications of potential threats, thus enabling decision-makers to anticipate.

5. Thematic presentations from Member States

The second day was moderated by Mr. Pedro Galache, Head of Unit at EFCA for Coast Guard and International Programmes. Mr. Galache introduced briefly the topic of the day, explaining that different MS would give an insight on some practical issues and how they use the evidence in legal proceedings.

- *Spain - Mr. David Poderoso Godoy, Subdirección General de Vigilancia Pesquera y Lucha Contra la Pesca Ilegal*

“In dubio pro reo” is what should be considered at all times when collecting evidence. This means that a defendant may not be convicted when there is doubt about his/her guilt. The main thing is what the court understands as an infraction.

The general principle in Spain is the application of procedural principles to administrative sanctioning law. The general interest has prevalence. When collecting evidence in Spain, inspectors bear in mind how they will use it in a judicial procedure. This is very important to be able to succeed in a procedure, whether administrative or judicial. Therefore, in Spain Sancipes 3.0 is used. It collects inspection reports and documents related to an infringement. Thus, inspectors have always a good overview of the collected data and information.

The “In dubio pro reo” principle raises some challenges. First, the inspectors analyse the facts, based on the collected evidence. Hereafter, they establish the infraction, always paying attention to the circumstantial evidence. The evidence shall be linked to the infraction.

A distinction is made between classical technologies, *i.e.*, technologies that are accepted by the court, and new technologies. These new technologies are new for the court and new for the Spanish fisheries control authorities. Spain makes use of 25 drones and gave some examples of where they used the drones.

- *France - Ms Carol Gautron, Centre Régional Opérationnel de Surveillance et de Sauvetage d'Etel (CROSSA Etel / CNSP)*

France indicated that they are intensively using the EMSA CMS services in cooperation with EFCA and make use of the two types of satellite imagery products, namely, optical or radar pictures. When the French authorities make use of the images, they send three weeks in advance the information they need. This information is the time and period, the geographic location and sensor type.

The authorities analyse the length and width of the vessels, the number of vessels and their position. They combine this information with the information gathered by the VMS/AIS. The

focus is on overseas fishing and the fight against IUU fishing. Besides the fight against IUU fishing there is a broader intelligence gathering and expansion of the database. Thus, the authorities find out what are the most frequented places and the periods of greatest activity. Images never serve as direct evidence. They support the inspectors, who always must confirm if there is an infraction. The question arises as to how in the future AI will influence fisheries control.

- ***Estonia - Mr Egert Tolk, Environmental Board***

The drones are used for multiple reasons in Estonia:

- Area observation.
- Searching for illegal fishing gear such as eel traps.
- Recording violations: traceability from the beginning until the end.
- Tracking fleeing suspects, they can follow poachers who flee.
- Crime scene observation.

The Estonian fisheries inspection authority makes use of small drones with thermal imaging cameras. It is more than sufficient to detect illegal fishing gear that is often used in shallow waters (shallow waters not accessible by boat). It saves a lot of time and is thus efficient and effective.

Another case was provided about IUU fishing in the Vasalemma estuary (a prohibited area) on illegal salmon fishing with gillnets. They were able to film the poachers from the beginning until the end. Without the footage the poachers would have been set free. There was a detailed questioning of the court on how the drone was used. Everything had to be documented.

- ***Croatia - Mr. Damir Grgić, Ministry of Agriculture, Croatia***

Croatia has about 650 fishing vessels with VMS devices installed (every vessel > 12m).

The main focus of fisheries activity monitoring is on the Jakuba Pomo Pit, which is a Vulnerable Marine Ecosystem (VME). The objective is to continuously monitor the activity of all fishing vessels. One part of the Jakuba Pomo Pit is situated in international waters and another part in the Croatian EEZ. One part of the HRV EEZ is a no-take zone, another part is only accessible for licensed vessels. International waters are also accessible with a license.

Maximum speed is 7 Kts and an automatic notification is sent to the authorities every time a vessel enters the zone.

Also, there is RPAS surveillance. 60% of the time the unmanned aerial vehicle is used for fisheries control. This helps a lot in the fight against IUU fishing.

- ***Belgium - Mr. Johan Robbens, Fisheries and Food, Belgium***

It is difficult to make a distinction between similar fish species, for example Lemon Sole and Common Sole, particularly when they are processed. DNA analysis technology can help to define the fish species in question. Using nucleic acid DNA analysis it is possible to establish with 100% certainty which fish species it concerns. This is an important technology, since studies have established that in Europe sometimes up to 25% of the fish is mislabelled. Of course, this is not an exact number, because of biased sampling, but nevertheless it is a real problem.

It was explained that “DNA-barcoding” is labour intensive and requires some time and is very expensive. Another issue is that processed products are more difficult to test. This has an impact on the DNA structure or there can be mixed samples, such as fish salad, where it is almost impossible to test.

Still, the DNA-barcoding has proven its usefulness and the goal should be to build a reliable DNA database with reference material making future DNA testing and the use of the technology for fisheries control more efficient and accessible.

- ***Italy - Lt. Cdr. ITCG Christian AMIN, Italian Coast Guard***

The coast guard in Italy is decentralised. It has 15 maritime directorates in total, but the fisheries control is a single authority under the Ministry of Agriculture.

The Italian Fisheries Control Centre (CCNP) has 5 big tasks:

- Coordination of inspection activities.
- Risk management at national level.
- Training fisheries inspectors.
- Management of digital platform of infringements.
- International activities.

It controls 24/7 the Italian fishing vessels and all vessels transiting Italian waters.

Italian authorities have difficulties using AIS data as evidence for non-compliance situations, because it is not always recognised in court. To use VMS as solid evidence for non-

compliance situations the operator developed very strict operational procedures. Every 15 minutes they receive a VMS signal.

VMS and AIS can be displayed simultaneously. Hence, they can detect anomalies such as AIS spoofing or falsified activity reporting.

- ***Cpt. pil. Nicolò Silvagni - Guardia di Finanza***

The Guardia di Finanza falls under the authority of the Ministry of Economy and Finance and is the police authority over the sea. Its main objective is border control, which is challenging since Italy has more than 8000 km of coastline.

An overview was given of the different aerial and naval assets that the Guardia di Finanza uses for fisheries surveillance and a wide range of other tasks. When the aerial assets spot something, they can stream the image live to services on the ground.

Moreover, surveillance training is an important task of the Guardia di Finanza. Therefore, they use an air-naval simulation centre.

6. Discussion panel

Mr. Rafael Duarte, Head of Sector for Cooperation at EFCA, moderated the discussion panel composed by the speakers from Member States:

- Mr. David Poderoso Godoy (Spain).
- Ms Carol Gautron (France).
- Mr Egert Tolk (Estonia).
- Mr. Damir Grgić (Croatia).
- Mr. Johan Robbens (Belgium).
- Lt. Cdr. Christian Amin.
- Cpt. pil. Nicolò Silvagni.

The moderator thanked panellists for their availability and encouraged participants to actively engage in the discussions. Regarding the information provided by the previous speakers, the moderator reminded that innovative technologies could be classified into:

- i) Cooperative technologies (Vessel Monitoring System – VMS, Automatic Identification System - T-AIS & Sat-AIS, Long Range Identification & Tracking – LRIT) and
- ii) Non-cooperative technologies (Earth Observation – EO - and Remote Sensing, Vessel Detection Service – VDS, Radio frequency – RF – detection and Infrared detection – VIIRS).

The moderator also reminded that evidence could be used:

- i) directly in law enforcement actions,
- ii) to activate other assets (e.g., Earth Observation to guide Offshore Patrol Vessels or aircrafts) which will gather or collect complementary data,
- iii) as an indicator for the decision-making process in real time (e.g. sniffer drone to take measurements from the exhaust plumes of ships).

Another element is the authentication of, for example vessel positions and authentication that a certain image was taken at a certain time in a certain location.

Having in mind the presentations of both days, a general question was made by the moderator to the panellists regarding the main challenges faced on the use of control technologies and the gathered evidence and specific questions were made tailored to the individual panellist.

On the use of evidence from technologies directly in legal proceedings, Mr. David Poderoso Godoy mentioned that it goes step by step. For drones only images are currently used in Spain and not videos. The information is used very carefully. In the future Spain would like to have a certification of all RPAS.

Mr Egert Tolk (Estonia) mentioned that videos from RPAS were accepted in court, but that current experience is limited and that evidence must be traceable.

Lt. Cdr. Christian Amin and Cpt. pil. Nicolò Silvagni provided examples on how RPAS is used as direct evidence and auxiliary evidence in Italy in fishing control related activities.

Ms. Carol Gautron (France) outlined why satellite images are not used as main evidence. She mentioned that there are many false positive detections, so we must control it also in real life. Maybe in the future this will get better with the help of AI. The way of working of the French authorities evolved and improved it over the years.

On the future development of DNA-analysis and if it will be possible to be used on the spot, Mr. Johan Robbens (Belgium) replied that the use on board this is not possible and that there is a laboratory needed. Also, when you have a thousand samples barcoding is impossible. Also, the geographic distance between species makes it difficult to differentiate between populations.

On a question regarding the legal basis for the use of new technologies, panellists mentioned that the fisheries control regulation provides that legal basis and that the follow up of the legal proceedings is dependent on each Member State. It is necessary to go step by step but carefully as there are also implications related to personal data protection that must be taken into account. There was the example given that there are already cameras in the public domain (that in port areas might collect evidence for fisheries control purposes) but it is dependent on each Member State as the cameras were certified for a certain purpose. Also,

drones are only used in specific situations. Not for a general patrol without specific objectives. It was also mentioned that in some cases, it is necessary to catch directly in the act as it might not be enough to have it on video. Surveillance might be followed immediately by action.

7. Debriefing Security exercise - Ministry of Defence

In recent years there has been great political instability due to the migrant crisis, the energy crisis and now the war in Ukraine. Security at sea is becoming increasingly important and is cross-sectoral. Cooperation is needed.

In the BELCOASTEX a lot of actors were involved; namely, the Federal police (SPN), EFCA, EMSA, Frontex, Defence, MRCC and MIK (Maritime Security Centre Belgium). Cooperation was the key word here.

It is done to test the knowledge regarding the windfarm and furthermore to raise general awareness, improvement of individual performance and building confidence.

The most important lessons learned are the following:

- If it were reality and not a drill, it would be a night operation and it would not take place during the day.
- Presence of an offshore expert is mandatory.
- Collaboration with the offshore industry is necessary.
- Growing experience leads to better understanding.
- Communication needs to improve.
- Regular training to maintain skills is also necessary.

8. Workshop outcome

Main workshop outcome is the following:

- With the aim of enjoying the full potential of innovative technologies it is important that they are fully integrated and accessible in the fisheries control operational environment, adapted to the business needs of the fisheries control community.
- The focus should not only be on capabilities of the actual technology. In order to increase the useability of evidence in legal proceedings it is necessary to invest in the certification, mapping and assessment of the related processes and data sources used.
- Furthermore, it is important that, in order to enjoy the full potential of innovative technologies, research and development go hand in hand with consideration of user

requirements and specific business needs of the fisheries control community. The DNA barcode for fishery control is crucial.

- The human factor, which transforms technological results into situational awareness and, later, into fishing inspection actions, continues to be key.
- It will all come down to working even more together, sharing best practice across different coast guard functions on how innovative evidence-gathering technologies are used.