

FASTER NEWSLETTER

#4



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PROGRESS OVER THE PAST 6 MONTHS

FASTER has completed the 2nd year of its lifecycle.

In the last six months a lot of results have been achieved and all technical tools have been tested in three trial demonstrations (Spain, Italy and Finland). Following these demonstrations, an online debriefing meeting was held for each of the demos with the first responders involved. The purpose of these meetings was to collect their comments and suggestions to fine-tune FASTER technologies making them compatible with the existing procedures. Now the technical teams are working to update the tools that will be tested in the 2nd and final round of

demonstrations to be held in the final months of the project, at the beginning of next year.

Furthermore, FASTER partners have presented information in several national and international events with the aim of spreading news on FASTER and its developments. More info about the events are on the FASTER website in the [Conferences section](#). ■



Italian pilot control room in Turin, Piedmont; 27th of January 2021

FASTER PLANNED MILESTONES

| | |
|--------------|---|
| May 2019 | FASTER start |
| October 2019 | User requirements and use cases |
| April 2020 | System architecture designed and components specified |
| October 2020 | First integrated tool and Components Versions Delivered |
| January 2021 | First Pilots Completed |
| October 2021 | Updated Technologies based on the first Pilot |
| January 2022 | Start of final Pilots |
| May 2022 | Official presentation of FASTER system |

FIRST 18 MONTHS ACHIEVEMENTS

| | |
|----------------|---|
| September 2019 | Communication material presented |
| October 2019 | User requirements and use cases submitted; Dissemination plan submitted |
| January 2020 | Technical specifications defined Innovation Strategy plan defined |
| April 2020 | System architecture defined |
| October 2020 | Component Versions Completed and Integration test done |
| December 2020 | Spanish pilot completed |
| January 2021 | Italian Pilot Completed |
| March 2021 | Finnish pilot completed |

THE FIRST TWO YEARS OF ACTIVITY



Image from the Spanish pilot, December 2020

FASTER is a 3-year H2020 project that aims to address the challenges associated with the protection of First Responders (FRs) in hazardous environments, while at the same time enhancing their capabilities in terms of situational awareness and communication. Having completed its second year and, despite the significant challenges posed by the Covid-19 pandemic, FASTER has managed to achieve its milestones according to its original plan.

At this stage, a first integrated version of the FASTER tools has been produced and demonstrated in 4 pilot activities, testing FASTER's tools in realistically simulated conditions with the participation of front-line FRs. Scenarios were built upon the mission to highlight the applicability and versatility of the FASTER tools in a variety of diverse settings. An overview is shared below:

- **Pilot 1** involved an **earthquake** of 7.3 degrees on the Richter scale, affecting a populated area in **Madrid**, Spain, and was carried out in November 2020.
- **Pilot 2** consisted of a **flooding scenario** based on a similar incident that occurred in November 2016 in the Municipality of **Moncalieri**, Italy. The pilot took place in January 2021.
- **Pilot 3** followed a **terrorism scenario** inside of a school building. This pilot was held in **Kajaani**, Finland in March 2021.
- **Training** was a demonstration of FASTER tools in a **hostile environment**, without power or communication infrastructure, close to **Athens**, Greece. The event took place in October 2020.

The 6th FASTER General Assembly, held on 30-31 March 2021, marked a milestone in the FASTER project pathway. Having completed the first round of piloting, all project partners joined in a fruitful and productive discussion. Technical partners shared information and when possible performed live demos of their tools, and end users gave feedback, sharing ideas about possible use cases for the tools and identifying any new end user requirements. Technical partners remain in close and continuous collaboration with end users to achieve a comprehensive analysis of what the latter expect that the FASTER tools will deliver. The goal is to create tools that users wish to adopt and use in their response operations.

The General Assembly has also paved the way for the last year of the project. A training and demonstration campaign in multiple locations in Europe and Japan has been developed, going beyond the original planning of the project. Additional piloting events are being planned in France, Portugal, Poland, Greece, Spain, Italy, Finland, and Japan. This piloting campaign, with the participation and guidance of technical partners, physical or remote, will maximize the opportunity of First Responders from diverse sectors to have a hands-on experience with the tools and provide feedback to fine-tune them. The FASTER consortium plans to open up the second round of piloting activities, offering to First Responders beyond the consortium to participate and evaluate the project tools, creating clustering, synergy, and exploitation opportunities.

Summing up, FASTER has successfully closed its first round of development, demonstration, and

evaluation. The project partners have updated the user requirements, the specifications, and the architecture of the FASTER tools to adhere to the needs of First Responders. The coming months will see the continuous update of the tools and the realization of a piloting campaign designed, hosted, and executed by the project's end users, where new use cases will be developed and FASTER tools will be tested and evaluated. The pilots will be used as a vehicle to boost the outreach of the project, empowering the communication and dissemination activities, and creating a clear exploitation path for the developed technologies. ■



Image from the Finnish pilot, March 2021

THE ITALIAN PILOT OF FASTER PROJECT MONCALIERI (TURIN)

FASTER's second trial demonstration was held in Moncalieri (Turin), Italy on January 27, 2021. In the two months leading up to the event, local organizers from the Piemonte Region civil protection were busy setting up, testing and training on the FASTER tools, finalizing the flooding scenario to incorporate the tools, and organizing and training other local participating stakeholders. The result was an intense and successful pilot day, demonstrating and evaluating FASTER tools and proving their added value to the disaster response activities of the regional civil protection agencies.

In a narrow strip of land near the Chisola River in the south of Moncalieri (Turin), where a severe flooding event took place in 2016, FASTER technologies and tools were used in the response phases: pre-alarm conditions (pre-event preparations), alarm conditions (rescue operations), residual critical conditions (post-event phase).

Three sites were used simultaneously for this demonstration: the Piedmont Region command center, and two field locations, the Chisola river embankment and the New Tetti Piatti village. The pilot developed from 9 a.m. until around 3 p.m., while the original schedule was planned from 9 a.m. until 6 p.m. Despite COVID restrictions 64 operators of the Regional System of Civil Protection, 36 of which are associated with volunteer organizations, participated in the event, helping greatly to make this event a success.

Stakeholder groups present included: Piedmont Region at regional level response (operations room), Piedmont Regional Agency for the Protection of

the Environment for the weather forecast, local Municipality of Moncalieri, Red Cross for rescue operations, Regional Volunteers Organizations for the logistics and rescue operation support, Forest Fires Volunteers Regional Corp to support logistics operation.

It's to be underlined that during the months leading up to the pilot date the pilot preparation took place with a deep involvement of all organizations helping the pilot to be carried out, with setting up of training sessions on the tools to be tested during the pilot.

A strong collaboration between the Piemonte civil protection authorities and the FASTER technical partners in charge of developing the tools was key to the success in planning the event, sharing tools by post or remotely (software downloads), setting up the tools with remote help from technical partners, remote training and on pilot day, remote technical support.

Many tools were tested in the Italian pilot: the Mission Management tool (MMT), including the two interfaces - the Chatbot and smartwatch - the common operational picture (COP) tools, the 2D mapping tool, drones, the latter operated by local authorized operators National 'Carabinieri' Association, FASTER's Local Weather Station, Smart Textiles Framework, the ResCuE (RESilient CommUnications Equipment) devices, the UAV Relay for extended communication equipment.

MMT Chatbot & SmartWatch, Smart Textiles Framework.

The MMT allows information exchange, including live mis-

sion assignment/status/details and location information to be exchanged from the command center and responders in the field. Real time information from the field is very useful in the command center to follow an unfolding emergency situation and make response-related decisions.

Using the tool, responders can receive instructions from leaders in the command room, and send back status updates, location information, pictures, videos, and voice messages to share important updates from the field.

They do so using a chatbot (smartphone) or a smartwatch. The wearable watches incorporate gesture control, meaning that with simple wrist movements it is possible to send operator position, send reports and change the current status of the operator so if he/she is in activity or if he/she has terminated his/her task.

Feedback on the MMT was positive, and participants in the FASTER demonstration could assess how easy it was to communicate with the control room and how quickly the information was delivered.

G-COP, P-COP, drones, 2D mapping tool.

FASTER's Common Operational Picture (COP) is a map-based tool that integrates data from other FASTER tools, allowing users to visualize all response information in one place. This offers a better understanding of the emergency, ensures that all relevant information reaches all relevant responders, and that they share an understanding about how the response is



Interface of the smartwatch used for the tests in Moncalieri, Italy



Red Cross First responders receiving updates through the chatbot

unfolding, supporting decision making.

Particularly interesting during the Italian pilot was using the COP to set up the drone flight, watching the drone along its path in the COP, and receive the data and visualize the mapping results on the COP as well. They are used to using drones to get an oversight of the area, but highly appreciated being able to track the drone along the map, receive quick and good mapping results, and also see other geo-localized information coming from other FASTER tools (smart wearables, MMT).

Weather station, ResCuE (Resilient CommUnications Equipment) devices, UAV Relay for extended communication.

The use of the FASTER local weather station is highly valued in a flooding scenario when determining whether it is possible to safely deploy UAVs to go out and monitor the flooded areas. Responders found that the weather station was easy to install and could be made operational within just a few minutes. Thanks to the adoption of standard protocols and easy integration with communication systems, this station easily integrates with real-time measurements managed by the regional environ-



Images from the camp and drone in Moncalieri pilot site

mental agency.

Responders also used FASTER's RESCUE communication devices, which are meant to pass along short text-based messages to responders (or from a response organization to the public) to deliver critical messages. They are meant to be used when no other communication means is possible: they are able to send pre-programmed messages without a network. Participants to the trial demonstrations found the ResCuE devices to be very easy and intuitive to use. The fall of the cellular networks during an emergency in a localized area would prevent sending messages between mobile devices, so ResCuE can fill this critical need.

FASTER also has a communication relay tool, possible to attach to UAVs. This tool is used to extend the communication range, making it possible to transmit information between the field and command centers. It can be used in the absence of a 4G or 5G connection.

All tested tools were acknowledged by pilot participants as very important to improve performances and security during an emergency. Suggestions have been given to technical partners for some improvement to be made, which they will work to incorporate before the final demonstrations of the FASTER tools.

The encouraging result of the exercise is the Regional Civil Protection System's true interest in using FASTER technologies during the management of civil protection events. In particular, the possibility of strengthening and improving the flow of communication between responders in the field and those in the command centers, allowing for real-time exchange of critical response information as well as information about the safety and

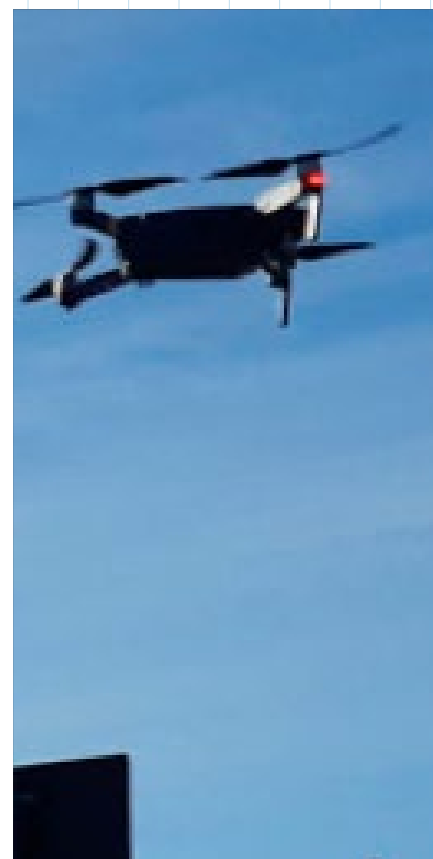
location of the responders.

During the pilot, FASTER partners held interviews with first responder participants to get their feedback on the tools. The video can be seen here:

https://vm-podcast.csi.it/mlab/projects/video/Video_Progetto_Faster/

A final demonstration will be held in Moncalieri, also following this flooding scenario, in the final months of the project, at the beginning of 2022. With the COVID restrictions lifted, this event will include additional stakeholders, and add two locations: Moncalieri's Command Center and a field location at Water Ski Lake, where a simulation of the flood will take place.

The FASTER project activities will continue with the improvement of the tested tools, in sight of the next final phase of tests in the period November 2021-February 2022. ■



Carabinieri's Drone flying over the pilot site in Moncalieri, Italy



Faster weather station and camp in the background, Moncalieri, Italy

THE FINNISH PILOT OF FASTER PROJECT KAJAANI (KAINUU)



The first round of the Finnish pilots was completed on the 10th of March 2021. The pilot took place in the Lehtikangas School, in the city of Kajaani. The pilot comprised of three indoor scenarios: explosion in handicraft classroom, hostage situation and fire outbreak. More than 40 first response operatives participated, carrying out medical aid tasks, fire suppression, breaching, shoring, evacuation, and hostage crisis de-escalation.

The aim of the pilot was to test FASTER tools in these different conditions and examine the usability of tools, ease of use as well as their reliability.

Explosion scenario

The SUMMIT XL rover, Smart textiles framework (STF), BUST, RESCUE, Mission Management Tool (MMT), Common Operational Picture (COP), MORSE tool, and gesture-controlled mini-UAVs were used in the first responder's work. The SUMMIT XL rover and BUST building scene analysis tool allow the first responders to scout and observe the situation in the building prior to the entry of the operatives, reducing the risk of harm. With the MMT, COP, Smart textiles and MORSE (gesture-recognition wearables) the first responders and team leader can communi-

te and exchange data in the field, send orders and call for the need to evacuate wounded persons. The RESCUE box was used to communicate instructions and information to the victims about incoming aid.

The gesture-based drone control allowed the first responders to examine the building for visual damage, all while controlling the drone hands-free.

Hostage situation

BUST, which allows users to visualize the building layout and readings from embedded sensors, was used to monitor sensors for movement, count the number of persons in the building sector where the perpetrator is, and observe abnormal readings from temperature, smoke, and CO2 sensors. The SUMMIT XL was sent in autonomously to spot the perpetrator. Through the STF, team leaders could monitor the biometric information - the well-being - of the operatives in the field, without the need for other communication tools.

Fire outbreak

When the BUST tool detected movement from a person, the SUMMIT XL rover was sent to that

location to confirm whether there were victims in closed/barricaded rooms, waiting for help. Simultaneously, BUST sensors alert of a fire outbreak on the second floor, in the faculty room. Fire fighters are sent to assess the situation. They use the MORSE device to confirm the fire outbreak to the team leader. MORSE allows responders out of each other's line-of-sight to communicate using predetermined gestures recognized by smartwatches.

Through the COP, the team leader monitors the ongoing situation in the field, where he reads the field reports coming in through the MMT, STF, BUST sensors alerts, and the geo-localized data is shown displayed on top of a map of the disaster site.

Responders evaluated the tools, offering feedback to technical developers. These ideas will be incorporated as much as possible. Following the successful trial in 2021, a second round will be organised in early 2022 to demonstrate the final version of the FASTER tools.



Images from within the Finnish pilot site in Kajaani, Finland; March 2021

JOINT ACTIVITY WITH OTHER EU H2020 PROJECTS

The European Commission is investing significant effort to enhance disaster resilience. Its H2020 program is funding numerous projects to foster innovation for First Responders.

More specifically, the DRS-02 calls requested the development of new ICT tools for First Responders to enhance their capabilities and safety. Each funded project develops innovative solutions to addresses these challenges in a unique way. Nonetheless, there is always an overlap on the tools created. Exploiting the diversity of technical expertise and user needs across the projects through clustering activities opens up new possibilities to collaborate, maximizing the added value of the solutions produced and the exploitation opportunities beyond the lifetime of the projects.

FASTER, recognizing the value of clustering activities, has launched a campaign to engage with relevant projects and foster collaboration over multiple levels, namely dissemination, knowledge exchange, and tool integration. In the dissemination level, FASTER is collaborating with H2020 projects INGENIOUS, CURSOR, ASSISTANCE, RESPONDRONE, Search & Rescue, INTREPID, and RESPOND-A to collectively improve outreach through the dissemination channels of each project. In parallel, FASTER is actively participating in the CERIS DRS and the IFAFRI community to present the project and exchange ideas with domain and cross-domain experts and stakeholders.

Moreover, FASTER organizes and participates in events for knowledge exchange among the projects. A cluster event on



the challenges of the pandemic was organized by FASTER and CURSOR with the participation of 5 projects to exchange experiences and best practices to alleviate the effect of Covid-19 in the project implementation. FASTER also participated with INGENIOUS in a workshop organized by RESPOND-A on the use of AR technologies for First Responders, where technology demonstrations and discussions took place. Further workshops are planned to share expertise

and address common challenges.

As FASTER is moving towards its final year, its tools are maturing, and multiple demonstration events are planned. A roadmap has been drafted including pilot and demonstration activities in several European countries, including France, Spain, Italy, Finland, Portugal, Poland, and Greece, and Japan. FASTER aims to exploit these events to promote clustering by disseminating them

and inviting local First Responders beyond the consortium to follow and participate (if possible) and provide feedback during the events. Moreover, FASTER pursues opportunities for joint piloting activities and tool integration with other projects. Such activities are already planned with CURSOR in Japan and RE-SPOND-A in Athens.

FASTER is looking forward to collaborating with new projects in the future. ■



First responders in action in the Madrid pilot site, December 2020

THE FASTER PROJECT PATH TO SUSTAINABILITY



The overall idea of a sustainable model starts elaborating the concept of ideas for how to solve emergency and social problems. In our case the project addressed specific First Responders problems aiming at providing both the effectiveness feeling and the improvement of their safety ^[1].

It is indisputable that we are currently facing the most difficult sustainability crisis of all time. The pandemic, climate change, poverty, pollution, water scarcity, overpopulation, income disparities, exploitation of resources and overconsumption are some of the challenges and problems that sometimes facilitate disasters. Proposing a sustainable model to people facing that crisis could be a hard job but anyhow emergencies must be faced and FASTER is providing sustainable solutions that, although not solving the general feeling of sustainability, could at least give First Responders sustainable instruments to be used to fight surrounding challenges keeping themselves safe.

The FASTER project has to pass the sustainability most critical phase: the passage from R&D and demonstration to commercialisation and the so-called valley of death, which describes a critical financing gap between initial public funding and regular institutional financing. After those consideration, the path

to project outcomes sustainability proposed is regulated by three Principles linked with FASTER project objectives:

Safety and Effectiveness: the FASTER al attention to their safety project proposed from the very beginning a twofold approach in addressing both the need for effective technologies for first responders with a special attention to their safety.

Responsible research and innovation (RRI): The project applied a responsible research attitude taking also in consideration a transparent, interactive process involving stakeholder.

Standards and Regulations: A project dealing with First Responders definitely should face regulation issues for three main reasons; 1) all technologies used by FRs should be respect specific standards such as the NISTIR 8196, 2) the use of technologies is regulated at national and sometimes regional levels, 3) use of personal

data should respect GDPR requirements.

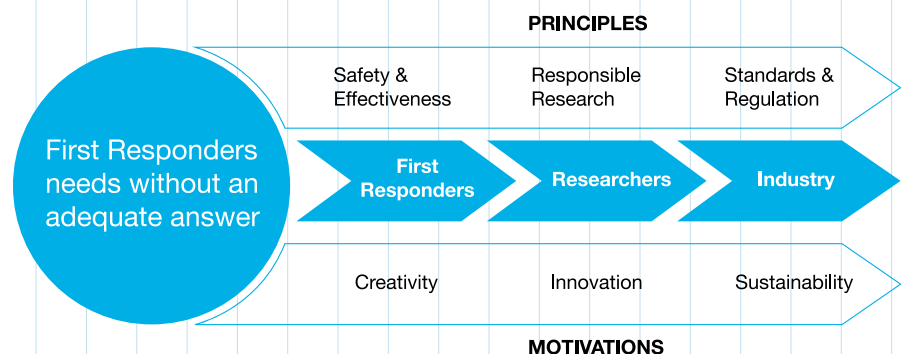
In the meantime, the FASTER project was built on three main Motivations:

Creativity: from the proposal writing phase the team was hardly motivated by several creative ideas and some of them were considered achievable during the project.

Innovation: selected technologies had been approached with an innovation-oriented attitude to design them in the full respect of the three principles illustrated in the previous paragraph.

Sustainability: at this point after the first round of pilots we collected enough information to proceed through a tuning of all technologies in order to let them fit better First Responders needs.

The following figure illustrates the path to sustainability, where, starting from identified First Responders needs addressing their ef-





fectiveness while improving their safety a sustainability flow starts with the support of both principles and motivations characterising the FASTER consortium generating a flow to sustainability involving First Responders, Researchers and finally the industry.

In order to guarantee the project sustainability, the FASTER team involved First Responders as stakeholders, coming from 8 different countries in the EU, the US and Japan; an advisory group is periodically discussing strategic choices done in the project and although the COVID 19 pandemic limited physical meeting, remote meeting also using Role Playing Game approach were used to better understand their needs and evaluate proposals.

The first round of pilots was performed in three countries and First Responders have been asked to provide their comments and suggestions to the researchers team. In the meantime, the team also collected information related to funding and decision mechanisms to be implemented to allow the adoption of FASTER technologies by First Responders. The project is going to release an average of TRL6/7 prototypes, so it is still early to address issues related to standardisation. Now that all possible steps to sustainability had been addressed it is important in the

next period to address the clear identification of what value proposition could be generated by developed technologies while identifying exploiters from the industrial and research views in order to reach the proper TRL levels to be adopted by First Responders. ■

1: Brem, A., & Puente-Diaz, R. (2020). *Creativity, Innovation, Sustainability: A Conceptual Model for Future Research Efforts*.



Italian Red Cross in action during the moncalieri pilot in Italy, January 2021



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