A novel integrated SYstem of Systems streNgthening tEchnical and logistical capacities to ensure better Response to emerGencies by synergIStically addrEssing FRs capability gaps

Evolution of Urban Search & Rescue (USAR) operations with remote sensing and information management via emerging ICT and robotics technologies for field deployment

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Emerging technology support for disaster risk reduction:

SYNERGISE will design, develop, integrate, deploy, test, validate and demonstrate a Novel Integrated Toolkit for Collaborative Response and Enhanced Situational Awareness (NIT-CRES), upgrading the management of complex incidents.

The ultimate aim of the project is to empower First Responders with a toolkit, enhancing incident response.

Duration: Sept'23 – Feb'27
Participants: 15 (EU, Japan, S.Korea, Switzerland, USA)
Budget: 6,940,631 €

FR deployment priorities

For the FR teams, three main priorities are of utmost importance:

- **Safety:** Ensure individual and team-level risk mitigation regarding possible hazards.
  - ➢ *Enhance situational awareness via sensing modalities.*
- **Speed:** Have a clear and detailed understanding of the "hotzone".
  - ➢ *Use UxVs, but also information fusion, assessment, AI-assisted C&C.*
- **Sensing:** Mitigate exposure of FRs to hazards and risks within the "hotzone".
  - ➢ *Employ remote sensing capabilities (e.g. NV, IR/thermal, dangerous chemicals, etc).*

Recommendations for new technologies in R&D projects:

✓ <u>Early end-user involvement</u>: Involving the FR organizations from day one.
✓ <u>Expectation management</u>: Find a common ground between the sets of expectations from end-users and technology experts.
✓ <u>Extensive field trials</u>: There is a large gap to cover between FRs and technology experts.
✓ <u>Standardization and interoperability</u>: New tools have to be completed or at least progressed towards final stages, before they can be fully integrated in the toolbox and assets of operational SAR organizations.

Areas of Need for New SAR Technologies

- FR safety at the personal level (gear, wearables, localization, biometrics).
- Team safety via hazard mapping, coordination, monitoring.
- Area assessment, marking, dynamic mapping, movement coverage (especially indoors).
- Fast automated visual screening of images, videos, maps (for victims and hazards).
- Remote sensing via multiple modalities (visual, chemical, sound, seismic, etc).
- Remotely operated or fully autonomous robots, putting distance between FRs and the scene.
- Automated access routing and navigation for the FR team.
- Mini-robotics & soft-robotics, used for specific tasks (e.g. search shafts).
- Victim detection, localization, access discovery, medical assessment.
- Indoor positioning & tactical communications (intra-team and team-C3).
- Augmented situational awareness for the FR team via VR/AR tools.

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