ECGFF – EMSA Workshop

"RPAS for Maritime Surveillance"

15-16 February 2022, Online and EMSA premises – Lisbon, Portugal

Draft Minutes of Meeting

This European Coast Guard Functions Forum (ECGFF) Workshop gathered 150 representatives from 23 coastal States, four EU agencies (EASA, EFCA, FRONTEX, and EMSA) as well as the European Space Agency (ESA), the Maritime Analysis and Operations Centre – Narcotics (MAOC (N)) and the European Commission, DG MOVE and DG HOME.

Supporting documents:

All presentations can be download from the password protected area at: https://extranet.emsa.europa.eu/

Folder details and password will be sent to participants.

List of participating countries:

Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain and Sweden.

Content

1. Welcome by EMSA and Croatian ECGFF Chairmanship

The joint Workshop was opened by EMSA's Executive Director, who welcomed participants and thanked the Croatian Chairmanship for the selection of topic for the Workshop, which is of importance to EMSA but also to the day-to-day surveillance activities of the Member States. She noted that embracing new technologies enables closer cooperation and efficiency gains at work. There are broader changes facing society and industry in terms of new technologies and digitalisation, and organisations involved in maritime surveillance also need to be prepared to adapt to these changes. Participants were reminded that EMSA began to provide these services five years ago and is now the largest provider of Remotely Piloted Aircraft (RPAS) services in the civil domain in Europe. EMSA's portfolio is continually being adapted to reflect the newest technologies focusing on the ones most useful to the Member State users. EMSA's Executive director reiterated the need for further cooperation in the definition of the future RPAS use in a safe and efficient manner for different coastguard functions. The EMSA Executive Director then wished the participants a fruitful workshop and passed the floor to the Chairman of the ECGFF.

The Chairman of the ECGFF and Chief of Staff – Deputy Commander of the Croatian Navy addressed the participants, thanking all involved on behalf of the Croatian Ministry of the Sea, Transport and Infrastructure. He noted the advantages of use of RPAS in support of coast guard functions and emphasized that it is important that all stakeholders provide support and assistance to each other. Finally, he expressed his hope that it would be possible to meet in person in future activities.

The Director of Maritime Safety Directorate, Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia, briefly addressed the Workshop. He began by thanking the ECGFF Chairmanship and EMSA for organising the Workshop, aimed at enhancing maritime domain awareness. He stated that in addressing modern challenges, cooperation between the EU Agencies and Member States is becoming increasingly important. Harmonisation between the stakeholders involved is key to taking action at sea. It was noted that in Croatia, there is good cooperation between all the authorities involved in the various coast guard functions, and that this cooperation is improving every year. EMSA provided valuable RPAS services to support Croatian maritime activities, which was seen as a very positive experience. Noting that it was a rich and interesting programme, the Director thanked participants for being prepared to share experiences.

The Moderator of the Workshop, Head of the Environmental Protection Unit, Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia, thanked the opening speakers, provided an outline of the Workshop agenda, and introduced the Member States who would deliver presentations to the plenary.

2. Member State presentations: best practices and lessons learnt

Member States with experience in using RPAS for maritime surveillance purposes delivered presentations to the Workshop.

2.1 Estonia

Estonian Police and Border Guard Board

The Estonian presentation addressed how the RPAS service provided by EMSA had been used in 2021 for the purposes of maritime safety, maritime monitoring and surveillance, identification of unidentified maritime objects, pollution control, and search and rescue. Reference was made to the ongoing and planned cooperation with Finland and Latvia in the context of the Baltic regional maritime surveillance activities.

For more information, please see the presentation.

2.2 France

Directorate for Maritime Affairs/SAR and Maritime Traffic Office, France

France delivered a presentation on the 2021 deployment for emissions monitoring, covering project management considerations, choice of location and RPAS capabilities, as well as deployment results. The role of Port State Control authorities in following up on emissions detections was highlighted as essential to the efficiency of the service.

For more information, please see the presentation.

2.3 Spain

Spanish Customs

The presentation from Spain reviewed the operational scenarios in which RPAS were used, and the presented main conclusions drawn about use of RPAS in those different scenarios.

For more information, please see the presentation.

2.4 Questions and Answers

Estonia was asked whether the operations were conducted in a segregated area in controlled airspace or uncontrolled airspace, and whether there was an air traffic control (ATC) service responsible for air traffic monitoring/separation. Estonia responded that for the operations, all flights were conducted in uncontrolled airspace. Restricted areas were established inside the 12 nautical mile (NM) zone and danger areas were allocated for the flights outside 12NM. Traffic information was provided by an ATC service during the flights.

Breakout sessions

In order to promote the exchange of opinions during the breakout sessions, the participants of each Working Group were invited to answer several questions live on the SLIDO application regarding the RPAS use for the maritime surveillance domain(s) and/or coast guard function(s) targeted by each Working Group. The answers to the poll were displayed live as respondents made their choices. Each poll was followed by a discussion on the responses provided, as participants contributed with concrete examples, opinions, and experiences, giving reasons for their answers and exchanging knowledge in the process. The complete responses to all the SLIDO polls are included in Annex. A summary of the discussions and the presentations to the plenary are included in Section 6.

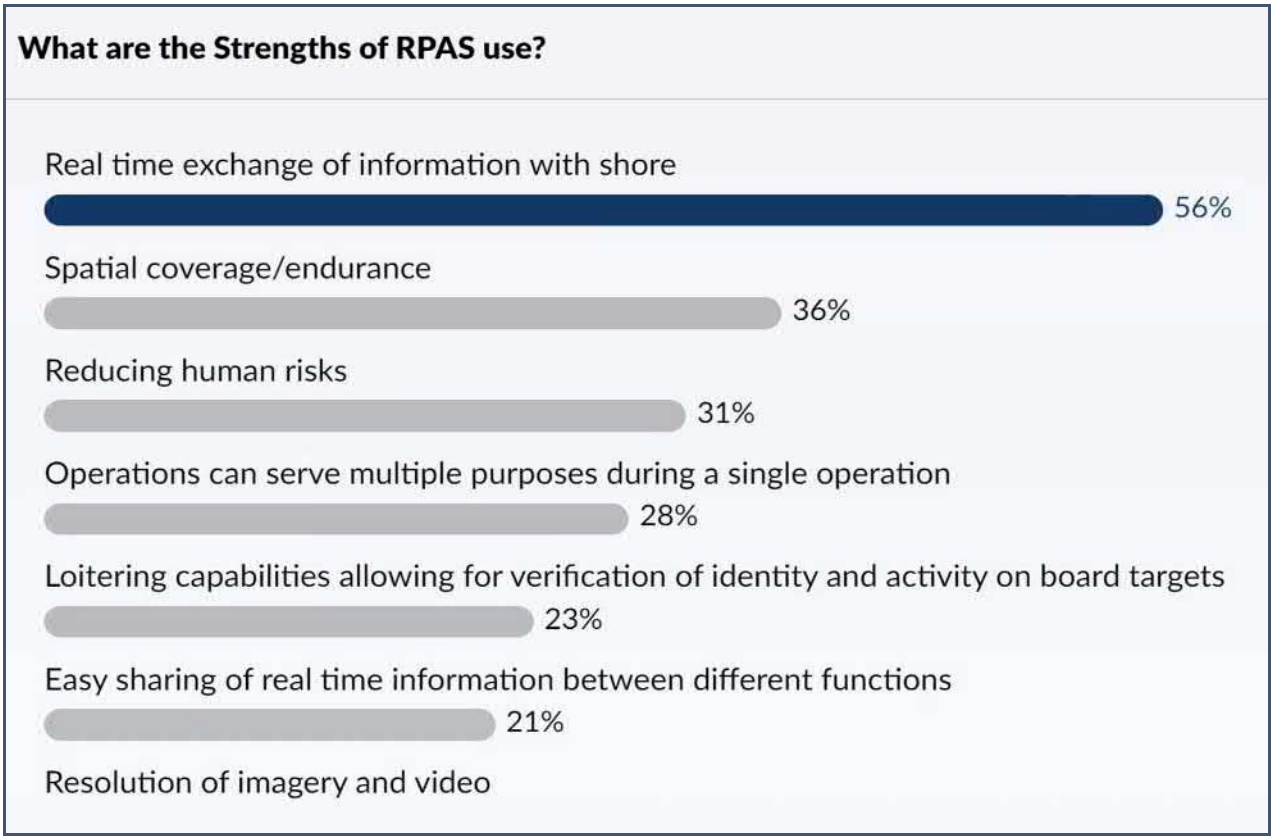


Figure 1: Example of SLIDO response to one of the poll questions in one of the breakout sessions

3. EU Coast Guard Functions agencies experience with RPAS Operations

3.1 European Maritime Safety Agency (EMSA)

EMSA provided an overview of RPAS services in 2021. This included eleven different operations at the request of one or more Member States across the year, with eight operations in parallel at one point. Ten EMSA oil spill response vessels were equipped with lightweight RPAS to assist response in case of oil spill emergencies. Member States requested support of vessels with RPAS on board for three emergencies in 2021. In addition, two EFCA patrol vessels were equipped with RPAS to support fisheries control operations. The presentation introduced EMSA's operational RPAS portfolio and provided examples of the service in operation.

For more information, please see the presentation.

3.2 European Fisheries Control Agency (EFCA)

The presentation from EFCA reviewed the experience of the EFCA chartered patrol vessel in using the lightweight RPAS to support operations. The number of flights were presented, noting fluctuations due to seasonal weather differences and to COVID restrictions. It was noted that in terms of weather conditions (wind and wave conditions), the constraints for flying RPAS were similar to the constraints for boarding vessels to conduct inspections. The RPAS were used for two main purposes: 1) to support the safety and security of the boarding team; and 2) to support evidence gathering.

For more information, please see the presentation.

3.3 Frontex, the European Border and Coast Guard Agency

The Frontex presentation provided an overview of the use of unmanned aerial systems by Frontex, presenting a timeline of previous, ongoing and planned deployments. The concept and purpose of aerial surveillance by Frontex was addressed, and how the operational aspects are implemented. Finally, some aggregate operational results were presented.

For more information, please see the presentation.

4. Other Institutions' experience with RPAS

4.1 European Aviation Safety Agency (EASA)

EASA presented on recent regulatory developments in civil domain, noting that State operations are not necessarily covered by the same regulations, although they can opt in. The regulatory approach being adopted is operations-centric, meaning that the key element is the risk of the operation rather than the type of aircraft used. An overview was given of regulatory developments including the 'U-space' concept and the framework for unmanned aerial systems (UAS) in the certified category. Participants were informed that the Commission is working on a Drone Strategy. Finally, participants were informed that the EASA website provides a lot of additional information on the UAS safety framework.

4.2 European Space Agency (ESA)

After first introducing the collaboration between ESA and EMSA, the presentation from ESA informed participants about some projects related to RPAS applications in the maritime domain. The projects and initiatives presented by ESA are available for review in the relevant presentation.

4.3 Questions and answers

The Workshop participants asked for more information regarding: 1) operating RPAS over the high seas; 2) ICAO recognition of U-Space activities in the high seas; and 3) regulations over the high seas.

This question was relayed back to EASA that responded:

- for civil aviation purposes and considering that at the moment not all United Nations International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARP) govern all UAS or RPAS operations, civil aviation operations over high seas should be performed with due regard for the safety of other airspace users. ICAO has provided model UAS regulations which are already included in the two UAS regulations for civil aviation in Europe - UAS operations in the open and specific category - and work is ongoing for UAS operations in the certified category. Until all SARPs for RPAS are established, operations over high seas could be performed by the establishment of dangerous area and information to other airspace users through notice to airmen (NOTAM).
- U-space and the services offered in the U-space airspace are not recognised by ICAO and therefore even if a U-space airspace is designated over high seas to try to implement those services there, it would not be recognised or respected by all other airspace users which are not regulated by that EU regulation.
- State operations over high seas shall have due regards to civil aviation, e.g. when performing operations that could cause danger to civil aviation, they would need to establish dangerous areas.

5. Presentations of the conclusions from the Working Groups

The conclusions of the Working Groups (see Section 0: Breakout sessions) were presented by the rapporteurs in plenary. The discussions were wide-ranging, and often initiated by the results of the SLIDO polls (Annex 2).

5.1 Working Group 1: Safety of navigation and ports, environment monitoring and response, search and rescue

The results of the working group were presented, starting with the strengths of RPAS use. The group identified as most important the real time exchange of information with shore that provides a quick response in case of accidents, pollution incidents and search and rescue situations and the spatial coverage/endurance allowing access to remote areas and providing cost effectiveness for surveillance of large sea areas. It was concluded that RPAS is a good tool for supporting decisions and to complement conventional surveillance tools. Another advantage is that it does not unnecessarily expose operational teams to severe weather situations or dangerous environments.

On the other hand, a number of weaknesses of RPAS use were also identified by the group. Of particular concern are limitations due to flight and airspace restrictions for safety reasons, which result in a lack of flexibility and availability of operations (e.g. airspace segregation via NOTAMs), limitations to range when there are no satellite communications (SatCom) on board, lack of robustness to severe weather conditions, and difficulties of integration of different systems as no data standards exist so far.

During the discussion on opportunities of RPAS use, the participants in the breakout group agreed on the potential of RPAS services, because a broad range of maritime surveillance use cases can be served simultaneously, which is extremely interesting for Maritime Surveillance authorities. RPAS can complement/increment manned aerial surveillance assets in particular in areas of high demand and on a regional level by increased cross border cooperation in Europe. The RPAS Data Centre was appreciated and in particular the connection to THETIS EU for emissions monitoring was seen as very positive. It was observed that regional RPAS operations are connecting Member States and authorities of different functions on national and regional level. The increase of regional and national cooperation and multi-agency operations is further increasing the value of RPAS operations.

The challenges for RPAS use were then addressed by the group, where again the complex process to achieve the necessary authorisations, including authorisations to fly, frequencies and airspace was highlighted. However, the time taken to set-up services becomes less each time, with the experience gained. Communication management between authorities and operators is needed. In addition, the large amount of data gathered during RPAS operations has to be made available with low latency. The data needs to be connected to provide added value products (e.g. via AI and machine learning algorithms).

Finally, the use cases for which RPAS brings particular additional added value to the maritime surveillance activities were ranked by participants; pollution monitoring (water and air), maritime search and rescue and general multipurpose maritime surveillance in coastal areas, were the use cases which participants felt brought most added value.

5.2 Working Group 2: Border control and law enforcement

Although several strengths and opportunities were identified by the participants, the group spent more time addressing the factors raised in the discussions on challenges and weaknesses. In addition, the plenary was informed that within the Group, there was wide consensus regarding some questions (specifically on weaknesses and challenges), and the discussions were based on the specific experiences of the participants based on national organisations and competences.

The general overview of the strengths of RPAS use pointed at the following main conclusions: easy sharing of real time information between different functions, spatial coverage/endurance and reducing human risks. In addition, it was stated that the sharing of data in real time is a recognized strength of the RPAS even if usage of data depends on technical and operational structure at national level.

On the other hand, related to the weaknesses of RPAS use, the main factors were considered to be: airspace limitations for safety reasons and lack of integration in the airspace with manned aircrafts. It was noted that difficulties in sharing airspace with other users is a clear weakness, resulting in operational impact on different type of coast guard functions (e.g. search and rescue cases). Additionally, it was flagged that the data collected cannot always be used in legal proceedings.

Following up with the opportunities of RPAS use, the main conclusions were that it can increase cross-border cooperation in Europe, that a broad range of maritime surveillance use cases can be served and that it can complement/increment maned aerial surveillance assets, particularly in areas of high demand. The improvement of EASA regulations in order to promote higher standards of safety and harmonization was also considered an opportunity.

Next, regarding the challenges for RPAS use, the complex process for all authorisations, including authorisations to fly, management of huge amounts of data and incident management and communication were considered to be the main challenges. It was also noted that the MALE RPAS are more expensive than manned aviation (but provide many more flight hours) and that manned aircraft are easily redeployable due to simplified regulation.

Finally, with regard to the use cases for which RPAS brings particular additional added value to the maritime surveillance activities, maritime border control/surveillance, general multipurpose maritime surveillance outside territorial waters and general multipurpose maritime surveillance in coastal areas, were ranked as most important. An additional consideration was noted that the major added value of RPAS is to operate in high-risk areas with no risk for the crew and that RPAS are difficult to detect when collecting evidence.

5.3 Working Group 3: Fisheries control and inspections

This working group evaluated the strengths, weaknesses, opportunities and challenges for the use of RPAS in support of the authorities in charge of fisheries control and inspections.

The main strengths of RPAS use for fisheries control in the opinion of the working group were: the low detectability by targets during operations (lower than patrol vessels approaching the target), the spatial coverage and endurance (that allow for enlarging the vessels' visual horizon), and the good resolution of imagery and video (for preboarding verification and for evidence gathering).

Related to the weaknesses of RPAS use, the main voted drawbacks were considered to be: airspace limitations for safety reasons, logistics for take-off and landing (that are particularly relevant when deploying RPAS from patrol vessels) and lack of integration in the airspace with manned aircrafts.

Following up with the opportunities of RPAS use, the main conclusions were that there are a broad range of maritime surveillance use cases that can be served in the fisheries domain, high interest of Maritime Surveillance authorities and that it can very well complement/increment maned aerial surveillance assets (particularly in areas of high demand).

The main challenge for RPAS use in the fisheries domain identified by the participants was the complex process for obtaining all authorisations for RPAS flights (including authorisations to fly and the management of huge amounts of data).

Specific additional topics were discussed in the context of RPAS operations: experience was shared regarding respect of personal data protection (regarding in particular video evidence) and acceptance of RPAS data as evidence in legal proceedings. Participants agreed that procedures and possibilities do not differ much from those applied for evidence gathered by manned patrol aircrafts or vessels, with the only difference that the RPAS provides more data than these traditional surveillance assets. Another element that was indicated as a particular challenge for operating RPAS for fisheries control was the discrepancy between Flight Information Regions (FIR) and Maritime Boundaries.

The use cases in the Fisheries domain where RPAS bring particular added value to maritime surveillance activities were recognized to be in providing an additional monitoring capacity during boarding operations ensuring safety and security for the boarding teams, and in the collection of evidence before inspection (avoiding evidence destruction when detecting patrol approaching). Deployment of RPAS was also found to be very useful in view of verifying fisheries restricted areas.

In the final conclusions it was agreed that RPAS is a promising additional asset for improving the efficiency of control and inspection tasks and a very useful tool for specific fisheries control purposes. The fisheries control community present at the working group was eager to make a wider and more frequent use of RPAS.

6. RPAS: industry presentations

Representatives from industry were invited to address the Workshop participants. In addition to presenting new technologies, this session also intended to provide some insight into how industry operators prepare for operations, from logistics to regulatory requirements.

6.1 Airbus DS Airborne Solutions GmbH

The Airbus presentation gave an overview of operational services, RPAS for maritime surveillance, choosing the RPAS platform, airspace integration, and payloads.

For more information, please see the presentation.

6.2 Nordic Unmanned AS

Nordic Unmanned presented a map of the countries where they had flight permits and operations. They provided an overview of the RPAS fleet used for maritime operations, along with quick facts on the systems and how they were being used by EMSA.

For more information, please see the presentation.

6.3 Schiebel Elektronische Geraete GmbH

The presentation by Schiebel focused on the Camcopter S-100, providing information on technical specifications, sensors, and payloads. Deployments performed for EMSA were presented, along with lessons learnt and best practices.

For more information, please see the presentation.

6.4 Collecte Localisation Satellites, REACT Consortium

The REACT presentation provided the background of services delivered for EMSA, the use cases addressed, and provided information on new developments and technologies.

For more information, please see the presentation.

6.5 Questions and Answers

Nordic Unmanned was asked whether they had experienced any problems with electro-magnetic fields from ships, and whether in that respect the RPAS can take-off and land from any ship (including diesel-electric). Nordic Unmanned replied that in the initial take-off phase the compass is disabled, and once clear of the vessel the autopilot is engaged; the same procedure is applied for landing. When the RPAS is approaching the vessel, the pilot takes over in a semi-automatic mode and guides the RPAS through the landing stage.

Another question posed to all industry representatives was whether the increasing number of marine windfarms had an impact on RPAS operations or on the sensors. All the representatives present replied that they had not felt any impact.

7. Meeting closure

EMSA's Head of Department for Safety, Security and Surveillance, thanked the Croatian Presidency of the ECGFF and the team behind the organisation of the Workshop. The high level of participation reflected the level of interest in RPAS technology and possibilities it offers. The Workshop succeeded in bringing together authorities at national and EU level to share information on the latest developments. It was noted that there are always initial setbacks when adopting new technologies and working practices, in this case often related to authorisations, permits, frequencies, etc, but as can be seen from the experiences shared, these issues are gradually getting easier solve. Integration of new tools is a gradual process, including at operational level, but we can also draw on decades of use in manned aviation to help inform some of the issues, such as how to deal with data streams and how to use evidence acquired. In this process of 'learning by doing', EMSA is motivated by the level of enthusiasm expressed by users of the service. EMSA's experience in RPAS is much more mature than 5 years ago, and the aim is to continue to give as many Member States as possible an opportunity to use RPAS in support of their daily tasks.

The Director of Maritime Safety Directorate, Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia thanked all participants for their presence and the two days of interesting discussions, both on opportunities and challenges. He summarised many of the key points made during the Workshop. Finally, he expressed appreciation for sharing of experience and ideas, as well as the presentations. Participants were informed that the third ECGFF Workshop would take place in Croatia in April 2022.

Annexes:

Annex 1 – ECGFF Workshop Agenda

Annex 2 – SLIDO poll results

RPAS for maritime surveillance

European Coast Guard Function Forum Workshop

DEFENCE AND SPACE

AIRBUS

Airbus DS Airborne Solutions GmbH

100%
Airbus subsidiary

40 years
Experience

Our key performance indicators, your success enablers

58,500+
Flight hours

5,500+
Missions

Up to 98%
System availability

AIRBUS

UAS operational services

- Main contractor / Program Management for service contracts
- Operations incl. MRO with 24h support
- Delivery of agreed flight hours per month / year
- Initial and continuing airworthiness
- Integrated logistic support (ILS)

AIRBUS

RPAS for MALE maritime surveillance

- Service delivered from Malta on pre-planned assignments as well as for ad-hoc calls
- Service as a full turnkey solution
- UAS fitted with versatile payloads (EO for day and IR for night purposes, MPR, AIS) with both LOS and BLOS operations
- Real Time Streaming of mission data to Frontex ICC

Essential commitment to the monitoring and security of European external borders and hence a contribution to the stability in Europe

FRONTEX
EUROPEAN BORDER AND COAST GUARD AGENCY

2020+

AIRBUS

RPAS support

- Identification of people smugglers
- Spotting illegal fishing
- Detection of maritime pollution
- Registration and identification
- Detection of fraudulent documents
- Support in readmission
- Border control
- Search and rescue
- Seizure of weapons
- Collecting intelligence about criminal network
- Seizure of drugs

FRONTEX
EUROPEAN BORDER AND COAST GUARD AGENCY

2020+

Operations since
07 May 2021

Deliverd Hours:
~ 2.000
Mediterranean Sea

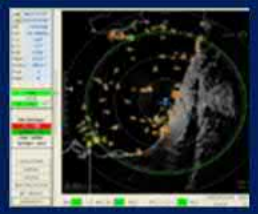
Missions:
~ 160

Av. Mission edurance:
12 – 18 Hrs

We support Frontex delivering surveillance for coordinated European monitoring activities

AIRBUS

Choosing the right platform for the customer



DETECTION

- Maritime patrol radar
- COMINT sensors

CLASSIFICATION

- Inverse SAR
- Classification library

IDENTIFICATION

- Electro-Optical
- Infrared/Lowlight cam

FRONTEX
EUROPEAN BORDER AND COAST GUARD AGENCY

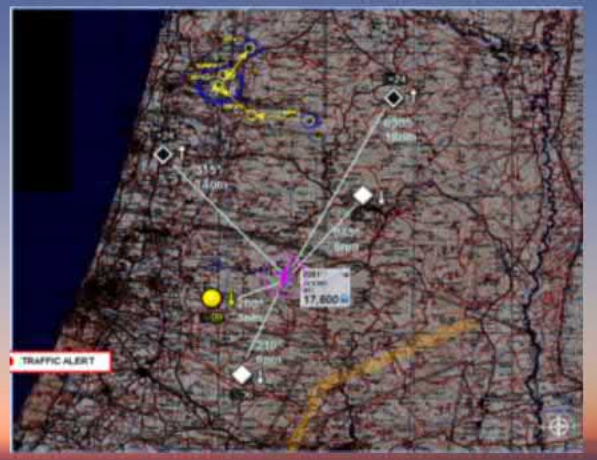
2020+

Why Heron 1:

- Operational in demanding environments
- Reconfigurable to maritime payload right for Frontex

AIRBUS

Airspace Integration Capabilities



Optimized for operation in civil and military airspace:

- ✓
- ✓
- ✓
- ✓
- ✓

[redacted]

AIRBUS

Operation Capabilities – e.g. Malta Intl. Airport

Fully integrated into normal operation:

- ✓ All pilots highly experienced in RPAS operation, holding also manned pilot licenses (CPL IR)
- ✓ No segregation from other traffic, no addtional NOTAMs
- ✓ Operation within TMA according to published IFR procedures
- ✓ Increasing confidence level with all in involved parties (ATC, Airport, etc.)

RPAS payloads – EO/IR camera

RPAS payloads – EO/IR camera

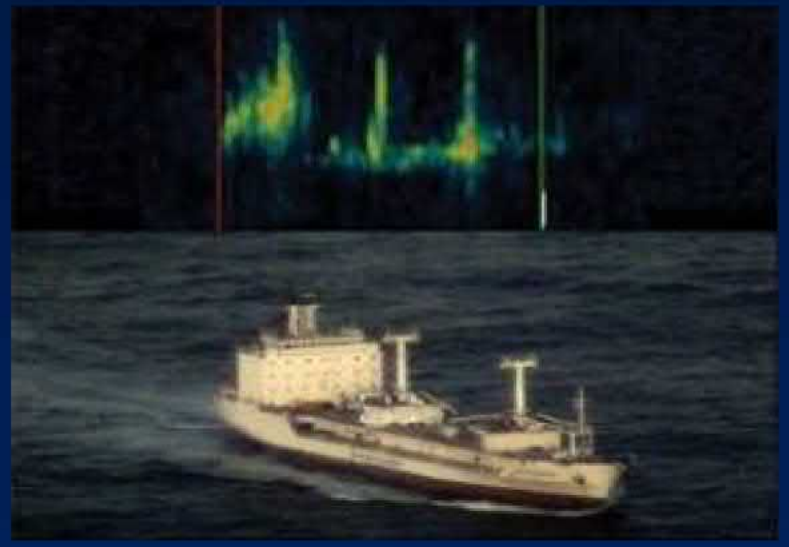
AIRBUS

RPAS payloads – Maritime Patrol Radar

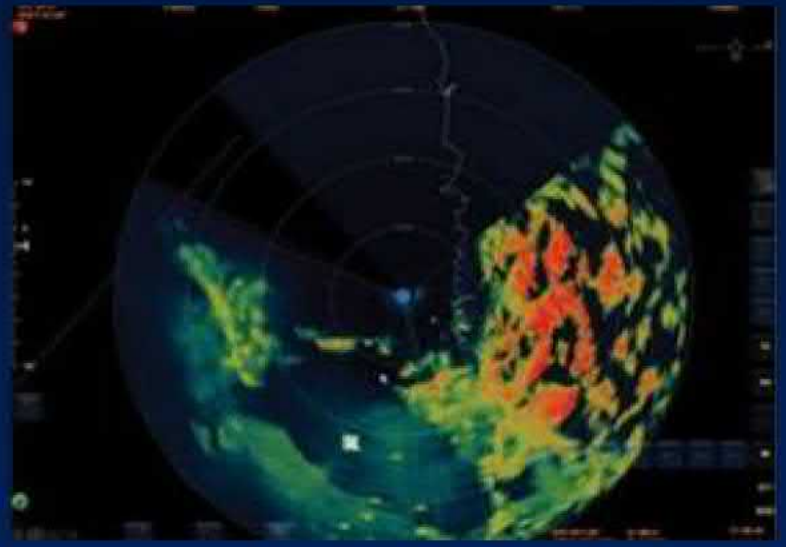
RPAS payloads – Maritime Patrol Radar

[redacted]

Sea Search Display



ISAR Mode Display



Navigation and Weather Mode Display

Impressions Maritime Surveillance Mission

We deliver safe, effective and reliable UAS operations.

You turn mission success into action.

AIRBUS

CLS
COLLECTE LOCALISATION SATELLITES

TEKEVER

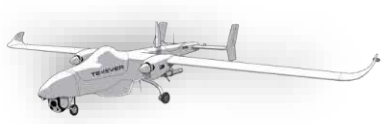
RPAS Services

ECGFF

16th February 2022

A successful partnership between CLS and Tekever

REACT: ALLIANCE OF MARITIME SURVEILLANCE AND RPAS
into a customised service



TEKEVER

nearly 10 years experience in RPAS solutions

CLS

20 years experience in satellite data acquisition, processing and analysis for MDA missions

#Component 1: RPAS

Long endurance RPAS for large coverage (RLOS and BRLOS) of Maritime Domain

#Component 2: LGCS

Local Ground Control Station, for pilot operations, payload operations and communications with RPAS

#Component 3: RPAS DC

For remote Real-Time access, replay of the missions, chat and data archiving

#Operational & active drone services since 2018 for EMSA

EMSA
European Maritime Safety Agency

- Number of missions (flights): +250
- Number of flight hours: +1200 hours
- Used for a range of activities: search and rescue, traffic monitoring, monitoring and detection of marine pollution, identification of illegal activities…
- Sensor payload includes EO/IR cameras, stills HR camera, laser illuminator, laser range finder, AIS/EPIRB receiver, maritime radar
- Services deployed in Spain, Portugal, Italy, and France, and used by different entities (navies, customs, coast guards, Frontex…)

TEKEVER

CLS

USE CASE

RPAS for long range Maritime Surveillance

TEKEVER

CLS

[redacted]

TEKEVER's AR5

#Unmanned aircraft system

Advanced medium-altitude, medium-endurance fixed wing UAS

Automatic take-off and landing (ATOL)

Short unpaved runways for take-off and landing

Weather conditions:

- [redacted]

#Enhanced capabilities

[redacted]

SATCOM: unlimited coverage and real-time/exhaustive data payload downlink

[redacted]

AR5 interfacing with EMSA RPAS-DC

3 simultaneous streams

EO

IR

Combined display including maritime radar PPI overlaid with AIS on one side and map overlaid with GSM Phone detections and radar detections

HR stills images

RPAS information

location, speed, wind, altitude, endurance, communication

TEKEVER

CLS

New developments/technologies for CG operations

[redacted]

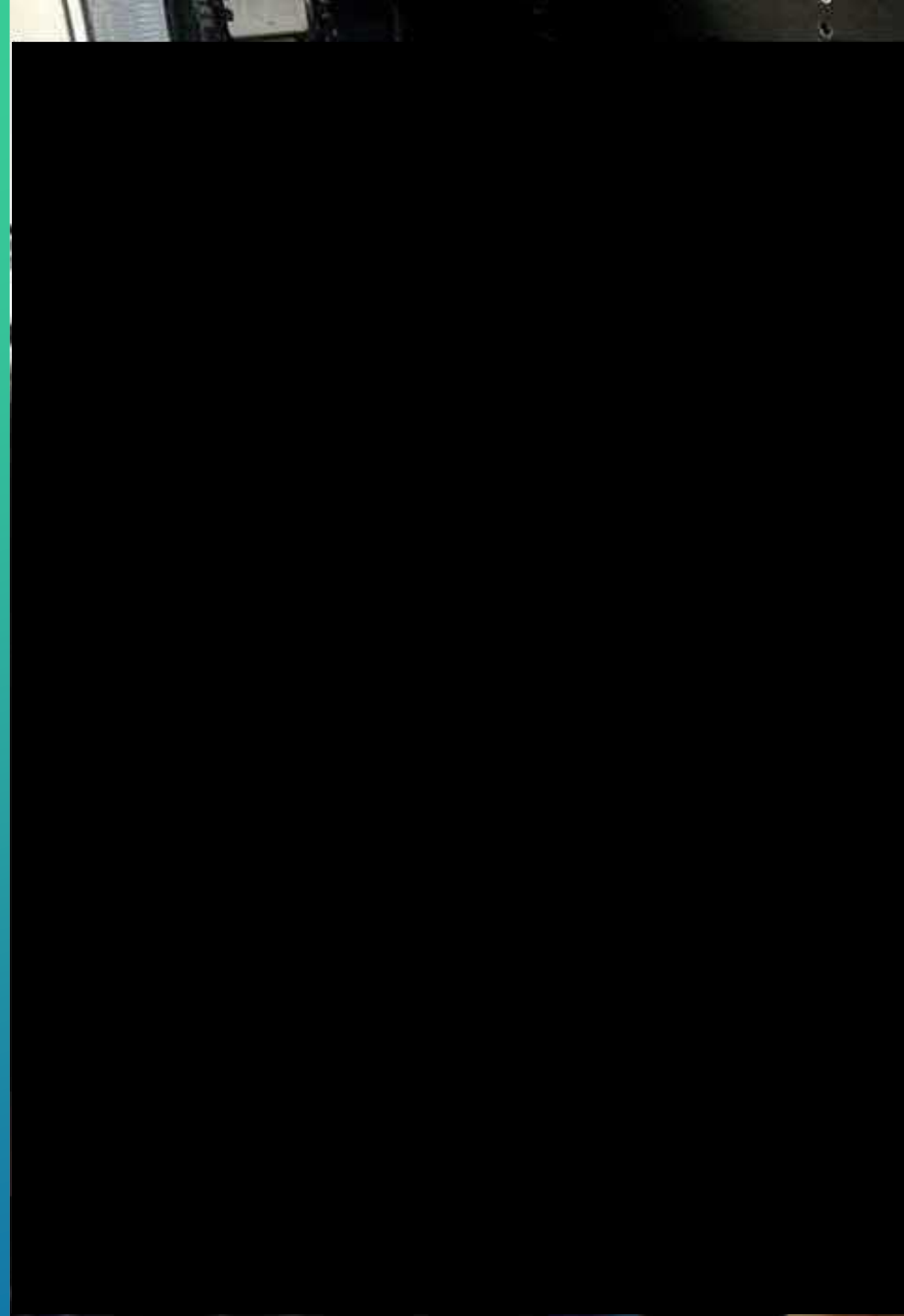
New developments/technologies for CG operations

[redacted]

[redacted]

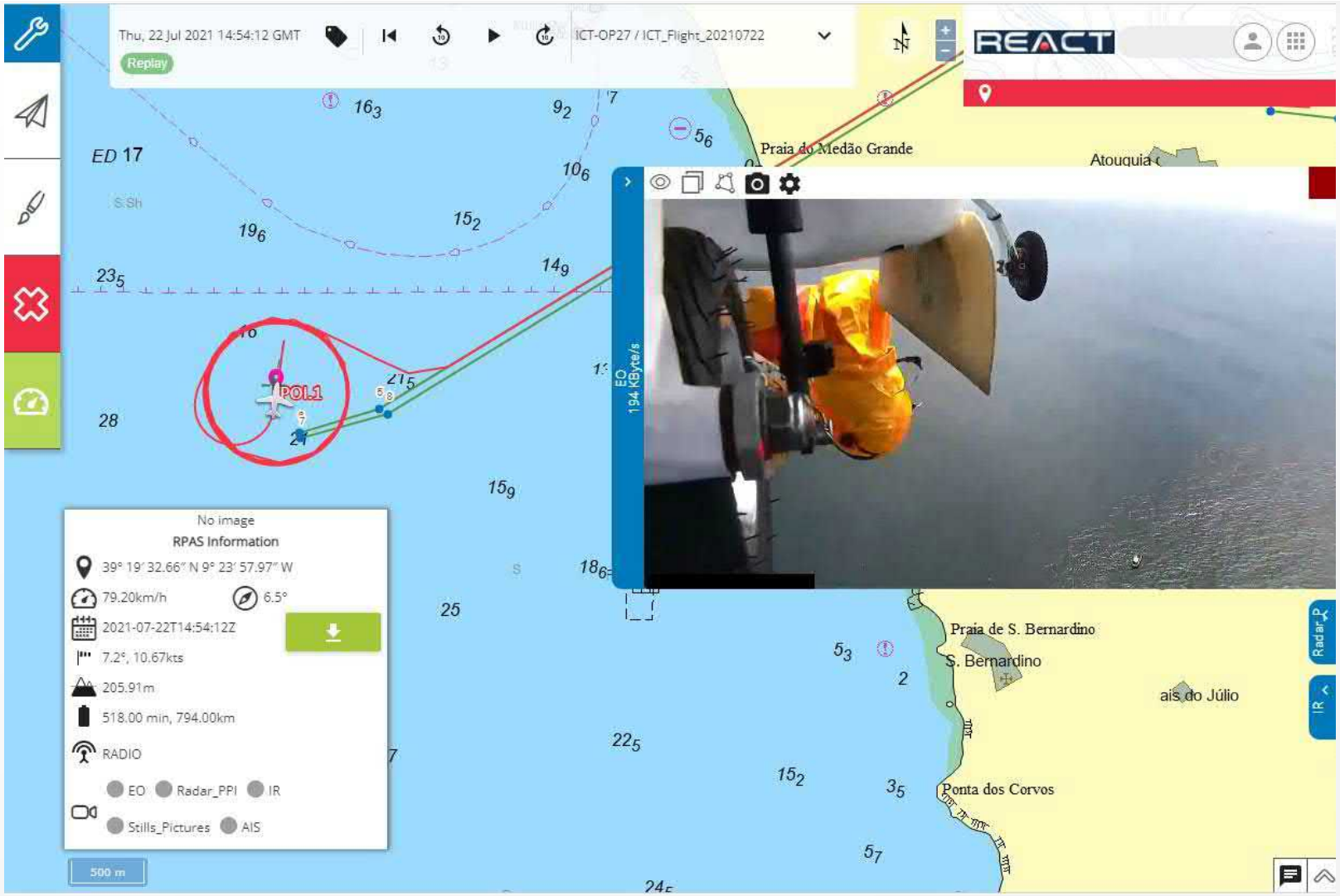
New developments/technologies for CG operations

[redacted]



USE CASE

Life-raft deployment in support to S&R operations




#E501


CLS
COLLECTE LOCALISATION SATELLITES
TEKEVER
Thank you


SCHIEBEL
CAMCOPTER® S-100
Product Presentation
SCHIEBEL

Schiebel

Company created in 1951.
Developing and producing VTOL UAV`s since 1995.
Present worldwide.

S-100 Production Facility

2006 Wiener Neustadt (Austria) opening

2020 facility extension

300 employees worldwide

Production hall: 7700 m²

Lot space: 23000 m²

Office area: 2500 m²

Specs

Loiter Speed: 55 kn (102 km/h) for maximum endurance

Endurance: >6 h with 34 kg payload plus optional external fuel tank extending endurance to >10 h

[redacted]

Maximum T/O weight: 200 kg

Payload capacity: 50 kg

Payload electrical power: 1000 W @ 24 V DC

Data link range: Up to 200 km (108 nm) available

Type of operation: Landbased and Shipboard

Multiple GCS: Handover procedure

CAMCOPTER® S-100

The only **proven** 200 kg MTOW VTOL UAS

35 customers on 5 continents

Several hundred thousand flight hours across the fleet

More than **400** AVs delivered

Small footprint for both land and maritime deployment

Day and night operations

Operated from **40+ ships**

24/7 support

Sensors and Payloads

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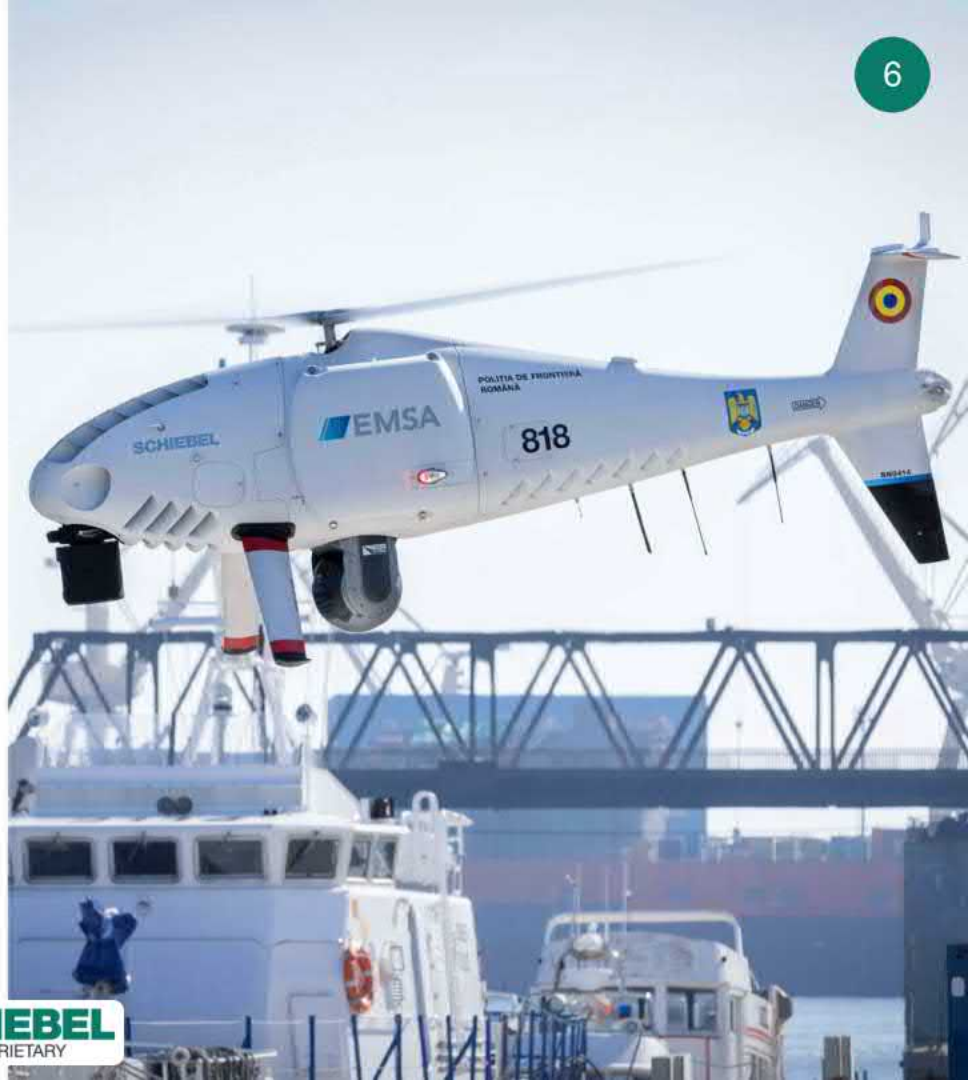


Reference RPAS with EMSA

European Maritime Safety Agency

To date 12 deployments, under 3 contracts:

1 in 2019, 4 in 2020, 7 in 2021, including:

- France (English Channel, 2x)
- Spain (Strait of Gibraltar & Galicia)
- Croatia, Finland, Denmark, Estonia, Lithuania, Romania

Lessons learned from services at sea

- [redacted]

- Civil Aviation Authorities requirements vs. State Operation
- Maintenance and availability planning / management
- Site survey – right choice of TO/landing area is key
- Maximize time for transport and onsite set-up

[redacted]

New technologies

- [redacted]

Best practices

- 24/7 readiness 7/7 operation
- Weekly / monthly scheduled flights
- Backup day for potential flight cancelations (e.g. weather)
- Enough spare parts, especially payloads (beyond contractual requirements)

Thank you!


NORDIC
UNMANNED


Flight permits
BVLOS Operations YTD 2021
Standby 24/7 pollution prevention
Various Infrastructure operations
Labrador Sea
Canary Island
Mediterranean Sea
Black Sea

Maritime Fleet

- S-100 Camcopter is a multi functional platform with many proven capabilities up to max gross weight of 200kgs.
- The Aerosonde is a long distance fixed wing platform that can carry and array of different ISR packages.
- The Indago allows for low-cost, fast response, short range inspections of fisheries and oil spill response.

CAMCOPTER® S-100

The CAMCOPTER® S-100 is a world leading, proven capability for military and civilian applications

Textron Aerosonde

European reseller of the world-wide leading UAV in the Defense & Security sector

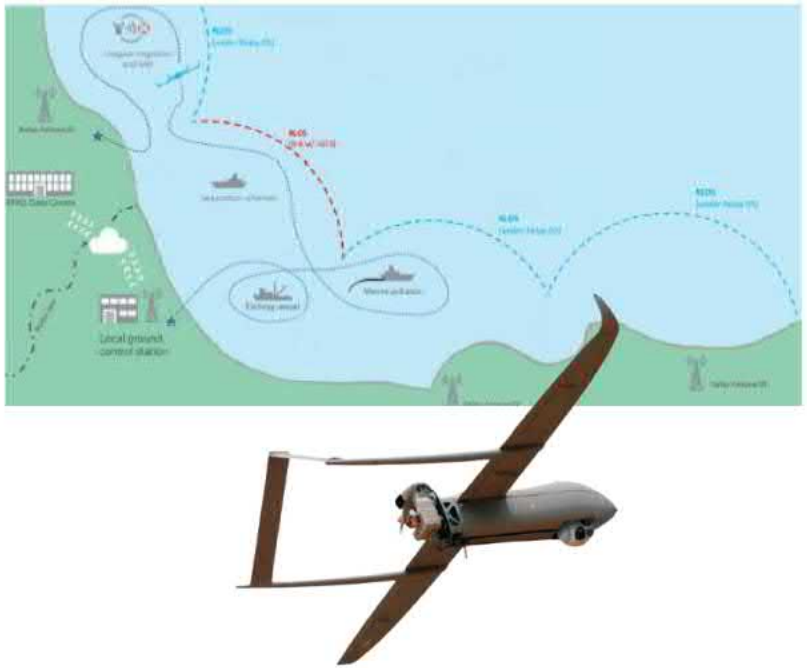
Lockheed Martin Indago

European reseller of the world-wide leading UAV in the Defense & Security sector

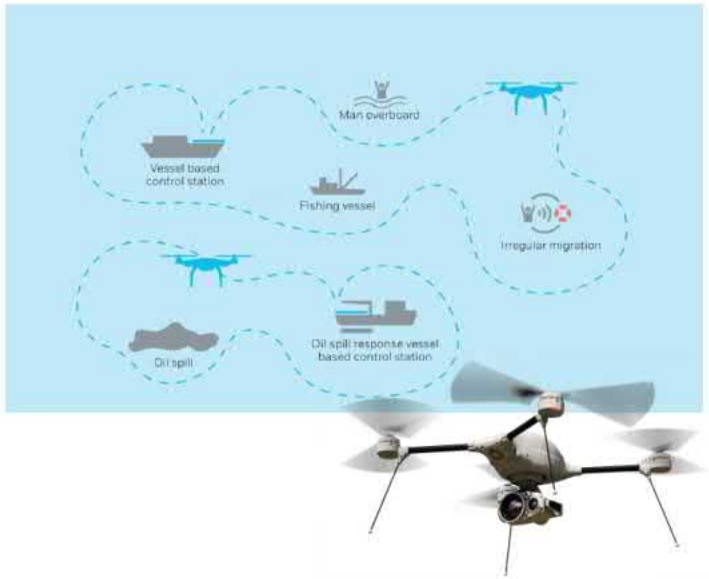
NORDIC UNMANNED

Our current EMSA CG Contracts

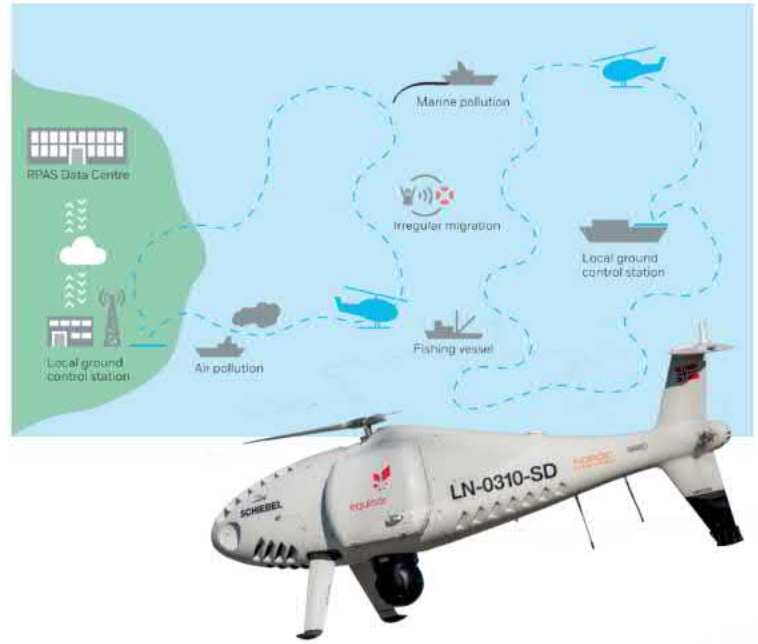
EMSA/OP/46/2020



EMSA/OP/12/2018 + EMSA/OP/1/2021



EMSA/OP/10/2018



QUICK FACTS

«The Lockheed Martin Indago platform is ideal for rapid response missions, land or vessel based with minimum logistical footprint and available space for takeoff and landing.

European Maritime Safety Agency has contracted the capacity both in 2018 and renewed the trust in 2021 after hundreds of proven flight hours»

Capablities

[redacted]

Day and night capable

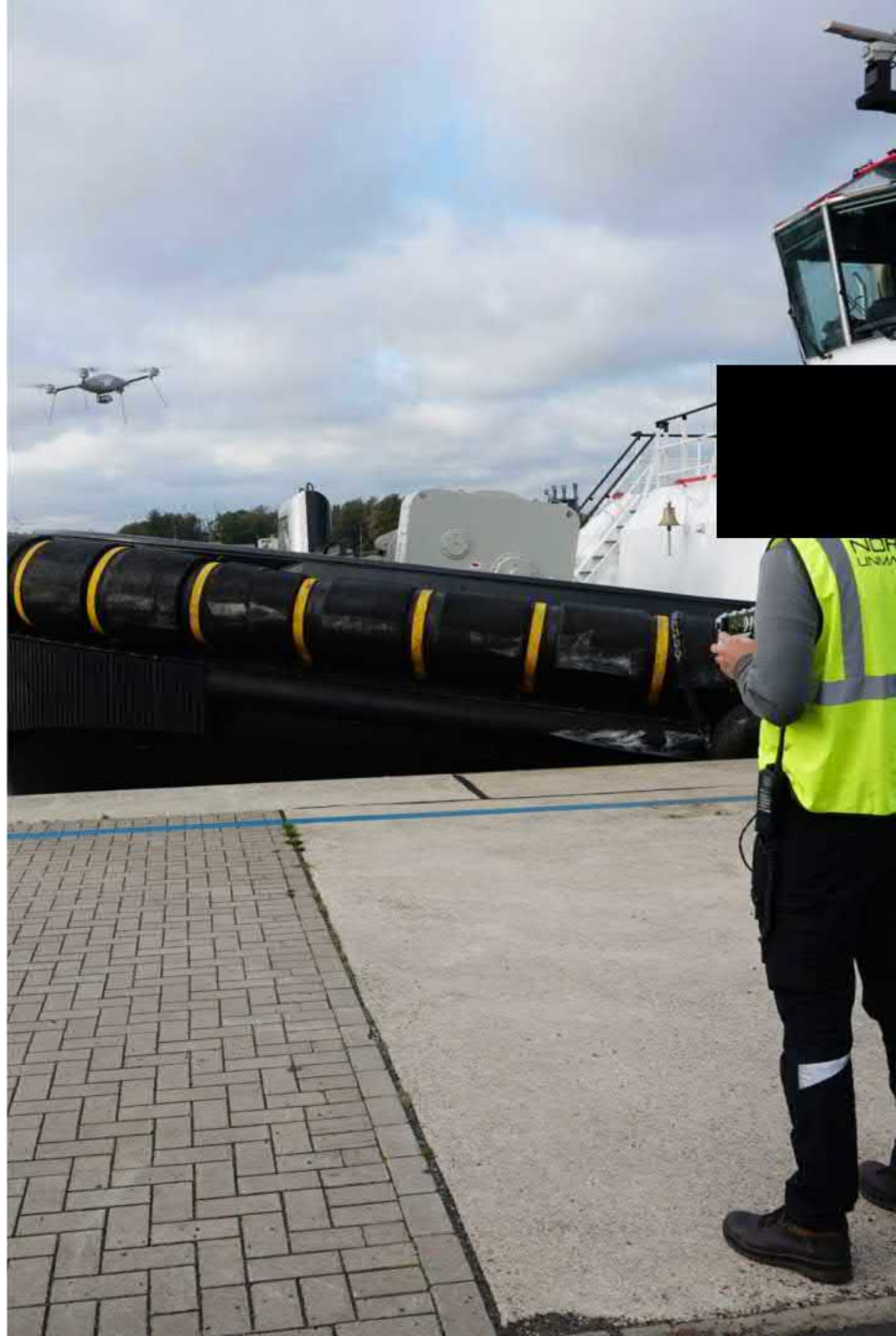
[redacted]

[redacted]

EO, IR, Combined EO/IR

Single pilot operation

Vessel operations



Indago mission: Stefan Cel Mare

Best Practices

«Planning missions together with the end-user is important to get the most out of the flight, this includes knowing in advance which vessels to track, reviewing airspace and methrological conditions»

Lessons Learned

«Missions are more successfull when pilot can communicate directly with the crew on the bridge, pilot should be positioned close to the bridge during the flight if feasible»

New technologies

- Automatic landing systems for vessels (QR code based)
- Payload integrated AI for object identification

QUICK FACTS

«The Camcopter S-100 is a trusted workhorse and most mature platform in its class with more than 70 000 flight-hours. Clients requesting long endurance and cutting-edge sensor technology turn to the Camcopter

European Maritime Safety Agency has contracted the capacity both in 2018 and renewed the trust in 2020 after thousands of proven flight hours»

Capablities

[redacted]

Day and night capable

[redacted]

[redacted]

EO, IR, SAR, AIS, AI automatic object detection, mobile phone detectors, EPIRP, emissions monitoring

Camcopter Missions

Best Practices

- Camcopter part of our LUC Approval
- Conduct a detailed site visit before deploying
- Start early with airspace planning and permissions, establish good communication with national CAAs and ATC.

Lessons Learned

- Planning of logistics and resupply of fuel is important, many times the sites are remote and even small tasks can be challenging.
- [redacted]

New technologies

- Automatic Scanning sensors
- Gradually more control room based operations and less personnel on site

QUICK FACTS

«The Aerosonde is a tactical UAS that has matured through military and civilian operations and has an impressive 500 000 flighthours. The platform can be equipped with a variety of configurations and is also available in a VTOL configuration.

European Maritime Safety Agency has contracted the capacity both in 2021 and operations are scheduled to start H1 2022»

Capabilities

[redacted]

Day and night capable

[redacted]

EO, IR, SAR, AIS, AI automatic object detection, mobile phone detectors, EPIRP

Aerosonde Mission: Denmark

Best Practices

«Due to the long endurance one should have a selection of preloaded missions that can be executed»

Lessons Learned

As with other long endurance deployments, «The Devil Is In the Details». A successfull deployment requires a robust support organization in order to coordinate logistics, airspace approvals and personell rotation.

New technologies

VTOL configuration to be available in 2023

«Plug and Play» architecture for future integrations, support a variety of sensors.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EMSA RPAS regional service in Estonia 2021

EGCFF Workshop
RPAS for maritime Surveillance

[redacted], Estonian Police and Border Guard Board

15.02.2022

Aim of the service

USER: Estonian Police and Border Guard Board

SERVICE:

- April – October 2021
- [redacted]
- Maritime safety, maritime monitoring and surveillance, identification of unidentified maritime objects, pollution control, SAR


Flight mission base: [redacted]
CAMCOPTER S-100
Operator: Schiebel
SCHIEBEL
EMSA
Copyright: EPBGB

Operating area

Cooperation with other MS

- Finland (Finnish Border Guard)
- Latvia (Latvian Coast Guard Service)
- Sweden (Swedish Coast Guard)

- sharing info collected during the flights
- flight planning

Challenges

- Possible operating areas
- COVID-19
- Use of RPAS-DC in JRCC (disconnecting, lagging etc): backup channel, specific CONOPS in WFS
- New asset for the end users
- Weather: heavy winds, icing, low clouds
- Flights on demand in case of incident
- Legislation
- Logistics

Mission 2022

Cooperation with Finland and Latvia

[redacted] Estonia

Planning phase

Flexibility, range

Airspace management

Trainings

Thank you!

Agencia Tributaria

DAVA Dirección Adjunta de Vigilancia Aduanera

Operational Tactic Spanish Customs RPAs EMSA

Subdirección General de Operaciones

Áreas de Operaciones Aeronavales y de CECOP

Agencia Tributaria

DAVA Dirección Adjunta de Vigilancia Aduanera

SPANISH CUSTOMS SURVEILLANCE

Spanish State Customs Agency of the Ministry of Finance, specialized in the fight against
Cross Border Crimes and Organized Crime

Maritime Surveillance and Control:

Prevention and Repression:

SMUGGLING

MONEY LAUNDERING

TAX AND CUSTOMS FRAUD

DRUGS TRAFFICKING

SURVEILLANCE OF CRITICAL SCENARIOS FOR LOCATING POTENTIAL TARGETS BY REAL TIME SIGHTINGS

Importance of the choice of the scenario: ESTRECHO DE GIBRALTAR

Multipurpose operation allows optimization of resources and increased surveillance capacity in the coverage area.

Plan services that guarantee performance

CONCLUSIONS GIBRALTAR´S STRAIT SCENARIO
Yes No Research and No Previous objective

Need to expand space for flights, east or west to ensure continuity in the operation. [redacted]

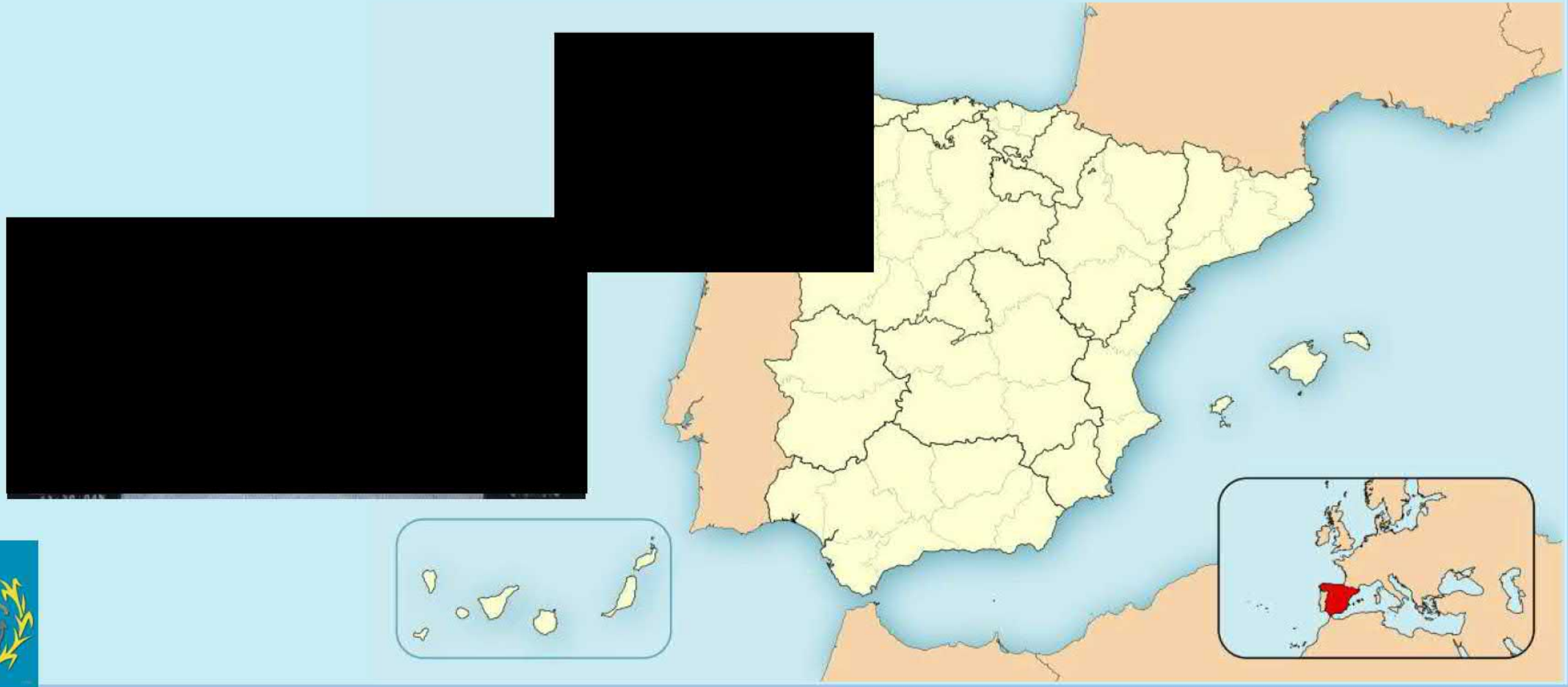
[redacted]

[redacted]

- **Confidentiality**
- **Speed and flexibility in the performance**
- **Nocturnality**
- **Invisibility of the acting means**

Importance of the choice of AOI/Scenario: GALICIA

[redacted]



CONCLUSIONS Post-projects in different operational scenarios:

- [redacted]

[redacted]

CONCLUSIONS Post-projects in different operational scenarios:

- COMMUNICATION CHANNELS: Need to simplify documents, distribution lists...
- Requirement of location in the same place of the Pilot and the Observer leading the mission: Inseparable binomial.
- Continuous training DataCenter

Thank you for your attention

[redacted]

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ECGFF – EMSA workshop on RPAS.

[redacted]

Directorate for Maritime Affairs/ SAR and maritime traffic office

Deployment 2021

- **Primary mission: emission monitoring (Sox);**
- **Mission on opportunity (SAR Support, fisheries control, support during exercise..)**

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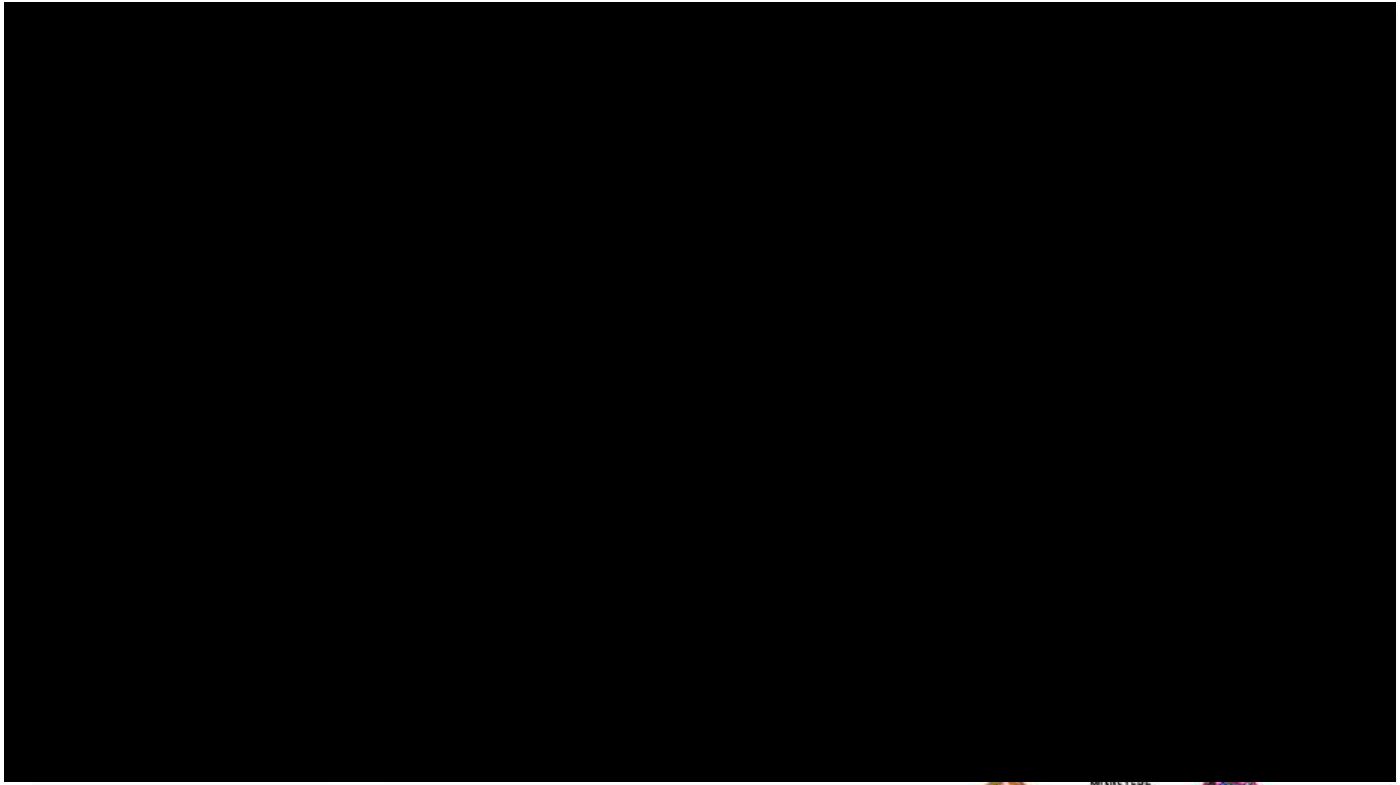
Project management

Consultation phase:

- **Permit to fly and airspace segregation**
  - **CONOPS**
  - **SORA Risk Analysis**
  - **CROSS Border procedure**
  - **“LUC”**
- **Frequency authorization**
- **Logistic modalities**

Deployment phase:

- **Coordination procedure**



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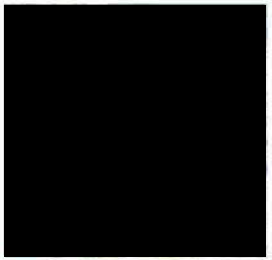
The geographical choice:

- Operational culture and expertise of the CROSS (MRCC, VTS and MAS function) in a framework of H24 permanence within a network of operational partners (Division action of the State at sea, triggering and coordination of nautical and aerial means of the coast guard function…
- Geographical location favorable to drone projection.
- A confluence of issues.

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Air space management:

- Two activable zones;
- Missions [redacted]

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The drone Schiebel Camcopter S-100 operated by Nordic Unmanned:

Technical specifications	
Length	3,20m
Weight	200kg
Payload capacity	50kg
Maximum speed	[redacted]
Cruising speed	[redacted]
Autonomy	6 hours at 34kg payload
Usage limits	[redacted]
Equipment	-Sensor « mini-sniffer » electro-chemical technology -Caméra TRAKKA TC 300 -Ocean watch (IA)

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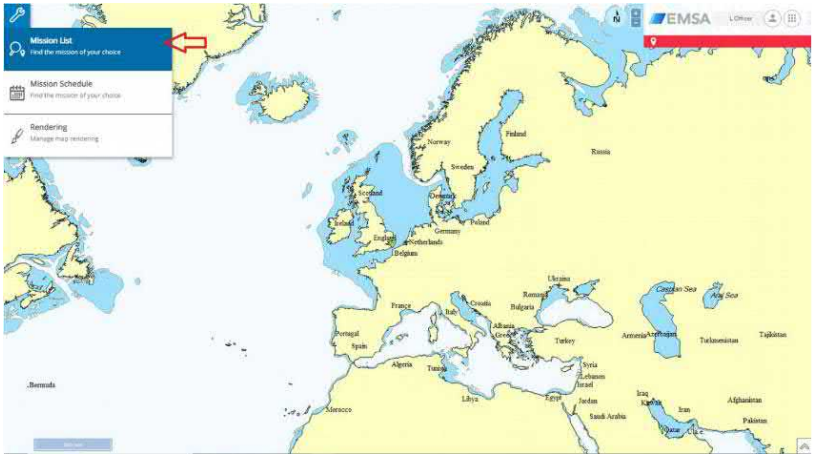
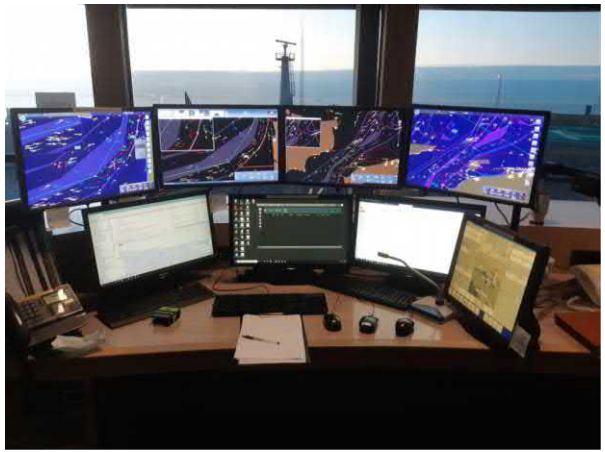
Deployment management:

- Dedicated watch by operator from the CROSS
- Upstream targeting procedure
- Live mission management via RPAS DC





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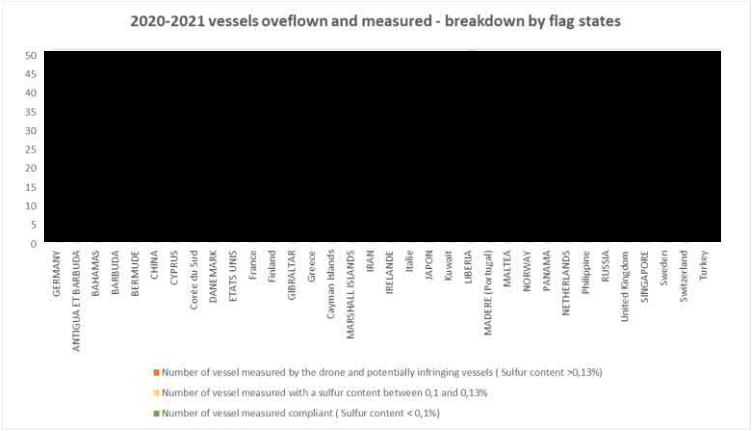
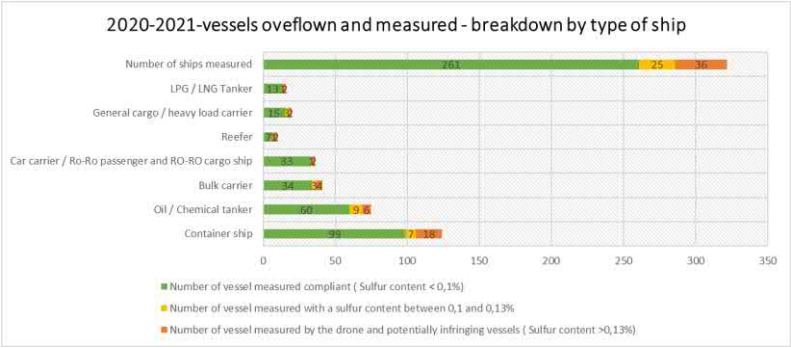
2020 - 2021 deployment release data :





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2020 - 2021 deployment release data emission monitoring:

[redacted]

SGS

RAPPORT D'ANALYSES

[redacted]

[redacted]

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2020 - 2021 deployment release mission on opportunity:

- Doubt removal
- Mission follow up in real time

[redacted]

[redacted]

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Outlook 2022

- Reconduction of a deployment from the [redacted] MRCC following the valuable results with the support of EMSA (April 2022).

- New EMSA deployment from the port of [redacted] (Autumn 2022) with a small elongation drone.

- **Strive for a multi-mission approach to employing the capacity allocated within the segregated airspace;**

- Carry out the consultations over a window of three to four months before deployment. Set up a "tailor-made" approach to access this type of service by the use of the cross border procedure under the new EU regulation from EASA and benefits from the “LUC”;

- Consolidate the legal framework for the processing of personal data (recordings and transmissions) through the use of sensors (onboard cameras, transponders, mini-sniffer…) on remotely piloted aircraft.

- Gain expertise in Nox control.

- **The prospect of bringing flexibility to the use of the drone for urgent needs beyond the segregated zone.**

- Harmonize practices concerning the targeting and continuity of public action.

- Anchored the deployment in a regional approach (Bonn agreement, data sharing, develop synergies..)

[redacted]

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Thank you for your attention

https://www.linkedin.com/posts/mer-gouv_pfue2022-activity-6886562338032402433-fZbl/

https://twitter.com/i/status/1480811969171144705

https://youtu.be/9x-q0aK1rHk

EMSA RPAS services

ECGFF Workshop on RPAS
February 2022

[redacted]

EMSA
European Maritime Safety Agency

Where were we flying in 2021

- 11 Operations in 2021 (8 in parallel)
- 10 EMSA Response Vessels equipped
- 2 EFCA patrol vessels equipped
- Participation in 6 Exercises
- Support to 3 maritime emergencies

More than 1700 Operational days

Operational RPAS portfolio

Emission monitoring

200kg, >4h, EO/IR, sniffer

<15kg, >50min, EO/IR, sniffer

Multipurpose Maritime surveillance

180kg, >10h, 500kM(SATCOM) EO/IR, Mar. radar, Still camera, radar detector, phone detector

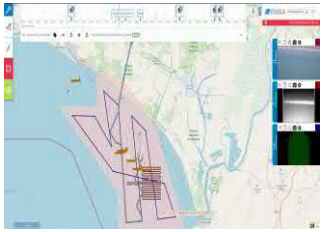
200kg, >6h, 200km EO/IR, opt. scanner VIS

36kg, >10h, 140km, up to 400km with ground relays EO/IR, radar Launcher & net

Light RPAS

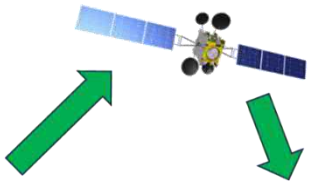
<5kg, >35min, EO/IR

Data Centre



SAT-COM

- RPAS to ground /
- ground to ground



Next Gen Q2 2022

Light-RPAS providing support during oil pollution emergencies

Recent use cases

Sinking of the ‘Sea Bird’, Greece

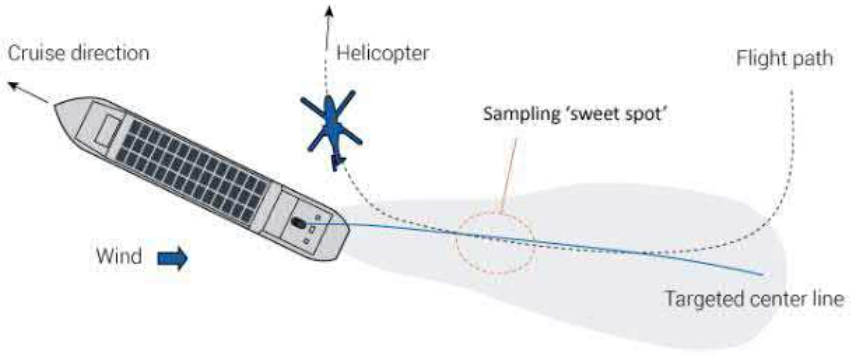
- EMSA’s Oil Spill Response vessels activated with L-RPAS on board
- Light-RPAS flew frequently and supported spill recovery operations

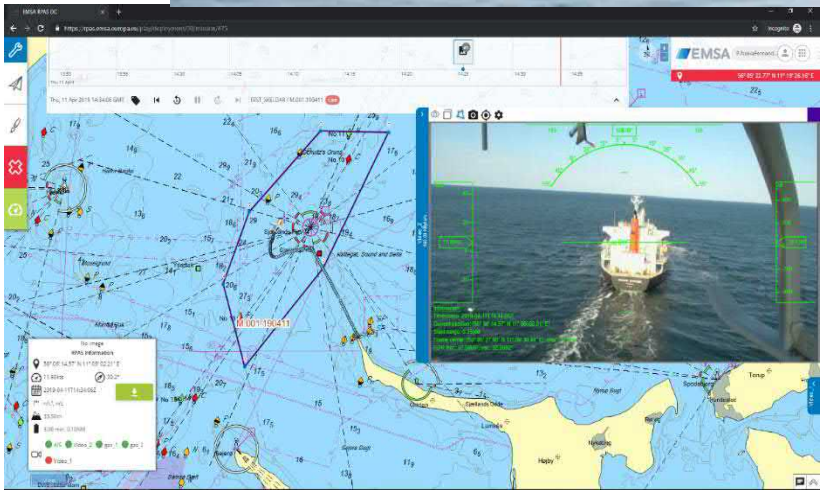
Oil spill in the Port of Antwerp, Belgium

- Light-RPAS was deployed for real-time monitoring of operations in the port area
- Light-RPAS helped to locate the spill, identify the responsible vessel and support the recovery

RPAS Emission Monitoring Service

- First deployment in 2017
- More than **1,000 SOx measurements** collected and transferred to THETIS-EU
- It has been employed **in SECA Countries** (e.g., Denmark, France, Lithuania) **and non-SECA (e.g. Spain)**
- VTOL RPAS with five hours of endurance
- Light-RPAS measurements at port or berthing areas

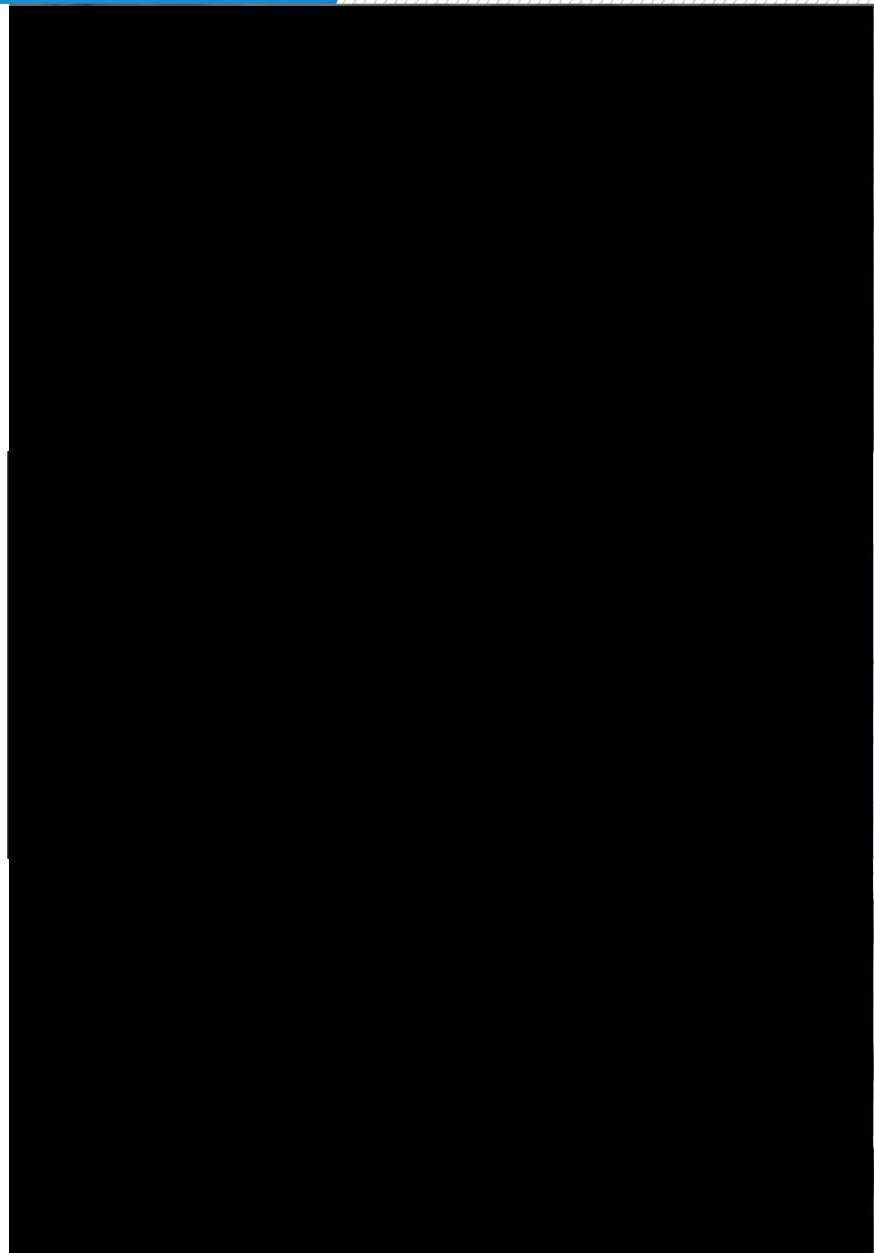




Maritime Safety SAR Case

Gibraltar strait, Spain 2021

- In the margin of an emissions monitoring operation
- **Man overboard event**: Man with lifejacket in rough sea
- Detection with the EO camera while patrolling the area of interest.
- Closest cargo vessel in the area provided support



Maritime safety
Traffic Separation Scheme monitoring

Gallaecian waters, Spain 2021

- Control of Cargo vessels in the TSS
- Complement maritime radars on shore
- **Detection of navigation hazards** (e.g. objects adrift)

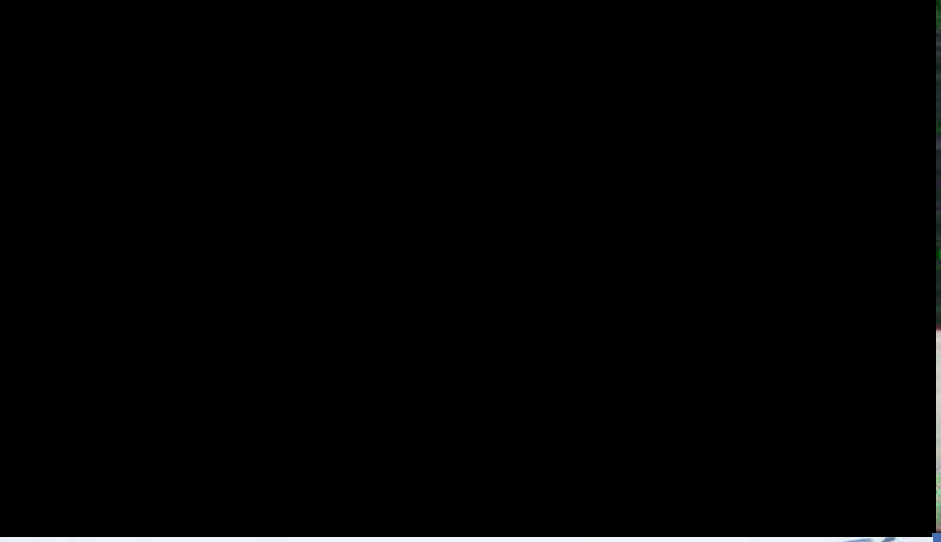
[redacted]

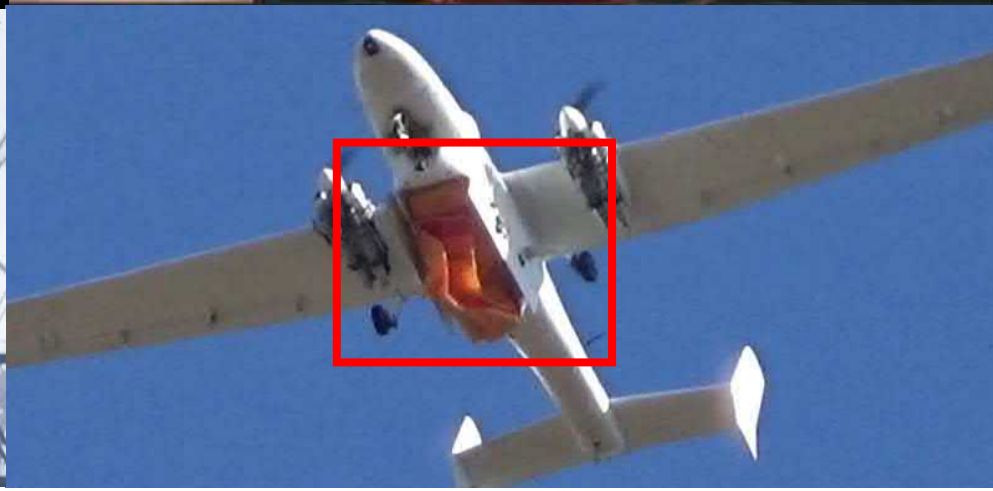
Maritime Safety – Stranded Boat

Gulf of Finland, 2021

- Boat with **engine failure** stranded in rocks
- RPAS provided **aerial support to the coast guard unit**
- Boat towed by coast guard vessel

RPAS Services Examples





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EMSA

European Maritime Safety Agency