beAWARE

Enhancing decision support and management services in extreme weather climate events

700475

D2.5

Pilot Use Cases Setup for the Second Prototype

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Abstract

This deliverable presents an updated version of the pilots that contains pilot´s operational scenario, scenario use case, demonstration site, equipment and participants, as well as the user requirements after the interaction of the users with the first Prototype of the platform. The function of this deliverable is to serve as the mandate or terms of reference for the design, development and realisation of the 2nd prototype of the platform.

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Executive Summary

This deliverable report on the setup of the second pilot use cases of beAWARE (P2), due M24 (December 2018), based on the interaction of the users with the 1st Prototype of the platform. More specifically, this deliverable presents an updated version of the three scenarios: flood, fire, heatwave that will be used to test the functionality and efficiency of the 2nd prototype of the platform.

This report capitalises on an updated approach for eliciting user requirements, which explores and consolidates the information and feedback collected from the 1st Pilot which was conducted on November 2018 in Thessaloniki, Greece and the comprehensive evaluation that performed with the aid of questionnaires of the participants and the partners. All the feedback collected guided the users to create, in this report, a valid and understandable set of information that can serve as a term of reference for the design, development and realisation of the second prototype of the platform.

This work focuses on the user perspective and is supposed to ensure the overall user-centric approach of all R&D activities within the beAWARE project. Although some of the expected functionalities are described in detail, D2.5 does not aim to demonstrate system or technical requirements.

Abbreviations and Acronyms

The following abbreviations have been used in this document:

P1	Prototype 1 / First Prototype
P2	Prototype 2 / Second Prototype
SDS	Scenario Demonstration Site
COC	Command Operational Center
PSAP	Public Safety Answering Point
ASL	Above Sea Level
UI	User Interface

Partner Names and Acronyms

AAWA	Alto Adriatico Water Authority
CERTH	Center for Research and Technology Hellas
FBBR	Frederiksborg Fire & Rescue Service
FMI	Finnish Meteorological Institute
HRT	Hellenic Rescue Team
IBM	IBM Israel – Science and Technology Ltd
IOSB	Fraunhofer Institute of Optronics, System, Technologies and Image Exploitation
MSIL	Motorola Solutions Israel Ltd
PLV	Valencia Local Police
AAWA	Alto Adriatico Water Authority
CERTH	Center for Research and Technology Hellas

Glossary

Term	Meaning in beAWARE
A	
Audio Item	Audio recording.
B	
Building	A structure with walls and a roof and usually windows and often more than one level, used for any of variety of activities, as living, entertaining, or manufacturing (e.g. a house or factory).
C	
Crisis	Situation with high level of uncertainty that disrupts the core activities and/or credibility of an organization and requires urgent action.
Crisis Management	Management process that identifies potential impacts that threaten an organization and provides a framework for building resilience, with the capability for an effective response that safeguards the interests of the organization's key interested parties, reputation, brand and value creating activities, as well as effectively restoring operational capabilities. Crisis management also involves the management of preparedness, mitigation response, and continuity or recovery in the event of an incident, as well as management of the overall programe through training, rehearsals and reviews to ensure the preparedness, response and continuity.
Crisis Classification Component	In the content of beAWARE project, it is a component which integrates and deploys the necessary technological solutions enabling stakeholders (authorities, first responders, citizens) to (a) timely aware them for an upcoming extreme natural event by acting as an Early Warning System; (b) provide real-time monitoring of the ongoing crisis, facilitating the risk assessment and decision support processes via the PSAP (Public Safety Answering Points) component.
Classification	The action or process of classifying something.
Communication	Any type of (tele) communication infrastructure.
D	
Damage	Combination of exposure and vulnerability
Data Analysis	A type of a task involving data analysis.
Disaster	The occurrence of physical event who causes negative impact, such as a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.
Drone	an unmanned aircraft or ship guided by remote control or onboard computers
E	

Term	Meaning in beAWARE
Early warning	The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response.
Early warning system	The set of capacities needed to generate and disseminate timely early warnings.
Energy	Any type of energy-generating infrastructure.
Exposure	The presence of people, livelihoods, environmental service and resources, infrastructures, economic and social and cultural assets in areas or places that are subject to the occurrence of physical events and that thereby are subject to future potential negative impact
F	
Forecast	Definite statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area.
Forecasting model	Numeric representation of a physical phenomenon, which - starting from input data (other forecasts, measures, etc.) - solves by numerical techniques its internal equations and provides forecasts as output data.
Flood	An overflow of a large amount of water beyond its normal boundaries, involving an area usually dry, triggered by various events (rainfall, snowmelt, exceeding of a drainage network, ...)
Flood forecasting model	a forecasting model which provide estimation of hydraulic variables (such as water level, velocity, depth…) in a specific domain from meteorological forecasts or measure as (intensity of rain, humidity, temperature…) provided as input
Flood map	Hazard outcome in case if flood, expressing the spatial distribution of the intensity of the flood in terms of depth, persistence or velocity
H	
Hazard	The occurrence of a physical event with a certain probability and intensity. Unlike the disaster, hazard may not cause any negative impact
Heatwave	A period of abnormally and uncomfortably hot and usually humid weather
Human	Human beings in danger.
I	
Image Analysis	The task of extracting useful information from still images.
Image Item	Captured image.
Impact	The impact of natural disasters and incidents.
Impact Type	The various types of impacts, like human, economic, and environmental impacts (e.g. injuries, damage to properties etc.)
Incident	The various incidents taking place during a natural disaster.

Term	Meaning in beAWARE
Incident Type	The various types of incidents, like e.g. floods, blocked streets etc.
L	
Living Being	Any living being that is in danger during a natural disaster.
Location	A location (point or area), indicated by latitude, longitude, and radius.
M	
Mission	A mission assigned to a rescue unit during a crisis.
Monument	A structure or building that is built to honour a special person or event.
N	
Natural Disaster	The actual manifestation of a natural disaster type. An instance of a natural disaster has specific climate conditions with specific values (e.g. temperature = 45) plus some other properties (e.g. start/end time).
Natural Disaster Type	The various types of disasters, like e.g. floods, forest fires, storms or earthquakes etc.
P	
Police	Law enforcement infrastructure and services.
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current disasters.
Prevention	The outright avoidance of adverse impacts of hazards and related disasters.
Priority	The condition of being regarded as more important than others are.
Property	Any type of private property.
Public awareness	The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards.
Public information	Information, facts and knowledge provided or learned because of research or study, available to be disseminated to the public.
R	
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.
Relief Place	a position or the state of being covered and protected
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Term	Meaning in beAWARE
Responder	A first responder unit (e.g. a firefighter, police officer or emergency medical physician).
Risk	The combination of the probability of certain hazard to occur and of its potential negative consequences.
Risk assessment	A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.
Risk management	The systematic approach and practice of managing uncertainty to minimize potential harm and loss.
Risk map	Spatial distribution of risk in a certain area, obtained by evaluation and combination of hazard, exposure and vulnerability in each point of spatial grid od a certain size
River Section	graphic representation of a river obtained by the intersection a river reach with a vertical plane usually orthogonal to the main direction of the flow
S	
Scenario or operational scenario	environmental and ecological context of the natural disaster and its impact of the elements at risk and stakeholder assets
Sensor	A Sensor is an instrument that observes a property or phenomenon with the goal of producing an estimate of the value of a parameter.
Severity	Measure of the possible consequences of a hazard, for example given by the comparison between a measurement or forecast of a weather variable (e.g. temperature, water level, rain …) and one or more predefined alert thresholds.
Stakeholder	Every subject (person or groups) who holds interest or concern regarding a certain action, objective, project and can be affected by it or can affect it.
Street	The road network infrastructure.
Subway	Subway infrastructure.
T	
Task	A task that has to do with analysing or processing items.
Text Analysis	The task of analysing textual corpora.
Text Item	A piece of text.
Transportation	Transportation services and infrastructure.
Technical requirement	formalization, standardization and elaboration of the user requirement specification and allocation in the beAWARE subsystems
U	

Term	Meaning in beAWARE
Use Case	conceptual description of intended or expected utilization of the beAWARE system to prepare for, respond to, or act upon the occurrence of the scenario
User Requirement	expectation, request, guidelines for functionalities, capabilities, conditionalities and features that would facilitate the successful completion of an use case
V	
Video Analysis	The task of extracting useful information from video sequences.
Video Item	A video recording.
Vulnerability	Susceptibility or predisposition for loss and damage to human being and their livelihoods, as well as their physical, social and economic system when affected by hazardous physical event.
W	
Water depth	the height of the water (in a river section, channel section, section of a pipe, specific point of flooded area) measured from the bottom or the ground
Water Level	The height of the water (in a river section, channel section, section of pipe, specific point of a flooded area…) measured from well-defined zero (i.e. the mean sea level)
Weather station	Q place equipped for measure weather, meteorological, hydrological or hydraulic data

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1 Introduction

The Pilot Uses Cases setup for the 2nd prototype of the beAWARE platform will be used to test, through three pilots, for flood, fire and heatwave, the performance of the second version of the beAWARE system.

This deliverable is a revision of D2.3 providing updated pilot use cases and elaborated user requirements. In addition, an updated evaluation plan is provided, that will be applied after the implementation of the 2nd prototype.

More specifically, **Section 2** summarizes the results of the 1st prototype's evaluation within the heatwave pilot. This includes feedback and recommendations concerning the beAWARE technology, pilot organization, and the very evaluation methods. More detailed evaluation can be found in D2.4.

In **Section 3**, updated flood scenario is presented, including (i) operational scenario that contains description of the pre-emergency phase, emergency-phase and fade-out phase shown in a "Storyline" presenting all the steps that shall be taken to test the 2nd prototype be AWARE platform , (ii) pilot use case requirements that will be fully implemented in the P2 as well as those that will be implemented in the P3, based on the 2.10, h, (iii) updated use cases depending on their maturity, (iv) description of flood demonstration site, and (v) description of flood scenario's participants, their roles, and used equipment.

Sections 4 and 5 contain the descriptions of fire and heatwave scenarios in a way to reflect their own specificity, respectively and are structured similarly to Section 3. Also updated Block Diagrams are included that depict the partial implementation of the Use Cases, in this second step of optimisation, towards the full realisation of the beAWARE platform.

In **Section 6** a revised evaluation approach is presented taking into account the experience of implementing the original evaluation methodology (elaborated in D2.2, D2.3) within the heatwave pilot.

Finally, **Section 7** summarizes the conclusions.

2 Methodology

At this step of the elicitation methodology the objective is to enhance the use cases and to extract user requirements from the pilot experience. Towards this direction we have collected feedback with the aid of questionnaires. The creation of this questionnaires followed the criteria and guideline expressed in the D2.2, adapting the basic structure proposed here to the heatwave pilot. All participants in the questionnaire procedure have actively given their consent to submit their forms. The user profiles of the participants have been evaluated, in order to understand the validity of ideas and concerns and whether those should be reflected in the 2nd version of the platform. Due to the nature of the questionnaire, answers have been carefully interpreted and understood, taking user profiles of the participants and their priorities into account. The outcome is summarized below:

2.1 Evaluation of the BeAWARE Technology (P1).

From the interaction of the end users with the platform it has been noticed that beAWARE provides an efficient support to the Control room operators in understanding and managing the incidents arrived, providing an ordinate and intuitive list of them and showing their location on the map. BeAWARE also helped to overcome some various issues noticed with the legacy tools inside the city, such as bad radio signal, interference, misunderstanding, need to ask twice etc.

Despite that, it was noticed that the platform could offer better features in crisis management, for instance, by sending specific messages to persons located in specific zones or by assigning specific tasks to the responders. In addition, routes to places of relief and first responders' location should be shown on the map. Furthermore, it was noted that integrating elements of disaster risk reduction such as historical information, risk maps etc, would greatly enhance platform's capabilities.

2.2 Evaluation of the methods (P1).

The various evaluation methods allow the Consortium to gather very useful feedback about the pilot; the different information collected (questionnaires, observation forms and feedbacks) were coherent and aligned, even if each of them highlighted different aspects of the pilot.

In particular, the participation to the questionnaires was very positive, however it has been noticed that the users tend to answers to multiple choice questions, while they generally avoid to provided comments, justifications or every other written comment in the 'blank' spaces of the questionnaire.

The observation forms gave very useful qualitative result, however the observers found it hard to indicate the timing of the actions, as requested in the forms, due to fact that numerous actions were occurring in rapid succession or even simultaneously. Consequently, the forms didn't provide enough information about the timing of the performed actions to make a 'quantitative' comparison between beAWARE and the legacy tools session.

2.3 Outcome

Although the Use Cases defined are different and reflect the challenge of having to deal with different crisis events, we have decided in all use cases to follow a similar approach. Based on the analysis we have carried out, the feedback we gathered from the interaction of the users with the P1, the interviews and discussions with relevant stakeholders that have been chosen we have composed in this second cycle of optimization an updated operational scenario that will be used as a guideline for all the Use Cases. This scenario has 4 sessions which are:

1. **Session 1 - Pre-emergency phase:** In this phase, the main objective is the early provision of information on emerging hazards as also the quick distribution of the first alerts to the public
2. **Session 2 - Emergency phase Part A:** In this phase, the authorities monitor the situation and take preventive decisions in order to reduce the upcoming event. Additionally, it contains tasks such as management of the first responders, as also tracking of their position.
3. **Session 3 - Emergency phase Part B:** This phase is a continuation of the previous emergency phase and aims to demonstrate the mechanism of aggregation and semantic integration of emergency information from multiple sources as well as the insight this mechanism provides to the decision makers.
4. **Session 4 - Fade out:** At this phase is presented a de-escalation of the emergency event and a recovery procedure starts until all systems return to normal. The system will generate a final report as a summarization of the incidents that occurred.

The main objective of this scenario is to highlight that in every phase of a crisis event, the beAWARE technology is able to provide detailed outline of the situation and thus to offer a great decision support tool to the Authority and to help the quick diffusion of information to the public and to the first responders. In the following sections it is outlined how this guideline applies to each Use Case separately.

3 Flood Scenario

The Flood pilot for the 2nd prototype will take place in Vicenza from the 7th of March 2019 in the 'COC Room' located in the 'AIM palace' (Contrà Pedemuro S. Biagio, 72, 36100 Vicenza VI), where the PSAP will be established for the implementation of the pilot. The selected room is the place where the Municipal Operational Centre (the COC) is established during an emergency that involves the Vicenza Municipality.

The main stakeholder that will be involved during the pilot are:

- Municipality of Vicenza: 5 participants
- AAWA: 20 participants
- AIM S.p.A : 1 delegate
- 'Alta Pianura Veneta'soil reclamation consortium: 3 participants
- Genio Civile: 1 delegate
- Volunteers of the Civil Protection and other groups (Carabineers, Alpines troopers etc..): 30 participants

The participants to the pilot will be adequately trained to the beAWARE technology by AAWA. More in detail there will be offered two different training sessions, one for the control room operators and decision Makers, who will use the PSAP and the second for the volunteers who will use the mobile application to interact with the beAWARE platform. The training session for the volunteers will be conducted in the evening, after the standard Italian working day.

The following training session have been planned:

- 25th of February - from 20:00 CET to 22:00: First day of mobile application training for the volunteers, that will take place in the headquarters of the civil protection volunteer organisation in the District of Debbia in Vicenza;
- 26th of February - from 09:00 CET to 12:00: First day of PSAP training for the staff of the Vicenza Municipality; the training will take place in a room of the Municipality;
- 5th of March -- from 09:00 CET to 13:00: second day of PSAP training for the staff of the Vicenza Municipality, at the presence of the whole beAWARE Consortium; the training will take place in the conference room of S.Corona in the Naturalistic and archeological Museum of Vicenza
- 5th of March - from 20:00 CET to 22:00: Second day of mobile application training for the volunteers, at the presence of the whole beAWARE Consortium; the training will take place in the conference room of S.Corona in the Naturalistic and archeological Museum of Vicenza

Moreover, the 6th of March, at the presence of the whole beAWARE Consortium, A general rehearsal of the pilot with the beAWARE technology will be performed from 9:00 CET to 12:00 CET. The purpose of this rehearsal is to provide an intimate environment for volunteers and entry point for users into unfamiliar beAWARE technology.

The story line for the flood pilot will be divided in three sessions that globally will cover all the flood Use Cases, that are described more in detail in the following paragraphs.

3.1 Flood Pilot Operational scenario

A general overview of the pilot storyline, the roles and the various sessions has been already provided in the D2.10, so the following chapter is going to provide just a brief summary of the main key points, remanding to the contents of the D2.10 for more detail.

For the pilot's purpose, The storyline will be divided in 3 sessions, that will perform twice: The first time the management of the emergency situation will rely only on the use of the legacy tools (which are: telephone - stable and mobile lines, VHF, email and press releases); the second time, the session will be executed with the beAWARE platform and the end-user tools (PSAP, mobile app and Sensor Thing Server).

- Session 1: - **Pre-emergency phase**: it focuses on the EWS and forecasting models; the dataset that will be used for the forecasting models will be the same of the real flood of the 1st November 2010 with an adequate time-scaling to fit the pilot strictly timing; this session will be divided in:
    - Session 1a - legacy tools: from 8:00 CET to 8:30 CET of the 7TH March 2019
    - Session 1b - legacy tools: from 8:30 CET to 9:00 CET of the 7TH March 2019
- Session 2: - **Monitoring the river (threshold exceeding) and triggering of the pre-defined task of the civil protection plan**: the dataset that will be used for the sensor measurement will be the same of the real flood of the 1st November 2010, with an adequate time-scaling to fit the pilot strictly timing; this session will be divided in:
    - Session 2a - legacy tools: from 9:00 CET to 10:30 CET of the 7TH March 2019
    - Session 2b - legacy tools: from 10:30 CET to 12:00 CET of the 7TH March 2019
- Session 3: - **Management of the Emergency:**
    - Session 2a - legacy tools: from 9:00 CET to 10:30 CET of the 7TH March 2019
    - Session 2b - legacy tools: from 10:30 CET to 12:00 CET of the 7TH March 2019

After the execution of these sessions and the debriefing session of the pilot, a real time drone's flight demonstration will be performed in the S.Agostino district, simulating an emergency situation where a person in danger is detected in the Retrone River. The drone will shoot a footage during an automatic river navigation routine and through the beAWARE's

ingestion mechanism will forward it to the video-analysis module for the detection of the target.

The main 'active' roles that will be covered during the pilot are:

- **Decision Maker**– Role performed by the mayor or one of its designed delegates
- **Members of the COC** (Support of the Decision maker) – Role performed by delegates of various offices of the Municipality, AAWA, AIM, Genio Civile and Soil reclamation Consortium.
- **Control room operators** (who will use the PSAP) – role performed by Vicenza Municipality and AAWA
- **First responders** – role performed by Volunteers, members of Soil Reclamation Consortium and AAWA. The first responders will be organized in the following 6 teams:
    - Team 1, Team 2, Team3, Team 4 and Team 5: Located in the Vicenza City Centre
    - Team SA: composed by member of Soil Reclamation Consortium and located in the S.Agostino district
- **Rescue team's leader** (using a responder's account to login to the mobile application and access more advanced capabilities): chosen for each team as the member with greater experience in civil protection and\or in the use of certain type of technologies.
- **Citizen**: roles performed by volunteers and AAWA (using the default functionalities of the application without login to an account). The citizen will be organized in two team, named in the following 'Team Citizen 1' and 'Team Citizen 2'.

The main interactions between the different roles that will take place during the pilot are summarized in the following picture.

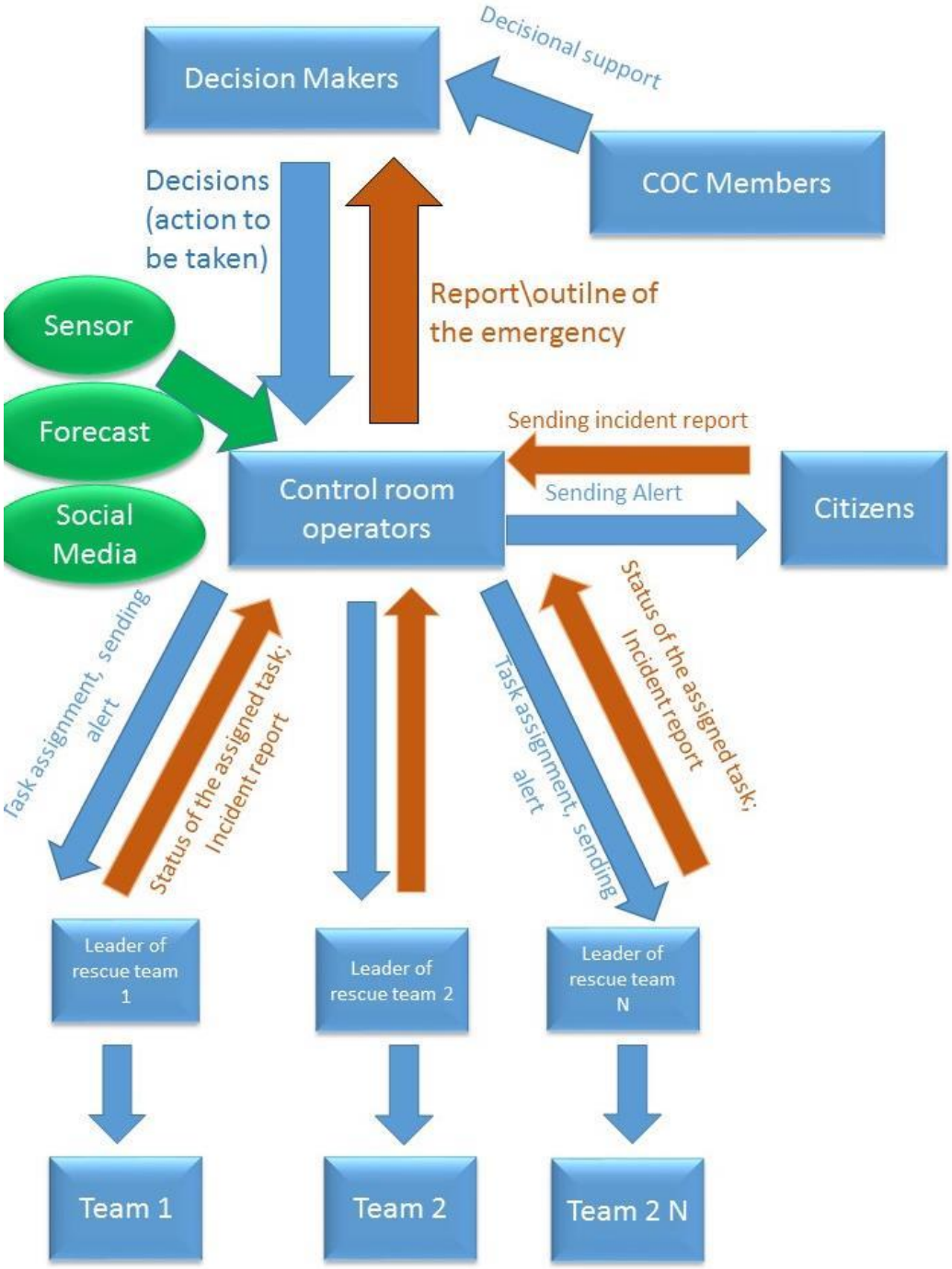


Figure 1. Roles and flow of information during the pilot

In addition to these 'active' players, there will be the role of the '**observer'** whose mission will be to watch the interaction of the 'players' with the beAWARE technology and to take notes about: the performed tasks, their timing, if there had been difficulties of any kind etc. During the pilot, the observers were located either in the control room (observers of the control room) or followed one of the various teams of first responders and citizen.

The following table contains the timetable for the three sessions of the pilot that will be performed with beAWARE technology. It should be noticed that this table represent the 'maximum' expectation for the pilot; however, since the timing is very strict and we cannot precisely estimate how long it takes for the users to perform certain actions, it could be possible that some of the actions in the table below will be skipped during the pilot. To determine if these timetables could be entirely presented during the pilot or not, a key indicator will be the results of the rehearsal and of the various test that are going to be performed before the pilot.

Session 1 – with beAWARE

Time	Location	Events	Actors	Action
08:30	COC room	PSAP activation with operator	Control room technicians	PSAP was activated due to the emission of the adverse weather conditions sent to the Mayor
08:35	COC room	Weather forecast of 4 march (h. 12:00 am) arrives from AMICO; it shows the exceeding of the first threshold in the next 54 hours	Control room technicians	- receiving of weather forecast - Evaluation of the forecasted scenario
08:40	COC room	Weather forecast of 5 march (h. 12:00 am) arrives from AMICO; it shows the exceeding of the second threshold in the next 54 hours	Control room technicians	- receiving of weather forecast - Evaluation of the forecasted scenario
08:40	COC room	COC activation	Control room technicians based on decision maker orders	- COC activation - Sending with PSAP of the communication dealing with COC opening. - Sending by PSAP of the alert based on AMICO results
08:40	Outdoor of the AIM building	Receiving of alerts	Citizen	- Receiving of public alerts on the App

08:40	COC room	Check of corresponding PGRA scenario	Control room technicians based on decision maker orders	- Search on the KB of the PGRA scenario corresponding to the actual situation
08:40	anywhere	Registration of teams with App in PSAP	Teams of volunteers	- Every team leader will install the app and will register on the app his/her team - Every team leader will declare the status of availability of his/her team without any task and
08:45	COC room	Weather forecast of 5 march (h. 12:00 am) arrives from AMICO; it shows the exceeding of the third threshold in the next 54 hours	Control room technicians based on decision maker orders	- receiving of weather forecast - Evaluation of the forecasted scenario - Sending by PSAP of the alert based on AMICO results
08:45	COC room	Check of teams on the territory	Control room technicians based on decision maker orders	- Check on PSAP the teams activated - Seeing of active teams and their location
08:50	COC room	Assignment tasks		Assignment of a task to team 1: verify the availability of sand bags in Matteotti square with PSAP (task on PSAP)
08:50	Near the Olympic theatre	Acceptance of task	Team 1	- the team leader receives the task and evaluate it - team leader accept the task

08:55	Matteotti square	Communication of reaching position	Team 1	- team reach the position (simulated) - team leader with App communicate that team 1 reaches the position
09:25	COC room	Check of active teams on the territory	Control room technicians based on decision maker orders	- Check on PSAP the teams activated and their status - Seeing of active teams, their location and the status of each task

Session 2 – with beAWARE

Time	Location	Events	Actors	Action
10:30	COC room	Monitoring on PSAP of the Valli del Pasubio sensors station (weather station)	Control room technicians	- PSAP notification of rain threshold exceeding - Visualization on PSAP of the rain gauge plot and confirmation of the exceeding
10:35	COC room	Check of the teams	Control room technicians based on decision maker orders	- Check on PSAP the teams activated and their status - Seeing of active teams, their location and the status of each task

10:40	COC room	Exceeding of the first threshold in Ponte Angeli	Control room technicians	- notification of threshold exceeding on PSAP and confirmation of the exceeding by seeing the plot - Threshold exceeding confirmed also from the Ponte Angeli webcam integrated on the PSAP
10:40	COC room	Sending of public alert to citizen	Control room technicians based on decision maker orders	- sending with PSAP of a public alert concerning the threshold exceeding - sending by PSAP of best practice for flood events
10:40	Any location	Alert receiving	Citizen and team leaders	- receiving of alerts on smartphone via App
10:45	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assignment of task 7 of the Civil protection plan to team 1 “Sluices on Astichello river”
10:45	Pusterla Bridge	Acceptance of task	Team 1	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
10:45	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assignment to team 1 of the task 33 of the Civil protection plan “140 sand bags in Matteotti square, opening of the distribution point”

11:45	Ponte Angeli bridge	Acceptance of task	Team 2	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
10:50	Park Querini	Communication of reaching position and proceeding with task	Team1	- team reach the position - team leader with App communicate that team 1 reaches the position and start work
10:55	Matteotti square	Communication of reaching position and proceeding with task	Team 2	-- team reach the position (simulated) - team leader with App communicate that team 2 reaches the position and start work
11:00	Park Querini	Communication of task complete	Team 1	- team leader communicates that the task assigned is complete and is available for a new task
11:00	COC room	Second threshold exceeding Ponte Angeli	Control room technicians	- notification of threshold exceeding on PSAP and confirmation of the exceeding by seeing the plot - Threshold exceeding confirmed also from the Ponte Angeli webcam integrated on the PSAP

11:00	COC room	Sending of public alert to citizen	Control room technicians based on decision maker orders	- sending with PSAP of a public alert concerning the threshold exceeding - sending by PSAP of best practice for flood events
11:00	anyone	Alert receiving	Citizen and team leaders	- receiving of alerts on smartphone via App
11:05	Matteotti square	Communication of task complete	Team 2	- team leader communicates that the task assigned is complete and is available for a new task
11:05	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assignment to team 2 to stay in Matteotti square and monitoring the distribution of sand bags
11:05	Matteotti square	Acceptance of task	Team 2	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
11:05	Matteotti square	Communication of reaching position and proceeding with task	Team 2	team reach the position - team leader with App communicate that team 2 reaches the position and start work

11:10	COC room	Second treshold exceeding in Retrone and S.Agostino	Control room technicians	- notification of threshold exceeding on PSAP and confirmation of the exceeding by seeing the plot - Threshold exceeding confirmed also from the webcam integrated on the PSAP
11:10	COC room	Invio di allerte alla popolazione (solo nell'area di S.Agostino)	Control room technicians based on decision maker orders	- sending with PSAP of a public alert concerning the threshold exceeding (local alert)
11:15	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assignment of the task “closure of sluice gates and check of pumps status” to SA team
11:15	S.Agostino - junction Cordano-Retrone	Acceptance of task	Team SA	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
11:15	S.Agostino - junction Cordano-Retrone	Communication of reaching position and proceeding with task	Team SA	- team reach the position (simulated) - team leader with App communicate that team SA reaches the position and start work
11:20	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assignment to team 3 of the task 1 of the Civil protection plan “ Aquadikes must be

				to be put on the opposite sides of the bridge”
11:20	Ponte Angeli	Acceptance of task	Team 3	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
11:20	Ponte Angeli	Communication of reaching position and proceeding with task	Team 3	- team reach the position (simulated) - team leader with App communicate that team reaches the position and start work
11:25	Ponte Angeli	Communication of issue during the proceeding of task	Team 3	- team leader with App communicate that team has a problem
11:25	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	-PSAP operator ask to team 4 to support team 3 for the task assigned. -PSAP operator assign to team 4 the same task as team 3
11:25	Ponte Angeli	Acceptance of task	Team 4	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task

11:30	Ponte Angeli	Communication of reaching position and proceeding with task	Team 4	-team reach the position - team leader with App communicate that team 4 reaches the position and start work
11:30	S.Agostino – junction Cordano -Retrone	Communication of task complete	Team S.A.	- team leader communicates that the task assigned is complete and is available for a new task
11:30	Matteotti square	Communication of the number of sand bags available on the distribution point	Team 2	- team leader communicates that remains the 60% of sand bags at the distributing point
11:30	COC room	Exceeding of the third threshold in Ponte Angeli	Control room technicians	- notification of threshold exceeding on PSAP and confirmation of the exceeding by seeing the plot - Threshold exceeding confirmed also from the Ponte Angeli webcam integrated on the PSAP
11:30	COC room	Recieving of social media data	Control room technicians	-Operators recieve results from the beAWARE social media analysis on the situation - Social media data confirms the high water level in Ponte Angeli section

11:30	COC room	Invio di allerte alla popolazione	Control room technicians based on decision maker orders	- sending with PSAP of a public alert concerning the threshold exceeding - sending by PSAP of best practice for flood events
11:30	anywhere	Alert receiving	Citizen and team leaders	- receiving of alerts on smartphone via App
11:35	COC room	Check of teams on the territory	Control room technicians based on decision maker orders	-Check on PSAP on the teams active and their status - Seeing of active teams and proceeding of each task - PSAP operator see that team 5 is available
11:35	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	- Assignment of task 6 of the Civil protection plan to team 5: " Minitoring of the situation at Convitto S. Marco"
11:35	Ponte Pusterla	Acceptance of task	Team 5	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task

11:40	Convitto S.Marco	Communication of reaching position and proceeding with task	Team 5	-team reach the position - team leader with App communicate that team 5 reaches the position and starts the work
11:40	Matteotti Square	Communication of the number of sand bags available on the distribution point	Team 2	- team leader communicates that remains the 30% of sand bags at the distributing point
11:45	COC room	Check of teams on the territory	Control room technicians based on decision maker orders	-Check on PSAP on the teams active and their status - Seeing of active teams and proceeding of each task - PSAP operator see that team 1 is available and is located near Ponte Angeli
11:45	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	- Assignment of task 6 of the Civil protection plan to team 1: " Monitoring of the situation at Convitto S. Marco"
11:45	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	- Assignment to team 1 the task: 80 sandbags to team 2 in Matteotti square

11:45	Ponte Angeli	Acceptance of task	Team 1	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
11:50	Ponte Angeli	Communication of task complete	Team 3 e 4	- team leader communicates that the task assigned is complete and is available for a new task
11:50	Matteotti square	Communication of reaching position and proceeding with task	Team 1	-team reach the position - team leader with App communicate that team 5 reaches the position and starts the work
11:55	Matteotti square	Communication of task complete	Team 1	- team leader communicates that the task assigned is complete and is available for a new task
11:55	Convitto S.Marco	Communication of task complete	Team 5	- team leader communicates that the task assigned is complete and is available for a new task

Session 3 – with beAWARE

Time	Location	Events	Actors	Action
13:00	COC room	Monitoring of Bacchiglione river with Ponte Angeli camera	Control room technicians	Operator see in PSAP the section of ponte Angeli with water level near the top of the embankments
13:05	COC room	Sending of a public alert concerning the near flood	Control room technicians based on decision maker orders	- sending with PSAP of the public alert concerning the near flood - sending by PSAP of best practice for flood events and the position of sand bags distribution points and secure areas
13:10-14:00	Vicenza City centre	Monitoring of the flood by citizen teams with App	Citizen team 1 and 2	- During the whole session citizen teams will move between the city center and the Bacchiglione river - Sending of periodic report via app concerning the status of flood (tweet, photos, videos)

13:10-14:00	COC room	Receiving of data from social media	Control room technicians	- During the whole session of beAWARE platform will collect tweets on a precise scheduled time - Operators receive data from social media analysis on the platform - social media data confirm the situation reported inside the incident reports from citizen and rescue teams
13:05	COC room	Communication about sand bags level	Team 2	- Team 2 with the App communicates that remain the 50% of the sand bags in the distributing point
13:10	Ponte Pusterla	Communication of the presence of a bridge obstructed	Team 5	- team 5 communicate the presence of wooden debris that obstruct the bridge - Team leader send an incident report “bridge obstructed” via app with some photos

13:10	COC room	Evaluation of the communication received	Control room technicians	-Operator see on the PSAP an incident report “bridge obstructed” in Ponte Pusterla and inform the decision maker
13:15	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Request for team 5 to call machinery to remove the obstruction
13:15	Ponte Pusterla	Acceptance of task and communication that team is already positioned	Team 5	- Team 5 accept the task, see the position and evaluate the scenario - team 5 accept the task - team leader with App communicate that team 5 reaches the position and starts the work
13:20	Contrà dei Torretti	Communication of possible bank failure	Team 3	- team 3 notice some failure on the wall of the bank of Bacchiglione - Team leader send an incident report “bank failure” via app with some photos

13:20	COC room	Evaluation of the communication received	Control room technicians	- -Operator see on the PSAP an incident report “bank failure” in Contrà Torretti and inform the decision maker
13:25	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Assegnazione a team 3 di rimanere in posizione e monitorare il muro
13:30	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Team 1 has to reach the distribution point in Matteotti square (task) and bring some sand bags from Team 2 and take them to Team 3 to resolve the bank failure
13:30	Ponte degli Angeli	Acceptance of task	Team 1	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
13:30	COC room	Receiving of a video from UAV in S.Agostino, evaluation of the situation, recognition of a person in Retrone river	Control room technicians	-PSAP operator receive the result of Drone analysys with the report about people in danger in Retrone river
13:35	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Task assignment to team SA, verify the presence of persons in danger in Retrone

13:35	S.Agostino - junction Cordano - Retrone	Acceptance of task	Team SA	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
13:35	COC room	Sending of public alert	Control room technicians based on decision maker orders	- PSAP operator see the distribution map of incident reports from citizen and rescue teams - Operator with PSAP send a public (small range eg. 250m) alert focused on the zone with high number of reports to signal that this area is flooded and citizen must leave.
13:40	Matteotti square	Communication of reaching position and proceeding with task	Team 1	- Team 1 communicate via App that reach the position (Matteotti square near Team 2) and is going to proceed with task assigned
13:40	Matteotti square	Communication about sand bags remain at the distribution point	Team 2	- team leader communicates that remains the 20% of sand bags at the

				distributing after the deliverable of team 1
13:40	S.Agostino - junction Cordano - Retrone	Acceptance of task and communication that team is already positioned	Team SA	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task
13:45	Ponte Pusterla	Communication of task complete	Team 5	- team leader communicates that the task assigned is complete and is available for a new task
13:45	S.Agostino - junction Cordano .- Retrone	Confirmation of people in danger	Team SA	- Team recognize a person in Retrone - Team confirm that the task assigned in complete - Team communicate that there is a person in danger in Retrone (incident report “people in danger”)

13:45	COC room	Task assignment to rescue teams	Control room technicians based on decision maker orders	Operator assign to Team SA the task “save people in danger”
13:45	S.Agostino - Confluenza Cordano e Retrone	Acceptance of task and communication that team is already positioned	Team 5	- team leader receive the task on the App, see the location and the decide about it - team leader accept the task - team leader communicates that the team is already positioned
13:45	Sala COC	Weather forecast of 7 march (h. 12:00 am) arrives from AMICO; it shows the lowering of water levels in the next 54 hours	Control room technicians	- Receiving of forecast - evaluating of scenario
13:50	Sala COC	The water level in Ponte Angeli is lowering	Control room technicians	- The exceeding of threshold arrives on PSAP, the plot show the water level of Bacchiglione in Ponte Angeli section below the second threshold - This information with the weather forecast show that the emergency is going to end

13:50	Sala COC	Sending of a communication of end of emergency	Control room technicians based on decision maker orders	- Operator send via PSAP the communication about the end of emergency
13:55	Contrà dei Torretti	Communication of task complete	Team 1	- Team communicate that the task assigned is complete and they will return to Matteotti square with sand bags for team 3
14:00	S.Agostino - junction Cordano - Retrone	Communication of task complete	Team S.A.	- Team communicate that the task assigned is complete and they will return to Matteotti square with sand bags for team 3

3.2 Flood Pilot User Requirement

The final full list of flood user requirements, been defined in D2.10 as result of the elicitation process started at the beginning of the project with the D2.1, and is reported in the table below. However, it should be noticed that, since the flood pilot will test the 2nd prototype of the beAWARE platform, not all the URs mentioned in D2.10, will be fully implemented during the flood pilot. More in detail, the UR fully implemented in the 2nd prototype of the platform is in green box in the table below, while the UR only partially implemented are listed in blue.

Table 1: Flood Pilot User Requirements

UR#	UC#	Requirement name	Requirement description
UR_101	All	Type of visualization	Display information to authorities in a web-GIS platform (citizen and first responders' reports by calls, apps, social media, Sensor measurements, etc.)
UR_102	101, 102, 103 104, 105, 106, 108	Map of the AMICO Flood EWS results	Display reliable and trustful flood forecasts, potentially dangerous situations and the forecasted level of risk to the authorities, based on the results of the Early Warning System AMICO (improved with the assimilation of Satellite data (snow cover, soil moisture, etc.) and Meteorological forecasts data with a finer spatial resolution provided by FMI)
UR_103	101, 102, 103 104, 105, 106, 108	Flood warnings	Provide authorities/citizens with automatic warnings on river levels overtopping some predefined alert thresholds, based both on forecast results (pre-emergency phase) and on real-time measurements by the sensors
UR_104	102, 103, 104, 105, 106	Send/receive emergency reports	Allow citizens to send text, images, audio and video messages from their mobile phone (for the different operative systems) and from their social media account to the authority during bad weather conditions when the GPS signal is low
UR_105	104	Send task reports	Allow First Responders to send reports about their assignments from their mobile phone to local authorities
UR_106	103,106	Visualize video cameras	Display streamed video from video cameras to the authorities/citizens

UR_107	102,103, 104, 105,106	Localize video, audio and images	Provide authorities with the ability to localize videos, audio and images sent by citizens from their mobile phones
UR_108	104	Localize task status	Provide authorities with the ability to localize first responders reports regarding the status of their assigned tasks
UR_109	102	Localize tweets	Provide authorities with the ability to localize Twitter messages concerning a flood event
UR_110	102	Localize calls	Provide authorities with the ability to localize Phone Calls (mobile application) to an emergency number concerning a flood event
UR_111	102, 109	Detect flooded elements from video	Provide authorities with the ability to detect and count flooded elements (e.g. cars and people inside the river) from video and images sent from mobile phones, social media and taken by drones
UR_112	102	Detect element at risk from reports	Provide authorities with the ability to detect the number of elements at risk and the degree of emergency by filling specific fields on the mobile app or from text sent by the mobile app and by social media
UR_113	102	Detect element at risk from calls	Provide authorities with the ability to detect the number of elements at risk and the degree of emergency from emergency calls
UR_114	102, 103, 106, 109	Detect water depth and velocity	Provide authorities with the ability to detect water level and water velocity from video and images sent by static cameras
UR_115	all	Real time flood mapping	Display flooded areas in real time to authorities/citizens coming from different sources (such as pre-defined risk maps, images taken by drones, etc.)
UR_116	102, 103, 105, 106, 108	Warning people approaching flood areas	Provide authorities with the ability to warn people in danger with warning messages, once they are approaching a flooded area

UR_117	102	Manage assignments in case of new emergencies	Provide authorities with the ability to manage first responder assignments
UR_118	106	River overtopping	Provide authorities/citizens with the ability to know if the river level is overtopping predefined alert thresholds
UR_119	103	Manage assignments based on river level overtopping	Provide authorities the ability to assign task to first responder teams related to the overtopping of predefined river level thresholds
UR_120	107	Map of rescue teams and task evaluation	Display to authorities the location in time of first responder teams in all the municipality and provide the ability to evaluate in real time the execution of the assigned tasks with a global visualization of the activities performed
UR_121	105	Detect rainfall volume and duration	Provide authorities with the ability to detect rainfall volume and duration from videos (static cameras)
UR_122	105	Rainfall warnings	Provide authorities/citizens with the ability to know in real time if the rainfall intensity is overtopping predefined alert thresholds
UR_123	106	Detect embankment exceeding	Provide authorities with the ability to detect from video, automatically, if a river embankment is overtopping and/or breaking. The module will detect overtopping in certain locations from static cameras. It requires a dedicated camera and feature for the specific location
UR_124	106	Embankment warnings	Provide authorities/citizens with the ability to know in real time if a river embankment is overtopping by employing static cameras which are calibrated to the characteristics of the specific locations
UR_125	102,106	Traffic warnings	Provide authorities with the ability to send warnings to citizens in order to avoid interferences inside the area involved by civil protection activities

UR_126	101	Map of Satellite data and weather forecasts	Display updated satellite images in case they are fed to the system and weather forecasts.
UR_127	all	Filters	Provide advanced filters in the data management platform (visualize and list information selected by filters/query)
UR_128	101, 102, 103, 105, 106	Evaluation of the level of risk	Provide authorities with the ability to evaluate the level of risks associated to the Citizens' and/or first responders' incident reports, based on all the available dataset, in particular on the information sent by citizen trough mobile application
UR_129	all	Automatic translation from a foreigner applicant	Make easy the communication between people with different languages. This feature refers to an automatic language detection, by performing speech recognition using all language models and then by comparing the scores
UR_130	all	Traffic Status	Display to the authorities the current traffic situation so that they can decide where to direct the first responders or inform them which roots to avoid
UR_131	all	Traffic warnings	Provide authorities with the ability to send warnings to citizens in order to avoid a certain area that is jammed with traffic
UR_132	109	Map of Drones images	Display updated images taken by the drone.
UR_133	102	Send water level estimation from mobile app	Provide the Citizen and first responders with the ability to estimate roughly the river water level by choosing a pre-defined water level category from a specific list in the mobile app.
UR_134	102	Send specific type of incident reports	Provide to the Citizen and the first responders the ability to use their mobile applications so as to specify the type of incident report from a pre-defined list of incidents.
UR_135	All	Specific mobile app for first responder and citizen	Provide different versions of the mobile app for citizen and first responders based on their different roles

UR_136	103	Detection of obstacles	Provide authorities with the ability to detect objects in the river (such as trunks, debris, etc.) that can impede the flow (in particular near bridge's openings, sluices, etc.) from video cameras and drones. The analysis module requires an extended amount of video samples to enable the robust detection of some types of obstacles.
UR_137	109	Detection the boundary of flooded area	Provide the authority the ability to visualize the extension of a flooded area from video taken by Drones. The analysis module requires extended samples to enable the image registration method and also the geo-location of every pixel in the image should be provided.
UR_138	All	Backup	Allow the authority to access and download in every moment, even after the occurrence of the flood, all the measurements and the forecasts, the text of all the incidents reports send by citizen or first responders, the list of the tasks assigned to the rescue teams and the texts of all the public alerts.
UR_139	110	Capacity of the safe areas	Provide to the authority the current level of crowding of the safe areas.
UR_140	110	Available resources at the sand packs distribution locations	Provide to the authority the current level of availability of the resources in all the sand-packs distribution points.
UR_141	,102,103, 108	Map of the Sensors measurements	Display the measurements taken from the available sensors of the weather stations.

3.3 Description of Flood Scenario Use Case

The following table in Blue those that will be partially implemented in the second prototype and finally in orange those that are in progress and will be evaluated in the final version of the system.

Table 2 shows the Use Cases for the flood scenario depending on their maturity. Specifically, in Green are shown the UC that will contain beAWARE technologies fully implemented in Blue those that will be partially implemented in the second prototype and finally in orange those that are in progress and will be evaluated in the final version of the system.

Table 2. Flood scenario Use Cases Modification

USE CASES FLOOD
UC_101: Declaration of the attention status and continuous monitoring of flood forecasting
UC_102: Management of new flood emergencies
UC_103: Monitoring river water level and assignment of tasks to first responders
UC_104: Evaluation of the execution of tasks
UC_105: Monitoring rainfall
UC_106: Monitoring river breaking/overtopping and assignment of relative tasks
UC_107: First responders monitoring
UC_108: Sensor and Flood forecasting alerts
UC_109: Acquiring images and video from drones and static cameras for flood risk management
UC_110: Management of the sand packs distribution points and of Safe Places

This section provides a description of all the differences between the final Use Cases (D2.10) and the2nd prototype's UCs

UC_103: Monitoring river water level and assignment of tasks to first responders

This Use Case concerns the assignment of tasks to first responders based on the monitored river water level both by the installed sensors and the results of visual analysis from cameras.

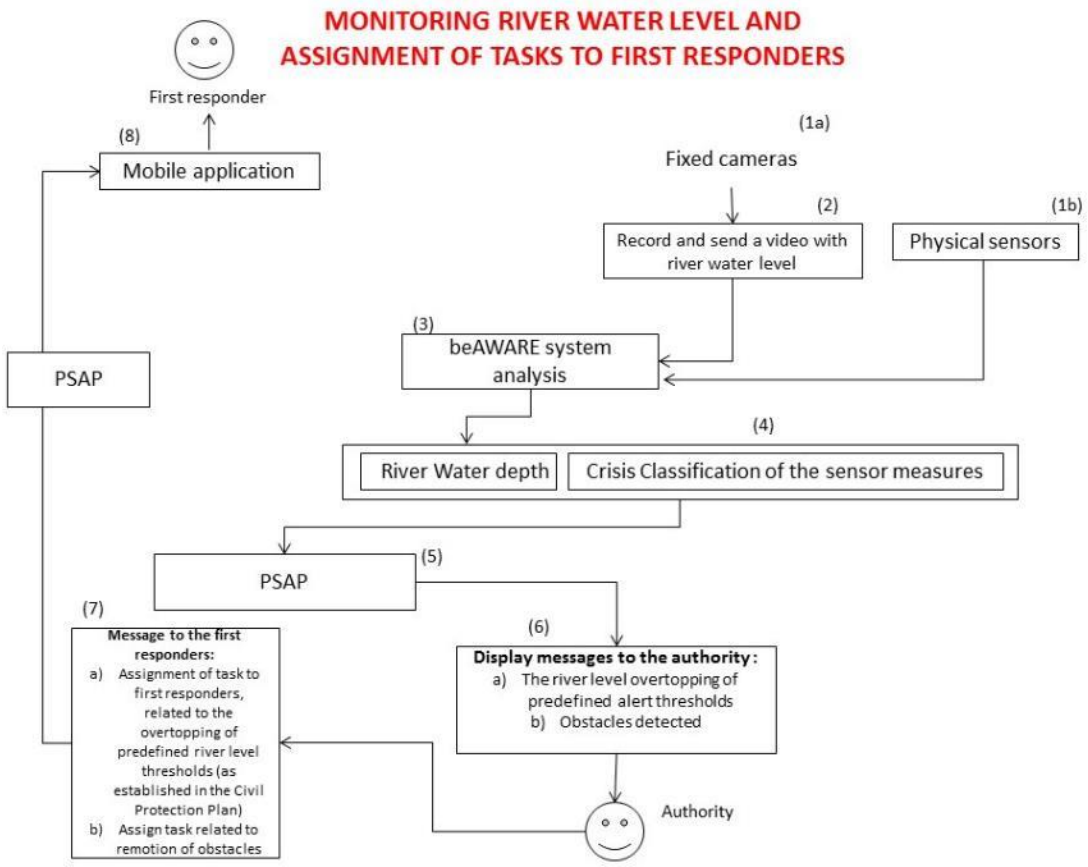
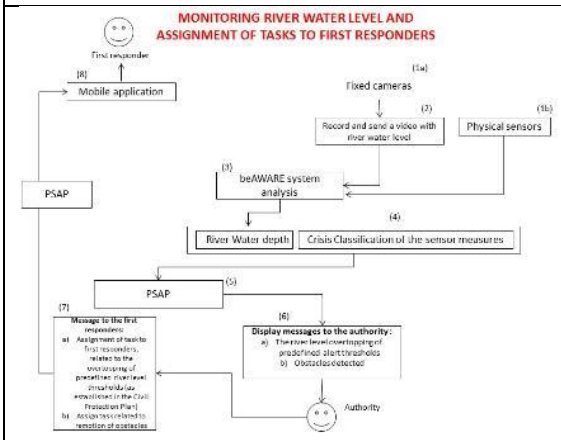
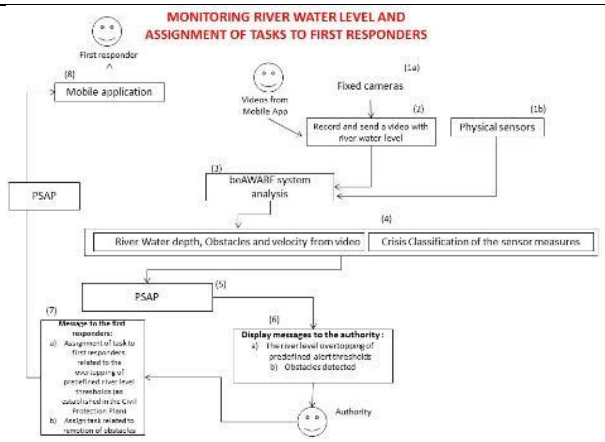


Figure 1. Block Diagram of the UC_103 for the 2nd prototype

The table below provided a comparison between the UC developed for the 2nd prototype and the one provided in D2.10.

Table 3. Updates from the UC_103

2nd Prototype	D2.10
Name	**Name**
Monitoring river water level and assignment of tasks to first responders	Monitoring river water level and assignment of tasks to first responders
Diagram	**Diagram**
	
Explanation	**Explanation**
Current Status (initial phase of the scenario) • Before the flood **What is known to the beAWARE system already** • Weather forecast • Sensors of the weather station for water level measures • Predefined alert thresholds of river level • Location of the forecasted flooded area **What is happening** • A fixed camera, located in correspondence of a river section of interest, records continuously water level inside the river • The system compares the measured data from sensors and the estimated water level from video analysis with the fixed thresholds aiming to detect a threshold exceeding	**Current Status (initial phase of the scenario)** • Before the flood **What is known to the beAWARE system already** • Weather forecast • Sensors of the weather station for water level measures • Predefined alert thresholds of river level • Location of the forecasted flooded area **What is happening** • A fixed camera, located in correspondence of a river section of interest, records continuously water level inside the river • The system compares the measured data from sensors and the estimated water level from video analysis with the fixed thresholds aiming to detect a threshold exceeding

Outcome	Outcome
• Once the river water level overtops predefined alert thresholds, the authority (e.g. mayor) assigns tasks to first responders	• Once the river water level overtops predefined alert thresholds, the authority (e.g. mayor) assigns tasks to first responders • Once the video analysis detects the presence of obstacles in the river (i.e trunks) that can create obstruction to the flow and increase the water level, the authority (e.g. mayor) assigns tasks to first responders

UC_105: Monitoring rainfall

This Use Case concerns the assignment of tasks to first responders based on the monitored rainfall intensity.

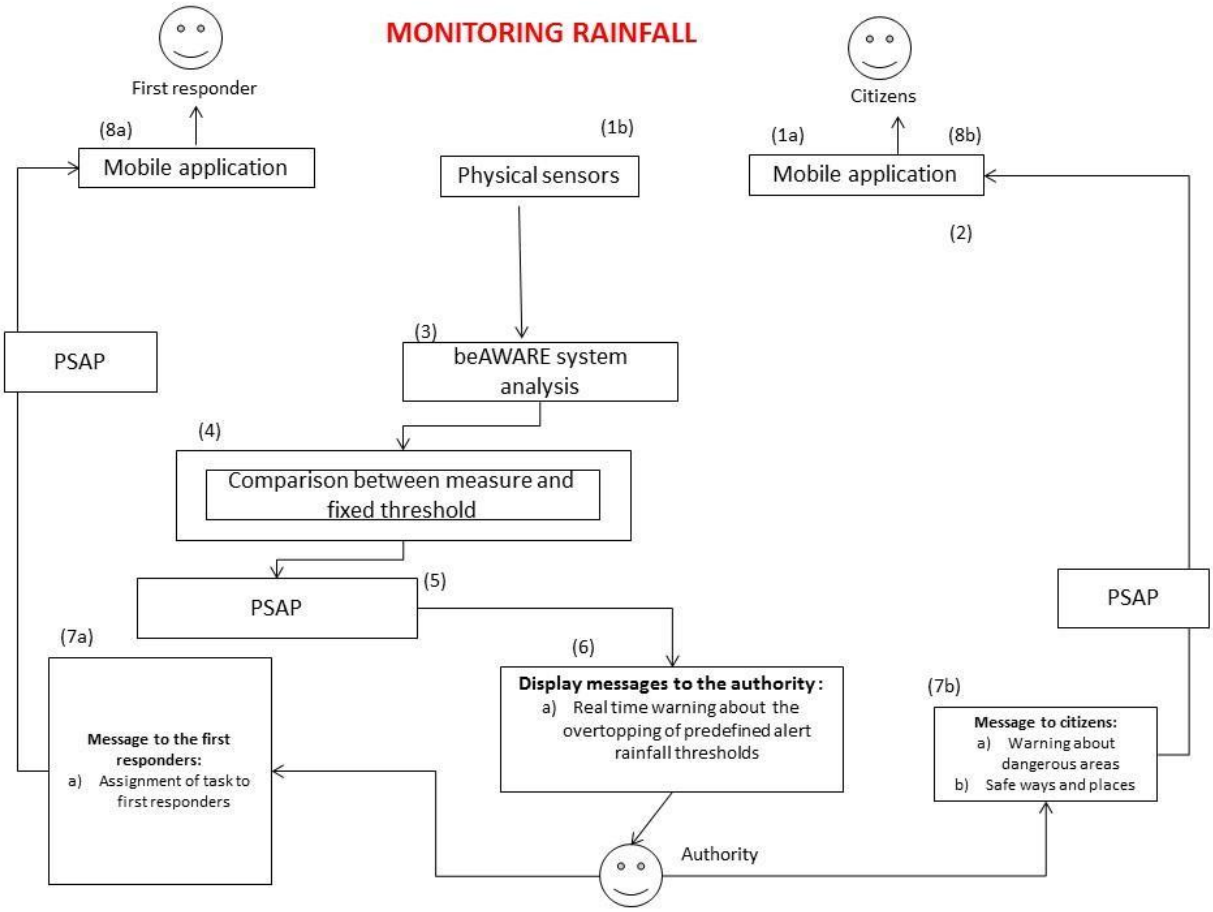
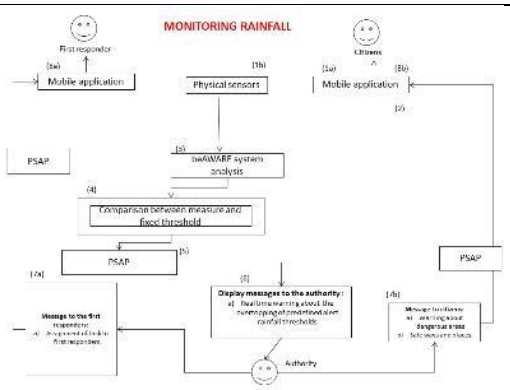
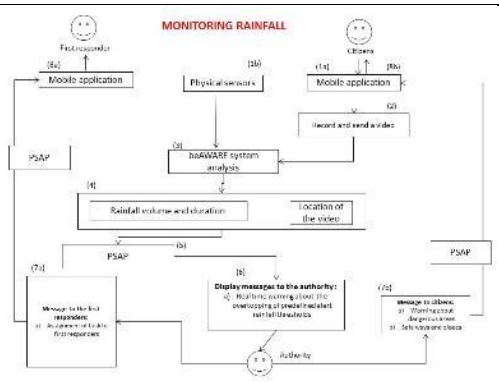


Figure 2. Block Diagram of the UC_105 for the 2nd prototype

The table below provided a comparison between the UC developed for the 2nd prototype and the one provided in D2.10.

Table 4. Updates from the UC_105

2nd Prototype	D2.10
Name	**Name**
Monitoring rainfall	Monitoring rainfall
Diagram	**Diagram**
	
Explanation	**Explanation**
Current Status (initial phase of the scenario) • During an intense rainfall event **What is known to the beAWARE system already** • Weather forecast • Land use • Soil moisture • Location of the forecasted flooded area • Predefined alert rainfall thresholds **What is happening** • Sensing data regarding weather observations (temperature, precipitation) are obtained and analysed **Outcome** • Once the rainfall threshold is overtopped the authority (e.g. mayor) assigns tasks to first responders (e.g. Pumping stations to be activated) • Once the rainfall threshold is overtopped the authority (e.g. mayor) sends notifications to citizens approaching the	**Current Status (initial phase of the scenario)** • During an intense rainfall event **What is known to the beAWARE system already** • Weather observations • Land use • Soil moisture • Location of the observed flooded area • Predefined alert rainfall thresholds **What is happening** • Sensing data regarding weather observations (temperature, precipitation) are obtained and analysed • Citizens are recording a video about a flooded area impacted after a rainfall event **Outcome** • Video analysis confirms that the area is flooded • Once the rainfall threshold is overtopped the authority (e.g. mayor) assigns tasks to first

dangerous areas (e.g. underpass to be avoided) and suggests alternative ways	responders (e.g. Pumping stations to be activated) • Once the rainfall threshold is overtopped the authority (e.g. mayor) sends notifications to citizens approaching the dangerous areas (e.g. underpass to be avoided) and suggests alternative ways

UC_106: Monitoring river breaking/overtopping and assignment of relative tasks

This Use Case concerns the assignment of tasks to first responders based on the monitored river breaking/overtopping.

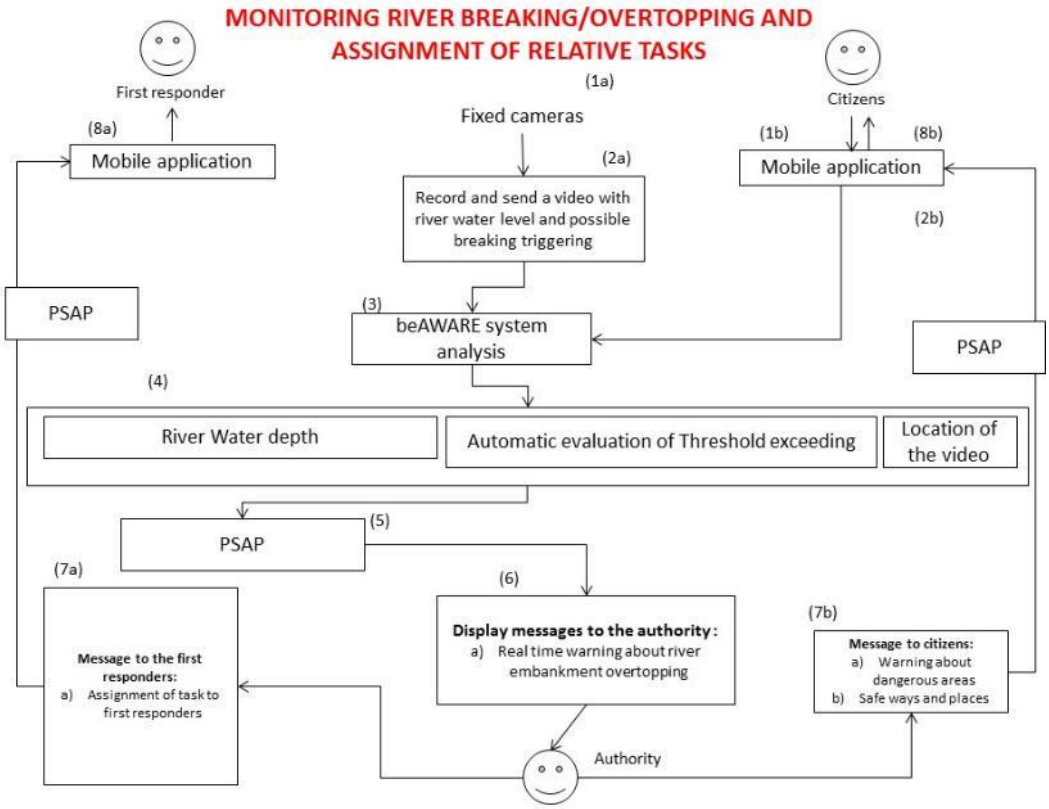
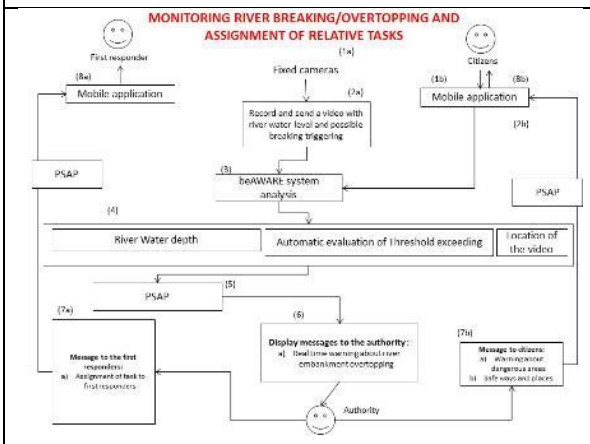
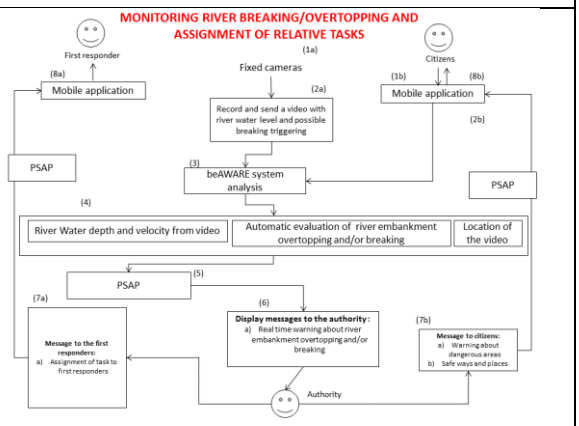


Figure 3. Block Diagram of the UC_106 for the 2nd prototype

Table 5. Updates from the UC_105

2nd Prototype	D2.10
Name	**Name**
Monitoring river breaking/overtopping and assignment of relative tasks	Monitoring river breaking/overtopping and assignment of relative tasks
Diagram	**Diagram**
	
Explanation	**Explanation**
Current Status (initial phase of the scenario) • Before the flood **What is known to the beAWARE system already** • Weather forecast • Location of the forecasted flooded area **What is happening** • Static surveillance cameras, located in the river sections of interest, record continuously water level inside the river and the possible overtopping triggering • Citizens are sending messages via mobile application concerning the river embankments and overtopping **Outcome** • Once the embankment is overtopped or broken the authority (e.g. mayor) assigns tasks to first responders • Once the embankment is overtopped or broken the authority (e.g. mayor) sends notifications to citizens approaching the	**Current Status (initial phase of the scenario)** • Before the flood **What is known to the beAWARE system already** • Weather forecast • Location of the forecasted flooded area **What is happening** • Static surveillance cameras, located in the river sections of interest, record continuously water level inside the river and the possible overtopping triggering • Citizens are sending messages via mobile application concerning the river embankments and overtopping **Outcome** • Once the water level rises and its close to overflood the authority (e.g. mayor) assigns tasks to first responders • Once the water level rises and its close to overflood the authority (e.g. mayor) sends

dangerous areas and suggests alternative ways	notifications to citizens approaching the dangerous areas and suggests alternative ways

UC_109: Acquiring images and video from drones and static cameras for flood risk management

This use case is related to the images and videos taken by drones and installed static cameras

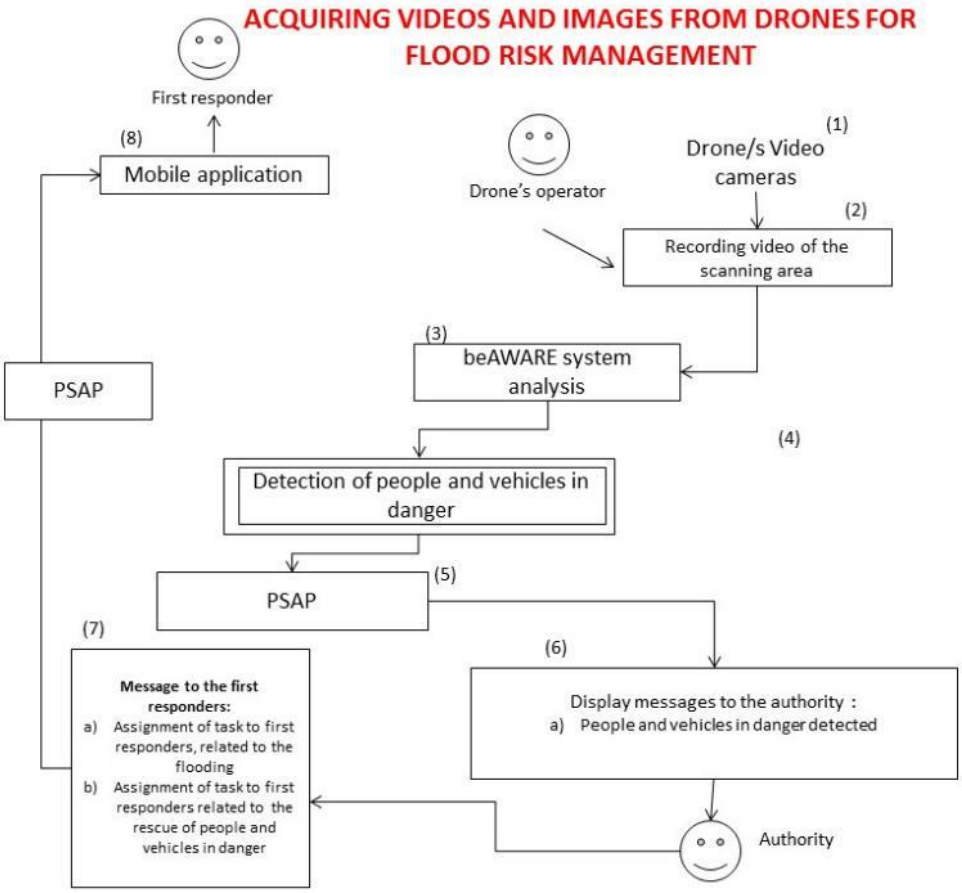
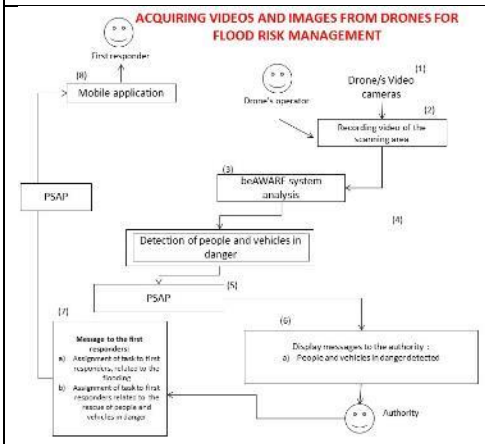
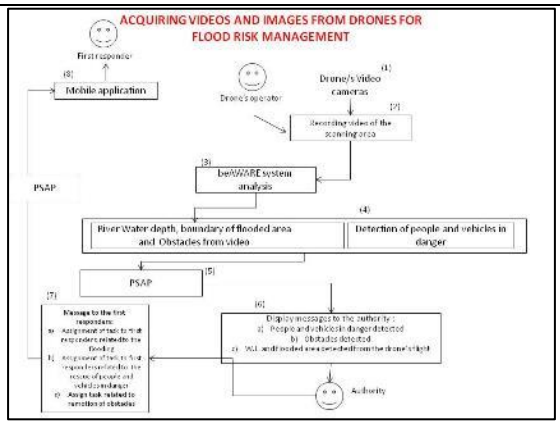


Figure 4. Block Diagram of the UC_106 for the 2nd prototype

The table below provided a comparison between the UC developed for the 2nd prototype and the one provided in D2.10.

Table 6. Updates from the UC_105

2nd Prototype	D2.10
Name	**Name**
This use case is related to the images and videos taken by drones and installed static cameras	This use case is related to the images and videos taken by drones and installed static cameras
Diagram	**Diagram**
	
Explanation	**Explanation**
Current Status (initial phase of the scenario) • During the flood **What will happen:** • Video and images from drones and installed surveillance (static) cameras arrive to the beAWARE system. • Visual analysis is applied to media files in order to detect the potential presence of people and vehicles in the river. **Outcome** • Once the presence of people and car in danger is detected, the authority (e.g. mayor) assigns tasks to first responders	**Current Status (initial phase of the scenario)** • During the flood **What will happen:** • Video and images from drones and installed surveillance (static) cameras arrive to the beAWARE system. • Visual analysis is applied to media files in order to detect the water level, the extension of the flooded area and the potential presence of people and vehicles in the river. **Outcome** • Once the presence of people and car in danger is detected, the authority (e.g. mayor) assigns tasks to first responders

3.4 Description Flood Demonstration site, equipment and participants

For the flood pilot's purpose, three different areas have been individuated

- **Control Room (or COC Room):** where the COC is established in case of a crisis that involves the municipality. In this room, for the entire duration of the pilot, the Decision maker will be settled, together with the COC delegates, the control room operators and the relative observers.
- **Vicenza City centre**: First responders and Citizen will be divided in teams deployed in the most critical points (in terms of flood risk) along the Bacchiglione River, in order test the mobile application.
- **The S.Agostino district**: this area is located in the southern of the Municipality of Vicenza, Crossed by the River Retrone. In this district will be deployed one of the rescue team and, after the pilot, will take place the autonomous drone flight.

In the following sub-chapters, a description of each of these areas of the participant and of the required equipment is going to be provided

3.4.1 Control Room

The Room of the COC (Municipal operative command centre) is located at the highest floor of the AIM Palace in Contrà Pedemuro S. Biagio, 72, 36100 Vicenza VI.

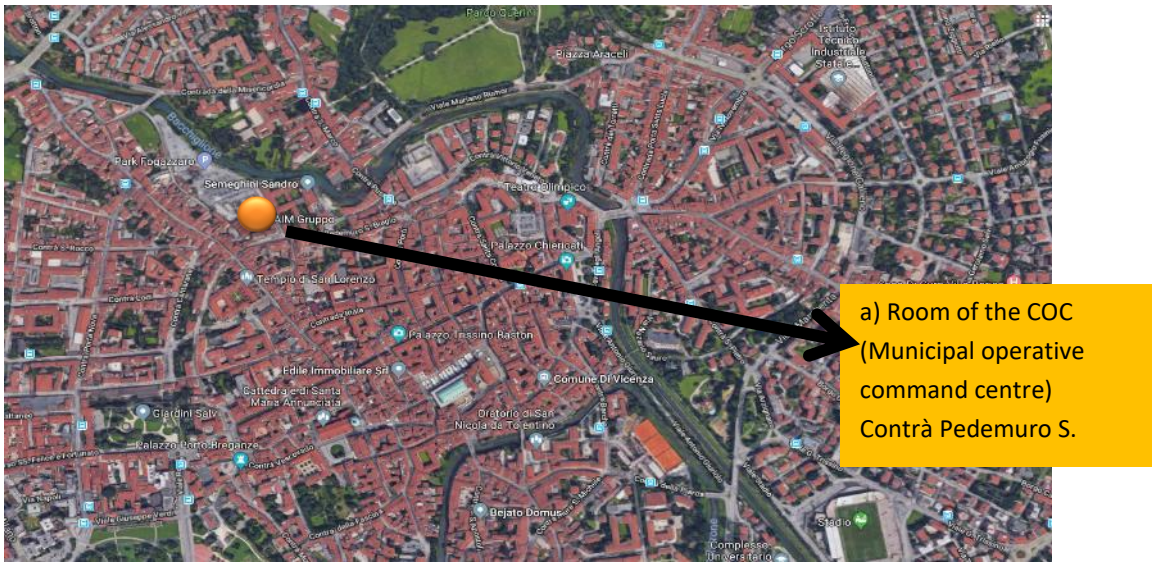


Figure 5. Position of the AIM Palace in the Vicenza City Centre

Figure 6. COC room.

During the Pilot, in the room will be allowed the presence of:

- the Decision maker
- 5 members of the COC
- 7 Politicians
- 6 control room operators (4 from the Municipality of Vicenza, 2 from AAWA's staff)
- One translator
- 4 observers
- Audience from beAWARE's projects and EU commission

In the COC room will be established the beAWARE Platform, in particular the PSAP Station (6 screens, one for the Map, one for the dashboard, one for the emergency management and one for issuing public alert) and the KB station (2 monitors), and the other legacy tools that will be used by the control room operators.

More in detail, the required equipment for the control room set-up is:

- 1 projector
- 6 screens for the PSAP and Sensor Thing Server
- 4 Laptops
- 1 Mobile device with the beAWARE mobile app

- VHFs for control room operator

It should be mentioned that the composition of the control room is not yet decided. Based on the final number of authorities that will be present, an auxiliary space beside the COC, that is currently used by the Municipality for the administration of the rescue teams, will be used.

3.4.2 **City Centre area**

Five teams of first responders will be deployed in the city centre, each of the team will be composed by:

- 3 volunteers
- 1 observer from AAWA (who speaks Italians)
- 1 observer from beAWARE Consortium

Each team will be equipped with:

- One mobile device (assigned to the rescue team leader), with the First responder version of the beAWARE mobile app installed
- One VHFs devices for each rescue team's leaders

Each rescue team has to perform certain task in specific location in the Vicenza City centre. according to the previously defined time table.

The involved areas of the city centre, which represents ones of the most critical points in case of flood, are:

- The bridge 'Ponte degli Angeli'
- The square 'Piazza Matteotti' (where the sand-pack distribution point is established)
- The Olympic theatre
- The street contra Torretti
- The boarding school 'Convitto S.Marco'
- The bridge 'Ponte Pusterla'
- The Querini Park

Figure 7. Main location of the rescue team during the pilot

In the table below is provided a summary of the location of each rescue team during the various phases of the pilot.

	Team 1	Team 2	Team3	Team 4	Team5
Session 1a (8:00 – 8:30)	8:00: In front of AIM Palace	In front of AIM Palace	In front of AIM Palace	In front of AIM Palace	In front of AIM Palace
	8:25 Matteotti square				
Session 1b (8:30 – 9:00)	8:30: Olimpc theatre	In front of AIM Palace	In front of AIM Palace	In front of AIM Palace	In front of AIM Palace
	8:55 Matteotti square				
Session 2a (9:00-10:30)	09:15 Pusterla Bridge	9:15 Ponte Angeli Bridge	9:30 Nearby Ponte Angeli Bridg	9:55 Nearby Ponte Angeli Bridg	10:05 Pusterla Bridge
	09:20 Querini Parl				
	10:15 Ponte Angeli		09:50 Ponte Angeli		10:15 Convitto S.Marco

	10:20 Matteotti square (with team 2)	9:25 Matteotti square (sand pack distributin point)		11:00 Ponte Angeli (with team 3)	
Session 2b (10:30 -12:00)	10:45 Pusterla bridge 10:50 Querini Park	10:45 Ponte Angeli bridge	11:00 Nearby Ponte degli Angeli	11:25 Nearby Ponte degli Angeli	11:35 Pusterla bridge
	11:45 Ponte Angeli 11:50 Piazza Matteotti (con Team 2)	10:55 Matteotti square (sand pack distribution point)	11:20 Ponte Angeli	11:30 Ponte Angeli (with team 3)	11:45 Convitto S.Marco
Session 3a (12:00-13:00)	12:30 Ponte Angeli 12:40 Matteotti square (with team 2) 12:55 Contrà dei torretti (With team 3)	Matteotti square (sand pack distribution point)	12:00 Ponte Angeli 12:20 Contrà dei Torretti	Together with the Citizen's team	12:10 Pusterla Bridge
Session 3b (12:00-13:00)	13:30 Ponte Angeli 13:40 Piazza Matteotti (con team 2) 13:55 Contrà dei torretti (Con team 3)	Piazza Matteotti (posizione del presidio di sacchi di sabbia)	13:00 Ponte Angeli 13:20 Contrà dei Torretti	Together with the Citizen's team	13:10 Pusterla Bridge

In addition to the rescue in the session 3, two team of 'citizen' will be deployed pre-defined path in the city centre along the Bacchiglione River, focusing on the most critical point

identified by the Civil Protection Plan, where the Citizen will test the mobile app by sending incident report.

Each citizen team will be composed by :

- 2 members of AAWA staff outside beAWARE project
- one or two volunteers
- 1 observer from AAWA (who speaks Italians)
- 1 observer from beAWARE Consortium

Each team of volunteers will be equipped with:

- Two mobile devices, with the Citizen's version of the beAWARE mobile app installed

Figure 8. Map of the most critical areas in the city centre in case of flood

3.4.3 **St. Agostino District**

In the district of S.Agostino (southern part of the Vicenza Municpality) will be deployed one team of first responders (named Team S.A in the story line), moreover; after the pilot there will take place the demonstration of the autonomous drone flight and the video-analysis to detect people in danger.

The rescue team in the S.Agostino district will be composed by:

- 2 volunteers from the Alta Pianura Veneta Soil reclamation consortium;
- 1 observer from AAWA

The team will be equipped with a mobile device where the First responder's version of the beAWARE app will be pre-installed.

The drone's flight will be performed by an authorized drone pilot employed by AAWA, according to the Italian regulation about drones.

For the drone's test, this additional equipment is required:

- One dummy to simulate people in danger
- One drones type DJI Mavic Pro, with its remote control and supply batteries
- 2 Mobile routers
- Laptop and mobile phone with the drone's software installed
- Laptop (for running the PSAP)

AAWA will also organize a shuttle service for transferring the beAWARE partner and the EU commission delegates from the vicenza City centre to this district (about 6km)

Figure 9. Part of the equipment using in occasion to one of the preliminary drone's flight on the 26th of November 2018=

4 Fire Scenario

This pilot case focuses on the management of the fire and evacuation of 980 people from two 3 floor buildings threatened by fire to a safe place. The incident is included within a pre-emergency level 3 (extreme risk of wildfire).

The completion of the fire pilot will be based on an exercise as its evaluation. The duration of the exercise is a 2 days event composed of several sessions.

The storyline for the fire pilot has five stages as follows:

1) Pre-emergency activation (level 3, extreme risk of fires).
2) Spotting a fire (emergency level 0 activation).
3) Worsening of the situation (emergency level 1 activation).
4) Evacuation management of educational centers. (emergency level 2 activation).
5) Fade out.

The storyline starts with the pre-crisis phase. There is a simulation of meteorological sensors measurements indicating an extreme risk of forest fires, and therefore the established protocol for pre-emergency level 3 (extreme risk of wildfire) is started and public alerts are sent through beAWARE platform.

During the pre-emergency phase the Crisis Classification module acquires forecasting data to classify the crisis level and provides early warnings to the system. Moreover, through the synthetisation of internal knowledge and external knowledge, valuable knowledge is generated, integrated into the beAWARE KB and visualised on the map. The Crisis Classification component acquires this data to classify the crisis event and provides early warnings followed by the estimated crisis level in local scale (identifying small areas of interest) and global scale. The results are sent to the PSAP where, upon users' request, a metric map and a dashboard interface are displayed allowing to the Users several ways of interaction. After receiving the indication of a forecasted crisis event, the decision maker assesses the situation and issues a general alert informing the general public about the forthcoming event. The following session starts when PSAP receives a warning from a citizen spotting a fire through the beAWARE system. Then the fire emergency protocol is activated (emergency level 0 activation), by means of informing and mobilizing the correspondent personnel.

In this phase the Real-Time Monitoring and Risk Assessment component is activated to estimate the risk of the ongoing crisis event. On the Dashboard of the PSAP there are several indicators illustrating the information received. The preventive measures are assigned semi-automatically to the first responders through the task manager and the task assignment

forms. The task assignment form is an extension to the incident view, which allows the operations manager to assign an incident to one or more response teams. The Tasks that are successfully assigned to teams can be tracked on the Tasks Table through a list of assignments given by the PSAP operators to the response teams. The mobile application provides also a channel to first responders to interact with the risk assessment process by inserting into the system valuable observations from the field. The obtained data is analysed and weighted in the estimation of the local level crisis risk.

In the third session, a worsening of the emergency occurs. Emergency level 1 is established and public alerts are sent through beAWARE platform.

This phase is a continuation of the previous emergency phase and aims to demonstrate the mechanism of aggregation and semantic integration of emergency information. beAWARE system collects and combines data from incidents reported by first responders in the field or citizens that are in danger. The analysis components of the system analyse the content of the reported incidents to extract conceptual information. The outcome of the analysis contributes to the detection of emergencies.

The storyline continues with the emergency level 2 activation and the evacuation of approximately 980 people (880 students plus 100 teachers) from two specific 3 floors buildings.

The emergency level 2 ends when people in danger are evacuated and fire is extinguished and controlled.

The purpose of the fade out phase is to demonstrate how the beAWARE supports direct and easy communication, between authorities, first responders and citizens and facilitates the distribution of information even in the *final phase* of the *emergency* management cycle. At this phase authorities remove the alert by sending a public message through the beAWARE platform.

More details about the proposed storyline can be found in the table below.

Table 7: Fire Pilot Story Line

	Legacy tools	beAWARE	Trigger	Expected behaviour	Players	Observers - Evaluators	Evaluation
Session A - Pre crisis GOAL: early warning, understand the problem, send the first alerts							
According to the weather forecast pre-emergency level 3 must be declared. Emergency Coordination Center (CCE) Issues a warning (fax and/or e-mail) to the affected municipalities. All public safety agencies related with the fire emergency plan are in a state of alert.	Phone call, walkie-talkie (TETRA)	**Crisis classification -> PSAP** **forecast data** **Highest temperature/wind/humidity values** **Average values**	Crisis Classfication run	See all the metrics and decide if there is an extreme risk of fire or not	3 PSAP operators (these roles will be there the whole time of the pilot in all sessions)	4 PSAP (these roles will be there the whole time of the pilot in all sessions)	
Authorities are issuing a warning informing the	Press, social media.	Public alert -> mobile app		Send three alerts • Message for public • Message for	4 end users with app 4 citizens with the app	2 in each team (total 4) 2 in the citizens group	

general public, and will mobilize the resources to be prepared for extreme risk of fires.				authorities • Message for first responders			
General instructions are given to the general public through the press, social media and public releases.		Public alert->mobile app		More specific instructions based on location are given through the beAWARE mobile app.	4 end users with app 4 citizens with the app	2 in each team (total 4) 2 in the citizens group	
Session B – Spotting a fire GOAL: Testing image/video/voice sharing by citizen for an early warning							
The day of the forest fire starts at 11 a.m., with a citizen's call to the PSAP/112 reporting a fire. of a citizen informing of a fire spotted. If the PSAP receives the call, it The PSAP	Phone call	Crisis classification -> PSAP (Emergency level 0) Mobile app-> PSAP (Image/video/voice+geolocalization)	Crisis Classfication run	Early warning is done faster thanks to the mobile app, and image/video provides more information than usual phone calls	3 PSAP operators (these roles will be there the whole time of the pilot in all sessions) 1 Citizen (spots the fire)	4 PSAP (these roles will be there the whole time of the pilot in all sessions)	

calls to 112 number (CCE). Initially pre-emergency then switches to emergency level 0. Authorities are notified through phone calls and text messages..							
An initial crew of firefighters and police officers are sent to the area	Phone call, walkie-talkie (TETRA)	Public alert->mobile app		All public authorities agencies related with the fire are in a state of alert, and a dedicated warning is issued by the beAWARE platform to all its users.	4 end users with app (2 policemen, 1 firefighter unit) 2 citizens with the app	1 in each end user (total 2) 2 in the citizens group	
PSAP receives new information about the crisis	Walkie-talkie (TETRA)	Mobile app->PSAP	Crisis Classfication run	End user send a report to PSAP	4 end users with app (2 policemen, 1 firefighter unit)	1 in each end user (total 2)	
Session C – Situation Worsening (switch to emergency level 1) **GOAL: Testing image/video/voice sharing by end user for an early warning**							

At 11.30 due to the extreme weather conditions, forest fire has worsened and emergency level increases to level 1	Phone call, walkie-talkie (TETRA).	Mob app, text report, social media (live tweets)	The call centers are receiving numerous calls of citizens and school staff that are seeing the forest fire or a big smoke column.		2x (2 end users in the field)	2 observers with them	
More resources are mobilized to the forest fire (one police patrol and two firefighters´ units) An advanced control post is established.	Phone call, walkie-talkie (TETRA)	Public alert->mobile app	Inform the authority of the new emergency level and that the advanced control post has been established	A flight with the drone is done from the advanced control post to assess the danger.	2 citizens with the app 2 policemen (one patrol) 2 firefighters´unit (5-7 members)	2 in the citizens group 3 in the end users groups	
A general warning is issued and citizens closer (or inside the natural park) receive more specific instructions	Phone call, walkie-talkie (TETRA).	Public alert->mobile app	Crisis Classfication run	Public is advised with updated instructions through the beAWARE mobile app. (Stay away and/or confinement measures)	2 citizens with the app 2 policemen (one patrol) 2 firefighters´unit (5-7 members)	2 in the citizens group 3 in the end users groups	
Session D – Evacuation Management of educational centres							

Thanks to the images provided by the drone we can determine that forest fire is heading towards urban areas and protective measures for citizens may be necessary. Therefore, emergency level is switched to level 2	Phone call, walkie-talkie (TETRA)	PSAP->mobile app Drone->Mobile app Mobile app-> PSAP	Crisis Classfication run	Updated instructions through the beAWARE mobile app are sent to citizens. (Stay away and/or evacuation/confinement measures)			
Educational centers inside the affected area are sent a notification informing of the necessity of evacuating these centers	Phone call, public address system, door by door warning/ notification to janitors	Public alert->mobile app		Primary school and secondary education institute activate the evacuation management in case of emergencies	4 inside educational centers (2x General coordinator and 2x responsible of alarm activation) 1 police patrol	3 (2 inside educational centers and one with new police patrol)	
Teachers and students go to a safe area. End users coordinate the evacuation.	Phone call, walkie-talkie (TETRA)	Public alert->mobile app			4 inside educational centers (2x General coordinator and 2x responsible	3 (2 inside educational centers and one with new police patrol)	

					of alarm activation) 1 police patrol		
All people in danger are in the safe area, only end users are close to the fire spot	Phone call, walkie-talkie (TETRA)	Mob-app		Reports from safe area with images and videos			
Session E - fade out							
Report from the team in the field, they determine that the fire has been extinguished	Phone call, walkie-talkie (TETRA)	Mobile app-> PSAP		Students and teachers can safely go back to the educational centers. Normal circulation and behavior is reestablished	1 Firefighter unit (chief in the Advanced control post)	2 observers	

4.1 Fire Pilot Use Case User Requirements

In this subsection will be presented the updated User Requirements, based on those as they were formed in the D2.10

The following table (Table 8) shows the User requirements for the fire scenario depending. In Green are shown the URs that are fully supported by P2, in Blue those that will are partially supported in the second prototype and in orange those that will be supported in the final version.

Table 8.User requirements Fire Pilot

UR#	UC#	Requirement name	Requirement description
UR_201	201, 204	Detection of people and goods in danger	Display information authorities/first responders to detect people and cars in danger.
UR_202	201,202,203,204	Detection of critical aspects	Provide authorities/first responders information in order to detect the following kind of situation, process, material or condition that can cause a wildfire or that could intensify its damaging impacts: Namely drought, air temperature and other weather aspects, fuel accumulation spots, crowds, etc.

UR#	UC#	Requirement name	Requirement description
UR_203	201,202,204	Study of the smoke behaviour	Provide information authorities/first responders with a study of the smoke behavior (vertical/inclined, column, smoke color). Extensive data samples are required for each specific type of smoke behavior for the training of the model.
UR_204	201,202,204	Identification of the fuel being burned	Provide information to authorities/first responders to know the type of fuel being burned by the color and the shape of the smoke. Extensive data samples are required for each specific type of fuel and various illumination changes due to daylight conditions, for the training of the model.

UR#	UC#	Requirement name	Requirement description
UR_205	201-202-204	Analysis of advancing fire	Provide authorities/first responders with an analysis of the advancing fire (flame progression, height and length). The analysis module requires extensive pri or knowledge of the area of interest, such as maps of vegetation and combustible materials, terrain morphology, accurate weather forecast and study of the microclimate caused by the fire, along with geo-location and characteristics of the fire and the burned area.
UR_206	201,202,203,204	Specific weather data	Provide authorities/first responders and citizens with specific weather data of the Devesa place, as it has a specific microclimate that might be different from other places.

UR#	UC#	Requirement name	Requirement description
UR_207	201,202,204	Aerial images/video (drone)	Display authorities/first responders to visualize aerial images of the fire and the trajectory of the flames. It will provide information about the extension (in case where we can detect the fire in sequential video frames) and the track of the fire, vehicles and people around the spot, in order to indicate candidate suspects or victims. The coordination is difficult in the forest especially when a fire is in progress. Thus, the aerial images could assist coordination between authorities and first responders by providing more information about forest fires evolvement.

UR#	UC#	Requirement name	Requirement description
UR_209	201,202,203,204	Electronic traffic panels	Display authorities/first responders to display in electronic traffic panels useful information and evacuation instructions in case. In the last year, Valencia Local Police has received a new car fleet which are equipped with led traffic panels that can display messages and useful information such as evacuation instructions and traffic information to citizens.
UR_210	201,202,204	Mobile application	Provide citizens to communicate a fire alert, detected neglects or other risk situations and even send visual data through a mobile application.

UR#	UC#	Requirement name	Requirement description
UR_211	201, 202, 203, 204	Location of personnel involved	Display authorities/first responders to visualize GPS location and/or real time footage of personnel on the incident site. Transmitted to an online map where the coordination centres can follow both the development of the incident and the location and amount of resources. The online map will also provide the possibility of interacting with the police and other agencies involved.
UR_212	201, 202, 204	Traffic warnings	Sending warnings to citizens in order to avoid interferences inside the area.
UR_213	201, 202, 203, 204	Recommendations	Sending recommendations to citizens.
UR_214	203	Warnings	Sending warnings of pre-emergency alerts to citizens by authorities
UR_215	201, 204	Evacuation orders	Ordering evacuations of citizens at risk.

UR#	UC#	Requirement name	Requirement description
UR_216	201, 202, 203, 204	Internal sharing of information	Sharing data (images, videos, geolocation, reports) regarding the forest fire among authorities & first responders
UR_217	201, 202, 203, 204	Twitter analysis and warning	Warning authorities/first responders about Twitter messages concerning the forest fire event.
UR_219	201,202,203,204	Coordination and communication between different resources	Provide communication between authorities and first responders, in order to improve their coordination.
UR_221	201,202,203,204	Geolocalitation of telephone calls	To geolocalize a mobile phone citizen call by sending a request permission message to the citizen, who would accept to be tracked temporarily.
UR_222	201,202	Filter of the emergency messages	Transfer emergency voice messages sent with mobile app by writing (only minor emergencies or only information call). The aim is to save time operator and do not lose emergency calls.
UR_223	201	Automatic selection of the level of emergency	This can be doing only with the operator's supervision. The aim is to save time and do not lost emergency messages sent through mobile app.

UR#	UC#	Requirement name	Requirement description
UR_224	201,202	Automatic translation from a foreigner applicant through mobile app	Make easy the communication between PSAP operator and people with different languages.
UR_225	201,202	Quick search of events and applicants	Data storage, in order to improve indexation of information relative to events and applicants.
UR_226	201,202,204	Video/image analysis	Detect people and vehicles in danger of the received video/images from drone and/or mobile application, and provide these inputs to our PSAP. Furthermore, if drone aerial images/video provide thermal information it can be used for looking over the fire perimeter once it has been extinguished, in order to locate sleeper fire and to avoid possible reproduction.
UR_227	201, 202 203 204	Specific mobile app for first responder and citizen	Provide different versions of the mobile app for citizen and first responders based on their different roles and knowledge.

UR#	UC#	Requirement name	Requirement description
UR228	203	Socio-cultural factors inputs	Provide with data input of socio-cultural factors that might increase the pre-emergency severity levels.

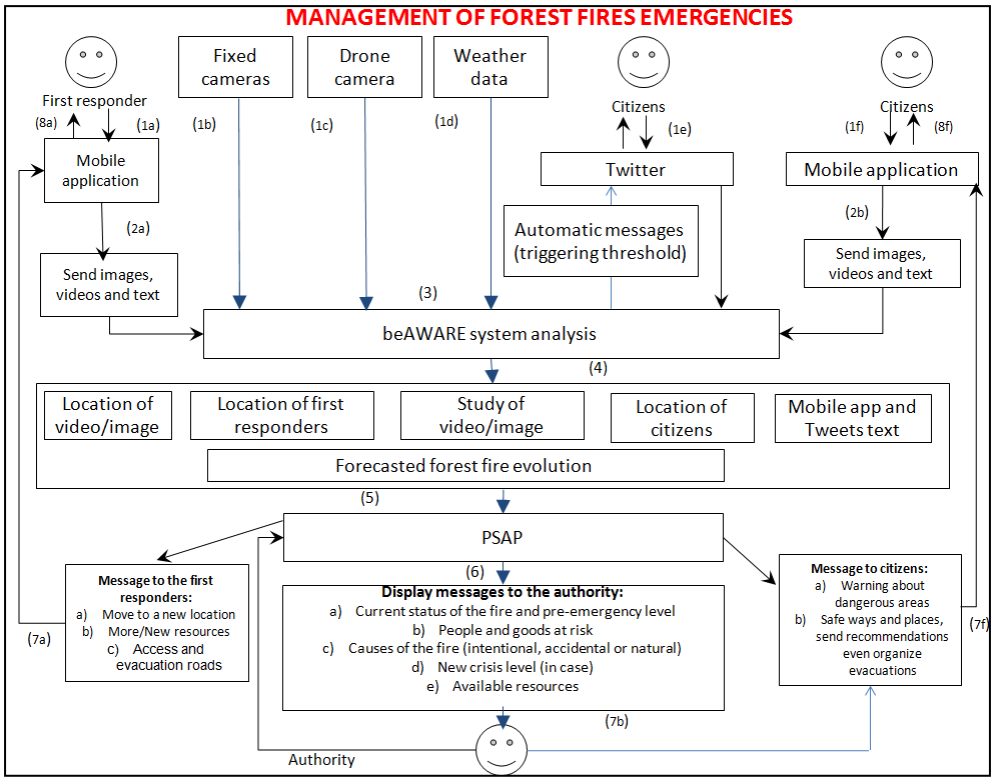
4.2 Description of Fire Scenario Use Case

The following table (Table 9) shows the Use Cases for the fire scenario depending on their maturity. In Green are shown the UCs that will contain technologies fully implemented and in Blue those that will be partially implemented in the second prototype.

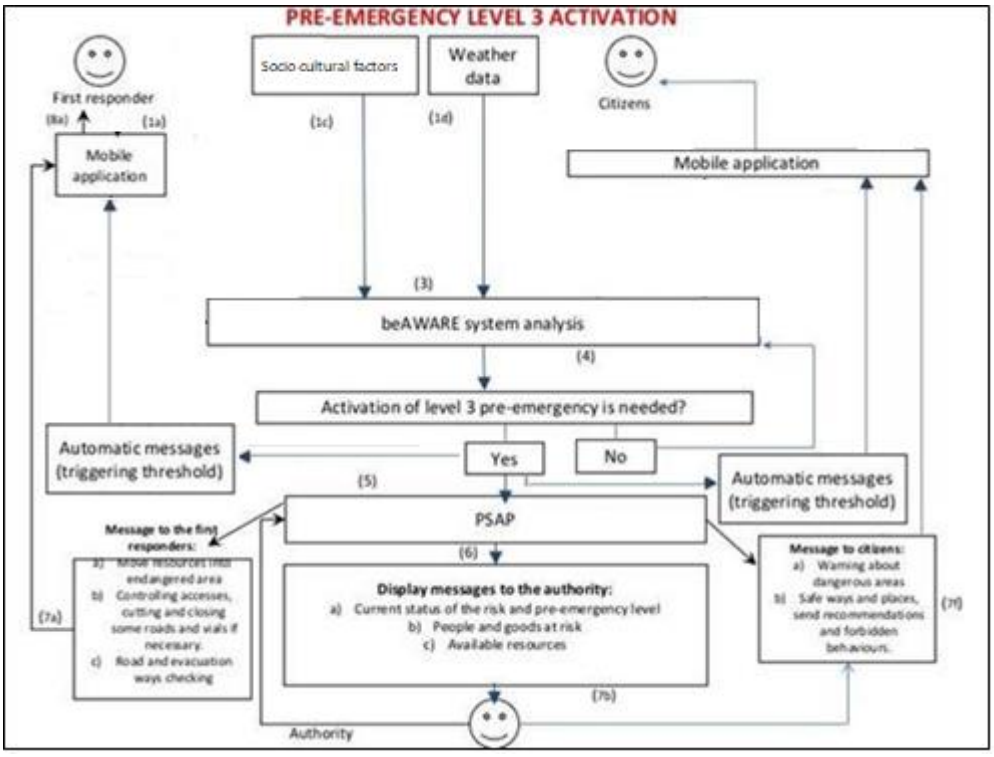
Table 9: Fire scenario Use Cases Modification

USE CASES FIRE
UC_201: Management of forest fires emergencies
UC_202: Activation of first responders
UC_203: Pre-emergency level 3 activation
UC_204: Evacuation management during an emergency

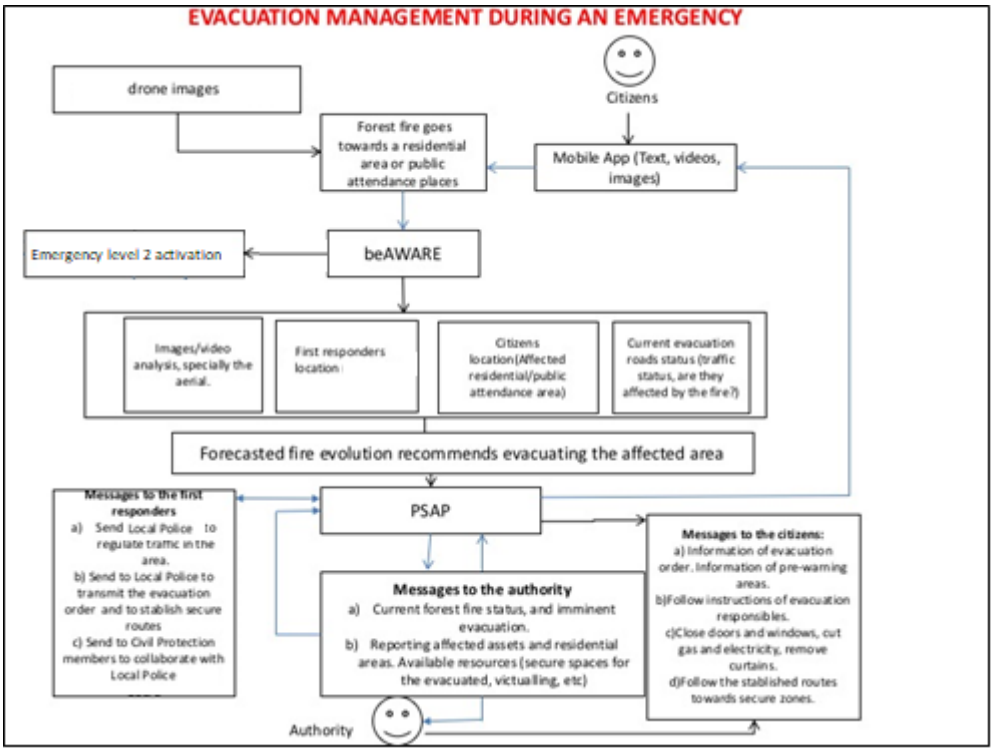
This step of implementation addresses, even partially, all the user requirements that the stakeholders deem to be important. The following block diagrams depict the flow in the UCs that are partially implemented in the second version of the beAWARE platform and the functionality of the system is visually explained..



Block Diagram of the UC201



Block Diagram of the UC203



Block Diagram of the UC204

4.3 Description of Fire Demonstration site

The pilot will consist in the evacuation of two educational centers due to a forest fire set in La Devesa del Saler (Valencia), in the heart of the Natural Park of L´Albufera. It will involve two different areas: the city of Valencia, where the PSAP will be located, and La Devesa del Saler, where the fire will occur.

As it was stated in D2.10, the fire spot will be located close to the centers which will be evacuated, as this image shows:

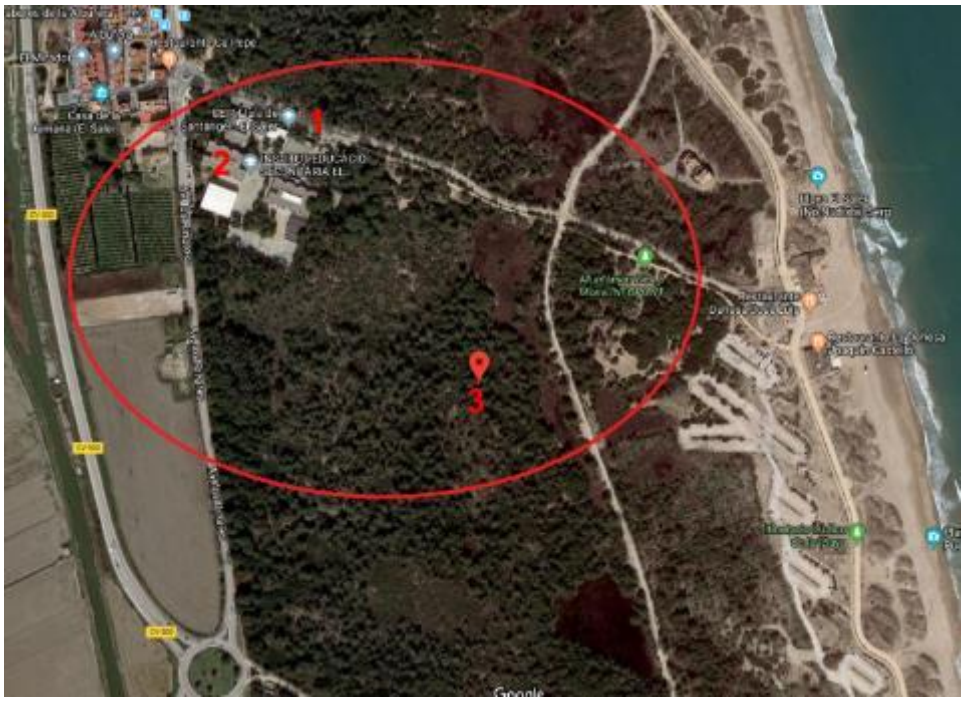


Figure 10. Main area of Fire pilot

1: Primary educational centre 2: Secondary educational centre 3: Fire spot location7

The proposed buildings to be evacuated are the Secondary Education Institute “El Saler” and the Primary School “Luis de Santángel”.

Secondary Education Institute “El Saler” information:

- Location: Avinguda delsPinars, s/n. El Saler (Valencia) 46012
- Coordinates: 39°22'54.1"N 0°19'52.9"W or 39.381700, -0.331362

Primary Education School “Luis de Santángel” information:

- Location: Avinguda delsPinars, s/n. El Saler (Valencia) 46012
- Coordinates: 39°22'56.2"N 0°19'51.3"W or 39.382267, -0.330929

The evacuation management will involve approximately 980 people (880 students and 100 teachers). Among them, there are key figures that develop fundamental roles inside these educational centres in the compulsory evacuation exercises. These are: General coordinator; floor coordinator; responsible of alarm activation; responsible of disconnecting power supplies; responsible of handicapped people and responsible of first aid.

The beAWARE center of command will be located at Valencia Local Police Headquarters inside Valencia urban area, being 16 kilometers (16 minutes by car) from the fire spot. On the other

hand, the fire station is only 3 kilometers (3 minutes by car) away of the fire spot. The following image shows a general view of these places:

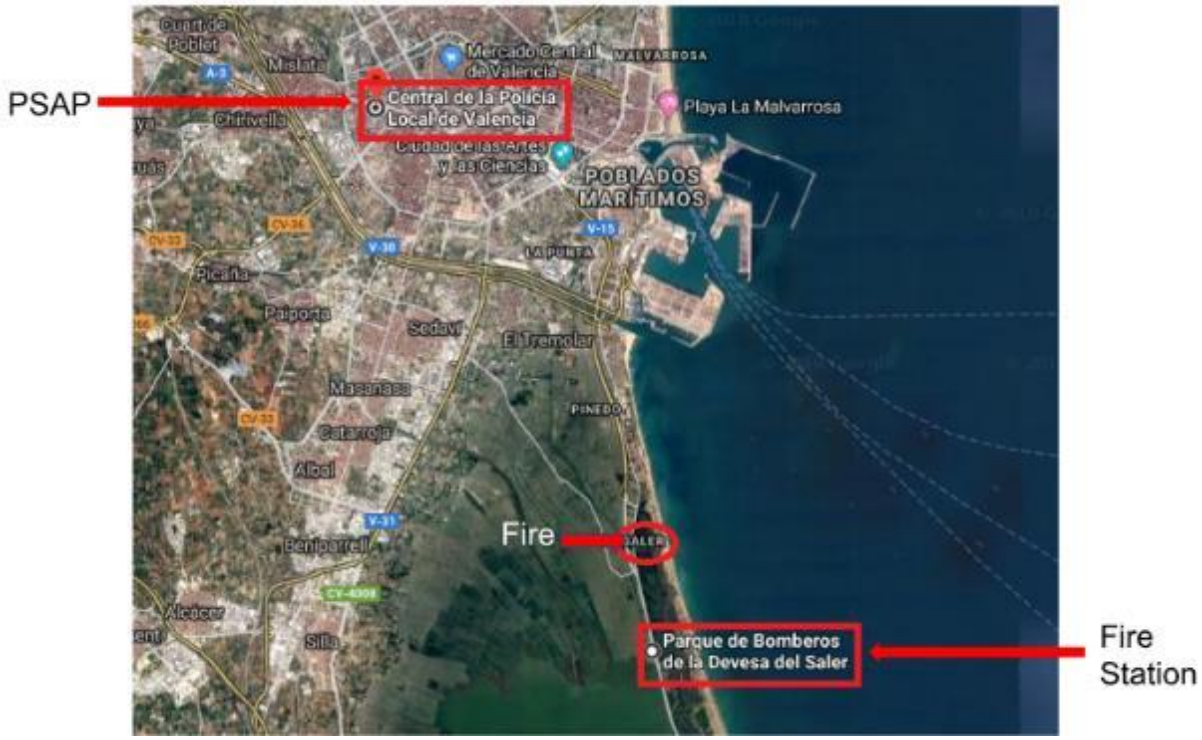


Figure 11. General area of Fire pilot execution

5 Heatwave Scenario

The heatwave pilot took place at Thessaloniki from 19 to 20 of November 2018. As mentioned in the D2.10, due to the maturity stage of the beAWARE platform (P1) at the time of the Heatwave pilot, some beAWARE components were not fully matured. Moreover, some User Requirements were not evaluated due to the fact that their relevant Use Cases were not fully tested at the heatwave pilot. Finally, the experience collected by the execution of the 1st pilot has driven in defining an enhanced and more realistic scenario which investigates in more detail the aspects of a crisis management operation.

5.1 Heatwave Pilot Operational scenario

The updated heatwave pilot storyline is divided into 4 sessions in order to address all updates of the Use Cases and User Requirements in each session. Those sessions are addressed through various actions with the use of the legacy tools on the one hand and the beAWARE platform and mobile application on the other. More specifically the execution of the pilot takes place in two runs; one where all participants (PSAP operators, first responders, and citizens) use only legacy tools such as VHF radio, telephone, e-mail and social media and another where all participants use the beAWARE and mobile application.

The updated scenario that will be used for the heatwave scenario for the second version of the system is presented below:

Initially, in the Pre-Emergency phase, a forecast is received on the PSAP indicating a possible heatwave in the next 3 days. Authorities, inform the public with announcements of the imminent event and set the rescue teams on alert. In the 1st version the crisis classification provided partial representation of discomfort variations in the urban environment. In this 2nd version fire hazard risk maps will be provided. Weather sensing data, together with spatial datasets of probabilistic fire risk, will determine indicators that would be valuable for decision-making. Next, after receiving the indication of the forecasted event, the decision maker assesses the situation and issues a general alert informing the general public about the forthcoming event. First Responders get informed and strategically positioned in critical areas in the city to better assist.

In “Session B – Traffic Jam and Power Outage”, at the day of the heatwave, the temperature starts rising from 39^{o} C, the alert system changes to yellow and all public authorities and other agencies related with the heatwave management is in a state of alert, the relief places open to accept people seeking shelter and a dedicated warning is issued by the beAWARE platform to all its users. Additionally, PSAP is receiving feed from static traffic cameras that provide live video streaming in various part of the city. The reason of collecting such data is because, authorities and PSAP operators, want to have a clearer picture about the situation on the

streets if there is a traffic jam if there are traffic lights that are not working or even if there are people in danger on the streets. As the day passes by, the temperature continues to rise and the first power outages are reported to the PSAP. Many roads are blocked due to heavy traffic and the places of relief are beginning to accept people who are seeking shelter. Moreover, authorities are releasing alerts through the platform. As the incidents are continuously increasing around the city authorities track the position of first responder teams. This gives the ability to the authorities and the PSAP operators to have a local, and a wider view, of the incidents and the position of the first responders who are executing the requested assignments. Due to the fact that there is power outage specific tasks/missions are given to the First Responders. Finally, as one rescue operation is still ongoing, a new incident near this operation reported at PSAP. The operator informs the active rescue team on the field, to dispatch some of its members to assist the person in need.

During “Session C – Places of Relief”, the temperature rises up to 42^{o} C and the alert system rises to red. The traffic lights are off and people are continuously arriving at the places of relief. The capacity of one of them reaches up to 80% and PSAP assigns first responders, which are in the area, to assist the situation in the specific place of relief. As the situation escalates, PSAP informs citizens to head to other places of relief and informs First Responders to direct people to the other ones and not to those that are reaching full capacity. Due to the power outage, elder people cannot use the elevator, as also people with health problems cannot leave the building without specialized assistance. The First Responders address the call from PSAP and assist people, wherever is needed, in order to help them and direct them to the closest relief place.

Finally, at “Session C2 – Fade out”, reports are arriving from the First Responders that the situation in the street is normalized, power as also traffic lights are restored and people return to their homes from the relief places. Nevertheless, the authorities inform the First Responders to stay on alert in order to manage any event that might arise until the complete de-escalation of the phenomenon. A summary report is generated and displayed on the PSAP which includes all incident events from the city over time.

The entire structure, of the heatwave pilot scenario as analyzes above is presented in the table below.

Heatwave Pilot storyline

Description	Legacy tools	beAWARE	Trigger	Expected behavior	Players	Observers - Evaluators	Evaluation
Session A - Pre-crisis GOAL: early warning, understand the problem, send the first alerts							
According to the weather forecast there is an estimate that a severe heatwave is coming in 3 days.	Email, phone call, VHF	Crisis classification -> PSAP o forecast data o highest temperature value o Average value from 4 places	Crisis Classification run	See all the metrics and decide if there is a heatwave or not	3 PSAP operators (these roles will be there the whole time of the pilot in all sessions)	4 PSAP (these roles will be there the whole time of the pilot in all sessions)	
Authorities are issuing a warning informing the general public, public authorities and first responders to be prepared for high	Email, phone call, VHF	Public alert -> mobile app		Send three alerts • Message for public • Message for authorities • Message for first responder	4 end users with app 4 citizens with the app	2 in each team (total 4) 2 in the citizen's group	

temperatures for the next days.							
General instructions are given to the general public through the press, social media and public releases.	Email, phone call, VHF	Public alert->mobile app		More specific instructions based on location and age group are given through the beAWARE mobile app base on age location	4 end users with app 4 citizens with the app	2 in each team (total 4) 2 in the citizens group	
A risk assessment regarding a forest fire which occurs after a heatwave is provided	*Email, phone call*	*Crisis classification -> PSAP* *o forecast data* *o highest temperature value* *Average value from 4 places*		*More specific and detailed information and data will be analyzed and the PSAP based on those will take actions (eg inform Rescue Teams, Authorities etc)*	*3 PSAP operators*	*2 observers with them*	
Session B - Traffic Jam **GOAL: understand the status of the heatwave, the problem of the electrical supply and the streets that are blocked**							
The day of the heatwave starts with 39°Cat 11.00 AM. The alert system changes to yellow. All	no extra information	Crisis classification -> PSAP o forecast data o highest temperature value o Average value from 4 places	Crisis Classfication run	See all the metrics and decide if there is a heatwave or not	3 PSAP operators (these roles will be there the whole time of the	4 PSAP (these roles will be there the whole time of the pilot in all sessions)	

public authorities agencies related with the heatwave are in a state of alert.					pilot in all sessions)		
The day of the heatwave starts with 39°Cat 11.00 AM. The alert system changes to yellow. All public authorities, agencies related with the heatwave are in a state of alert, and a dedicated warning is issued by the beAWARE platform to all its users.	Email, phone call, VHF	Public alert->mobile app		All public authorities agencies related with the heatwave are in a state of alert, and a dedicated warning is issued by the beAWARE platform to all its users.	2 end users with app 2 citizens with the app	2 in each team (total 4) 2 in the citizens group	
At 12.30 PM the temperature rises to 42°C. Due to the extreme temperatures	Call	Mob app, text report	inform them about the black out	End user send a report	2x(2 end users in the field)	2 observers with them	

and extensive AC use, the electrical supply system is overcharged and there is a power outage.							
	Email, phone call, VHF	Public alert->mobile app		The alert system changes to orange. The first responders are notified on the first cases that need to intervene through the platform and VHF	4 end users with app	2 in each team (total 4)	
Due to the power cut, the roads are blocked with heavy traffic. The places of relief are beginning to accept people who are seeking shelter there.	Email, phone call, VHF	Public alert->mobile app	inform the authority the places of relief are open	Public is advised with updated instructions through the beAWARE mobile app and guided to the nearest place of relief.	4 citizens with the app	2 in the citizens group	
• At 14.30 the temperatures rises further to 45°C. The alert system is upgraded to red. The	Email, phone call, VHF						

authorities issue a warning through press releases, mass media and through posts on social media accounts.							
	Email, phone call, VHF	mob app report 4 images 4 videos from the street	inform them when to send the reports (every 5 minutes)	report about the traffic	2 end users in the field	2 observers with them	
	Email, phone call, VHF	Public alert->mobile app	inform the authority the places of relief are open	Due to the power cut, the roads are blocked with heavy traffic. The places of relief are beginning to accept people who are seeking shelter there. The platform notifies the public of the nearest available location.	4 citizens with the app	2 in the citizens group	
Authorities track the movements of first responder teams in all the municipality and provide the ability to	*Email, phone call, VHF*	*mobile app*	inform the authorities with the position of the rescuers	*Map of rescue teams and task evaluation*	*2 rescuers with the mobile app*	*1 observer with them*	

evaluate in real time the execution of the assigned tasks with a global visualization of the activities performed							
Give specific evacuation orders to First Responders of people trapped inside a building/elevator etc	*Email, phone call, VHF*	*mobile app*	inform the rescuers after a call or at tweet that a person asks for help	specific instructions are sent through the beAWARE mobile app to the rescuers to rescue people in danger	*2 rescuers with the mobile app*	*1 observer with rescuers*	
Another incident occurs near the first one and PSAP send part of the active team in the area to deal with the new incident	*Email, phone call, VHF*	*mobile app*	*new incident from phone call, tweet which is near the active team on the field*	specific instructions are sent through the beAWARE mobile app to the rescuers to assist in the new danger	*2 rescuers with the mobile app*	*1 observer with rescuers*	
Session C - Place of relief							
At 14.30 the temperatures rises further to 45°C. The alert system is	Email, phone call, VHF	Public alert->mobile app		The public is advised through the beAWARE platform and mobile app to stay at home, in cool			

upgraded to red.				areas or seek shelter to air-conditioned places.			
			The call centers of public authorities are receiving numerous calls of elderly with health people who are stuck in their houses without AC and elevator, and require immediate attention.				
All the main roads are blocked due to the jam and lack of traffic lights.							
Some of shelters are beginning to arrive to the critical 80% of capacity and specific		social media	live tweets				

Some of shelters are beginning to arrive to the critical 80% of capacity and specific		social media	dataset				
Some of shelters are beginning to arrive to the critical 80% of capacity and specific	Email, phone call, VHF	Mob-app		Reports from shelters with images and videos			
Assign task to first responder to go from one relief place to another to help the situation	*Email, phone call, VHF*	*mobile app*	*Second place of relief, needs assist, request from mobile app*	specific instructions are sent through the beAWARE mobile app to the rescuer to go from one relief place to the other	*1 rescuer with the mobile app*	*1 observer with the rescuer*	
specific instructions are sent through the beAWARE mobile app to the public to show which relief place is still open and easier to access	Email, phone call, VHF	Public alert->mobile app		specific instructions are sent through the beAWARE mobile app to the public to show which relief place is still open and easier to access			

Give specific evacuation orders to First Responders	*Email, phone call, VHF*	*mobile app*	*After an incident evacuation orders are given from mobile app to the rescuers for a specific place of relief*	specific instructions are sent through the beAWARE mobile app to the rescuers to evacuate the relief place.	*3 rescuers with the mobile app, 10 citizens*	*2 observer with rescuers*	
Session C(2) - fade out							
Report from the team in the field	Email, phone call, VHF	Public alert->mobile app		Using the analysis with media from traffic of the platform and by notifying the general public to avoid taking cars, the traffic is progressively decreasing in the road and by 16.00 the roads are clearer. The temperature for the first time drops to 43°C.			

Gradually, the phenomenon is managed, the temperature drops below 36 °C, power is restored and people return to their homes from the shelters. Nevertheless, to the weather forecast for the next days, authorities are on alert to manage any event that might rise during the duration of the phenomenon.	Email OR phone call OR VHF	Crisis classification -> PSAP o forecast data o highest temperature value o Average value from 4 places	Crisis Classfication run				

5.2 Heatwave Pilot Use Case User Requirements

The following table (Table 10) shows the User requirements for the heatwave scenario depending on their maturity. In Green are shown the URs that are fully supported by P2, in Blue those that will are partially supported in the second prototype and in orange those that will be supported in the final version.

Table 10: User Requirement for the 2nd Prototype

UR#	UC#	Requirement name	Requirement description
UR_301	301, 302, 305, 306	Real time weather forecast	Provide the authorities with real time weather forecast in relation to the progression of the heatwave phenomenon
UR_302	301	Automatic warning	beAWARE system to generate and provide the authorities with an automatic warning when an imminent heatwave phenomenon is forecasted
UR_303	302	Risk assessment for a forest fire	Provide the authorities with a risk assessment regarding the probability of a forest fire to occur during or in the upcoming period after a heatwave. The relevant authorities will have an assessment of a fire risk based on the weather forecast during a heatwave and especially during the following days
UR_304	301, 302, 303, 305	Heatwave intensity	Provide the authorities with a risk assessment regarding the intensity of the upcoming and/or ongoing phenomenon in the city. Provide an estimation of the heatwave impact on the population by assess the Discomfort Index.

UR#	UC#	Requirement name	Requirement description
UR_305	303, 304, 305	Possible locations for incidents	Display to the authorities, visual information about possible locations in the city (or outside the city) where a situation is more likely to develop that will require rescue team intervention (for example, based on past experience, traffic jam and/or accidents will be more likely to occur at a main street intersection/ public park/ entrance to hospitals or banks… etc.). In such cases a decision might be made to send rescue teams in advance to shorten response time if/when an incident occurs
UR_306	301, 302, 303, 305, 306	Number of people affected	Provide the authorities an estimation of the people that might be affected from the phenomenon and in which areas. Also, the assessment of the Discomfort Index of the upcoming and/or ongoing heatwave extreme event is provided.
UR_307	306	Power needs	Provide the authorities an estimation on the power needs during a heatwave based on its foreseen progression
UR_308	303, 306	Infrastructure overload	Provide the authorities an estimation of damage/overload to the city's infrastructure (phone lines, electricity, water, etc)
UR_309	303	False Alarms	Provide to the authorities a procedure to confirm necessity of rescue teams so they are not sent needlessly to one place instead of somewhere else where they are needed more urgently, therefore the ability to handle false alarms.

UR#	UC#	Requirement name	Requirement description
UR_310	303, 304, 305	City-wide overview of the event	Provide the authorities to have a city-wide overview of the event – allow decision making authorities an overall view of all incidents handled at any point in time/ see where all rescue teams are located in real-time to allow them to make informed decisions regarding who to send where etc.
UR_311	301, 302, 303, 304, 305, 306	Information Storage	Provide the authorities, with access to all historical information by providing storage for all information for future lessons-learned purposes, so that after the heat wave situation is over, decision making authorities can review the information gathered and handled during the event, and set-up better procedures to handle future events more efficiently
UR_312	301, 304, 305, 306	Warning citizens	Provide to citizens warnings through the beAWARE app, of an imminent heatwave and a list of proactive measures and how to reduce its effects
UR_313	303	First responders status	Provide to the authorities the current status and location of all first responders when they are performing their tasks
UR_314	303	Assign tasks to first responders	Allow authorities to assign additional tasks to those first responders who are available or even instruct those who are able to assist other responders
UR_315	303, 304	Traffic Status	Facilitate the authorities by providing monitoring capabilities of the current traffic situation from installed surveillance (static) cameras, so that they can decide where to direct the first responders or inform them which roots to avoid.

UR#	UC#	Requirement name	Requirement description
UR_316	305	Capacity of relief places	Provide to the authorities the current state of the available capacity of all relief places that are available to the public. The assessment is performed by the analysis of the video from static or mobile camera.
UR_317	303, 304, 306	Areas with power outage	Display to the authorities the areas where there is a power outage
UR_318	303, 306	Trapped citizens	Allow authorities to know if there are people trapped (e.g. in an elevator) and display where
UR_319	303, 306	Trapped elders at home	Allow authorities to know if there are elder people trapped in houses without an A/C and display where
UR_320	303, 306	Hospital availability	Show to the authorities the current availability of the hospitals
UR_321	301, 306	Affected area	Provide to the authorities an assessment for the forecasted or the observed Crisis Level which indicates the impact of heatwave crisis event in the region of interest
UR_322	304, 305	Information for incident status from Social Media	Provide to the authorities, information regarding potential risks in case there is a situation inside the city (eg car accident, etc.) gathered from social media
UR_323	305, 306	Information for Hospital Status from Social Media	Provide to the authorities, information regarding overcrowded hospitals and places offered to the public with a/c, gathered from social media
UR_324	304	Information for existing situation in the Social Media	Provide to the authorities, information regarding existing traffic conditions all over the city grid gathered from social media
UR_325	305	Suggested places for relief	Provide citizens with information regarding the suggested places for relief through an app.

UR#	UC#	Requirement name	Requirement description
UR_326	301, 302, 303, 304, 305, 306	Type of visualization	Display to the authorities/citizens all the information in a web-gis platform
UR_327	304, 305, 306	Send emergency reports	Allow citizens to send text, images and video messages from their mobile phone (for the different operative systems) and from their social media account to the authority
UR_328	303, 304	Send task reports	Allow First Responders to send reports about their assignments from their mobile phone to local authorities
UR_329	304, 305	Visualize video cameras	Display streamed video from video cameras to the authorities/citizens
UR_330	303, 304, 305, 306	Localize video and images	Provide authorities with the ability to localize videos and images sent by citizens from their mobile phones
UR_331	303	Localize task status	Provide authorities with the ability to detect the location of first responders
UR_332	304, 305, 306	Localize tweets	Provide authorities with the ability to localize Twitter messages
UR_333	304, 305, 306	Localize calls	Provide authorities with the ability to localize voice messages sent with mobile app by writing to an emergency number concerning citizens who are trapped. The aim is to save time operator and do not lose emergency calls
UR_334	303	Manage assignments in case of new emergencies	Provide authorities with the ability to manage first responder assignments
UR_335	303	Map of rescue teams and task evaluation	Display to authorities the movements of first responder teams in all the municipality and provide the ability to evaluate in real time the execution of the assigned tasks with a global visualization of the activities performed
UR_336	304	Traffic warnings	Provide authorities with the ability to send warnings to citizens in order to avoid a certain area that is jammed with traffic

UR#	UC#	Requirement name	Requirement description
UR_337	303	Location of vehicles and personnel involved	Allow authorities/first responders to visualize GPS location and/or real time footage of vehicles and personnel on the incident site. Transmitted to an online map where the coordination centres can follow both the development of the incident, and the location and amount of resources. The online map will also provide the possibility of interacting with the police and other agencies involved
UR_338	304, 305, 306	Warnings	Allow authorities to send warnings of pre-emergency alerts to citizens.
UR_339	303	Evacuation orders	Allow authorities to order evacuations of citizens at risk.
UR_340	303, 304, 305, 306	Internal sharing of information	Allow authorities and first responders to share data (images, videos, geolocation, reports)
UR_341	304, 305, 306	Twitter analysis and warning	Allow authorities/first responders to be warned by Twitter messages concerning traffic jam, availability of places of relief, potential hazards or people in danger
UR_342	303, 304, 305, 306	Coordination and communication between different resources	Provide communication between authorities and first responders, in order to improve their coordination

5.3 Description of Heatwave Scenario Use Case

The following table shows the Use Cases for the heatwave scenario depending on their maturity. In Green are shown the UCs that will contain technologies fully implemented and in Blue those that will be partially implemented in the second prototype. The partial implementation is explained by the maturity level of the User Requirements as also the development of the platform and its components. The Use Cases will be fully satisfied in the in the next and final iteration of the development cycle.

Table 11. Tested Use Cases Heatwave pilot

USE CASES HEATWAVE
UC_301: Heatwave forecasting alert
UC_302: Heatwave fire risk assessment
UC_303: First Responder Management
UC_304: Management of traffic emergencies
UC_305: Management of Places for relief
UC_306: Response to Power Outage

The UC_302 Heatwave fire risk assessment will be implemented at the Pre-emergency phase, whereas the UC_303, UC_304, UC_305, UC_306 will be implemented at the Emergency phase. Based on D2.1 Use Cases Block Diagrams, some of the updates are presented.

UC_302: Heatwave fire risk assessment

As stated in D2.1 this Use Case concerns the calculation of risk for a forest fire to start as a result of a heatwave, based on the forecasted weather conditions during and after the period of the heatwave.

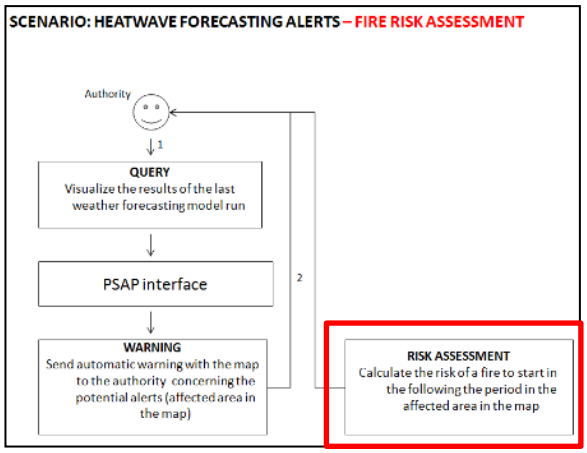


Figure 12. UC_302 Block Diagram

For the updated heatwave scenario, because of the continuous development of the beAWARE platform, the PSAP collects the weather data and with the help of the Crisis Classification component gives the PSAP operators and the authorities the ability to have not only the heatwave prediction but also to have a visualized fire risk assessment at the dashboard of the platform.

UC_303: First Responder Management

In this Use Case, the beAWARE platform will give the ability to the PSAP to track the position of the First Responders on the field.

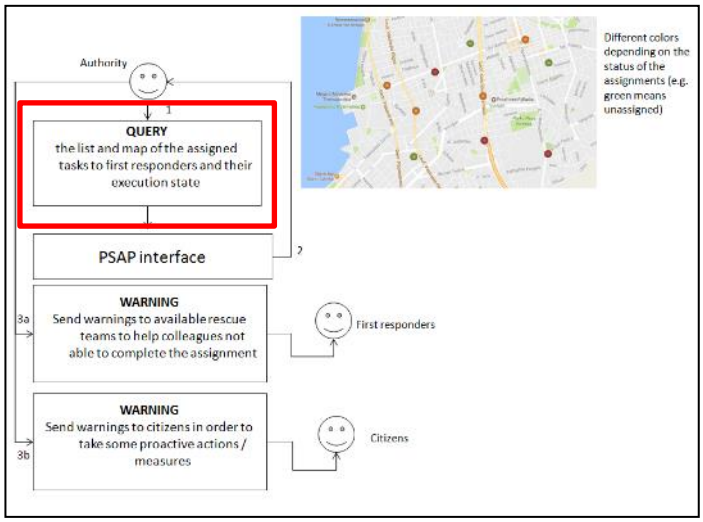


Figure 13. UC_303 Block Diagram

During the heatwave pilot, in Thessaloniki, and because of the maturity level of the platform, this was not able to be demonstrated. In the second pilot as also in future simulated exercises the position of the First Responders, can be shown on the map and thanks to that ability, the PSAP can send more dedicated tasks/commands to be executed based on the active operation in the area.

UC_304: Management of traffic emergencies

This Use Case concerns the monitoring of traffic jam situations in order to support a more efficient deployment of the first responders.

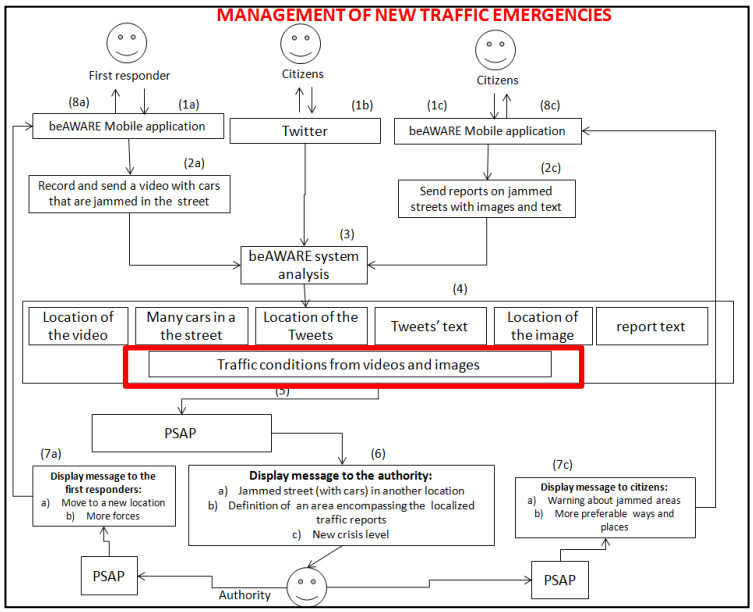


Figure 14. UC_304 Block Diagram

The ability to take data from traffic cameras and analyse them was not able to be demonstrated during the first pilot in Thessaloniki. At the second pilot this functionality will be tested in order PSAP and authorities to have a more accurate image on the streets, monitor the situation and assign tasks to First Responders based on the needs of each incident.

5.4 Description of Heatwave Demonstration site

The map from the execution of the heatwave pilot is presented in D2.10. The following ones, are created based on the updates of the Use Cases, the updated storyline, and the maturity level of the beAWARE platform and will be used in the second pilot and/or in simulated exercises.

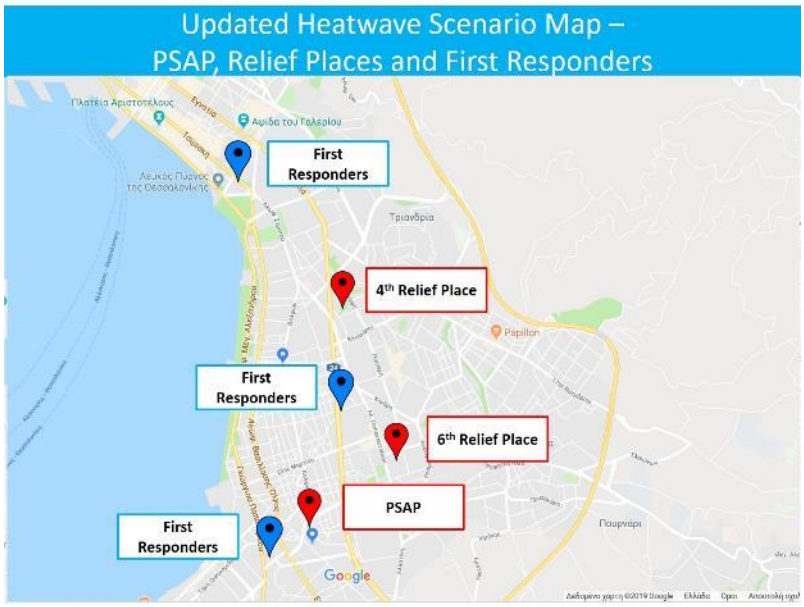


Figure 15. Updated Map with First Responder positions

Based on the updated storyline and Use Cases, the beAWARE platform will be able to visualize the position of the First Responders. This visualisation will give the ability to the authorities and the PSAP to better distribute all available resources to tackle with the heatwave phenomenon.

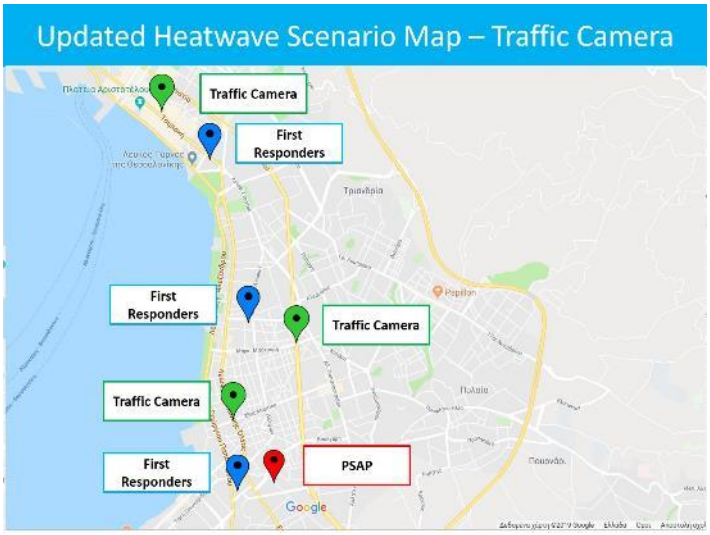


Figure 16. Updated Map with Traffic Camera positions

During the Emergency Phase, the PSAP will have the ability to monitor the situation on the streets thanks to the traffic camera. Additionally, PSAP will develop the First Responders and can track their position across the city. Based on those data, PSAP will distribute the available forces based on the requested assistances from citizens.

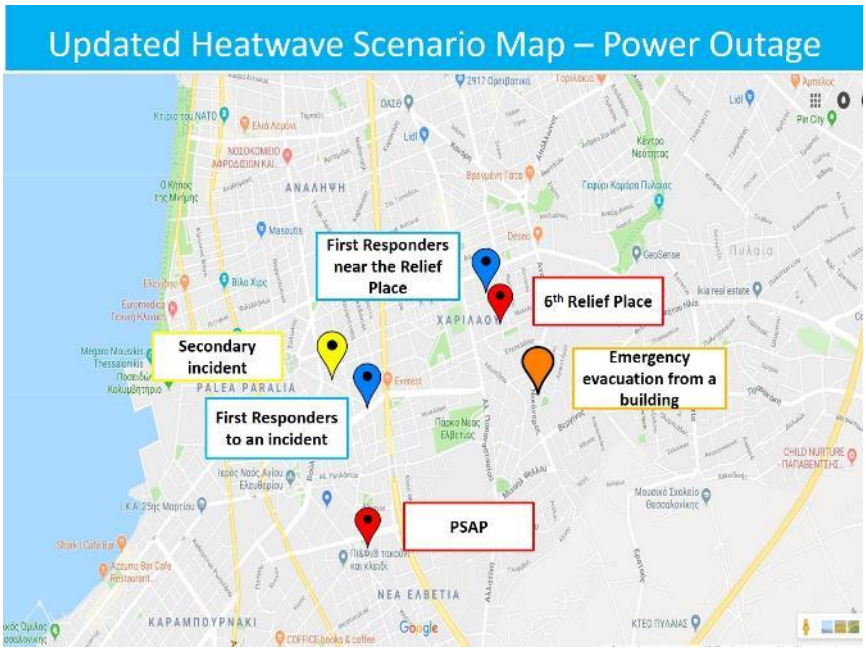


Figure 17. Updated Map with Power Outage and incidents positions

In the above map, the updated power outage scenario is presented. As described and in the above sub-sections, during the Emergency phase, First Responders who are near a relief place are assigned, by PSAP, to evacuate a building with people that are seeking cooling place and others that request more specialized help. Additionally, another First Responder team who are involved in an incident receives information from PSAP to dispatch a part of its team and address a near citizen help.

To summarize from above, the updated storyline, Use Cases and maps are based on the continuation of the development of the beAWARE platform. The development of the platform will give the ability to test more functionalities and address more end users Requirements and help them be more sufficient in their job.

6 Pilots Evaluation

The evaluation of the 2nd prototype will follow a similar approach to the one for the 1st prototype; therefore, it will be based on the following three key points:

- **Observers sheets**: these sheets will be used to collect feedback and notes taken by the 'observers' in each of the six sessions. Every observer was assigned to a specific type of 'actor' (i.e. there were some observers in the control room, others followed the first responder teams, etc.) with the aim to take note of every performed task, its timing and occurred problems. The observers will be also advised to note any useful comment about the interaction of the 'players' with the beAWARE technology.
- **Questionnaires:** created according to the criteria expressed in the D2.2 these questionnaires will be sent by email to all the 'observers' and 'players' after the pilot.
- **Debriefing session:** a specific debriefing session for all the participants (both actors and observers) will take place after the pilot, in order to collect feedback and suggestion from each participant.

According to the result of the 1st prototype evaluation, described in the D2.4, the questionnaires that will be prepared for the P2 pilot will have a similar structure than the one used for the P1 pilot, since they provided very useful information in that occasion. Therefore, the questionnaires will require from the participants some personal information (i.e. age, gender, professional background etc..). Additionally, they will provide a series of questions about how the 'observers' and 'players' evaluate the pilot organization and structure, the easiness to perform specific task with and without beAWARE; there will also questions about the rating of specific functionalities of the system and the clearness of the provided instructions.

The questionnaires will be provided in both user's language and in English (for the observers chosen inside the beAWARE consortium).

About the observation form, the evaluation of the 1st prototype highlighted that it had been difficult for the observers to take notice of all the action performed and about their time, since most of them were performed in rapid succession. For that reason, the form will be slightly revised.

First of all, the new forms will provide a list of the main expected actions to be performed during each session to facilitate observers in following the script. This list of action will be basically the same reported in the time tables in the previous chapters of this deliverable, conveniently divided between the various sessions and roles. More specifically, there will be provided different observation forms with respect to the different user roles to be observed.

For each of the planned action that will be listed in the form, the observer should then indicate

- If the action was successfully performed, if the action was partially performed noting the potential problems the users encountered or if no action is taken at all (i.e. by a cross in one of these three different boxes)
- An estimation of the timing, if is applicable or if the user is able to provide it;
- Additional notes or comments related to the action taken.

Similarly to the questionnaires, the observation forms will be provided both in English and observer's language.

Moreover, since the most of the interaction between participants during the pilot is expected to be in native language, adequate support and translation is foreseen to be provided for the non- native observers.

7 Conclusions

In this Deliverable an updated overall approach for the 2nd prototype has been made in a way to reflect a user-centred design process. This approach is based on the requirements set for the 1st prototype as well as on the experience gained from the beAWARE development since then.

The deliverable describes the updated user requirements based on the Use Cases scenarios and stakeholders' distinct expectations in order to enhance the capabilities of the platform. The user requirements incorporate the prior user experience elicited by the execution of the P1, with the aid of questionnaires, interviews, hot and cold debriefs. The user requirements in this deliverable provide valuable input to "D7.5 Integrated beAWARE platform 2nd version" for specifying the set of functionalities of the P2 version of the beAWARE platform.

The use case scenarios and the user requirements will be further elaborated and extended in the subsequent phases of the project. All the advantages and disadvantages that will be recorded thanks to the iterative and incremental approach will guide the consortium to minimize the identified gaps as well as to take corrective actions and to ensure that the users' requirements will be satisfactorily fulfilled.

8 References

beAWARE Deliverables:

- D2.1 – User cases and initial user requirements
- D2.2 – Evaluation methodology
- D2.3 – Pilot use cases setup for the 1st prototype
- D2.4 – Evaluation report of the 1st prototype
- D2.10 – Final use cases and requirements
- Acoustic warning system: they warn the population of the central areas (**http://www.comune.vicenza.it/uffici/dipterr/infrastruttureeverdepubblico/protcivile/sirenediallarme.php);**