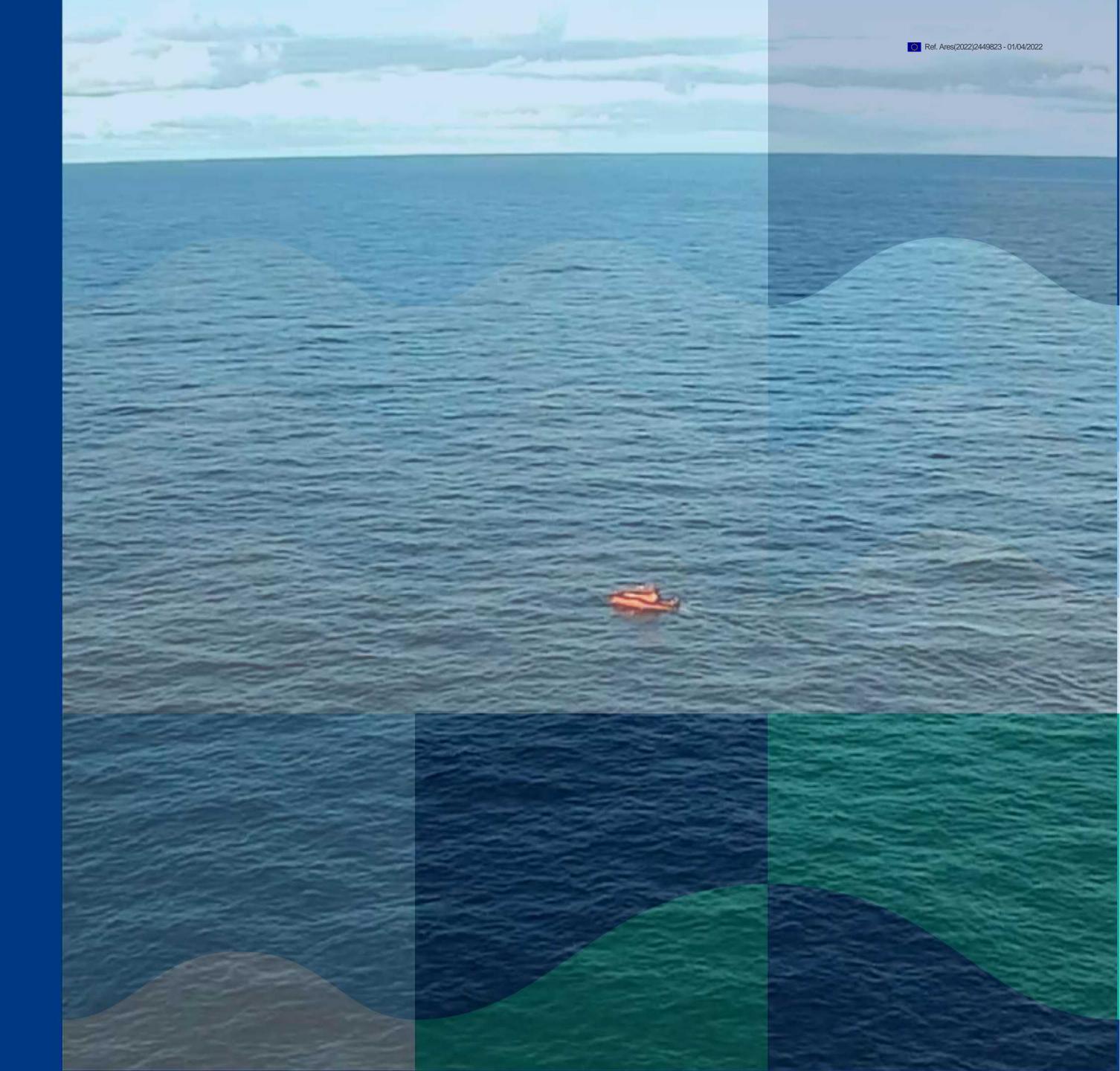


# EFCA experience with RPAS operations

ECGFF-EMSA Workshop
RPAS for maritime Surveillance

16/02/2022







# Number of flights

Area	2019	2020	2021	Total
Baltic Sea				
Mediterranean and NEAFC				
Mediterranean Sea				
NAFO				
North Sea				
Western Waters				
<b>Grand Total</b>				

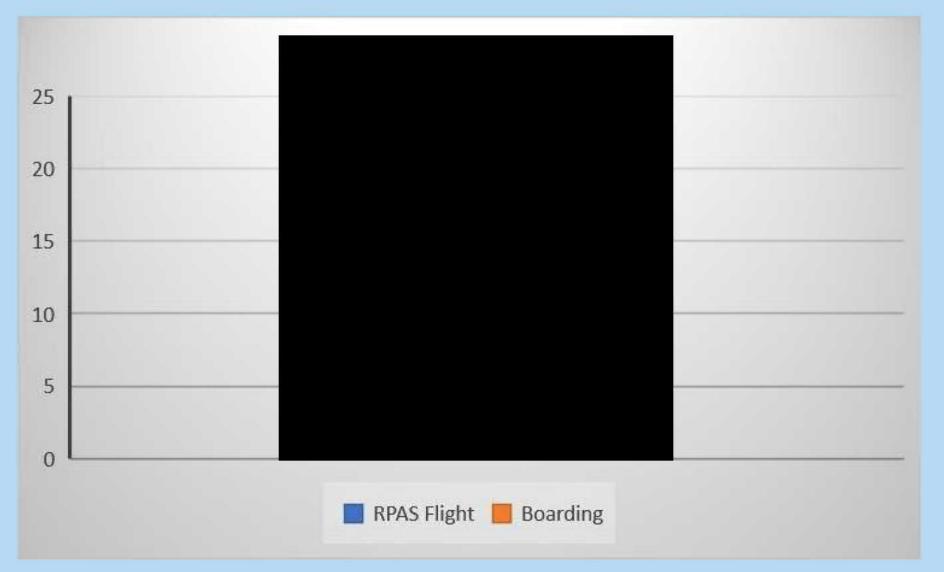


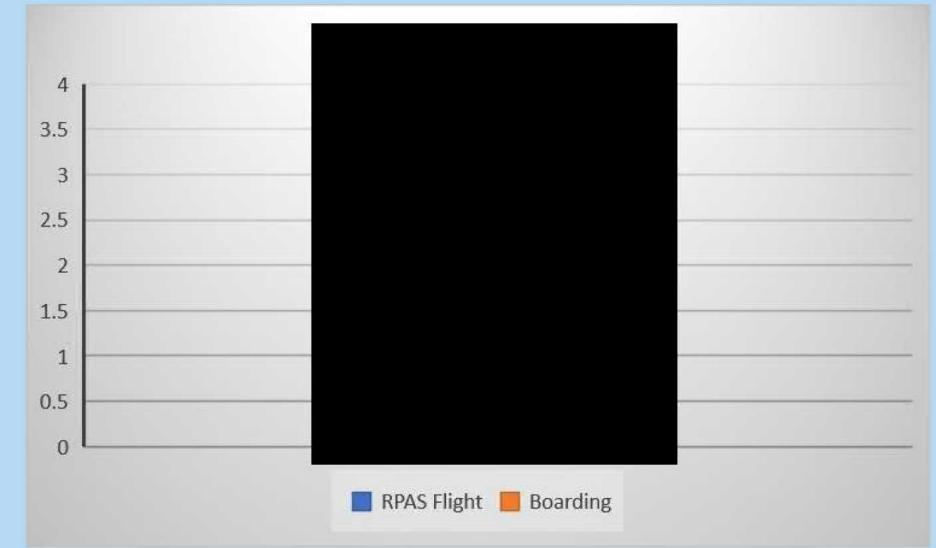






# Weather Conditions (2021 Patrols)

















# Safety and security of boarding team

✓ During pre-boarding and boarding phases to do checks on safety and security of boarding teams and information gathering

✓ Covid pandemic related measures: check open spaces on board target vessels









# Experience has show added value for fisheries control

- ✓ Obtain images of catch and species of a haul
- ✓ Detection of fishing vessels for which VMS or AIS is not received
- ✓ Visualisation of fishing gear used
- ✓ Checking possible fishing activity in Fisheries Restricted Areas
- ✓ Checking discarding and High-grading practices







# Images of catch and species of a haul

- ✓ General images of the catch volume of a haul can be obtained based on video footages collected by the RPAS.
- ✓ To obtain images of species catch composition. This is possible when the catch is composed of a limited number of fish species that have differences in size or colour.













# Fishing gear and activity related

- ✓ To get images about the gear and net in use and check possible gear attachments
- ✓ Checking possible activity in Fisheries Restricted Areas









# Night flights

✓ The use of RPAS for night surveillance (using infrared sensor),
in areas where there is a higher risk of use of illegal fishing gear























#### **EUROPEAN BORDER AND COAST GUARD AGENCY**

### Frontex Surveillance Aircraft

Multipurpose Aerial Surveillance applied on Unmanned Aerial Systems

ECGFF RPAS for maritime Surveillance 2022 (EMSA)

**Author: Frontex Situation Centre** 

UAS overview in FX

Concept

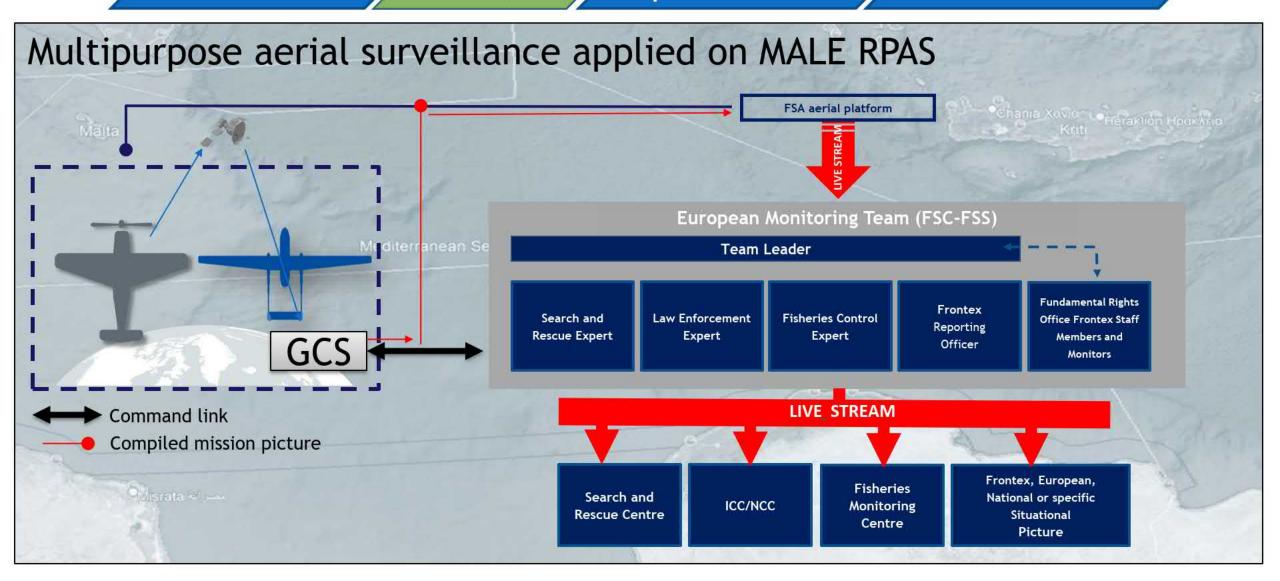
Implementation

Conclusion



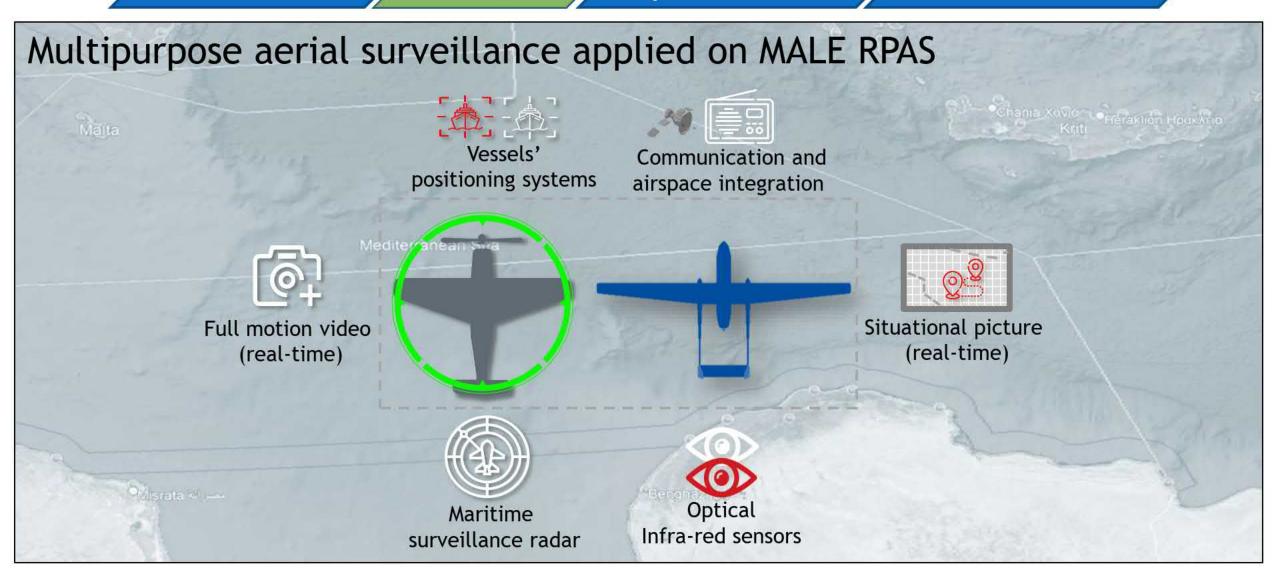














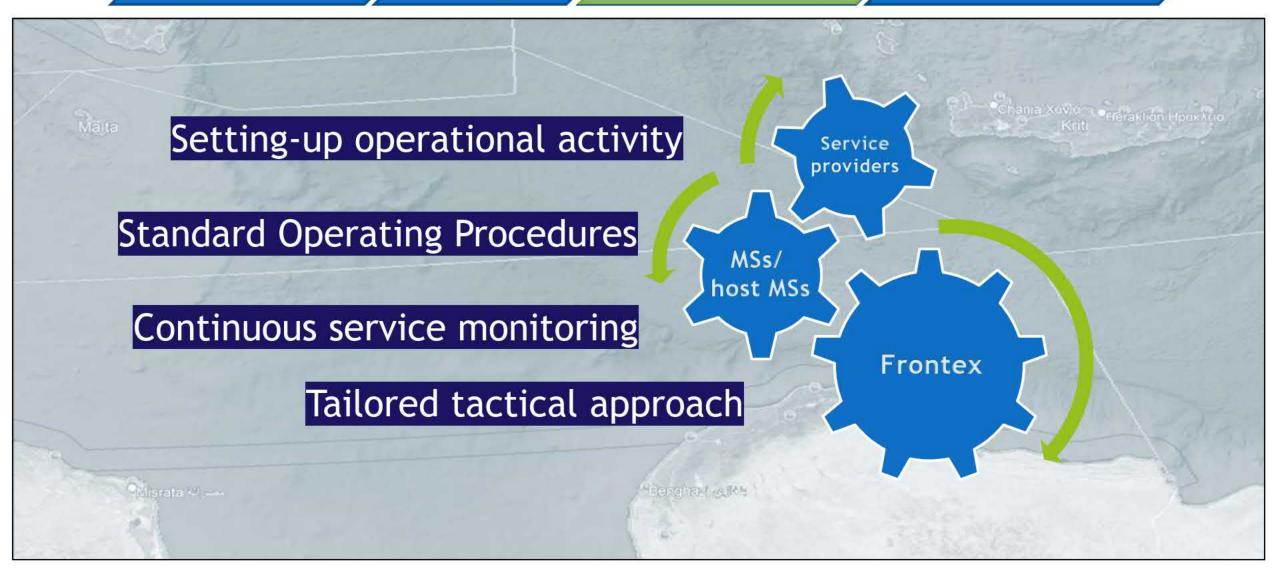






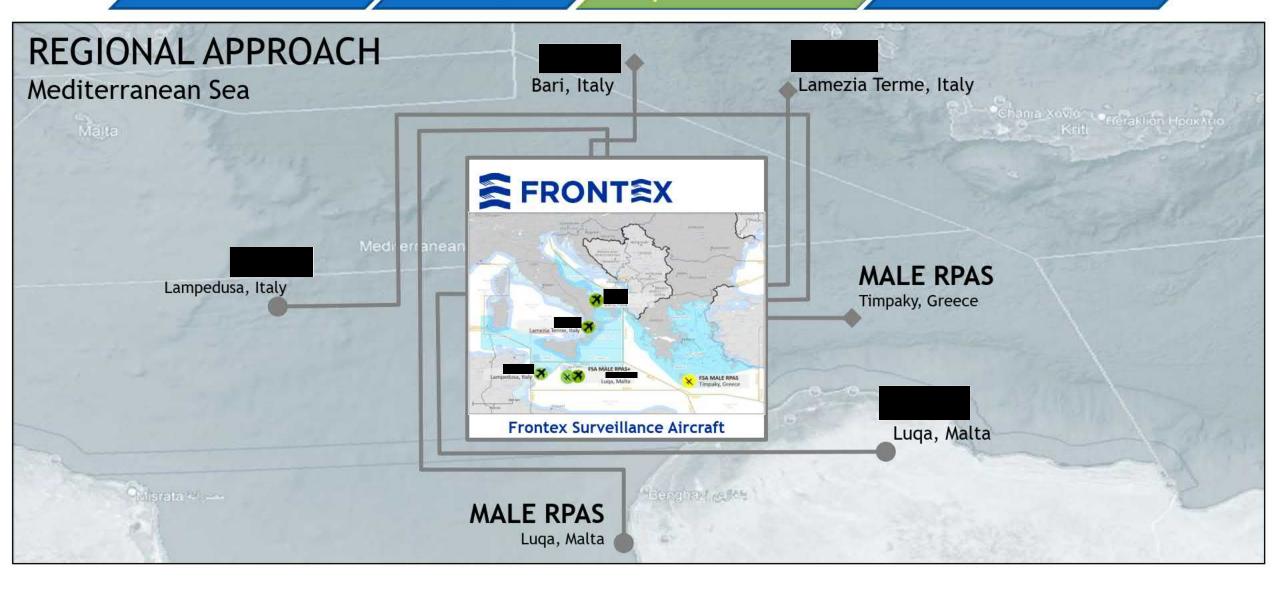














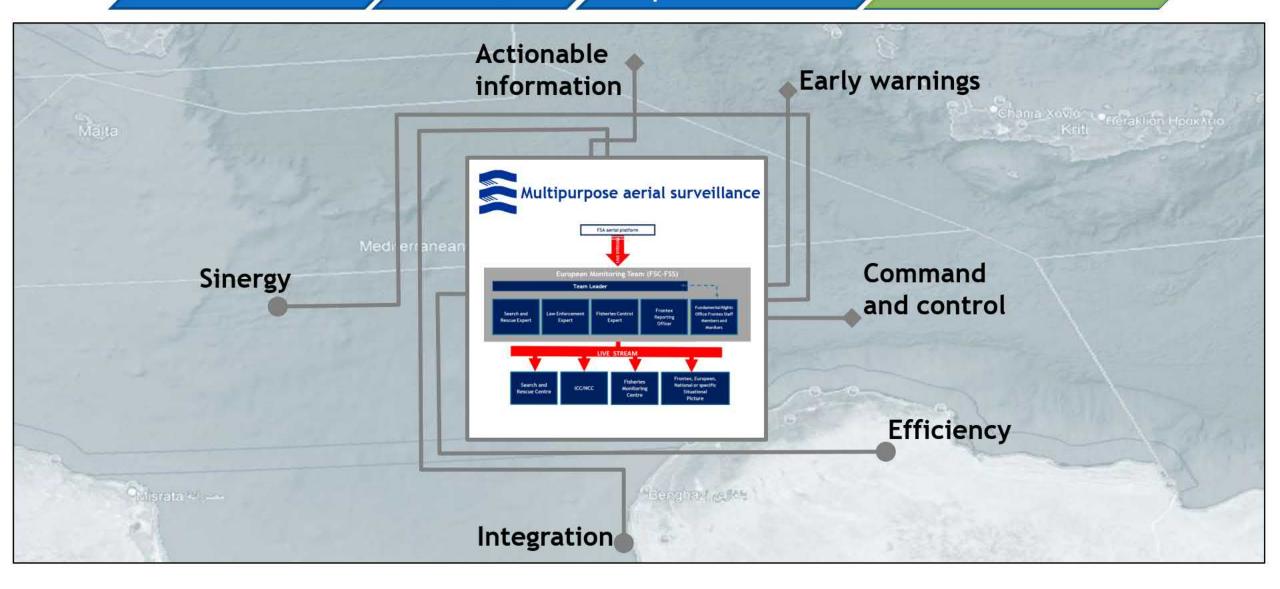


UAS overview in FX

#### Concept

### Implementation

#### Conclusion



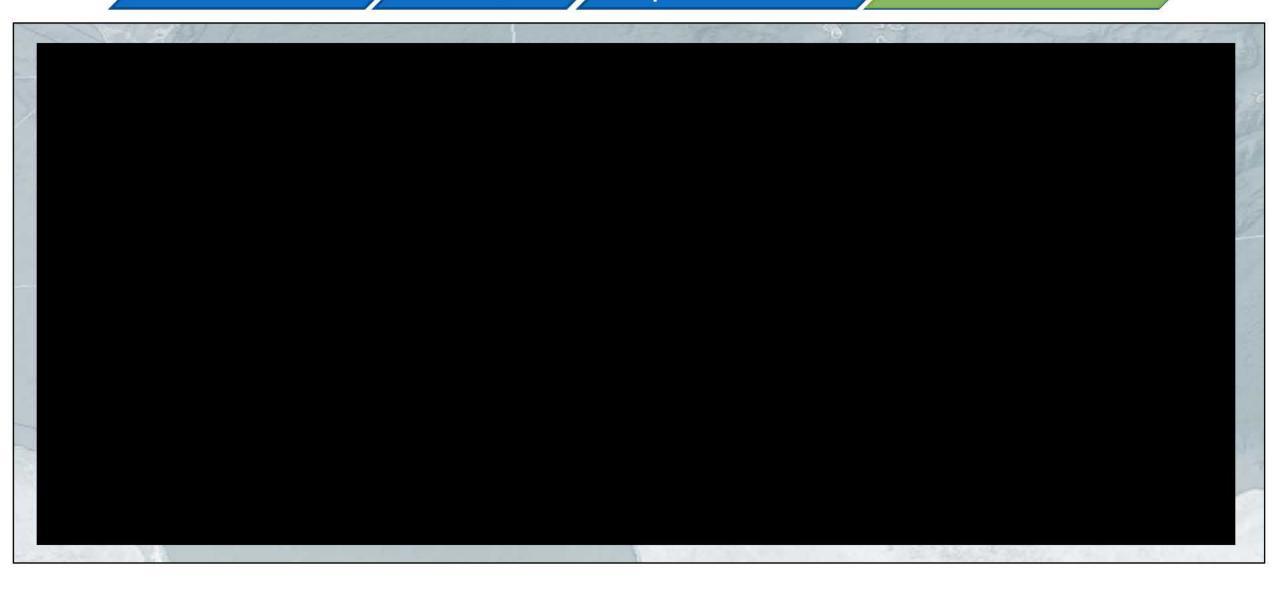




















**EUROPEAN BORDER AND COAST GUARD AGENCY** 

Thank you!

**Author: Frontex Situation Centre** 



# SPACE and RPAS APPLICATIONS FOR MARITIME



# What difference does space make?







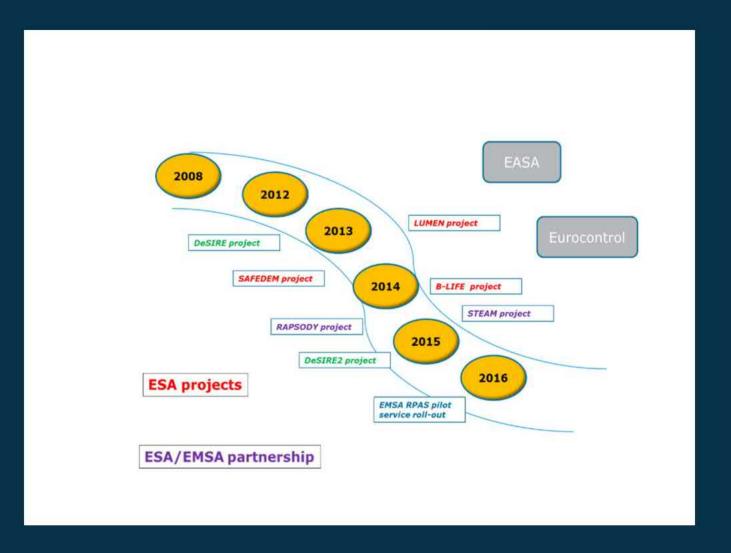


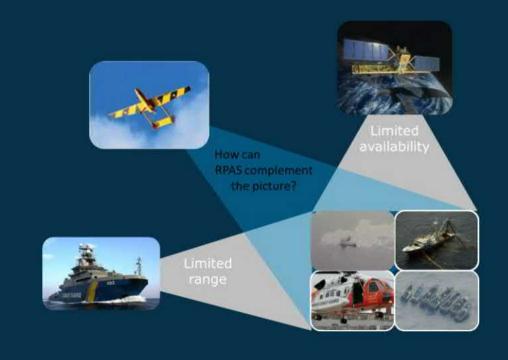


### Collaboration ESA/EMSA on RPAs









- Maritime surveillance: incl. search and rescue operations, fishery control, border control, anti-drug trafficking, anti piracy, safety of navigation, etc.
- Maritime pollution monitoring
  - Emissions monitoring

# **New developments**



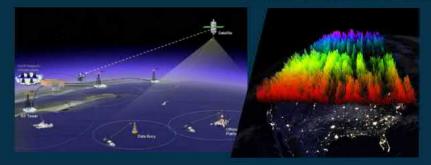
#### **RPAs**

- Increased endurance
- Drone mission platforms
- Automated flight management systems
- Cybersecurity/Blockchain
- Data Analytics









#### And other technologies

- Unmanned vessels
- VDE-SAT
- HAPs
- RF- Analytics

# **BOREAL**







#### Intelligence Surveillance Reconnaissance (ISR) using SATCOM

supporting

the surveillance of large areas in the maritime and land domains



Dispatch appropriate means of rescue for a ship in distress with damages onboard and source of potential marine pollution

R

SATCOM: connectivity link between the drone and the remote center or direct link to ground for line-of-sight operations

SATEO: for situational awareness

### **FLAMES**







Demonstration of automated Flight Management for the operation of Unmanned Aerial Systems

- Automated flight management platform for maritime surveillance and future urban drone services
- Improved mission safety and efficiency through analysis of drone performance and situational awareness data



FLAMES | ESA Business Applications

SATEO: for Digital Elevation Models and high-resolution weather information

SATCOM and SATNAV: connectivity and tracking

















Provision of risks and vulnerability assessment for UASs/RPAS and their subcomponents

- CyberSec Test Range, a technological framework combining ICT, EO and SATCOM, in the (Italy).
- Facility that experiments UAS (Unmanned Airplane System) and studies their integration into non-segregated airspace.
- overall assessment on vulnerability and resilience of UAS with respect to cyberattacks
- VLOS, RLOS, and BRLOS operations will be verified against hardware attacks, wireless attacks, and sensor spoofing



SATCOM: used for both UAS Command, Control (C2) and ATC (C3) and payload communications in case of Beyond Radio Line of Sight (BRLOS) operations.

GNSS: used to support UAS position and navigation

EO: is used in support of mission simulation and preparation.

## **ThermAleego**







- Drone mission commissioning platform for match making between entities requiring drone missions and appropriate drone pilot
- Post-processing software for thermal imagery obtained by drones





#### THE DRONE SERVICE PLATFORM

Powered by AI and Biockchain technology

- EASE OF U
- DATA SAFFTY & INTEGRITY
- DIGITAL SIGNATURE
- DISTRIBUTED LEDGER TECHNOLOGY

SATEO: mapping layers for visualization of surroundings

SATNAV: geo-locate and recompose drone images for analysis

# NG-RMP: Next Generation – Recognised Maritime Picture













Early identification of unusual behavior of vessels alerting operators for planning of future investigation







- S-AIS data, CCTV footage and vessel data from port and shipping authorities integration
- automated decision support system using data mining, data analysis and simulations to provide for early identification of unusual behaviour of vessels

NG-RMP | ESA Business Applications

Maritime surveillance reaps commercial rewards | ESA Business Applications

Established partnership with one of the world's largest insurance brokers, Aon, to provide space-adapted surveillance technology for tracking marine assets in real-time

415 HO enerations Command and Control Centro



# **NEW MARITIME INITIATIVES,** PROJECTS AND PARTNERS



### Space for Smart and Uncrewed Shipping





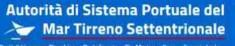
Fraunhofer













203

Department

for Transport

### Ports of the Future

European Sea Ports Organisation's (ESPO) priority areas: air pollution, energy usage and de-carbonisation



Portuguese project supported by European Space Agency (ESA) Space Solutions aims to "clean up" the Azores ports | ESA **Business Applications** 





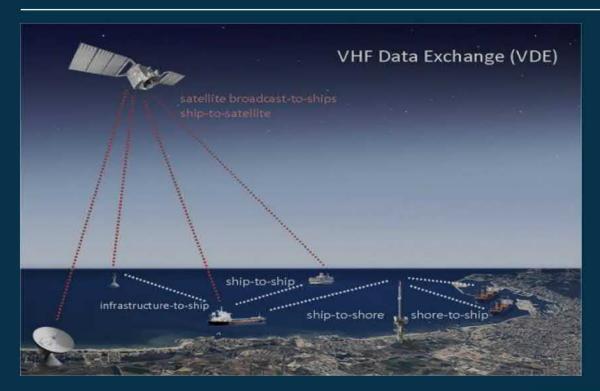
Projects started in UK, FR, IT, NO, BE, PT, LU with participation of port authorities

<u>Innovative air pollution service for UK smart city harbours</u> and ports > SPRINT Belfast

Harbour

### VDE-SAT Applications and Services Platform (VASP)



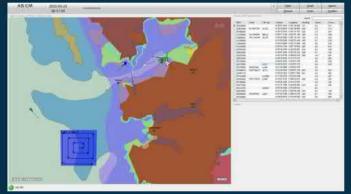




- Ship mandatory reporting information to authorities
- Support to S&R: distribution of individual search patterns and collection of position report from involved ships
- Distribution of Maritime Safety Information, e.g. ice charts and weather maps







# SyriUS - Synergetic surveys using Unmanned maritime systems and Satellites



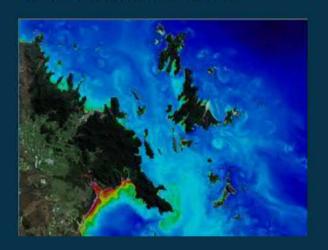
SyriUS develops innovative data services for bathymetric mapping, seafloor characterization, and environmental monitoring





SyriUS services are:

- Bathymetric mapping for maritime surveillance
- Benthic and seafloor characterisation for environmental monitoring and offshore infrastructure



Synergetic surveys using Earth observation (EO) technology combined with unmanned maritime systems (UMS) solutions in particular Autonomous Surface Vehicles (ASVs)

**Targeted Users:** Bathymetric survey companies, Hydrographic offices, Dredging companies and Public authorities

Pilot test areas: Norway, Sweden and Netherlands







**European Regulatory developments in the field of UAS for civil UAS operations** 

EASA Drones Programme Manager

### Agenda

- > Outlook on European Regulations in the field of UAS
- Upcoming regulatory developments
  - ➤ U-space
  - > UAS in the certified category
- > Events
  - > EASA High Level Conference on Drones together with Amsterdam Drone Week



### Operation centric, risk-based, performance based regulation



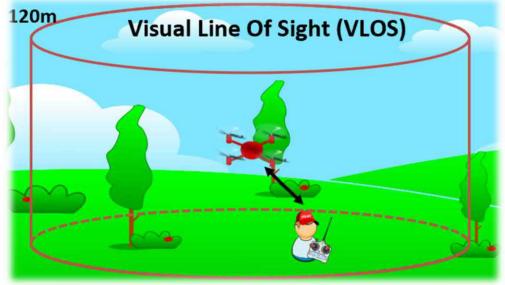




# Open category

Prescriptive requirements





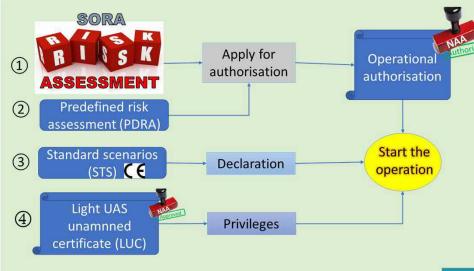
- A1 fly over people
- A2 fly close to people
- A3 fly far from people



# **Specific category**

Requirements based on the risk assessment performed by the UAS operator

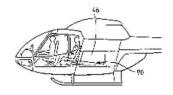


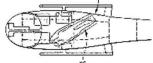


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## Definition of certified category

→ UAS operations with a risk such that the following is required:





Airworthiness certification



Operator certification



Remote pilot license

## Examples



Operations over assemblies of people with a large UAS

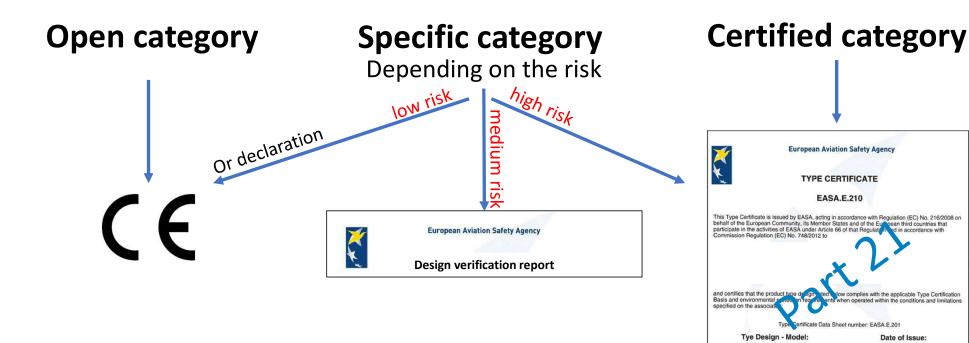


**Transport of people** 



Transport of dangerous goods if in case of accident they pose high risk to third parties

# Verification of the design of the UAS



#### **Certification basis:**

- **SC Light UAS** or
- CS- x complemented by future CS UAS



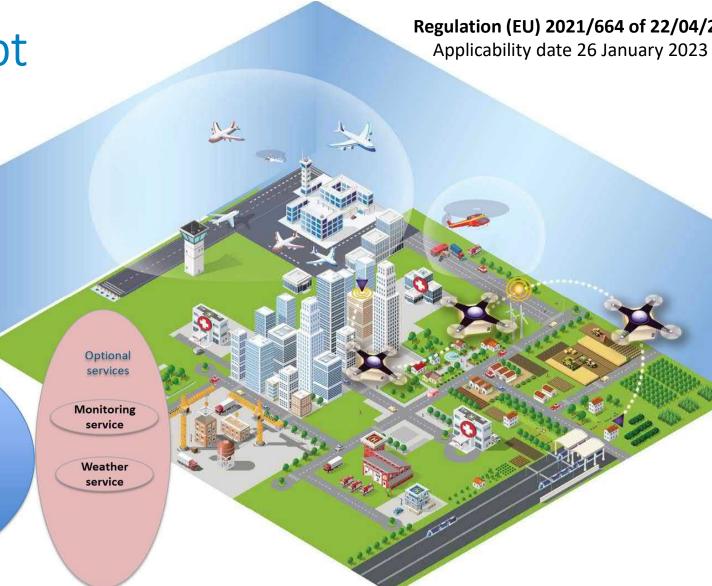
Date of Issue

U-space concept

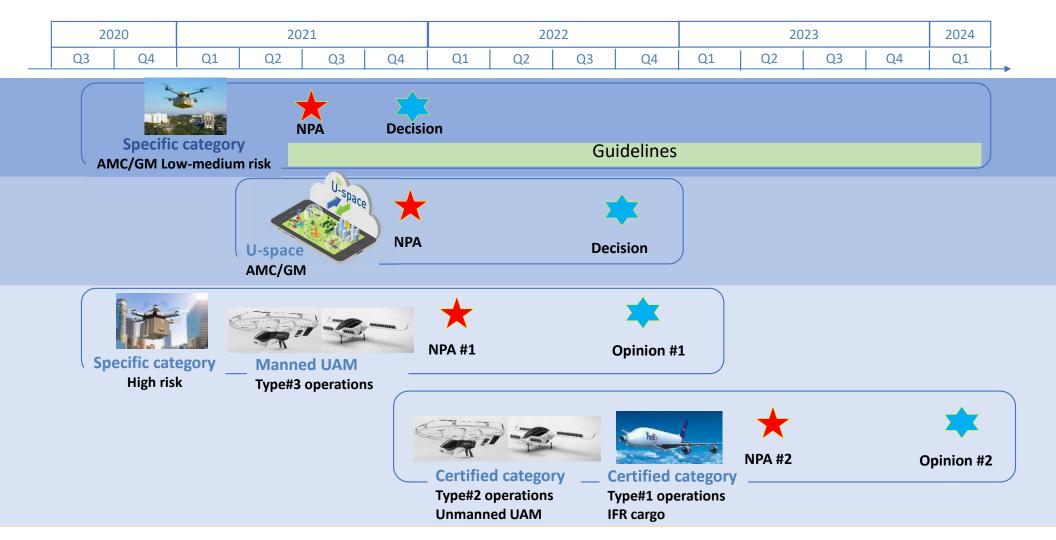
**U-space airspace**where some services are provided.

**U-space services** 

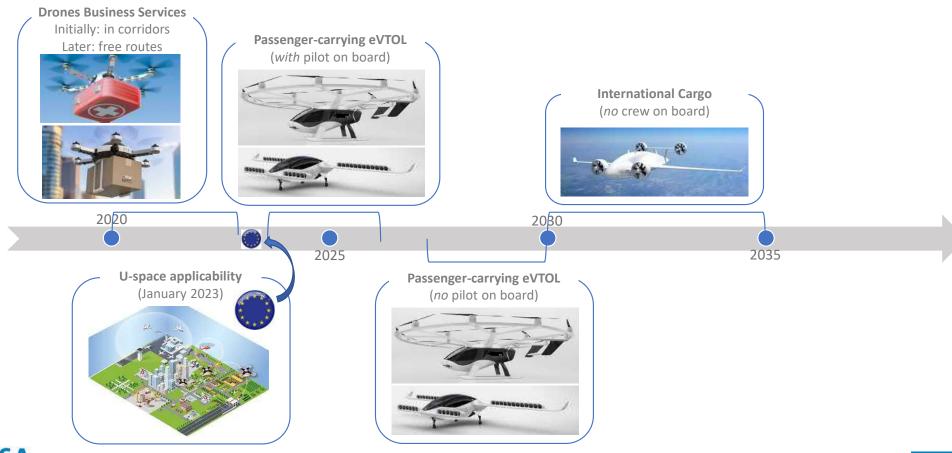




# Next rulemaking activities



# **Expected industry developments**EASA regulatory input to EC Drone Strategy 2.0





### EASA drone website

https://www.easa.europa.eu/domains/civil-drones-rpas

### **Documentation**





Videos and presentations





FaQ







# Thank you for your attention



easa.europa.eu/connect













Your safety is our mission.

An Agency of the European Union





# Agenda: European Coast guard Function Forum Workshop RPAS for Maritime Surveillance

Lisbon, 15 February 2022 – 16 February 2022

Time: Lisbon

#### Tuesday, 15 February 2022

Time	Agenda Item	Speaker
12:30 – 13:30	Registration / Coffee and snacks	
13:30 – 13:45 13:45 – 14:15	1. Welcome / Opening  Welcome Agenda introduction Expected results  2. Member States best practices and lessons learnt  CONOPS Range vs flexibility of deployment Logistics, Communication Live transmission of data Permit to fly and risk analysis Airspace management Operational procedures and coordination with other surveillance means Experience with sensors	European Maritime Safety Agency, Executive Director,  European Coast Guard Functions Forum, Presidency,  Ministry of the Sea, Transport and Infrastructure, Deputy Minister,  Estonia - Estonian Police and Border Guard Board, Superintendent  France - Directorate for Maritime affairs / SAR and Maritime traffic office, Special Assessor for Maritime Surveillance,  Spain - Spanish Customs, Technical expert group in the maritime domain (CECOP) Subdirectorate for operations,
14:15- 14:30	<ul> <li>Information and assets on site</li> <li>Questions and answers</li> </ul>	Participants
14.15-14.50	QUOSILOTIS CITO CITSWEIS	· ·
14:30 – 14:40	3. Breakout sessions: general information	EMSA

14:40 – 15:00	Coffee break	
15:00 – 16:30	4. Breakout sessions: Strengths, Weaknesses, Opportunities and Challenges for RPAS in the maritime domain per function  WG 1: Safety of Navigation and Ports, Environment Monitoring and Response, SAR (Room -1.11)	WG 1:  Chair: Croatia - Ministry of the Sea, Transport and Infrastructure / Maritime Safety Directorate,  Rapporteur: Germany - Maritime and Hydrographic Agency (BSH),  Facilitator: EMSA, Senior Project Officer – Surveillance Unit,
	WG 2: Border control and Law enforcement (Room - 1.06)	WG 2:  Chair: Italy - Italian Coast Guard, Head of Department – Fisheries and Environment Protection,  Rapporteur: Romania - Border Police, Head of Service of the Naval Surveillance and Control Service in the General Inspectorate,  Facilitator: Frontex, Senior Team Leader from Risk Analysis Unit,
	WG 3: Fisheries control and inspections (Room - 1.17)	WG 3:  Chair: Direção-Geral de Recursos Naturais, Segurança e Serviços Marítimos, Fisheries Inspector in the Fisheries Inspectorate,  Rapporteur: Ministerio de Agricultura y Pesca, Fisheries Inspector – Inspection Means and Public Acquisitions Unit, Atlantic / NAFO NEAFC – Western Waters Unit,

	Discussion: Based on overviews and outcomes from topics 1., 2. and 3.  (WGs runs in parallel)	Facilitator: European Fisheries Control Agency, Specialist Officer Control Technologies - Unit Coast Guard and International Programmes,
16:30	End of the 1 <sup>st</sup> Day	
16:30 – 17:30 Only for WG chairs, rapporteurs	Drafting conclusions from breakout sessions	WG chairs and rapporteurs from MS Facilitators from Agencies
and facilitators		

### Wednesday, 16 February 2022

Time	Agenda Item	Speaker			
08:30 - 09:00	Coffee				
09:00 - 09:45	EU Coast Guard Functions agencies     experience with RPAS Operations     EMSA     EFCA     Frontex	European Maritime Safety Agency, Senior Project Officer – Surveillance Unit,  European Fisheries Control Agency, Head of Sector - Unit Coast Guard and International Programmes,  Frontex, Surveillance Aircraft Expert from the Frontex Situation Centre,			
09:45 – 10:15	2. Other Institution experience with RPAS  Regulatory framework Lessons learnt Way forward	European Union Aviation Safety Agency, Drone Programme Manager,  European Space Agency, Head of Projects and Studies implementation Division,			
10:15 – 10:30	Questions and answers	Participants			
10:30 – 10:50	Coffee break				
10:50 – 11:20	Presentation of the conclusions from WGs day1	WG Rapporteurs from MS			
11:20 – 11:30	Questions and answers	Participants			
11:30 – 12:15	RPAS industry point of view     Lessons learned from services at sea     New technologies     Best practices	Industry representatives:  Airbus DS Airborne Solutions GmbH, ILS Manager UAS Services,			

		Nordic Unmanned AS, VP Green Solutions,
		Schiebel Elektronische Geraete GmbH, Key Account Manager,
		Collecte Localisation Satellites, REACT Consortium, Director – Maritime Surveillance,
12:15 – 12:30	Questions and answers	Participants
12:30 – 12:45	Meeting Closure     Lessons learned and way ahead	European Maritime Safety Agency, Executive Director
		European Coast Guard Functions Forum, Presidency,
		Ministry of the Sea, Transport and Infrastructure, Deputy Minister,
12:45 – 14:30	Lunch / End of workshop	

Country	First Name	Last Name	Organization	Email	City/Place	of Departure
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No			Online	Yes	Yes
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No			Online		Yes
No			Online		100
No			Online	Yes	Yes
No			Online	Yes	162
No			Online	169	Yes
No			Online		169
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		Permanent Repres			
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From:
Sent: 16 April 2021 11:49

To:

Cc:
Subject: RE: HR EUCGFF Presidency, 15.04.2021

Dear , dear EMSA colleagues,

Thank you very much for your time yesterday and all informations provided us, including todays mail.

To summerize, the proposal of the topic in principle would be "RPAS cross-sectorial cooperation and regional approach". I would be most obliged if you could provide us with your thoughts on to extend the topic with live exercise in which could participate m/v (stand-by oil response vessel) and drones. For this puropse drones that could be engaged in potential exercise could be: from Croatian MoD, EMSA lightweight one, or combination of those two.

Would be this possible to plan and arrange according to organizational and financial framework?

#### Best regards,



Uprava sigurnosti plovidbe | Maritime Safety Directorate



Pošiljatelj:
Poslano: 16 April 2021 09:36
Primatelj: S
Kopija:

Predmet: RE: HR EUCGFF Presidency, 15.04.2021

#### Dear Colleagues,

As discussed yesterday during our fruitful first meeting, I hereby attach for your information a sample package of documents from the last EMSA/ECGFF Workshop (under the French Chairmanship) and Agendas from two of the previous ones.

If you wish to receive more samples or have any questions, please do not hesitate to contact us.

#### Best regards,



EMSA / Praça Europa 4 / 1249-206 Lisbon / Portugal
Tel +351 21 1209 440 / Fax +351 21 1209 211
@emsa.europa.eu / emsa.europa.eu

From:

Sent: Wednesday 14 April 2021 14:24

To:

Cc:

Subject: RE: HR EUCGFF Presidency, 15.04.2021

Hello from Lisbon!

Perfect, looking forward to meet you tomorrow

Best

From:

Sent: Wednesday 14 April 2021 14:17

To:

Cc:

Subject: HR EUCGFF Presidency, 15.04.2021

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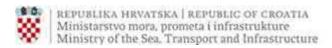
Dear EMSA colleagues,

This mail is to confirm tomorrows videocall regarding Croatian EUCGFF Presidency.

On behalf of Croatian Maritime Administration, the videoconference will be attended by:

Looking forward to meet you tomorrow,

Kind regards,



Uprava sigurnosti plovidbe | Maritime Safety Directorate



From:
Sent: 11 May 2021 09:01

To:

Cc: HR EUCGFF precidency, info

#### [EXTERNAL SENDER]

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Dear EMSA colleagues,

Hope this mail finds you well.

I take this opportunity to inform you that Croatian EUCGFF precidency meeting was held on Friday 07 May with conclusion to provide them by 24 May at leatest with tentative agenda for our January 2022 workshop "RPAS Cross-Sectorial Cooperation and Regional Approach".

Our idea was to take the following pproach:

- First half of the first day:
- presentation HR Ministry of the Sea: RPAS experiences and overview in Croatia (CONOPS, main ouputs, lessons learned possible from MGMT and operational point of view)
  - EMSA presentation: RPAS experiences and future cooperatin in cosatguard functions
  - other Agencies or HR Government Body presentation related to the topic
- Second half of the first day:
- arrange with workshop approach, i.e. to raise 3 ineteresting topics related to RPAS and to divide participants related to topics they are interested to
- First half of the second day:
  - to present conclusions from 3 worskshops from previous day
  - final conclusions

I would be most obliged if you could share with us opinion on proposed approach. Following agreed approach between EMSA and this Ministry, we will proceed with mutual sharing of the ideas for agenda topics.

Thanks in advance.

Best regards,

From:

**Sent:** 28 September 2021 15:57

To:

Cc:

**Subject:** EUCGFF EMSA WORKSHOP

**Attachments:** Draft Agenda ECGFF 2022 RPAS workshop.docx

Follow Up Flag: Follow up Flag Status: Completed

#### [EXTERNAL SENDER]

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Dear , dear EMSA colleagues,

Following our previous discussions on EUCGFF Workshop and based on recived proposal for which we are very grateful, we elaborated the Agenda Workshop, as attached.

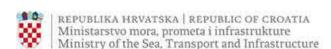
The concept proposal for the 1<sup>st</sup> Day morning session would be to cover relevant topics (1.,2.,3.) as an inputs for working groups after Lunch break (4.), as well as for the next day panel discussion.

On beginning of the 2<sup>nd</sup> Day we can give a wider perspective of RPAS inviting EASA and/or ESA and/or EUSPA, according to your feedback. Later the presentation of the outcomes of the WGs from previous day and Panel Session could be performed.

Should you have any comments or modifications on the draft agenda, we would be happy to hear from you.

Furthermore, we would be most obliged if we could fix the days for the workshop.

Kind regards,



Uprava sigurnosti plovidbe | Maritime Safety Directorate

