Horizon Europe | *Civil Security for Society*

1. Destination – Better protect the EU and its citizens against Crime and Terrorism

Call – <u>Border Management</u> 2023

Session Chairs:

- *Alberto Bianchi (Leonardo/ IMG-S))*
- *Krzysztof Samp (ITTI/IMG-S)*
- *Sirra Toivonen (VTT)*

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Effective management of EU external borders

#	Organisation	Presenter
CL3-2023-BM-01-01		
1	FGI	Tuomo Malkamäki
3	Kemea	Genny Dimitrakopoulou
4	Visionware	Filipe Custódio
5	Zanasi & Partners	Maria Ustenko
6	Gradiant	Alicia Jimenez
7	Onera	Rémi Baque
8	Elistair	Solange Tardi
9	Military University of Technology	Konrad Wojtowicz
10	Turkish Coast Guard Command	Ismail Ilgar
CL3-2023-BM-01-02		
11	ForceApp BV	Ioannis Margaritis
12	Hologarde	Marie Kolago
CL3-2023-BM-01-04		
13	DBC diadikasia	Nikos Avgerinos

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BM-01-01

Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
1	Finnish Geospatial Research Institute (FGI)	Tuomo Malkamäki

Collaborative situational awareness from drones, towers and sensor meshes for autonomous border surveillance

- *Tuomo Malkamäki*
- *tuomo.malkamaki@nls.fi*
- *National Land Survey of Finland*
- Role: *Proposal coordinator*

- Proposal activity: HORIZON-CL3-2023-BM-01-01
  - Capabilities for border surveillance and situational awareness

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Proposal idea/content

- Situational awareness center with multimodal geospatial, satellite and historical monitoring data combined with continuous data stream from a monitoring sensor platform, AI based analytics and data fusion.

- Sensor platform for autonomous situational awareness, comprising:
  - Towers with monitoring sensors capable of semi-autonomous surveillance, network connection, processing unit and drone battery charge (docker)
  - Ground/mobile docker stations/boxes
  - Ground sensor meshes
  - Swarm of drones with sensors and edge processing capacity
  - Drone sensors for collaborative positioning, monitoring, and target detection

- Human-Machine-interface designed for monitoring both inside and outside the border crossing points in land and sea borders

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Project participants

- Existing consortium:
  - Proposed coordinator: *FGI - NLS*
  - *Research institutes / universities: 3 (Finland/Italy/Poland)*
    - *Remote sensing, navigation/positioning, drone operations, sensor development/fusion, machine learning, environment modeling/SLAM*
  - *Drone technology provider: 1 (Finland)*
  - *Border authorities: 2+*

- Looking for partners with the following expertise/ technology/ application field:
  - *Mesh connectivity/data transfer, CBRN knowledge*
  - *API and UI with VR/AR for c2 systems*
  - *We are open for discussions with other relevant partners*

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BM-01-01

Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
3	Kemea	Genny Dimitrakopoulou

BM-01-01 (GeoBorder)

- Genny Dimitrakopoulou
- g.dimitrakopoulou@kemea-research.gr
- Center for Security Studies (KEMEA), Hellenic Ministry of Citizen Protection
- Proposal coordinator and/or WP leader

- Proposal activity: HORIZON-CL3-2023-BM-01-01: Capabilities for border surveillance and situational awareness

Genny Dimitrakopoulou, MSc, MA, LLM
Research Associate

Center for Security Studies (KEMEA)
Hellenic Ministry of Citizen Protection
P. Kanellopoulou 4, 101 77, Athens, Greece
Tel:+302107710805 Fax:+302111004499
Email: g.dimitrakopoulou@kemea-research.gr
Website: www.kemea.gr

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Proposal idea/content

1. Increase border surveillance capabilities by developing technologies with better performance and cost-efficiency, ensuring compliance with legal and ethical regulations and norms.
2. Development and deployment of land & maritime efficient, flexible, and interoperable technologies integrated with legacy systems, existing infrastructures, EUROSUR and CISE.
3. Organise operational trials in different countries from Mediterranean to Baltic/Scandinavia with cross-community and cross-authority synergies.
4. Link with BMVI, exploit results and lessons learnt from ANDROMEDA, EFFECTOR, NESTOR, PROMENADE, BorderUAS, FOLDOUT etc.

- Technologies planned to be covered:
  ➢ Wide area surveillance with advanced detection & tracking capabilities
  ➢ Deployment of mobile, semi-autonomous surveillance towers
  ➢ IoT and advanced mesh connectivity
  ➢ Enhanced C2 and situational awareness with virtual and AR capabilities
  ➢ RPAS systems and autonomous vehicles
  ➢ Advanced sensors for geolocalisation
  ➢ Passive, low-energy systems
  ➢ Artificial intelligence

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Project participants

- Existing consortium (forming):
  - Coordinator: KEMEA or Hellenic Police (or technical partner)
  - Partners: KEMEA and cluster of Hellenic end-users (border & coast guards, defence etc.)

  ➤ Looking for partners (Border Guard Authorities, Industries, RTOs and Academia) with the following expertise/ technology/ application field:

    - Border & Coast Guard Authorities from Mediterranean and Nordic Countries
    - Networked deployable, mobile, semi-autonomous surveillance towers
    - Passive, low-energy systems for border surveillance and situational awareness
    - Interoperability of sensing, analysis, and C2 systems with VR/AR
    - Experience in interoperability with EUROSUR and CISE

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SMI2G

Thank you for your attention!

www.kemea.gr/en

Genny Dimitrakopoulou – g.dimitrakopoulou@kemea-research.gr

BM-01-01

Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
4	Visionware	Filipe Custódio

BOSENPRO - BOrder SENsor PROtector

- *Filipe Custódio*

- *fcustodio@visionware.pt*

- *VisionWare (POR)*

- Role: *Coordinator*

- Proposal activity: CL3-2023-BM-01-01 Capabilities for border surveillance and situational awareness (IA)

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Proposal idea/content

- *Deployable sensor system with integrated AI that detects critical events – the system works deployed in the field and only needs to communicate when the AI detects events.*
  - *Events may be: person or vehicle crossing restricted area; boat approaching beach; wi-fi/SIM systems tries to connect, and others.*
  - *Images or other evidences are sent to a central system*

- *Multiple deployment possibilities (tower, drone, treetop, sea buoy)*

- *Sensors work autonomously and process on the edge; evidence can be stored if connectivity is impaired;*

- *Privacy by design with automatic blurring of images - unblurring on request of authorities after need is established*

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Project participants

- Existing consortium:
  - Proposed coordinator: *VisionWare (POR)*
  - Other present members*:*
    - *Integrated intelligent Camera developer*
    - *System Integrator*

- Looking for partners with the following expertise/ technology/ application field:
  - *Border/Coast Guard Authorities*
  - *UAV/UMV developer*
  - *Researcher in the field of border protection/migration et. al.*

BM-01-01

Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
5	Zanasi & Partners	Maria Ustenko

UNIFRONT
UNiversal AI-platForm for Mediterranean fRONtier paTrol

Maria Ustenko
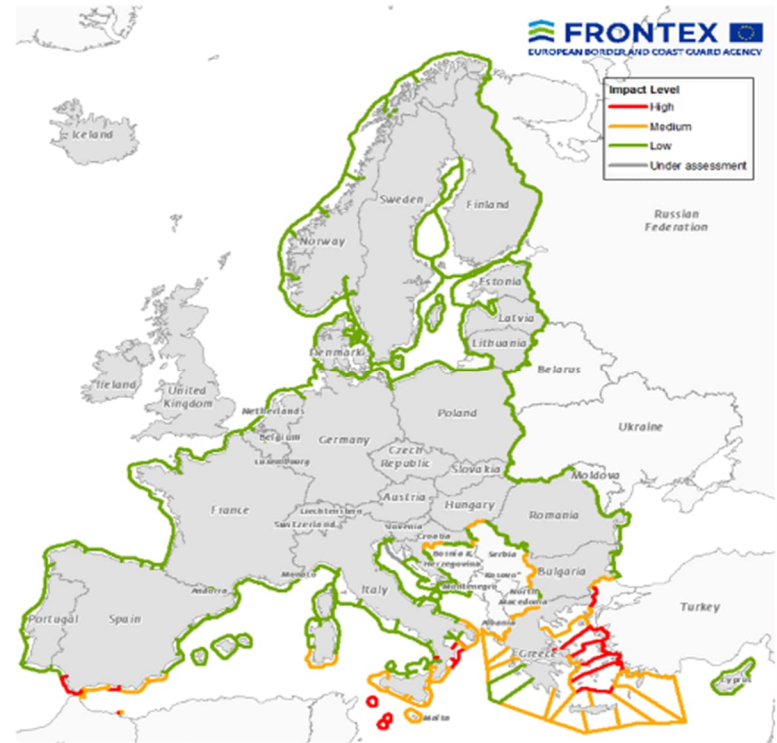
maria.ustenko@zanasi-alessandro.eu

Role: *Proposal coordinator/Scientific-Technical coordinator*

Proposal activity: *HORIZON-CL3-2023-**BM-01-01***

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UNIFRONT idea

Design a shared border surveillance **AI-driven solution** in order to improve border security in the Mediterranean area, cost and sea, made of:

- **onboard sensors** and **signal processing [**_COFDM, IP-based, MESH, etc, channels, RINICOM, Havelsan_**]** – sensors for geolocalisation, drones, adapted for marine environment [_wing-in-ground drones, e.g. SEAWINGS project_], IoT, VR and AR for enhanced C2 and situational awareness;

- **ground AI-based platform** for visualizing and analysis of the collected data [_unstructured Big Data analysis_] **used by** Board**/**Coast guard authorities.
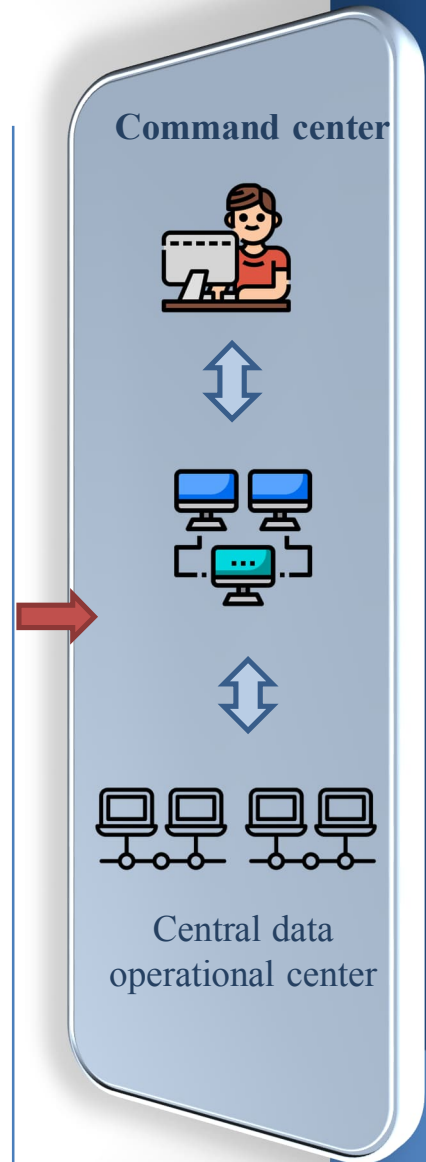
23

Maria Ustenko, maria.ustenko@zanasi-alessandro.eu

Data Collection through network connectivity

Command center

Data From mobile towers

Data From sensors

Data From drones

Central data operational center

Maria Ustenko, maria.ustenko@zanasi-alessandro.eu

Project participants

SMI2G

- **Existing consortium**:
  - Proposed coordinator/ scientific technical coordinator

- **Other consortium participants**:
  - *TECOMS (IT, SME)*
  - *RINICOM (UK, SME)*
  - *EU border guard authorities*
  - *LAUREA (FIN, Academia)*
  - *Palma (ES, RTO)*
  - *DRI (FR, SME)*
  - *Havelsan (TR) TBC*
  - *Tubitak (TR, Public) TBC*

Zanasi & Partners — Security Research and Advisory

- **Looking for**:
  - *AI developers*
  - *System integrators*
  - *Border & Cost guard authorities*

- **Z&P is also interested in:**
  - *HORIZON-CL3-2023-__FCT-01-01__*
  - *HORIZON-CL3-2023-__BM-01-03__*
  - *HORIZON-CL3-2023-__INFRA-01-02__*
  - *HORIZON-CL3-2023-__CS-01-03__*

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BM-01-01

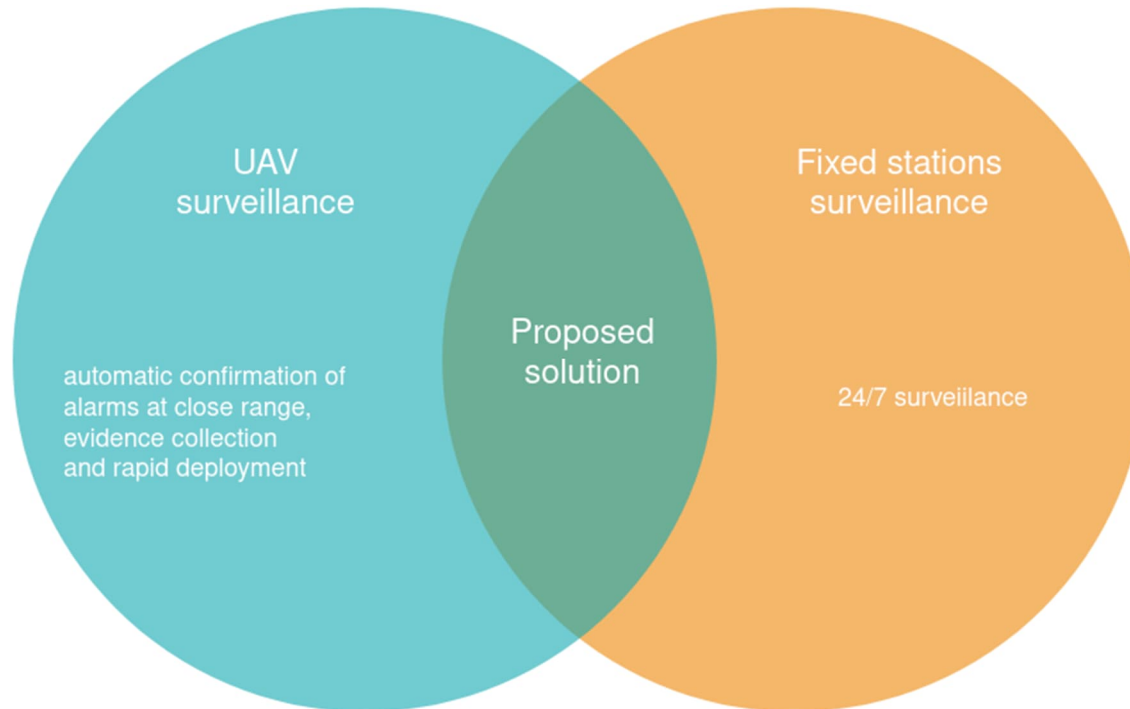Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
6	Gradiant	Alicia Jimenez

Border threat detection

- *Alicia Jiménez*
- *ajimenez@gradiant.org*
- *Gradiant (RTO, Spain)*
- Role: *WP leader, S/T provide*

- Proposal activity: CL3-2023-BM-01-01: *CAPABILITIES FOR BORDER SURVEILLANCE AND SITUATIONAL AWARENESS*

Border threat detection

The proposal consists of combining both types of surveillance modalities (UAV-based and fixed station-based) in order to take advantage of each modality's strengths and alleviate their respective weaknesses. Proposal would consist of (but not limited to) the following activities:

UAV
surveillance

automatic confirmation of
alarms at close range,
evidence collection
and rapid deployment

Proposed
solution

Fixed stations
surveillance

24/7 surveillance

Alicia Jiménez / ajimenez@gradiant.org

Border threat detection

Automatic surveillance from ground-based fixed IR cameras

- *Video Surveillance for the detection of drones or UAVs, ground or maritime vehicles.*

- *Multi-spectral video processing for improving detection/tracking capabilities with respect to separate spectral bands.*

- *Efficient video processing in low SwaP devices for flexible deployment in remote locations.*

- *Automatic generation of pre-alarms in real time.*

- **Automatic and rapid deployment of UAV for target detection and tracking**

  - *Video processing for detection/tracking of people, vehicles and objects (land and maritime scenarios).*

  - *Efficient video processing in low SwaP devices for flexible deployment on board UAVs.*

  - *Automatic confirmation of evidence in real time.*

Alicia Jiménez / ajimenez@gradiant.org
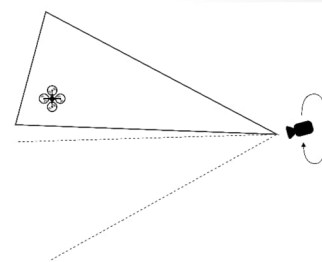
Project participants

- Existing consortium: No
  - GRADIANT role: *Video processing for improving detection/tracking*

- Looking for partners with the following expertise/ technology/ application field:
  - *Law enforcement authorities, border control agencies*
  - *Technology integrators*
  - *Unmanned vehicles manufacturers*
  - *Partners from previous BM- 2021-01-01*

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BM-01-01

Capabilities for border surveillance and situational awareness

| #	Organisation	Presenter
7	Onera	Rémi Baque

UAV Based radar remote sensing for BM

- *Rémi Baqué*
- *remi.baque@onera.fr*
- *ONERA*
- *WP leader*

- Proposal activity: **HORIZON-CL3-2023-BM-01-01**

Proposal idea/content

- *Concept : Continuously day/night and all weather radar imagery and moving target detection on ground/sea and under forest used for detection of people and vehicles crossing borders*

- *Activities : Theoretical study, requirements, real environment demonstration (sensor and platform management, measurement and signal/image processing) and recommendations*

- *Radar sensors onboard small aircraft and UAV (small and high altitude)*

Buried pipe acces

Manhole cover

Fences

<10 cm resolution
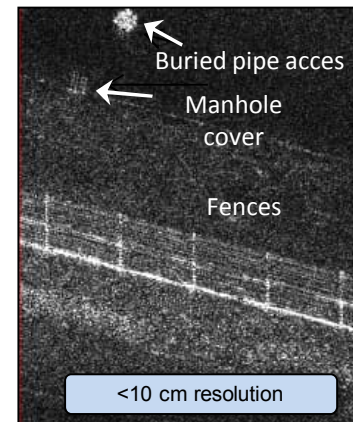
Project participants

- Existing consortium:
  - Proposed coordinator: *TBD*
  - Partners / Other participants: *Elistair, UCL, TNO to be confirmed*

- Looking for partners with the following expertise/ technology/ application field:
  - *Lead*
  - *End users*
  - *Electronic Warfare sensors for smartphone detection*
  - *Optronic / LIDAR / thermal IR sensors*
  - *Other platform/sensors*

Rémi Baqué / remi.baque@onera.fr

BM-01-01

Capabilities for border surveillance and situational awareness

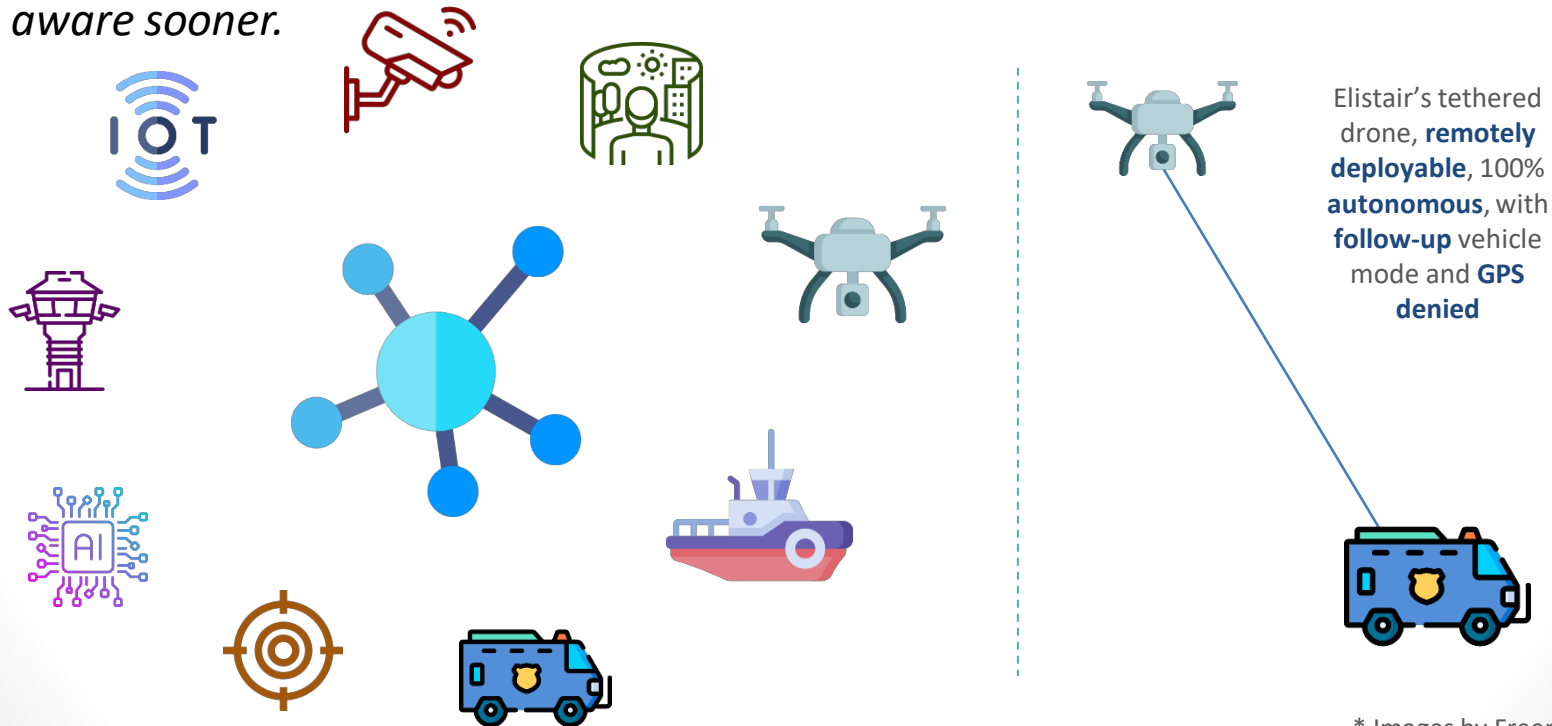| #	Organisation	Presenter
8	Elistair	Solange Tardi

BORDER SURVEILLANCE

- *Solange Tardi, Partnership and fundraising officer*

- *s.tardi@elistair.com*

- *Elistair, SME*

- Role: *Technical Partner (Task Leader, eventually WP leader)*

- Proposal activity: *HORIZON-CL3-2023-BM-01-01, Capabilities for border surveillance and situational awareness*

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Proposal idea/content

- *An integrated system composed of new technologies and legacy systems, integrated in a Command&Control system to facilitate decision making of operators and providing a 24/24h monitoring/surveillance of the border.*

- *Technologies could be integrated on a patrol vehicle (land or maritime) to enhance situational awareness and help end-users take quicker decisions/be aware sooner.*

Elistair's tethered drone, **remotely deployable**, 100% **autonomous**, with **follow-up** vehicle mode and **GPS denied**

* Images by Freepik

Solange TARDI – s.tardi@elistair.com

Project participants

- The consortium needs to be created, Elistair is offering its help :
  - Ideas of partnership :
    - 2 or more Border/Coast Guard Authorities
    - Other technical partners : boat provider, UGV, radar, RF solutions…
    - Integrator
- Looking for partners with the following expertise/ technology/ application field:
  - *Command & control system expert*
  - *Technologies : cameras, RF systems, radars, unmanned systems…*
  - *Social media analysis technology*
  - *Augmented Reality*

Solange TARDI – s.tardi@elistair.com

BM-01-01

Capabilities for border surveillance and situational awareness

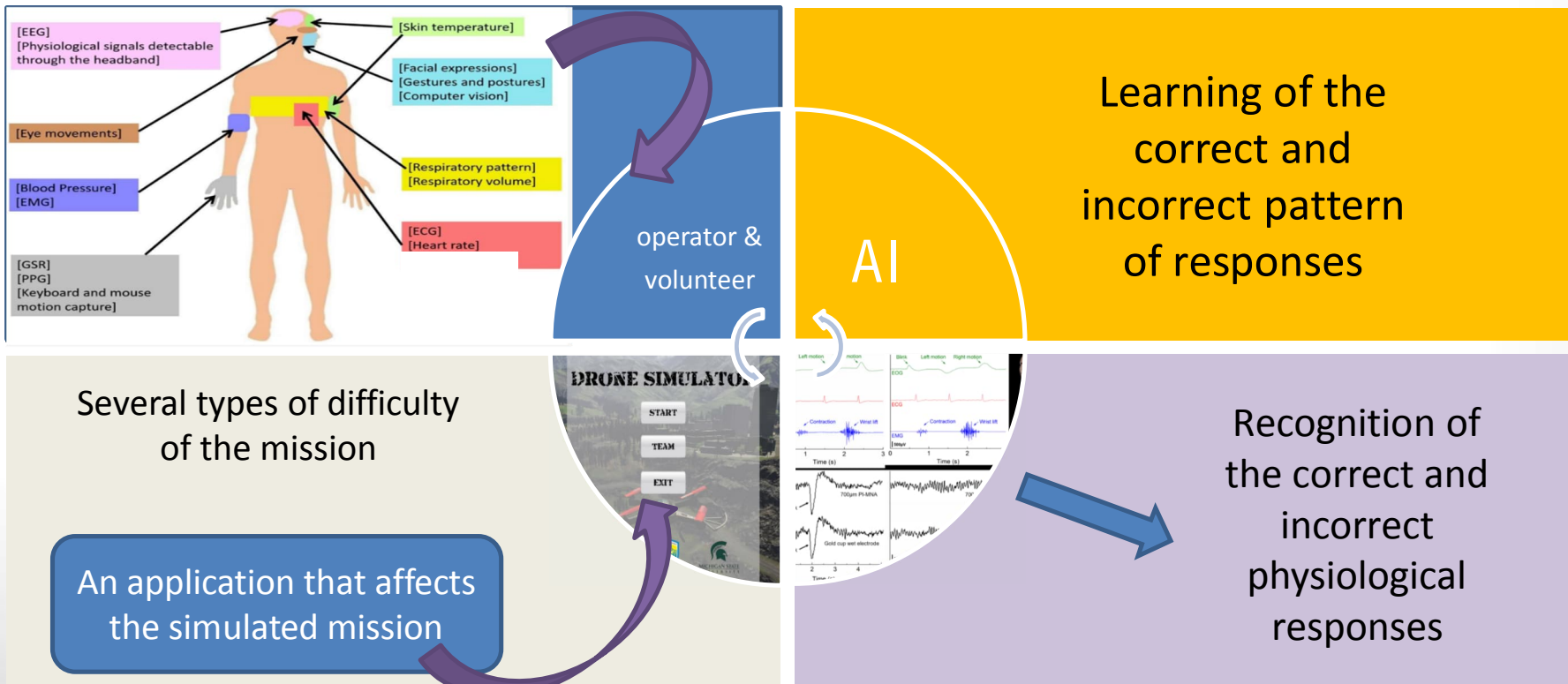| #	Organisation	Presenter
9	Military University of Technology	Konrad Wojtowicz

Biometric Border Guard - biobGAI

- *Lt Col Konrad Wojtowicz*

- *konrad.wojtowicz@wat.edu.pl*

- *Military University of Technology, Warsaw, Poland*

- Role: *WP leader*
  - *vehicle data acquisition and processing*
  - *biometric data acquisition and processing*

- Proposal activity: *CL3-2023-BM-01-01: Capabilities for border surveillance and situational awareness*
  CL3-2024-BM-01-01: Interoperability for border and maritime surveillance and situational awareness

![SMI2G logo]

Border guard vehicle simulation environment for data acquisition and operator evaluation

- *Vehicle data processing for AI driven mission management system*
- *Biometric data processing for AI driven mission customization and operator evaluation*

[EEG]
[Physiological signals detectable through the headband]

[Skin temperature]

[Facial expressions]
[Gestures and postures]
[Computer vision]

[Eye movements]

[Respiratory pattern]
[Respiratory volume]

[Blood Pressure]
[EMG]

[ECG]
[Heart rate]

[GSR]
[PPG]
[Keyboard and mouse motion capture]

operator & volunteer

AI

Learning of the correct and incorrect pattern of responses

Several types of difficulty of the mission

DRONE SIMULATOR

START

TEAM

EXIT

Recognition of the correct and incorrect physiological responses

An application that affects the simulated mission

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Lt Col Konrad Wojtowicz, konrad.wojtowicz@wat.edu.pl

Project participants

- Existing consortium:
  - Partners / Other participants:
    - **Hellenic Air Force Academy, Greece**
      - **flight data acquisition**
      - **flight data processing to feed AI engine**
    - **Military Technical Academy, Romania**
      - **biometric data acquisition and processing**
      - **data processing and AI**
    - **Open University Cyprus**
      - **comprehensive simulation engine**
- Looking for partners with the following expertise/ technology/ application field:
  - Coordinator: *industry partner*
  - *Industry partners: UAV, AI, VR, simulation, biometric*
  - *End Users: Border Guard, Military, Security Service*

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BM-01-01

Capabilities for border surveillance and situational awareness

#	Organisation	Presenter
10	Turkish Coast Guard Command	Ismail Ilgar

Turkish Coast Guard Command
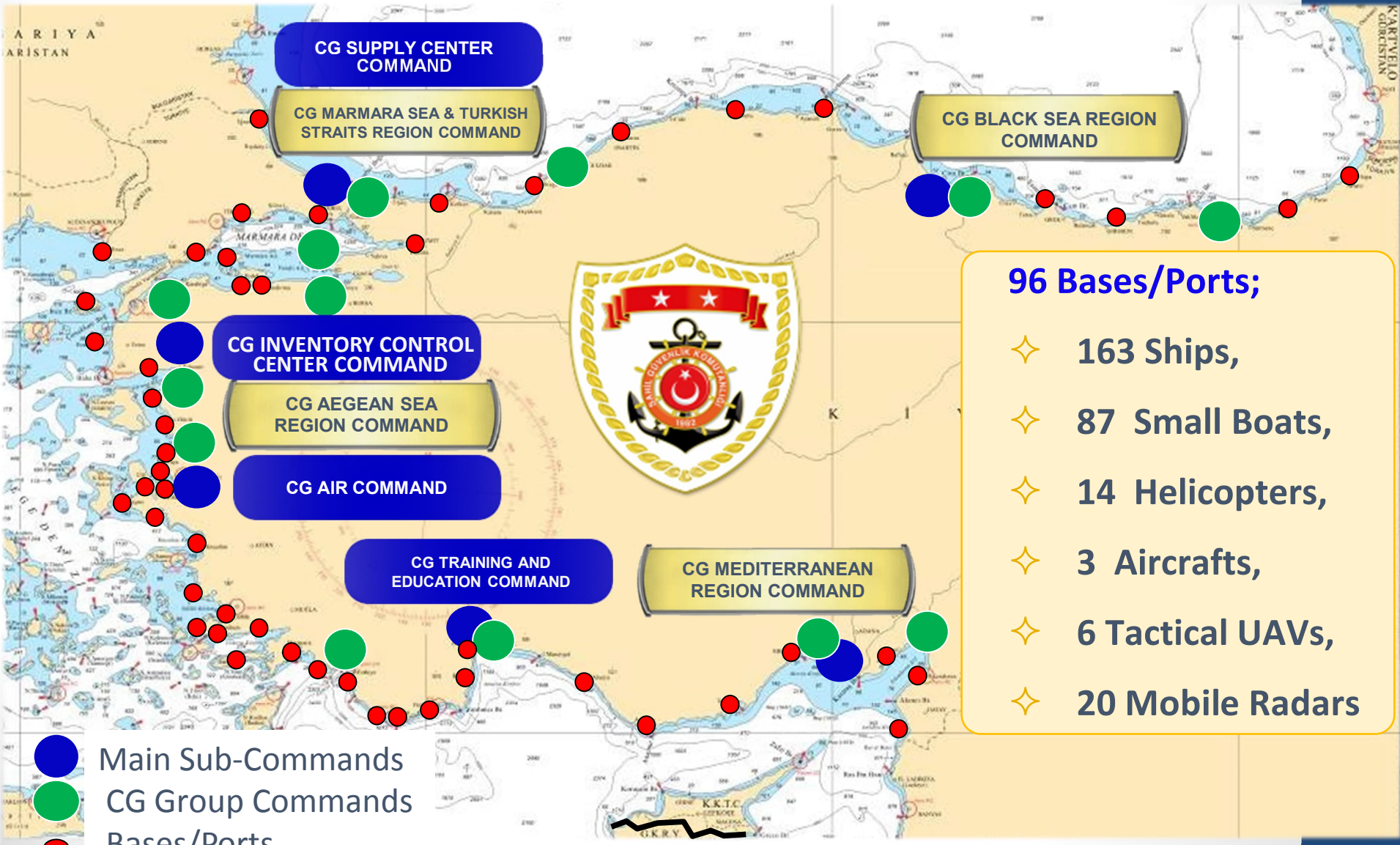
Captain (CG) İSMAİL ILGAR

Turkish Coast Guard Command

diab@sg.gov.tr/iilgar@sg.gov.tr

Role: *Proposal coordinator, WP leader*

- Proposal activity:
  - HORIZON-CL3-2023-BM-01-01: Capabilities for border surveillance and situational awareness
  - HORIZON-CL3-2024-BM-01-01: Interoperability for border and maritime surveillance and situational awareness
  - Fighting Crimes and Terrorism Calls (2023-2024)
  - Border Management Calls (2023-2024)
  - HORIZON EIC-2023 HUMANITARIAN-PRIZES-05

Assets and Deployment

CG SUPPLY CENTER COMMAND

CG MARMARA SEA & TURKISH STRAITS REGION COMMAND

CG BLACK SEA REGION COMMAND

CG INVENTORY CONTROL CENTER COMMAND

CG AEGEAN SEA REGION COMMAND

CG AIR COMMAND

CG TRAINING AND EDUCATION COMMAND

CG MEDITERRANEAN REGION COMMAND

96 Bases/Ports;

- ✧ **163 Ships,**
- ✧ **87 Small Boats,**
- ✧ **14 Helicopters,**
- ✧ **3 Aircrafts,**
- ✧ **6 Tactical UAVs,**
- ✧ **20 Mobile Radars**

● Main Sub-Commands
● CG Group Commands
● Bases/Ports

Related Content (Main Missions)

- **Search and Rescue**

- **Struggling against Irregular Migration**

- **Ensuring Maritime Security**

İsmail Ilgar, diab@sg.gov.tr/*iilgar@sg.gov.tr*

Projects with Related Content

- **Coast Guard Management System Project**
    - *Includes detection and identification of tracks,*
    - *With radar and day/night visual systems,*
    - *In the coastal and offshore areas,*
    - *With 95% coverage in territorial waters.*

- **A Semi-Autonomous Sea Vehicle Development Project**
    - *Aims to enhance the interception capability.*

- **The Procurement of the Remotely Operated Underwater Vehicles (ROV)**
    - *Increases the underwater search, scanning, detection and identification capabilities.*

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BM-01-02

Identify, inspect, neutralize Unexploded Ordnance (UXO) at sea

#	Organisation	Presenter
11	ForceApp BV	Ioannis Margaritis

ROBFIDES

- *Ioannis Margaritis*

- *info@forceapp.eu*

- *ForceApp BV*

- Role: *Proposal coordinator*

- Proposal activity: *HORIZON-CL3-2023-BM-01-02*

"Intelligent Monitoring of UXOs: Robotic Fishes to identify Unexploded Ordnance at sea "

1

ROBFIDES

Robotic Fishes of modular type (sensors carried in accordance with the mission)

- *UXO Detection [close distance images transmission – positive recognition – geo UXO database update]*
- *UXO identification [image processing process]*
- *UXO classification [comparative analysis through historical data database]*
- *UXO assessment [Subsea dynamic laser scanners – acoustic & ultrasound sensors]*

SAT IoT connectivity

Ultrasound connectivity
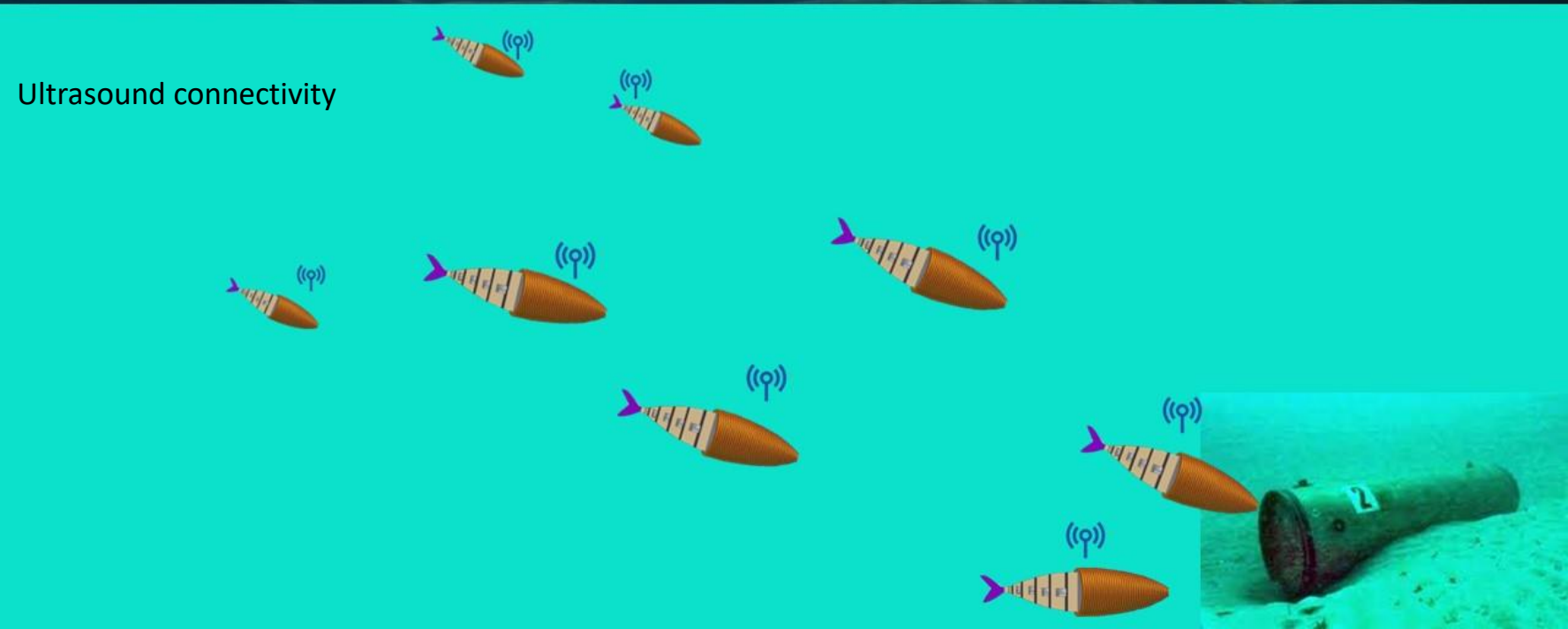
Georeferenced UXO information database

Historical Data
(focusing on bombs dropping history, mine disposal, types of ammunition etc.)

Database update

Web based platform

Data Fusion
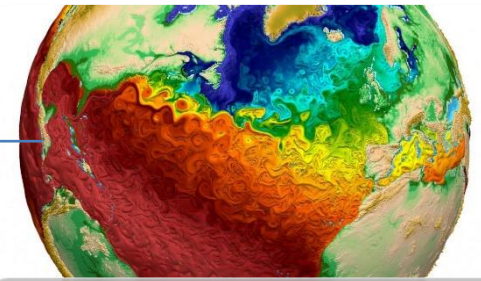
Prediction model

Environmental data
(focusing on sea currents, sea temperature)

Marine traffic data
(focused on dredgers, fishing boats)

Seabed mapping data

Project participants

- Existing consortium:
  - Proposed coordinator: *FORCEAPP BV*
  - Partners / Other participants: *Regional stakeholders in Greece, EO data specialists, AI/ML experts, SaT IoT providers, potential shipbuilders*

- Looking for partners with the following expertise/ technology/ application field:
  - *At least 2 Border or Coast Guard Authorities from at least 2 different EU Member States or Associated countries*
  - *Municipalities / regional authorities in other EU Member states*
  - *Relevant academic partners*
  - *Industry partners (maritime operations)*
  - *International organisations (e.g., International Maritime Organization (IMO), UN)*

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ForceApp BV

BM-01-02

Identify, inspect, neutralize Unexploded Ordnance (UXO) at sea

#	Organisation	Presenter
12	Hologarde	Marie Kolago

Preliminary proposal name: UXO SMART-DETECT

- *Name of the speaker : Yvan TRUPCEVIC / Marie KOLAGO*

- *Mail: Marie.Kolago@adp.fr*

- *Company: HOLOGARDE, Groupe ADP*

- *Role: project coordinator or WP leader (both options possible)*

- **Proposal activity: CL3 – BM – 01-02: "Identify, inspect, neutralise Unexploded Ordnance (UXO) at sea"**
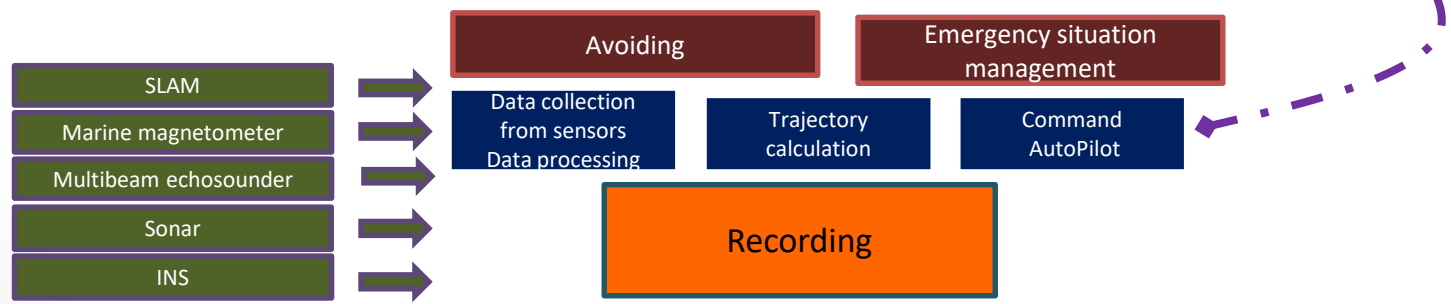
1

Proposal idea/content:

- *Description of the proposed project: **increasing automatization of UXO detection process & its reliability***
  - *Operational environment of the solution will focus on a **depth up to 600 meters** (so as to include submarines in the security risk)*
  - ***The solution will incorporate IA** to allow (i.) data processing in real-time & (ii.) increased detection capacity*
  - *Possibility to use the existing **UHV MANTA** (unmanned hybrid vehicle, designed by Marine Tech) as part of use-cases:*
    - *Initially designed for bathymetry*
    - *Now, dual-use UHV (both for civil, security & military purposes)*
    - *Agnosticity: capacity to incorporate a variety of sensors.*

  - ***Suggested use-case**: increasing UHV MANTA decision-making autonomy in underwater environment up to the 600m-depth targeted.*

- *Increasing **UHV** decision-making autonomy:*

  - *Current status: no possibility of live-time communication with UHVs due to depth constraint, therefore **autonomy is required** to achieve **UXO detection missions with improved capacities** ;*

  - *Incorporation of IA (SLAM) in the solution aims at **allowing UHV decision-making capacity regarding mission outcomes** (continue / avoiding obstacle / autopilot / selection of appropriate actions to identify, discriminate & mapping the target,...).*

SLAM	
Marine magnetometer	
Multibeam echosounder	
Sonar	
INS	

Avoiding

Emergency situation management

Data collection from sensors
Data processing

Trajectory calculation

Command AutoPilot

Recording

3

Hologarde-Marine Tech_marie.kolago@adp.fr

Project participants

- *Existing consortium:*
  - *Proposed coordinator: Hologarde – Groupe ADP*
  - *Partners / Other participants: Marine Tech (French partner, confirmed so far):*
    - *MARINE TECH: design & manufacturing of autonomous underwater vehicles (AUVs)*
    - *HOLOGARDE: C2 software, management of air traffic in low & very low-level airspace.*
- *Looking for partners with the following expertise/ technology:*
  - ***UXO threat & risk assessment*** *expertise,*
  - ***Underwater UXO depollution operations*** *(private company or Navies),*
  - *Sensors' providers: mostly **photogrammetic measuring cameras** with **SLAM**.*
- *Come & join us!*

BM-01-04

Interoperability of systems and equipment at tactical level; between equipment and databases; and/or between databases of threats and materials

#	Organisation	Presenter
13	DBC diadikasia	Nikos Avgerinos

Intelligent pan-European customs dataspace (C-SPACE)

- **Name of proposer/speaker:** *Nikos Avgerinos*
- **E-mail:** *navgerinos@diadikasia.gr*
- **Organisation:** *Diadikasia Business Consulting - DBC*
- **Role:** *Proposal coordinator*

- Proposal activity: *CL3-2023-BM-01-04: Interoperability of systems and equipment at tactical level; between equipment and databases; and/or between databases of threats and materials*

Intelligent pan-European customs dataspace (C-SPACE)

- *Introducing an integrated European approach to customs risk and e-commerce management that promotes compliance and introduces an "acting as one" customs authorities setup.*

- *Harmonised exchange of information on the basis of internally accepted data models and message formats.*

- *Reengineering of customs and customs related processes to enhance their efficiency, effectiveness and uniform application.*

- *Offer to operators services to be able to interact in the same way with the customs authorities of any Member State.*

- *Enhance cooperation between customs and security and border management authorities and synergies between their information systems.*

- *Development of security policies which demand more personal data to be provided, customs, like other authorities, will have to deal with that and with issues such as privacy.*

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Intelligent pan-European customs dataspace (C-SPACE)

- Existing consortium:
  - Proposed coordinator: *DBC (Greece)*
  - Partners / Other participants: *Customs, LEAs, technology providers. Countries: Greece, Denmark, France, Slovenia (tbc), Ireland (tbc).*

- Looking for partners with the following expertise/ technology/ application field:
  - *Standardisation*
  - *Spectroscopy*
  - *Custom equipment suppliers*
  - *Additional customs, border authorities to offer pilots*

Nikos Avgerinos navgerinos@diadikasia.gr

At 10:30 – 11:30

Coffee and Brokerage SSRI & BM