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FOR
MATIK
2021

COMPUTER SCIENCE
& SUSTAINABILITY
27.09. – 01.10.2021

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FIRST RESPONDER ADVANCED TECHNOLOGIES
FOR SAFE AND EFFICIENT EMERGENCY RESPONSE

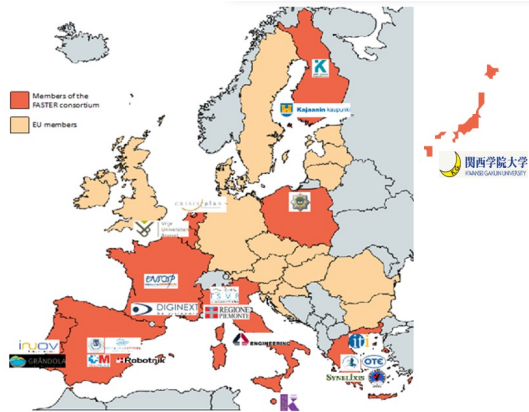
LEAN Method applied to USAR Team
introducing new technologies for improving
the search and rescue procedure, FASTER
Project.

<https://www.faster-project.eu/>

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[Special Track: Advances and Gaps in
Risk Information Management III
EnviroInfo.-](#)

CONSORTIUM



23 partners

3 Industry | 4 SMEs
8 Research/Academic
8 First Responders

+ 4 Linked 3rd Parties (FRs)

EMERGENCIES TEAMS



This project has received funding
from the European Union's Horizon 2020
research and innovation programme
under grant agreement N 833507





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FASTER in a glimpse

Aims and Tools

FASTER aims to develop state-of-the-art technical solutions to protect first responders in complex environments while enabling them to operate in a seamless and efficient way in any environment.



Communication

5G network utilization,
Infrastructure-less
communication,
Body and Gesture based
User Interfaces,
Ad-Hoc relay networks,
Blockchain-based trusted
network



Mobiles & Wearables

AR devices for improved
situational awareness,
Smart textiles for bio-
monitoring,
K9 wearables,
mobile mission
management



Situational Awareness

Portable Common
Operational Picture,
UAVs and UGVs for
inspection, mapping (but
also intervention),
Risk assessment utilizing
AI-based data processing



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Summary of the planning process phases:

<https://www.insarag.org/methodology/insarag-guidelines/>

- 1. Assess the situation.
- 2. Establish/obtain (from the LEMA/OSOCC) incident objective.
- 3. Develop and disseminate the Action Plan.
- 4. Request needed resources.
- 5. Execute, monitor progress, update the plan as needed.




INSARAG | 30
Preparedness Response YEARS

ABOUT

GLOBAL STRUCTURES

REGIONAL GROUPS

 **GUIDELINES**

GUIDA

In the INSARAG coordination methodology there are Assessment, Search and Rescue (ASR) Levels that define the different types of activity carried out at a major USAR incident. These help to make the planning process

- **ASR Level 1:**

Wide Area Assessment. Key results of this are a sectorization plan, locations and prioritizations for the initial Action Plan. This will allow teams to deploy and then carry out.

- **ASR Level 2:**

Sector Assessment, which primarily gathers details of the potential live rescue locations (worksites) so a⁵ more detailed action plan can be formulated and teams deployed to maximise life-saving opportunities.



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ASR1

Wide Area Assessment

- The Security Forces assessing the situation .
- Swarm of drones is dispatched to map the disaster area, provide continuous updates regarding casualties and damage, entry points and procedures, and specific requests for assistance.
- Control Center must create an up-to-date 2D map of the area.
- Sectorizing and prioritizing the area. Using the mapping result ,planning where to send search and rescue teams.
- Blockchain distributed network is employed to ensure reliable, secure data transfer.
- Artificial Intelligence is employed to detect the extent of damage in the area and possible signs of victims.





ASR 1 Purpose :

- o Determining the scope and magnitude of the incident
- o Identifying scope, location and types of damage
- o Estimating the urgent resource needs
- o Developing a sectorization plan
- o Establishing priorities
- o Identifying general hazards
- o Identifying infrastructure issues



Sectorisation



Sectorising an affected area using streets and city block layouts.



Sectorising an affected area using prominent features e.g. Sector A North of the river, Sector B South of the river.

Worksite

To allow effective coordination it is essential to uniquely identify every site where significant USAR operations take place. Each of these sites will be known as a worksite.



ASR2

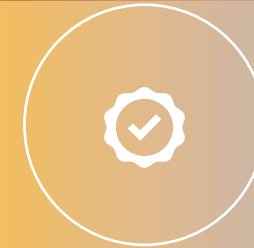
- It needs to be a fast paced but methodical assessment.
- Aim > to assess the whole sector in a timely manner.
- The Worksite Triage form used to gather the essential information.
- Information from the local population and local responders.
- An ASR Level 2 Assessment can be repeated later if it is necessary
 - ✓ Assessment with additional dogs, which may produce different results.

- ❖ Smart textiles (UWA) – measure and track biometric information
- ❖ Smart wearables (UWA) – measure and track environmental conditions.
- ❖ The K9 unit starts scanning the possible worksites for victims. In one of the worksites, a number of victims is detected.
- ❖ Gesture controlled Portable UAVs AR device CETH; DXT], the PCOP and the command and control center.
- ❖ ECObox devices [UniWA]



Rescue teams start the procedures to extract the victims from the debris.

- Health status is continuously monitored through the wearables and the smart textile sensors and sent to the PCOP for processing [INOV].
- Due to an aftershock, part of the worksite collapses and a member of the SAR team is trapped in the ruins.
- The trapped first responder is using the gesture-based communication methodology [UniWA] to alert the rest of the teams.
- The messages are communicated using a haptic interface.



ASR 3 / 4

Rapid Search and Rescue

/ Full Search and Rescue

ASR Levels 3 and 4 to
brief, deploy and prioritise
USAR resources to achieve
the maximum benefits.



Experience





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Use Case Overview

Campo de Prácticas



Collapsed Building



Urban flooding



Indoor Disaster



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FASTER Video: Vision, objectives and partners



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Autonomous terrestrial vehicle
with thermal camera

FIGURE 1-FASTER TOOLS TESTED in MADRID PILOT

DRON WITH 2D CAMERA,
SYRINGE CARRIER,
GEOLOCATOR AND PARACHUTE



Autonomous terrestrial vehicles
with 3D mapping



Covid
Protocol

Lean Method





SEVERAL CONCLUSIONS

- The tools tested have been a breakthrough in improving USAR work⁴.
 - The possibility of receiving priority information,
 - The dispatching of robots and drones to a specific area,
 - & the communication and coordination between all teams, enable managers to obtain an optimal overview of the entire disaster and efficient management.
- INSARAG³(NATO)'s professional Assessment, Search and Rescue (ASR) methods have increased their effectiveness by innovative technologies.



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LinkedIn: [FASTER-project Horizon 2020](#)



Thanks for your attention



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