

exail



**OPTIMISING SOFTWARE  
INTEGRATION FOR  
AUTONOMOUS SYSTEMS  
WITHIN A HYBRID ENVIRONMENT**



# exail

- › Leading high-tech industrial group
- › Specializing in cutting-edge robotics, maritime, navigation, aerospace and photonics technologies.
- › Expanding customer's capabilities with a full range of robust in-house manufactured components, products and systems.
- › Employing a workforce of 1800 people worldwide
- › Global footprint and presence in 80+ countries.

**exail** =  **ECA GROUP** + **iXblue**

Exail was formed by ECA Group and iXblue joining forces in 2022. It is a subsidiary of Groupe Gorgé, a family-owned company specialized in high-technology.

# Stronger together

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**1800+**

EMPLOYEES

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**280+**

MILLIONS D'EUROS  
DE CHIFFRE D'AFFAIRE

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**20+**

% DU CHIFFRE D'AFFAIRE  
INVESTI EN R&D

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**80%**

DU CHIFFRE D'AFFAIRE  
REALISE A L'EXPORT



**SUPPORT**

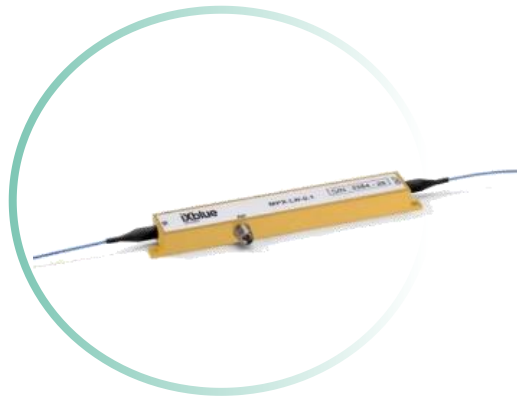
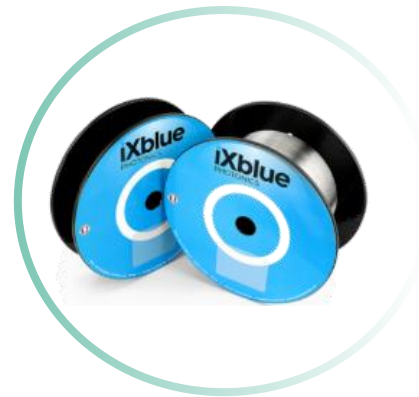
**exail**



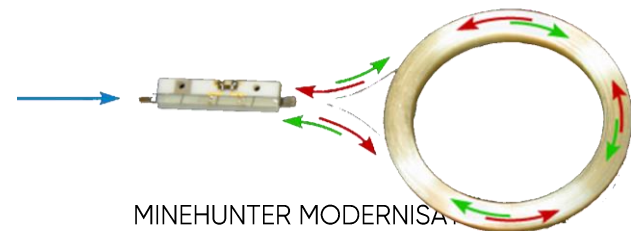
# From components to complex systems

## Components

> Fiber, Optic & Acc



5



MINEHUNTER MODERNISA

## Products/sensors

> Navigation



> Quantum technology / Gravimeter



> Simulator



> Subsea Positioning / Sonar

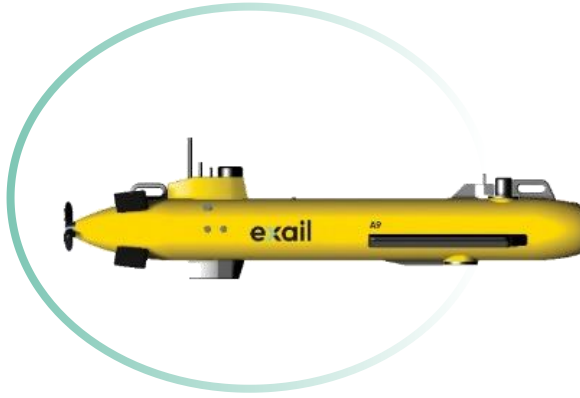


## Platforms

> Unmanned Surface Vehicles



> Unmanned Underwater Vehicles

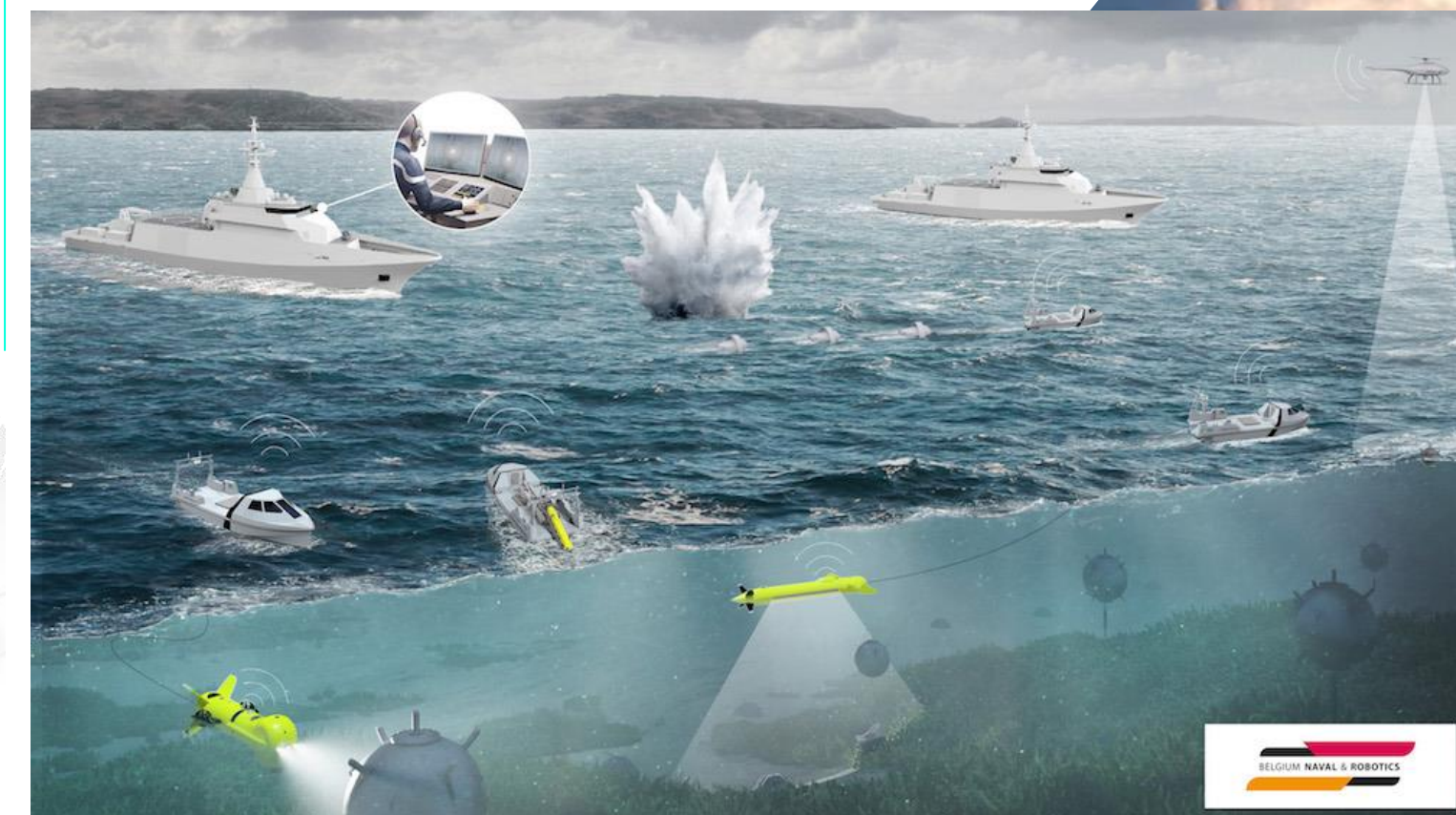
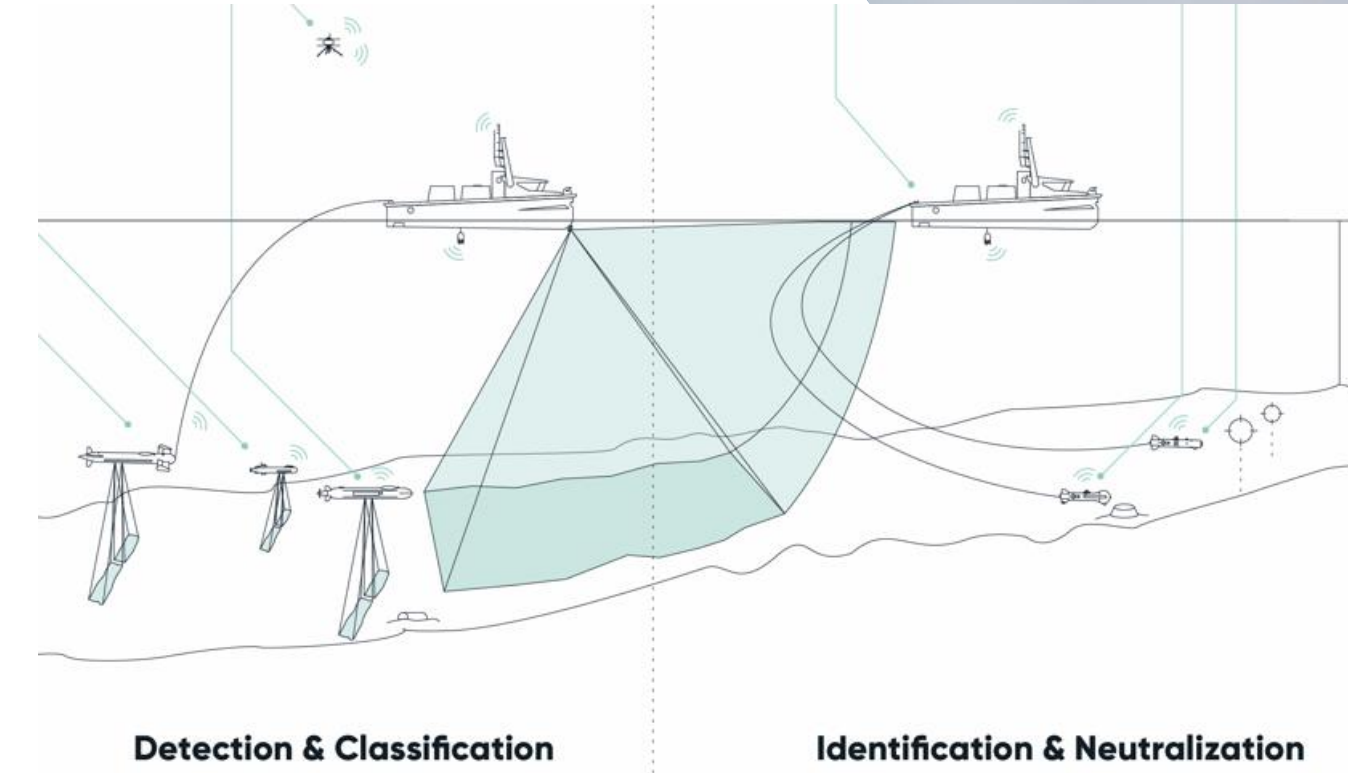


> Unmanned ground Vehicles



## Integrated Systems

> Hydrography and MCM





# > rMCM Toolbox

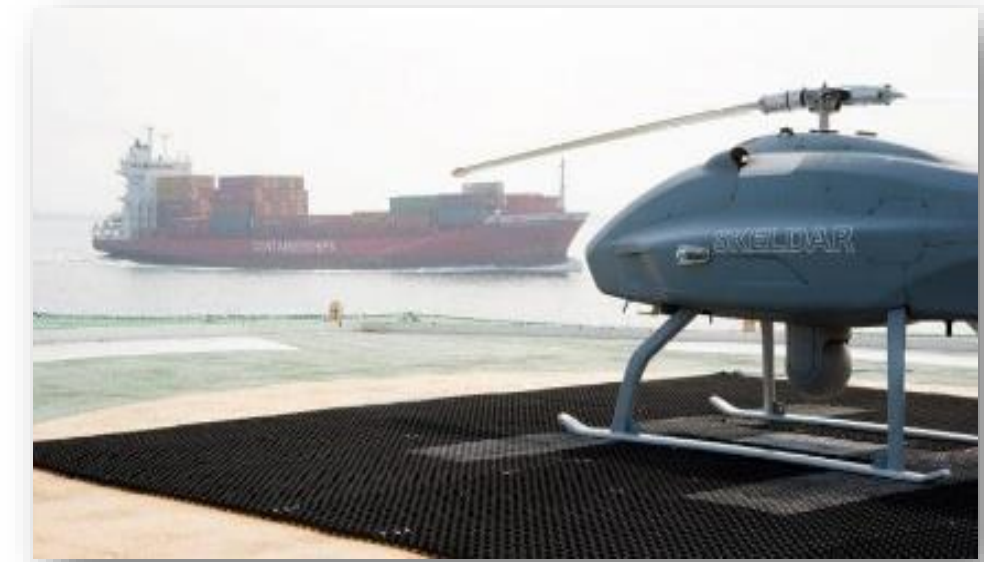
Toolbox Drones overview



> Drone Carrier Vessel  
MCM Mother Ship



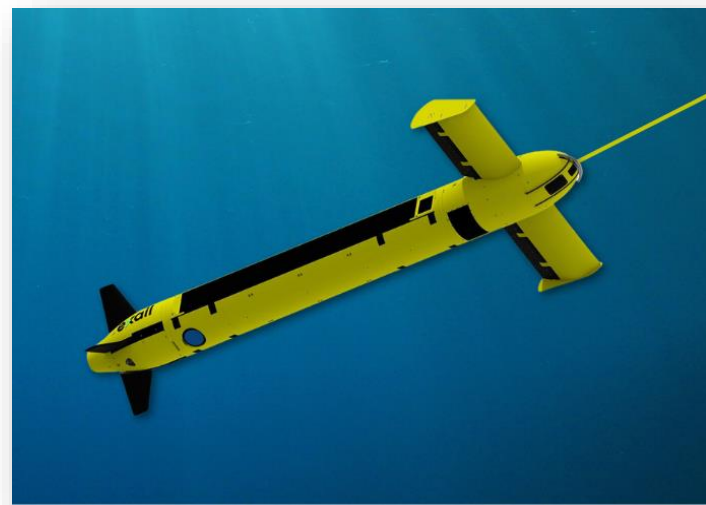
> 2x Inspector 125 surface USV



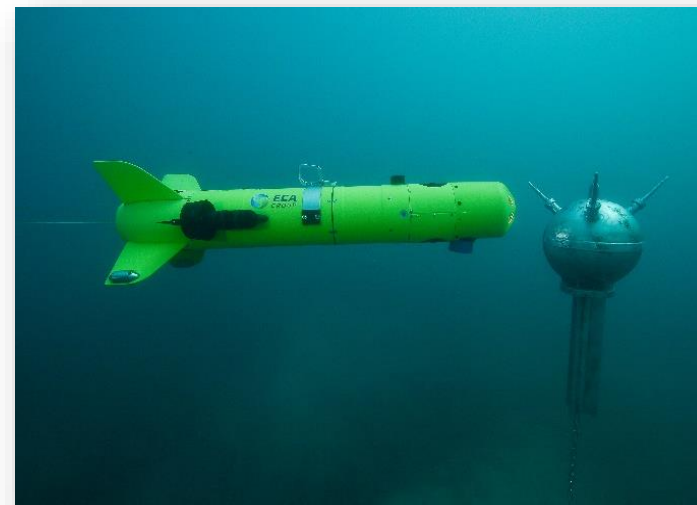
> 2x UMS Skeldar V200 UAV



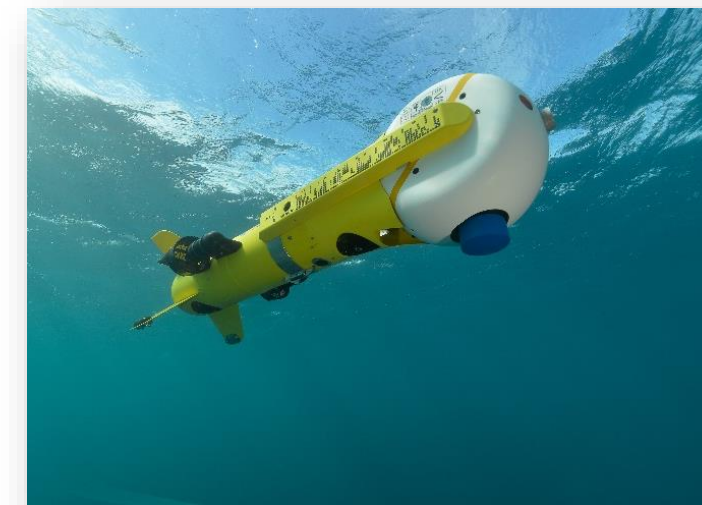
> 3x A18-M AUV



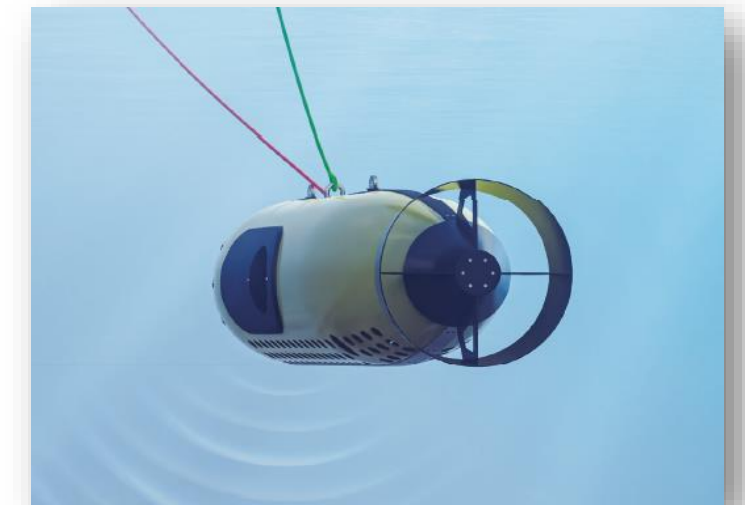
> 2x T18-M Towed sonar



> 4x SeaScan ROV  
(identification)



> 40x K-Ster C ROV  
(minekiller)



> 1x Patria Multi influence  
sweep



# ➤ Software integration platform

- Testing and evaluation of embedded and surface software
- Representation of equipment onboard MCMV
- Drone farm to operate all software on the vehicles
- Mix of virtual and real environment
- Dynamic simulator to animate drones



# ➤ Challenges

- Not simply testing vehicle but a complex integrated system
- Software development multi domain & multi site
- Improve integration time and cost between sub-system integration
- Regular connection of all pieces of complex puzzle
- Confronting software to environment hardware as early as possible
- Visibility for client on software development



## ➤ Accelerating maturity

- Using simulation as a means of validation of software
- Confronting system to difficult conditions (environmental, operational, failure...)
- Reducing errors through extensive simulated testing
- Through radio link to testing area at sea optimization of development teams time
- Learning through simulation how to enhance vehicle performance
- Being as mature as possible before taking drones to sea

# ➤ Inspection vehicle simulated test

CoMMI - Profil ROV - Campaign: Demo18

**User Data**

Latitude	Longitude	Depth (m)
42.99079473	6.26768869	49

**External Data**

Target ID:

**User insert a target**

**Sonar Datas**

Mission:

Id	Confidence

**System state : OFF**

Ship distance: 0.0 m    Waypoint distance: ... m    Target distance: ... m

Ship bearing: 90 °    Waypoint bearing: ... °    Target bearing: ... °

Cable paid out: ... m 300 330 000 030 060    Speed (STW): 0.0 kt

**MapTree**

- Vector charts
- Raster charts
- Cartographic objects
- Mission objects
- Current mission objects
- Replay tracks
- Mobiles
  - Ship
  - ROV\_EMDS
  - MILCO

**Light**

Battery: 100%

F.O. Link: PORT

Heading: 000 °

Yaw rate: 0.0 °/s

Depth: 0.0 m

Altitude: 49.1 m

Speed: 0.0 kts

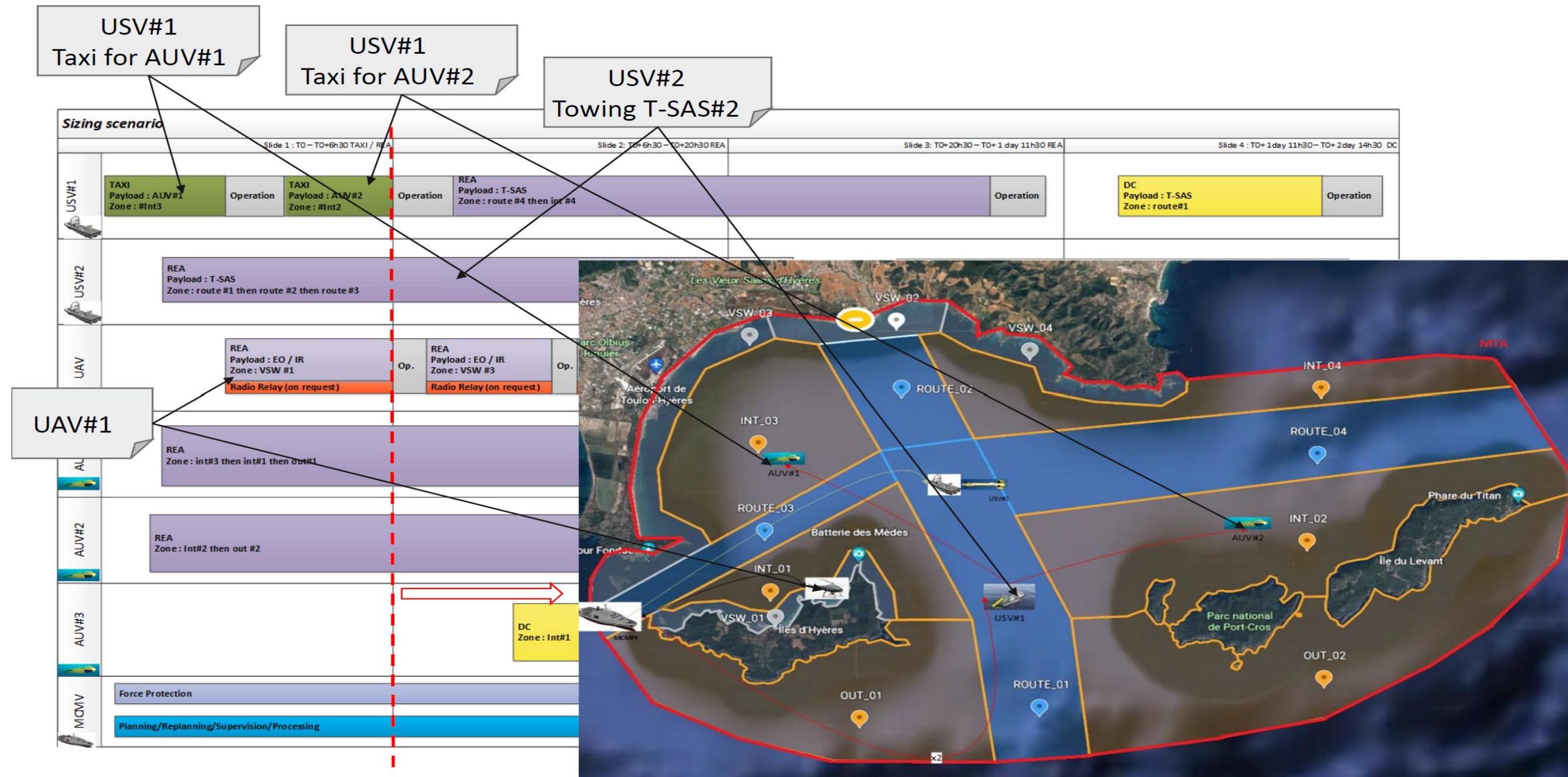
Hovering: OFF

PREV MODE (F1)    NEXT MODE (PRERUN) (F2)    VIEW ... (F3)    CTRL (F4)    RANGE (F5)    SELECT (F6)    GAIN (F7)    SCAN RATE/FREQ (F8)    STATE (F9)    TILT (F10)



# ➤ Sizing scenario and training

- Defining a mission to test system performance
- Environment of mission area completely modelised
- Reference given as 21 day mission using up to 11 drones simultaneously





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