

RescEU CBRN-DSIM-IT, an innovative fleet of high-tech vehicles designed to respond to international emergencies

Edoardo Cavalieri d'Oro

A CONSORTIUM OF ITALIAN EXCELLENCE





From Milan to National & International Missions

A journey from our local command to Italy's national fire and rescue system, and from there to European and international emergency response.





The Italian National Fire and Rescue Service

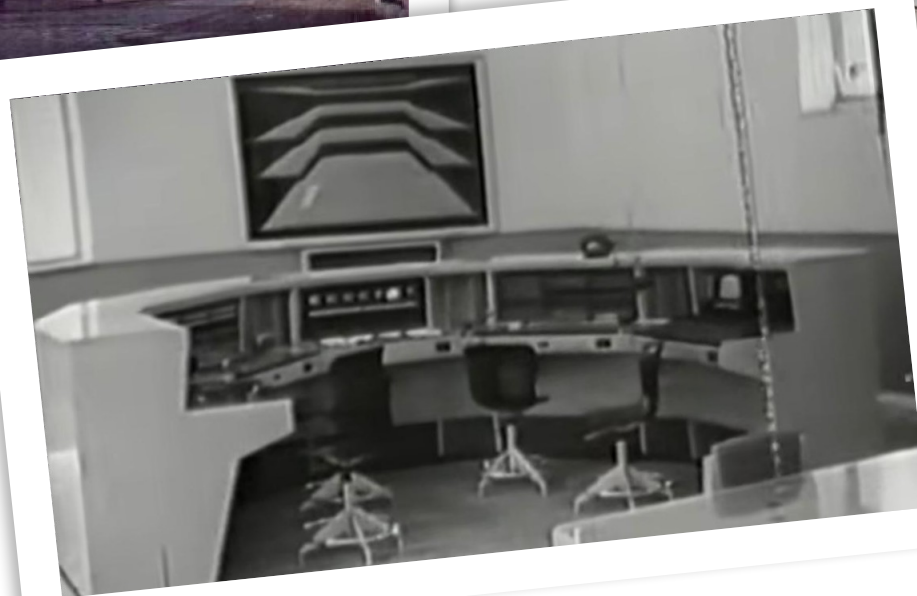
The Corpo Nazionale dei Vigili del Fuoco is Italy's national fire and rescue service, operating under the Ministry of the Interior. It provides rescue, prevention and civil protection support across the country.





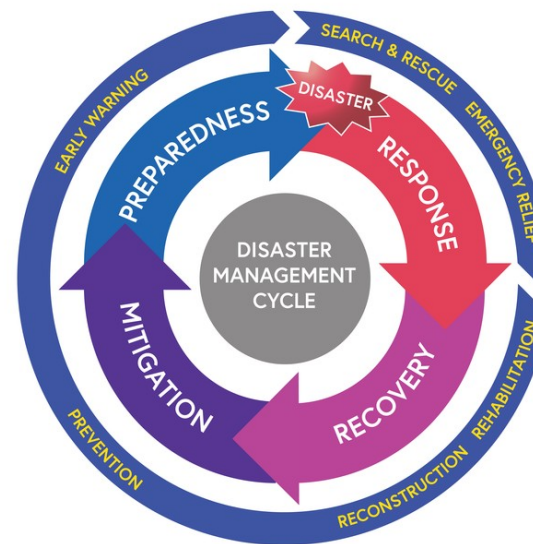
The Milan Fire Command

Milan has a long-standing fire and rescue tradition, combining operational response with innovation, training and technical development.





The CNVVF: A Full-Cycle Emergency Organization



The Italian Fire and Rescue Service covers prevention, preparedness and emergency response within a single national technical system.



The European Civil Protection Framework

The EU Civil Protection Mechanism coordinates assistance from Member States and participating states before, during and after major disasters.

EU Civil Protection Mechanism Activation



EU Civil Protection Mechanism

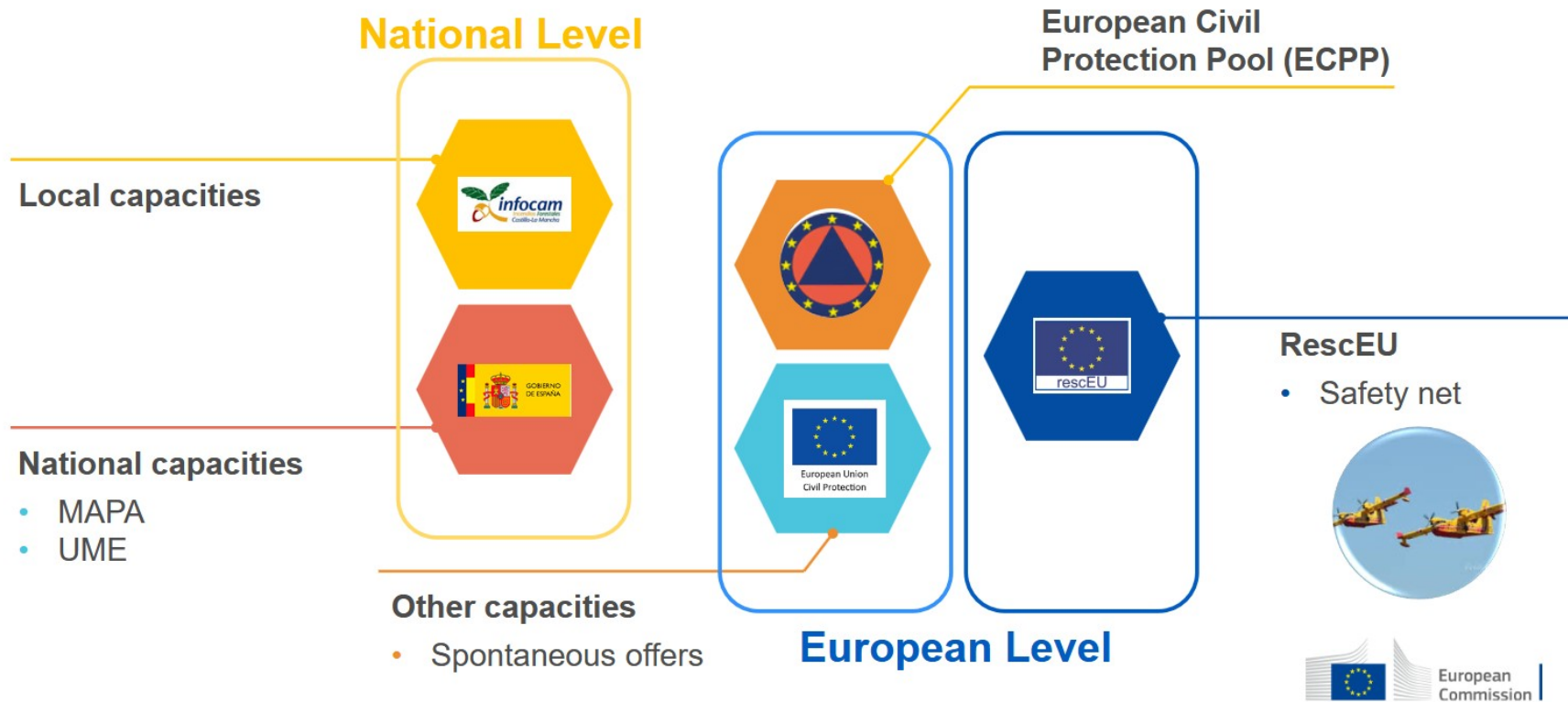
32 activations in 2017



- Tropical cyclones
- Floods and landslides
- Yellow fever outbreaks
- Advisory and preparedness missions
- Refugees
- Earthquakes
- Forest fires



European Response Mechanisms



European emergency response is built on national capacities, pre-committed assets and rescEU strategic reserves.



What rescEU Is and Why It Exists

rescEU is the EU strategic reserve for major disasters and emerging risks, fully financed by the European Union

Additional response mechanism amended in 2019

First activation in August 2019 in Greece

100% financed through the Next Generation EU instrument for 2 Billion Euros

Emergency call not on a voluntary basis

- ❑ CBRN scenarios for both Civil Protection and Civil Defense

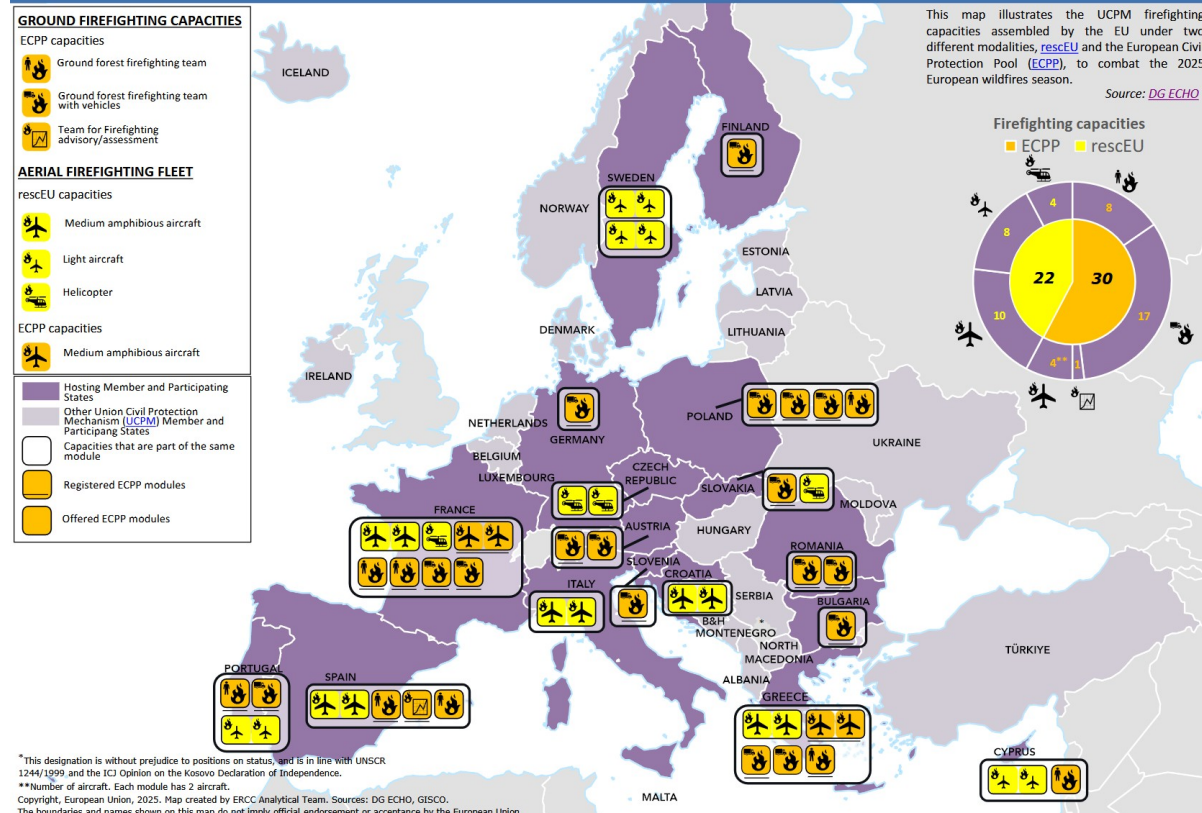
Emergency Response Coordination Centre (ERCC) – DG ECHO Daily Map | 27/05/2025

Forest Firefighting Capacities in 2025 (rescEU and ECPP)

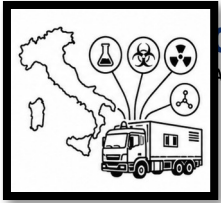


This map illustrates the UCPM firefighting capacities assembled by the EU under two different modalities, rescEU and the European Civil Protection Pool (ECPP), to combat the 2025 European wildfires season.

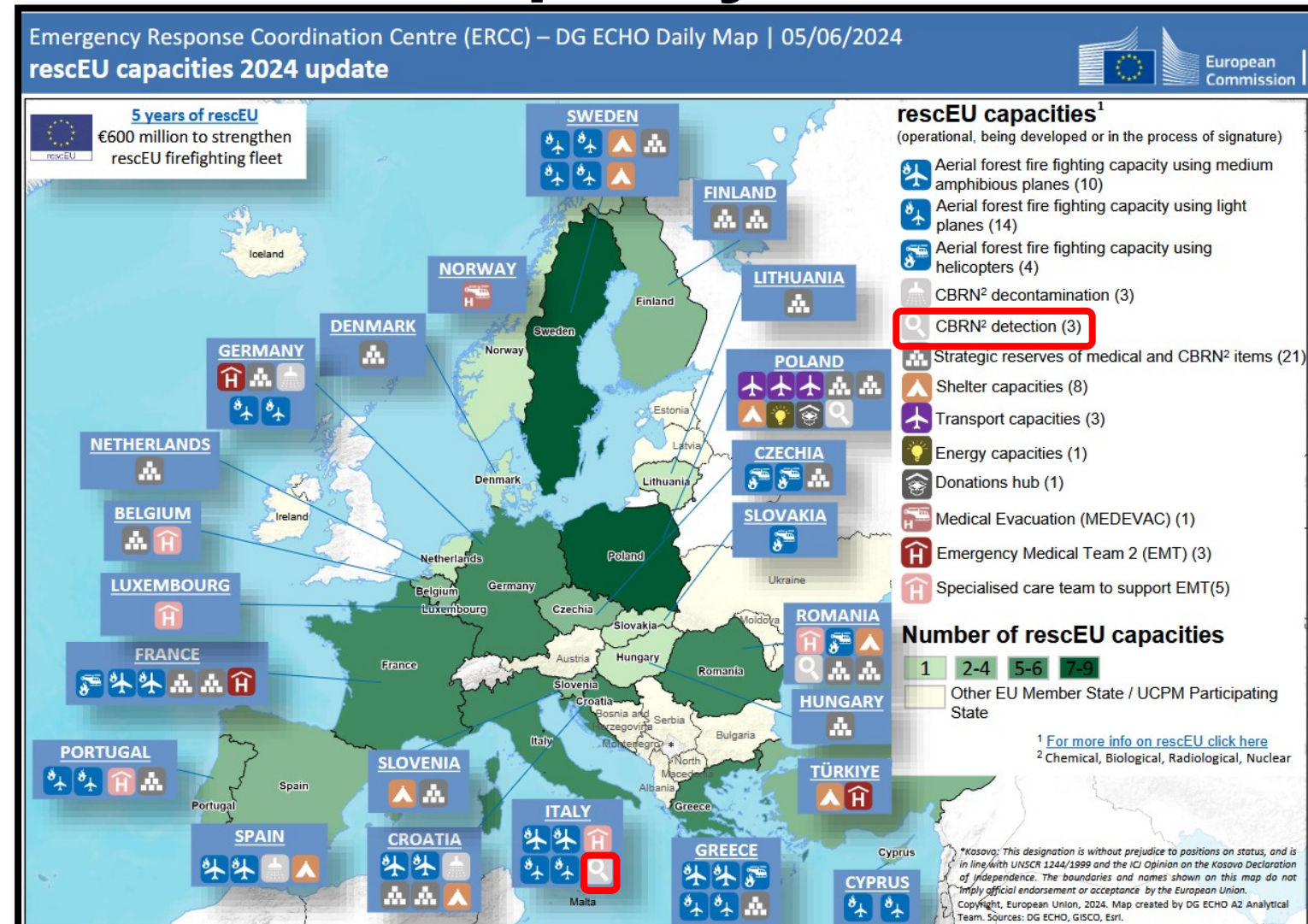
Source: DG ECHO



Italian rescEU CBRN Capacity



Italy's project consists in developing an advanced rescEU capacity for chemical, biological, radiological and nuclear emergencies.





rescEU CBRN-DSIM-IT and Its Partners



The project brings together first responders, national CBRN authorities, research organizations and private technology partners.

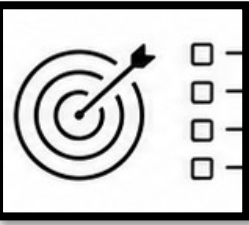




Project Specificities

The capacity builds on previous operational experience, research projects and CBRN expertise, transforming them into a deployable system.





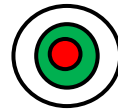
Specific Objectives of the Italian Fire Service

To design, operate and deploy a modular CBRN response capability that can support Italy and Europe in complex emergencies.





The Fleet Concept



Few large, highly equipped vehicles. Few highly trained operators. Strong digital mission support. High logistical autonomy.

Red orange zone vehicles

Detection, sampling, monitoring, recognition
Health monitoring and self-protection

- Communication and decision support



Green zone laboratories

Identification of CBRN agents in solid, liquid and airborne matrices
Diagnostic analysis

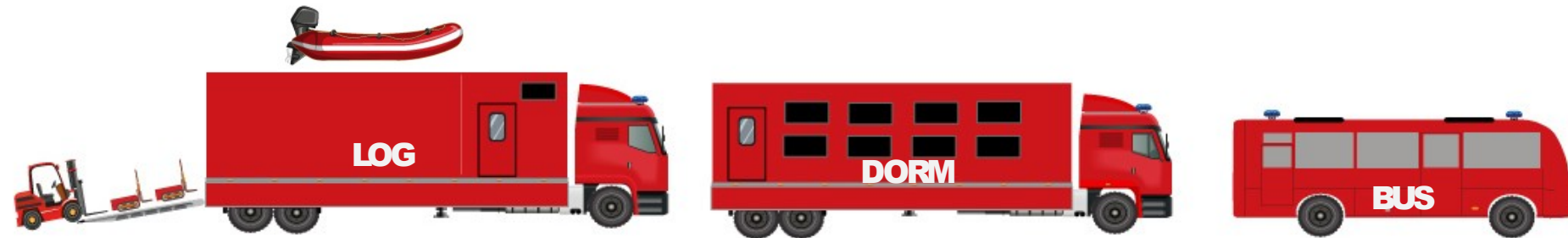
- Reportage and communication



White zone vehicles

Transport
Logistical support to the mission

- Sleeping and washing





Capability Architecture

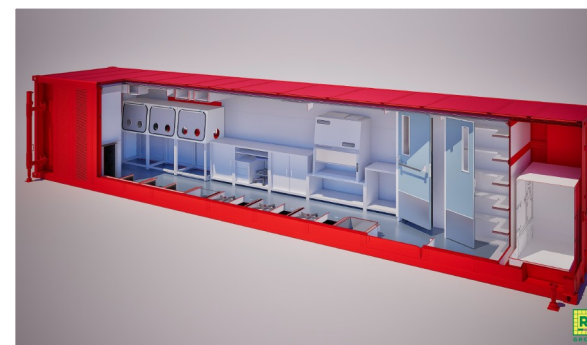
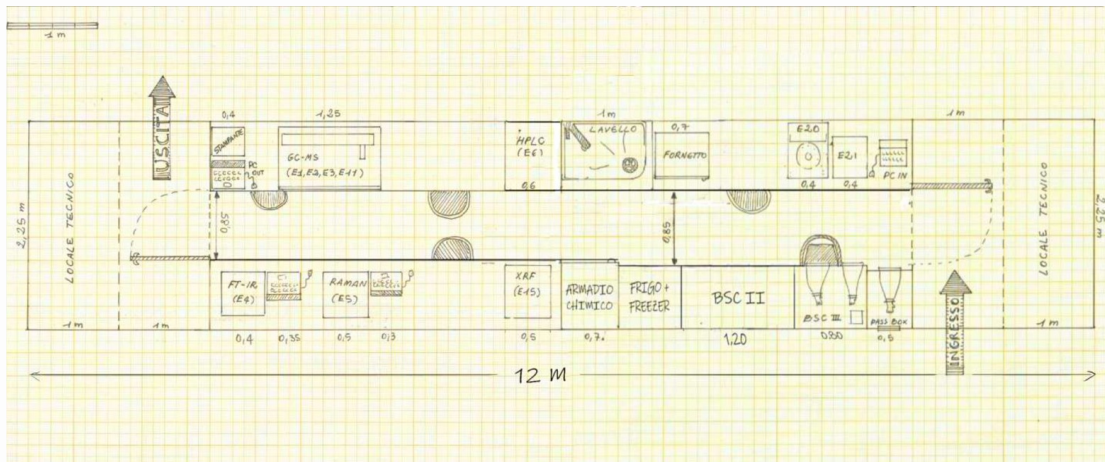
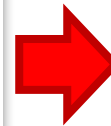
The fleet is organized around command, field operations, laboratories, decontamination, logistics, welfare and connectivity.





BIO-LAB — Mobile Biological Laboratory

The BIO-LAB enables field detection, identification and characterization of biological threats in high-risk scenarios





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DSM - Fleet Command Vehicle

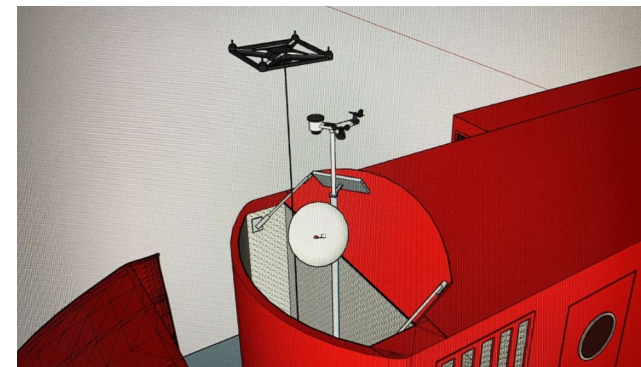
The DSM is the operational core of the fleet, combining detection, sampling, monitoring and mission control.





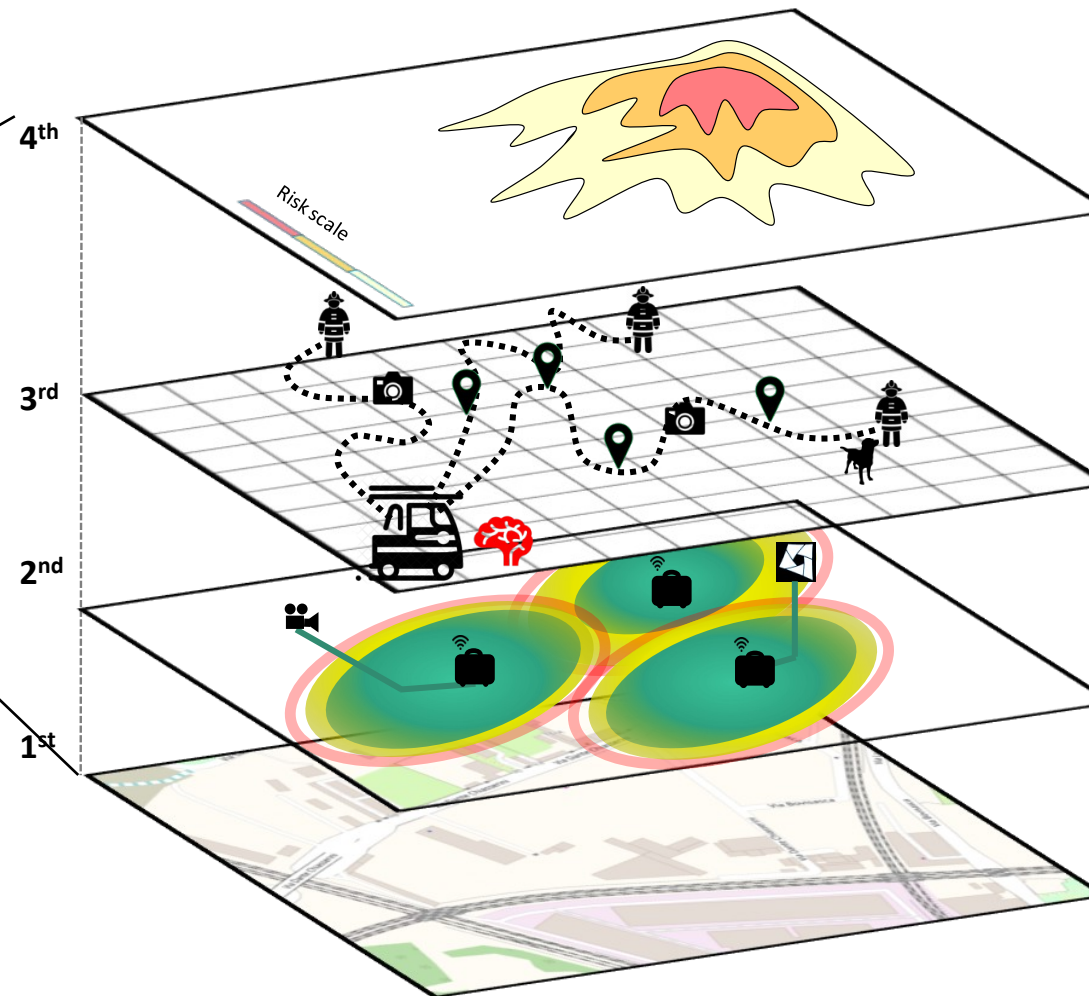
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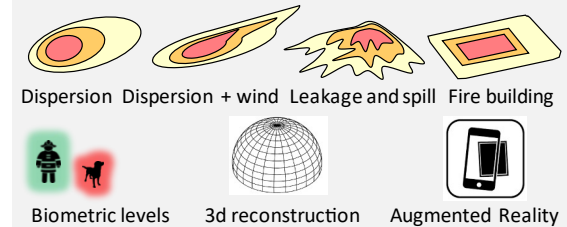


DSM - Mission Control Layer

The DSM collects field data, processes information on board and supports real-time operational decisions.



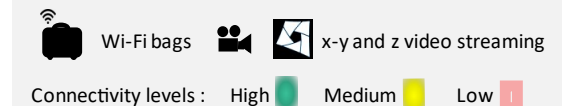
4th layer: Processed info dashboard and risk zoning maps



3rd layer : localization/tracking grid of first responders, waypoints, pictures and video points, data sources



2nd layer: connectivity and coverage (performance of IoT efficiency)



1st layer: mapping system used for scenario's representation



DSM - IoT Operational System

Field detectors transmit real-time data directly to the DSM control room

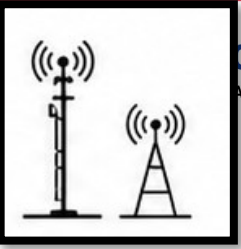
DSM Room for Mission Control – Inauguration of San Siro 2026



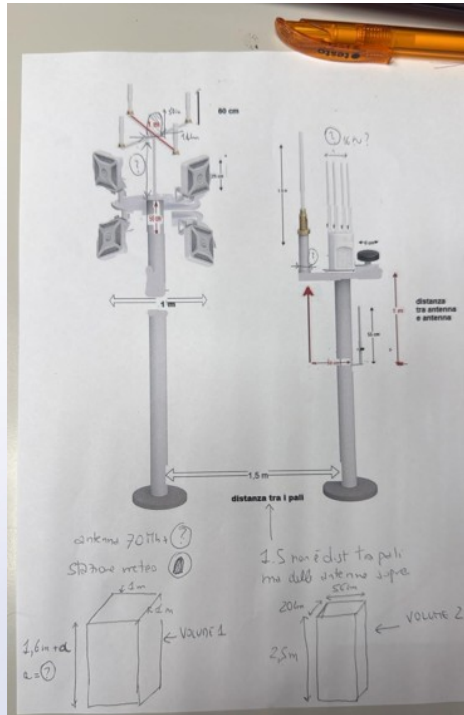
IoT = Server, sistemi TLC, ...



DSM = Alexa of emergencies

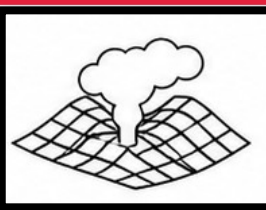


DSM – Telecom. Systems



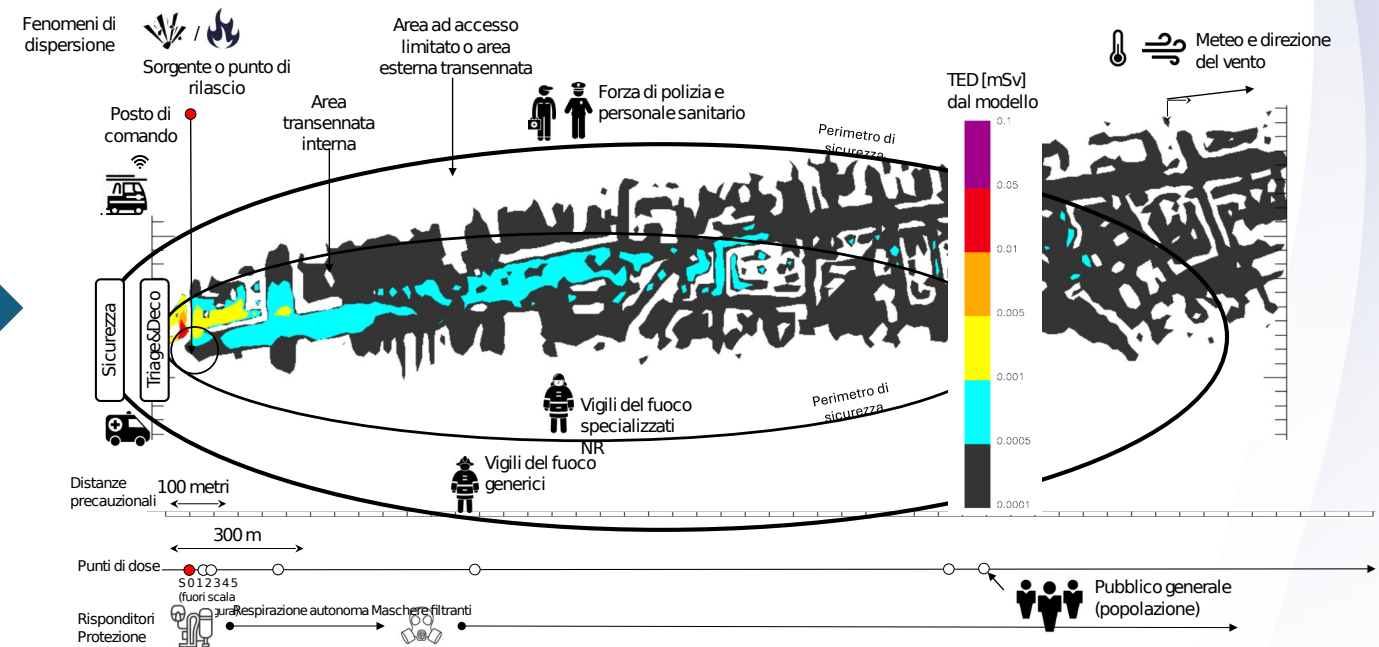
Redundant audio, video and data links ensure resilient communications during CBRN operations.

LTE Band B7 & B28 & B68 System
Promox servers with Nas and UPS
✓ Digital matrix audio video system



DSM - Real-Time 2D and 3D Modelling

01/04/2022 21:05:00



Mathematical models simulate the dispersion of toxic clouds in real time, including in urban environments.



DSM - Onboard Computing Power

Data are processed and stored on board, supporting secure and autonomous mission management.



Artificial Intelligence, Simulation, Visual Computing,
Immersive Spatial Computing



Madison Huang Senior Director of
Product Marketing, NVIDIA



An Interagency Operational Model

rescEU CBRN-DSIM-IT is a unique practical example of interagency innovation, combining operations, science and technology.



Testing during Milan-Cortina Winter Olympics

Milan-Cortina 2026 provides a real operational environment to test monitoring, detection and coordination systems.





Thank you for your attention !

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