



RELIABLE AND RAPIDLY DEPLOYABLE SENSOR APPLICATIONS FOR FIRST RESPONDERS

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FIRST RESPONDERS

First responders are the groups of people, services and organisations with specialised skills and qualifications, whose duty is to **arrive first to the emergency zone**, rescue operations, and **perform crisis management** in natural or humanmade disasters.

- **Complex and dynamic situations**
- **Different organizations**
have to work closely together
- **Time and safety** are crucial



OPEN ISSUES



First responders often must use **inefficient, weak and obsolete technologies** in the operations, both for **sensing** and for **message dispatching**. With respect to the current situation, the operational capabilities of the first responders can be dramatically boosted by the advances in technology and engineering fields such as **smart sensor systems, wearables, data processing, data fusion, data analytics, communication infrastructure, and artificial intelligence** tools.

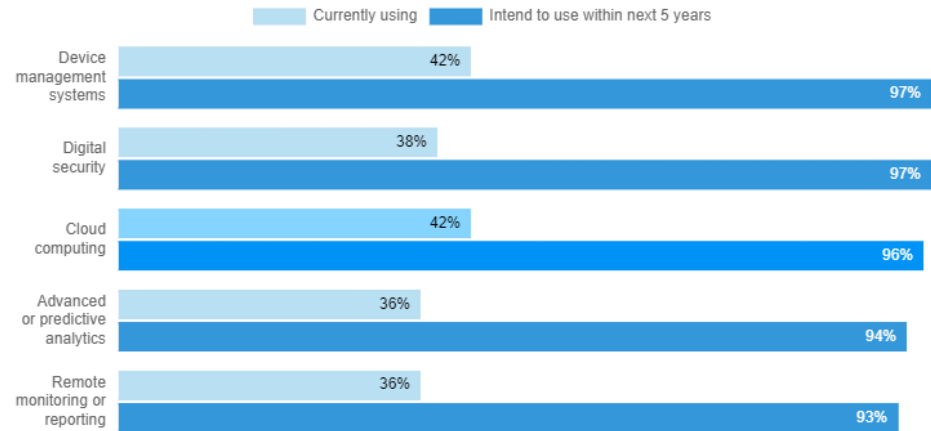
BUSINESS PERSPECTIVES

9 out of 10 **public safety agencies** say increased expectations from citizens are **driving the need for more efficient field operations**.

72% of the agencies are **concerned** they aren't investing in **new mobile technology** quickly enough.

Most agencies **expect to adapt quickly**, with many looking to **upgrade their agencies** within the next few years

Public safety agencies using the following technologies



Data presented is from Zebra's "The Future of Field Operations: A Look at the Public Safety Sector through 2025" report

MAJOR CHALLENGES FOR FIRST RESPONDERS



Real-time localization and real-time monitoring of first responders

- Localisation of first responders is vital for the responder's safety.
- Location transmission by using hand-held radios is an inefficient procedure, especially in dense smoke.
- ➔ Localization systems need to provide locations outside, in buildings, above and below the ground in real-time.
- ➔ Information on vital activity and status of responders is crucial for their safety.



Detection of Surrounding Risks and Threats

- Fragmentary, incomplete and sometimes wrong information.
- Rapidly evolving situations, generating new hazards.
- ➔ Need for various types of sensor systems to detect, identify and monitor threats for responders to be well prepared against unexpected emergencies.



Information Fusion and Comprehensible User Interfaces

- Danger of information & complexity overflow
- ➔ AI allows to detect, identify and classify the threats and anomalies to generate detailed common situational awareness picture.
- ➔ User interfaces (UIs) enhanced with Augmented Reality (AR) can present refined information to the responders.

The **TeamAware** project is currently developing an integrated and cost-efficient **situational awareness system** for **first responders** from different sectors with heterogeneous and hardly interoperable sensor units including drone mounted, wearable, and external sensor systems.

Duration: May 2021 – April 2024

Website: <https://teamaware.eu/>



Teamaware ADDRESSING THE NEEDS

Integrated In-Team Situational Awareness

- Integrating indoor/outdoor localisation, body posture capture and health monitoring to provide a complementary solution for situational awareness within team-members

Integration of various types of sensors

- Detect, identify and monitor threats for responders to be well prepared against unexpected emergencies

Enhanced User Interfaces (UIs)

- Usage of Augmented Reality (AR) and Artificial Intelligence (AI) to present refined information to the responders

Resilient ICT infrastructure

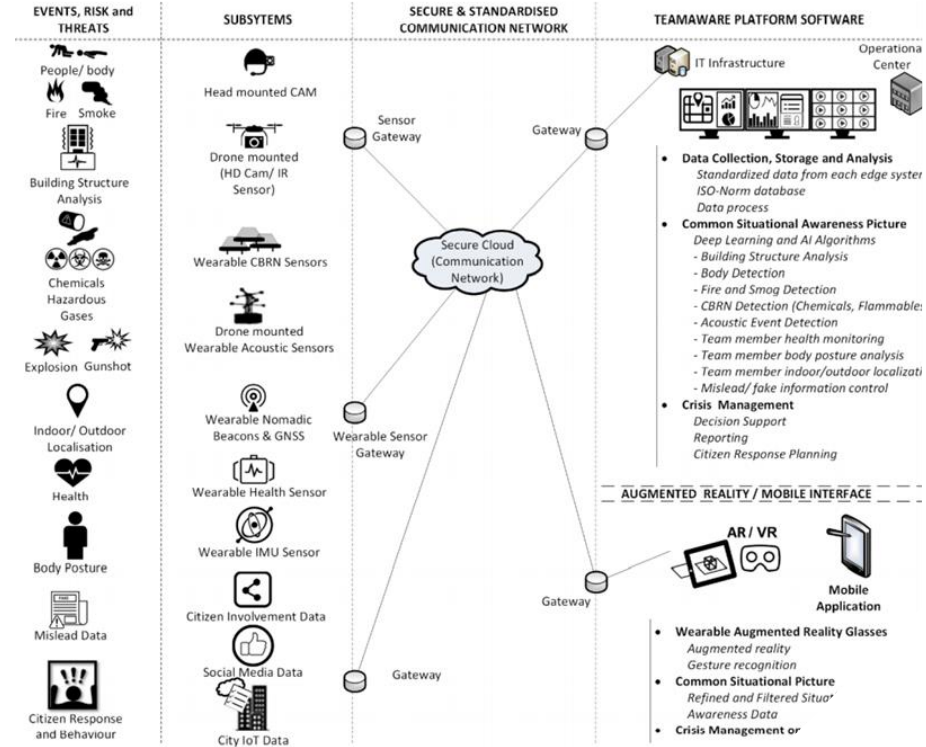
- Message dispatching interoperability enabling seamless cross-organisation communication

Teamaware

RESILIENT ARCHITECTURE

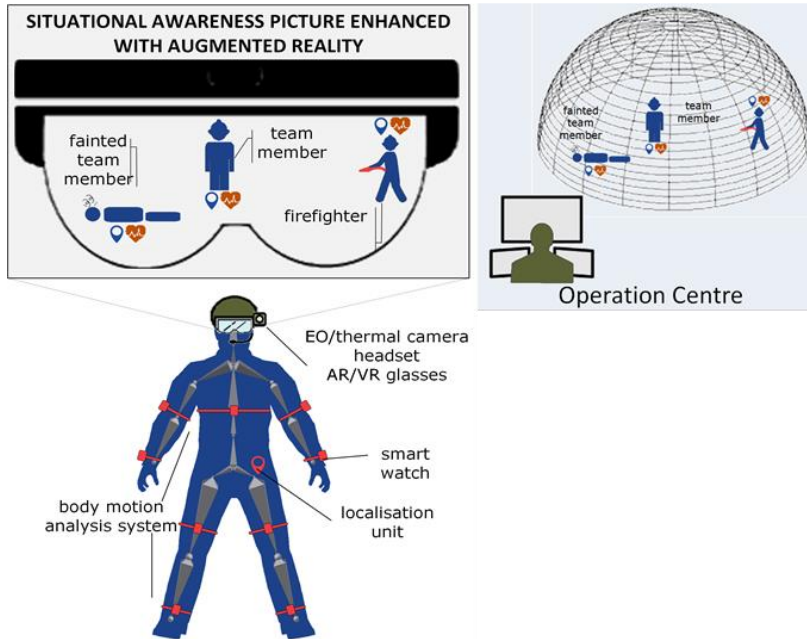
Teamaware creates a flexible and resilient communication network:

- Build on top of different networks (5G, 4G, WiFi, etc)
- Network-agnostic gateway
- Redundant and resilient by design
- Clear information stream
- Cross-organisations dispatch of messages
- Redundant and resilient by design
- Cross-organisations dispatch of messages



TeamWare

AUGMENTED SENSORS



- **Body Motion Analysis (BMAS)** enhances situational awareness:
 - Support members during the save and rescue.
 - Monitor status of members (fatigue analysis, postural information, sitting, running, walking, holding a hose, abnormal body postures (alerts), etc.)
- BMAS is integrated with indoor/outdoor localization systems and wearables (smart health monitoring modules, cameras, AR and VR devices)
- ➔ **AR glasses** enable first responders to see the status of the other members
- ➔ **VR interfaces** are used by the operation center to monitor the overall scene.

Teamaware IN A NUTSHELL

“**Perfect**” support application for field operations **still don’t exist** but ...

... a capability gap analysis showed that the main effort should be devoted to address:

- Real-time localisation and real-time monitoring of first responder team members
- Detection of surrounding threats and risks
- Fusion of information from several types of sources
- Presentation of fused information via user-friendly displays

Teamaware will provide an integrated and cost-efficient **situational awareness system** for first responders from different sectors

- How to deploy: Use case implementation
- Next steps: Exploitation, adoption and go-to-market

THANK YOU!

Mario Drobics, 27th September 2022

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