



EUSATfinder initiative to support emergency scenarios

zeroEmission
MEDITERRANEAN
TRENDS & EXPOFORUM

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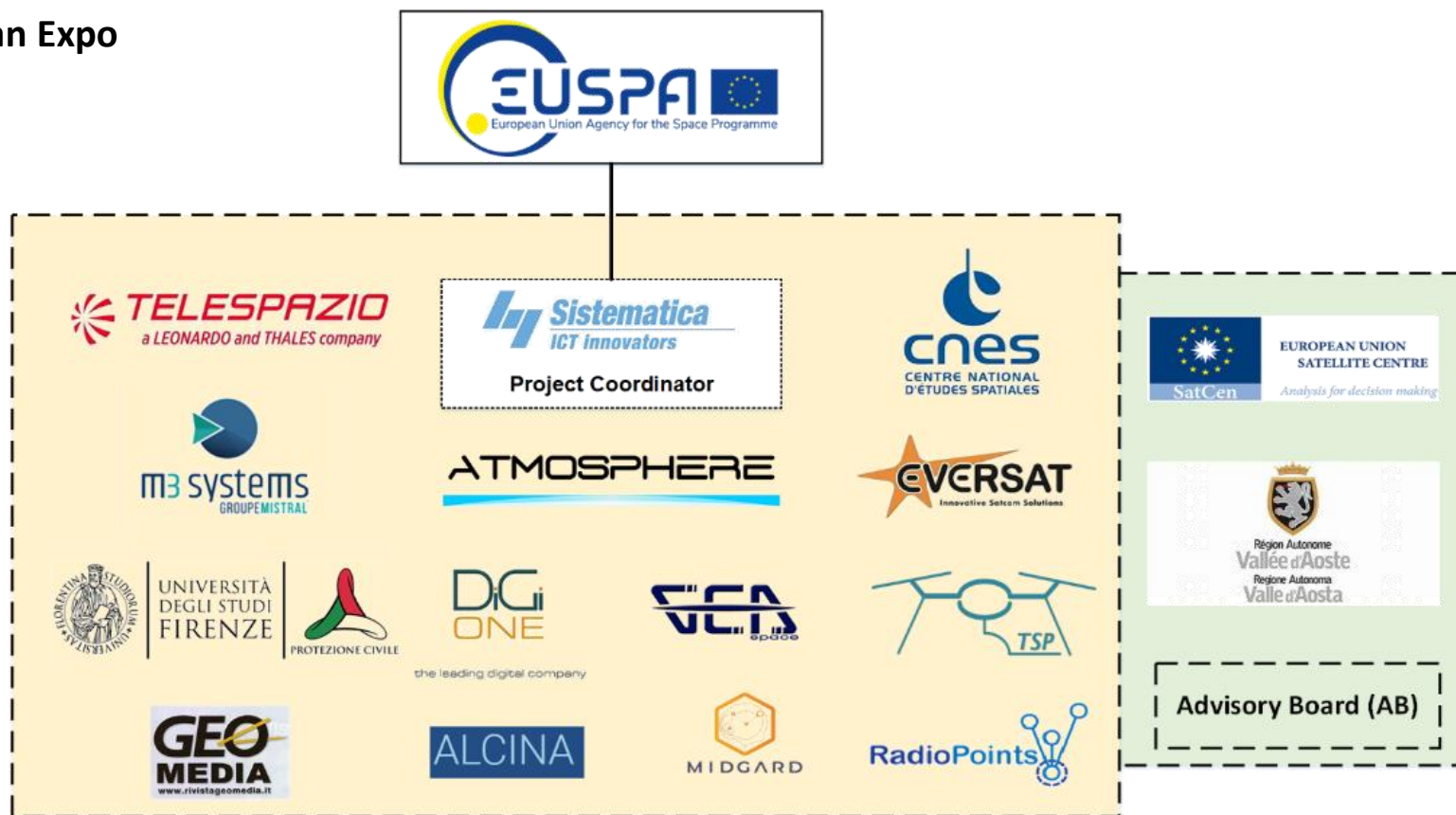
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Why Space Technology for the Green Transition?

The Sustainability Challenge



Climate change accelerates extreme weather events across the Mediterranean



Renewable energy assets span vast, often remote or offshore areas



Environmental monitoring demands continuous, wide-area data coverage



Disaster response at energy sites needs real-time situational data



Traditional ground monitoring fails when infrastructure is destroyed

The Space Solution



Satellite EO covers entire regions in near-real-time at global scale



Drones perform close-range inspection of individual energy assets



SATCOM maintains communications when all terrestrial networks are offline



Copernicus delivers standardised, free environmental data services



Integrated space-ground systems close every remaining monitoring gap

EUSATfinder & the Zero Emission Mediterranean Expo

Positioning EUSATfinder at the Green Nexus

The Zero Emission Mediterranean Expo brings together leaders in clean energy, sustainability policy and innovative technology. EUSATfinder presents a compelling space-based toolset directly applicable to the green transition:

Climate & Env. Monitoring



Satellite + drone data fusion tracks land cover, glacier retreat, and ecosystem changes linked to renewable site selection

Energy Infrastructure Safety



Real-time surveillance of wind farms, solar parks, and grid corridors during extreme weather or emergency events

Mediterranean Basin Focus



Supports cross-border environmental governance among coastal EU & partner nations — tracking marine pollution, deforestation, and drought

GOVSATCOM for Green Ops



Secure government satellite channels guarantee mission continuity for emergency responders at renewable energy disaster sites

Renewable Energy & Sustainability Use Cases

01



Wind Farm Surveillance

BVLOS drones with SATCOM connectivity perform automated long-range inspection of offshore and onshore wind turbines. The BOREAL system covers up to 1,000 km in a single 10h mission, detecting structural anomalies and environmental encroachment without human intervention on the ground.

02



Solar Park Monitoring & Grid Emergency

Satellite EO + drone photogrammetry generates high-resolution 3D maps and orthophotos of large-scale solar parks. When extreme weather strikes or grid infrastructure is damaged, the MOC deploys to the site maintaining communications and coordinating rapid repair teams.

03



Environmental & Ecological Impact Assessment

Copernicus EMS/CLMS services, Sentinel-2/Landsat optical data, and in-situ drone observations combine to produce ecological baseline maps for renewable project Environmental Impact Assessments (EIAs) and ongoing operational compliance monitoring.

04



Coastal & Marine Monitoring (Mediterranean)

Ground motion mapping (Copernicus EGMS/Sentinel-1 SAR), marine pollution detection, and coastal erosion tracking support offshore wind and tidal energy sites across the Mediterranean basin, informing coastal zone management and zero-emission maritime operations.

Emergency Scenarios



Being able to **transmit images and videos directly from the field**, immediately after a survey, is crucial for real-time analysis and response in critical areas. However, data transmission poses significant challenges, especially in mountainous regions. Cellular networks or other data connections are often unreliable or unavailable in remote, rugged areas, which can lead to delays in sharing essential information with decision-makers. Overcoming these transmission limitations is key to ensuring that **detailed data from the field reaches experts quickly**, allowing them to make timely assessments and respond effectively to potential hazards.

- **Technology-Driven Operations:** Emphasis on secure communication, data processing, and drone support reflects modern disaster management trends.
- **Communication Infrastructure Needs:** Reliability, coverage, and security top, with satellite communication playing a pivotal role.
- **Integrated Management Platforms:** Need for user-friendly, multi-platform tools with robust data fusion and decision support capabilities.
- **Operational Versatility:** Interest in supporting activities across data analysis, field operations, and monitoring highlights the multi-faceted nature of disaster management.



Context

- **Diversity of main involved entities/roles/services (e.g. technical/medical rescue, social care, firefighting, police, etc.) and typical communication channels**

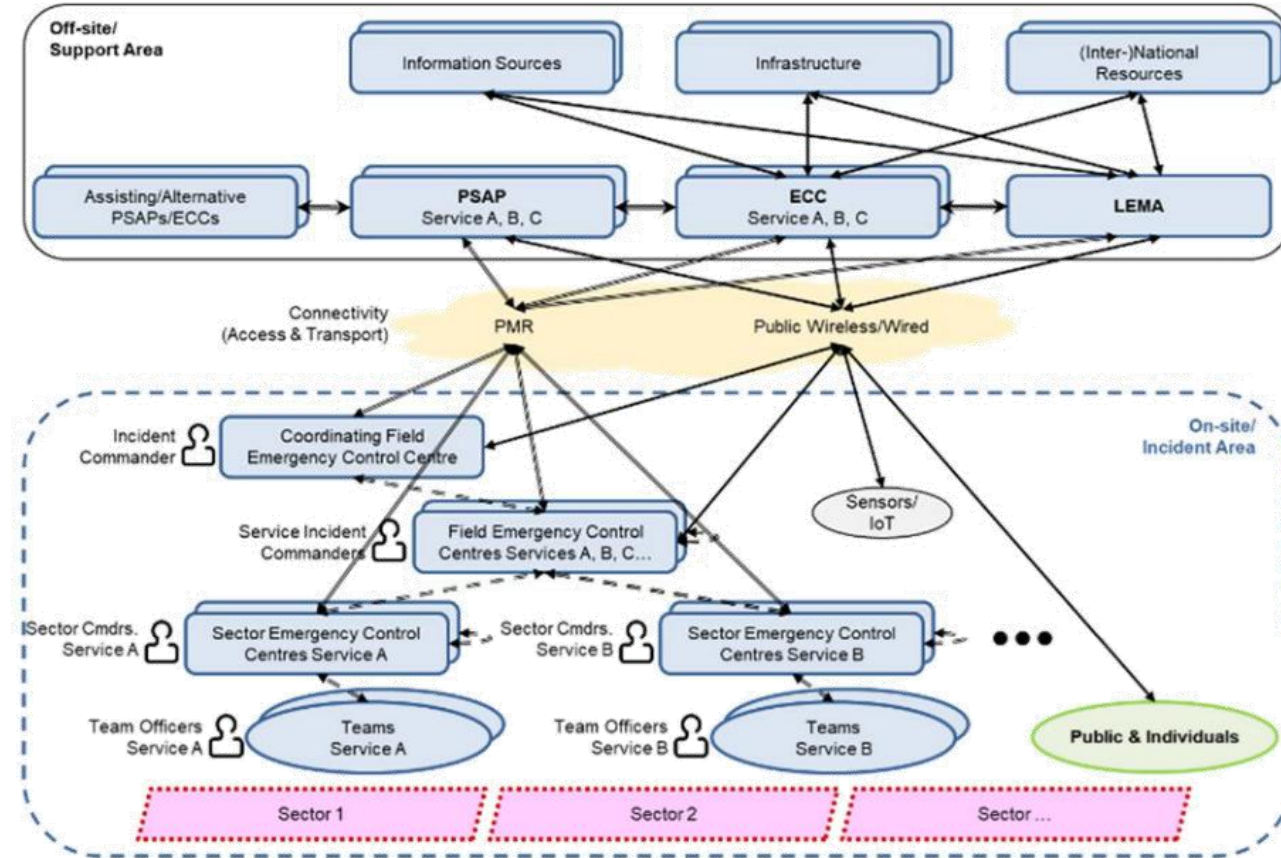
Emergency services may combine two or more disciplines (e.g. technical rescue and emergency medical service) within the same command hierarchy. This applies to Public Safety Answering Points (**PSAPs**) and Emergency Control Centres (**ECCs**) in the background support area, too. The coordinating on-site incident command can be subject to individuals or task forces.

- **On site/ Incident area**

Each deployed emergency service may have its own hierarchy structure in the incident area consisting of teams, sector commands, and a service incident command. Infrastructure set-ups are largely common for emergency and disaster management approaches in many countries, but there are also various regional differences (legislation).

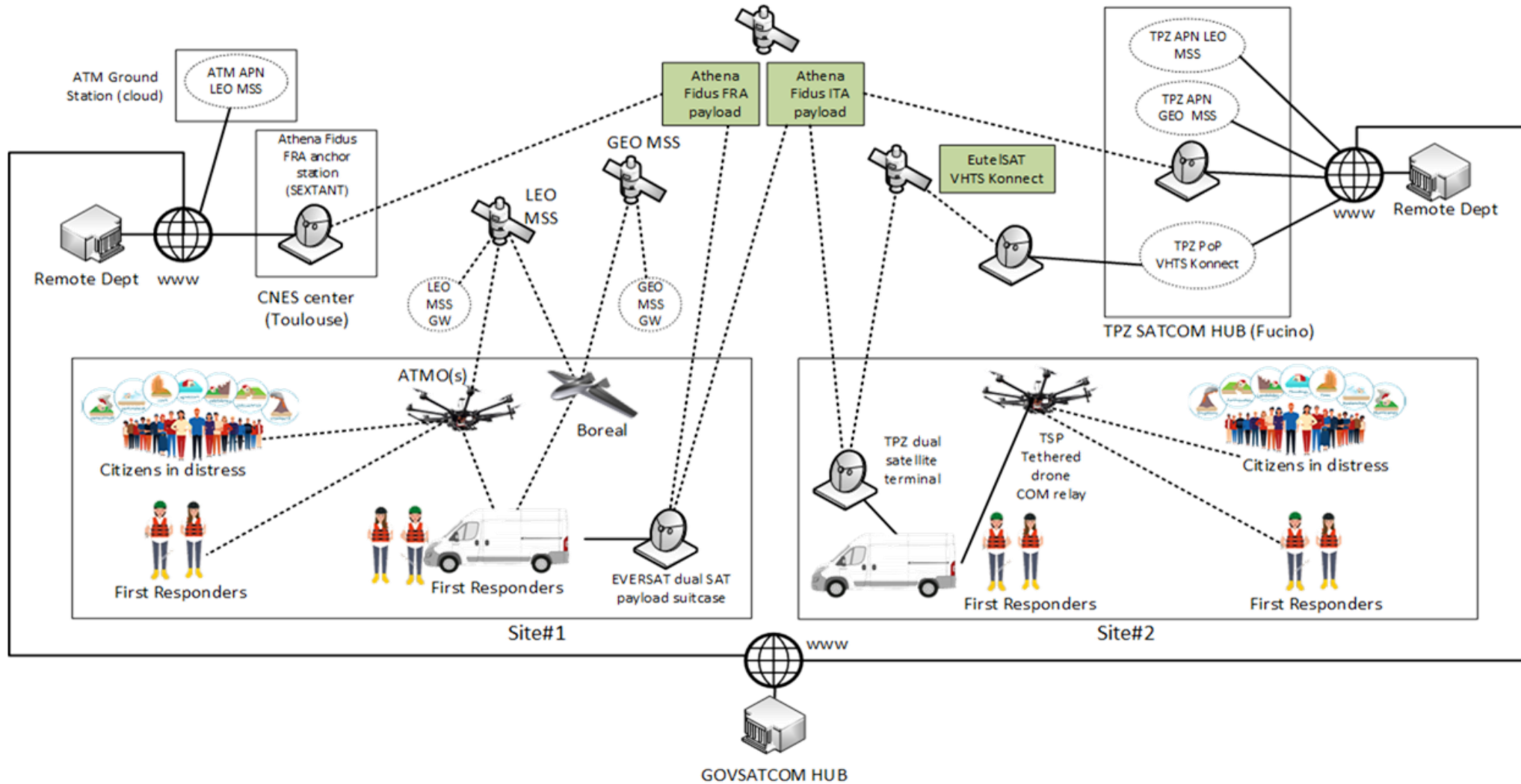
- **Off-site/ Support area**

Covers support, e.g. hospitals, shelters, technical equipment, materials, external services.



Source: ETSI TR 102 445 V1.2.1 (2023-04) Emergency Communications (EMTEL);
Overview of Emergency Communications Network Resilience and Preparedness

EUSATfinder connectivity



SATCOM services under test in EUSATfinder

	Inmarsat SwiftBroadband	Iridium Certus	Eutelsat Konnect	Athena-Fidus (Italian Payload)	Athena-Fidus (French Payload)
Operator	Inmarsat	Iridium Communications	Eutelsat Communications	ASI + Segredifesa (Italy)	CNES + DGA (France)
Orbit Type	GEO (~35,786 km)	LEO (~780 km)	GEO (~35,786 km)	GEO (~35,786 km)	GEO (~35,786 km)
Satellite Platform	I-4 / I-6	Iridium NEXT	Spacebus NEO	Spacebus 4000B2	Spacebus 4000B2
Service category	MSS – Mobile Satellite Service	MSS – Mobile Satellite Service	FSS – Fixed Satellite Service	FSS – Fixed Satellite Service	FSS – Fixed Satellite Service
Frequency Band	L-band	L-band (user), Ka-band (crosslinks)	Ka-band	Ka-band (encrypted)	Ka-band (encrypted)
Coverage	Global (except polar regions)	Truly global (including poles)	Europe, Africa, Middle East	Italy + operational theaters	France + operational theaters
Beam Architecture	Regional beams	Dynamic LEO footprint	Spot beams (~65 in VHTS)	Dedicated beams for Italian users	Dedicated beams for French users
Max Throughput	~432 kbps per channel (~1 Mbps aggregated)	Up to 704 kbps (Certus 700)	75 Gbps (Konnect), 500 Gbps (Konnect VHTS)	~1.5 Gbps	~1.5 Gbps
Latency	~600 ms	~30–50 ms	~600 ms	~600 ms	~600 ms
Security Level	AES encryption, VPN	AES encryption, mesh routing	Commercial-grade encryption	NATO-grade encryption, secure IP	NATO-grade encryption, secure IP
Mobility Support	Aviation (incl. UAV), maritime, land mobile	Aviation (incl. UAV), maritime, land mobile	Fixed/mobile VSAT terminals	Military-grade terminals	Military-grade terminals
Polar Coverage	✗ No	☑ Yes	✗ No	✗ No	✗ No
Primary Use Cases	In-flight connectivity, maritime broadband	Voice/data, IoT, emergency, UAV telemetry	Rural broadband, emergency backup	Defense, civil protection, emergency ops	Defense, civil protection, emergency ops

GovSatCom – Governmental Satellite Communications

•**Purpose:** To provide secure, reliable satellite communications for EU Member States, civil protection, defense, and diplomatic missions.

•Architecture:

- Based on existing national assets (e.g. Athena-Fidus, SICRAL, Syracuse).
- Shared access model across EU institutions and Member States.

•Key Features:

- Prioritized access during emergencies and crises.
- Interoperability with NATO and national systems.
- Cost-effective pooling of satellite capacity.

•Strategic Role:

- Acts as a transitional solution until IRIS² becomes fully operational.
- Enhances EU sovereignty in secure communications.

IRIS² – Infrastructure for Resilience, Interconnectivity and Security by Satellite

•**Purpose:** To deploy a European constellation for secure, resilient, and global connectivity.

•Timeline:

- **2026–2029:** Satellite deployment phase.
- **2030:** Full operational capability.

•Features:

- Global coverage, including polar regions.
- Services for defense, diplomacy, infrastructure, and commercial use.
- Public-private partnership with European space industry (e.g. Thales, Airbus, SES).

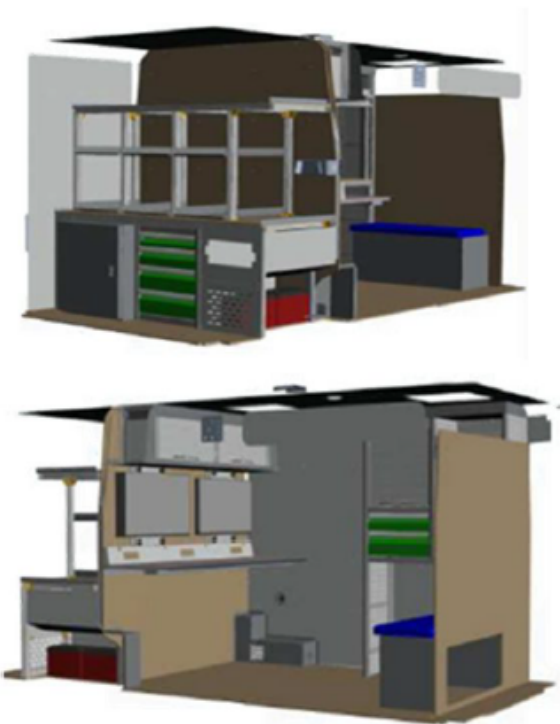
•Compatibility:

- IRIS² will coexist with commercial systems like Starlink, allowing EU Member States to use both without conflict.

Mobile Operation Center (MOC)

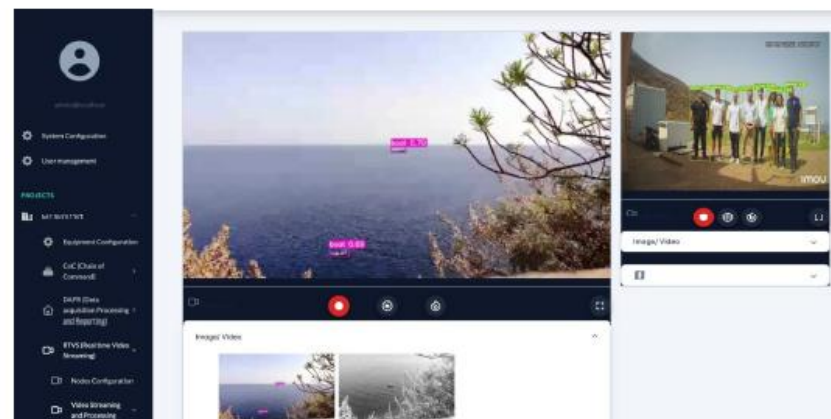
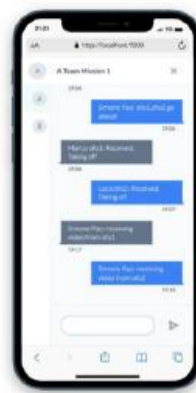
A key component of the EUSATfinder solution is the MOC, which aims to provide an easy-to-deploy on-site center to support first responders' operations efficiently and cost-effectively. The proposed concept comprises a special vehicle equipped with the following assets:

- ✓ A **fleet of drones** selected in number and category (i.e. fixed wings, rotary wings w/ and w/o cable) depending on the type of emergency.
- ✓ **Gateway communications infrastructure** for remote control rooms and external services such as Copernicus and U-space providers, leveraging state-of-the-art links (via satellite or terrestrial if the MOC can be positioned in a covered area).
- ✓ **Secure and independent local M&C communications infrastructure** providing continuous coverage of approximately 10 km as a central backbone available without interruption during real-time operations for first responders in the field and to collect data from environmental sensors launched by the drone fleet.
- ✓ **Ground Mission Segment (GMS) and Ground Control Segment (GCS) to manage the drone fleet.** The mission module will be based on the customization of the legacy product for mission preparation and execution. These modules will be designed to have a single interface with **U-space services** for the entire drone fleet. It includes command and control, telemetry transmission, video transmission and recording, artificial intelligence, mapping algorithms, and 3D reconstruction.
- ✓ **Integrated mapping platform** combining drone and EO data collection (Copernicus EMS CLMS), as well as planning, acquisition, processing, and final reporting processes.



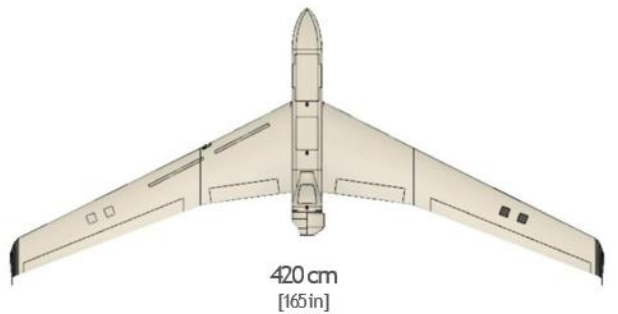
Application Layer concept

- **Decision-Making Operations Center Module (M-COD)** – Off-site, for example located at the First Responder's operations center and potentially integrable with other systems
- **Mobile Operations Center Module (M-COM)** – On-site, for example deployed on a specialized vehicle serving as a remote operations center
- **Mobile Application Module for Operators (M-AMO)** – On-site, for example installed on First Responders' handheld devices
- **Mobile Application Module for Civilian Users (M-AMC)** – Installed on citizens' personal devices after registration



M3Systems drone Boreal

- More than 10 years of expertise on the Boreal UAV
- Manufacturer of Boreal UAV : high endurance fixed wing drone.



8 h
Autonomie
maximum



7 Kg
Maximum charge
utile



Example of mission:

- Maritime surveillance
- Agriculture mapping
- RF direct link up to 100km
- Sarcom integration for command and control or ground retransmission



Tethered Rotary wings UAS

Nowadays, tethered drones are employed across many domains to provide reliable surveillance support.

TSP offers a rotary-wing tethered drone system equipped with point-to-point antennas that can be rapidly deployed in the field:

- **CONTINUITY:** Operates continuously for extended durations thanks to ground power allowing long endurance surveillance operations by day and night.
- **USABILITY:** Robust and quick to deploy, even from a mobile platform like the one shown, providing an effective, persistent surveillance solution.
- **COVERAGE:** Capable of monitoring wide areas several square kilometres and delivering comprehensive situational awareness.
- **SECURITY:** Acts as an integral part of a resilient infrastructure, protected against accidental or intentional threats.



Thank you for your attention

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