



Assessment of the RPAS operations deployed from on board OPV Lundy Sentinel in terms of the added value for fisheries inspection and control

1. Background

The European Fisheries Control Agency requested in May 2019¹ the service to the European Maritime Safety Agency (EMSA) of a Vertical Take-Off and Landing lightweight Remotely Piloted Aircraft System (RPAS) to be deployed from on board the EFCA chartered Offshore Patrol Vessel Lundy Sentinel. The request was for an initial experience of operating an RPAS from the chartered OPV for fisheries control purposes, in particular this RPAS would be used as a complementary fisheries control tool such as to have an initial pre-boarding assessment for fisheries inspectors (before boarding a fishing vessel) and to check certain fisheries control measures remotely. An initial assessment of the viability to deploy the RPAS from on board the EFCA chartered OPV was made with a positive outcome² and a satellite communication (service provided also by EMSA) was also established for streaming in real time to the EFCA Coordination Centre.

2. Objective

The objective of this document is to make an operational assessment on the RPAS service deployed during the period of deployment between the 1 September and the 30 November 2019, in view of future contracting of the service. The assessment covers:

- The practical aspects of deploying the RPAS from on board OPV Lundy Sentinel using (e.g. tasks on board for the EFCA Liaison Officer on Board (LOB), Operational Procedures);
- Operational added value for fisheries control of using RPAS from board of OPV Lundy Sentinel (with the current RPAS or with RPAS having higher endurance);
- Possible improvements that could substantially enhance the service.

¹ Ref. Ares(2019)3137186 - 13/05/2019

² Nordic Unmanned - EMSA OP12 Indago Site visit onboard "Lundy Sentinel"

3. RPAS main technical specifications

The main technical specification of the RPAS used were the following:

- Weight: 2300g
- Battery powered quadcopter with an endurance of about 35 minutes
- Max range: 5 Nm (9 km) legal and technical max range
- Max working range from target: 2,5 Nm (4,5 km)
- Maximum Altitude: legally limited to 120 m
- Maximum Speed: 30 kts or 56 km/h
- Camera 1: optical camera: 4 x digital zoom
infra Red Camera: 8 x digital zoom
- Camera 2: optical camera: 30 x optical zoom

The drone needs to be operated within visual or radio line of sight from the operator without any objects being in between them.

The full technical specifications are available in the technical fiche of EMSA.

4. Summary of operational activity

| Patrol | Dates | Geographical Area | Number of RPAS flights | Number of boardings |
|-----------|--------------------|-----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Patrol 17 | 1 – 14 Sep 19 | Central Med | 5 surveillance flights 9 test/training flights Totals 14 flights | 2 flights combined with boarding 3 boardings without flight Total 5 boardings |
| Patrol 18 | 16 – 29 Sep 19 | Central Med / Adriatic Sea | 9 surveillance flights 1 test/training flights Totals 10 flights | No flights combined with boarding 16 boardings without flight Total 16 boardings |
| Patrol 19 | 01 – 13 Oct 19 | Central Med / Adriatic Sea | 13 surveillance flights 6 test/training flights Totals 19 flights | 7 flights combined with boarding 4 boardings without flight Total 11 boardings |
| Patrol 20 | 15 – 29 Oct 19 | Western Med North Atlantic | 9 surveillance flights 1 test/training flights Totals 10 flights | 9 flights combined with boarding 3 boardings without flight Total 12 boardings |
| Patrol 21 | 31 Oct – 20 Nov 19 | North Atlantic Gulf of Biscay North Sea | 4 surveillance flights 1 test/training flights Totals 5 flights | 1 flight combined with boarding 4 boardings without flight Total 5 boardings |
| Patrol 22 | 22 Nov – 04 Dec 19 | Baltic Sea | 8 surveillance flights 1 test/training flights Totals 9 flights | 6 flights combined with boarding 4 boardings without flight Total 10 boardings |

Important to note: The meteorological limits to fly the RPAS are in general: wind of max - 4 Bft and sea state 4, these are usually also the limitations to perform boarding boat operations.

5. Operational assessment of deploying the RPAS from on board OPV Lundy Sentinel

Positive aspects:

- The additional workload for operating the RPAS is not seen as a heavy extra burden for LOBs. From a user point of view it takes little skills to operate the system by giving instructions to the pilot on what part of the fishery operation the LOB wants to observe.
- The footage is of a very good quality and useful.
- It can be used to survey the BFT fishery, especially the cages.
- The light weight RPAS has a legal capacity to fly up to 5 Nm without any prior requests, based on the Norwegian licence.
- There is only one external operator required to operate the drone, the logistics is very basic (some bags) and the operational and storage space are very limited.
- The impact of the RPAS on the ship exploitation is limited.
- There is a possibility to stream the images live via the EMSA SatCom system to any stakeholder.
- When not known of its presence it is difficult for the target to detect the RPAS when in operation.

Aspects for improvement:

- The current endurance of the RPAS is limited.
- A concern was raised that if the workload is very high during the patrol, this might interfere in the conduct of the inspections. However, it is important to underline that the RPAS is a tool to be used if useful for the LOB and inspection team.
- The operational distance is seen as low. One LOB proposes a flight distance of at least 10 Nm.
- The use in adverse weather is limited, wind force 4 Bft and sea state 4.
- The video does not provide information regarding date, time and the target position or the distance from the RPAS. However this can be added in an overlay to the footage.

6. Added value for fisheries inspection and control

The use of RPAS in the fisheries control operations is considered to provide an added value. Some examples of practical cases and possible use of RPAS are provided below:

- Fishing restricted area: A vessel was detected inside a fishing restricted area for some time and left the area once Lundy Sentinel approached. The RPAS was used to see that the catch was being sorted on board after the fishing vessel left the area. This was a clear indication that the vessel was fishing in the restricted area.
- RPAS used to watch a fishing vessel with the crew sorting the catch and using fish as bait to possibly catch tuna. Discarding fish – possibly to attract tuna. RPAS and good quality of images allowed to have a clear view of what was happening on board.
- RPAS is used to accompany through live stream remotely the inspection team while the inspection team is on board a fishing vessel.

- One LOB considered that the RPAS may be useful for maritime surveillance to detect fishing vessels not transmitting AIS/VMS in order to identify the targets and to obtain the information necessary to call the fishing vessel by radio (especially e.g. when the fishing vessel is at a distance not possible to see with the binocular or when the unidentified fishing vessel is trying to move away from the EFCA chartered OPV. The current RPAS does not have sufficient endurance to allow this.
- The RPAS is a good pre-inspection tool to keep the target vessel under surveillance after informing them they will be inspected

Suggestions to improve:

A more performant RPAS to be able to fly further from the vessel and to operate longer and in worse weather should be a great advantage. It would be beneficial if the maximum legal distance to operate should coincide with the maximum operational distance and endurance. The legal distance to operate from the mother vessel according to the Norwegian license in International waters which is 5 Nm. The endurance should be one hour or more.

Other important considerations:

- All data is subject to data protection and should not be disseminated to anybody nor kept for personnel purposes.
- Procedures to exchange data with the Member States are being developed.

7. General conclusion and proposed way forward

EFCA should continue testing a new and promising technology for fisheries inspection and it is proposed to continue with the RPAS on board of Lundy Sentinel during 2020. A more powerful drone with higher endurance would even enhance this new operational capacity considerably.

The data protection rules should be further developed and documented in procedures.

There is a role to be tested for the current RPAS, but preferable updated RPAS, during the next Bluefin Tuna campaign.